Tree Species Selection for Green Infrastructure

Issue EN 1.4/2025

A Guide for Specifiers

Written by:
Dr Andrew Hirons and Dr Henrik Sjöman

Trees & Design Action Group

Primary Project Funder

NERC SCIENCE OF THE ENVIRONMENT

Academic Partners

Lancaster University

University Centre Myerscough

SLU

Guidance Sponsors

Arboricultural Association trees.org.uk

HTA

Royal Horticultural Society
Sharing the best in Gardening

Authors and Acknowledgements

Navigation
Contents page
The Tree Profiles

Andrew D. Hirons is a Senior Lecturer at University Centre Myerscough. He teaches on the full-time and online courses in Arboriculture and Urban Forestry, specialising in tree biology and arboricultural practices. Andrew is passionate about translating science into practice and, with this in mind, his current research activity focuses on the use of plant traits to inform species selection for urban environments and enhance the resilience of our urban forest.



Henrik Sjöman is a Senior Researcher at the Swedish University of Agricultural Sciences and Scientific Curator at Gothenburg Botanical Garden. His work mainly focuses on developing knowledge of site-adapted plant use for urban environments; how species' adaptations modify tree performance and the delivery of ecosystem services. Working extensively with landscape architects and practices in the landscape industry, the prime focus of Henrik Sjöman's work has become to expand the knowledge of how to diversify the urban treescape.



Acknowledgements
Without funding, the charity Trees & Design Action Group, would be unable to realise its vision for developing and disseminating guidance aimed at securing a resilient population of trees in our towns and cities. Huge gratitude is, therefore, extended to the Natural Environment Research Council who provided funding for our project Tree Selection for Green Infrastructure through the Green Infrastructure Innovation Project (NE/N017773/1). Additionally, the Arboricultural Association, Horticultural Trade Association and the Royal Horticultural Society provided funds to help secure the delivery of this digital guidance document. Thank you all, this would not have been possible without your financial assistance.

We would like to gratefully acknowledge Hossein Arshadi, Jessica Beattie, Ian Dodd, David Elphinstone, James Hitchmough, Tony Kirkham, Jamie Puértolas, Keith Sacre and Al Smith for sitting on the focus group in the formative stages of this project. Your insightful guidance and helpful discussion was much appreciated.

A number of people and organisations have given permission for their photos to be used, have assisted with the development of figures or with data collection. Barcham Trees, Tim Baxter, Caerhays Estate, Ryan Charnock, Hervé Cochard, GreenBlue Urban, Hillier Nurseries, Linda Hirons, Kevin Martin, Frank J. Schmidt & Son Co., Duncan Slater, Harry Watkins and Charles Williams: thank you for your generosity.

The dissemination seminars for this project, held in London and Birmingham, would not have been possible without the organisational assistance provided by Emma Ferranti and Sue James. Furthermore, the speakers: Tijana Blanusa, Dominic Eyre, Leigh Hunt, Anne Jaluzot, Tony Kirkham (Chair), Charles Lane, Rob MacKenzie and Alister Scott (Chair) greatly enriched the day for all attendees.

A number of people spent time considering, revising and improving draft versions of this document. We are particularly indebted to Jessica Beattie, David Elphinstone, Nick Hewitt, Ruth Hirons, Anne Jaluzot, Sue James, Keith Sacre and Alison Smith for the time they committed to enhancing this document.

Our graphic designer, Steve Parker of Reduction, deserves tremendous credit for the production of such a high quality document. His experience, expertise, patience and professionalism has enhanced this collaboration beyond measure. We really could not have done it without you.

Finally, to our wives, Ruth (ADH) and Johanna (HS), who have all too often shouldered additional family responsibilities because of our work commitments; thank you. Undoubtedly, we could not have written this without your love and support.

Suggested citation:
Hirons, A.D. and Sjöman, H. (2019) *Tree Species Selection for Green Infrastructure: A Guide for Specifiers*, Issue 1.4. Trees & Design Action Group.

Copyright: Trees and Design Action Group Trust.

ISBN: 978-0-9928686-4-2

Contents: Use the various hyperlinked › symbols to efficiently navigate the document and go directly to your chosen page

Navigation
‹ Contents page
› The Tree Profiles

The aim of this guide is to enable you to select appropriate trees for your planting scheme. By doing so, you will enhance the benefits bestowed on our communities by trees, help enrich our shared landscape and create a more sustainable urban forest for future generations.

A series of chapters provide a commentary on the interpretation of this guide and tree species selection for green infrastructure. Specific information on over 280 trees is included in the *Tree Profiles* and a *Tree Selector* tool helps you identify candidate trees by a range of criteria.

Introduction

Authors and Acknowledgements ›

Foreword ›

Chapter 1: Interpreting this guidance ›

Chapter 2: The principles of tree selection for green infrastructure ›

Chapter 3: Enhancing ecosystem services of green infrastructure through tree selection ›

The Tree Profiles

Key to Profiles ›

Alphabetical Index ›

The Profiles: ›

Tree Selector: ›

– Use potential ›

– Mature size ›

– Crown form ›

– Crown density ›

– Environmental tolerance ›

– Ornamental qualities ›

Bibliography ›

Revisions Log ›

Foreword

The act of planting a tree is a huge investment. It is often celebrated as an inherently generous act as most of the benefits the tree provides will be endowed on subsequent generations, not the person who planted it. Of course, this is very true, but the gift of planting a tree is completely worthless unless the tree successfully establishes and thrives within the landscape. Our future treescapes are not determined by the number of trees planted but by those that have established, reached independence and have a bright, sustainable future for all to enjoy.

One of the great joys of trees in our parks, gardens and landscapes is their diversity and the many aesthetic attributes that they provide us with, including flowers, fruit, bark colour, and leaf shape and colour. For those with a passion for trees, this is an endless source of intrigue and fascination. It has certainly been a great source of pleasure and satisfaction for me to celebrate the diversity of trees by planting many different species in the arboretum and gardens at the Royal Botanic Gardens, Kew, as well as being the custodian of the trees planted by my predecessors. For those planning our future landscape, tree selection is one of the most important aspects of landscape design, arboriculture or horticulture; if we get it wrong we have failed in our duties. The diversity of tree species represents an opportunity to plant the right tree in the right location, giving it the best chance of a sustainable future, thereby creating resilience within the tree population to climate change and the introduction of exotic pests and pathogens. The challenge, therefore, is to understand how this diversity, expressed by trees, can lead to more appropriate tree selection decisions for our gardens, towns and cities.

In light of all this, I was extremely pleased to learn that NERC were supporting a green infrastructure Innovation Project, focussing on tree selection for our urban environment. Historically, too many selection decisions have been made on the basis of simple aesthetics or on superficial, contradictory reference information. Therefore, the approach that Andrew Hirons and Henrik Sjöman have of using science to underpin guidance represents a significant step forward in the quality of information available to those specifying trees. *Tree Species Selection for Green Infrastructure: A Guide for Specifiers* collates a wide range of information and presents it in an accessible way. I am sure that this guide will be a valuable asset to many who have the vision to plant trees.

Tony Kirkham
Former Head of Arboretum, Gardens and Horticultural Services, Royal Botanic Gardens, Kew and Patron of the Trees and Design Action Group



Exemplar species: There are a number of useful *Ulmus* cultivars that are resistant to Dutch elm disease. The upright varieties can be particularly valuable for street plantings, as shown here.

Navigation
Contents page
The Tree Profiles



© Andrew Hirons

Tree Selection for Green Infrastructure: A Guide for Specifiers complements the series of Trees and Design Action Group (TDAG) guidance focusing on the delivery of sustainable treescapes in and around our towns and cities.

It emphasises the need to acknowledge the natural heritage of a tree to ensure that the chosen species is capable of thriving on the planting site. Over 280 individual tree profiles are supported with explanatory guidance to help ensure that appropriate species are planted in our shared public spaces.

Audience

This guide is written for anyone with an interest in specifying trees for green infrastructure. This is likely to include: arboriculturists; architects; civil and structural engineers; designers; landscape architects; landscape contractors; non-profit organisations; planners and tree officers.

Aims and context

Previous TDAG guidance *Trees in the Townscape* established 12 principles of urban forestry good practice at the policy level. *Trees in Hard Landscapes* evaluated practical challenges and solutions for integrating trees into streets, civic spaces and other paved areas (such as car parks). It emphasised the requirement for collaboration between key stakeholders, identified key design choices, promoted some technical solutions and provided a framework for procuring appropriate trees.

Tree Selection for Green Infrastructure provides more extensive guidance on selecting appropriate species for a range of contrasting planting scenarios. As well as providing advice on the general approach to species selection, it includes information for over 280 species on their use-potential, size and crown characteristics, natural habitat, environmental tolerance, ornamental qualities, potential issues to be aware of, and notable varieties.

The overall aim of this guide it to provide, clear, robust information to specifiers to enable appropriate species selection and aid the diversification of the urban forest.

Limitations

Tree Selection for Green Infrastructure: A Guide for Specifiers is, by its very nature, a guide. Its primary focus is on assisting those making tree species selection decisions for green infrastructure projects in the British Isles. It provides information on species that are available from British Isles based tree nurseries at a stock size that is suitable for planting into green infrastructure planting schemes. Typically, this means that the species are required to be available at 'standard' stock sizes[1] and above. It does not, therefore, contain the many species that might be available at much smaller sizes for the domestic market.

Changes in demand for trees for planting and urban greening schemes, both in the UK and continental Europe, are likely to result in the range of plants available in nurseries varying and changing locally.

Since the focus is on appropriate species selection, this guidance does not attempt to be scrupulous with regards to botanical accuracy. For example, conifers are considered to 'flower' even though they have strobili rather than flowers, and 'flower clusters' is used in a general sense to describe corymbs, panicles and racemes. Of course, these are important botanical distinctions, but we felt that the document should be as accessible as possible to non-specialists. Numerous tree guides are available with this information, should it be required.

It is also important to accept that this guidance seeks to recommend species that should perform well in contrasting planting scenarios. There will always be an important role to be played by the experience, intuition and vision of individual specifiers. No single document will have all the answers.

Origins and future intentions

This guidance is the major outcome of a Natural Environment Research Council (NERC) Green Infrastructure Innovation Project (NE/N017773/1) entitled *Tree Selection for Green Infrastructure*. This project provided the opportunity to evaluate the current approach to tree species selection within the British Isles, conduct some original research on a sub-set of species and produce this guidance. In addition to the NERC sponsored research, data derived from studies funded by the Hyland R. Johns Research Grant (TREE Fund), Fund4Trees and The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS) has been used in this guidance. A review of a wide range of published literature, indicated in the *Bibliography*, has also been used to underpin the recommendations.

Although every effort has been made to ensure the accuracy and accessibility of the content, it is anticipated that this document will initiate a conversation between a range of stakeholders using trees in green infrastructure and those tasked with providing guidance. Upon receipt of feedback, requests for additional species profiles, availability of new data or in response to a particular need, it will be possible to revise the guidance. Therefore, it is hoped that Tree Selection for Green Infrastructure will be nourished by the community that it seeks to serve, in order that collective experience and expertise can be made readily available for all.

Please engage with this document; share your experiences and ideas[2] so that the best contemporary knowledge on species selection can be utilised by those that share a vision for a diverse, sustainable and thriving urban forest.

Funders of research used in the development of this guidance

NERC SCIENCE OF THE ENVIRONMENT

TREE FUND Cultivating Innovation

fund4trees

FORMAS

[1] A tree with a stem circumference of 8-10cm at 1m in height.

[2] Corresponding author is Andrew Hirons ahirons@myerscough.ac.uk

Use potential

Planting sites within green infrastructure are highly variable. Even with a single planting scheme, individual planting sites may well differ substantially from neighbouring sites or those in close proximity. For this reason, it is necessary to develop a suite of broad recommendations based on more general characteristics of particular planting scenarios. These have formed the basis of the *Use Potential* recommendations within this guidance. The following summaries describe which species-level criteria have been employed to inform the recommendations. It should be noted that the lists formed on the basis of these criteria bundles aim to provide lists of candidate species that will perform well in the different scenarios, however, a wider range of species will be capable of surviving in each scenario.

Park



Parks have no restrictions to crown and root development imposed by built infrastructure. However, it is possible that constraints are imposed on the planting site by a range of other factors. Existing vegetation, soil conditions, exposure, species-specific environmental tolerances and proximity to the coast may all be relevant to selection decisions. Nevertheless, the 'Park' category represents the highest quality environment found within green infrastructure. Therefore, all species represented in this guide could be used within a park environment providing the environmental conditions on the site are carefully considered.

Paved



Paved scenarios often have serious constraints to the rooting environment caused by small rooting volumes, often in combination with impermeable surfaces that prevent water from infiltrating the rooting environment. Consequently, trees suitable for the *paved* environment are at least moderately tolerant to drought. Furthermore, they do not have serious issues with fruit litter that can be the cause of conflict with users of streets, courtyards and plazas. This bundle of characteristics also makes the *paved* trees useful for podium plantings. However, as no size constraints have been imposed for this category, it is important to consider the available above- and below-ground space before confirming a species choice.

A wider range of species has the potential to be used in paved environments, providing there is additional investment in the rooting environment. This will need to include the provision of an extensive volume of low bulk density (<1.4 g cm^{-3}) soil, a good water supply and excellent aeration.

SuDS



The implementation of Sustainable Drainage Systems (SuDS) can involve the creation of a wide range of growing environments. Where open vegetated channels (swales) are frequently flooded, waterlogging tolerance will be a highly relevant criterion for species selection. However, SuDS schemes that incorporate specifically designed bioretention systems or tree pits have engineered soils (substrates) that are very free draining (up to 300mm per hour). This leads to rooting environments that are frequently waterlogged and rapidly dry. In natural ecosystems, highly dynamic fluctuations in soil water availability are unusual but species that are tolerant of analogous conditions can be found in upland riparian corridors closely associated with seasonal watercourses. As such, the distinctive characteristic of trees recommended for *SuDS* is that they are at least moderately tolerant to both waterlogging and drought. No other restrictions have been imposed on this category.

Small garden



Trees suitable for *small gardens* will have at least one notable ornamental characteristic and will typically be small or medium in size. Exceptionally, a very slow growing tree of large (potential) size may be included in this category. This allows for the fact that trees capable of reaching great proportions in their natural habitat may not reach such scales in cultivation. No environmental tolerance pre-requisites have been set for this category. However, the quality of the rooting environment and light availability will still be highly relevant to appropriate species selection.

Coastal



Trees recommended for *coastal* sites have had no size or environmental tolerance criteria imposed on them but are known to perform well in coastal regions, as they are less susceptible to saline aerosols and wind exposure. Therefore, it will be important to evaluate species' tolerance to other relevant conditions, such as shade, drought and waterlogging, before finalising species choices.

Transport corridor



Trees suitable for *transport corridors* have had no size or environmental tolerance criteria imposed on them but are noted in the plant-use literature to have some tolerance to salt within the rooting environment. Many of these species also have some tolerance to air pollution. Unfortunately, no quantitative scales for salt and air pollution have been developed so the recommendations are necessarily based on observation.

Tree size and crown characteristics

One of the most important criteria for the selection of trees is the mature tree size and crown characteristics. The potential impact and benefits bestowed by trees are frequently related to tree size. Furthermore, future management requirements (and expense) also correspond to the relationship between tree size and the spatial constraints of the planting site. Therefore, information on mature size, crown form and crown density is displayed on each tree profile.

Mature size



Trees have been placed into one of four mature size categories: *massive* (>25m), *large* (15-25m), *medium* (10-15m) and *small* (<10m). The icons indicate the most likely maximum height of the tree growing in cultivation; this is confirmed by the associated text, which also indicates the potential tree height in natural populations. As the purpose of this guide is to disseminate information to plant users, the size categories used in the *Tree Selector* reflect the tree size most like to be achieved in cultivation, rather than ideal native environments. Importantly, the quality of the rooting environment as well a range of other environmental conditions, such as average temperature, light quality and exposure, will affect tree development. Therefore, growth environments that deviate substantially from the ideal conditions for each species often reduce mature size. Cultivar selection may also be an important factor determining final tree size.

Crown form



Tree crowns often have a characteristic form when grown in open environments. This feature can often be an important design element of a planting scheme as well as affecting how the tree crown interacts with surrounding vegetation and infrastructure.

Eight contrasting crown forms have been chosen to represent the crown diversity found within this guide. *Globular* crowns have a rounded form with vertical and horizontal dimensions being approximately equal. *Ovoid* crowns are somewhat elliptic, broader at the base than they are at the top, with the vertical axis greatly exceeding the horizontal axis. *Obovoid* crowns are also somewhat elliptic, with the vertical axis greatly exceeding the horizontal axis but are broader in the upper part of the crown. *Conical* crowns are approximately triangular in their outline and are broadest at their base. *Columnar* crowns have a vertical axis that greatly exceeds the horizontal axis but the proportions of the upper and lower crown are similar. *Irregular* crowns have an asymmetrical and uneven outline. *Weeping* crowns have strongly pendulous branches. Finally, *vase* crowns are much broader in the upper crown, which is often relatively flat rather than rounded.

Despite a tendency for a particular form, very few species rigidly conform to a particular shape. Many species are inherently variable in their morphology as a function of maturity or environment and fall somewhere between categories. The text associated with the icons endeavours to indicate this variation, where applicable. Predictable crown forms are much more readily achieved with the use of known cultivars, therefore, if consistency of form is desired from an aesthetic point of view, use a proven cultivar.

Adjacent vegetation or built infrastructure that influences the light environment and wind exposure will usually have an effect on the crown that may cause it to deviate from its expected form. Injury or failure to larger branches, via natural means or as a result of pruning, can also profoundly alter the ultimate crown form.

Crown density



Healthy crowns differ in their density as a function of leaf and branching characteristics. Together with crown size, crown density has particular implications for shading, shelter and rainfall interception. Three categories are used in this guide: *dense*, *moderate* and *open*. In some cases, it has been possible to underpin these categories with leaf area index (LAI: leaf area per unit ground area (m^2 m^{-2}) data. Dense crowns typically have a LAI of >6m^2 m^{-2}, moderate crowns 3-6m^2 m^{-2} and open crowns <3m^2 m^{-2}.

Native environment



Knowledge of the tree's native environment is critical when making robust species selection decisions. This part of the profile provides a short description of the tree's native range, principal habitats, successional status and an indication of soil preferences. In the case of artificial hybrids, a note on the parents is provided.

Environmental tolerance

In natural and managed landscapes, a suite of environmental challenges influences tree growth and performance. In natural environments, differential tolerance to environmental stress helps to determine which habitat a species competes most effectively in and, by implication, the likely performance in analogous managed landscapes. Ensuring the tree is able to cope with the likely conditions on the planting site is fundamental to the success of any planting scheme.

Each tree profile in this guide includes a tolerance scale for shade, drought and waterlogging as one or more of these environmental stresses are relevant to every planting site. A four-level qualitative scale has been developed to provide meaningful resolution across the tolerance spectrum without the risk of categorising large numbers of species in a middle rank, as is often the case with three- and five-level scales. The tolerance rating of each tree reflects a combination of plant-user experience, plant trait data and published literature. Inevitably with such a wide range of species, the quality of information is much higher for some species than it is for others. For this reason, where the tolerance characteristic for a particular stress is less certain, the phrase 'Estimated to be' has been used in the tolerance description.

Niinemets and Valladares (2006) reviewed ecological literature for 806 woody temperate species and produced a continuous five-level tolerance scale for shade, drought and waterlogging. Where there were shared species, the scale used in this guide generally interprets the Niinemets and Valladares (2006) analysis in the following way: 1 to 2 as *Sensitive*, 2 to 3 as *Moderately sensitive*, 3 to 4 as *Moderately tolerant* and 4 to 5 as *Tolerant*. Despite being a highly instructive source document, this scheme was not rigidly applied as there were numerous species where we felt that revisions were needed. To further aid the interpretation of the tolerance scales, a more detailed account of their development is presented below.

Shade tolerant



Tolerance to shade is closely associated with the particular ecological niche that a species occupies in its native habitat. For example, early successional or pioneer species are well adapted to open, high-light environments whilst late-successional species and understorey species are much better adapted to the lower light levels under the forest canopy. Existing vegetation as well as built infrastructure can substantively influence the quality and quantity of the light available to the tree. Therefore, the potential light environment is an important consideration for those selecting trees. A species is allocated its shade tolerance rating based on whether they can grow satisfactorily at a certain light availability. The four-level scale used in this guide relates approximately to the following light conditions, expressed as a percentage of full sunlight: *tolerant to shade* (<10% full sunlight); *moderately tolerant to shade* (10-25% full sunlight); *partially tolerant to shade* (25-50% full sunlight) and *intolerant to shade* (>50% full sunlight).

It should be noted that many species towards the more tolerant end of the spectrum often perform better in slightly higher light levels than their tolerance rating suggests, however, it is generally unrewarding to plant *moderately tolerant* or *tolerant* trees in fully open (high-light) environments. It should also be acknowledged that, for many larger species, shade tolerance diminishes somewhat with age. This is because a tree's need for shade tolerance is typically reduced as it becomes established within the forest canopy. Therefore, the allocated ratings are most closely related to young trees of the species and not fully mature specimens.

Drought tolerance



Many planting situations in urban environments result in water scarcity for trees. For example, small rooting (soil) volumes, compacted soil and impermeable surfaces all act to reduce soil water availability and accelerate adverse water deficits building up within the tree. The four-level scale, *tolerant to drought*; *moderately tolerant to drought*; *moderately sensitive to drought;* and *sensitive to drought,* makes use of a number of sources of information.

The Niinemets and Valladares (2006) scale integrates a range of climatic factors and the physiological potential to survive with <50% of foliage damage or dieback to create a continuous five-level scale (Table 1.1).

Table 1.1 Scale used by Niinemets and Valladares (2006) to rank 806 temperate woody species according to their drought tolerance. Trees were allocated a ranking based on their ability to survive on a site, with <50% foliage damage and dieback. P : PET is the ratio of precipitation to potential evapotranspiration.

Scale ranking	Annual precipitation (mm)	Distribution of precipitation (coefficient of variation)	P : PET ratio	Soil water potential (MPa)	Duration of dry period
1: Very intolerant	>600	Minimal	>3.0	> -0.3	A few days
2: Intolerant	500-600	<10%	1.5 : 3	-0.3 to -0.8	A few weeks
3: Moderately tolerant	400-500	10-15%	0.8-1.5	-0.8 to -1.5	Up to a month
4: Tolerant	300-400	20-25%	0.5 : 0.8	-1.5 to -3	2-3 months
5: Very tolerant	<300	>25%	<0.5	< -3	More than 3 months

In addition to the Niinemets and Valladares (2006) dataset a number of plant traits, relevant to drought tolerance, have also been used to confirm or revise the drought tolerance rating. The leaf water potential at leaf turgor loss (Ψ_{P0}) represents a quantitative plant trait that can be used to rank species, drought tolerance (Bartlett *et al*. 2012; Sjöman *et al*. 2015; 2018). Where available from our own dataset of approximately 200 species, Ψ_{P0} was used to inform the categories: generally, Ψ_{P0} >-2.5 MPa was classed as *sensitive*; -2.5 to -3 MPa as *moderately sensitive*; -3 to -3.5 MPa as *moderately tolerant* and <-3.5 MPa as *tolerant*. Another trait that was used to support the allocation of drought tolerance ratings was the water potential at 50% loss of hydraulic conductivity (Ψ_{50}). This trait provides excellent guidance on a species' vulnerability to drought (Choat *et al*. 2012). Data used to help validate our drought tolerance ratings was taken from a published meta-analysis of xylem vulnerability curves (Lens *et al*. 2016) and supplemented by additional data produced for this project. The resulting constellation of data was particularly valuable for determining the best allocation for species that fell close to a threshold between two tolerance levels.

Regardless of a species' drought tolerance ranking, the full expression of drought tolerance will only come about in well-established trees. Therefore, the selection of drought tolerant trees should never be seen as a substitute for good post-planting aftercare, such as mulching and irrigation.

Waterlogging tolerance



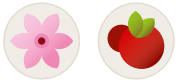
Waterlogging is caused by poor drainage in combination with high levels of rainfall (or irrigation). The effects of persistently saturated soils are complex, however, the most significant factor effecting trees is the deficit in oxygen within the rooting environment. This reduces the ability of roots (and many soil organisms) to aerobically respire and, as a result, they very quickly run out of metabolic energy. Consequently, unless the tree has specialist adaptations, high levels of root mortality precede a decline in the crown and, in serious cases, whole tree mortality.

Most temperate deciduous trees can cope with several weeks, waterlogging during the period of winter dormancy as metabolic activity is minimal. However, waterlogging during active growth is more serious because roots are more active and require aerobic soils. In general, the more active the growth, the more rapidly the effects of waterlogging can be seen. Factors such as the water oxygenation status and temperature will also affect how acutely waterlogging stress develops so there can be a great deal of variation around how trees experience waterlogging stress.

For this scale, *tolerant* species can survive consistent waterlogging for the duration of the growing season. *Moderately tolerant* species can survive consistent waterlogging for approximately one month during the growing season. *Moderately sensitive* species are only likely to survive if the waterlogging event is less than two weeks during the growing season and *sensitive* species are only likely to survive if the waterlogging event is less than a few days during the growing season. However, it is important to note that as this scale relates to the likely time-course to tree mortality, symptoms of waterlogging (and associated dysfunction) will be apparent within a shorter period of time.

Understanding the mechanisms and traits that confer tolerance to environmental stress is a vitally important aspect in tree selection. Those with a deeper interest in how trees respond to key environmental stresses should consult Hirons and Thomas (2018) or a plant ecology text such as Larcher (2003), Schulze *et al*., (2005), Lambers *et al*. (2008), Keddy (2017) or Leuschner and Ellenberg (2017).

Flowering and fruiting



The phenology (timing) of flowering and fruiting are important aesthetic features of trees as well as being critical for ecological reasons. As well as a brief description of the type of flower and fruit, this section also indicates the time period which peak flowering and fruiting can be expected.

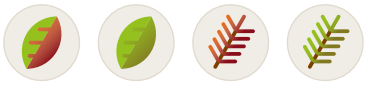
This guide uses eight periods during the year to indicate in which period peak flowering and fruiting are likely to occur (Table 1.2). Of course, after pollination, fruit begins to develop so immature fruit may be seen on the trees for much of the period between flowering and the indicative period of peak fruiting. There is also a great deal of variation in the fruiting behaviour of trees. Many hybrids are sterile so do not produce any fruit. For some genera (especially of the conifers), it can take a number of years to for fruit to fully mature. Other genera (*e.g. Quercus* and *Fagus*) exhibit a 'masting' strategy, where fruiting is very high in 'mast' years, but often rather scant in the intervening years. Where relevant, these cases are noted in the profile commentary.

As with other aspects of tree development, flowering and fruiting phenology responds to a number of environmental cues, such as day-length and temperature, as well as the general quality of the growing environment. Therefore, some variation in the timing of flowering and fruiting will occur as a function of site and unseasonal weather. It is also important to recognise that the suggested calendar period may be shifted to later in the year for the coolest parts of the British Isles.

Table 1.2 Periods used to indicate peak flowering and fruiting with the associated approximate calendar periods for larger parts of the British Isles.

Indicative seasonal period	Approximate calendar period for the British Isles
Early spring	March through to early April
Late spring	Late April through to the end of May
Early summer	Early June through to early July
Late summer	Late July through to the end of August
Early autumn	Early September through to early October
Late autumn	Late October through to early November
Early winter	Late November through to the end of December
Late winter	Early January to the end of February

Leaf type



To help the reader visualise the tree's crown more effectively, leaves are divided into four main types: broadleaved deciduous, broadleaved evergreen, deciduous conifer and evergreen conifer. In this section, a brief description of the leaf is provided as well as an indication of significant ornamental leaf characteristics, such as autumn colour.

Single- and multi-stemmed



Trees tend to be available from the nursery as single- or multi-stemmed. This section indicates the likely availability of stock type, as well as providing a brief description of the bark and noting particularly attractive stem features.

Issues to be aware of



Many trees have issues that are important to consider as part of the selection process. These inevitably vary by species, but this section identifies characteristics such as: potential allergenicity, abundant fruit litter, thorns, toxicity or a propensity to produce root suckers. Importantly, features identified here may not be problematic in all planting scenarios, however, being aware of potential sources of conflict or future management challenges is fundamental to appropriate species selection.

Notable varieties

For some trees, the nursery sector only supplies the species so there are few widely available varieties or cultivars. However, in many cases, numerous varieties are available. Often these are highly desirable because of their reliable growth characteristics and ornamental features. Whilst it is challenging to list every

potential variety, the most widely available varieties have been identified alongside a descriptive title that helps to capture its distinctive characteristic.

Tree Selector

After the individual tree profiles, lists of trees under key categories of use-potential, mature size, crown form, crown density, environmental tolerance and ornamental qualities have been collated. As with the key menus and alphabetical tree index, to aid navigation, each tree is hyperlinked to the individual tree profile. These lists also help the reader to compare trees with common characteristics.

In addition to the information in this document, a *Supplementary Database* is available to download. This Excel-based tool allows users to create a species shortlist using multiple categorical filters. Download from here

References

Bartlett, M.K., Scoffoni, C. and Sack, L. (2012) The determinants of leaf turgor loss point and prediction of drought tolerance of species and biomes: a global meta-analysis. *Ecology Letters*, 15: 393-405.

Choat, B., Jansen, S., Brodribb, T.J., Cochard, H., Delzon, S., Bhaskar, R., *et al*. (2012) Global convergence in the vulnerability of forests to drought. *Nature*, 491: 752-756.

Hirons, A.D. and Thomas, P.A. (2018) *Applied Tree Biology*. Wiley Blackwell. Oxford, UK.

Keddy, P.A. (2017) *Plants and Vegetation; Origins, Processes, Consequences*, Second edition. Cambridge University Press, Cambridge, UK.

Lambers, H., Stuart Chaplin III, F. and Pons, T. L. (2008) *Plant Physiological Ecology*, 2nd edition. Springer, Berlin, Germany.

Larcher, W. (2003) *Physiological Plant Physiology*, 4th edition. Springer, Berlin, Germany.

Lens, F., Picon-Cochard, C., Delmas, C.E., Signarbieux, C., Buttler, A., Cochard, H., Jansen, S., Chauvin, T., Doria, L.C., Del Arco, M. and Delzon, S., (2016). Herbaceous angiosperms are not more vulnerable to drought-induced embolism than angiosperm trees. *Plant physiology*, 661-667.

Leuschner, C. and Ellenberg, H. (2017) *Ecology of Central European Forests: Vegetation Ecology of Central Europe, Volume I*. Springer, Berlin, Germany.

Niinemets, Ü. and Valladares, F. (2006) Tolerance to shade, drought, and waterlogging of temperate northern hemisphere trees and shrubs. *Ecological Monographs*, 76: 521-547.

Schulze, E.-D., Beck, E. and Müller-Hohenstein, K. (2005) *Plant Ecology*. Springer, Berlin, Germany.

Sjöman, H., Hirons, A.D. and Bassuk, N.L. (2015) Urban forest resilience through tree selection: Variation in drought tolerance in Acer. *Urban Forestry and Urban Greening*, 14: 858-865.

Sjöman, H., Hirons, A.D. and Bassuk, N.L. (2018) Magnolias as urban trees – a preliminary evaluation of drought tolerance in seven magnolia species. *Arboricultural Journal*, pp.1-10.

Exemplar species: These oaks transform this busy public square. As well as being aesthetically appealing, they help to cool the local environment, improving the experience of diners and employees of local businesses.

Navigation
Contents page
The Tree Profiles



© Steve Parker

Tree selection is of strategic importance

Trees are a major component of the green infrastructure in our urban environments; as such, they are directly associated with a range of benefits or ecosystem services. As the provision of these services is dependent on healthy trees in our landscapes, the proportion of ecosystem services bestowed by trees is proportionate to their vitality. In turn, this can only be secured by good quality growing environments hosting appropriate species.

Multiple incentives for appropriate species selection should be apparent. Higher establishment success enhances the positive contribution trees make within any green infrastructure scheme. Potential disservices can also be minimised and future maintenance requirements reduced. These outcomes are all important for managers seeking to sustainably manage trees in green infrastructure and foster stewardship from the communities most directly impacted by their presence.

For understandable reasons, aesthetic criteria often dominate species selection decisions for green infrastructure projects. However, such an approach is seldom as rewarding as at first envisioned. Trees will only perform well and express their ornamental assets fully if they are appropriate for the site conditions. For example, maples (*Acer* spp.) often famed for their autumn colour rarely deliver this if they have experienced prolonged periods of drought through the growing season. Poorly selected plant material is prone to under-performance, decline and early mortality.

Therefore, the principal driver in tree selection decisions should relate to the species' ability to thrive on the chosen site, as the overwhelming majority of benefits imparted on communities by trees relies on the tree performing well in the landscape. Trees clinging on to life, barely surviving, require more intensive management, are more vulnerable to pests and pathogens and, ultimately, deliver meagre benefits. With numerous pressures on land in urban environments, the precious space allocated to trees must provide an effective contribution to the landscape and long-lasting, sustainable benefits. For these reasons, species selection is a subject that warrants strategic attention by decision makers across the green infrastructure community.

Four themes of effective tree selection

Effective tree selection relies on consideration of four factors: *Constraints*, *Tree ecophysiology*, *Ecosystem services* and *Aesthetics* (Figure 1). Of these, the primary considerations are constraints and tree ecophysiology as these factors secure the species' appropriateness for site. Once these criteria have been fully accounted for, secondary considerations that relate to desirable ecosystem services and aesthetics help to refine the best candidate species for the project.

Constraints

Constraints on the species selected are allied to the 'real world' challenges of establishing trees within and around urban environments. They are composed of a range of site, biological and practical issues for consideration. Site considerations include: the condition of the likely rooting environment; proximity of built structures; underground infrastructure; future space requirements and extant pollution. Technical and design solutions aimed at alleviating many of these site-related constraints are presented in *Trees in Hard Landscapes: A Guide for Delivery*, published by TDAG.

Biological constraints may be imposed on tree selection as a result of targets aimed at promoting species diversity, reducing risk factors associated with threats from pests and pathogens or the responsibility to protect adjacent environments from invasive species.

Practical constraints include the availability of plant material from the nurseries, budgetary restrictions, future management requirements and regulations such as those imposed by planning obligations (*e.g.* Section 106 agreements of the UK Town and Country Planning Act as amended) or those presented by BREEAM (Building Research Establishment Environmental Assessment Method) accreditation (Box 1).

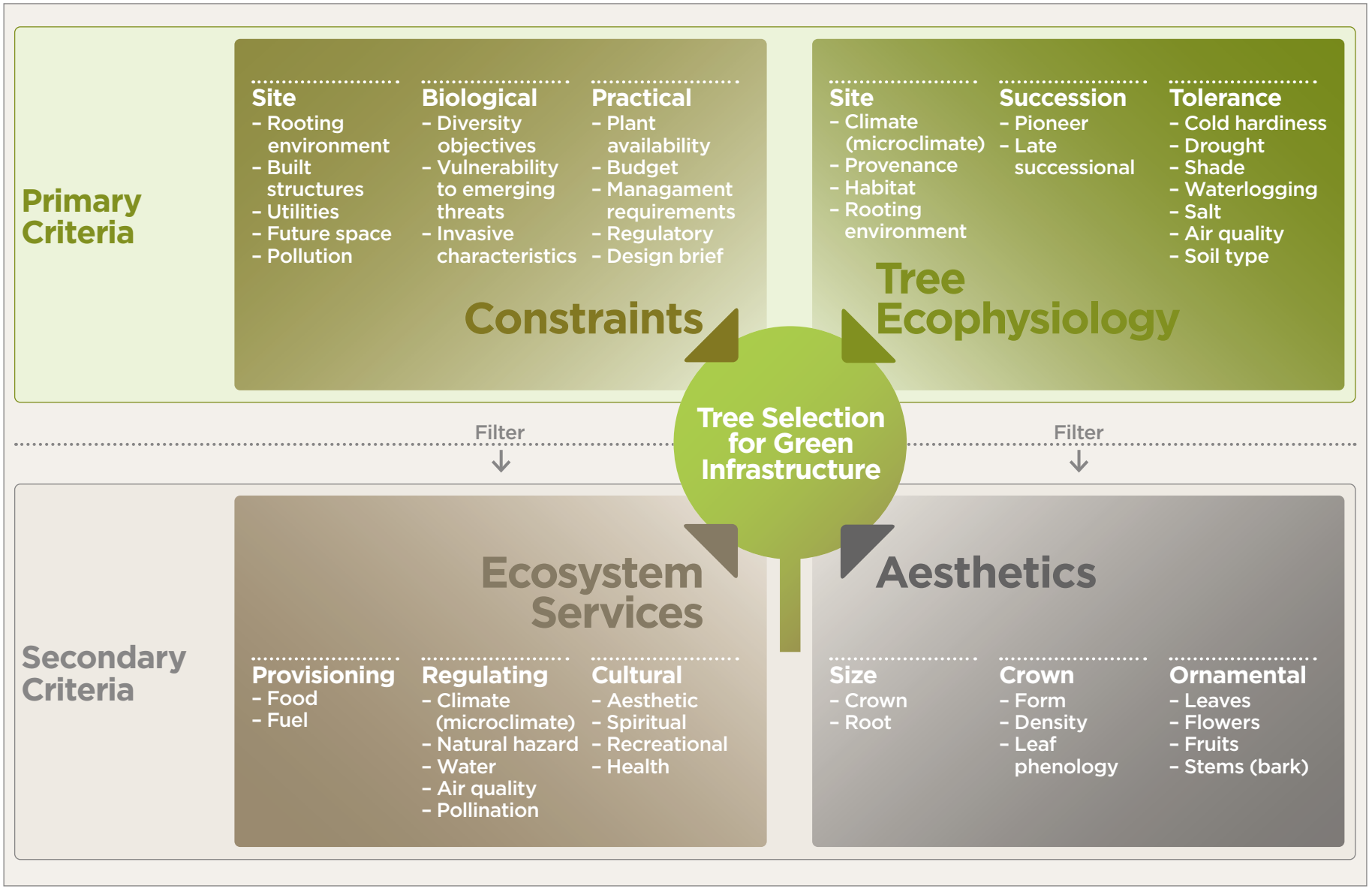


Figure 1 **Factors to consider for effective tree selection.**

Adapted from Johnston and Hirons (2014)

Box 1 Tree species selection and BREEAM.

BREEAM is a sustainability assessment method for masterplanning projects, infrastructure and buildings developed by the Building Research Establishment (BRE). A third party certification process aligns developments to particular standards with the aim of creating more sustainable environments, enhancing the well-being of the people who live and work in them, protecting natural resources and developing attractive property investments.

BREEAM assessment is a complex and involved process with many elements, a few of which are relevant to tree selection decisions.

Appropriate landscape design and tree selection are particularly useful for securing accreditation by supporting the following categories and aims in the BREEAM Communities Technical Standard (SD202 Issue 1.2 – August 2017):

- ***Social wellbeing***
  - **(SE11) Green Infrastructure**
    Aim: To ensure access to high-quality space in the natural environment or urban green infrastructure for all.
- ***Environmental conditions***
  - **(SE08) Microclimate**
    Aim: To ensure the development provides a comfortable outdoor environment through the control of climatic conditions on a micro scale.
  - **(SE10) Adapting to climate change**
    Aim: To ensure the development is resilient to the known and predicted impacts of climate change.
  - **(SE13) Flood risk management**
    Aim: To avoid, reduce and delay the discharge of rainfall to public sewers and watercourses, thereby minimising the risk of localised flooding (on and off site), watercourse pollution and other environmental damage.
- ***Resources and energy***
  - **(RE03) Water strategy**
    Aim: To ensure that the development is designed to minimise water demand through efficiency and appropriate supply-side options, taking full account of current and predicted future availability of water in the area.
- ***Land use and Ecology***
  - **(LE04) Enhancement of ecological value**
    Aim: To ensure that the ecological value of the development is maximised through enhancement.
  - **(LE05) Landscape**
    Aim: To ensure that the character of the landscape is respected and, where possible, enhanced through the location of features and design appropriate to the local environment.
- ***Transport and movement***
  - **(TM02) Safe and appealing streets**
    Aim: To create safe and appealing spaces that encourage human interaction and a positive sense of place.

Trees are one of the most fundamental components to *green infrastructure* because of their potential size, longevity and contribution to a host of ecosystem services. As the performance of trees is strongly related to appropriate selection and planting design, the 'high-quality space' sought by BREEAM should therefore reflect good practice in tree selection.

Trees influence *microclimate*, especially through shading, reducing wind-speed and increasing humidity. Therefore, careful landscape design with appropriate species can enhance thermal comfort, help improve the energy efficiency of buildings and improve the functionality of outdoor environments.

Adapting to climate change is a central theme in any sustainable development. Resilience to known and predicted impacts of climate change will need to be considered within the context of the green infrastructure. Selection of tree species that are capable of thriving in future environments will be essential. Consideration of how trees can contribute to the modification of microclimate and the species' ability to thrive in warmer, more water scarce conditions

Box 1 Tree species selection and BREEAM. (continued)

should therefore be prominent. Drought tolerance is likely to be a particularly important species trait as this relates to the resilience of green infrastructure under future climate scenarios and will contribute to the *water strategy* by minimising the water demand of the landscape and reducing reliance on irrigation. Additionally, a diverse palette of tree species will also improve the resilience of green infrastructure to biotic threats (pests and pathogens) caused by climate change and globalisation of trade.

Numerous *flood risk management* strategies involve the use of trees within Sustainable Drainage Systems (SuDS). Trees (and their associated rooting environments) help to reduce flood risk by increasing transpiration (water loss by vegetation), rainfall interception, infiltration and storage. They may be integrated into developments in bioretention systems, detention basins, swales or as part of specially designed tree pits. These scenarios all require careful species selection, as the environmental tolerance of species will be intrinsically linked to their performance in these designed landscapes. Further guidance on appropriate tree species for SuDS can be found in the *Tree Selector* tool. At least two credits are available towards BREEAM certification if SuDS schemes are effectively integrated into a development.

A key motivation for the provision of green infrastructure is the *enhancement of ecological value* afforded by the development and its associated landscape. Species diversity will aid this goal, providing the species are suitable for the planting location. However, trees known to host a wide range of other species should be prominent. It will also be important to consider phenological diversity within the landscape so that, for example, peak flowering time is not uniform within the designed elements of green infrastructure. Other considerations relevant to maximising ecosystem services with tree species selection are discussed in Chapter 3.

To help maintain coherence of landscape character, criterion that help accumulate credits towards BREEAM certification include the percentage area of native tree, shrub and herbaceous plantings, calculated on the basis of both new and retained plantings. A requirement of at least 60% native species contributes towards one credit and at least 80% native species contributes towards three credits under LE05. Provision is made within the guidance for 'other ecologically appropriate species' to be included within these percentages where a suitably qualified ecologist supports their inclusion within the scheme. However, characteristics of species within this provision are obscure. On the condition that species have a minimal risk of habitat invasion, we suggest species that are more likely to thrive on the given site because of specific site conditions should be considered, especially when they offer functional diversity to the ecological attributes of the site or help support an overarching strategy that improves the resilience of green infrastructure to climate change. Indeed, the paucity of native species in the British Isles and other parts of northern Europe means that landscape-scale ecosystem services are likely to be greatly enhanced with the inclusion of appropriate exotic species (Sjöman *et al.* 2016).

For clarity, here is a list of species, native to the British Isles (included in this guide):

Acer campestre
Alnus glutinosa
Betula pendula
Betula pubescens
Carpinus betulus
Corylus avellana
Crataegus laevigata
Crataegus monogyna
Fagus sylvatica
Ilex aquifolium
Juniperus communis
Malus sylvestris
Pinus sylvestris
Populus nigra
Populus tremula
Prunus avium
Prunus padus
Quercus petraea
Quercus robur
Salix caprea
Salix pentandra
Sorbus aria
Sorbus aucuparia
Sorbus torminalis
Taxus baccata
Tilia platyphyllos
Tilia x *europaea*
Tilia cordata

Box 1 Tree species selection and BREEAM. (continued)

Where effective transport of vehicles and people is integral to developments seeking BREEAM certification, trees can play a substantial role in creating *safe and appealing streets*. This can be done by improving the aesthetics of a street with well-selected tree species and cultivars, as well as utilising trees within traffic-calming schemes. In addition to appropriate species selection, provision of high-quality, well-designed rooting environments is also essential for the long-term sustainability of street planting.

The provision of sustainable green infrastructure within developments, underpinned by good practice in species selection, should be integral to the aim of BREEAM certified schemes to provide attractive investment opportunities.

Whilst the above commentary briefly describes where tree species selection is particularly relevant to BREEAM certification, it must be noted that independent third-party experts conduct BREEAM assessments and award certification.

Tree Ecophysiology

Ecophysiology is the science that seeks to describe the physiological mechanisms underlying ecological observations (Lambers *et al*. 2008). It explores the traits exhibited by a species that determine its geographical distribution and habitat preferences. Ecophysiological characteristics are, therefore, highly instructive when seeking to match trees to particular planting sites.

Site characteristics are fundamental to evaluate prior to species selection. Of primary importance is the climate (and microclimate) found on the site. According to the Köppen-Geiger climate classification system (Peel *et al*. 2007), the British Isles is classified as a temperate oceanic climate without a pronounced dry season and with a warm summer (code Cfb, Figure 2). The mean temperature of the coldest month is greater than 0°C, there are four (or more) months with a mean temperature above 10°C and the warmest month has a mean temperature less than 22°C. In addition to the British Isles, this climate type is found in Belgium, France, Ireland, the Netherlands, most of New Zealand and the Australian states of Victoria and Tasmania. Small pockets are also found in Western Asia (Turkey and Georgia), South America (Chile and Argentina) and the Eastern Cape in South Africa. Long-term (1981-2010) rainfall records in the British Isles indicate a typical annual average rainfall of 600 to 3000mm, with the west and north-western regions being wetter than the eastern and southeastern regions (Met Office).

Although, at a regional scale, the climate can be well characterised according to a global classification system, the conditions found in and around urban environments can deviate substantially from those presented by long-term climate data. In particular, air temperatures are often elevated and humidity levels reduced as a consequence of the Urban Heat Island effect (Orlandini *et al*. 2017). Impervious surfaces and drainage infrastructure also disrupt the infiltration of rainfall into the soil, reducing the volume of water that is available for uptake by roots and decoupling regional rainfall trends from soil water availability. Compacted soils further reduce soil infiltration and drainage increasing the likelihood of waterlogging, even after fairly minor rainfall events. Numerous microclimates also exist within the built environment as a result of shade, shelter, reflective surfaces and

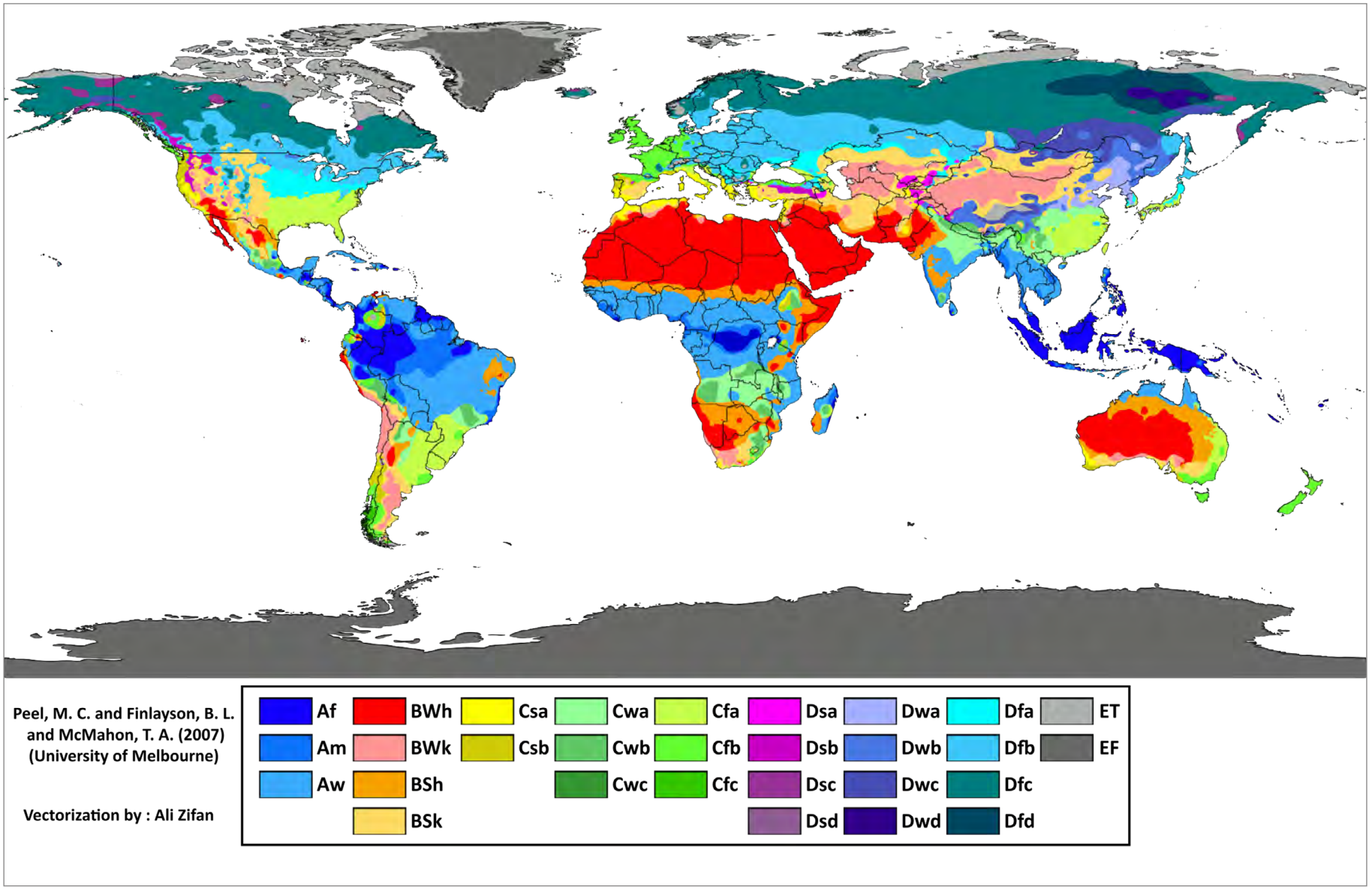


Figure 2 World map of Köppen-Geiger climate classification system. The British Isles has a temperate oceanic climate coded Cfb on this map.

Redrawn from: Peel *et al.* 2007, with permission of Creative Commons Attribution-Share Alike Unported License.

wind corridors. Such variations in the growth environment between urban and adjacent rural areas can be highly relevant to tree performance (and survival) in green infrastructure.

Some tree species have a natural distribution that extends beyond the range of a single climate type. For example, silver birch (*Betula pendula*) can be found in oceanic and continental climates of Mediterranean, temperate and sub-arctic (boreal) regions. In such cases, the provenance or ecotype of the tree will be critical to its performance on any given site. Southern populations of silver birch frequently exhibit insufficient cold hardiness to be planted in more northerly locations, as they are vulnerable to late frosts. Similarly, southern ecotypes of Norway maple (*Acer platanoides*) are more prone to frost cracks than northern ones (Sjöman *et al*. 2017). Unfortunately, despite its importance, many commercially available cultivars do not have precise information on their parental lineage. Consequently, more general knowledge about species' distribution and habitats often has to suffice when selecting trees.

In natural environments, major climatic drivers and habitat preferences help to segregate species. Species suited to more open environments must be adapted to low humidity, high levels of exposure, high levels of light (radiation) and potentially nutrient-poor soils (Figure 3). Such conditions require a suite of traits that are characterised by *early-successional* or *pioneer species*. They often exhibit good growth rates in quite challenging environments but do not invest in characteristics that ensure longevity. Nevertheless, pioneer species have an important role to play in urban environments as they have an inherent capacity for growth in difficult situations. They also provide the ecological pathway for the successful establishment of *late-successional* species that prefer to develop in environments with existing vegetation or conditions that represent a later stage in forest development. Late-successional species typically mature in understorey forest environments. Whilst the low light levels of the understorey are challenging for many species, trees have less weed competition, are buffered temperature extremes, experience soil drying more gradually, enjoy greater soil fertility and more shelter. Consequently, traits that make a species competitive in an open 'pioneer' landscape make them less suited to 'late-successional' environments and *vice versa*. In nature, competitiveness in one environment frequently results in trade-offs being made against adaptation to a contrasting environment. However, for those tasked with tree selection, this presents an opportunity to exploit knowledge of a tree's native habitat and apply it to planting recommendations. For example, a shady urban canyon or north-facing courtyard represents conditions found at a late stage of forest succession, whereas an open urban square with much higher light levels more closely represents a pioneer site. By assessing the phase of succession that a species naturally occupies, it is possible to refine species choices for urban conditions to improve the likelihood of successful tree establishment (Sjöman *et al*. 2017).



Figure 3 The successional status of a tree species is an important aspect of tree selection. Early-successional or 'pioneer' trees are typically much more capable of growing in open, high-light, low-humidity environments with poor quality soil. Pioneer trees have good growth rates but are relatively short-lived. Late-successional species require higher quality soil, higher humidity and more sheltered positions to perform well. They often take longer to establish but invest in characteristics that provides good longevity.

Table 2.1 Summary of tree species that can grow successfully in early successional pioneer growing conditions and late successional conditions.

Species for pioneer growing conditions:

Abies procera
Acacia dealbata
Acer campestre
Acer x freemanii
Acer negundo
Acer rubrum
Acer saccharinum
Alnus cordata
Alnus glutinosa
Alnus incana
Alnus x *spaethii*
Betula alleghaniensis
Betula ermanii
Betula lenta
Betula maximowicziana
Betula nigra
Betula papyrifera
Betula pendula
Betula pubescens
Betula utilis
Catalpa bignonioides
Catalpa speciosa
Celtis australis
Celtis occidentalis
Cercis canadensis
Cercis siliquastrum
Crataegus monogyna
Cupressus sempervirens
Elaeagnus angustifolia
Fraxinus americana
Fraxinus angustifolia
Fraxinus ornus
Fraxinus pensylvanicum
Gleditsia triacanthos
Juglans nigra
Juniperus communis
Juniperus scopulorum
Juniperus virginiana
Koelreuteria paniculata
Larix x *marschlinsii*
Larix sibirica
Liquidambar styraciflua
Maackia amurensis
Maclura pomifera
Metasequoia glyptostroboides
Paulownia tomentosa
Picea sitchensis
Pinus heldreichii
Pinus nigra
Pinus pinaster
Pinus sylvestris
Paulownia tomentosa
Populus alba
Populus balsamifera
Populus x *berolinensis*
Populus x *canadensis*
Populus laurifolia
Populus nigra
Populus simonii
Populus tremula
Populus trichocarpa
Prunus avium
Prunus cerasifera
Prunus maackii
Prunus mahaleb
Prunus padus
Prunus sargentii
Prunus virginiana
Prunus x *yedoensis*
Pseudotsuga menziesii
Pterocarya fraxinifolia
Pterocarya x *rehderiana*
Pterocarya rhoifolia
Quercus acutissima
Quercus cerris
Quercus castaneifolia
Quercus coccinea
Quercus frainetto
Quercus macranthera
Quercus palustris
Quercus robur
Quercus rubra
Rhus typhina
Robinia pseudoacacia
Salix alba
Salix caprea
Salix fragilis
Salix pentandra
Salix x *sepulcralis*
Sequoiadendron giganteum
Sorbus aucuparia
Sorbus hybrida
Sorbus latifolia
Styphnolobium japonicum
Syringa reticulata
Ulmus 'Rebona'
Ulmus 'New Horizon'
Zelkova serrata

Species for late successional conditions:

Abies amabilis
Abies concolor
Abies fraseri
Abies homolepis
Abies grandis
Abies koreana
Abies nordmanniana
Abies sibirica
Acer circinatum
Acer griseum
Acer heldreichii ssp. *trautvetteri*
Acer pensylvanicum
Acer platanoides
Acer pseudoplatanus
Acer rubrum
Acer rufinerve
Acer tataricum
Acer tataricum ssp. *ginnala*
Acer tegmentosum
Acer x *zoechense*
Aesculus flava
Aesculus hippocastanum
Amelanchier lamarckii
Carpinus betulus
Carya ovata
Cercidiphyllum japonicum
Chamaecyparis lawsoniana
Cornus controversa
Cornus kousa
Cornus mas
Cryptomeria japonica
Fagus grandifolia
Fagus orientalis
Fagus sylvatica
Ilex aquifolium
Magnolia kobus
Magnolia obovata
Magnolia tripetala
Ostrya carpinifolia
Ostrya caroliniana
Picea abies
Picea omorika
Pinus cembra
Pinus peuce
Pinus x *schwerinii*
Pinus sibirica
Prunus laurocerasus
Prunus padus
Sciadopitys verticillata
Sorbus aucuparia
Sorbus torminalis
Stewartia pseudocamelia
Taxus baccata
Thuja plicata
Thujopsis dolabrata
Tilia cordata
Tilia x *europaea*
Tilia platyphyllos
Tilia tomentosa
Tsuga canadensis
Tsuga heterophylla

Adapted from Sjöman *et al.* (2017)

Similarly, other aspects of a tree's natural habitat can inform selection decisions for green infrastructure (Figure 4). Paved urban environments, such as urban plazas, are represented in nature by warm, south-facing, mountain slopes with limited soil volume at an early phase of succession. Species such as black pine (*Pinus nigra*), sessile oak (*Quercus petraea*), goldenrain tree (*Koelreuteria paniculata*), mahaleb cherry (*Prunus mahaleb*) and Russian olive (*Elaeagnus angustifolia*) are suitable trees, as they naturally occur in similar conditions and have developed strategies for coping with these conditions (Sjöman *et al*. 2017). However, by improving the planting site by increasing rooting volumes with structural soils (see TDAG 2014), the site becomes more comparable to a scree slope with rooting conditions that provide good aeration and moderate retention of water and nutrients. A number of species grow well on scree slopes and exhibit good long-term development. If the urban planting site is fully exposed to the sun, pioneer species are most suitable since they can cope with the open, exposed, low-humidity sites with a high evaporative demand. Examples of such species are Italian alder (*Alnus cordata*), Hungarian oak (*Quercus frainetto*), Turkey oak (*Q. cerris*), Swedish whitebeam (*Sorbus intermedia*), Sargent's cherry (*Prunus sargentii*), zelkova (*Zelkova serrata*), field maple (*Acer campestre*), Japanese tree lilac (*Syringa reticulata*), ginkgo (*Ginkgo biloba*) and European hackberry (*Celtis australis*). Where buildings shade the planting site for part of the day, late-successional species that occur naturally on scree slopes may be more suitable. These include hop hornbeam (*Ostrya* spp.), hornbeam (*Carpinus* spp.), elm (*Ulmus* spp.) and silver lime (*Tilia tomentosa*), all of which can cope with the relatively poor soil conditions, shady, more humid and cooler conditions (Sjöman *et al*. 2017).

Planting sites might be further improved with structural cells capable of hosting large volumes of high-quality soil or structural soils that increase the soil (substrate) volume available to roots (see TDAG 2014). This will provide opportunities to establish a wider range of species, especially if the site is also fairly sheltered.

Even on rich parkland sites, it is important to consider comparable habitats and the likely successional stage represented by the planting location. On open sites where it may be desirable to create a windbreak, pioneer species from cool, rich forests should be selected, as they possess developmental strategies that facilitate rapid establishment. Examples of such species are silver maple (*Acer saccharinum*), poplars (*Populus* spp.), many willows (*Salix* spp.), silver birch (*Betula pendula*), alder (*Alnus* spp.) and Russian olive (*Elaeagnus angustifolia*). Where established trees already exist on parkland, mature crowns modify the microenvironment, influencing light and humidity levels. These planting locations represent a later phase in forest succession and favour species such as: western hemlock (*Tsuga heterophylla*), fir (*Abies* spp.), sycamore (*Acer pseudoplatanus*), small-leaved lime (*Tilia cordata*), beech (*Fagus* spp.), yew (*Taxus* spp.) and western red cedar (*Thuja plicata*) (Sjöman *et al*. 2017).

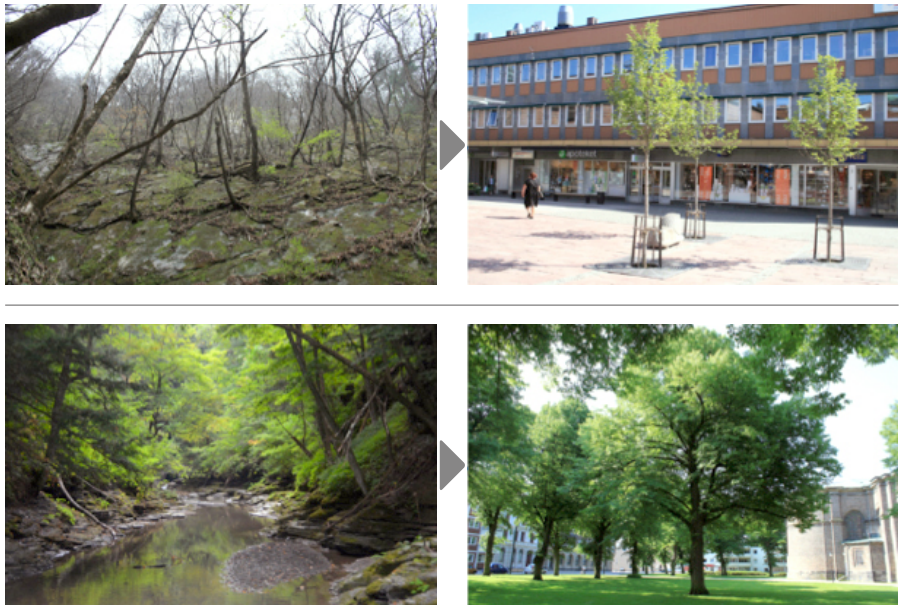


Figure 4 When analysing a tree's capacity to grow in urban environments, understanding the conditions it naturally grows in should help inform selection decisions. Trees growing on steep, south-facing mountain slopes with shallow rocky soil have developed traits that make them tolerant of these conditions. Such species often perform well in challenging urban conditions. Species that naturally grow in moist river valleys have much more in common with park environments. © Henrik Sjöman

Allied to the successional status and habitat preference of a species is its tolerance to a range of individual stress factors. Although these interact, understanding particular thresholds for injury from different stress factors is crucial to selection decisions. In temperate environments, temperature thresholds for injury are a major factor in the performance and survival of trees. Resistance to damage caused by low temperatures (*cold-hardiness*) is fundamental for determining the natural distribution of species and, subsequently, is a major factor in determining where a species can be grown. Low temperatures kill trees that are not hardy enough for the area, are unable to acquire hardiness quickly enough during autumn or lose hardiness too quickly in spring (Hirons and Thomas 2018). If the tree is to be

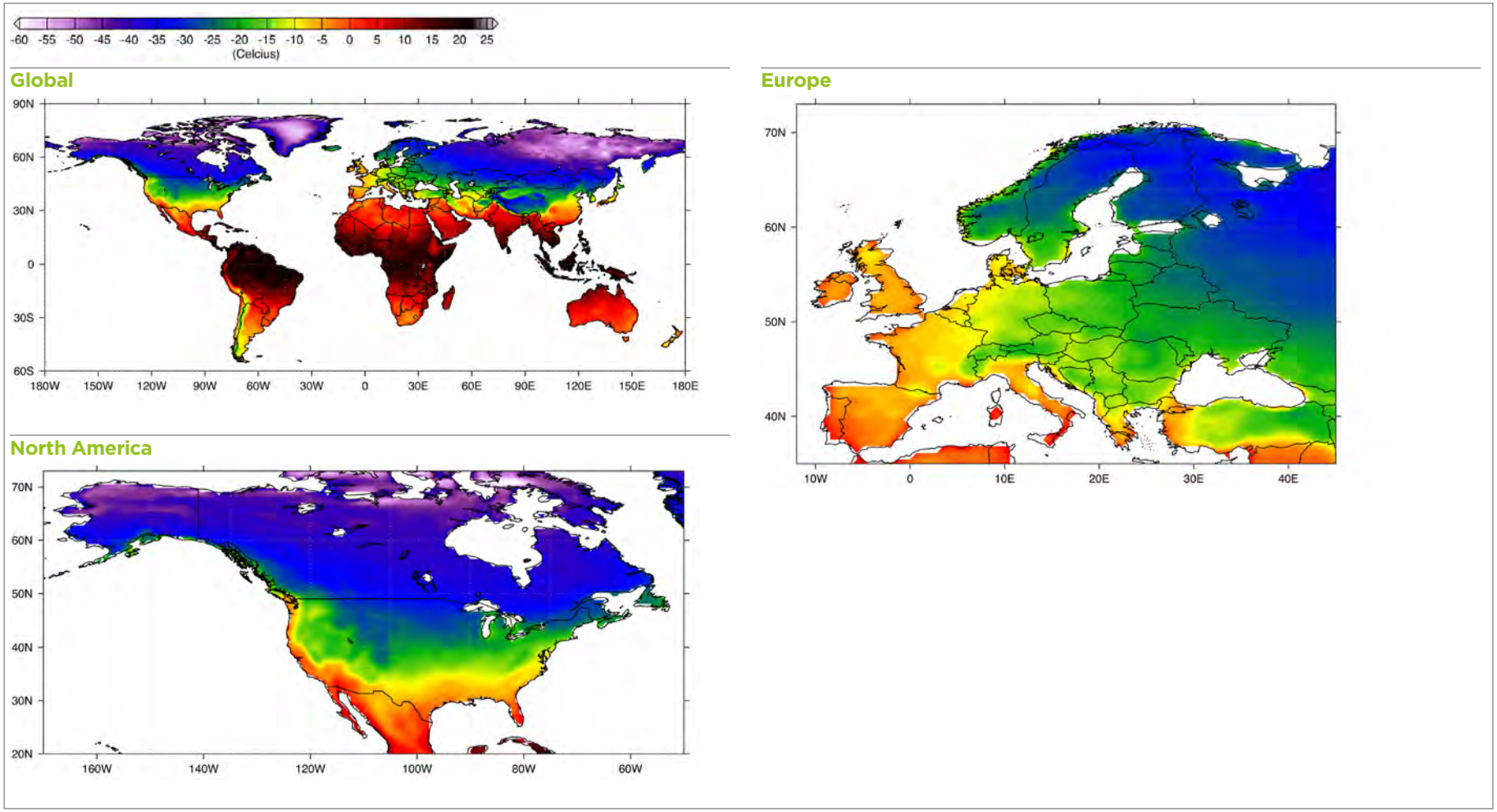


Figure 5 **Average annual minimum temperature (°C) at 2m above ground (1986-2015), using data from ERA-Interim Reanalysis.**

Plotted by Linda Hirons (National Centre for Atmospheric Sciences, University of Reading).

Source: Data from Dee (2011).

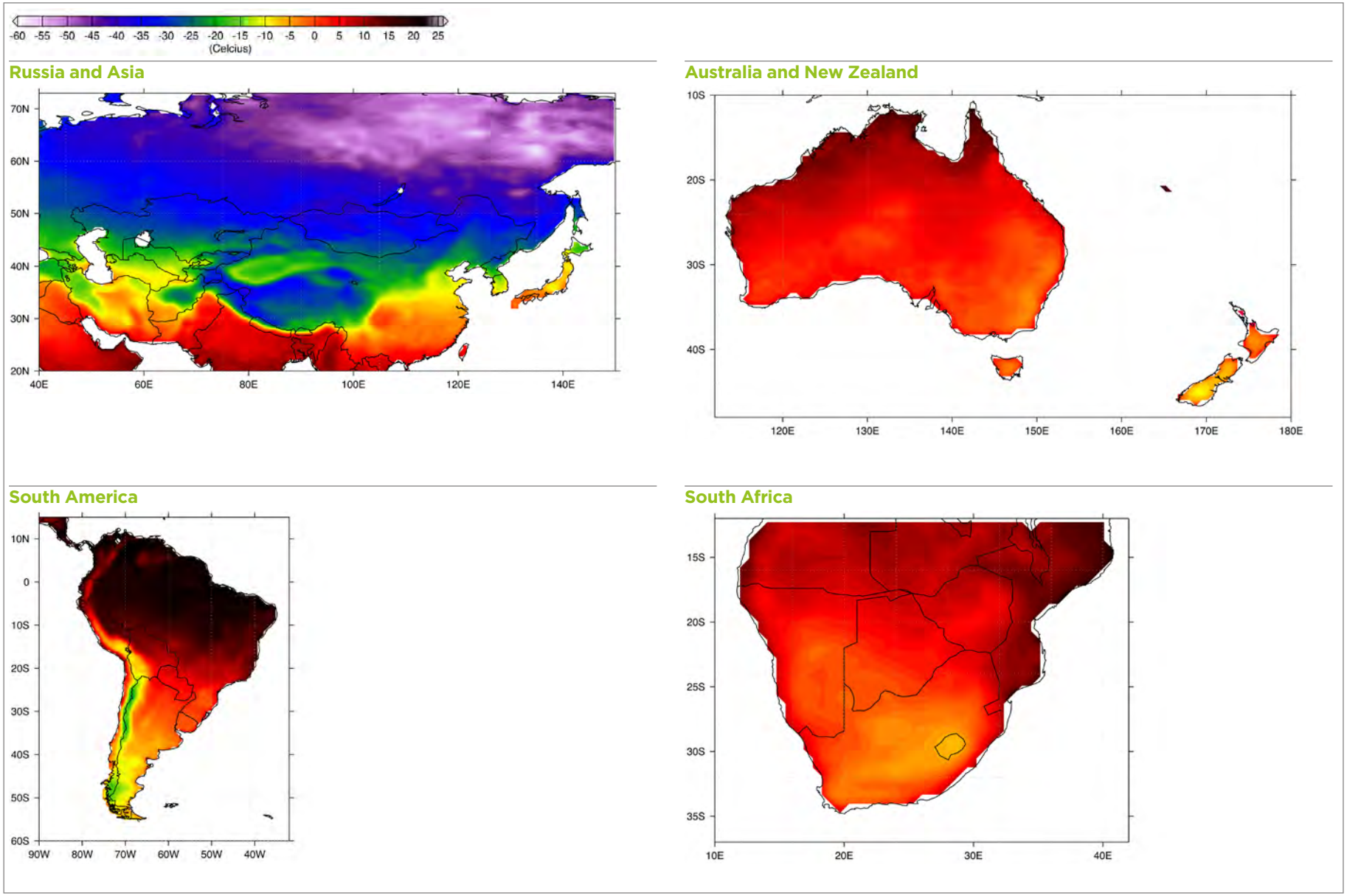


Figure 5 Average annual minimum temperature (°C) at 2m above ground (1986-2015), using data from ERA-Interim Reanalysis.

Plotted by Linda Hirons (National Centre for Atmospheric Sciences, University of Reading).

Source: Data from Dee (2011).

grown outside of its natural range, it is therefore critical to match the cold-hardiness of a tree to its planting location. Consequently, cold-hardiness is a crucial factor in selecting trees for planting. Unless otherwise indicated, all species represented in this guide have sufficient cold-hardiness for all or most of the British Isles. This means that they are capable of surviving minimum winter temperatures of around -13°C (Figure 5).

Although still classed as a 'temperate climate', other regions, including large parts of the eastern US and eastern China (*e.g.* code Cfa, Figure 2), are distinguished from the British Isles climate by their hotter summers – where the warmest month averages greater than 22°C. This additional summer heat, combined with a tendency for a rapid transition from spring to summer, can be essential for some species to thrive. It is, therefore, the lack of suitable summer temperatures, rather than insufficient cold-hardiness that often determines which species from other temperate climates will perform well in the British Isles. For example, white oak (*Quercus alba*) and closely associated oak species are widespread in the eastern US, have sufficient cold-hardiness for the British Isles, but tend not to perform well in the cooler summers. Similarly, native oaks from the British Isles (*Quercus petraea* and *Q. robur*) do not perform well in regions with hot summers. Consequently, climate-matching species to both winter and summer temperatures is essential when selecting species for amenity landscapes (Hirons and Thomas 2018).

Assuming the species is compatible with the site's climate in relation to temperature, it is access to water that is most likely to limit tree development: water availability influences almost every physiological process in the tree. Root loss during transplanting, small rooting (soil) volumes and impervious surfaces can all contribute to the rapid development of drought stress[1]. Higher air temperatures, low atmospheric humidity, and turbulent airflow caused by wind tunnels and traffic also act to increase the tree's water requirements. Consequently, for trees in paved, street environments, good tolerance to drought[2] is essential. Fortunately, critical thresholds for mortality as a result of drought stress can be characterised by evaluating quantifiable traits such as the water potential at leaf turgor loss and the vulnerability of the xylem to embolism (Hirons and Thomas 2018). Such data (where available) have been used in the development of the drought-tolerance ranking of species represented in this guide. Further details of how this was done can be found in Chapter 1.

When seeking to establish future landscapes, it is vital to acknowledge that the challenge of acquiring water (and other resources) becomes more acute for the tree as its crown develops and demands more from the soil. Therefore, future requirements of the rooting environment must be considered when selecting a tree species – mature size is particularly relevant. Landscape trees are often capable of using in excess of 100 litres per day during summer. Therefore, the rooting environment must be capable of supplying sufficient water during the growing season.

Since green infrastructure in urban environments is often closely associated with the built environment, buildings as well as other vegetation can influence the quality of the light environment that trees are planted in. Tolerance to shade is closely coupled with the successional preference of a species as well as its potential to survive in a forest understorey. A shaded forest understorey may receive as little as 0.25% of the light that reaches the forest canopy (Hirons and Thomas 2018). The leaf and photosynthetic responses to light must therefore be fundamentally different across co-occurring species found at different vertical positions in the forest. While those capable of occupying a position in the canopy may well be able to acclimate to a wide range of light environments, understorey specialists are readily damaged by light intensities found in open environments. However, they are 'calibrated' to be able to effectively photosynthesise in low-light conditions. Planting understorey species in open environments or locations surrounded by reflective surfaces will rarely be rewarding, as they are unable to process all the light efficiently. Species with good shade tolerance[3] are much more useful in shady courtyards, on the northern side of tall buildings and on the shady side of streets. Species with poor shade tolerance[4] are unsuited to such sites but will perform well on more open sites with prolonged access to direct sunlight.

[1] Strictly speaking we should refer to 'drought' as 'water deficits' because drought has a precise meteorological definition. Water deficits may arise as a result of impermeable surfaces, small rooting volumes or root damage but without the lack of precipitation needed to define a climatic drought.

[2] Species categorised as 'Drought tolerant' and 'Moderately tolerant to drought' in this guide.

[3] Species categorised as 'Shade tolerant' and 'Moderately tolerant to shade' in this guide.

[4] Species categorised as 'Partially tolerant to shade' and 'Intolerant to shade' in this guide.

Most tree species, especially those found on forested mountain slopes, require excellent drainage and soil aeration if they are to thrive. This is often lacking in amenity landscapes with poorly developed soil profiles, widespread soil compaction and impermeable sub-surface layers. As the predominant stress factor associated with waterlogging is soil hypoxia, tolerance to waterlogging is also a useful surrogate for tolerance to low soil oxygen. Roots and beneficial soil organisms require a good oxygen supply; the importance of sufficient soil aeration is therefore difficult to overstate. Cellular energy supplies are rapidly depleted in hypoxic conditions and unless the species is well adapted to waterlogging, roots quickly die. This is rapidly followed by a decline in the condition of the crown, visual symptoms of leaf wilting and, ultimately, crown dieback. Traits such as aerenchyma and enlarged lenticels around the base of the stem are associated with waterlogging tolerance, and help ventilate the oxygen-deprived roots and their associated rhizosphere (Hirons and Thomas, 2018). Unless effectively ameliorated, poorly aerated soil will restrict species choices to those with good tolerance to waterlogging[5]. These species are often found in riparian habitats associated with watercourses and other permanent bodies of water.

In temperate oceanic climates, tree tolerance to salt can be critical for tree survivorship. During winter, de-icing salts are frequently spread on roads and other paved areas to depress the freezing point of water and reduce the risks associated with ice. This often leads to high salt levels in adjacent soils and a marked reduction in the osmotic potential of the soil solution. As a result, water in the soil becomes harder for the tree to access, even in what appear to be moist soils. Species that are unable to tolerate this change in the condition of the soil water can experience water deficits. Consequently, growth rates decline and key physiological processes, such as photosynthesis, are disrupted. Sodium and chlorine ions may also accumulate to toxic levels inside plant tissues and, once a species-specific threshold for injury has been passed, cellular functions deteriorate. Leaf necrosis (dead patches of cells) and chlorosis (loss of green colour), particularly on the older leaves where the ions have had longer to accumulate, are indicative symptoms of damage (Costello *et al.* 2003).

Coastal regions are prone to salt-laden winds that are damaging to many species so careful consideration needs to be given to species selection on coastal sites. Salt-spray is also generated by traffic driving on salted roads. Therefore, trees planted in transport corridors are also required to have some tolerance to salt. Species with thick, leathery leaves tend to be more tolerant to salt-spray, particularly if they are also covered with leaf hairs. However, unlike tolerance to drought stress, quantitative traits associated with tolerance to salts held in the soil solution or air are currently unknown. For this reason, much of what we know about species' tolerance to salt is based on practitioner experience. Lists of salt-tolerant species are published in many standard plant-use texts and nursery catalogues. Despite the scales being somewhat arbitrary, these observations can provide critical insights into the suitability of trees for sites that are vulnerable to high levels of salinity.

Air pollution can take highly diverse forms and precise information on the thresholds of injury relating to specific pollutants is scarce, particularly for amenity species. As with salt, information relating to tree tolerance to air pollution is also primarily derived from practitioner experience. Nonetheless, such observations are vital when considering species selection in heavy industrial areas and transport corridors.

Trees are often associated with a particular soil type. Understanding this aspect of their habitat can help determine which species will perform best under analogous conditions in amenity landscapes. However, many species will be able to grow successfully in a wider range of soil types than is suggested by their population distribution in natural landscapes. For example, a tree that can perform well on dry, sandy soil, may also be able to perform perfectly well on other soil types but, in natural environments, they get out-competed by species that can perform even better. As a result, their tolerance to drought has pushed them towards more marginal sites: they grow well in more favourable conditions but, do not compete well in them. Similarly, pH has been shown to influence a wide range of soil factors, most notably nutrient availability, but providing the pH is not too extreme (<4 or >8), it seems to have a minimal effect on tree growth (Binkley and Fisher 2013). However, pH has been routinely

[5] **Species categorised as 'Tolerant to waterlogging' and 'Moderately tolerant to waterlogging' in this guide.**

implicated in nutrient deficiencies for some species, *e.g. Quercus palustris*, that do require an acid soil. Therefore, in general, matching species precisely to soil-type is desirable rather than essential – this is particularly true for pioneer species that tend to be able to grow on a wide range of soils. Of far greater importance is the requirement for low soil bulk density (<1.4 g cm^{-3}) and good soil aeration. Over-compacted soils and hypoxic rooting environments will be detrimental to tree roots, regardless of whether the soil-type is well matched to a species' apparent preference.

Ecosystem services

Having considered the primary criteria for tree selection – *constraints* and *tree ecophysiology* – a list of species that are likely to perform well on the planting site can be determined. This 'filtered' species list can then be evaluated according to desired *ecosystem services* and *aesthetics*.

There are various frameworks used to describe the benefits derived from ecological processes provided to humans, widely referred to as *ecosystem services*. Of the four categories used in the Millennium Ecosystem Assessment (2005), *provisioning*, *regulating* and *cultural* services are most relevant to trees in green infrastructure. *Provisioning* services provided by trees in green infrastructure can include, food and fuel supply. *Regulating* services are associated with the mitigation of unfavourable microclimates through cooling or sheltering specific spaces, a reduction in the impact of natural hazards (such as flooding), an improvement in the regulation of water flow and quality, enhancing air quality, and increased opportunities for pollinators to thrive. *Cultural* services are driven by the spiritual interaction between trees and people, recreational opportunities and the positive aesthetic impact trees have on amenity landscapes. Trees also provide habitat for other species, such as birds, bats, insects and fungi, which contribute to these cultural services as well as having a value in their own right. All these services provide benefits for human health and wellbeing as well as economic benefits, which can be reflected in avoided costs (*e.g.* flood damage; energy costs; healthcare costs) and the appreciation of assets (such as higher property values close to green space).

With such a diverse range of benefits bestowed by trees in green infrastructure, tree selection will need to be led by aspirations or requirements of the planting scheme. Further guidance on maximising ecosystem services through tree selection can be found in Chapter 3.

Aesthetics

Although *aesthetics* can be considered a cultural ecosystem service, its traditional prominence and on-going relevance for tree selection means that it should be considered as a distinctive criterion. Tree size, crown characteristics and ornamental qualities all contribute to the aesthetic impact trees have on our landscape. Well-selected trees can be continuous features of our daily lives, yet provide a dynamic visual narrative of time through their seasonal changes and incremental development.

Size, crown and ornamental characteristics are of greatest importance to the aesthetic contribution trees make to green infrastructure. Abundant flowers and vibrant autumn colours deliver the greatest visual impact and such selection criteria are worthy, providing the species is capable of thriving on the site. As with other aspects of tree performance, aesthetic functions are strongly related to overall site suitability as determined by the primary criteria for selection (Figure 1). A tree species stressed by challenging environmental conditions will not express its aesthetic potential and, consequently, have a diminished impact on the landscape in which it is planted.

Tree selection – only one component of successful tree establishment

Whilst the emphasis of this guide is on tree selection, it is vital that appropriate species selection is not seen as the only component of successful tree establishment. Three other components – *Rooting environment*, *Plant quality* and *Arboricultural practice* – are also fundamental to tree establishment (Figure 6).

The rooting environment comprised of soil (or analogous substrate) provides anchorage and the medium for water and nutrient acquisition; it is, therefore, essential to the performance of the tree.

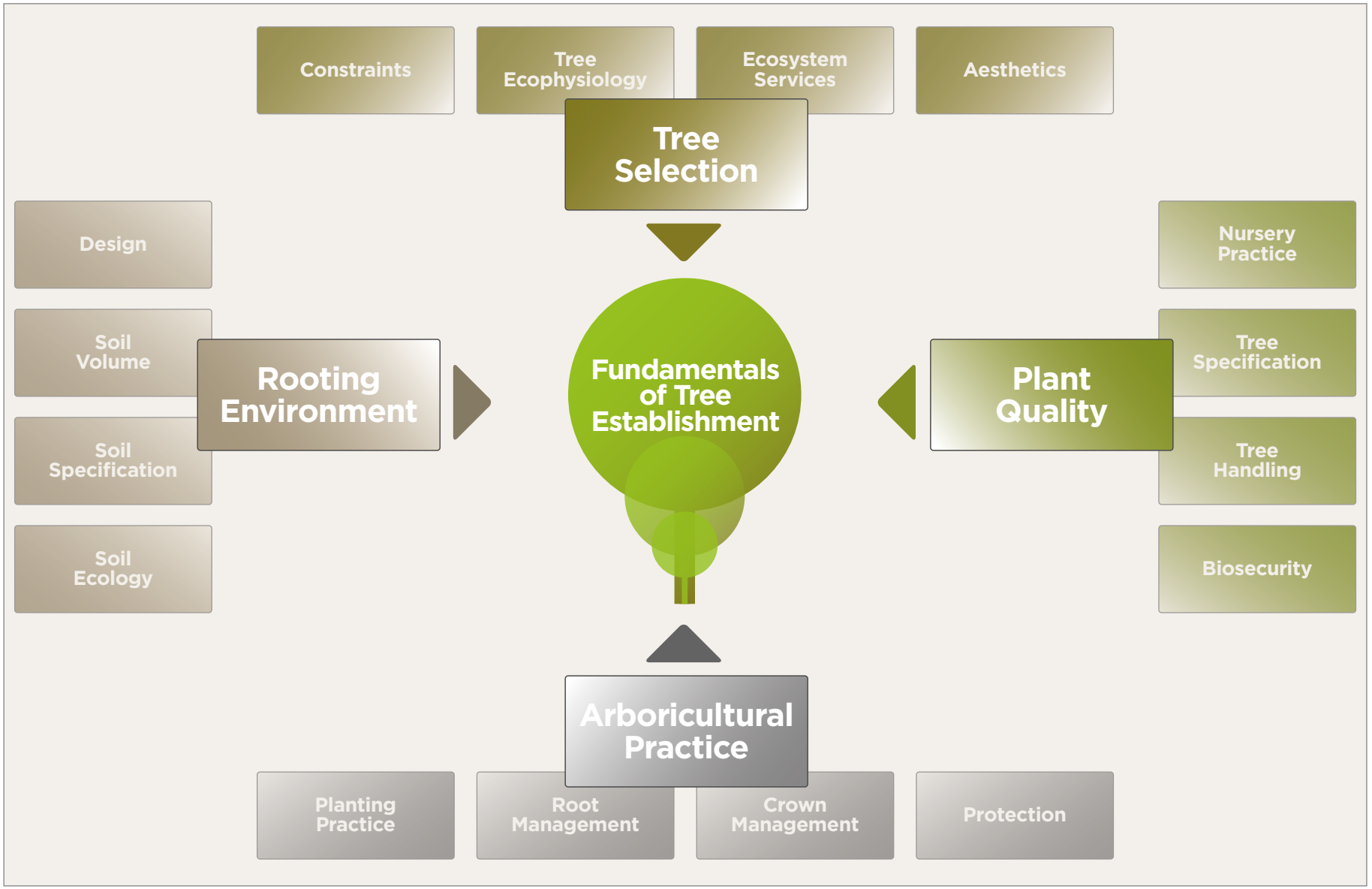


Figure 6 **Fundamental components of tree establishment are: tree selection; the rooting environment; plant quality and; arboricultural practice.**

Adapted from: Hirons and Percival (2012)

In many planting scenarios, trees may be planted with good success, providing soil compaction; low aeration and/or resource deficiencies do not act to suppress root growth. On sites with extensive paved surfaces, rooting environments benefit from being precisely designed to ensure that sufficient soil volumes exist to meet the current and future tree requirements[6]. To help ensure that soil is capable of providing sufficient water and nutrient resources, it is desirable to use specifications that provide guidance on expectations of soil texture, bulk density, aeration, hydraulic conductivity, electrical conductivity (salinity) and nutritional status: this may require specialist advice from an experienced arboriculturist. Furthermore, advocacy of approaches that promote good soil ecology is vital to the sustained performance of the rooting environment as a whole.

Healthy trees are derived from high-quality nursery stock. Ensuring excellent plant quality will be essential to secure tree establishment. Clearly, quality plant material is inextricably linked to excellent nursery practices. The adherence to *BS 8545 Trees: from nursery to independence in the landscape – Recommendations* (BSI 2014) will help ensure high-quality plant material. As a purchaser, precise specifications should always be used to provide clear guidance and expectations to the nursery. Wherever possible, the procurement of contract-grown stock can provide greater assurances to purchaser and nursery alike.

Care should also be taken to guarantee that poor handling between the tree nursery, any intermediary holding sites and the planting site do not compromise high-quality nursery stock. Key practices include: transportation in a covered vehicle as well as protection from temperature extremes, mechanical damage and root desiccation. Further advice on handling and storage can be found in BSI (2014).

Good biosecurity on the tree nursery is critical to ensure that threats posed by pathogens and pests are minimised. Whilst species diversity is strategically important to improve resilience within the urban forest, it is vital that innovative planting schemes do not compromise the health of established trees. Those procuring trees must make responsible decisions with regards to sourcing nursery stock. Biosecurity policies should be in place within each nursery; further guidance, for example from the Arboricultural Association, should also be followed.

Purposeful engagement with tree nurseries, underpinned by clear specifications, will help ensure that high-quality trees are available for your planting scheme.

Having provided a good-quality rooting environment and secured high-quality plant material, it is vital that tree establishment is not compromised by poor arboricultural practices. Poor planting practices (*e.g.* planting too deep) or insufficient protection can rapidly lead to early tree mortality. At planting, interventions to improve the quality of the root system (*e.g.* removal of root defects) and crown (*e.g.* formative pruning) will also help to reduce future maintenance requirements and promote tree longevity.

Good quality aftercare is fundamental for providing momentum to tree establishment after planting. Mulching and irrigation are paramount to help promote root development in the years following transplantation. Without these basic interventions, the prospects of successful establishment are greatly diminished. Comprehensive and extended periods of aftercare are especially important for slower growing trees, such as *Quercus robur*, *Corylus colurna* and many late-successional species (Table 2.1), however, often these species are more tolerant of environmental stress and have greater long-term potential. In all cases, good-quality planting aftercare will pay dividends in tree vitality and performance.

[6] See TDAG (2014) and Hirons and Thomas (2018) for further details on how this might be achieved.

References

Binkley, D. and Fisher, R.F. (2013) *Ecology and Management of Forest Soils*, 4th edition. Wiley-Blackwell, Chichester, UK.

BSI (2014) *BS 8545 Trees: from nursery to independence in the landscape – Recommendations*. British Standards Institution.

Costello, L.R., Perry, E.J., Matheny, N.P., Henry, J.M. and Geisel, P.M. (2003) *Abiotic Disorders of Landscape Plants: A Diagnostic Guide*. University of California, Agricultural and Natural Resources Publication 3420, CA, USA.

Dee, D.P., Uppala, S.M., Simmons, A.J., Berrisford, P., Poli, P., Kobayashi, S., Andrae, U., Balmaseda, M.A., Balsamo, G., Bauer, D.P. and Bechtold, P. (2011) The ERA-Interim reanalysis: Configuration and performance of the data assimilation system. *Quarterly Journal of the Royal Meteorological Society*, 137(656), pp.553-597.

Hirons, A.D. and Percival, G.C. (2012) Fundamentals of Tree Establishment: A Review. *In*: Johnston, M. and Percival, G. (*eds.*) *Proceedings of the Urban Trees Research Conference, 'Trees, People and the Built Environment'*. Held in Birmingham, 13-14 April 2011. Forestry Commission.

Hirons, A.D. and Thomas, P.A. (2018) *Applied Tree Biology*. Wiley-Blackwell, Oxford, UK.

Johnston, M. and Hirons, A.D. (2014) Urban Trees. In: Dixon, G. and Aldous, D. (Eds.) *Horticulture – Plants for People and Places, Volume 2*. Springer. pp.693-711.

Lambers, H., Stuart Chaplin III, F. and Pons, T. L. (2008) *Plant Physiological Ecology*, 2nd edition. Springer, Berlin, Germany.

Met Office https://www.metoffice.gov.uk/public/weather/climate/

Millennium Ecosystem Assessment (2005) *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.

Orlandini, S., Vanos, J.K., Matzarakis, A. Massetti, L. and Petralli, M. (2017) Urban Forestry and Microclimate. In: Ferrini, F., Van Den Bosch, C.C.K. and Fini, A. (eds.) *Routledge Handbook of Urban Forestry*. Taylor & Francis.

Peel, M.C., Finlayson, B.L. and McMahon, T.A. (2007) Updated world map of the Köppen-Geiger climate classification. *Hydrology and earth system sciences discussions*, 4(2) 439-473.

Sjöman, H., Morgenroth, J., Deak-Sjöman, J., Sæbø, A. and Kowarik, I. (2016) Diversification of the urban forest—Can we afford to exclude exotic tree species? *Urban Forestry Urban Greening*. (18) 237-241.

Sjöman, H., Hirons, A., Deak-Sjöman, J. (2017) Criteria in the selection of urban trees for temperate urban environments. *In*. Ferrini F., Konijnendijk van den Bosch, C., Fini, A. (Eds.) *Routledge Handbook of Urban Forestry*. Routledge. 339-362.

TDAG (2014) *Trees in Hard Landscapes; A Guide for Delivery*. Trees and Design Action Group.

Exemplar species: *Cercis siliquastrum* is a small to medium-sized tree with vibrant pink flowers that transform this roadside planting bed in late spring. This species also helps improve soil fertility.



© Henrik Sjöman

Introduction

Trees make our towns and cities better places to live. They are a fundamental component of green spaces and green networks that combine to make up our green infrastructure. Evidence of the positive contribution trees make to society is extensive and expanding: trees enrich our lives.

At the most basic level, trees improve the aesthetic appeal of urban environments, help to provide a sense of place and mark the passage of time (Figure 3.1).

Trees provide economic benefits by adding value and reducing costs. For example, residential property prices have been shown to markedly increase when they are part of, or close to, landscapes with mature trees; healthy street trees can enhance the atmosphere of commercial districts, positively affecting consumer behaviour (Wolf 2005; 2017). Costs associated with storm-water management infrastructure, health impacts of air pollution and energy usage are somewhat mitigated by trees (Roy *et al*. 2012; Mullaney *et al*. 2015).



Figure 3.1 ***Prunus sargentii*** **provides spectacular autumn colour, enhancing the appeal of this paved area and helping to mark the passage of time.** © Henrik Sjöman

The cultural services provided by trees have important benefits for our health and well-being (Wolf and Robbins 2015; van den Bosch 2017). The reasons for this are often complex, however, a number of studies help to provide insights into some important relationships between trees and human health. For example, higher tree cover within 250m of home was associated with better general health, partially mediated by lower levels of obesity and better neighbourhood social cohesion (Ulmer *et al*. 2016). Physiological studies showing reduced pulse rates and cortisol (a stress hormone) levels tangibly demonstrate the positive psychological effect exposure to trees can have on our bodies (Ochiai *et al*. 2015). Access to green infrastructure more generally has also been shown to reduce blood pressure (Grazuleviciene *et al*. 2015), improve mental health (Reklaitiene *et al*. 2014; Song *et al*; 2014; Bratman *et al*. 2015) and improve sleep patterns (Gladwell *et al*. 2016). Interestingly, it is likely that some species perform especially well when it comes to enhancing our well-being. For example, Ikei *et al*. (2015) found that the scent of oil from the Hinoki cypress (*Chamaecyparis obtusa*), widely used in soap and cosmetics in Japan, positively affects brain activity and induces a feeling of 'comfortableness'. Indeed, this type of effect is the basis for shinrin-yoku (forest-air breathing or forest bathing), a popular form of relaxation in Japan.

Support for the value of urban trees to human health and well-being also comes from studies evaluating the consequences of their loss. Since 2002, over 100,000,000 ash (*Fraxinus* spp.) have been lost in North America as a result of an invasive beetle, emerald ash borer (*Agrilus planipennis*). This huge loss of trees has been associated with increased human mortality as a result of high levels of cardiovascular and respiratory diseases (Donovan *et al*. 2013). Furthermore, an increase in crime has also been related to the large-scale tree losses due to emerald ash borer (Kondo *et al*. 2017).

Trees can also have environmental benefits for people living in urban environments. In winter, trees can provide shelter from cold wind, improving the outdoor environment for people (Deak-Sjöman *et al*.

2016). In summer, cooling as a result of shade and evapotranspiration can have a substantial impact on the thermal comfort. At a local level, by absorbing over 90% of the sun's radiation, a person in the shade of a tree can feel 10-15°C cooler (Armson *et al.* 2012; Orlandini *et al.* 2017). On a larger scale, the evapotranspiration of trees can mitigate the urban heat island effect by utilising the sun's radiative energy to evaporate water, reducing its ability to warm air and surfaces (Ennos *et al.* 2014).

Impervious surfaces in urban environments limit the infiltration of rainfall into the ground and substantially increase storm-water runoff, elevating the risk of flooding. Trees help to reduce local flood events by intercepting rainfall, delaying (or preventing) water from reaching the ground, removing water from the soil via transpiration and improving infiltration (Berland *et al.* 2017). Sustainable drainage systems (SuDS) that incorporate tree rooting environments are a further way trees can be used to reduce flood risk.

In addition to these benefits to human society, urban trees provide habitat and food for an array of wildlife, greatly enhancing the biodiversity of the urban realm. This, in turn, provides more opportunities for people to interact with wildlife, enhancing cultural ecosystem services such as education, recreation (*e.g.* bird-watching), aesthetic value and sense of place.

Without exception, species selection will have an impact on the benefits bestowed by trees to the individuals and communities that encounter them. Variation in the efficacy of a particular tree to perform well is very context dependent, but by following some basic strategies (described below), it is possible to enhance the ecosystem service provision of planting schemes.

Establish ecosystem service priorities

The term *ecosystem services* captures the vast array of benefits to human society accrued from the natural environment. For planting schemes to be most impactful, it is useful to establish ecosystem service priorities. For example, is there a need for cooling, flood mitigation, aesthetic impact or habitat for a particular species? With careful design and appropriate species selection, planting schemes can deliver multiple services. Once clarity exists on the objectives of a planting scheme, it is possible to identify species traits that enable the tree to efficiently deliver that benefit.

Trees for cooling

For cooling, the magnitude of the benefit is closely related to crown size and density. Larger crown volumes shade a greater area whilst denser crowns with a higher leaf or plant area index[1] intercept solar radiation more effectively, reducing local temperatures (Gratani and Varone 2006; Bowler *et al.* 2010; Gómez-Muñoz *et al.* 2010; Sanusi *et al.* 2017). All other factors being equal, larger trees with dense crowns are most effective at local cooling. Clearly, these criteria could be readily prioritised with judicious species selection.

Tree position is also important for shading (Figure 3.2): the service is maximized if people can access and use the space under the



Figure 3.2 The ability of trees to modify local microclimate is an important ecosystem service provided by trees. © Andrew Hirons

[1] **Leaf Area Index (LAI) is the leaf area per unit ground area; Plant Area Index also includes the stem material. Typically measured as m^2 of leaf/plant per m^2 of ground ($m^2\ m^{-2}$).**

tree, or if the tree directly shades a building where people live or work. Health benefits may be even greater where vulnerable people benefit, *e.g.* the elderly, the sick and young children.

The potential for cooling via evapotranspiration is also closely linked to species' characteristics. Trees with larger crowns (specifically leaf area) generally require more water and, therefore, provide more evaporative cooling, although substantial variation does occur as a function of species. A major source of this variation comes from the species-specific response to soil drying (Hirons and Thomas 2018). Some species aim to avoid water deficits developing by closing their stomata and reducing water loss early in the drying cycle. Other species maintain transpiration for longer during the drying cycle and maintain physiological leaf function at lower (more negative) water potentials[2]. Analysis has shown that drought tolerance, indicated by the leaf water potential at turgor loss, is strongly related to stomatal function with more drought-tolerant species keeping stomata open for longer during a drying event (Bartlett *et al.* 2016). Therefore, as a general rule, the larger, more drought-tolerant species ('moderately tolerant' and 'tolerant' in this guidance) will provide a greater evapotranspirational cooling service per unit of crown volume. This is an important consideration for species selection as cooling services are of greatest value in hot and dry conditions. The more drought sensitive species ('moderately sensitive' and 'sensitive' in this guidance) tend to deliver most of their cooling benefits through shading. Furthermore, a number of the more drought sensitive species (*e.g. Betula* spp.) will lose their leaves in response to drought, thus reducing their ability to cast shade.

Trees for flood mitigation

By intercepting rainfall, enhancing soil infiltration and removing water from the soil, trees help regulate storm-water and mitigate local flooding events. However, species' characteristics markedly influence the capacity of individual trees to regulate storm-water. Interception is governed principally by the size of the tree, leaf area, and the surface morphology of leaves and bark (Berland *et al.* 2017). Large, healthy trees with dense crowns and highly textured surfaces (leaves and bark) intercept and store water most effectively (Livesley *et al.* 2014; Van Stan *et al.* 2015; Xiao and McPherson 2011; 2016).

Leaf phenology (evergreen *vs.* deciduous) is also highly relevant as deciduous trees intercept much less rainfall during the 'leaf-off' period. Therefore, ensuring larger evergreen conifers and evergreen broadleaved species feature in planting schemes will improve year-round interception performance.

Evapotranspiration of water from the soil modulates soil water between rainfall events. As water demand is positively related to leaf area, crown size has an overwhelming influence on the ability of the tree to dry out the soil. Numerous other factors also affect the transpiration rates of trees. As a general rule, pioneer species often have higher transpiration rates, at least when water is abundant. However, as root mortality resulting from waterlogging (= oxygen deprivation) can be substantial, the rate of root recovery immediately after waterlogging will also influence the soil drying after saturating rainfall events. Larger, pioneer trees (*e.g. Alnus* spp.) that are tolerant or moderately tolerant to waterlogging are likely to perform well in this regard.

Tree pits, even for small trees, can considerably increase infiltration into soils by reducing surface run-off (Armson *et al.* 2013). Where tree pits are integrated into sustainable drainage systems (SuDS), the problems associated with high volumes of surface run-off can be reduced further. However, species that can cope with highly dynamic fluctuations in soil-water availability typified by engineered SuDS tree pits are scarce, as they are required to have some tolerance to both waterlogging and drought. To aid the overall performance of SuDS schemes, suitable species have been given the *SuDS* use potential in this guidance.

Rooting depth and morphology will also modify soil infiltration, but these characteristics are difficult to predict in the widely contrasting rooting conditions associated with urban environments. Therefore, improving soil infiltration using rooting characteristics is not a useful criterion for species selection, but simply another advantageous outcome of all trees in urban environments.

[2]**Water potential is a measure of the water status of the plant. In simple terms, the lower (more negative) the water potential, the greater the degree of water deficit within the plant. All good plant physiology books give a more detailed explanation to the interested reader.**

Trees for air quality regulation

Trees can help to remove air pollution, both by absorbing polluting gases and fine particles into their leaves, and by filtering out particles that stick to the leaves. In general, species with dense crowns and more textured leaves are most effective at filtering out pollution. Evergreen trees can provide this service all year round, whereas deciduous trees will provide little benefit during the leaf-off period. However, the impact of trees on air quality is complex and depends on local conditions. The benefits will be greatest where a dense canopy or hedge provides a barrier between the source of pollution (*e.g.* vehicles on a busy road) and a place used by people (*e.g.* a pavement, park, housing or playground). In contrast, where the canopy encloses both the source of pollution and the people, it can trap the pollution beneath it, reducing dispersion and increasing pollutant concentrations. Thus, through their influence on street ventilation, trees can play an important role in mediating local air quality. Consequently, where avenues of trees are being planted alongside busy roads, those selecting tree species must consider their canopy-forming ability and their crown density. Their ability to cope with air pollution will also be relevant.

A further way the selection of species can influence air quality is by adding texture to the surface of the land. By planting trees of different heights and dimensions, the airflow over the land's surface becomes more turbulent. This creates more mixing of air, accelerating the dispersal of pollution and reducing exposure to the pollutant.

In addition, some trees can produce allergenic pollen or biogenic volatile organic compounds (see section below on minimising disservices). Therefore, the role trees play in influencing urban air quality is complex and context dependent. More detailed information on urban air quality and its interaction with green infrastructure can be found in the *TDAG document First Steps in Urban Air Quality* (Ferranti *et al.* 2018).

Trees for carbon storage and sequestration

Trees sequester carbon dioxide from the atmosphere through the process of photosynthesis and store carbon as biomass (Nowak *et al.* 2013). As carbon is primarily stored in lignified (woody) tissues of stems and roots, larger, long-lived trees offer the greatest carbon-storage potential. For this service, size really does matter. Faster-growing species sequester carbon more rapidly than slower-growing species, for any given tree size. However, it is tree health and longevity that secure long-term carbon storage determine which species have the greatest potential for mitigating carbon emissions. Emphasis should therefore be placed on specifying larger species capable of performing well on the planting site if these services motivate planting.

Whilst urban trees can undoubtedly contribute towards long-term goals to reduce atmospheric carbon levels, it is important to set their value in context. Greater London's 8.4 million trees are estimated to store 2.4 million tonnes of carbon and sequester about 77,200 tonnes of carbon each year (Rogers *et al.* 2015). This is approximately 3% of Greater London's annual carbon emissions, or to put it another way, enough to cover its carbon emissions for about 12 days. Therefore, in the grand scheme of things, urban forests make fairly modest contributions to the global challenge of reducing carbon emissions.

However, the provision of high-quality green infrastructure is capable of modifying carbon-intensive behaviours. For example, green networks and corridors that enable commuters to walk or cycle to work will reduce carbon (and other) emissions as well as providing health benefits for those using the infrastructure. Trees will necessarily be central to the success of such schemes and will, therefore, have a useful role to play in holistic strategies focused on mitigating a city's carbon emissions.

Trees for provisioning and cultural services

Although urban trees do not play a major role in delivering provisioning services, the wood from tree removals or pruning could be used for fuel (*e.g.* in biomass boilers). Urban trees can also provide food (fruit or nuts) on a small scale, which can have cultural benefits through the recreational or educational value of gathering 'street food' from urban trees, parks, school or hospital grounds, orchards, or community gardens.

Trees deliver significant cultural services, including aesthetic value, interaction with wildlife, sense of place, and opportunities for education and recreation. This guide provides detailed information on the aesthetic qualities of trees, and the section below describes how to maximise the wildlife value of trees. Educational opportunities can be maximised through maintaining a diverse mix of trees with good wildlife value. This is aided by the provision of interpretation boards and 'tree trails' where appropriate. Sense of place is very subjective: it could be associated with native trees (characteristic of the area) or with distinctive non-native trees, but in either case it seems likely that larger mature or veteran trees might be valued more highly.

Trees for biodiversity and pollination

Other ecosystem services that are mediated by species-specific attributes include those relating to wildlife value. A diversity of tree height within a landscape will provide the vertical structure required by many birds. Larger species that mature and reach veteran status are particularly valuable for nesting and roosting, providing they are not illuminated by artificial light. Winter-roosting birds undoubtedly benefit from evergreen trees, especially conifers that have dense, protective crowns.

Co-evolution of wildlife and trees has led to native species being particularly valuable for wildlife. Trees that host a diverse range of insects, will also indirectly support birds and bats: native *Crataegus*, *Quercus* and *Salix* have excellent credentials in this regard. However, many non-native species also have value, particularly when they flower during periods when native trees do not, or have desirable fruits. In general, 'near-native' exotic species that are more closely related to native species are preferable to those that are more phylogenetically distinct. For example, many non-native *Sorbus* or *Crataegus* have excellent wildlife credentials, whilst *Eucalyptus* tends to support fewer species.

Many native and non-native species offer valuable floral resources to bees and other pollinating insects (Somme *et al.* 2016). Pale, scented flowers are particularly good for bats because they attract insects at dusk, when bats are actively foraging. However, it is important



Figure 3.3 Conifers, such as this *Cupressus arizonica* 'glauca', provide useful habitat for winter-roosting birds. This image also shows how dense crowns can intercept precipitation. © Andrew Hirons

to note that 'double-flowered' cultivars (Figure 3.4) tend to be less valuable as their nectar and pollen supply has been diminished in favour of visual flowering qualities (Corbet *et al.* 2001), and the shape of the flower may prevent access to the pollen and nectar. Therefore, where habitat provision is an important planting objective, double-flowered cultivars should be avoided.

Many fruits (especially the more fleshy berries, drupes and pomes) are also an important food source for birds and small mammals. In fact, even non-fleshy fruits and seeds can provide good nourishment for birds. In this guidance, look out for information in the 'Notes' section relating to wildlife value.

Maximising the delivery of multiple ecosystem services

With careful design, it should be possible to design planting schemes that deliver multiple services and benefits. For example, larger trees provide greater levels of carbon storage, cooling and flood prevention (Figure 3.5). In most cases, larger trees will also have



Figure 3.4 Trees with double flowers, such as this *Prunus* 'Matsumae Hanazomei', are spectacular in spring, but they have less value for insects that rely on pollen and nectar as a food source. © Andrew Hirons



Figure 3.5 Large trees, such as these *Platanus* x *hispanica*, are essential components of green infrastructure and the delivery of a range of ecosystem services. © Andrew Hirons

greater wildlife value and a higher cultural value. Therefore, making space for and planting larger species is essential to maximise the delivery of ecosystem services from our urban forest.

In addition, ensuring functional and phenological diversity, within the constraints of the planting site, can enhance some services. Phenology relates to the timing of natural events; leaf and flower phenology are particularly important considerations for impactful planting schemes (Figure 3.6). In larger planting initiatives, a diverse species palette that targets a variety of functions can add value to the planting scheme. For example, the range of benefits provided by the planting scheme can be extended by including both evergreen and deciduous trees and a mix of species with contrasting flowering periods (especially if native or near-native species are included). In this guidance, the *Tree Selector* tool will help select a range of species with diverse attributes.



Figure 3.6 Trees that flower in summer can be used to extend the flowering season of a planting scheme and provide useful sources of pollen and nectar during a period when most tree species have finished flowering. Top images: *Stewartia sinensis* flowering in early summer. Bottom images: *Tetradium daniellii* flowering in late summer. © Andrew Hirons

Minimise disservices

Whilst the understandable focus of many schemes is on the ecosystem services that can be accrued through successful tree establishment, it is important to acknowledge that trees are not ubiquitously beneficial (Lyytimäki 2017). Dense crowns will cool local areas in winter, potentially reducing the appeal of outdoor spaces. Litter from trees (*e.g.* leaves, fruit) can be a nuisance, particularly on paved sites. Some species are potentially invasive, either via vegetative or seed propagation. Poor species selection, especially in relation to mature size, can create management liabilities and conflicts with surrounding infrastructure. Where there are known problems with a particular tree species, these are noted in the '*Issues to be aware of*' section of the profile pages.

Some trees, notably wind-pollinated species, can release copious amounts of pollen. This problem can be particularly acute with male cultivars of dioecious species. In some cases, such as *Betula* spp., this pollen also carries an allergy-causing risk that should be considered in planting specifications. When planting in close proximity to vulnerable groups, such as the elderly (*e.g.* close to care homes) and young children (*e.g.* close to primary schools) the selection of species with a high allergy-causing potential should be avoided. In a more general sense, species diversity is crucial to reducing the dose potential of any single problematic species. Trees that are known to have high allergy-causing potential have been identified in the '*Issues to be aware of*' section of the profile pages. Information on allergenicity was based on Ogren (2015) and Samson et al., (2017). More information on allergies and trees can be found on the Allergy UK website, the Society for Allergy Friendly Environmental (SAFE) Gardening website and Orgren (2015).

There are several ways in which trees can negatively influence the air quality of our towns and cities. Pollen, and occasionally leaf hairs (*e.g.* from *Plantanus* x *hispanica*), are the source of particulate matter that,

quite apart from any allergy-causing potential, can reduce the local air quality. Many tree species also emit large amounts of biogenic volatile organic compounds (BVOCs). When combined with nitrous oxide pollutants (NO_x), BVOCs can, with the help of strong sunlight, form a further pollutant: ozone (O_3). For interest, those species that do emit high levels of BVOCs are mentioned in the 'Notes' section of the profiles[3]. However, whilst these species do have the potential to reduce air quality by increasing ozone, in reality, only very large-scale green infrastructure projects, dominated by high emitting species, would cause significant ozone pollution.

Survival is not enough: select trees capable of thriving in the long-term

As discussed in Chapter 2, once the constraints of a site have been fully considered, it is vital to apply ecophysiological information to the selection decision to help ensure that the tree is capable of thriving on the planting site. Trees clinging onto life do not deliver abundant ecosystem services: survival is not enough. It does not matter how profuse the flowering, how striking the autumn colour or how majestic the mature specimen promises to be, if it dies because it is poorly suited to the site, then it is only good for the saprotrophs. In itself, this is not a bad thing, but the chances are, supplementing the diet of wood decaying fungi or providing housing for specialist invertebrates is not the planting objective. Removal and replacement of dead trees is, or should be, an unnecessary management liability.

This guidance aims to bring together a broad range of information relating to species' tolerance to key environmental stressors, such as shade, drought and waterlogging. The four-level qualitative scale used for these stresses is explained in Chapter 1 and the outcomes of the species-level evaluations are collated in the *Tree Selector* tool. This information should help select trees that are capable of performing well in contrasting planting scenarios.

Strategic species diversity delivers resilience in an urban forest

There is general agreement that higher species diversity increases the resilience of ecosystems to future biotic and abiotic threats (Hooper *et al*. 2005; Smith *et al*. 2017). In the context of the urban forest, the corollary of this assumes that the greater the range of species, the more likely it is that the health of fewer trees will be compromised by any single threat. Urban forests, or sectors of the urban forest, become more vulnerable if they are comprised of only a few dominant species, as a significant climatic event, pest or pathogen outbreak may make it necessary to remove a high percentage of the trees (Sjöman *et al*. 2014). Therefore, strategic diversification of the urban tree population is critical for building resilience into the urban forest and associated green infrastructure.

The term 'strategic' is particularly relevant because simply increasing the range of species planted within our urban areas is not sufficient to build resilience within the tree population. For example, there are many species that will never be appropriate to plant in streets or paved courtyards: they do not have the traits or strategies required to cope with the conditions often associated with these locations. A diverse urban forest has little value if it leads to high mortality rates during tree establishment. Diversification should be strategic in that it should expand the range of species used from a species pool that has long-term growth potential.

Studies that include data on urban tree species diversity (*e.g. Trees in Towns II* (Britt and Johnston 2008) and i-Tree projects (*e.g.* Rogers *et al*. 2015)) can justifiably present urban forests as diverse according to widely accepted indices of biodiversity. However, these studies also indicate that whilst a broad range of species may be found in urban landscapes, a narrow range of dominant, large-crowned species provides the majority of the ecosystem services. Consequently, threats to a relatively few species disproportionately compromise the value of the urban forest as a whole. Indeed, at the local scale (*e.g.* street or park), the potential loss of a single species may remove the vast majority of tree cover in that location. Since the provision of many ecosystem services is often positively correlated with tree size, diversification should be strategic so that sites capable of supporting large specimens also support a diverse range of larger species ('Large' and 'Massive' in this guidance).

Prescriptive quotas for diversity are not always helpful as they often fail to adequately consider the scale of the planting initiative. It is the diversity at the landscape scale that is most important for building

[3] **Species known to be high BVOC-emitters produce more than 10 µg g^{-1} h^{-1} (microgram of BVOC per gram of dry weight per hour) and this information is based on Lancaster University's BVOC dataset and Samson *et al*. (2017).**

resilience in our urban forests. Consequently, it is not necessary for every planting project to have the widest variety of species possible. There are legitimate elements of urban landscape design that, for aesthetic effect, are more appropriately achieved with a narrow range of species (and/or cultivars). It may be that significant site constraints also limit the species pool from which to select. However, where design intentions or site constraints do not limit the range of species used, new planting schemes should be diverse. Indeed, the future resilience of a planting scheme is a meritorious design goal in itself. Analysis of tree diversity around a new planting scheme that reveals functional uniformity, such as dominance of spring flowering trees, could be addressed by the opportunistic introduction of new species into the local landscape. In this way it is possible to retrofit new ecosystem services into the landscape or improve the efficacy of existing services.

Vulnerabilities within the urban forest come from plantings characterised by a narrow range of species multiplied across a landscape. Diversification should be strategic so that the governance of tree populations takes place at the largest scale possible. This is often challenging to achieve in practice because no single authority has jurisdiction over tree selection criteria at a regional level. More typically, multiple stakeholders are responsible for tree selection within any one region or city; thus, coordination of species choices is difficult to realise.

Where a diverse urban forest has been identified, it is vital that complacency is not allowed to suppress the pursuit of species diversity. Those responsible for urban tree populations must be forward-looking. Whilst diversity within the tree population should be a fundamental objective in urban forest management, care should be taken to anticipate future threats. A diverse species palette often has significant value, but there are some scenarios where diverse populations of trees can still be threatened.

Seemingly diverse urban forests may be more vulnerable to an insect pest, capable of feeding on a wide range of species, than a less diverse urban forest made up of fewer susceptible species. For example, Asian longhorn beetle (*Anoplophora glabripennis*) is a threat to many key tree genera used in urban landscapes (*e.g. Acer*, *Aesculus*, *Alnus*, *Betula*, *Carpinus*, *Corylus*, *Fagus*, *Fraxinus*, *Platanus*, *Populus*, *Prunus*, *Salix* and *Ulmus*), so it is possible to have a fairly diverse urban tree population that is still endangered by certain scenarios (Sjöman *et al.* 2014). Diversification should be strategic so that future plantings are designed to extend species diversity beyond the known hosts of significant biotic threats. Information from the UK Plant Health Risk Register will be essential to help plan for a strategically diverse urban forest, as it provides a risk assessment of host species' susceptibility to known pest and pathogen threats.

When selecting trees for new planting sites, it is important to remember that trees have no foresight. They cannot anticipate the likely future stresses inherent in the planting location and they cannot anticipate the potential threat from pests and pathogens. As a result, consideration of such matters must be the responsibility of those tasked with selecting trees.

Crucially, the strategic diversification of urban forests must be achieved in a sustainable way that does not compromise the biosecurity of the urban forest by irresponsibly importing trees directly to site. Those responsible for planting trees in urban environments must follow good practice with regards to the procurement of trees so that new pests and pathogens are not introduced into our urban forests as a consequence of well-intended goals for species diversity. Further guidance on the biosecurity of tree procurement can be found in Cox and Roberts (2018), available from the Arboricultural Association.

Conclusion

Tree species selection can have a profound impact on the delivery of ecosystem services from the urban forest. Trees must be appropriately selected for sustained ecological well-being and not only for short-term aesthetic purposes. There must be strategic species diversification to enhance the resilience of tree populations to future biotic and abiotic threats. For efficient delivery of any singular or allied group of ecosystem services, it is vital trees are selected for specific traits, or constellations of traits, known to deliver that service.

Wherever possible, larger species should be planted as these have been shown to be of greatest benefit across a range of services. Functional and phenological diversity within any planting scheme can enhance the breadth and duration of any ecosystem services. Finally, every attempt should be made to minimise potential disservices provided by trees. If these basic rules are adhered to, then the value of your planting scheme will be enhanced.

References

Armson, D., Stringer, P. and Ennos, A.R. (2012) The effect of tree shade and grass on surface and globe temperatures in an urban area. *Urban Forestry and Urban Greening*, *11*(3), pp.245-255.

Armson, D., Stringer, P. and Ennos, A.R. (2013) The effect of street trees and amenity grass on urban surface water runoff in Manchester, UK. *Urban Forestry & Urban Greening*, *12*(3), pp.282-286.

Bartlett, M.K., Klein, T., Jansen, S., Choat, B. and Sack, L. (2016) The correlations and sequence of plant stomatal, hydraulic, and wilting responses to drought. *Proceedings of the National Academy of Sciences*, *113*(46), pp.13098-13103.

Berland, A., Shiflett, S.A., Shuster, W.D., Garmestani, A.S., Goddard, H.C., Herrmann, D.L. and Hopton, M.E. (2017) The role of trees in urban stormwater management. *Landscape and Urban Planning*, *162*, pp.167-177.

Bowler, D.E., Buyung-Ali, L., Knight, T.M. and Pullin, A.S. (2010) Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landscape and Urban Planning*, *97*(3), pp.147-155.

Bratman, G.N., Hamilton, J.P., Hahn, K.S., Daily, G.C. and Gross, J.J. (2015) Nature experience reduces rumination and subgenual prefrontal cortex activation. *Proceedings of the National Academy of Sciences*, *112*(28), pp.8567-8572.

Britt, C. and Johnston, M. (2008) *Trees in Towns II: A new survey of urban trees in England and their condition and management* (No. 9). Department for Communities and Local Government.

Corbet, S.A., Bee, J., Dasmahapatra, K., Gale, S., Gorringe, E., La Ferla, B., Moorhouse, T., Trevail, A., Van Bergen, Y. and Vorontsova, M. (2001) Native or exotic? Double or single? Evaluating plants for pollinator-friendly gardens. *Annals of Botany*, *87*(2), pp.219-232.

Cox, S. and Roberts, J. (2018) Application of Biosecurity, Arboriculture: Guidance note 2. Arboriculture Association. UK.

Deak-Sjöman, J.D., Hirons, A.D. and Sjöman, H. (2016) Branch area index of solitary trees: Understanding its significance in regulating ecosystem services. *Journal of Environmental Quality*, *45*(1), pp.175-187.

Donovan, G.H., Butry, D.T., Michael, Y.L., Prestemon, J.P., Liebhold, A.M., Gatziolis, D. and Mao, M.Y. (2013) The relationship between trees and human health: evidence from the spread of the emerald ash borer. *American Journal of Preventive Medicine*, *44*(2), pp.139-145.

Ennos, A.R., Armson, D. and Rahman, M.A. (2014) How useful are urban trees? The lessons of the Manchester Research Project. In: Johnston, M. and Percival, G. (eds.) *Trees, People and the Urban Environment II*. Institute of Chartered Foresters, Edinburgh, UK, pp. 62-70.

Ferranti, E.J.S., MacKenzie, A.R., Ashworth K., and Hewitt C.N. (2017) *First Steps in Urban Air Quality*. A Trees and Design Action Group (TDAG) Guidance Document. London, UK.

Gladwell, V.F., Kuoppa, P., Tarvainen, M.P. and Rogerson, M. (2016) A lunchtime walk in nature enhances restoration of autonomic control during night-time sleep: Results from a preliminary study. *International Journal of Environmental Research and Public Health*, *13*, 280.

Gomez-Muñoz, V.M., Porta-Gándara, M.A. and Fernández, J.L. (2010) Effect of tree shades in urban planning in hot-arid climatic regions. *Landscape and Urban Planning*, *94*(3-4), pp.149-157.

Gratani, L. and Varone, L. (2006) Carbon sequestration by *Quercus ilex* L. and *Quercus pubescens* Willd. and their contribution to decreasing air temperature in Rome. *Urban Ecosystems*, *9*(1), pp.27-37.

Grazuleviciene, R., Dedele, A., Danileviciute, A., Vencloviene, J., Grazulevicius, T., Andrusaityte, S., Uzdanaviciute, I. and Nieuwenhuijsen, M.J. (2014) The influence of proximity to city parks on blood pressure in early pregnancy. *International Journal of Environmental Research and Public Health*, *11*(3), pp.2958-2972.

Hirons, A.D. and Thomas, P.A. (2018) *Applied Tree Biology*. Wiley-Blackwell. Oxford, UK.

Hooper, D.U., Chapin, F.S., Ewel, J.J., Hector, A., Inchausti, P., Lavorel, S., Lawton, J.H., Lodge, D.M., Loreau, M., Naeem, S. and Schmid, B. (2005) Effects of biodiversity on ecosystem functioning: a consensus of current knowledge. *Ecological Monographs*, *75*(1), pp.3-35.

Ikei, H., Song, C. and Miyazaki, Y. (2015) Physiological effect of olfactory stimulation by Hinoki cypress (*Chamaecyparis obtusa*) leaf oil. *Journal of Physiological Anthropology*, 34:44.

Kondo, M.C., Han, S., Donovan, G.H. and MacDonald, J.M. (2017) The association between urban trees and crime: Evidence from the spread of the emerald ash borer in Cincinnati. *Landscape and Urban Planning*, 157: 193-199.

Livesley, S.J., Baudinette, B. and Glover, D. (2014) Rainfall interception and stem flow by eucalypt street trees – The impacts of canopy density and bark type. *Urban Forestry and Urban Greening*, *13*(1), pp.192-197.

Lyytimäki, J. (2017) Disservices of urban trees. In: Ferrini, F., van den Bosch, C.C.K. and Fini, A. (eds.) *Routledge Handbook of Urban Forestry*. Routledge. London pp.164-176.

Mullaney, J., Lucke, T. and Trueman, S.J. (2015) A review of benefits and challenges in growing street trees in paved urban environments. *Landscape and Urban Planning*, 134: 157-166.

Nowak, D.J., Greenfield, E.J., Hoehn, R.E. and Lapoint, E. (2013) Carbon storage and sequestration by trees in urban and community areas of the United States. *Environmental Pollution*, *178*, pp.229-236.

Ochiai, H., Ikei, H., Song, C., Kobayashi, M., Miura, T., Kagawa, T., Li, Q., Kumeda, S., Imai, M. and Miyazaki, Y., (2015). Physiological and psychological effects of a forest therapy program on middle-aged females. *International Journal of Environmental Research and Public Healt*h, *12*(12), pp.15222-15232.

Ogren, T.L. (2015) *The allergy-fighting garden: stop asthma and allergies with smart landscaping*. Ten Speed Press.

Orlandini, S., Vanos, J.K., Matzarakis, A., Massetti, L., and Petralli, M. (2017) Urban forestry and microclimate. In: Ferrini, F., van den Bosch, C.C.K. and Fini, A. (eds.) *Routledge Handbook of Urban Forestry*. Routledge. London pp.96-111.

Reklaitiene, R., Grazuleviciene, R., Dedele, A., Virviciute, D., Vensloviene, J., Tamosiunas, A., Baceviciene, M., Luksiene, D., Sapranaviciute-Zabazlajeva, L., Radisauskas, R. and Bernotiene, G. (2014) The relationship of green space, depressive symptoms and perceived general health in urban population. *Scandinavian Journal of Public Health*, *42*(7), pp.669-676.

Rogers, K., Sacre, K., Goodenough, J. and Doick, K. (2015) *Valuing London's Urban Forest: Results of the London i-Tree Eco Project*. Treeconomics, London, UK.

Roy, S., Byrne, J. and Pickering, C. (2012) A systematic quantitative review of urban tree benefits, costs, and assessment methods across cities in different climatic zones. *Urban Forestry and Urban Greening*, 11: 351-363.

Samson, R., Ningal, T.F., Tiwary, A., Grote, R., Fares, S., Saaroni, H., Hiemstra, J.A., Zhiyanski, M., Vilhar, U., Cariñanos, P. and Järvi, L. (2017) Species-Specific Information for Enhancing Ecosystem Services. In: Pearlmutter, D., Calfapietra, C., Samson, R., O'Brien, L., Ostoić, S.K., Sanesi, G. and del Amo, R.A. (*eds.*) *The urban forest: cultivating green infrastructure for people and the environment (Vol. 7)*. Springer. Berlin, Germany.

Sanusi, R., Johnstone, D., May, P. and Livesley, S.J. (2017) Microclimate benefits that different street tree species provide to sidewalk pedestrians relate to differences in Plant Area Index. *Landscape and Urban Planning*, 157: 502-511.

Smith, A.C., Harrison, P.A., Soba, M.P., Archaux, F., Blicharska, M., Egoh, B.N., Erõs, T., Domenech, N.F., György, Á.I., Haines-Young, R, Li, S, Lommelen, E., Meiresonne, L., Ayala, .M., Mononen, L., Simpson, G., Stange, E., Turkelboom, F. Uiterwijk, Veerkamp, C.J. and de Echeverria, V.W. (2017) How natural capital delivers ecosystem services: a typology derived from a systematic review. *Ecosystem Services*, *26*, pp.111-126.

Somme, L., Moquet, L., Quinet, M., Vanderplanck, M., Michez, D., Lognay, G. and Jacquemart, A.L. (2016) Food in a row: urban trees offer valuable floral resources to pollinating insects. *Urban Ecosystems*, *19*(3), pp.1149-1161.

Song, C., Ikei, H., Igarashi, M., Miwa, M., Takagaki, M. and Miyazaki, Y. (2014) Physiological and psychological responses of young males during spring-time walks in urban parks. *Journal of Physiological Anthropology*, 33:8.

Ulmer, J.M., Wolf, K.L., Backman, D.R., Tretheway, R.L., Blain, C.J., O'Neil-Dunne, J.P. and Frank, L.D. (2016) Multiple health benefits of urban tree canopy: The mounting evidence for a green prescription. *Health and Place*, *42*, pp.54-62.

van den Bosch, M. (2017) Impacts of urban forests on physical and mental health and wellbeing. In: Ferrini, F., van den Bosch, C.C.K. and Fini, A. (eds.) *Routledge Handbook of Urban Forestry* (pp. 82-95). Routledge. London.

Van Stan, J.T., Levia Jr, D.F. and Jenkins, R.B. (2015) Forest canopy interception loss across temporal scales: Implications for urban greening initiatives. *The Professional Geographer*, *67*(1), pp.41-51.

Wolf, K.L. (2005) Trees in the small city retail business district: Comparing resident and visitor perceptions. *Journal of Forestry*, *103*(8), pp.390-395.

Wolf, K.L. (2017) Social aspects of urban forestry and metro nature. *In*: Ferrini, F., van den Bosch, C.C.K. and Fini, A. (eds.) *Routledge Handbook of Urban Forestry* (pp. 65-81). Routledge. London.

Wolf, K.L. and Robbins, A.S., (2015). Metro nature, environmental health, and economic value. *Environmental Health Perspectives*, *123*(5), p.390.

Xiao, Q. and McPherson, E.G. (2011) Rainfall interception of three trees in Oakland, California. *Urban Ecosystems*, *14*(4), pp.755-769.

Xiao, Q. and McPherson, E.G. (2016) Surface water storage capacity of twenty tree species in Davis, California. *Journal of Environmental Quality*, *45*(1), pp.188-198.

Exemplar species: *Davidia involucrata* has unusual white bracts during flowering. As they flutter in the spring breeze, these give the tree huge character. Here, its broad crown provides shade for a restaurant veranda.



© Andrew Hirons

The Tree Profiles

Navigation
Contents page

– Key to Profiles
– Alphabetical Index
– The Profiles
– Tree Selector
– Bibliography

Key to Profiles

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential


Park


Paved


SuDS


Small garden


Coastal


Transport corridor

Mature size


>25M
A massive tree (capable of reaching >25m)


15-25M
A large tree (mature size of 15-25m)


10-15M
A medium tree (mature size of 10-15m)


<10M
A small tree (mature size of <10m)

Crown form


Globular – rounded, circular form; vertical and horizontal axis about equal


Ovoid – elliptic to egg-shaped, broadest at the base, vertical axis exceeding horizontal axis


Obovoid – elliptic to egg-shaped, broadest at crown apex, vertical axis exceeding horizontal axis


Conical – approaching triangular in outline, broadest at base


Columnar – cylindrical, vertical axis greatly exceeding horizontal axis


Irregular – asymmetrical, uneven outline


Weeping – weeping branches


Vase shaped

Crown density


A dense crown


A moderately dense crown


An open crown

Natural habitat



Environmental tolerance


Tolerant to shade


Moderately tolerant to shade


Partially tolerant to shade


Intolerant to shade


Tolerant to drought


Moderately tolerant to drought


Moderately sensitive to drought


Sensitive to drought


Tolerant to waterlogging


Moderately tolerant to waterlogging


Moderately sensitive to waterlogging


Sensitive to waterlogging

Ornamental qualities


Peak flowering times


Peak fruiting times


Deciduous broadleaved


Evergreen broadleaved


Deciduous conifer


Evergreen conifer


Single-stemmed


Multi-stemmed

Issues to be aware of



Alphabetical Index

Click an arrow to go to the profile page. Use the arrows top right on each profile to return.

● **Native species to the British Isles**

Fraxinus spp. are currently under trade restrictions in the UK so have been omitted from this version of the guidance.

A

Abies concolor (White fir)
Abies fraseri (Fraser fir)
Abies grandis (Grand fir)
Abies koreana (Korean fir)
Abies nordmanniana (Nordmann fir)
Abies procera (Noble fir)
Acacia dealbata (Silver wattle)
Acer buergerianum (Trident maple)
Acer campestre ● (Field maple)
Acer capillipes (Red snake-bark maple)
Acer cappadocicum (Caucasian maple)
Acer davidii (Père David's maple)
Acer x freemanii (Freeman's maple)
Acer griseum (Paperbark maple)
Acer japonicum (Full moon maple)
Acer monspessulanum (Montpellier maple)
Acer negundo (Box elder)
Acer palmatum (Japanese maple)
Acer platanoides (Norway maple)
Acer pseudoplatanus (Sycamore)
Acer rubrum (Red maple)
Acer rufinerve (Grey-budded snake-bark maple)
Acer saccharinum (Silver maple)
Acer saccharum (Sugar maple)
Acer shirasawanum (Shirasawa's maple)
Acer tataricum (Tatarian maple)
Acer tataricum* subsp. *ginnala (Amur maple)
Acer triflorum (Three-flowered maple)
Acer x zoeschense (Zoeschen maple)
Aesculus x carnea (Red horse chestnut)
Aesculus flava (Yellow buckeye)
Aesculus hippocastanum (Horse chestnut)
Aesculus indica (Indian horse chestnut)
Aesculus parviflora (Dwarf horse chestnut)
Aesculus pavia (Red buckeye)
Ailanthus altissima (Tree of heaven)
Alnus cordata (Italian alder)
Alnus glutinosa ● (Common alder)
Alnus incana (Grey alder)
Alnus x spaethii (Spaeth alder)
Amelanchier alnifolia (Alder-leaved serviceberry)
Amelanchier arborea (Downey serviceberry)
Amelanchier canadensis (Canadian serviceberry)
Amelanchier lamarckii (Serviceberry)
Aralia elata (Angelica tree)
Araucaria araucana (Monkey puzzle)
Arbutus unedo (Strawberry tree)

B

Betula ermanii (Stone birch)
Betula lenta (Cherry birch)
Betula maximowicziana (Monarch birch)
Betula nigra (River birch)
Betula papyrifera (Paper birch)
Betula pendula* subsp. *pendula ● (Silver birch)
Betula pendula* subsp. *szechuanica (Chinese white birch)
Betula pubescens ● (Downy birch)
Betula utilis* subsp. *albosinensis (Chinese red birch)
Betula utilis* subsp. *jacquemontii (White-barked Himalayan birch)
Betula utilis* subsp. *utilis (Himalayan birch)
Buxus sempervirens (Box)

C

Carpinus betulus ● (Hornbeam)
Carpinus japonica (Japanese hornbeam)
Carya illinoinensis (Pecan)
Carya ovata (Shagbark hickory)
Castanea sativa (Sweet chestnut)
Catalpa bignonioides (Indian bean tree)
Catalpa x erubescens (Hybrid catalpa)
Catalpa speciosa (Northern catalpa)
Cedrus atlantica (Atlas cedar)
Cedrus deodara (Himalayan cedar)
Cedrus libani (Cedar of Lebanon)
Celtis australis (Nettle tree)
Celtis occidentalis (Common hackberry)
Cercidiphyllum japonicum (Katsura tree)
Cercis canadensis (North American redbud)
Cercis siliquastrum (Judas tree)
Chamaecyparis lawsoniana (Lawson cypress)
x Chitalpa tashkentensis (Chitalpa)
Cladrastis kentukea (Yellow wood)
Clerodendrum trichotomum (Harlequin glorybower)
Cornus alternifolia (Alternate leaf dogwood)
Cornus controversa (Wedding cake tree)
Cornus 'Eddie's white wonder' (Hybrid dogwood)
Cornus florida (Flowering dogwood)
Cornus kousa (Chinese dogwood)
Cornus mas (Cornelian cherry dogwood)
Corylus avellana ● (Hazel)
Corylus colurna (Turkish hazel)
Corylus maxima (Filbert)
Cotoneaster frigidus (Tree cotoneaster)
Crataegus x grignonensis (Grignon hawthorn)
Crataegus laevigata ● (Woodland hawthorn)
Crataegus x lavalleei (Lavallée hawthorn)
Crataegus x media (Red thorn)
Crataegus monogyna ● (Common hawthorn)
Crataegus x persimilis (Broad-leaved cockspur thorn)
Cryptomeria japonica (Japanese cedar)
Cupressus arizonica (Arizona cypress)
Cupressus macrocarpa (Monterey cypress)
Cupressus sempervirens (Mediterranean cypress)
x Cuprocyparis leylandii (Leyland cypress)
Cydonia oblonga (Common quince)

D

Davidia involucrata (Pocket handkerchief tree)
Diospyros kaki (Chinese persimmon)

E

Elaeagnus angustifolia (Russian olive)
Eucalyptus gunnii* subsp. *gunnii (Cider gum)
***Eucalyptus pauciflora* group** (Snow gums)
Eucommia ulmoides (Guttapercha)
Euonymus europaeus (Common spindle tree)

F

Fagus orientalis (Oriental beech)
Fagus sylvatica ● (Common beech)
Ficus carica (Common fig)

G

Ginkgo biloba (Maidenhair tree)
Gleditsia triacanthos (Honey locust)
Gymnocladus dioica (Kentucky coffee tree)

H

Halesia carolina (Carolina silverbell)
Hamamelis x intermedia (Hybrid witch hazel)
Heptacodium miconioides (Seven-son flower)
Hippophaë salicifolia (Willow-leaved sea buckthorn)

I

***Ilex x altaclerensis* group** (Hybrid holly)
Ilex aquifolium ● (European holly)
***Ilex x aquipernyi* 'Dragon Lady'** (Hybrid holly)
***Ilex x koehneana* 'Chestnut Leaf'** (Chestnut leaved holly)
***Ilex* 'Nellie R. Stevens'** (Hybrid holly)

J

Juglans nigra (Black walnut)
Juglans regia (Common walnut)
Juniperus communis ● (Common juniper)
Juniperus scopulorum (Rocky mountain juniper)
Juniperus virginiana (Eastern red cedar)

Alphabetical Index

Click an arrow to go to the Profile page. Use the arrows top right on each profile to return.

● **Native species to the British Isles**

K

Koelreuteria paniculata (Golden rain tree)

L

Laburnum anagyroides (Common laburnum)
Laburnum* x *watereri (Hybrid laburnum)
Larix decidua (Common larch)
Larix kaempferi (Japanese larch)
Larix* x *marschlinsii (Hybrid larch)
Ligustrum japonicum (Japanese tree privet)
Ligustrum lucidum (Chinese privet)
Liquidambar styraciflua (Sweetgum)
Liriodendron tulipifera (Tulip tree)

M

Magnolia acuminata (Cucumber tree)
Magnolia denudata (Yulan magnolia)
***Magnolia* 'Elizabeth'** (Hybrid magnolia)
***Magnolia* 'Galaxy'** (Hybrid magnolia)
Magnolia grandiflora (Southern magnolia)
***Magnolia* 'Heaven Scent'** (Hybrid magnolia)
Magnolia kobus (Kobushi magnolia)
Magnolia* x *loebneri (Loebner magnolia)
Magnolia* x *soulangeana (Saucer magnolia)
***Magnolia* 'Spectrum'** (Hybrid magnolia)
***Magnolia* 'Star Wars'** (Hybrid magnolia)
Magnolia stellata (Star magnolia)
***Magnolia* 'Susan'** (Hybrid magnolia)
***Magnolia* 'Yellow Bird'** (Hybrid magnolia)
Malus baccata (Siberian crabapple)
Malus cultivars (Apples and crabapples)
Malus hupehensis (Chinese crabapple)
Malus sylvestris ● (European crabapple)
Malus toringo (Toringo crabapple)
Malus trilobata (Lebanese wild apple)
Malus yunnanensis (Yunnan crabapple)
Maytenus boaria (Chilean mayten)
Mespilus germanica (Medlar)
Metasequoia glyptostroboides (Dawn redwood)
Morus alba (White mulberry)
Morus nigra (Black mulberry)

N

Nothofagus antarctica (Antarctic beech)
Nyssa sylvatica (Black tupelo)

O

Olea europaea (Olive)
Ostrya carpinifolia (Hop hornbeam)

P

Parrotia persica (Persian ironwood)
Paulownia tomentosa (Foxglove tree)
Phellodendron amurense (Amur cork tree)
Picea abies (Norway spruce)
Picea breweriana (Brewer spruce)
Picea omorika (Serbian spruce)
Picea orientalis (Caucasian spruce)
Picea pungens (Colorado blue spruce)
Picea sitchensis (Sitka spruce)
Pinus nigra (Black pine)
Pinus pinaster (Maritime pine)
Pinus pinea (Stone pine)
Pinus radiata (Monterey pine)
Pinus strobus (Eastern white pine)
Pinus sylvestris ● (Scots pine)
Pinus wallichiana (Bhutan pine)
Platanus* x *hispanica (London plane)
Platanus orientalis (Oriental plane)
Populus alba (White poplar)
Populus* x *canadensis (Hybrid poplar)
Populus* x *candicans (Ontario poplar)
Populus nigra ● (Black poplar)
Populus tremula ● (Eurasian aspen)
***Prunus* 'Accolade'** (Hybrid cherry)
Prunus avium ● (Wild cherry)
Prunus cerasifera (Cherry plum)
Prunus domestica (Common plum)
Prunus dulcis (Almond)
Prunus fruticosa (Steppe cherry)
Prunus laurocerasus (Cherry laurel)
Prunus lusitanica (Portugal laurel)
Prunus maackii (Manchurian cherry)
***Prunus* 'Okame'** (Hybrid cherry)
Prunus padus ● (Bird cherry)
***Prunus* 'Pandora'** (Hybrid cherry)
Prunus sargentii (Sargent's cherry)
Prunus* x *schmittii (Hybrid cherry)
Prunus serrula (Tibetan cherry)
Prunus serrulata (Japanese cherry)
Prunus* x *subhirtella (Hybrid cherry)
***Prunus* 'Umineko'** (Hybrid cherry)
Prunus* x *yedoensis (Yoshino cherry)
Pseudotsuga menziesii (Douglas fir)
Pterocarya fraxinifolia (Caucasian wing-nut)
Pterocarya stenoptera (Chinese wing-nut)
Pyrus calleryana (Callery pear)
Pyrus communis (Common pear)
Pyrus salicifolia (Willow-leaved pear)

Q

Quercus acutissima (Sawtooth oak)
Quercus bicolor (Swamp white oak)
Quercus* x *bimondorum (Hybrid oak)
Quercus castaneifolia (Chestnut-leaved oak)
Quercus cerris (Turkey oak)
Quercus coccinea (Scarlet oak)
Quercus frainetto (Hungarian oak)
Quercus* x *hispanica (Spanish oak)
Quercus ilex (Holm oak)
Quercus palustris (Pin oak)
Quercus petraea ● (Sessile oak)
Quercus phellos (Willow oak)
Quercus robur ● (Pedunculate oak)
Quercus rubra (Red oak)
Quercus suber (Cork oak)
Quercus* x *turneri (Turner's oak)

R

Rhus typhina (Staghorn sumac)
Robinia pseudoacacia (False acacia)

S

Salix alba (White willow)
Salix babylonica (Weeping willow)
Salix caprea ● (Goat willow)
Salix daphnoides (Violet willow)
Salix pentandra ● (Bay-leaved willow)
Salix* x *sepulcralis (Weeping willow)
Sequoia sempervirens (Coastal redwood)
Sequoiadendron giganteum (Giant sequoia)
Sorbus aria ● (Whitebeam)
Sorbus* x *arnoldiana (Hybrid Sorbus)
Sorbus aucuparia ● (Rowan)
Sorbus cashmiriana (Kashmir rowan)
Sorbus commixta (Japanese rowan)
Sorbus discolor (Chinese rowan)
Sorbus intermedia (Swedish whitebeam)
***Sorbus* 'Joseph Rock'** (Hybrid Sorbus)
Sorbus latifolia (Broad-leaved whitebeam)
Sorbus pseudohupehensis (Hupeh rowan)
Sorbus thibetica (Tibetan whitebeam)
Sorbus* x *thuringiaca (Hybrid Sorbus)
Sorbus torminalis ● (Wild service tree)
Sorbus vilmorinii (Vilmorin's rowan)
Stewartia pseudocamellia (Japanese stewartia)
Stewartia sinensis (Chinese stewartia)
Styphnolobium japonicum (Japanese pagoda tree)
Styrax japonicus (Japanese snowball tree)
Syringa* x *chinensis (Chinese lilac)
Syringa reticulata (Japanese tree lilac)
Syringa vulgaris (Common lilac)

T

Tamarix gallica (French tamarisk)
Tamarix ramosissima (Salt cedar)
Tamarix tetrandra (Four-stamen tamarisk)
Taxodium distichum (Swamp cypress)

Alphabetical Index

Click an arrow to go to the Profile page. Use the arrows top right on each profile to return.

● **Native species to the British Isles**

Taxus baccata ● (Common yew)
Tetradium daniellii (Chinese bee tree)
Thuja plicata (Western red cedar)
Tilia americana (American basswood)
Tilia cordata ● (Small-leaved lime)
Tilia* x *euchlora (Caucasian lime)
Tilia* x *europaea ● (Common lime)
Tilia henryana (Henry's lime)
Tilia mongolica (Mongolian lime)
Tilia oliveri (Chinese white lime)
Tilia platyphyllos ● (Large-leaved lime)
Tilia tomentosa (Silver lime)
Tsuga canadensis (Eastern hemlock)
Tsuga heterophylla (Western hemlock)

U

***Ulmus* – resistant cultivars** (Elms)

Z

Zelkova serrata (Japanese zelkova)

Abies concolor (White fir)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of growing up to 60m in ideal conditions. Generally, smaller outside of its native environment.

A conical crown form with lower crown getting to about 8m wide at maturity.

A dense crown.

Natural habitat

Native to the western US. A late successional species of mixed conifer forests on mountain slopes, up to 3400m in southern Californian stands but only to about 600m in the more northerly stands in Oregon. Adaptable to a wide range of soils providing they are well aerated.

Environmental tolerance

Tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Flowers in early summer, fairly inconspicuous.

LATE SUMMER

Cylindrical cones (7-12cm) turn from green to purplish.

Evergreen conifer with needle leaves.

Single-stemmed. Relatively smooth grey bark on younger stems, becoming deeply furrowed with age.

Issues to be aware of

Potentially a very tall tree so requires space to grow. Numerous dwarf forms are available for planting in small garden situations.

Notable varieties

Numerous ‘dwarf’ varieties are available for use in small garden situations.

Notes

- Known to be more heat and drought tolerant than *Abies grandis*.
- Young trees are sensitive to weed competition (including turf), require humidity and ample soil moisture.
- Well established trees are less sensitive to exposure.
- There are many dwarf varieties that may be useful for small gardens.

The tree and its features





Left: A young *Abies concolor*.
© Duncan Slater

Right: A semi-mature *Abies concolor* in a park planting.
© Duncan Slater





Left: Needle leaves of *Abies concolor*. New shoot growth can be seen as lighter green. © Duncan Slater

Right: Cylindrical cones of *Abies concolor* are an attractive feature.
© Duncan Slater

Abies fraseri (Fraser fir)

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree, typically 15-25m.

Straight, conical to columnar crown.

A dense crown.

Natural habitat

A late-successional tree native to the cool, moist southern slopes of the Appalachian mountains where it co-occurs with red spruce (Picea rubens). Its naturally occurs between 1400-1800m and as far south as 36°N. Mean annual temperatures range from 2-6°C, maximum temperatures rarely exceeding 27°C and minimum temperatures -18°C. It is highly adaptable in relation to soil preference and can occupy sites on steep sites with thin rocky soils.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Flowers in early summer, fairly inconspicuous.

EARLY AUTUMN

Small (3-6cm) upright cones follow mature in early autumn.

Evergreen conifer with needle leaves.

Single-stemmed. Grey-brown bark becomes rough with age. Of little ornamental merit.

Issues to be aware of

Typically shallow rooted (20-40cm) so is vulnerable to surface disturbance.

Notable varieties

Numerous ‘dwarf’ varieties are available for use in *small garden* situations.

Notes

- Young trees are sensitive to weed competition (including turf), require humidity and ample soil moisture.
- Well established trees are less sensitive to exposure.

The tree and its features





Left: A young *Abies fraseri* showing a conical form.
© Henrik Sjöman

Right: Needle leaves of *Abies fraseri* with an apical bud.
© Ryan Charnock



Female ‘flowers’ of *Abies fraseri* tend to emerge in early summer.
© Duncan Slater

Abies grandis (Grand fir)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of exceeding 80m in favourable environments.

Conical to columnar form.

A dense crown.

Natural habitat

A late-successional tree found in the mixed conifer forests of the Pacific Northwest. It is a key species in the temperate rainforest, but can be found from British Columbia down to the Coast, Cascade and Sierra Nevada mountains of northern California. Its preferred climate is humid and cool to cold with average annual temperatures of 6-10°C. Typically found on slopes between 1400-2135m in its southern range but will grow from near sea level to over 1000m farther north. Prefers mildly acid, moist, free draining soils.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Flowers in early summer, fairly inconspicuous.

EARLY AUTUMN

Large (5-10cm) upright cones mature in early autumn.

Evergreen conifer with needle leaves.

Single-stemmed

Issues to be aware of

Capable of becoming an extremely large tree so requires plenty of space. In oceanic climates, *Abies grandis* can self seed and is potentially invasive.

Notable varieties

Some ‘dwarf’ varieties are available for use in *small garden* situations.

Notes

- Young trees are sensitive to weed competition (including turf), require humidity and ample soil moisture.
- When well established it can grow very quickly (around 1m per year).

The tree and its features





Left: Shade tolerance allows *Abies grandis* to develop well amongst other trees. © Duncan Slater

Right: A semi-mature *Abies grandis* in an open park. © Duncan Slater



Light green young growth contrasts starkly with the darker needles from previous years. © Henrik Sjöman

Abies koreana (Korean fir)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A large tree up to 18m but more commonly 10-15m. Slow growth rate.

Conical, compact form, 3-4m wide at the base.

A dense crown.

Natural habitat

Native to the southern part of the Korean peninsula where it forms low forests or shrub-forests mountainous regions between 1000-1900m. A late-successional species found in sub-alpine areas on shallow soils, low in organic matter.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Flowers in early summer, fairly inconspicuous.

LATE SUMMER

Small (4-9cm) upright cones that turn from green to blue, purplish or reddish brown.

Evergreen conifer with needle leaves.

Single-stemmed. Smooth purplish bark when young, becoming darker and rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Numerous ‘dwarf’ varieties are available for use in *small garden* situations.

Notes

- Young trees are sensitive to weed competition (including turf), require humidity and ample soil moisture.
- Slow growing even when well established.

The tree and its features



The slow-growing *Abies koreana* makes an excellent garden tree.

© Henrik Sjöman



Cones, that become prominent in late summer, are an attractive feature of *Abies koreana*.

© Henrik Sjöman

Abies nordmanniana (Nordmann fir)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of exceeding 50m in favourable environments.

Conical to columnar form.

A dense crown.

Natural habitat

A large range from eastern Europe, through the Anatolian peninsula to western Asia, especially prominent in the Caucasian mountains. A late-successional species found on deep, fertile soils at 600-2200m.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Flowers in early summer, fairly inconspicuous.

EARLY AUTUMN

Large (10-17cm) upright cones maturing by early autumn.

Evergreen conifer with needle leaves.

Single-stemmed.

Issues to be aware of

Capable of becoming an extremely large tree so requires plenty of space.

Notable varieties

Some ‘dwarf’ varieties are available for use in *small garden* situations.

Notes

– Young trees are sensitive to weed competition (including turf), require humidity and ample soil moisture.

The tree and its features



A stand of *Abies nordmanniana* displaying the strong conical growth of this species.

© Henrik Sjöman





Left: Needle leaves of *Abies nordmanniana*.

© Duncan Slater

Right: The female ‘flowers’ of *Abies nordmanniana* are attractive but fairly inconspicuous.

© Duncan Slater

Abies procera (Noble fir)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of growing up to 80m in ideal conditions. Generally, smaller outside of its native environment.

A conical crown form with lower crown getting to about 8m wide at maturity.

A dense crown.

Natural habitat

Native to the western US. A pioneer to mid-successional species of snowy mountain slopes, up to 2700m. Adaptable to a wide range of soils providing they are well aerated. Well suited to an oceanic climate.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Flowers in early summer, fairly inconspicuous.

LATE SUMMER

Cylindrical cones (10-20cm) turn from green to greyish-purple, with green bracts.

Evergreen conifer with needle leaves.

Single-stemmed. Relatively smooth grey bark on younger stems, becoming reddish-brown, fissured, checked and flaky with age.

Issues to be aware of

Potentially a very tall tree so requires space to grow.

Notable varieties

Bluish-green needles	'Glauca'.

Notes

- Providing it has sufficient soil depth *Abies procera* is known to be highly resistant to windthrow as it roots deeply.
- A fast growing *Abies* when established.

The tree and its features





Left: *Abies procera* displaying strong conical growth.
© Duncan Slater

Right: *Abies procera* has short needle leaves.
© Duncan Slater





Left: The female 'flower' of *Abies procera* develops in early summer.
© Duncan Slater

Right: Upright cones develop in late summer.
© Duncan Slater

Acacia dealbata (Silver wattle)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

SuDS

Tree size and crown characteristics

10-15M

A medium tree, typically between 5-15m tall although it has been recorded as reaching 30m in its native range.

Generally a globular crown form but can become irregular in shape.

A moderately dense crown.

Natural habitat

Native to the warm-temperate climate of southeastern Australia (including Tasmania) where it is found on the tablelands and foothills of the Australian Alps, between 50-1000m. It occurs within forests, often forming a dominant shrub in eucalypt forests. However, it is a pioneer species so rapidly becomes dominant as a small tree in clearings or on disturbed sites where it can spread into colonies. It is often found in riparian environments and can cope with a wide range of soils, partly because nitrogen-fixing bacteria aid its nutrition.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Peak flowering in early spring.

LATE SUMMER

Seed pods mature in late summer, 5-6 months after flowering.

Evergreen broadleaved species with bipinnate leaves.

Single-stemmed.

Issues to be aware of

Has the potential to form root suckers, especially after significant frosts (and fire in its native habitat). Produces large amounts of seed.

Notable varieties

Smaller form	'Gaulois Astier'.

Notes

- Requires a warm microclimate to perform well.
- Although it is moderately tolerant to shade prefers full sun in cooler climates, such as the British Isles.
- Good for bees and other insects.

The tree and its features





Left: Profuse yellow flowering is an attractive feature of *Acacia dealbata.* © Duncan Slater

Right: Bipinnate leaves give a soft appearance to the crown. © Duncan Slater





Left: Yellow flowers of *Acacia dealbata* appear in early spring. © Duncan Slater

Right: Seedpods of *Acacia dealbata* are an interesting feature, but not highly ornamental. © Duncan Slater

Acer buergerianum (Trident maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A large tree up to 25m in its native habitat but typically smaller in cultivation.

Ovoid, spreading to approximately 10m wide.

A dense crown.

Natural habitat

Native to the temperate region of eastern China, Taiwan and Japan. Found in broadleaved forests from sea level to 1500m.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Small, whitish flowers appearing in late spring.

LATE SUMMER

Samara fruits mature in late summer.

Deciduous broadleaved tree with distinctive three-lobed leaves with excellent autumn colour in the right conditions.

Single-stemmed with grey-brown bark that peels off in flakes on mature stems.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Requires a warm microclimate to perform well.
- Good for bees and other insects.
- Observed to have some tolerance to salt and air pollution.

The tree and its features



Leaves of *Acer buergerianum* with their characteristic trident shape.

© Andrew Hirons

Acer campestre (Field maple)

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

10-15M

A medium tree, typically <15m but exceptionally may reach 20m.

Natural crown form is typically globular. Some cultivars provide alternative forms.

A dense crown.

Natural habitat

Occurs naturally in most of continental Europe (except Nordic countries) and parts of western Asia and north Africa. Can be found as an understorey tree, woodland edge species as well as an open grown tree on lower hillsides, plains, steppes (margins) and riverbanks. It commonly grows as a shrub in thickets. Prefers neutral and calcareous soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Light green flowers borne in upright clusters in late spring. Fairly inconspicuous.

LATE SUMMER

Samara fruits maturing in late summer.

Deciduous broadleaf tree. Simple, five-lobed leaves that turn a golden colour in autumn.

Single-stemmed or as a multi-stemmed shrub with a grey-brown corky bark, vertically fissured on mature stems.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Natural form	‘Elsrijk’.
Narrow crown	‘Baronne’, ‘Green Column’, ‘Arends’.

Notes

- Seed propagated trees are very variable in terms of size, growth habit and seasonal properties. The use of known cultivar is essential if a predicable form is required.
- Observed to have some tolerance to salt and air pollution.
- Good for bees and other insects.

The tree and its features



A roadside planting of *Acer campestre* ‘Elsrijk’ showing a golden autumn colour.

© Henrik Sjöman





Left: Grey-brown fissured bark of *Acer campestre*.

© Duncan Slater

Right: Simple, lobed leaves of *Acer campestre*.

© Andrew Hirons

Acer capillipes
(Red snake-bark maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

In cultivation this tree can be viewed as a medium tree, growing up to 15m. Recorded up to 25m in native habitat.

Obovoid.

A dense crown.

Natural habitat

Native to the mountains of southern Japan. Found as part of the forest understorey on moderately moist, fertile soils along streams. In cultivation, it as been noted as preferring mildly acid, moist, free-draining soil.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Flowering in late spring. Clusters of small yellowish flowers, 8-12cm long, starting upright before drooping.

EARLY AUTUMN

Samara fruits 2-3cm long ripen in early autumn.

Deciduous broadleaved tree. 3-5 lobed leaves, held on a red petiole. Young leaves are red, turning dark green as they mature. Excellent purple autumn colour.

Single- or multi-stemmed. Young branches had reddish-brown bark with axial white stripes. More mature stems become green with white stripes.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

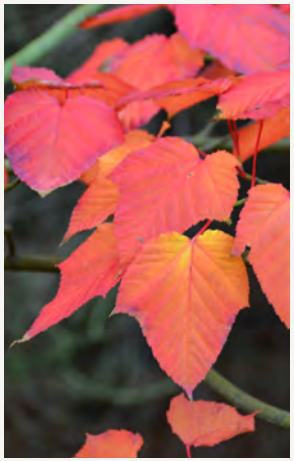
- As an understorey tree, it requires high humidity and cannot cope with weed competition (including turf). Mulching is essential.
- Sensitive to warm and dry microclimates.
- Good for bees and other insects.

The tree and its features



Acer capillipes growing in a garden location.
© Andrew Hirons





Left: The simple leaves with immature samara fruits of *Acer capillipes*.
© Andrew Hirons

Right: *Acer capillipes* displays an excellent autumn colour.
© Henrik Sjöman

Acer cappadocicum (Caucasian maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Tree size and crown characteristics

15-25M

A large tree that grows to between 20-25m.

Ovoid crown.

A moderately dense crown.

Natural habitat

Native to the Caucasus, Turkey, Northern Iran and the western central Himalaya. Found at altitudes up to 3000m, commonly along the banks of streams and on moist, shady slopes. This suggests it has some tolerance to brief periods of waterlogging. However, it is also known to have at least some tolerance to shallow, dry and calcareous and lime-rich soils.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Yellow-green flower clusters emerge with the leaves in late spring.

EARLY AUTUMN

Samara fruits mature in early autumn.

Deciduous broadleaved tree. Leaves have 5-7 lobes, they are crimson when young, turning dark green with age. In autumn leaves turn yellow.

Single- and multi-stemmed. Mature stems have a light-grey bark with vertical fissures, young shoots often appear striped.

Issues to be aware of

Root suckers can cause a nuisance in some situations.

Notable varieties

Yellow leaved	‘Aureum’.
Red leaved	‘Rubrum’.

Notes

– Good for bees and other insects.

The tree and its features



A young *Acer cappadocicum* growing in a parkland situation.

© Andrew Hirons





Left: The simple, lobed leaves of *Acer cappadocicum*.

© Andrew Hirons

Right: Yellow-green flower clusters emerge in late spring with the leaves.

© Andrew Hirons

Acer davidii
(Père David's maple)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree growing up to 15m but, more typically, 10-12m.

Variable, typically obovoid to ovoid.

A moderately dense crown.

Natural habitat

Native to central China, found as part of the forest understorey, up to 3000m. Noted as preferring mildly acid, moist but well drained soils. There is very scarce information on natural habitat preferences and environmental tolerances present in the English language literature.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Yellowish flowers on pendulous clusters.

EARLY AUTUMN

Yellow-green samara fruits mature in early autumn.

Deciduous broadleaved tree. Leaves on young trees and young shoots typically have three lobes but as the tree matures entire leaves are formed. Good autumn colour.

Single- and multi-stemmed. Belonging to the 'snake-bark' maples, it has striated bark. Grey, green or reddish with white stripes.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

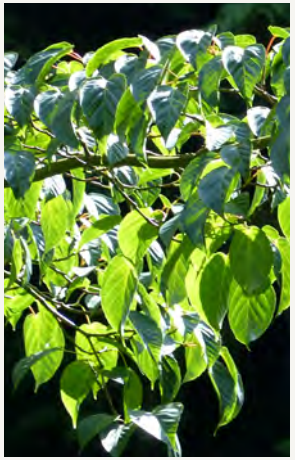
The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- As an understorey tree, it requires high humidity and cannot cope with weed competition (including turf). Mulching is essential.
- Sensitive to warm and dry microclimates.

The tree and its features





Left: A young *Acer davidii* growing in a garden situation.
© Duncan Slater

Right: Simple leaves of a mature *Acer davidii*.
© Andrew Hirons





Left: The snake-bark of *Acer davidii*.
© Duncan Slater

Right: Young samara fruits of *Acer davidii*.
© Andrew Hirons

Acer x freemanii (Freeman's maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS

Tree size and crown characteristics

15-25M

A large hybrid tree growing to 25m.

An ovoid crown.

A moderately dense crown.

Natural habitat

A naturally (and artificial) hybrid that occurs where the ranges of the parent species, *Acer rubrum* and *A. saccharinum*, overlap. Found naturally in floodplain and lowland deciduous forest communities of eastern North America. Prefers mildly acidic soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Red flowers appear in clusters. Separate male and female flowers occurring on the same tree or on separate trees in early spring.

EARLY SUMMER

Samara fruits maturing in early summer.

Deciduous broadleaved tree. Simple leaves with five lobes. Excellent autumn colour, except incalcareous or dry conditions.

Single-stemmed. Light grey bark, smooth initially but becoming scaly with age.

Issues to be aware of

Slightly brittle wood (but less so that Acer saccharinum) so exposed locations should be avoided.

Notable varieties

Hybrid-type habit	'Autumn Blaze', 'Autumn Fantasy'.
Upright/Columnar habit	'Armstrong'.

Notes

– A fast growing and readily established tree.

The tree and its features



Acer x *freemanii* makes an attractive urban tree, especially in autumn.

© Henrik Sjöman



The simple, lobed leaves of *Acer* x *freemanii*.

© Andrew Hirons

Acer griseum (Paperbark maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree growing up to 12m.

A globular to ovoid crown.

A moderately dense crown.

Natural habitat

Native to central China. Noted as preferring acid to neutral soils that are free draining. Information on this species' habitat is scarce in the English language literature.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Yellow flowers emerging with new leaves in late spring.

EARLY AUTUMN

Samara fruits mature in early autumn.

Deciduous broadleaved tree with trifoliate leaves.

Single- and multi-stemmed. Highly ornamental cinnamon coloured peeling bark.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Slow growing but worth the wait. Worth considering large planting stock if immediate impact is desired.

The tree and its features



A well established mature *Acer griseum* displaying a globular crown.

© Andrew Hirons





Left: Attractive cinnamon coloured peeling bark is an ornamental feature of *Acer griseum*.

© Andrew Hirons

Right: Yellow flowers emerge with the young leaves.

© Andrew Hirons

Acer japonicum (Full moon maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree that grows up to 12m.

Globular crown, but variable.

A dense crown.

Natural habitat

Native to the northern Japan. Found on mountain slopes up to 1800m as an understorey tree in deciduous forests. Information on this species' habitat is scarce in the English language literature.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Small red flowers held in clusters appear before the leaves.

LATE SUMMER

Samara fruits mature in late summer.

Deciduous broadleaved tree. Seven to eleven lobes. Large variety of leaves found across the cultivars. Stunning autumn colours from creams to oranges and reds.

Single- or multi-stemmed with smooth grey bark.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

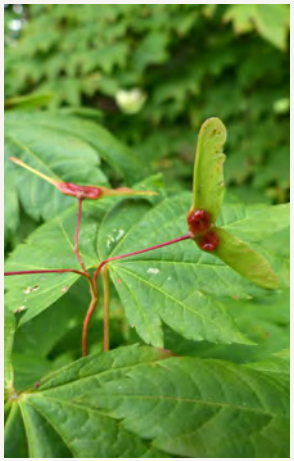
The tree and its features



A globular crown of *Acer japonicum* growing well in a garden situation.

© Andrew Hirons





Left: Very attractive, simple, lobed leaves of *Acer japonicum* will display excellent autumn colours.

© Andrew Hirons

Right: Young samara fruits of *Acer japonicum*.

© Andrew Hirons

Acer monspessulanum (Montpellier maple)

Use potential

Park

Paved

Coastal

Tree size and crown characteristics

10-15M

A medium tree up to 15m, more typically 10m.

Globular crown.

A dense crown.

Natural habitat

Native to the warm-temperate and Mediterranean regions of southern and central Europe, north Africa and central Asia. Grows on sandy loam soil and dry gravelly slopes of various aspects up to 1700m. Preferring neutral or calcareous soil. Found in coastal regions, particularly in the Balkans.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Yellow-green on pendulous inflorescences appearing in late spring.

LATE SUMMER

Reddish samaras maturing in late summer.

Deciduous broadleaved tree. Three lobed, dark green leaves with a glossy upper surface.

Single- or multi-stemmed. Dark-grey bark developing fissures with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Slow growing in cooler environments, performs best in a warm microclimate.

The tree and its features



Acer monspessulanum in a garden situation.

© Andrew Hirons





Left: Small, lobed leaves of *Acer monspessulanum*.

© Andrew Hirons

Right: Young samara fruits of *Acer monspessulanum* mature by late summer.

© Andrew Hirons

Acer negundo (Box elder)

Use potential

Park

SuDS

Tree size and crown characteristics

15-25M

A large tree growing up to 25m.

Globular to irregular crown form. Becoming 10-15m wide.

A moderately dense crown.

Natural habitat

Native to North America. Enjoys humid areas and can often be found in riparian zones along the shores of permanent watercourses, where it acts as a pioneer.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Dioecious: male and female flowers appearing on different plants. Male flowers in dense red clusters. Female flowers in long pendulous racemes. Appearing before leaves in spring.

LATE SUMMER

Samara fruits held on pendant racemes of female trees.

Deciduous broadleaves tree. Pinnate leaves with three or five leaflets. Yellow in autumn.

Single- and multi-stemmed tree. Light grey to brown bark, developing fissures with age.

Issues to be aware of

Considered invasive in some parts of North America, Europe and temperate Asia. However, not generally considered invasive in the British Isles. *A. negundo* has brittle wood, this should be considered when placing the tree. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Variegated leaves	'Aureovariegatum' and 'Aureomarginatum' are standard variegated leaves. 'Flamingo' has variegated leaves with cream to light-pink margins.

Notes

- A fast growing and easy to establish species.
- Although partially tolerant to shade, branches that are shaded are often shed. Therefore, planting in full sun is preferable.

The tree and its features



A large *Acer negundo* showing a characteristically broad crown.

© Henrik Sjöman



Left: The tassel-like male flowers of *Acer negundo*.

© Duncan Slater

Right: Samara fruits of *Acer negundo* hang in pendulous clusters.

© Duncan Slater

Acer palmatum (Japanese maple)

Use potential

Park

Small garden

Tree size and crown characteristics

A medium tree growing up to 15m. Often less than 10m in cultivation.

<10M

Globular to irregular crown form.

A moderately dense crown.

Natural habitat

Native to Japan, Taiwan, Korea and eastern China. An understorey species of found up to 1100m. Requires consistently moist soil but cannot tolerate waterlogging.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

Small red – purple flowers held on corymbs appearing in late spring.

LATE SPRING

Small samara fruits maturing in early autumn.

EARLY AUTUMN

Deciduous broadleaved tree. Palmate leaves, five to seven lobed. Gives spectacular autumn colour, variable by cultivar.

Single- or multi-stemmed. Smooth, reddish on young stems, turning grey-brown as stem matures.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

There are so many cultivars of this species that it is best to talk to you nursery about your requirements. Cultivars vary by leaf colour, leaf form, shoot development and tree size.

Notes

- Although it can be considered tolerant to shade, it grows best in partial shade.

The tree and its features



A globular crown of *Acer palmatum*.

© Andrew Hirons



Acer palmatum gives a spectacular autumn display.

© Andrew Hirons

Acer platanoides (Norway maple)

Use potential

Park

Paved

Tree size and crown characteristics

15-25M

A potentially massive tree capable of reaching 30m in favourable conditions. Cultivars tend to be smaller.

Ovoid to globular crown form. Crown spread can become over 20m.

A dense crown.

Natural habitat

Native to continental Europe where it has a very wide distribution within the cool-temperate region. It prefers nutrient rich sites of sunny slopes but is a highly adaptable and competitive woodland species. Tends to be absent from areas of peaty and consistently wet soils.

Environmental tolerance

Tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Greenish-yellow held on upright umbels appear before the leaves in early spring.

LATE SUMMER

Samara fruit matures in late summer.

Deciduous broadleaved tree. Leaves five-lobed. Autumn colour is excellent in many cultivars that do not have purple/red or variegated foliage.

Single-stemmed. Grey-brown bark, smooth when young but developing vertical fissures with age.

Issues to be aware of

A. platanoides release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type habit	‘Emerald Queen’, ‘Farlakes Green’, ‘Summershade’.
Upright/columnar habit	‘Cleveland’, ‘Columnare’, ‘Fairview’, ‘Olmsted’.
Compact rounded	‘Globosum’.
Purple/Red foliage	‘Crimson King’, ‘Crimson Kentry’, ‘Faassen’s Black’. ‘Schwedleri’, ‘Royal Red’, ‘Deborah’, ‘Fairview’.
Yellow	‘Princeton Gold’.
Variegated	‘Drummondii’.

Notes

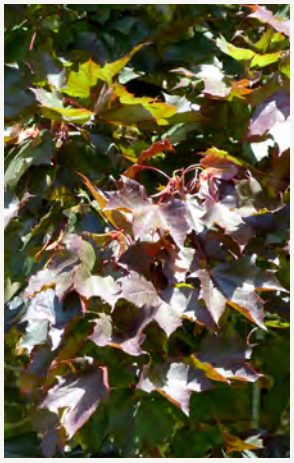
- Seed propagated trees are very variable in terms of size, growth habit and seasonal properties. The use of known cultivar is essential if a predicable form is required.
- Observed to have some resistance to air pollution.

The tree and its features



Acer platanoides can make imposing trees in park situations.
© Andrew Hirons





Left: Attractive lobed leaves of *Acer platanoides*.
© Andrew Hirons

Right: Purple-leaved cultivars, such as this *Acer platanoides* ‘Crimson King’, can provide contrast to a planting scheme. © Andrew Hirons

Acer pseudoplatanus (Sycamore)

Use potential

Park

Coastal

Tree size and crown characteristics

15-25M

A potentially massive tree capable of reaching 40m in favourable conditions. Cultivars are often much smaller.

Ovoid to globular. Broad crown capable of exceeding 20m in width.

A dense crown.

Natural habitat

Native to cool-temperate continental Europe and parts of western Asia, naturalised in the British Isles. Found in deciduous woodland habitat up to 1500m. In drier regions of its range, it prefers the cooler north facing slopes. It can cope with a wide range of soils, including calcareous, but does not tolerate consistently wet, waterlogged sites. Also found in coastal regions where it can withstand salt-laden winds.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Yellowish green flowers held on pendulous racemes.

LATE SUMMER

Samara fruits maturing in later summer.

Deciduous broadleaved tree. Leaves usually five lobed and dark green. Poor autumn colour.

Single-stemmed. Young stems have smooth to finely-fissured bark whilst mature stems have large elongated bark scales that peel off to reveal reddish brown layer underneath.

Issues to be aware of

Invasive in some regions. Horses eating seeds or seedlings may develop atypical myopathy. *A. pseudoplatanus* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type habit	'Negenia'.
Upright/columnar habit	'Erectum'.
Red/Purple foliage	'Spaethii', 'Autropurpureum'.
Yellow	'Worley', 'Brilliantissimum' (starting with pink hue ending up as a yellow/light-green).
Variegated	'Leopoldii'.

Notes

- Well established trees grow fast. They cast a deep shade so not much will grow underneath them.
- Observed to have some resistance to air pollution.

The tree and its features



A mature *Acer pseudoplatanus* with a broad, globular crown.
© Andrew Hirons





Left: Large bark scales are characteristic of mature stems in *Acer pseudoplatanus*. © Andrew Hirons

Right: *Acer pseudoplatanus* 'Brilliantissimum' has young leaves that emerge pink before turning light-green.
© Andrew Hirons

Acer rubrum (Red maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS | Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 40m in favourable environments. Cultivars are usually much smaller.

Ovoid to globular crown.

A moderately dense crown.

Natural habitat

Native to eastern North America where it has a huge natural range. It prefers lowland mesic (moist) deciduous woodland and floodplains, including quite poorly drained sites. However it may also be found on some upland sites as it can cope with shallow, nutrient poor soils. Does not tolerate calcareous soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Red flowers appear in clusters. Separate male and female flowers occurring on the same tree or on separate trees in early spring.

EARLY SUMMER

Samara fruits maturing in early summer.

Deciduous broadleaved tree. Simple leaves with three to five lobs. Excellent red or crimson autumn colour, except in calcareous or dry conditions.

Single-stemmed. Light grey bark, becoming scaly with age.

Issues to be aware of

Develops a very shallow root system, particularly on poorly drained sites. Potentially invasive, if this is a concern, plant a sterile cultivar such as 'Autumn Flame' or a male cultivar such as 'Brandywine' or 'Indian Summer' to prevent spread by seeding. *A. rubrum* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type habit	'Embers', 'Indian Summer', 'October Glory'.
Upright/Columnar habit	'Bowhall', 'Doric', 'Scanlon', 'Karpick'.
Autumn colour	'Red Sunset', 'October Glory'.
No seeds	'Autumn Flame', 'Brandywine', 'Indian Summer'.

Notes

- Seed propagated trees are very variable in terms of size, growth habit and seasonal properties. The use of known cultivar is essential if a predicable form is required.
- Observed to have some tolerance to salt and air pollution.

The tree and its features





Left: A young *Acer rubrum* 'October Glory' showing strong growth in a garden location. © Andrew Hirons

Right: *Acer rubrum* has simple, three to five lobed leaves. © Andrew Hirons





Left: The red autumn leaves are a highly ornamental feature of *Acer rubrum*. © Henrik Sjöman

Right: Samara fruits develop shortly after flowering. These often have an attractive reddish hue. © Duncan Slater

Acer rufinerve
(Grey-budded snake-bark maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree growing up to 15m.

Obovoid to globular crown no more than 7m wide.

A moderately dense crown.

Natural habitat

Native to the understorey of mountain forests in Japan up to 2500m. Usually found on rather dry soils from the middle to upper slopes in deciduous forests.

Environmental tolerance

Estimated to be tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Flowers appear in late spring, initially on upright racemes but they later begin to droop.

LATE SUMMER

Samara fruits mature in late summer.

Deciduous broadleaved tree. Simple leaves, three to five lobes. Excellent autumn colour, orange-red to scarlet-red.

Single- or multi-stemmed. One of the snake-bark maples: on younger stems, white axial strips form on a green background. Bark becomes grey in older stems.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



Acer rufinerve growing well in a shady location.

© Andrew Hirons





Left: *Acer rufinerve* has a characteristic 'snake-bark'.

© Andrew Hirons

Right: Simple, lobed leaved of *Acer rufinerve*.

© Andrew Hirons

Acer saccharinum (Silver maple)

Use potential

Park

SuDS

Tree size and crown characteristics

15-25M

A potentially massive tree growing up to 40m in favourable conditions. Typically smaller in cultivation.

Globular crown.

An open crown.

Natural habitat

Native to eastern North America. It is a lowland floodplain tree found in mesic (moist) temperate deciduous forest up to 600m.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Green-yellow clusters of flowers appear before leaves in early spring.

EARLY SUMMER

Samara fruit is mature by early summer.

Deciduous broadleaved tree. Simple, five lobed leaves, light green above and silvery below. Leaves turn yellow in autumn.

Single-stemmed. Light grey bark becoming scaly on older stems.

Issues to be aware of

Silver maple has weak, brittle wood so should not be used as a street tree or close to infrastructure. A vigorous shallow root system may cause problems with hard surfaces. Invasive in some regions. *A. saccharinum* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Cut leaf	'Asplenifolium', 'Born's Gracious', 'Lacinatum Wieri'.
Upright/Columnar habit	'Pyramidale'.

Notes

- A fast growing species that readily establishes.
- Useful on sites where rapid establishment is preferred. However, starts to decline after 50 to 75 years.
- The cultivar 'Pyramidale' is more tolerant to wind exposure than species type.

The tree and its features



Acer saccharinum establishes readily and is fast growing.

© Henrik Sjöman



Acer saccharinum 'Lacinatum Wieri' has attractive cut leaves.

© Andrew Hirons

Acer saccharum (Sugar maple)

Use potential

Park

Tree size and crown characteristics

15-25M

A potentially massive tree capable of reaching 40m in favourable conditions. Typically smaller in cultivation.

Globular to ovoid crown. Crown spread is usually less than 10m.

A dense crown.

Natural habitat

Native to the mesic (moist) deciduous forests of eastern North America. Requires, deep fertile and well-drained soils.

Environmental tolerance

Tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of greenish-yellow flowers appearing with the leaves in late spring.

EARLY AUTUMN

Samara fruits mature in early autumn.

Deciduous broadleaved tree. Simple five lobed, palmate leaves. Turning yellow in autumn.

Single-stemmed. Mature stems develop elongated scales that become detached over time.

Issues to be aware of

Allelopathic roots may inhibit the growth of neighbouring trees, particularly if they are native to eastern deciduous forests of North America.

Notable varieties

Species type habit	'Legacy', 'Green Mountain'.
Upright/Columnar habit	'Newton Sentry'.

Notes

– Seed propagated trees are very variable in terms of size, growth habit and seasonal properties. The use of known cultivar is essential if a predicable form is required.

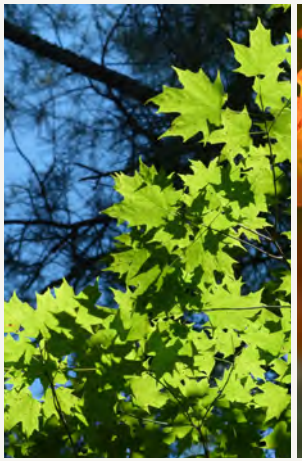
The tree and its features





Left: A mature *Acer saccharum*.
© Andrew Hirons

Right: A young *Acer saccharum* beginning to display its spectacular autumn colour. © Henrik Sjöman





Left: *Acer saccharum* leaves highlighted by sunlight.
© Andrew Hirons

Right: The autumn colour of *Acer saccharum* is highly ornamental.
© Henrik Sjöman

Acer shirasawanum (Shirasawa's maple)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A medium tree that can eventually reach 15m in favourable conditions. It tends to be less than 8m in cultivation.

Globular crown form.

A dense crown.

Natural habitat

Native to the low mountain deciduous forest of Japan. Found as part of the understorey on moist but well-drained sites on mountain slopes between 700-1800m. In cultivation, known to prefer light, moist, mildly acidic organic soils.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Upright clusters of flowers with creamy petals and red sepals and anther. Appearing with the leaves in later spring.

EARLY AUTUMN

Samara fruits mature in early autumn.

Deciduous broadleaved tree. Simple nine to eleven lobed leaves. Spring colour yellow with leaves turning orange or crimson red in autumn.

Multi-stemmed or with a very short single stem. Light brown bark axially striated with grey-green strips.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Yellow leaves	'Aureum'.

The tree and its features





Left: *Acer shirasawanum* 'Aureum' grows well amongst other vegetation. © Duncan Slater

Right: *Acer shirasawanum* leaves and flowers. © Henrik Sjöman



Acer shirasawanum leaves and samara fruits. © Duncan Slater

Acer tataricum (Tatarian maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Paved
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

10-15M

A medium tree or large shrub growing up to 12m.

An obovoid tree with a broad-spreading crown.

A moderately dense crown.

Natural habitat

Native to warm-temperate regions of eastern Europe, Central Asia and Russia up to 2200m. It occurs in the forest steppe and steppe zones in as an understorey tree, particularly on forest margins. In the steppes, it is found on the slopes of gullies. This tree is known to have good tolerance to drought, salt, air pollution and wind.

Environmental tolerance

Moderately tolerant to shade.

Tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Creamy, fragrant flowers on panicles appearing in late spring.

EARLY AUTUMN

Samara fruits maturing in early autumn. Pink to bright red as they mature.

Deciduous broadleaved tree. Variable leaf shape: unlobed on mature stems, three, or five lobes on younger stems. Good yellow autumn colour.

Multi-stemmed, occasionally single-stemmed. Grey-brown with small fissures.

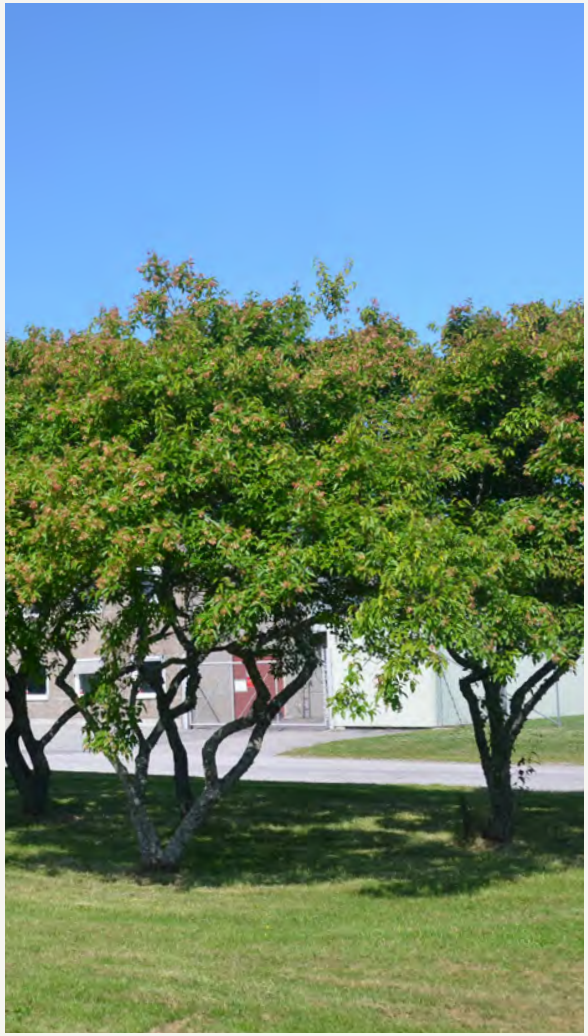
Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



Acer tataricum typically comes as a multi-stemmed tree.

© Henrik Sjöman

Acer tataricum subsp. *ginnala* (Amur maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M
A small tree or large shrub growing up to 10m.

A squat obovoid tree, often broader than it is tall.

A dense crown.

Natural habitat

Native to Russia, China, Korea and Japan. Found in sparse forests 100-800m. This tree in known to be tolerant drought, salt, air pollution and wind but little information is recorded about its preferred habitat in the English language literature.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING
Creamy, fragrant flowers on panicles appearing in late spring.

EARLY AUTUMN
Samara fruits maturing in early autumn.

Deciduous broadleaved tree. Three lobed. Excellent red autumn colour, although this is often short-lived as the leaves drop quite quickly.

Multi-stemmed. Grey-brown with small fissures.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- This sub species has better autumn colour than *Acer tataricum*.
- Often sold as *Acer ginnala*.
- Observed to have some tolerance to salt and air pollution.

The tree and its features



Acer tataricum subsp. *ginnala* makes an attractive garden tree.
© Henrik Sjöman





Left: Young leaves of *Acer tataricum* subsp. *ginnala* emerge red, before turning green.
© Henrik Sjöman

Right: Samara fruits of *Acer tataricum* subsp. *ginnala*.
© Henrik Sjöman

Acer triflorum
(Three-flowered maple)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m in favourable conditions.

A globular to ovoid crown.

A moderately dense crown.

Natural habitat

Native to North east Asia (Manchuria) and the Korean peninsula.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Yellow flowers in groups of three (triflorum) appear in late spring.

EARLY AUTUMN

Samara fruits mature in early autumn.

Deciduous broadleaved tree. Trifoliate dark green leaves. Excellent red autumn colour, even on shady sites.

Single- or multi-stemmed. Cinnamon colour exfoliating bark is a highly attractive feature.

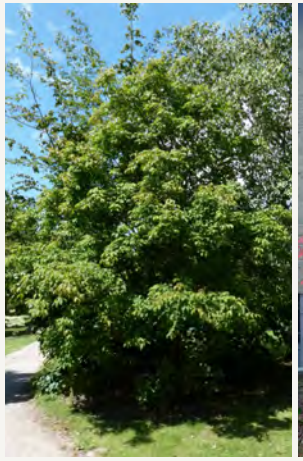
Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features





Left: *Acer triflorum* makes an attractive garden tree. © Andrew Hirons

Right: The excellent autumn colour is a real asset of *Acer triflorum*. © Henrik Sjöman





Left: Exfoliating bark is attractive on mature *Acer triflorum* trees. © Andrew Hirons

Right: Trifoliate leaves turn from green to red during autumn. © Andrew Hirons

Acer x zoeschense (Zoeschen maple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Paved
SuDS

Tree size and crown characteristics

15-25M

A large tree growing up to 20m.

An ovoid crown.

A moderately dense crown.

Natural habitat

Not a naturally occurring hybrid. Its parents are *Acer campestre* and *A. cappadocicum* subsp. *lobelii*. so has similar habitat requirements to them.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Moderately tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Yellow-green flowers held in upright clusters appear after the leaves in early summer.

EARLY AUTUMN

Samara fruits mature in early autumn.

Deciduous broadleaved tree. Simple, five or seven lobed leaves, glossy and dark green in colour. Good autumn colour with leaves turning orange to red.

Single-stemmed. Light grey bark, less corky than its parent *Acer campestre*.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Hybrid type habit	'Annae'.

Notes

– An underused maple worthy of greater attention.

The tree and its features



A mature *Acer* x *zoeschense* displaying an ovoid crown.

© Andrew Hirons



Simple, glossy, five to seven lobed leaves are dark green in summer but typically turn orange to red in autumn.

© Andrew Hirons

Aesculus x *carnea* (Red horse chestnut)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m.

A globular crown that can get up to 15m wide.

A dense crown.

Natural habitat

An artificially occurring hybrid: parents are *Aesculus hippocastanum* and *A. pavia*.
All *Aesculus* sp. enjoy deep, moist and well-drained soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Red-pink flowers held on 15-20cm upright panicles appear in late spring.

EARLY AUTUMN

Round slightly prickly husks containing one nut (conker).

Deciduous broadleaved tree. Palmately compound leaves with five leaflets.

Single-stemmed. Grey-green bark, smooth at first developing axial fissures with age.

Issues to be aware of

Conkers create significant 'litter' in autumn that has caused problems on streets with high pedestrian traffic.

Notable varieties

Hybrid-type habit	'Briotii'.

Notes

– Casts a deep shade so not much will grow underneath it.

The tree and its features



Mature *Aesculus* x *carnea* flowering in late spring.
© Henrik Sjöman



Aesculus x *carnea* 'Briotii' has attractive pink-red flowers.
© Henrik Sjöman

Aesculus flava
(Yellow buckeye)

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 40m in favourable conditions. Largest trees in Europe are 20-25m.

A ovoid crown, typically with a width less than 15m.

A dense crown.

Natural habitat

Native to eastern North America, particularly the southern Appalachian mountains. Found in river valleys and hillsides as part of mixed mesophytic forests of low to moderate elevation (up to 1500m). Prefers mildly acid humus rich soils.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Yellow flowers held in 10-15cm upright clusters. Appearing in late spring to early summer. Highly ornamental.

EARLY AUTUMN

Smooth, round fruits holding one or two nuts mature in early autumn. Poisonous to humans.

Deciduous broadleaved tree. Palmately compound leaves with five or seven leaflets.

Single-stemmed. Dark brown bark, starting smooth, becoming scaly with age.

Issues to be aware of

Seeds are poisonous to humans. Conkers create significant 'litter' in autumn that could cause problems on streets with high pedestrian traffic.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- This species casts a very deep shade so not much will grow underneath it.

The tree and its features



Left: A young, open-grown *Aesculus flava*. © Duncan Slater

Right: *Aesculus flava* has yellow flowers held in upright clusters.
© Henrik Sjöman



Attractive, palmately compound leaves with the immature fruit of *Aesculus flava*.
© Andrew Hirons

Aesculus hippocastanum (Horse chestnut)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m in favourable environments.

A globular to ovoid crown that can exceed 20m in width.

A dense crown.

Natural habitat

Native to the Balkan peninsula. Found in the subalpine zone in humid, warm valleys in 'ravine forests'. All *Aesculus* spp. enjoy deep, moist and well-drained soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

White flowers with yellow, then red patches, held in 20-30cm upright clusters. Appearing in late spring to early summer. Highly ornamental.

EARLY AUTUMN

Spiny husks containing lustrous brown nuts, know as 'conkers'. Mature in early autumn,

Deciduous broadleaved tree. Palmately compound leaves with five to seven leaflets.

Single-stemmed. Grey-brown bark, smooth at first becoming scaly with age.

Issues to be aware of

Conkers create significant 'litter' in autumn that has caused problems on streets with high pedestrian traffic.

Notable varieties

Double flowered	'Baumannii'.
No conkers	'Baumannii'.
Upright/Columnar	'Pyramidalis'.

Notes

- *Aesculus hippocastanum* faces a wide range pests and pathogens. Therefore it is not recommended.
- Casts a deep shade so not much will grow underneath it.
- *Aesculus flava* and *A. indica* are better candidates if you want a 'horse chestnut' look.

The tree and its features





Left: A mature *Aesculus hippocastanum* in a park situation. © Henrik Sjöman

Right: Expanding leaves and flower bud of *Aesculus hippocastanum*. © Andrew Hirons





Left: *Aesculus hippocastanum* has highly ornamental upright flower clusters. © Duncan Slater

Right: The characteristic 'conker' fruit of *Aesculus hippocastanum*.
© Duncan Slater

Aesculus indica
(Indian horse chestnut)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m in its natural habitat.

A globular to ovoid crown spreading to about 12m.

A dense crown.

Natural habitat

Native to wooded areas of the Himalayan lowlands from Kasmir to west Nepal at altitudes between 900-3600m. Found in forests, shady ravines and along water-courses. Prefers moist, mildly acid, humus rich soils.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

White flowers with yellow and red patches held in 20-25cm upright clusters. Appearing in early summer. Highly ornamental.

EARLY AUTUMN

Rough, round fruits holding one or two nuts. Early autumn.

Deciduous broadleaved tree. Palmately compound leaves with seven leaflets. Decent autumn colour.

Single-stemmed with a short, thick trunk. Mature bark peels in long strips.

Issues to be aware of

Conkers create significant 'litter' in autumn that has caused problems on streets with high pedestrian traffic.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Casts a deep shade so not much will grow underneath it.

The tree and its features



A mature *Aesculus indica* tree with a broad, dense crown.
© Andrew Hirons





Left: Upright flower clusters are a highly ornamental feature in early summer. © Kevin Martin

Right: Developing fruits of *Aesculus indica*. These will mature in early autumn.
© Andrew Hirons

Aesculus parviflora
(Dwarf horse chestnut)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree up to 4m tall.

A squat globular crown form. Often much wider than it is tall: 10m wide in some cases.

A dense crown.

Natural habitat

Native to southeastern North America. Prefers open woodland areas with moist, humus rich soils.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

White flowers held in 20-40cm upright clusters. Highly ornamental, appearing in late summer.

EARLY AUTUMN

Smooth pear-shaped husks containing a single nut. Often not developed to maturity in the British Isles.

Deciduous broadleaved tree/shrub. Palmately compound leaves with five or seven leaflets. Leaves turning yellow in autumn.

Multi-stemmed. Grey-brown smooth bark.

Issues to be aware of

Seeds are poisonous to humans.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



The squat, globular crown of *Aesculus pavia*.

© Andrew Hirons



Upright flower clusters are highly ornamental in late summer.

© Andrew Hirons

Aesculus pavia (Red buckeye)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree growing to 12m but generally not more than 8m.

Globular to ovoid crown, up to ~8m wide.

A dense crown.

Natural habitat

Native to southeastern North America where it grows lowland forests in the shade of canopy species. Found on floodplains and moist slopes to about 450m.

Environmental tolerance

Tolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Red flowers head in upright panicles 10-25cm long appearing in early summer. Highly ornamental.

EARLY AUTUMN

Pear shaped smooth husks holding one nut. Mature in early autumn.

Deciduous broadleaved tree. Palmately compound leaves with five lobes. Yellow in autumn.

Single-stemmed but branching low, or multi-stemmed. Smooth, dark-grey with conspicuous lenticels.

Issues to be aware of

Seeds are poisonous to humans.

Notable varieties

Species-type habit	'Atrosanguinea'.

The tree and its features





Left: A mature *Aesculus pavia* showing and ovoid crown.
© Duncan Slater

Right: Palmately compound leaves of *Aesculus pavia*.
© Andrew Hirons





Left: Attractive, red, upright flower clusters of *Aesculus pavia* 'Atrosanguinea' can be seen in early summer.
© Andrew Hirons

Right: Pear-shaped fruit of *Aesculus pavia*.
© Duncan Slater

Ailanthus altissima (Tree of heaven)

Use potential

Park
Paved
Coastal
Transport corridor

Tree size and crown characteristics

>25M

A massive tree, capable of reaching 30m in favourable conditions.

A globular to ovoid crown.

A moderately dense crown.

Natural habitat

Native to temperate and warm-temperate regions in China and north Vietnam. This invasive species has naturalised in similar climates across the world. It is an early-successional species that is capable of growing in a wide range of habitats, providing there is sufficient light. Although it prefers nutrient-rich loamy soils, it can succeed on nutrient-poor soils. Noted as being tolerant of air pollution and salt-tolerant.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Greenish flowers appearing in early summer held on 10-20cm terminal clusters. Dioecious: male and female flowers on separate trees.

EARLY AUTUMN

Spirally twisted samaras with a single centrally placed seed maturing in early autumn.

Deciduous broadleaved tree. Pinnately compound leaves composed of 15 to >30 leaflets.

Typically single-stemmed. Grey bark with superficial diamond-shaped fissures developing with age.

Issues to be aware of

A potentially highly invasive tree, particularly in warmer regions. Male trees have an unpleasant odour when flowering so only plant female trees. Allelopathic roots are toxic to a wide range of woody and herbaceous species. Vegetative reproduction occurs via root suckers. *A. altissima* also release a lot of pollen so males have high allergenicity potential during the flowering period.

Notable varieties

Red/Purple leaves	'Sangiovese'.

Notes

– Observed to have some tolerance to salt and air pollution.

The tree and its features



Left: A mature *Ailanthus altissima* in a park. © Andrew Hirons

Right: *Ailanthus altissima* is a robust urban tree but can be invasive. © Henrik Sjöman



Left: Pinnately compound leaves of *Ailanthus altissima*. © Andrew Hirons

Right: Terminal clusters of greenish-white flowers appear on *Ailanthus altissima* in early summer. © Andrew Hirons

Alnus cordata (Italian alder)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Paved
SuDS
Coastal

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m in ideal conditions.

A conical form. Typically <8m crown spread.

A moderately dense crown.

Natural habitat

Native of Corsica, southern Italy and Greece. A pioneer species of riparian habitats and low-mid elevation mountain slopes up to 900m. Capable of coping with relatively unfertile soils as it has the ability to form associations with *Frankia* that fix atmospheric nitrogen and make it available to tree roots.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female catkins are usually found on the same shoot appearing late winter to early spring.

LATE SUMMER

Stalked cones (holding seeds) in groups of one to three are mature in late summer.

Deciduous broadleaved tree. Simple, glossy, dark green leaves.

Single-stemmed. Smooth grey bark on young stems, becoming furrowed as the stem ages.

Issues to be aware of

A. cordata release a lot of pollen so have high allergenicity potential during the flowering period. Has been observed to cause problems when hard surfaces have been placed close to the trunk.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

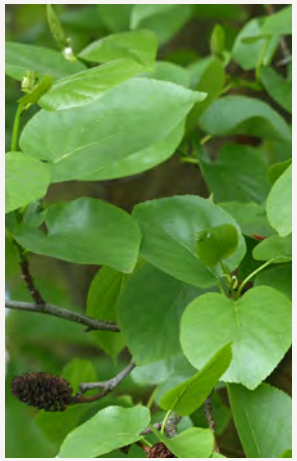
- Grows best in a warm microclimate and is highly suitable for an inner city environment.
- Observed to have some tolerance to salt.

The tree and its features



Alnus cordata can make a very effective street tree, particularly in the warm microclimates often provided by inner city environments.

© Henrik Sjöman





Left: *Alnus cordata* has glossy heart-shaped leaves.

© Andrew Hirons

Right: Catkins provide a subtle ornamental feature in early spring. The male catkin is shown here.

© Duncan Slater

Alnus glutinosa (Common alder)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 40m in ideal conditions, more typically 20-25m.

A conical to ovoid form. Typically <10m crown spread.

An open crown.

Natural habitat

Native to Europe, western Asia and north Africa. A pioneer species of lowland moist and wet habitats up to 2000m. Capable of coping with relatively unfertile soils as it has the ability to form associations with *Frankia* that fix atmospheric nitrogen and make it available to tree roots. Not suitable for calcareous soils.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female catkins are usually found on the same shoot appearing late winter to early spring.

LATE SUMMER

Stalked cones (holding seeds) in groups of three to five are mature in late summer.

Deciduous broadleaved tree. Simple dark green leaves.

Single- or multi-stemmed. Smooth purple-grey bark on young stems, becoming grey with fissures as the stem ages.

Issues to be aware of

Many seeds are produced that can germinate readily in adjacent areas, especially on moist bare ground. *A. glutinosa* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Cut leaf	'Laciniata', 'Imperialis'.

Notes

– Observed to have some tolerance to salt and air pollution.

The tree and its features



An open-grown *Alnus glutinosa* in late winter.

© Henrik Sjöman





Left: Simple leaves of *Alnus glutinosa*.

© Duncan Slater

Right: Male catkins of *Alnus glutinosa* appear in early spring.

© Duncan Slater

Alnus incana (Grey alder)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | SuDS | Coastal | Transport corridor

Tree size and crown characteristics

>25M

A large tree capable of reaching 20m in ideal conditions.

A conical to ovoid form. Typically <8m crown spread.

An open crown.

Natural habitat

Native to Europe and the Caucasus. Pioneer species of riparian and floodplain woodlands and the lower part of mountain slopes. Capable of coping with relatively unfertile soils as it has the ability to form associations with *Frankia* that fix atmospheric nitrogen and make it available to tree roots.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female catkins are usually found on the same shoot appearing late winter to early spring.

LATE SUMMER

Sessile or short-stalked cones (holding seeds) in groups of four to eight are mature in late summer.

Deciduous broadleaved tree. Simple dark green leaves.

Single- or multi-stemmed. Smooth light-grey bark.

Issues to be aware of

Many seeds are produced that can germinate readily in adjacent areas, especially on moist bare ground. Root suckers also common. *A. incana* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Yellow leaved	'Aurea'.
Cut leaved	'Laciniata'.

Notes

- Only use on open slopes where you are seeking to stablise the soil as root suckers can be a big problem, even in paved sites.
- Graft cultivated varieties onto A glutinosa to minimise root sucker potential.
- Observed to have some tolerance to salt and air pollution.

The tree and its features



Alnus incana grows well in a roadside verge.
© Andrew Hirons





Left: Simple leaves of *Alnus incana*.
© Andrew Hirons
Right: Immature fruits (cones) of *Alnus incana*.
© Duncan Slater

Alnus x *spaethii* (Spaeth alder)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS | Coastal | Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m.

A conical to ovoid form. Typically <10m crown spread.

A moderately dense crown.

Natural habitat

An artificial hybrid between Alnus japonica (native to north-east Asia and Japan) and A. subcordata (native to the Caucasus). Highly versatile site preferences providing there is plenty of light. It has an ability to withstand coastal winds. Capable of coping with relatively unfertile soils as it has the ability to form associations with *Frankia* that fix atmospheric nitrogen and make it available to tree roots.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be moderately tolerant to waterlogging.

Ornamental qualities

LATE WINTER

Male and female catkins appear in late winter. Highly ornamental.

EARLY AUTUMN

Sessile to short stalked cones in groups of three to nine mature in early autumn.

Deciduous broadleaved tree. Simple dark green leaves.

Single-stemmed. Grey-brown bark smooth on young stems, becoming slightly fissured with age.

Issues to be aware of

A. x *spaethii* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- A fast growing tree that readily establishes.
- Observed to have some tolerance to salt and air pollution.

The tree and its features



Alnus x *spaethii* is a robust hybrid alder with excellent potential in urban areas.

© Henrik Sjöman





Left: Simple leaves of *Alnus* x *spaethii*.

© Hillier Nurseries

Right: Male catkins of *Alnus* x *spaethii* are an attractive feature in late winter.

© Hillier Nurseries

Amelanchier alnifolia
(Alder-leaved serviceberry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

Shrub or small tree up to 5m. Very rarely, it can to 8m.

<10M

A globular crown but quite variable.

A moderately dense crown.

Natural habitat

Native to north-western North America. Associated with forest margins, forest openings or open-canopy tree stands. It is found on a wide range of sites from alluvial plains, moist valleys to mountain slopes. Restricted to a shrubby form on dry, gravelly sites. Forms small groups to extensive thickets.

Environmental tolerance

Moderately tolerant to shade but requires good light for best growth.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

Creamy-white flowers, 5-15 on short, upright clusters appear in late spring. Fragrant.

LATE SPRING

Small deep-purple to black berry-like, edible fruits ripen in late summer.

LATE SUMMER

Deciduous broadleaved tree. Simple leaves, bronze when young, dark green during summer and turning yellow in autumn.

Single- or multi-stemmed. Smooth grey to reddish-brown bark.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Upright/Columnar habit	'Obelisk'.

The tree and its features



Amelanchier alnifolia is often found as a multi-stemmed tree, ideal for compact situations.

© Henrik Sjöman



Attractive creamy-white flowers cover the crown in late spring.

© Henrik Sjöman

Amelanchier arborea
(Downey serviceberry)

Use potential

Park

Small garden

Transport corridor

Tree size and crown characteristics

10-15M

A large tree to 20m, but typically cultivated varieties only reach 10-12m.

An ovoid crown.

A moderately dense crown.

Natural habitat

Native to temperate deciduous forests of eastern North America. Found in cool, moist microclimates. These are typically north facing slope aspects, close to streams. Best growth (and flowering) is on forest margins and on sites associated with canopy gaps. Occurs on shallow, acid, nutrient-poor soils but does prefer fertile, well-drained sites.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Fragrant white flowers, held in clusters, in groups of 4-10. Appearing in early spring, usually before the leaves.

EARLY SUMMER

Berry-like fruit ripening in early summer. Edible but undesirable – good for wildlife.

Deciduous broadleaved tree. Simple leaves, emerging with a dense covering of hairs as they expand but becoming glabrous (smooth) at maturity. Highly ornamental autumn colour, yellow with red tints.

Single- or multi-stemmed. Smooth grey-brown bark, becoming slightly fissured with age. The fine branching pattern is also an attractive feature of this tree.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Species-type habit	'Robin Hill'.

Notes

- Although this species is noted to be tolerant to shade, it will do much better in partial shade to full sun conditions.
- Observed to have some tolerance to salt and air pollution.

The tree and its features





Left: A young *Amelanchier arborea* 'Robin Hill'. © Henrik Sjöman

Right: A young *Amelanchier arborea* 'Robin Hill' showing autumn colour. © Henrik Sjöman



Leaves of *Amelanchier arborea* 'Robin Hill' with yellow and red tints in autumn. © Henrik Sjöman

Amelanchier canadensis
(Canadian serviceberry)

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

<10M

A shrub or small tree that reaches 8m in height.

Vase shaped.

A moderately dense crown.

Natural habitat

Native to temperate forests of eastern North America. Found in lowland areas, up to 200m, often on the margins of swamps and boggy areas. Often found in coastal areas. Prefers forest margins and fairly open canopy cover.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

White flowers held in upright clusters in groups of 4-10. Appearing with the leaves in late spring.

LATE SUMMER

Reddish-purple berry-like fruit appearing in early summer. Edible.

Deciduous broadleaved tree. Simple leaves with good autumn colour.

Multi-stemmed. Smooth grey bark. Naturally has an upright form.

Issues to be aware of

Forms thickets through root suckering, however, this could be an advantage in some circumstances.

Notable varieties

Species-type habit	'Rainbow Pillar'.

The tree and its features





Left: *Amelanchier canadensis* makes and attractive small tree. © Duncan Slater

Right: Simple leaves of *Amelanchier canadensis*. © Duncan Slater





Left: Upright clusters of small white flowers are very attractive in late spring. © Duncan Slater

Right: Berry-like fruit provide a good food source for wildlife. © Duncan Slater

Amelanchier lamarckii (Serviceberry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A shrub or small tree capable of reaching 10m.

A globular to vase-shaped crown form.

A moderately dense crown.

Natural habitat

Native to eastern North America but naturalised across temperate Europe. Found in lowland forest margins. Capable of growing well in a wide range of soils but preferring slightly acidic, moist but well drained soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

White flowers held in upright clusters, appearing with the leaves in late spring.

EARLY SUMMER

Berry-like fruits, purple-black when ripe in early summer. Edible.

Deciduous broadleaved tree. Simple leaves, emerging copper-red and contrasting nicely with the flowers; changing to a dull green as they mature. Excellent yellow to red autumn colour.

Multi-stemmed, occasionally single-stemmed. Smooth grey bark.

Issues to be aware of

Large quantities of fruit can cause problems on paved sites. Produces root suckers as it naturally wants to form a thicket.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



A flowering multi-stemmed *Amelanchier lamarckii* is highly ornamental in late spring.

© Barcham Trees



Berry-like fruits are attractive in late summer.

© Duncan Slater

Aralia elata (Angelica tree)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of growing to about 12m but is often found as a large shrub.

Vase shaped.

A moderately dense crown.

Natural habitat

Native to temperate deciduous forests of Japan, the Korean peninsula, east China and Manchuria. It is primarily a gap coloniser, but is also found on forest margins. Prefers cool, moist, free-draining soils in full sun or partial shade.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Large white clusters of small flowers appear in early autumn.

LATE AUTUMN

Clusters of small round fruit mature in late autumn. Excellent for wildlife.

Deciduous broadleaved tree. Large bi-pinnate leaves are a highly attractive feature. Leaves a little prickly. Good autumn colour with leaves turning red, unusually, this coincides with flowering.

Multi-stemmed, occasionally single-stemmed. Stems are armed with spines.

Issues to be aware of

Spines on stems and leaves, which may be problematic in some circumstances. Root suckers can cause this species to spread and form a thicket. As a result it is considered invasive in some temperate regions.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



A young *Aralia elata* growing in a garden situation.
© Andrew Hirons





Left: Spines on the stem of *Aralia elata* are an interesting feature, but may be problematic in some circumstances.
© Andrew Hirons

Right: Large clusters of small white flowers are attractive in late summer. © Andrew Hirons

Araucaria araucana (Monkey puzzle)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Coastal

Tree size and crown characteristics

>25M

A massive tree, capable of reaching 50m. Smaller in cultivation, but still massive.

Conical when young, but at maturity developing a characteristic elevated umbrella-type crown.

A dense crown.

Natural habitat

Native to the southern Andes mountains in the temperate region of Chile and Argentina. They occur on mountain slopes between 600-1800m on well-drained, sandy or gravelly, acidic soils of volcanic origin. Occurring on moderately xeric (dry) sites as well as mesic (moist) sites. Native climate is often characterised by dry summers and high precipitation (often snow) winters. Also found along the coast, therefore, tolerates coastal winds and salt well.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Flowers not of ornamental value. Pollen from male catkins released early summer.

EARLY AUTUMN

Female cones appear in spring but mature in the early autumn of following year.

Evergreen conifer. Robust, thick, dark glossy green leaves spirally arranged on the branches. They remain alive for 10-15 years.

Single-stemmed. Smooth grey-brown bark when young, maturing to a rough-textured bark with age.

Issues to be aware of

Leaves have a spiny tip so should be avoided in some circumstances. Although fairly slow-growing, this is a very large tree so requires space to develop.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features





Left: Mature *Araucaria araucana* provides character to any open landscape. © Andrew Hirons

Right: A umbrella-shaped crown develops in mature *Araucaria araucana*. © Henrik Sjöman





Left: The bark of *Araucaria araucana* has a rough texture at maturity. © Andrew Hirons

Right: Large scaly leaves with a sharp point are arranged in a spiral pattern. © Andrew Hirons

Arbutus unedo (Strawberry tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Paved
Small garden

Tree size and crown characteristics

<10M
A small tree capable of reaching 10m.
A globular crown form.
A dense crown.

Natural habitat

Native to the Mediterranean region with relic populations in western Ireland. Found in sclerophyllous woodlands and rocky outcrops on acidic or calcareous free-draining soils.

Environmental tolerance

Moderately tolerant to shade.
Tolerant to drought.
Sensitive to waterlogging.

Ornamental qualities

LATE AUTUMN
Drooping clusters of small white or pinkish flowers appear in late autumn.
LATE AUTUMN
Strawberry-like fruit ripens in the late autumn of the year after flowering. Edible but undesirable.

Evergreen broadleaved tree. Simple leathery leaves, dark shiny green.

Single- or multi-stemmed. Young stems are reddish and mature to grey-brown rough, scaly bark.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

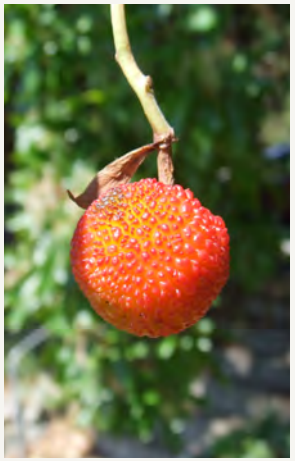
- Needs a warm microclimate to perform well.
- Observed to have some tolerance to salt.

The tree and its features




Left: *Arbutus unedo* is a small, slow-growing, evergreen tree. © Duncan Slater

Right: Simple, leathery leaves provide all-year interest. © Duncan Slater

Left: *Arbutus unedo* flowers in late autumn. © Duncan Slater

Right: Strawberry-like fruit ripen in late autumn, a year after flowering. © Duncan Slater

Betula ermanii (Stone birch)

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 30m in the wild. Typically less than 20m in cultivation.

Globular to ovoid crown, often wide-spreading.

An open crown.

Natural habitat

Found in the cool-temperate deciduous and mixed deciduous-coniferous forests up to the tree-line in east Asia, north China, the Russian Far East, Korea and Japan. A pioneer species capable of colonising steep sites with thin and poor quality soils. Requires good soil aeration.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring, becoming pendulous. Attractive but not exceptional.

EARLY AUTUMN

Pendant fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple leaves. Good golden-yellow autumn colour, but it tends to drop its leaves earlier than other birch (Betula) species – at least in the British Isles.

Single- and multi-stemmed. Highly attractive creamy to orangey-pink bark that peels in thin sheets.

Issues to be aware of

Abundant pollen can cause allergies in some people.

Notable varieties

Species-type habit	'Grayswood Hill', 'Blush'.

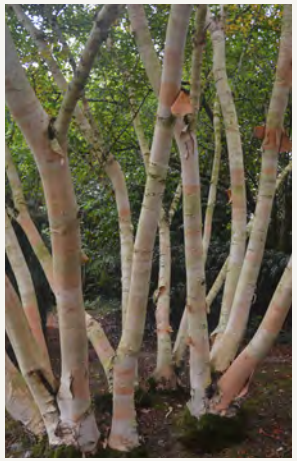
Notes

- A fast-growing pioneer species.
- Sensitive to weed competition during establishment so will perform much better with regular mulching.

The tree and its features



A *Betula ermanii* in late autumn with its carpet of fallen yellow leaves.
© Henrik Sjöman





Left: Multi-stemmed *Betula ermanii* displaying the orangey-pink bark to great effect. © Henrik Sjöman

Right: Leaves of *Betula ermanii* with developing fruiting catkins.
© Andrew Hirons

Betula lenta (Cherry birch)

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree up to 20m.

Globular to columnar crown.

An open crown.

Natural habitat

Moist cool temperate deciduous and mixed deciduous-coniferous forests of eastern North America. 0-1500m, but especially 300-600m. A pioneer to mid-successional species capable of colonising open ground and gaps in the forest canopy. Also found on rocky ravine slopes, particularly when north-facing.

Environmental tolerance

Partially sensitive to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring, becoming pendulous. Attractive but not exceptional.

EARLY AUTUMN

Upright, persistent fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple leaves. Excellent golden yellow autumn colour.

Single-stemmed. Brown to brown-black bark appearing dark grey to black with age. Lenticels much less prominent than in other birches.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. Abundant pollen can cause allergies in some people.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Sensitive to weed competition during establishment so will perform much better with regular mulching.
- An under-used tree birch tree in the British Isles.

The tree and its features



Betula lenta showing good autumn colour in a garden.
© Tim Baxter





Left: The bark of *Betula lenta* is attractive, particularly on younger stems. © Henrik Sjöman

Right: The leaves of *Betula lenta* display an excellent golden yellow.
© Henrik Sjöman

Betula maximowicziana (Monarch birch)

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree that grows to 30m in its native habitat. Typically smaller in cultivation.

Ovoid to columnar crown, reaching 8-10m wide at maturity.

An open crown.

Natural habitat

Native to low altitude cool-temperate forest of Japan and north-east Asia, including the Russian Far-east and the Kuril Islands. A long-lived pioneer tree, that may become the dominant species in a forest stand.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring. Male catkins becoming pendulous. Attractive but not exceptional.

EARLY AUTUMN

Fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple, heart-shaped leaves. Leaves are slightly hairy on both sides when young and have rather attractive elongated teeth on the leaf margins. The leaves are large in relation to other birch (*Betula*) species. Yellow autumn colour.

Single-stemmed. Grey bark, peeling in thin strips.

Issues to be aware of

Abundant pollen can cause allergies in some people.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- A fast-growing species, especially when well established.
- Sensitive to weed competition during establishment so will perform much better with regular mulching.

The tree and its features





Left: *Betula maximowicziana* is capable of becoming a large tree. © Henrik Sjöman

Right: Leaves of *Betula maximowicziana* turn yellow in autumn. © Henrik Sjöman



Catkins of *Betula maximowicziana* are attractive in late spring.
© Barcham Trees

Betula nigra (River birch)

Use potential

Park

Small garden

Transport corridor

Tree size and crown characteristics

10-15M

A large tree growing up to 25m. Typically reaching a mature height of 15m in cultivation.

Ovoid crown form, often quite irregular and occasionally more globular.

An open crown.

Natural habitat

A pioneer tree of warm-temperate riparian habitats. Growing on floodplains and the banks of ponds, steams and rivers. Capable of growing in drier conditions quite successfully but its use of water-courses to aid seed dispersal means that it is predominantly associated with water within its natural range. Native to eastern North America from Florida to Massachusetts and as far west as Texas and Ohio.

Environmental tolerance

Intolerant to shade.

Moderately sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring. Pendulous male catkins are attractive.

EARLY SUMMER

Fruiting catkins mature in early summer.

Deciduous broadleaved tree with simple leaves.

Available as a multi-stemmed or a single-stemmed tree. A rugged shaggy bark, dusky pink in colouration in younger trees, becoming darker grey and more platy with age. Attractive.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. *B. nigra* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Smaller form	'Heritage'.

Notes

- Seed propagated trees are highly variable, particularly in relation to the ornamental quality of the bark. Use a cultivar with proven properties.
- 'Heritage' is very heat tolerant cultivar and smaller than the species type so could be considered for small gardens.
- Might be worth using in SuDS schemes but is likely to shed leaves during dry periods.
- Sensitive to weed competition during establishment so will perform much better with regular mulching.
- Observed to have some salt tolerance.

The tree and its features





Left: *Betula nigra* available as a single-stemmed and multi-stemmed tree. © Tim Baxter

Right: Simple leaves of *Betula nigra*. © Duncan Slater





Left: The exfoliating bark of *Betula nigra* is an attractive feature. © Henrik Sjöman

Right: Male catkins are an attractive feature of *Betula nigra* in late spring. © Duncan Slater

Betula papyrifera (Paper birch)

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 30m. Cultivated varieties typically grow less than 20m.

An ovoid crown, occasionally becoming globular.

An open crown.

Natural habitat

A pioneer tree of northern North America with a natural distribution from the Pacific to Atlantic coasts and from Alaska down as far as Colorado and Virginia. Colonises gaps in deciduous and coniferous forests.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins develop in late spring.

EARLY AUTUMN

Fruiting catkins mature in early autumn.

Deciduous broadleaved tree with simple leaves. Excellent orange-yellow autumn colour.

Single-stemmed. Young shoots and branches are reddish-brown. Trunks vary from very white to brown or pinkish with bark peeling in paper-like sheets. Lenticels provide further bark interest. Highly attractive.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. *B. papyrifera* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- A fast-growing tree, especially when well established.
- Sensitive to weed competition during establishment so will perform much better with regular mulching.

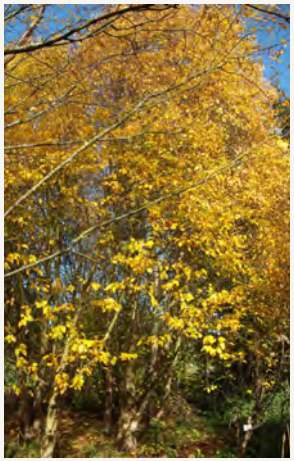
The tree and its features



A stand of *Betula papyrifera* displaying their striking white bark.

© Henrik Sjöman





Left: *Betula papyrifera* has very attractive white bark.

© Tim Baxter

Right: In autumn, *Betula papyrifera* turn a brilliant yellow colour.

© Tim Baxter

Betula pendula subsp. *pendula* (Silver birch)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Transport corridor

Tree size and crown characteristics

15-25M

Large trees up to 25m in ideal conditions. Typically only reaching around 15m in height.

Columnar, often rather irregular with a weeping (pendulous) branches at maturity. 6-8m wide.

An open crown.

Natural habitat

A pioneer tree capable of growing on a wide range of soil types. It is particularly associated with light, sandy, nutrient-poor, acid soils of heathland. However, it is also a primary coloniser of gravely soils and chalky soils. Requires high light environments and will not compete well in shade. *B. pendula* subsp. *pendula* has an expansive natural range throughout northern Europe and eastwards to central Asia.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring, becoming pendulous. Attractive but not exceptional.

EARLY AUTUMN

Pendant fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple leaves. Good yellow autumn colour.

Single- and multi-stemmed trees available. Younger trees have smooth, white bark, barely peeling in small shreds. With age, the stem presents dark, corky patches of bark. These are especially prominent and may conjoin on the lower portion of the trunk, but corky patches may also be seen someway up the trunk.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. Has the tendency to shed small diameter twigs, especially after strong winds. *B. pendula* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type habit	'Tristis', 'Zwitsers Glorie'.
Upright	'Fastigiata', 'Obelisk'.
Cut-leaved	'Crispa', 'Dalecarlica', 'Laciniata'.
Purple	'Purpurea'.
Small Weeping	'Youngii'.

Notes

- Sensitive to weed competition during establishment so will perform much better with regular mulching.
- 'Youngii' is a suitable cultivar for small gardens.
- Observed to have some tolerance to salt.

The tree and its features



A mature, open-grown *Betula pendula*.

© Andrew Hirons



The small, simple leaves of *Betula pendula* hang on pendulous branches.

© Andrew Hirons

Betula pendula subsp. *szechuanica* (Chinese white birch)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree up to 25m.

Irregular crown at maturity, 6-8m wide.

An open crown.

Natural habitat

A pioneer tree of canopy gaps in mixed deciduous-conifer forests of southwestern China and southeastern Tibet. Also forms a sub-alpine montane forest in southeastern Tibet on the drier inner ranges. Requires high light environments and will not compete well in shade.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring, becoming pendulous. Attractive but not exceptional.

EARLY AUTUMN

Pendant fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple leaves. Good yellow autumn colour.

Single-stemmed tree. Younger stems have a brownish-yellow bark but this is quickly shed to reveal a smooth, white, chalky bark that peels over time. Raised cinnamon-coloured strips of lenticels provide a further attractive feature of the stem.

Issues to be aware of

Likely to display similar rooting and crown characteristics to *Betula pendula* subsp. *pendula*. *B. pendula* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Sensitive to weed competition during establishment so will perform much better with regular mulching.
- An underused birch in the British Isles.

The tree and its features



Betula pendula subsp. *szechuanica* is a attractive birch with white bark, shown here in a field-grown nursery.

© Hillier Nurseries

Betula pubescens (Downy birch)

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree to 20m in height but reduced to less than 1m in extreme habitats within its natural range.

Irregular, ovoid to conical crown. 6-8m wide at maturity.

An open crown.

Natural habitat

A pioneer of moist woods, fens, wet mountainsides and gaps in coniferous forests. Peaty and slightly acid soils tolerated well. Extensive natural range from Newfoundland, through Europe (and as far south as northern Turkey) and into central Siberia. Performs better on moist sites than the closely related *Betula pendula* subsp. *pendula*.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring, becoming pendulous. Attractive but not exceptional.

EARLY AUTUMN

Pendant fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple leaves with a velvety texture from the leaf hairs. Good yellow autumn colour.

Single-stemmed. Young shoots are downy, particularly in early in the growing season. Younger trees have smooth, white bark, barely peeling in small shreds. With age, the stem presents dark, corky patches of bark in a similar way to *Betula pendula* subsp. *pendula*.

Issues to be aware of

B. pubescens release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Purple leaved	'Rubra'.

Notes

- Sensitive to weed competition during establishment so will perform much better with regular mulching.
- Might be worth using in SuDS schemes but is likely to shed leaves during dry periods.

The tree and its features





Left: An open-grown *Betula pubescens*. © Duncan Slater

Right: As a pioneer tree *Betula pubescens* can cope with some challenging conditions.
© Tim Baxter





Left: The bark of *Betula pubescens* is attractive, but not the best of the birches. © Duncan Slater

Right: The young shoots of *Betula pubescens* are covered in small, downy hairs.
© Tim Baxter

Betula utilis subsp. *albosinensis* (Chinese red birch)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A massive tree up to 35m in its native habitat. Typically <15m in cultivation.

Ovoid crown becoming more rounded with age if grown in the open.

An open crown.

Natural habitat

Found in north-central China in deciduous or mixed deciduous-coniferous forests. Often found around forest openings and on rocky soils, such as those associated with scree slopes between 1000-4400m.

Environmental tolerance

Estimated to be partially shade tolerant.

Moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring. The female catkins are erect at flowering whilst the male catkins are pendulous.

EARLY AUTUMN

Pendant fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple leaves. Good golden-yellow autumn colour.

Single- or multi-stemmed trees available. Peeling bark, typically a coppery colour overlain with white. Stems also have bold lenticel flecking across the stem. Highly ornamental.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. *B. utilis* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type habit	'Fascination'.
Pinkish bark	'China Ruby'.

Notes

– Sensitive to weed competition during establishment so will perform much better with regular mulching.

The tree and its features



Left: A young *Betula utilis* subsp. *albosinensis* growing in a roadside verge. © Andrew Hirons

Right: Simple leaves of *Betula utilis* subsp. *albosinensis*. © Andrew Hirons



Left: *Betula utilis* subsp. *albosinensis* has very attractive pinkish bark. © Henrik Sjöman

Right: The fruiting catkin of *Betula utilis* subsp. *albosinensis* matures in early autumn. © Duncan Slater

Betula utilis subsp. *jacquemontii* (White-barked Himalayan birch)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A massive tree up to 35m in its native habitat. Typically, less than 15m in cultivation.

Ovoid crown becoming more rounded with age if grown in the open.

An open crown.

Natural habitat

Found in the west Himalaya in the Kashmir region and western Nepal. Found in open deciduous forests. Often found growing close to stony river beds and on scree slopes between 2700-4500m.

Environmental tolerance

Estimated to be partially shade tolerant.

Moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring. The female catkins are erect at flowering whilst the male catkins are pendulous.

EARLY AUTUMN

Pendant fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple leaves. Young leaves particularly glossy. Good golden-yellow autumn colour.

Single- or multi-stemmed trees available. Highly ornamental creamy-white peeling bark with prominent lenticels flecking the stem.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. *B. utilis* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

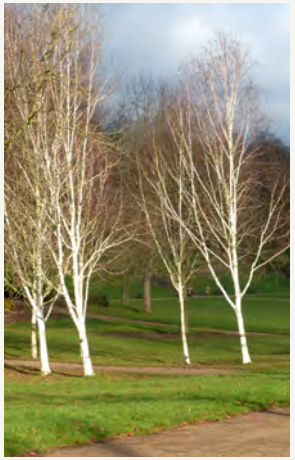
Species-type habit	'Doorenbos', 'Grayswood Ghost'.
Conical	'Jermyns', 'Silver Shadow'.

Notes

– Sensitive to weed competition during establishment so will perform much better with regular mulching.

The tree and its features





Left: A young *Betula utilis* subsp. *jacquemontii* growing in a garden location. © Andrew Hirons

Right: Highly attractive white bark is especially prominent in the winter silhouette. © Andrew Hirons





Left: White bark of *Betula utilis* subsp. *jacquemontii* 'Doorenbos'.
© Henrik Sjöman

Right: Simple leaves are particularly glossy when young.
© Andrew Hirons

Betula utilis subsp. *utilis* (Himalayan birch)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

15-25M

A massive tree up to 35m in its native habitat. Typically much smaller in cultivation.

Ovoid crown becoming more rounded with age if grown in the open.

An open crown.

Natural habitat

Found in a broad distribution from the central Himalaya through western China in deciduous or mixed deciduous-coniferous forests. Often found growing close to stony river beds and on scree slopes between 2700-4500m.

Environmental tolerance

Estimated to be partially shade tolerant.

Moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female catkins emerge in late spring. The female catkins are erect at flowering whilst the male catkins are pendulous.

EARLY AUTUMN

Pendant fruiting catkins become prominent by early autumn.

Deciduous broadleaved tree with simple leaves. Good golden-yellow autumn colour.

Single- or multi-stemmed trees available. Peeling bark, typically brown-pink to copper-orange in colour with prominent lenticels flecking the stem. Highly ornamental.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. *B. utilis* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Sensitive to weed competition during establishment so will perform much better with regular mulching.

The tree and its features



Betula utilis subsp. *utilis* has attractive peeling bark.

© Tim Baxter

Buxus sempervirens (Box)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree (or shrub) capable of reaching 10m over time.

Globular to irregular crown.

A dense crown.

Natural habitat

An understorey tree (or shrub) native to the Mediterranean and Caucasus. It will grow on a wide range of soils, including on calcareous soils. Unusually, it can cope with dry shade.

Environmental tolerance

Tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Small creamy flowers appear in late spring. Separate male and female flowers are found in clusters held in leaf axils. Attractive but relatively inconspicuous.

LATE SUMMER

Small, hard seed capsules are fully developed in late summer.

An evergreen-broadleaved tree with small, simple leaves.

Single-stemmed but also sold in shrub form.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Slow growing and slow to establish.
- Sensitive to weed competition during establishment so will perform much better with regular mulching.
- Excellent for dry shade.

The tree and its features



Buxus sempervirens is a slow-growing tree with a globular crown.

© Andrew Hirons



The small, glossy, evergreen leaves of *Buxus sempervirens* create a dense crown.

© Andrew Hirons

Carpinus betulus (Hornbeam)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m.

An ovoid to globular crown.

A dense crown.

Natural habitat

A cool-temperate deciduous tree found across from the European Pyrenees through to western Asia and as far north as southern Sweden. Predominantly an understorey or mid-successional tree of beech or oak woodland. Requires good soil fertility but is adaptable as it is frequently found as part of scree forests.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Separate male and female catkins are found on the same tree, appearing in late spring. Attractive but not exceptional.

EARLY AUTUMN

Attractive, drooping fruit clusters are most conspicuous when they turn brown in early autumn.

Broadleaved deciduous tree with simple leaves. In autumn leaves turn yellow. Leaves of young trees often remain on the tree over winter (marcescence). These dead leaves are the pushed off by the emerging leaves the following spring.

Single-stemmed. Smooth grey bark.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. *C. betulus* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Upright	‘Columnaris’, ‘Fastigiata’, ‘Frans Fontaine’.
No fruits	‘A. Beeckam’, ‘Frans Fontaine’.

Notes

– Seed propagated trees are very variable in terms of size, growth habit and seasonal properties. The use of known cultivar is essential if a predicable form is required.

The tree and its features



A fully mature, open-grown *Carpinus betulus* growing in a parkland situation.
© Henrik Sjöman



Left: Simple leaves and fruit of *Carpinus betulus*.
© Andrew Hirons

Right: A young fruit cluster. These blend in with the leaves in summer but become more prominent when they turn brown in early autumn. © Andrew Hirons

Carpinus japonica (Japanese hornbeam)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m.

An vase shaped to globular crown.

A moderately dense crown.

Natural habitat

A cool-temperate deciduous tree found at high elevations on mountain slopes in Japan. A forest edge species rather than an understorey species.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Separate male and female catkins are found on the same tree, appearing in late spring. Attractive but not exceptional.

EARLY AUTUMN

Attractive cylindrical fruit clusters are apparent when they turn brown in early autumn.

Broadleaved deciduous tree with simple leaves slightly more elongated than *Carpinus betulus*. In autumn leaves turn yellow.

Single-stemmed. Grey-brown bark that flakes off in small scales.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. *C. japonica* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



The leaves of *Carpinus japonica* are slightly more elongated than *C. betulus* and turn yellow in autumn. Cylindrical fruit clusters also provide interest in late summer and early autumn.

© Barcham Trees

Carya illinoinensis (Pecan)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 35m in its native habitat. Much smaller in cultivation.

An ovoid crown, becoming globular in the open. Capable of becoming very broad (40m+) at maturity.

A moderately dense crown.

Natural habitat

Found in lowland deciduous forest communities and river floodplains of the Mississippi drainage basin. Prefers deep, humic soils. Requires summer heat if it is to be successful.

Environmental tolerance

Intolerant to shade.

Moderately sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Separate pendulous male catkins and upright female catkins are found on the same tree, appearing in late spring. Attractive but not exceptional.

LATE AUTUMN

Bunches of 3-10 elongated nuts ripen by late autumn. Edible.

Deciduous broadleaved tree with pinnate leaves.

Single-stemmed. Light brown-grey bark with deep irregular furrows at maturity.

Issues to be aware of

A potentially very broad tree, needs space. Litter from nuts can be problematic, particularly in 'masting' years.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Requires a warm microclimate.

The tree and its features



A semi-mature *Carya illinoinensis* enjoying the space provided in this garden.

© Andrew Hirons



The pinnate leaves of *Carya illinoinensis*.

© Andrew Hirons

Carya ovata
(Shagbark hickory)

Use potential

Park

Tree size and crown characteristics

15-25M

A potentially massive tree capable of reaching 45m in its native habitat but typically 20-25m in cultivation.

An ovoid crown, becoming globular in the open. Capable of becoming 15-20m wide at maturity.

A moderately dense crown.

Natural habitat

Native to eastern US where it has a large natural range. Found on dry slopes, well drained lowland woods and occasionally in wet bottomlands. Adaptable to a wide range of soils, including calcareous and lime rich soils, providing they are well drained.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Separate pendulous male catkins and upright female catkins are found on the same tree, appearing in late spring. Attractive but not exceptional.

LATE AUTUMN

Nuts borne singly or in pairs ripen by late autumn. Edible.

Deciduous broadleaved tree with pinnate leaves. Provides a beautiful yellow autumn colour.

Single-stemmed. Light brown-grey bark that exfoliates in large strips, hence ‘shagbark’, at maturity.

Issues to be aware of

Potentially a very large tree so requires space.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Requires summer heat to perform well so a warm microclimate is preferable.
- It is rather slow to establish so requires a good level of aftercare.

The tree and its features





Left: *Carya ovata* displaying an ovoid crown.
© Duncan Slater

Right: The bark exfoliates in large strips and provides an interesting feature on mature stems. © Henrik Sjöman





Left: The pendulous male catkins add interest in late spring but are not highly ornamental. © Duncan Slater

Right: Edible nuts, borne singly or in pairs, mature by late autumn.
© Duncan Slater

Castanea sativa (Sweet chestnut)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m.

Ovoid to irregular form, capable of becoming very wide (25m+) at maturity.

A dense crown.

Natural habitat

A predominantly warm-temperate species found sporadically in mixed deciduous forests around the Mediterranean basin, northern Turkey and the Caucasus. It has naturalised widely across Europe, including in the warmer parts of the British Isles and as far north as southern Sweden. Prefers well-drained, warm, acid soils. Heat tolerant.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Separate male and female flowers are found on the same tree, prominent in late summer. Upright male flower spikes are attractive but female flowers are inconspicuous.

LATE AUTUMN

Glossy brown edible nuts held in a prickly husk that splits when ripe.

A deciduous broadleaved tree, with simple leaves with characteristic pointed teeth on its margin.

Single-stemmed. Dark grey bark with deep helical fissures at maturity. Capable of very large girths.

Issues to be aware of

Prickly fruit husks may become problematic in some situations.

Notable varieties

Glossy leaves	‘Glabra’.
Upright	‘Pyramidalis’.
Variegated	‘Albomarginata’.

The tree and its features





Left: The ovoid crown of an open-grown *Castanea sativa*. © Duncan Slater

Right: *Castanea sativia* ‘Albomarginata’ has variegated leaves. © Duncan Slater





Left: The upright clusters of male flowers provide interest in early summer. © Andrew Hirons

Right: Edible nuts, held in prickly husks, ripen in late autumn.

© Andrew Hirons

Catalpa bignonioides (Indian bean tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m. Fast growing.

Irregular, often rather broad spreading. Crowns may reach around 10m in diameter.

A moderately dense crown.

Natural habitat

Native to lowland deciduous forest (0-200m) in the eastern United States. Predominantly found as a pioneer in riparian environments and on the margins of floodplains. As such, it performs best a deep, moist loam soil.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Highly ornamental large orchid-like flowers in upright clusters are most abundant in early summer.

EARLY AUTUMN

Long seed pods have developed by early autumn be will often persist through winter.

Deciduous broadleaved tree with fairly large simple leaves. Shed relatively early in the British Isles.

Single-stemmed. Grey, shallowly fissured bark becomes platy with age.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. Large leaves can readily block drains. Relatively weak wood.

Notable varieties

Yellow leaved	'Aurea'.
Globular	'Nana'.

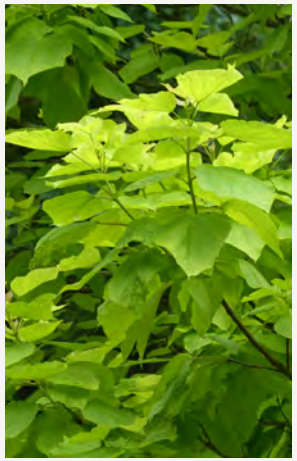
Notes

– Branches are easily shaded out so requires full sun if its natural form is to be maintained.

The tree and its features



Open grown *Catalpa bignonioides* 'Aurea' provides contrast in a garden park.
© Andrew Hirons





Left: The large, simple leaves of *Catalpa bignonioides* 'Aurea' are yellow-green. © Andrew Hirons

Right: The long seed pods of *Catalpa bignonioides* can persist on the tree through winter.
© Duncan Slater

Catalpa x *erubescens* (Hybrid catalpa)

Use potential

Park

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m. Fast growing.

Ovoid crown becoming broader as the tree matures.

A moderately dense crown.

Natural habitat

An artificial hybrid between *Catalpa bignonioides* and *C. ovata*. It has similar requirements to *C. bignonioides*.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Highly ornamental large orchid-like flowers in upright clusters are most abundant in late summer.

LATE AUTUMN

Long seed pods have developed by late autumn be will often persist through winter.

Deciduous broadleaved tree with fairly large simple leaves. Newly developed leaves are dark purple in colour and ornamental. However, they are shed relatively early in the British Isles.

Single-stemmed. Grey, shallowly fissured bark becomes platy with age.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. Large leaves can readily block drains. Relatively weak wood.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



A young *Catalpa* x *erubescens* growing in a park.

© Andrew Hirons



Attractive flowers provide interest in late summer as well as a useful food source for insects.

© Andrew Hirons

Catalpa speciosa (Northern catalpa)

Use potential

Park

Tree size and crown characteristics

15-25M

Potentially a massive tree up to 32m in its natural habitat. In cultivation a height of 15-20m is more typical.

An ovoid crown sometimes developing a more irregular form. To around 8m wide.

A moderately dense crown.

Natural habitat

Native to lowland deciduous forest (50-200m) in the eastern United States. Predominantly found in riparian environments and on the margins of floodplains. Whilst it performs best a deep, moist loam soil, it can cope with a wide range of soil conditions.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Highly ornamental large orchid-like flowers in upright clusters are most abundant in early summer.

EARLY AUTUMN

Long seed pods have developed by early autumn be will often persist through winter.

Deciduous broadleaved tree with fairly large, heart-shaped, simple leaves.

Single-stemmed. Grey, shallowly fissured bark that peels in long plates in on mature stems.

Issues to be aware of

Large leaves can readily block drains.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Known to cope well with alternate flood and drought conditions so it is probably worth trying in SuDS schemes.
- Wood is highly resistant to decay but rather brittle.
- Most easily distinguished from *C. bignonioides* by the lack of odorous leaves, when crushed.
- Good for bees and other pollinating insects.

The tree and its features



A flowering *Catalpa speciosa* can make real impact in a park situation. The ovoid crown can get quite broad so this species does require plenty of space.

© Henrik Sjöman

Cedrus atlantica (Atlas cedar)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Tree size and crown characteristics

>25M

A massive tree up to 50m in its natural habitat. Smaller in cultivation, but still massive.

Conical, becoming broad as the tree matures.

A dense crown.

Natural habitat

Native to the Atlas mountains in Morocco and Algeria between 1000-2000m.

Environmental tolerance

Estimated to be partially tolerant to shade.

Tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Male cones appear a few weeks before the female cones in late summer. Male and female flowers are never on the same branches. Inconspicuous.

EARLY AUTUMN

Upright cones 5-8cm mature in the early autumn of the year after fertilisation.

Evergreen conifer with needle leaves forming rosettes on the short shoots. The 'glauca' group have bluish-green to silvery needles.

Single-stemmed. Smooth, light-grey bark when young: becoming fissured and platy on more mature stems.

Issues to be aware of

Capable of becoming a very large, broad tree.

Notable varieties

Bluish-green	'Glauca'.
Upright	'Fastigiata'.

The tree and its features



A *Cedrus atlantica* 'Glauca' providing colour interest in a park situation.

© Andrew Hirons



Cedrus atlantica 'Glauca' cones are an attractive feature.

© Andrew Hirons

Cedrus deodara (Himalayan cedar)

Use potential

Park

Paved

Tree size and crown characteristics

>25M

A massive tree up to 60m in its natural habitat. Smaller in cultivation, but still massive.

Conical, becoming broader as the crown matures. Fairly horizontal branches give the tree a flat, layered crown in older trees.

A dense crown.

Natural habitat

Native to eastern Afghanistan, northern India and western Nepal from sub-tropical zones to the slopes of the Himalayan ranges between 1200-3500m. Becomes particularly dominant on cool northern slopes.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Dioecious. Male flowers appear in early summer but only shed pollen in early autumn. Female flowers appear in late summer and mature by early autumn. Inconspicuous.

EARLY AUTUMN

Upright cones 5-8cm mature in the early autumn of the year after fertilisation.

Evergreen conifer with needle leaves forming rosettes on the short shoots. Young branched slightly pendulous.

Single-stemmed. Smooth, light-grey bark when young: becoming fissured and platy on more mature stems.

Issues to be aware of

Capable of becoming a very large, broad tree.

Notable varieties

Yellowish	‘Aurea’.
Pendulous	‘Pendula’.
Bluish	‘Karl Fuchs’.

The tree and its features





Left: A young *Cedrus deodara* has a conical crown that broadens with age. © Henrik Sjöman

Right: The potentially massive size of *Cedrus deodara* means they can become imposing trees. © Duncan Slater



Upright cones certainly add interest but are fairly inconspicuous.
© Duncan Slater

Cedrus libani
(Cedar of Lebanon)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Tree size and crown characteristics

>25M

A massive tree up to 40m in its natural habitat. Smaller in cultivation, but still massive.

Conical when young, branches becoming horizontal with age to give a broad, stratified crown. Highly attractive.

A dense crown.

Natural habitat

Native to western Asia, especially Lebanon and Syria. The largest stands currently occur between 1300-2100m in Lebanon.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY AUTUMN

Male flowers mature in early autumn a few weeks before the female flowers. Inconspicuous.

EARLY AUTUMN

Upright cones 8-10cm fully mature in the early autumn two years after fertilisation.

Evergreen conifer with needle leaves forming rosettes on the short shoots.

Single-stemmed. Smooth, light-grey bark when young: becoming fissured and platy on more mature stems. Highly characteristic stratified crown of layered horizontal branches makes this tree a parkland classic.

Issues to be aware of

Capable of becoming a very large, broad tree.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



The mature form of *Cedrus libani* with its stratified crown provides character to park situations.

© Henrik Sjöman



The male ‘flowers’ of *Cedrus libani* provide interest in early autumn but are not highly ornamental.

© Duncan Slater

Celtis australis (Nettle tree)

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m in its natural habitat.

A globular crown.

A moderately dense crown.

Natural habitat

Found in small stands in around the Mediterranean basin and the Balkan Peninsula. Prefers open, well drained sites.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Separate male and female flowers occurring on the same tree. Unremarkable flowering event in late spring.

EARLY AUTUMN

A single drupe fruit held on a slender stalk. Edible. Maturing by early autumn but persisting into winter.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. The bark is smooth and grey when young, as it ages it develops corky ridges and becomes rough in texture.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Young trees have an erratic branch architecture, therefore they require extensive formative pruning. Consider purchasing large stock sizes to help reduce this issue.
- Noted to have some tolerance salt and air pollution.

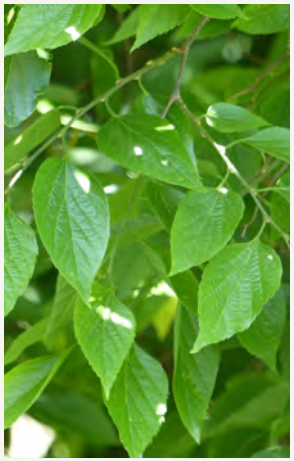
The tree and its features



Celtis australis is a robust tree that can be used in paved environments.

© Henrik Sjöman





Left: Corky ridges develop on mature stems.

© Henrik Sjöman

Right: Simple leaves of *Celtis australis*.

© Andrew Hirons

Celtis occidentalis (Common hackberry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 35m in parts its natural range. Smaller in cultivation.

A globular crown, capable of becoming broad.

A moderately dense crown.

Natural habitat

Found throughout much of the eastern United States in wooded lowland slopes, stream banks and floodplains.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Separate male and female flowers occurring on the same tree. Unremarkable flowering event in late spring.

EARLY AUTUMN

A single drupe fruit held on a slender stalk. Edible. Maturing by early autumn but persisting into winter.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. The bark is smooth and grey when young, as it ages it develops corky ridges and becomes rough in texture.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Observed to have some tolerance to salt and air pollution.

The tree and its features



The globular crown of *Celtis occidentalis* can become quite broad.
© Andrew Hirons





Left: The bark of *Celtis occidentalis* develops corky ridges as it matures. © Henrik Sjöman

Right: The simple leaves of *Celtis occidentalis* with immature fruit. This will ripen by early autumn and is edible (but not particularly desirable). © Andrew Hirons

Cercidiphyllum japonicum (Katsura tree)

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 30m in its native habitat. Typically smaller in cultivation.

An ovoid to globular crown, sometimes more irregular.

A moderately dense crown.

Natural habitat

Native to Japan, China and parts of the eastern Himalaya region. Prefers south-facing mountain riparian zones with gentle slopes and fertile soils of lowland alluvial forests. The species is very cold-hardy but does require summer heat from a continental climate to achieve this. In more maritime climates, such as the British Isles, it can be susceptible to late frosts as the leaves emerge.

Environmental tolerance

Partially tolerant to shade.

Sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Relatively inconspicuous flowers emerge before the leaves in late spring. Male and female flowers are borne on separate trees (dioecious).

LATE SUMMER

The female trees have small pods clustered together in groups of two to five.

Deciduous broadleaved tree with simple leaves. Young leaves emerge a reddish bronze, are green throughout summer and turn a fantastic yellow-red or yellow-orange in autumn. Highly ornamental.

Single- or multi-stemmed. Fissured grey bark.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes.

Notable varieties

Weeping	‘Amazing Grace’, ‘Pendulum’.
Purple leaves	‘Rotfuchs’.

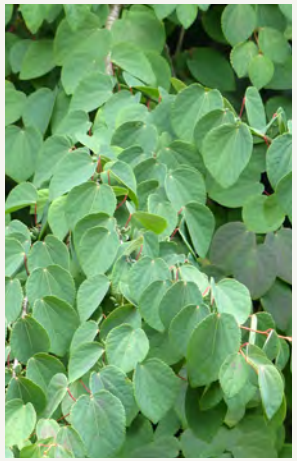
Notes

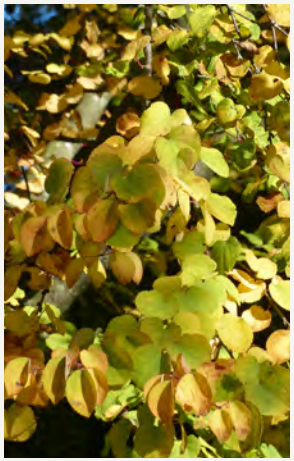
- Sensitive to salt.
- *Cercidiphyllum* spp. are known to be a high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A semi-mature *Cercidiphyllum japonicum* growing well in a garden location.
© Andrew Hirons





Left: Simple leaves emerge reddish-bronze before becoming a matt-green in summer. © Andrew Hirons

Right: *Cercidiphyllum japonicum* provides an excellent autumn display when the leaves turn yellow in autumn.
© Andrew Hirons

Cercis canadensis (North American redbud)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A medium tree that capable of growing 12m but typically less than 10m in cultivation.

A globular crown.

A moderately dense crown.

Natural habitat

Native to temperate deciduous forest of eastern North America (inc. Mexico), 0-670m. Of variable habitat. Most frequent in forest margins but is also capable of growing in the understorey of moist forests. Regularly found on dry sites, including on limestone, with good fertility. Capable of nitrogen-fixation which is a major benefit on marginal or disturbed sites where it can act as a pioneer. Has much greater cold-hardiness than *C. siliquastrum*.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of 4-8 pink flowers appear from the leaf axil in late spring shortly before the leaves emerge. Spectacular and highly ornamental.

EARLY AUTUMN

Flat seed pods 6-10cm long mature by early autumn and persist through winter.

Deciduous broadleaved tree with a simple leaf.

Single- or multi-stemmed. Grey bark with shallow fissured that may flake in small plates on mature specimens.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Purple leaves	'Forest Pansy'.

Notes

- Although noted to be moderately tolerant to shade, will perform better in partial shade or full sun.

The tree and its features



Cercis canadensis is an excellent tree for small gardens. In late spring the clusters of pink flowers provide a spectacular display.

© Henrik Sjöman

Cercis siliquastrum (Judas tree)

Use potential

Park | Paved | Small garden | Coastal

Tree size and crown characteristics

<10M

A medium tree that capable of growing 12m but typically less than 10m in cultivation.

A globular crown.

A moderately dense crown.

Natural habitat

Native to forest margins and the understorey of dry forests in south eastern Europe and western Asia. Although cold-hardy enough for the British Isles, this species does require summer heat to thrive. Therefore, warm microclimates should be favoured. Capable of acting as a pioneer on marginal or disturbed sites as it is aided by N-fixing bacteria. Also known to grow on calcareous soils.

Environmental tolerance

Moderately tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of pink flowers appear from the older wood in late spring shortly before the leaves emerge. Spectacular and highly ornamental.

EARLY AUTUMN

Flat seed pods 6-10cm long mature by early autumn and persist through winter.

Deciduous broadleaved tree with a simple leaf.

Single- or multi-stemmed. Grey bark with shallow fissured on mature specimens.

Issues to be aware of

No substantial issues to be aware of.

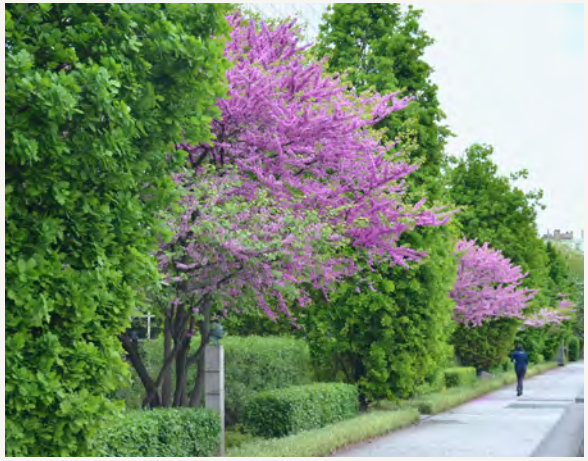
Notable varieties

Larger flowers	‘Bodnant’.
White flowers	‘Alba’.

Notes

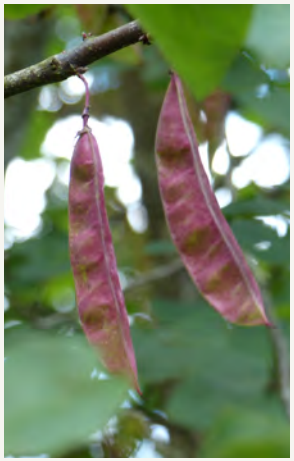
– Although noted to be moderately tolerant to shade, will perform better in partial shade or full sun.

The tree and its features



Cercis siliquastrum flowering in a roadside planting bed.
© Henrik Sjöman





Left: Clusters of pink flowers provide a very attractive display shortly before the leaves emerge. © Andrew Hirons

Right: Flat seed pods mature in early autumn but tend to persist for several months, adding winter interest.
© Andrew Hirons

Chamaecyparis lawsoniana (Lawson cypress)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of growing up to 70m: cultivars are much smaller.

A conical crown.

A dense crown.

Natural habitat

Native to the mixed coniferous forest and mixed deciduous-conifer forest of north-western US. Found in a Mediterranean-type climate with summer fog. Mostly found on sandy and clay-loam but also found on serpentine soil (extremely nutrient poor but rich in heavy metals). Found 0-1950m, mostly on the lower mountain slopes, particularly alongside rocky river banks.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Separate male and female flowers on the same branches. Flowering occurs in late spring but of no ornamental value.

LATE AUTUMN

Round cones about 10mm in diameter ripen in late autumn.

Evergreen conifer with scale leaves.

Single-stemmed. Thick, reddish-brown bark with long fissures.

Issues to be aware of

Potentially an extremely large tree. *C. lawsoniana* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Upright	‘Columnaris’, ‘Columnaris Glauca’, ‘Yvonne’, ‘Erecta’.
Weeping	‘Imbricata Pendula’, ‘Inversa’.
Bluish	‘Columnaris Glauca’.
Yellow	‘Stardust’.
Upright yellow	‘Yvonne’.

The tree and its features

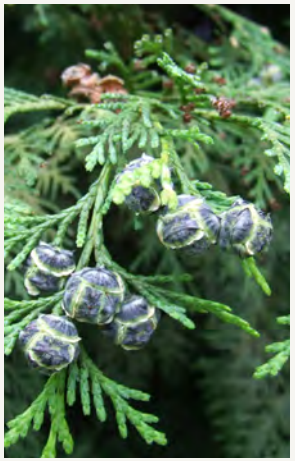




Left: *Chamaecyparis lawsoniana* ‘Erecta’ can provide dense screening. © Andrew Hirons

Right: The strongly conical crown of *Chamaecyparis lawsoniana*. © Henrik Sjöman





Left: Scale leaves of *Chamaecyparis lawsoniana*. © Henrik Sjöman

Right: The fruit of *Chamaecyparis lawsoniana* is fairly inconspicuous and of little ornamental value. © Duncan Slater

x *Chitalpa tashkentensis* (Chitalpa)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree up to 10m. <10M

A globular to irregular crown.

A dense crown.

Natural habitat

A nothogeneric hybrid between the Mexican species *Chilopsis linearis* and *Catalpa bignonioides*, both of Bignoniaceae. Prefers a fertile loam or sandy soil. Warm microclimates and a sunny, sheltered position are also preferable.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Highly ornamental trumpet-shaped, light pink flowers with a yellow centre (2.5-5cm long) held in upright clusters. Appearing in early summer. EARLY SUMMER

A sterile hybrid, no fruit formed.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Bark grey-brown with shallow fissures.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Hybrid-type	‘Summer Bells’.

Notes

– Probably worth trialling in paved environments as it is estimated to have moderate drought tolerance and it produces no fruit.

The tree and its features



x *Chitalpa tashkentensis* ‘Summer Bells’ is a small tree with excellent potential. It has very attractive trumpet shaped flowers.

© Barcham Trees

Cladrastis kentukea (Yellow wood)

Use potential

Park

Tree size and crown characteristics

10-15M

A potentially large tree up to 18m but usually less than 12m in cultivation.

A globular crown, capable of becoming quite wide for a relative small tree. Often branching low.

A dense crown.

Natural habitat

Native to temperate deciduous forests of eastern US. Found in valleys (up to 1080m) on well-drained, fertile soils, often on limestone. Will perform best in warm microclimates although they have good cold-hardiness. Capable of fixing atmospheric nitrogen and, therefore, improving site fertility.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to waterlogging.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Long drooping clusters of white pea-like flowers. Highly ornamental, appearing in early summer.

EARLY AUTUMN

Dangling flat pod, 3-8cm long, maturing by early autumn. Persisting into winter.

Deciduous broadleaved tree with pinnate leaves hosting alternate leaflets. Leaves turn golden-yellow in autumn.

Single- or multi-stemmed. Grey bark smooth when young but becoming shallowly fissured with age.

Issues to be aware of

Does not flower consistently in the British Isles.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

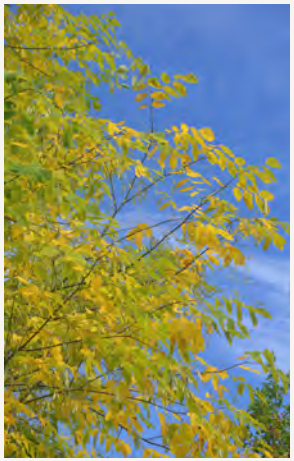
- Young branches are known to be brittle so extreme care needed during handling.

The tree and its features



Cladrastis kentukea flowering in early summer.
© Henrik Sjöman





Left: Drooping clusters of white flowers are ornamental.
© Henrik Sjöman

Right: The leaves of *Cladrastis kentukea* turn a golden-yellow in autumn.
© Henrik Sjöman

Clerodendrum trichotomum (Harlequin glorybower)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree capable of reaching 10m but generally less than 6m.

A globular, bushy crown.

A moderately dense crown.

Natural habitat

Native to China, India, Japan, the Korean peninsula and Taiwan. Forming mountain thickets up to 2400m. Prefers warm microclimates.

Environmental tolerance

Intolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Large clusters of white, fragrant flowers enveloped with a purple casing. Appearing in late summer. Highly ornamental.

LATE AUTUMN

Small deep blue, eventually black, berries with crimson calyx from late autumn.

Deciduous broadleaved tree with simple leaves. Leaves smell of peanut butter when rubbed.

Typically multi-stemmed but also cultivated in to a small single-stemmed tree. Relatively smooth, light grey bark.

Issues to be aware of

Forms root suckers.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



A young *Clerodendrum trichotomum* in a garden situation with its bushy, globular crown.

© Andrew Hirons



Clerodendrum trichotomum has fragrant, highly ornamental flowers that appear in late summer.

© Andrew Hirons

Cornus alternifolia (Alternate leaf dogwood)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree (or shrub) growing up to 8m.

An irregular crown, often quite broad for a small tree.

A moderately dense crown.

Natural habitat

Native to a wide range in the temperate forests of eastern North America. Most frequent in cool moist understorey and on forest margins, preferring fertile forests soils, 50-1900m. Understorey and forest margin species.

Environmental tolerance

Tolerant of shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

A flattened or convex cluster of creamy white flowers held just above the leaves in early summer.

EARLY AUTUMN

Bluish-black clusters of drupes mature in early autumn. Popular with birds.

Deciduous broadleaved tree with simple, alternate leaves.

Single-stemmed but also found as a multi-stemmed shrub. Reddish brown smooth bark when young, becoming fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Slow growing and slow to establish, but worth the wait.

The tree and its features



The stratified crown of *Cornus alternifolia* growing in a forest understorey. This species has attractive convex clusters of creamy with flowers in early summer.

© Henrik Sjöman

Cornus controversa (Wedding cake tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

10-15M

A large tree capable of reaching 20m in its native habitat, but typically less than 12m in temperate Europe.

An irregular crown with distinct layers. Highly ornamental architecture.

An open crown.

Natural habitat

Native to China, Japan, Taiwan, the Korean peninsula and the Himalayas. Found in deciduous or mixed deciduous-conifer mountain forests 200-2600m.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Large convex clusters of creamy white flowers, lightly scented. Held above the foliage in early summer.

EARLY AUTUMN

Clusters of small, round, dark blue fruits ripen in early autumn.

Deciduous broadleaved tree with simple alternate leaves. Good yellow autumn colour but leaves fall in early autumn.

Single-stemmed. Green-brown bark, becoming rougher with age.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes.

Notable varieties

Species-type form	‘Pagoda’.
Variegated leaves	‘Variegata’.

The tree and its features



Cornus controversa has a beautiful layered crown that is accentuated when flowering.
© Henrik Sjöman





Left: *Cornus controversa* has attractive convex clusters of creamy white flowers. © Andrew Hirons

Right: The round fruits of *Cornus controversa* ripen in early autumn.
© Duncan Slater

Cornus ‘Eddie’s white wonder’ (Hybrid dogwood)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree up to 10m.

An ovoid crown.

A moderately dense crown.

Natural habitat

A hybrid between *Cornus florida* and *C. nuttalli*. Does not occur naturally.

Environmental tolerance

Estimated to be tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Insignificant flowers, accompanied by highly ornamental white bracts in late spring.

No fruits, a sterile hybrid.

Deciduous broadleaved tree with simple opposite leaves. In autumn, the leaves turn crimson red.

Single- or multi-stemmed. Young stems have purple hue. Bark is grey, flaking with age.

Issues to be aware of

Fruits are toxic to humans.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



The white floral bracts of *Cornus* ‘Eddie’s white wonder’ give a stunning display in late spring and early summer.
© Barcham Trees



Right: White floral bracts surround rather insignificant flowers in *Cornus* ‘Eddie’s white wonder’. © Henrik Sjöman

Left: Good autumn colour of *Cornus* ‘Eddie’s white wonder’ extend the seasonal interest of this hybrid.
© Henrik Sjöman

Cornus florida (Flowering dogwood)

Use potential

Park

Small garden

Tree size and crown characteristics

A medium tree up to 15m but in cultivation it rarely exceeds 8m.

<10M

A globular crown.

A moderately dense crown.

Natural habitat

Native to eastern North America from southern Canada to Florida. Found in deciduous and mixed deciduous-coniferous forest edges and forest understories, 0-1200m. Prefers cool, well drained acid or neutral soils.

Environmental tolerance

Tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

Insignificant flowers, accompanied by highly ornamental white bracts in late spring.

LATE SPRING

Bunches of red-yellow drupes ripen by early autumn. Good for birds.

EARLY AUTUMN

Deciduous broadleaved tree with simple opposite leaves. In autumn the leaves turn crimson red.

Multi-stemmed tree. Bark is grey, flaking with age.

Issues to be aware of

Fruits are toxic to humans.

Notable varieties

Red bracts	'Cherokee Chief'.

Notes

- Although noted to be tolerant to shade, will perform better in partial shade or full sun.

The tree and its features



A mature *Cornus florida* makes an attractive landscape tree with a range of seasonal interest.
© Henrik Sjöman





Left: *Cornus florida* has attractive white floral bracts that surround insignificant flowers. © Henrik Sjöman

Right: Good autumn colour and red-yellow drupes give *Cornus florida* autumnal interest.
© Henrik Sjöman

Cornus kousa (Chinese dogwood)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree up to 10m but in cultivation it rarely exceeds 8m.

A globular crown.

A moderately dense crown.

Natural habitat

Native to China, Japan and the Korean peninsular. Found in deciduous and mixed deciduous-coniferous forest edges and forest understories, 400-2200m. Prefers cool, well-drained acid or neutral soils.

Environmental tolerance

Moderately tolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Insignificant flowers, accompanied by highly ornamental white bracts in early summer. These persist through much of the summer.

EARLY AUTUMN

Agglomerated drupes look somewhat similar to strawberries ripening by early autumn. Edible.

Deciduous broadleaved tree with simple opposite leaves. In autumn the leaves turn various shades of red, orange or purple.

Multi-stemmed tree. Bark is grey, flaking with age to reveal a copper or olive-green colour.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Species-type habit	'China Girl', 'var. Chinensis', 'Milky Way'.
Pink bracts	'Stella Pink'.

Notes

- Although noted to be tolerant to shade, will perform better in partial shade or full sun.

The tree and its features



The white floral bracts of *Cornus kousa* are highly ornamental in late spring.

© Andrew Hirons





Left: White floral bracts accompany rather inconspicuous flowers.

© Andrew Hirons

Right: Edible fruits ripen to a red colour in early autumn.

© Henrik Sjöman

Cornus mas
(Cornelian cherry dogwood)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

<10M

Small tree up to 5m but in cultivation when raised as a standard it can get a little over 5m.

A globular to ovoid crown, branching close to the ground.

A moderately dense crown.

Natural habitat

Native to dry deciduous forests of southwestern Europe and western Asia. Found in the forest understorey and forest margins. Prefers calcareous soils but will also tolerate mildly acidic soils. Enjoys a hot climate, nevertheless, it is very cold-tolerant.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE WINTER

Small clusters of bright yellow flowers emerge before the leaves in late winter.

EARLY AUTUMN

Red, ovoid drupe fruit ripens by early autumn. Attractive and edible, rich in vitamin C.

Deciduous broadleaved tree with simple opposite leaves. In autumn the leaves turn various shades of red, orange or purple.

Multi-stemmed tree, unless cultivated into a 'standard' single-stemmed tree. Bark is grey-brown, flaking in small plates on mature stems.

Issues to be aware of

Shallow rooting may cause problems with hard surfaces, particularly when combined with small or poorly aerated soil volumes. Fruits can be a problem in paved sites.

Notable varieties

Yellow leaved	'Aurea'.
Variegated	'Variegata'.

Notes

– Slow growing.

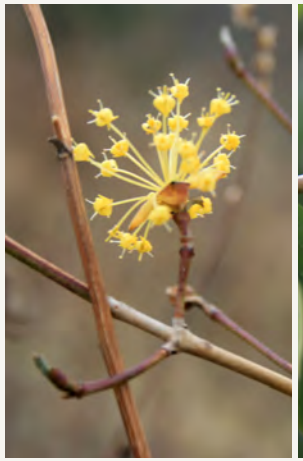
The tree and its features





Left: Although often shrub-like, *Cornus mas* can make an excellent small tree. © Henrik Sjöman

Right: Simple leaves of *Cornus mas*. These will provide good autumn colour. © Henrik Sjöman





Left: *Cornus mas* has clusters of yellow flowers in late winter that provide hope for spring. © Henrik Sjöman

Right: *Cornus mas* yields attractive (and edible) red drupes in early autumn. © Henrik Sjöman

Corylus avellana (Hazel)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small multi-stemmed tree growing to 6m.

A globular crown.

A moderately dense crown.

Natural habitat

Native to Europe (including the British Isles) and western Asia. An understorey shrub/multi-stemmed tree of temperate deciduous forests.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE WINTER

Male catkins emerge in late winter and are attractive, female flowers occur at the same time but are inconspicuous.

EARLY AUTUMN

Nuts mature by early autumn. Edible.

Deciduous broadleaved tree with simple leaves.

Multi-stemmed tree or shrub. Grey-brown bark with lenticels apparent on the younger stems. Older stems have a slightly flaky bark.

Issues to be aware of

Hazelnuts can be problematic on paths.

Notable varieties

Twisted stems	'Contorta'.
Purple leaves	'Zellernus'.

The tree and its features



Corylus avellana provides a useful native small, multi-stemmed tree for use in gardens and parks.

© Duncan Slater



Hazelnuts can be harvested from *Corylus avellana* in early autumn. Here they are shown at an immature stage of development.

© Duncan Slater

Corylus colurna (Turkish hazel)

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

15-25M

A large tree growing to 24m.

A conical to ovoid crown.

A moderately dense crown.

Natural habitat

Native to warm-temperate forests of southeastern Europe and western Asia. Predominately found in open woodland in forest margins. Grows on a wide range of soils, including calcareous, providing they are well drained.

Environmental tolerance

Intolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE WINTER

Male catkins emerge in late winter and are attractive, female flowers occur at the same time but are inconspicuous.

EARLY AUTUMN

Nuts mature by early autumn, held in characteristic, ornamental husks. Edible.

Deciduous broadleaved tree with simple leaves.

Single-stemmed tree. Grey bark becoming platy and flaking on mature stems.

Issues to be aware of

Hazelnuts can be problematic on paths. *C. colurna* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Purple-red leaves	'Te-Terra Red'.
Columnar	'VDB Obelisk'.

Notes

– Slow growing and slow to establish so requires good aftercare for 3-5 years post planting.

The tree and its features





Left: A young *Corylus colurna* in a paved environment.
© Henrik Sjöman

Right: Male catkins of a young *Corylus colurna* emerge in late winter. © Duncan Slater





Left: Simple leaves of *Corylus colurna*.
© Andrew Hirons

Right: A characteristic ornamental husk surrounding the nut of *Corylus colurna*.
© Duncan Slater

Corylus maxima (Filbert)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small multi-stemmed tree growing to 6m.

A globular crown.

A moderately dense crown.

Natural habitat

Native to southern Europe and Anatolian Peninsula. An understorey shrub/multi-stemmed tree of warm-temperate deciduous forests. Occurs on a wide range of soils, including calcareous.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE WINTER

Male catkins emerge in late winter and are attractive, female flowers occur at the same time but are inconspicuous.

EARLY AUTUMN

Nuts mature by early autumn. Edible.

Deciduous broadleaved tree with simple leaves.

Multi-stemmed tree or shrub. Grey-brown bark with lenticels apparent on the younger stems. Older stems have a slightly flaky bark.

Issues to be aware of

Hazelnuts can be problematic on paths.

Notable varieties

Purple	‘Purpurea’.

The tree and its features



Corylus maxima ‘Purpurea’ is a useful small, purple-leaved tree for small gardens and parks.

© Duncan Slater



The nuts of *Corylus maxima* are enclosed by a smooth husk. They mature in early autumn and are edible.

© Duncan Slater

Cotoneaster frigidus (Tree cotoneaster)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree up to 10m in its natural habitat, smaller in cultivation.

A globular crown, less than 5m wide.

A dense crown.

Natural habitat

Native to the Himalaya region.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Upright clusters of 20-40 small white flowers appear in early summer.

EARLY AUTUMN

Bright red clusters of pome fruits in early autumn. Highly ornamental and valuable for birds.

Deciduous broadleaved tree with simple leaves.

Single-stemmed small tree. Smooth grey bark becoming slightly platy with age.

Issues to be aware of

Fallen fruit may cause a nuisance on footpaths.

Notable varieties

Compact	‘Cornubia’.

Notes

– Good for bees and other pollinating insects as it flowers after many other trees have finished their flowering.

The tree and its features



Cotoneaster frigidus ‘Cornubia’ is a useful flowering tree in early summer.
© Andrew Hirons





Left: Clusters of white flowers are attractive to bees and other pollinating insects in early summer. © Duncan Slater

Right: Attractive clusters of red pomes make *Cotoneaster frigidus* valuable for birds.
© Andrew Hirons

Crataegus x *grignonensis* (Grignon hawthorn)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M
A small tree capable of growing 7m.
A globular crown.
A dense crown.

Natural habitat

A hybrid of *Crataegus mexicana* and an unknown male parent. Only found in cultivation.

Environmental tolerance

Estimated to be partially tolerant to shade.
Estimated to be moderately tolerant to drought.
Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING
Clusters of very attractive white flowers emerge in late spring after the leaves have expanded.
EARLY AUTUMN
Clusters reddish-brown pome fruits mature by early autumn.

Deciduous broadleaved tree with simple leaves. Leaves remain on the tree until early winter.

Single-stemmed. Grey-brown bark becoming platy with age.

Issues to be aware of

Heavily thorned. Fallen fruit may cause a nuisance on pathways.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Good for wildlife as flowers provide food for a range of insects and fruits are desirable for birds and small mammals.

The tree and its features




Left: A mature *Crataegus* x *grignonensis* is a useful small tree for a range of situations. © Andrew Hirons

Right: Simple leaves of *Crataegus* x *grignonensis* with recently pollinated flowers. © Andrew Hirons




Left: The flowers of *Crataegus* x *grignonensis* appear in late spring and are attractive to bees and other pollinating insects. © Duncan Slater

Right: The bark of *Crataegus* x *grignonensis* becomes platy and rough with age. © Andrew Hirons

Crataegus laevigata (Woodland hawthorn)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M

A small tree capable of growing 8m, typically around 5m.

A globular crown.

A dense crown.

Natural habitat

Native to temperate Europe. Occurs in deciduous forest margins and clearings. Found on a wide range of soils.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of very attractive white flowers emerge in late spring after the leaves have expanded.

EARLY AUTUMN

Clusters red, pome fruits in early autumn.

Deciduous broadleaved tree with simple leaves.

Single-stemmed in cultivation but often multi-stemmed in their natural habitat. Grey-brown bark becoming platy with age.

Issues to be aware of

Thorned.

Notable varieties

Double flowers	‘Plena’.
No fruit	‘Plena’.

Notes

- Vulnerable to fireblight (*Erwinia amylovora*).
- Good for wildlife as flowers provide food for a range of insects and fruits are desirable for birds and small mammals.

The tree and its features





Left: A flowering *Crataegus laevigata* is very attractive in late spring. © Duncan Slater

Right: Simple lobed leaves of *Crataegus laevigata*. © Duncan Slater





Left: Clusters of small, predominantly pink, flowers emerge shortly after the leaves have expanded. © Duncan Slater

Right: Clusters of small red fruits are attractive to a range of wildlife. © Duncan Slater

Crataegus x *lavalleei* (Lavallée hawthorn)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M
A small tree capable of growing 6m.
A globular crown.
A dense crown.

Natural habitat

A hybrid of *Crataegus mexicana* and an unknown male parent. Only found in cultivation.

Environmental tolerance

Moderately tolerant to shade.
Moderately tolerant to drought.
Sensitive to waterlogging.

Ornamental qualities

LATE SPRING
Clusters of very attractive white flowers emerge in late spring after the leaves have expanded.
EARLY AUTUMN
Clusters of yellow-red or orange-red, glossy pome fruits in early autumn.

Deciduous broadleaved tree with simple leaves. Leaves persist to early winter.

Single-stemmed. Grey-brown bark becoming platy with age.

Issues to be aware of

Thorned. Fallen fruit may cause a nuisance on pathways.

Notable varieties

Cultivar-type habit	‘Carrièrei’.

Notes

– Good for wildlife as flowers provide food for a range of insects and fruits are desirable for birds and small mammals.

The tree and its features



Crataegus x *lavalleei* makes an excellent small tree and should be used more widely.

© Henrik Sjöman



Clusters of fruits are attractive to a range of wildlife in autumn.

© Henrik Sjöman

Crataegus x *media* (Red thorn)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M

A small tree capable of growing 10m but usually less than 8m.

A globular crown, around 6m wide at maturity.

A dense crown.

Natural habitat

A naturally occurring sterile hybrid between *Crataegus laevigata* and *C. monogyna*. 'Paul's Scarlet' is a particularly striking variety with crimson flowers.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of very attractive flowers emerge in late spring after the leaves have expanded.

Sterile hybrid, not fruit.

Deciduous broadleaved tree with simple leaves. Provides good autumn colour with leaves turning yellow.

Single-stemmed in cultivation but often multi-stemmed in their natural habitat. Grey-brown bark becoming platy with age.

Issues to be aware of

Thorned.

Notable varieties

Crimson double flowers	'Paul's Scarlet'.
No fruit	'Paul's Scarlet'.

Notes

- Vulnerable to fireblight (*Erwinia amylovora*).
- Also sold as *Crataegus laevigata* 'Paul's Scarlet' but this name is now outdated.

The tree and its features



Crataegus x *media* growing in roadside planting.
© Duncan Slater



Crataegus x *media* 'Paul's Scarlet' has spectacular double flowers in late spring.
© Duncan Slater

Crataegus monogyna (Common hawthorn)

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

10-15M

A medium tree capable of growing 12m but usually less than 8m.

A globular crown.

A dense crown.

Natural habitat

Native to temperate Europe, northern Africa, western Asia, parts of Russian and Afganistan. Occurs in deciduous forest margins and clearings. Found on a wide range of soils, except those that are very sandy.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of very attractive white flowers emerge in late spring after the leaves have expanded.

EARLY AUTUMN

Clusters red, pome fruits in early autumn.

Deciduous broadleaved tree with simple leaves.

Single-stemmed in cultivation but often multi-stemmed in their natural habitat. Grey-brown bark becoming platy with age.

Issues to be aware of

Thorned.

Notable varieties

Columnar	'Stricta'.

Notes

- Vulnerable to fireblight (*Erwinia amylovora*).
- Good for wildlife as flowers provide food for a range of insects and fruits are desirable for birds and small mammals.

The tree and its features



Crataegus monogyna is a versatile small tree. The 'Stricta' cultivar, shown here, has a more upright, columnar form.
© Andrew Hirons





Left: White flowers adorn *Crataegus monogyna* in late spring. © Andrew Hirons

Right: Clusters of red pome fruits ripen in early autumn and are attractive to a range of wildlife.
© Duncan Slater

Crataegus x *persimilis* (Broad-leaved cockspur thorn)

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M
A small tree capable of growing 5m.
A globular crown.
A dense crown.

Natural habitat

A naturally occurring hybrid between *Crataegus crus-galli* and *C. succulenta*. Found in north-eastern US in a scattered distribution around the southern Great Lakes region.

Environmental tolerance

Estimated to be partially tolerant to shade.
Estimated to be tolerant to drought.
Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING
Clusters of very attractive flowers emerge in late spring after the leaves have expanded.
EARLY AUTUMN
Clusters of red pome fruit ripen in early autumn.

Deciduous broadleaved tree with glossy simple leaves. Provides good autumn colour with leaves turning yellow-red.

Single-stemmed in cultivation but often multi-stemmed in their natural habitat. Grey-brown bark becoming platy with age.

Issues to be aware of

Thorned.

Notable varieties

Hybrid-type habit	'Splendens'.

Notes

– Also sold as *Crataegus* (x) *prunifolia* but this name is now considered outdated.

The tree and its features



Crataegus x *persimilis* has a spectacular flowering display in late spring.
© Andrew Hirons



Crataegus x *persimilis* has clusters of white flowers that appear shortly after the leaves in late spring.
© Andrew Hirons

Cryptomeria japonica (Japanese cedar)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 50m. Smaller in cultivation, but still massive.

A conical crown becoming more ovoid with age.

A dense crown.

Natural habitat

Native to Japan. Found in mountain forests, 50-1800m. It can survive on a wide range of soils but much prefers fertile, warm sites.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

Separate male and female flowers occur on the same tree but they are inconspicuous.

Small (1-2.5cm) round cones at various stages of development can be found on mature trees.

Evergreen conifer with needle-like leaves. *Cryptomeria japonica* has distinct juvenile foliage on young trees, this is retained in the cultivar 'Elegans'.

Single-stemmed. Attractive reddish-brown to brown-grey bark with long fibrous ribbing.

Issues to be aware of

Potentially a very large tree. *C. japonica* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Juvenile foliage	'Elegans'.

The tree and its features



Left: A small group of *Cryptomeria japonica* in a park. © Andrew Hirons

Right: *Cryptomeria japonica* showing a characteristically conical crown form. © Duncan Slater



Left: The unusual foliage of *Cryptomeria japonica* has needle-like leaves. © Henrik Sjöman

Right: The small cones of *Cryptomeria japonica* add interest but are fairly inconspicuous. © Andrew Hirons

Cupressus arizonica (Arizona cypress)

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m.

A conical tree.

A dense crown.

Natural habitat

Native to southern North America on dry, rocky, mountain slopes, 900-2700m. Requires a warm, sheltered microclimate to perform well in the British Isles.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

Male and female flowers occur separately but on the same tree. Inconspicuous. Most pollinating occurs in early spring.

Round, knobbly cones (around 2cm in diameter) held on short stalks. Persistent for many years.

Evergreen conifer with scale-like leaves.

Single-stemmed. Grey-brown to purple bark with a flaky or fibrous texture. Bark can be very attractive when exposed.

Issues to be aware of

C. arizonica release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type habit	'var. *Glabra*'.
Columnar	'Pyramidalis'.
Blue-green foliage	'Glauca'.

Notes

– Prefers a warm microclimate.

The tree and its features





Left: *Cupressus arizonica* 'Pyramidalis' showing a columnar form. © Duncan Slater

Right: A young *Cupressus arizonica* 'Glauca' provides year-round interest. © Andrew Hirons





Left: *Cupressus arizonica* 'Glauca' has blue-green scale leaves. © Andrew Hirons

Right: In mature specimens, the bark becomes flaky and can take on a mottled appearance. © Andrew Hirons

Cupressus macrocarpa (Monterey cypress)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Coastal

Tree size and crown characteristics

>25M

A massive tree capable of reaching 25m in wild, but 40m in cultivation. Some cultivars much smaller.

A conical tree when young, becoming flat-topped with horizontal branches at maturity.

A dense crown.

Natural habitat

Native to the Monterey Peninsular in California. Found on poor quality, shallow, coastal soils. Prefers a warm maritime climate but will also grow further inland.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Male and female flowers occur separately but on the same tree. Inconspicuous.

Round, knobbly cones (around 3-4cm in diameter). Persistent for many years.

Evergreen conifer with scale-like leaves. Coloured varieties are available.

Single-stemmed. At maturity bark has long grey fibrous ridges exposing younger reddish-brown bark in between.

Issues to be aware of

Potentially a very large tree. *C. macrocarpa* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Yellow	'Goldcrest'.

The tree and its features



Cupressus macrocarpa providing a dominant feature in a large garden.

© Duncan Slater



A flowering shoot of *Cupressus macrocarpa* displaying the knobbly, round cones that can be seen all year round.

© Andrew Hirons

Cupressus sempervirens (Mediterranean cypress)

Use potential

Park

Paved

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 30m in wild, but many cultivars are much smaller.

Wild-type has an irregular crown. More widely planted variety has a columnar crown.

A dense crown.

Natural habitat

Native to the Mediterranean basin and western Asia. Most frequent on steep rocky slopes and river canyons, 100-1700m. *Cupressus sempervirens* can act as a pioneer on poor quality soils, tolerating shallow rocky and clayey soils. Requires a warm, sheltered microclimate to perform well in the British Isles.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

Male and female flowers occur separately but on the same tree. Inconspicuous.

Round, knobbly cones (around 2-4cm in diameter). Persistent for many years.

Evergreen conifer with fine scale-like leaves.

Single-stemmed. At maturity bark has long grey fibrous ridges exposing younger reddish-brown bark in between.

Issues to be aware of

Potentially a very large tree, however, columnar varieties are more compact. *C. sempervirens* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type habit	'var. *horizontalis*'.
Columnar	'var. *pyramidalis*', 'var. *stricta*', 'Green Pencil'.

The tree and its features



Left: *Cupressus sempervirens* with a very columnar form. © Duncan Slater

Right: Columnar varieties such as this 'var Pyramidalis' provide architectural qualities. © Barcham Trees



Fine scale-leaves of *Cupressus sempervirens*. © Duncan Slater

x *Cuprocyparis leylandii* (Leyland cypress)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Coastal

Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m, but many cultivars are smaller.

A large columnar crown.

A dense crown.

Natural habitat

A hybrid between *Cupressus macrocarpa* and *Xanthocyparis nootkatensis* (syn *Cupressus nootkatensis* syn *Callitropsis nootkatensis*). Adaptable to a wide range of soils and tolerant of salt laden winds.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Inconspicuous.

Most varieties appear sterile.

Evergreen conifer with fine scale-like leaves.

Single-stemmed. A reddish-brown bark, becoming rough at maturity.

Issues to be aware of

Potentially a large tree, dense tree.

Notable varieties

Yellow	'Castlewellan'.

Notes

– Fast growing and quick to establish.

The tree and its features





Left: x *Cuprocyparis leylandii* can provide a large, dense columnar crown. © Andrew Hirons

Right: The bark of x *Cuprocyparis leylandii* has a reddish-brown appearance. © Andrew Hirons



Scale leaves of x *Cuprocyparis leylandii* have little ornamental merit.
© Andrew Hirons

Cydonia oblonga (Common quince)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree growing up to 10m.

<10M

A globular, bushy crown form.

A dense crown.

Natural habitat

Native to western Asia, particularly the Caucasus and northern Iran. Found in forest margins and open woodland on rocky slopes.

Environmental tolerance

Intolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

Quite large (4-5cm in diameter) white to light-pink flowers emerge in late spring.

LATE SPRING

Golden yellow pear-shaped fruit around 10cm long ripen by late autumn. Edible if cooked.

LATE AUTUMN

Deciduous broadleaved tree with simple leaves: turning yellow in autumn.

Single-stemmed. Mature bark is slightly rough dark brown, young stems have velvety hairs.

Issues to be aware of

Large fruit may cause a nuisance if allowed to fall on pathways.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



The small, bushy crown of *Cydonia oblonga*.

© Duncan Slater





Left: Simple leaves and flower buds of *Cydonia oblonga*.

© Duncan Slater

Right: This immature fruit will ripen to a golden-yellow colour in late autumn.

© Duncan Slater

Davidia involucrata
(Pocket handkerchief tree)

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m in its native habitat, in cultivation typically less than 15m.

A globular crown.

A moderately dense crown.

Natural habitat

Native to China, particularly the mixed montane forests, 1100–2600m, in Guizhou, west Hubei, west Hunan, Sichuan and north Yunnan. Requires a moist, organic soil in a relatively sheltered position.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Flowers held on a small round head held on a short stalk. Fairly unremarkable in themselves but accompanied by two (rarely three) very attractive white bracts. Late spring.

LATE AUTUMN

Small ovoid drupe greenish brown, often with purplish bloom. Ripening by late autumn. Persisting.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. A grey-brown bark, becoming slightly rough with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Hairy leaf	subsp. *involucrata*.
Smooth leaf	subsp. *vilmoriniana*.

Notes

– Fairly slow to establish but certainly worth the wait.

The tree and its features



A mature *Davidia involucrata* creates shade for this restaurant veranda.
© Andrew Hirons





Left: Relatively unremarkable flowers are accompanied by highly ornamental white floral bracts in late spring.
© Henrik Sjöman

Right: Ovoid drupe fruits mature in late autumn and often persist for several months. © Andrew Hirons

Diospyros kaki (Chinese persimmon)

Use potential

Park

Tree size and crown characteristics

<10M

A large tree capable of reaching 25m. In the British Isles it will be less than 10m.

A globular to ovoid crown.

A moderately dense crown.

Natural habitat

Native of the Yangtze valley in China as part of the transitional mixed mesophytic deciduous forest bordering the subtropical evergreen broadleaved forest. Prefers a deep, fertile, slightly acidic soil. In the British Isles, it will require a warm microclimate as leaves are sensitive to frosts.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Male and female flowers are on separate trees (dioecious) both are fairly inconspicuous. Flowering occurs in early summer.

LATE AUTUMN

Attractive, yellow-orange round fruits ripen by late autumn, providing there has been a warm summer. Edible.

Deciduous broadleaved tree with glossy simple leaves. Spectacular orange-red autumn colour.

Single-stemmed. Brown-grey, deeply grooved bark at maturity.

Issues to be aware of

Fruit drop in winter may cause problems on paved areas.

Notable varieties

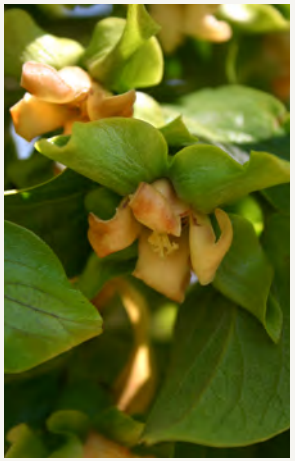
The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Good for bees.

The tree and its features





Left: Simple leaves and young fruit of *Diospyros kaki*.
© Barcham Trees

Right: The female flowers of *Diospyrus kaki* are attractive but not prominent. © Barcham Trees



The edible fruit of *Diospyrus kaki* is attractive and can persist on the tree until early winter.
© Barcham Trees

Elaeagnus angustifolia (Russian olive)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Small garden | Coastal | Transport corridor

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m but usually less than 8m.

A globular crown, becoming quite broad spreading for a small tree.

A moderately dense crown.

Natural habitat

Native to central and western Asia, naturalised across much of southern Europe. Found on open, dry and warm environments such as the steppe regions. Capable of growing on a wide range of soils, including on calcareous soils. Its nitrogen-fixing ability also helps it perform well on low nutrient sites.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Small, yellow flowers in groups of 1-3 from the leaf axils of young shoots emerge in early summer. Discretely attractive and fragrant.

EARLY AUTUMN

Olive-shaped yellow-orange fruits covered by silvery scales. In warm regions they ripen by early autumn, but they may never fully ripen in the British Isles.

Deciduous broadleaved tree with simple leaves. Scales on the underside of the leaves and on the young shoots give a silvery appearance.

Single-stemmed in cultivation, but often shrubby in its natural environment. Young bark is grey-green with silvery scales, becoming darker and more fissured with age and losing silvery appearance.

Issues to be aware of

Invasive in warmer climates, however, this is not a real problem in cooler climates such as the British Isles. *E. angustifolia* release a lot of pollen so have high allergenicity potential during the flowering period

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Good tolerance to air pollution, wind and salt, making this species very versatile.
- Excellent for nectar-gathering insects.
- Buy a large tree, as they can be rather unruly when young.

The tree and its features



Eleagnus angustifolia is a useful drought tolerant tree with attractive silvery green foliage.

© Henrik Sjöman



Silvery scales cover the immature fruit before revealing yellow-orange fruits.

© Henrik Sjöman

Eucalyptus gunnii subsp. *gunnii* (Cider gum)

Use potential

Park

Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m.

An ovoid crown.

An open crown.

Natural habitat

Native to the mountains of Tasmania, 500-1200m. Found on poorly drained soils and frost-prone plateaus in pure stands or with other eucalypt species. One of the most cold-tolerant of the eucalypts.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately tolerant to waterlogging.

Ornamental qualities

LATE AUTUMN

Groups of 2-3 white frilly flowers emerge in late autumn in the British Isles but more typically during summer in their natural range. Attractive but not prominent.

Woody capsules known as 'gum-nuts' take at least a year to ripen and may persist for some time.

Evergreen broadleaved tree with simple leaves. Juvenile leaves are silvery-green, rounded and quite different from the long narrow, bluish to green adult foliage.

Single-stemmed. Bark on mature trees is often rough at the base (up to around 6m), smooth olive to pinky-grey within the crown (and on young trees).

Issues to be aware of

Although one of the most cold-tolerant eucalypts it is sensitive to wind-chill and severe winters, occasionally experienced in the British Isles.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Juvenile foliage is a particular favourite of florists.
- Observed to have some tolerance to salt.

The tree and its features



Eucalyptus gunnii subsp. *gunnii*, shown here, is one of the most cold-tolerant eucalypts.
© Duncan Slater





Left: The long, narrow sickle-shapes leaves of *Eucalyptus gunnii* subsp. *gunnii* hang vertically.
© Andrew Hirons

Right: The flowers of *Eucalyptus gunnii* subsp. *gunnii* are very attractive but rather inconspicuous. © Duncan Slater

Eucalyptus pauciflora group
(Snow gums)

Use potential

Park

Tree size and crown characteristics

10-15M

The tallest representatives of this group can reach 30m. Most frequently available sub-species reach 10-18m.

Most frequently available sub-species have a vase shaped crown as a result of their multi-stemmed architecture.

An open crown.

Natural habitat

Native to the mountains of southeastern Australia, mostly 1000-2000m. It forms pure stands on slopes and mountain plateaus. *E. pauciflora* subsp. *niphophila* is the highest altitude eucalypt and, therefore, often considered the most cold-tolerant of the genus. As it is an alpine tree, it prefers cool soil.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Groups of scented white frilly flowers emerge in late spring. Attractive.

Woody capsules known as 'gum-nuts' take at least a year to ripen and may persist for some time.

Evergreen broadleaved tree with simple leaves. Juvenile leaves are distinctly smaller and more blue green that the longer more glossy green adult foliage.

Most often multi-stemmed but also found as single-stemmed trees in cultivation.
Smooth bark throughout trunk and crown, ivory to olive streaked with grey bands.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

subsp. *debeuzevillei*	See notes.
subsp. *niphophila*	See notes.

Notes

– *E. pauciflora* subsp. *debeuzevillei* tends to be faster growing and taller (up to 18m) than subsp. *niphophila* which only gets to about 10m.

The tree and its features



A mature *Eucalyptus pauciflora* provides dappled shade in this courtyard. The light, smooth bark is particularly attractive.

© Andrew Hirons

Eucommia ulmoides (Guttapercha)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A large tree growing up to 20m.

An ovoid crown, occasionally spreading to a more globular form.

A moderately dense crown.

Natural habitat

Native to China, but this species is now only found in cultivation. No wild populations exist.

Environmental tolerance

Estimated to be partially tolerant to shade.

Tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers found on separate trees. Both are inconspicuous and have little ornamental merit.

EARLY AUTUMN

One-seeded winged fruits found on the female trees by early autumn.

Deciduous broadleaved tree with simple leaves. Glossy green at maturity. A useful identifying feature is that when the leaves are broken, thin latex threads hold the two parts together.

Single-stemmed. Light grey bark, shallowly fissured.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- An under-utilised tree with great potential for green infrastructure projects.
- Observed to have some tolerance to salt and air pollution.

The tree and its features



Eucommia ulmoides growing in a planting bed.
© Andrew Hirons





Left: Flowers of *Eucommia ulmoides* emerge with the leaves but are fairly inconspicuous. © Duncan Slater

Right: The glossy green leaves of *Eucommia ulmoides* are attractive throughout summer.
© Andrew Hirons

Euonymus europaeus (Common spindle tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M
A small tree capable of reaching 8m.

A globular crown.

A moderately dense crown.

Natural habitat

Native to most of Europe (including the British Isles) and western Asia. It is found most frequently forest margins but will also occur in the understorey of forest canopies with lighter shade. Found in coastal locations as well as inland. Adaptable to a wide range of soils, including calcareous sites.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING
Yellowish-green flowers appear amongst the new foliage in late spring but are easily missed and not of great merit.

EARLY AUTUMN
Clusters of small red fruit held in orangey husks. Highly ornamental, especially with the vibrant autumn colour of leaves.

Deciduous broadleaved tree with simple leaves. Excellent red autumn colour.

Multi-stemmed, but can be grown into a single-stemmed tree with careful pruning. Grey, relatively smooth bark. Younger stems often have corky wings.

Issues to be aware of

Fruit is poisonous.

Notable varieties

Abundant fruit	‘Red Cascade’.

The tree and its features



Euonymus europaeus has a bushy, globular crown.
© Duncan Slater





Left: Simple leaves of *Euonymus europaeus*. They turn red in autumn. © Duncan Slater

Right: Flowers of *Euonymus europaeus* are small and easily missed amongst the new leaves.
© Duncan Slater

Fagus orientalis (Oriental beech)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m in its natural habitat.

A globular to broad ovoid crown form.

A dense crown.

Natural habitat

Native to western Asia and southeastern Europe, in the Caucasus region and eastern Balkan peninsula. A canopy tree of warm-temperate forests, 200-2000m. Requires humus-rich, well drained soil.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers are separate but born on the same tree. Of little ornamental value.

EARLY AUTUMN

Small nuts held in a bristly husk are most apparent in early autumn. Some years fruiting is much heavier than other years (masting behaviour).

Deciduous broadleaved tree with simple leaves. Some years will see a beautiful yellow-golden autumn colour.

Single-stemmed. Smooth, grey bark.

Issues to be aware of

Potentially a very large, spreading tree.

Notable varieties

Columnar	'Iskander'.

Notes

- Superficially very similar to *Fagus sylvatica* with which it can form hybrids.
- Less susceptible to woolly aphid than *Fagus sylvatica*.
- More heat and drought tolerant than *Fagus sylvatica*, however, still considered moderately sensitive to drought.
- Sensitive to salt spray.
- *Fagus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A *Fagus orientalis* (centre) growing well amongst other trees in a park situation.

© Andrew Hirons



Leaves and fruit of *Fagus orientalis*.

© Andrew Hirons

Fagus sylvatica (Common beech)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable or reaching 30m in its natural habitat.

A globular to broad ovoid crown form.

A dense crown.

Natural habitat

Native to much or temperate Europe (including the British Isles). A canopy tree of mixed or pure forests, from sea level to 2700m. It can cope with a wide variety of soils, including calcareous, providing they are humus-rich and well drained. As a shade tolerant tree it is difficult to establish in the open.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers are separate but born on the same tree. Of little ornamental value.

EARLY AUTUMN

Small nuts held in a bristly husk are most apparent in early autumn. Some years fruiting is much heavier than other years (masting behaviour).

Deciduous broadleaved tree with simple leaves. Some years will see a beautiful yellow-golden autumn colour.

Single-stemmed. Smooth, grey bark.

Issues to be aware of

Potentially a very large, spreading tree.

Notable varieties

Cut leaved	‘Asplenifolia’, ‘Rohanii’.
Columnar	‘Dawyck’, ‘Dawyck Gold’, ‘Dawyck Purple’.
Yellow leaved	‘Dawyck Gold’, ‘Zlatia’.
Weeping	‘Pendular’, ‘Black Swan’, ‘Purple Fountain’.
Copper/Purple	‘Dawyck Purple’, ‘Purpurea’, ‘Rohanii’, ‘Black Swan’, ‘Riversii’, ‘Purple Fountain’.

Notes

- As a shade tolerant tree it is difficult to establish in the open.
- Numerous cultivars are available, most widely supplied are cited here.
- *Fagus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A mature *Fagus sylvatica* in a parkland situation.
© Andrew Hirons





Left: *Fagus sylvatica* ‘Asplenifolia’ has attractive cut-leaves, shown here in autumn. © Andrew Hirons

Right: Small ‘beech nuts’ are held in a bristly husk and are most apparent in early autumn.
© Duncan Slater

Ficus carica (Common fig)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A medium tree capable of reaching 15m in its native range, but much smaller (less than 10m) in the British Isles.

A globular crown.

A dense crown.

Natural habitat

Native to Western Asia and southeastern Europe. Found in dry, rocky places within warm-temperate climates, but capable of growing in cooler climates. Requires a warm microclimate in the British Isles. It will grown on a wide range of soils, including calcareous.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Male and female flowers are found on separate trees (dioecious). Flowers hidden so of no ornamental value.

Pear-shaped fruits about 5cm long start green and ripen brown-purple. Requires summer heat to fully ripen. Edible. Also see notes.

Deciduous broadleaved tree with simple leaves. Leaf shape is variable across a crown, but often the leaves have attractive lobes.

Single-stemmed.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Species-type habit	'Nero', 'Verdino'.

Notes

- Figs have a rather complex reproductive cycle. *Ficus carica* can to bear two crops of fruit a year, but only one tends to ripen in the British Isles (if any). Embryo fruits are formed in late summer of one year, overwinter, and only ripen in late summer the following year. Fruits initiated in spring tend not to ripen.
- Observed to have some tolerance to salt.

The tree and its features



Ficus carica, growing well in an urban garden.

© Duncan Slater



Simple, lobed leaves are very attractive and appear somewhat exotic.

© Duncan Slater

Ginkgo biloba (Maidenhair tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A massive tree, capable of reaching 30m. Typically smaller in cultivation.

Ovoid, becoming more irregular with age.

A moderately dense crown.

Natural habitat

Native of the Yangtze valley in China as part of the transitional mixed mesophytic deciduous forest bordering the subtropical evergreen broadleaved forest. Found in valleys 300-1100m, on acidic, well-drained, silty soil. However, *Ginkgo biloba* has proven highly adaptable to a range of soil types.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers are found on separate trees (dioecious). Both have little ornamental value.

LATE AUTUMN

Female trees produce drupe fruit, singly or in pairs which ripen by late autumn. Ripe fruits smell of rancid butter, for this reason male trees make better selections for urban environments.

Deciduous gymnosperm (botanically, *Ginkgo biloba* is not a conifer) with simple leaves. Autumn colouration is excellent with leaves turning a golden yellow.

Single-stemmed with greyish bark, becoming more deeply fissured with age.

Issues to be aware of

Ripe fruits smell of rancid butter so is undesirable for most urban plantings. The juice form the fruit can also cause skin irritation.

Notable varieties

Male clones	'Autumn Gold', 'Lakeview', 'Princeton Sentry'.
Male clones narrow	'Fastigiata', 'Fairmount'.

Notes

- A very robust tree that is also observed to have some tolerance to salt and air pollution.
- *Ginkgo* is known to be a high emitter of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features

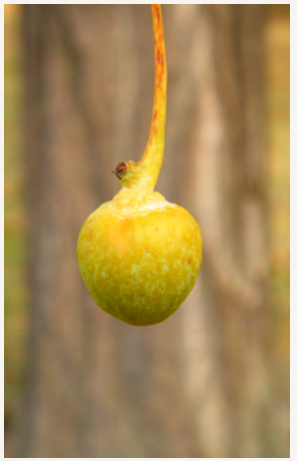




Left: *Ginkgo biloba* provides excellent autumn colour and visual interest in a public square. © Andrew Hirons

Right: The simple leaves of *Ginkgo biloba* are highly distinctive. © Andrew Hirons





Left: The male flower of *Ginkgo biloba*. © Duncan Slater

Right: This drupe fruit from female *Ginkgo biloba* trees smell terrible when ripe. For this reason, it is best to use male clones.

© Duncan Slater

Gleditsia triacanthos (Honey locust)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS | Coastal | Transport corridor

Tree size and crown characteristics

15-25M

A potentially massive tree capable of reaching 40m in its natural habitat. Typically much smaller in cultivation.

An ovoid to irregular crown.

An open crown.

Natural habitat

Native to central North America. Most frequent on the floodplains of the Mississippi river basin, also found in woodland on the Gulf coast and in open woods up to 600m within its range. It is very tolerant to heat so will perform best in a warm microclimate but is sufficiently cold-tolerant for the British Isles. As a member of Fabaceae it is also capable of fixing atmospheric nitrogen, this helps it to perform well on poor quality soils.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SUMMER

Male and female flowers are separate, found in relatively inconspicuous racemes in early summer.

LATE AUTUMN

Flat, sickle shaped and slightly twisted, seed pods 30-40cm long mature to a lustrous brown by late autumn. Often persisting into winter.

Deciduous broadleaved tree with pinnate or bi-pinnate leaves. Excellent yellow autumn colour.

Single-stemmed. Bark is dark grey with shallow fissures. Armed with simple or branched thorns.

Issues to be aware of

Thorns on the stem are quite formidable so it is often best to select a thornless cultivar.

Notable varieties

Thornless	‘f. inermis’, ‘Moraine’, ‘Shademaster’.
Regular form	‘Imperial’, ‘Skyline’, ‘Draves’.
Yellow leaves	‘Sunburst’.
Podless	‘Moraine’.
Small	‘Elegantissima’.

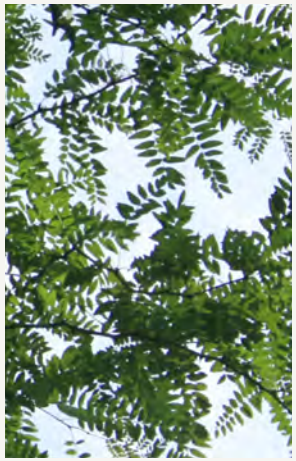
Notes

- Observed to have some tolerance to salt and air pollution.
- Capable of performing well in hard surfaces.

The tree and its features



Gleditsia triacanthos is tolerant to drought so useful for paved environments. © Henrik Sjöman





Left: Leaves of *Gleditsia triacanthos* can either be pinnate or bipinnate. © Henrik Sjöman

Right: The flower of a yellow-leaved variety, *Gleditsia triacanthos* ‘Sunburst’. © Duncan Slater

Gymnocladus dioica (Kentucky coffee tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Transport corridor

Tree size and crown characteristics

15-25M

A potentially massive tree capable of reaching 30m in its natural range, much shorter in the British Isles.

A globular crown. In winter it appears to have a very sparse silhouette.

A moderately dense crown.

Natural habitat

Native to eastern US. Found in deciduous forests on moist slopes 100-600m and on floodplains. It enjoys damp fertile soils but as a member of Fabaceae it is also capable of fixing atmospheric nitrogen, this helps it to perform well on poorer quality soils.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Male and female flowers are on separate trees (dioecious). Greenish white clusters borne in early summer. Attractive.

LATE AUTUMN

Seed pods 15-25cm long maturing to a dark brown by late autumn. On female trees only.

Deciduous broadleaved tree with bipinnate leaves. Very attractive foliage throughout the year. Leaves emerges with a pinky-red hue and in autumn turn a golden yellow colour.

Single-stemmed. A grey-brown bark that develops shallow fissures with age.

Issues to be aware of

Seeds are poisonous unless cooked by boiling or roasting.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Slow growing in the British Isles as it enjoys more summer heat, however, it is perfectly cold-tolerant.
- Observed to have some tolerance to salt.

The tree and its features





Left: A young *Gymnocladus dioica*. © Henrik Sjöman

Right: A semi-mature *Gymnocladus dioica* in a park situation. © Duncan Slater





Left: The large bipinnate leaves of *Gymnocladus dioica* offer interest throughout the growing season. © Henrik Sjöman

Right: *Gymnocladus dioica* has greenish-white flowers, borne in early summer. © Duncan Slater

Halesia carolina
(Carolina silverbell)

Use potential

Park

Tree size and crown characteristics

<10M

A small tree capable of reaching 10m. See notes for larger variety.

Irregular to globular crown form.

A moderately dense crown.

Natural habitat

Native to the eastern forests of the US, but of a scattered distribution. It does best as part of the understorey or on the margins of deciduous forests, 0-1600m. However, it is also found on elevated floodplains, swamp margins and riverbanks. Requires a acid or neutral soil to perform well.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

White bell-shaped flowers held in pendant clusters in late spring as the leaves emerge. Highly ornamental.

EARLY AUTUMN

Creamy-green pear-shaped fruit 2-5cm long with four papery wings mature in early autumn.

Deciduous broadleaved tree with simple leaves.

Single- or multi-stemmed. Bark brown-grey becoming more deeply fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Larger form	See notes.

Notes

– A similar but larger version (up to 24m) of this species *Halesia tetraptera* var. *monticola* syn *Halesia monticola* is also sold. Considered by some to be the same species. This group is has had significant taxonomic controversy recently and this is yet to be fully resolved.

The tree and its features



A flowering *Halesia carolina* tree in an park situation.

© Andrew Hirons



The flowers of *Halesia carolina* emerge with the leaves in late spring.

© Andrew Hirons

Hamamelis x intermedia
(Hybrid witch hazel)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree less that 4m. Mostly shrub-like.

Vase shaped low crown.

A moderately dense crown.

Natural habitat

A hybrid between *Hamamelis japonica* and *Hamamelis mollis*. No natural range or habitat. Could be considered an understorey shrub or small tree of temperate forests. Enjoys organic soil analogous to a forest soil.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE WINTER

Clusters of characteristic yellow, red or orange flowers with narrow petals. Flowering in late winter. Highly attractive.

EARLY AUTUMN

A woody capsule develops by early autumn.

Deciduous broadleaved shrub or small tree with simple leaves. Excellent red-orange autumn colour.

Multi-stemmed by character, but occasionally cultivated as a small single-stemmed tree. Smooth brown bark.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Yellow flower	‘Arnold Promise’, ‘Angelly’, ‘Pallida’, ‘Westerstede’.
Copper-orange flower	‘Jelena’.
Red flower	‘Diane’, ‘Ruby Glow’.

Notes

- Numerous cultivars exist, only a few of the most widely available are represented here.
- Sensitive to warm, dry microclimates.

The tree and its features



Hamamelis x *intermedia* flowering in a woodland garden.
© Duncan Slater





Left: The flowers of *Hamamelis* x *intermedia* appear well before the leaves in late winter. © Duncan Slater

Right: Simple leaves of *Hamamelis* x *intermedia*. These will give excellent autumn colour.
© Duncan Slater

Heptacodium miconioides (Seven-son flower)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree up to 7m. <10M

Vase shaped to globular form.

A moderately dense crown.

Natural habitat

Native to eastern and central China. Found on cliffs, in scrub and forests 600-1000m. Known to tolerate a wide range of soils.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

Creamy white flowers help in upright terminal clusters in early autumn. Fragrant. EARLY AUTUMN

Clusters of highly attractive fruits turn from green to purple, then tan during early winter. EARLY WINTER

Deciduous broadleaved tree with simple leaves.

Single-stemmed or as a multi-stemmed shrub. Bark is yellowish brown, peeling in long strips at maturity. Attractive but not exceptional.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- A rare, but very useful small tree because of its late flowering and fruiting.
- Excellent for bees and other insects as it is very late flowering.

The tree and its features





Left: A mature *Heptacodium miconioides* growing in a planting bed. © Andrew Hirons

Right: The simple leaves of *Heptacodium miconioides* with developing flower buds. © Andrew Hirons



The flowering of *Heptacodium miconioides* in early autumn make it a very useful plant for insects. © Andrew Hirons

Hippophaë salicifolia
(Willow-leaved sea buckthorn)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

<10M — A small tree capable of reaching 10m.

An irregular to globular crown.

A moderately dense crown.

Natural habitat

Native to the Himalayas up to 3000m in dry valley slopes. It's ability to fix atmospheric nitrogen makes if capable of surviving on poor quality soils, including calcareous soils. It is known to be tolerant of coastal conditions.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING — Male and female flowers found on separate trees (dioecious). Very small yellow-green flowers produced late spring. Unremarkable.

EARLY AUTUMN — Small, round, fleshy fruits are held close to the branches in clusters. Yellow when ripe in early autumn. Persisting through much of winter.

Deciduous broadleaved tree with simple willow-like leaves. Green on the upper side, light grey underneath as a result of leaf hairs.

Single-stemmed. Young stems covered in brown hairs and scale giving a velvety feel. Mature bark is rough with longitudinal flakes.

Issues to be aware of

This tree does have some spines.

Notable varieties

No fruit	'Robert', 'Streetwise'.
Upright	'Streetwise'.

Notes

- An excellent choice for challenging coastal sites and for poor quality (but well drained) soils.
- Observed to have some tolerance to salt and air pollution.

The tree and its features



Hippophaë salicifolia 'Streetwise' growing in a paved environment. This is an under-used species with excellent characteristics for a range of planting scenarios.

© Hillier Nurseries

Ilex x *altaclerensis* group (Hybrid holly)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

10-15M

A medium tree up to 12m. Some cultivars are much smaller.

A conical crown.

A dense crown.

Natural habitat

A complex hybrid between *Ilex aquifolium* and *Ilex perado* (including various subsp. of *I. perado*). More than 50 cultivars are available within this hybrid group. Prefers quite humic, mildly acidic (pH 6) soil that is well drained.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers are borne on separate trees (dioecious).

EARLY AUTUMN

Drupes (berry-like fruit) ripen by late autumn and often persist throughout winter.

Evergreen broadleaved trees with simple, often spiny leaves. Numerous cultivars with variegated leaves are also part of this group.

Single-stemmed and multi-stemmed, dependant on the cultivar. Relatively smooth grey-green bark.

Issues to be aware of

Some cultivars have quite spiny leaves that may be unsuitable for some situations.

Notable varieties

Hybrid-type habit	‘Camellifolia’.
Variegated	‘Golden King’.

Notes

- Due to the wide range of cultivars available, it is best to consult with your nursery regarding the most suitable cultivar for your needs. Two of the most widely available are mentioned here.
- *Ilex* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features





Left: An open-grown *Ilex* x *altaclerensis*. © Duncan Slater

Right: Glossy, evergreen leaves of *Ilex* x *altaclerensis* are often spiny. © Duncan Slater





Left: Male flowers of *Ilex* x *altaclerensis* are attractive but fairly inconspicuous. © Duncan Slater

Right: The bright red drupes add interest to *Ilex* x *altaclerensis* throughout autumn and often into winter. © Duncan Slater

Ilex aquifolium (European holly)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

15-25M

A large tree up to 25m. Some cultivars are much smaller.

A conical crown to ovoid crown.

A dense crown.

Natural habitat

Native to Europe, Western Asia and parts or north Africa. Forming part of the understorey in a wide range of forests across its native region. Prefers humic soil but is tolerant of both acidic and calcareous soils providing they are well drained.

Environmental tolerance

Moderately tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers are usually borne on separate trees (dioecious) in late spring to early summer. Inconspicuous.

LATE AUTUMN

Drupes (berry-like fruit) ripen by late autumn and often persist throughout winter. Usually red, but some cultivars may have yellow or orange fruit.

Evergreen broadleaved trees with simple, often spiny leaves. Numerous cultivars with variegated leaves are also available.

Single-stemmed and multi-stemmed, dependant on the cultivar and stock type. Relatively smooth grey bark.

Issues to be aware of

Some cultivars have quite spiny leaves that may be unsuitable for some situations.

Notable varieties

Compact	‘Alaska’ (female), ‘Atlas’ (male).
Variegated leaves	‘Argentea Marginata’, ‘Aurea Marginata’.
Narrow	‘Pyramidalis’.
Yellow fruit	‘Bacciflava’.
Mostly spineless leaves	‘J.C. van Tol’.

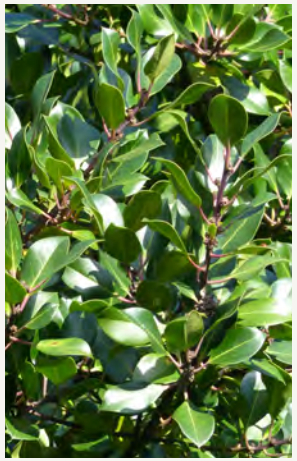
Notes

- Due to the wide range of cultivars available, it is best to consult with your nursery regarding the most suitable cultivar for your needs. Most of the widely available cultivars are female so will bear the characteristic berry-like fruit. An exception to this would be the male, and therefore fruitless, cultivar ‘Atlas’.
- *Ilex* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).
- Excellent for dry shade.

The tree and its features



A pair of *Ilex aquifolium* guarding the gate to an urban park.
© Andrew Hirons





Left: Glossy, evergreen leaves of *Ilex aquifolium* ‘J.C. van Tol’ are mostly spineless. © Andrew Hirons

Right: Red drupes of *Ilex aquifolium* give vibrant colour through autumn and winter. Shown here with the spiny, species-type leaves. © Andrew Hirons

Ilex x *aquipernyi* 'Dragon Lady' (Hybrid holly)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

<10M

A small tree up to 8m.

A conical crown to ovoid crown.

A dense crown.

Natural habitat

An interspecific hybrid from *Ilex aquifolium* and *I. pernyi*. Prefers humic soil but is tolerant of both acidic and calcareous soils providing they are well drained.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

A female cultivar with inconspicuous flowers appearing in late spring.

LATE AUTUMN

Red drupes (berry-like fruit) ripen by late autumn and often persist throughout winter.

Evergreen broadleaved trees with simple, spiny leaves.

Single-stemmed and multi-stemmed, dependant on the stock type. Relatively smooth grey bark.

Issues to be aware of

Spiny leaves may be unsuitable for some situations.

Notable varieties

This is a cultivated variety profile, thus no additional varieties are identified.

Notes

- Syn *Ilex* 'Meschick'.
- *Ilex* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A row of *Ilex* x *aquipernyi* on the tree nursery. This is a useful conical holly that has attractive red fruits, providing a male pollinator is nearby.

© Barcham Trees

Ilex x *koehneana* 'Chestnut Leaf' (Chestnut leaved holly)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

10-15M

A medium tree up to 15m.

A conical crown to ovoid crown.

A dense crown.

Natural habitat

An interspecific hybrid from *Ilex aquifolium* and *I. latifolia*. Prefers humic soil but is tolerant of both acidic and calcareous soils providing they are well drained.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

A female cultivar with inconspicuous flowers appearing in late spring.

LATE AUTUMN

Red drupes (berry-like fruit) ripen by late autumn and often persist throughout winter.

Evergreen broadleaved trees with simple, spiny leaves.

Single-stemmed and multi-stemmed, dependant on the stock type. Relatively smooth grey bark.

Issues to be aware of

Spiny leaves may be unsuitable for some situations.

Notable varieties

This is a cultivated variety profile, thus no additional varieties are identified.

Notes

- Syn *Ilex castaneifolia*.
- *Ilex* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Attractive, chestnut-like, evergreen leaves are characteristic of *Ilex* x *koehneana* 'Chestnut Leaf'.

© Duncan Slater

Ilex 'Nellie R. Stevens' (Hybrid holly)

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

<10M

A small tree up to 8m.

A conical crown to ovoid crown.

A dense crown.

Natural habitat

An interspecific hybrid thought to be from *Ilex aquifolium* and *I. cornuta*. Prefers humic soil but is tolerant of both acidic and calcareous soils providing they are well drained.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

A female cultivar with inconspicuous flowers appearing in late spring.

LATE AUTUMN

Red-orange drupes (berry-like fruit) ripen by late autumn and often persist throughout winter.

Evergreen broadleaved trees with simple, spiny leaves.

Single-stemmed and multi-stemmed, dependant on the stock type. Relatively smooth grey bark.

Issues to be aware of

Spiny leaves may be unsuitable for some situations.

Notable varieties

This is a cultivated variety profile, thus no additional varieties are identified.

Notes

- A good vigorous cultivar.
- *Ilex* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Ilex 'Nellie R. Stevens' is a vigorous holly cultivar that has red-orange berry-like fruit. This nursery row demonstrates how this cultivar could be used for screening.

© Barcham Trees

Juglans nigra (Black walnut)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 50m in its natural habitat.

A globular crown. More conical when young.

A moderately dense crown.

Natural habitat

Native to the eastern US. Generally not abundant, but occurring frequently in a range of habitats, especially in moist temperate forests, 0-1000m. Also occurs on calcareous uplands, slopes and floodplains. Performs best on deep loamy well-drained, moist soils that are mildly acidic but can cope with a range of pH values providing them are not too extreme (pH <4.5 or pH >8). Very sandy soils or clay soils are not suitable.

Environmental tolerance

Intolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers occur separately on the same tree. Both are relatively inconspicuous in late spring.

EARLY AUTUMN

Rounded nut, 5-8cm in diameter, held in a thick green husk that does not split. Ripens by early autumn. Edible.

Deciduous broadleaved tree with pinnately compound leaves. Yellowish autumn colour is attractive.

Single-stemmed. Light grey-brown bark, becoming deeply fissured with age.

Issues to be aware of

Fruit fall may cause conflict with paved surfaces during autumn. *J. nigra* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- This species has a deep rooting habit so requires deep (at least 1m, preferably more) soil depth to perform well.
- High value timber.
- Tolerant of heat.

The tree and its features



A semi-mature *Juglans nigra* in a park planting.

© Andrew Hirons





Left: *Juglans nigra* has large pinnate leaves.

© Andrew Hirons

Right: Edible walnuts are held in thick green husks.

© Duncan Slater

Juglans regia (Common walnut)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m in its natural habitat.

A globular to ovoid crown. More conical when young. Up to 15m in width at maturity.

A moderately dense crown.

Natural habitat

Native to southeastern Europe, western Asia and western China. Generally not abundant, but occurring frequently moist temperate forests. Performs best on deep loamy well-drained, moist soils that are mildly acidic but can cope with a range of pH values providing them are not too extreme (pH <4.5 or pH >8). Very sandy soils or clay soils are not suitable.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers occur separately on the same tree. Both are relatively inconspicuous in late spring.

EARLY AUTUMN

Rounded or ellipsoid nut, 4-6cm in diameter, held in a thick green husk that splits when it ripens in early autumn. Edible.

Deciduous broadleaved tree with pinnately compound leaves. Yellowish autumn colour is attractive but not spectacular.

Single-stemmed. Light grey-brown bark, becoming deeply fissured with age.

Issues to be aware of

Fruit fall may cause conflict with paved surfaces during autumn. *J. regia* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- This species has a deep rooting habit so requires deep (at least 1m, preferably more) soil depth to perform well.
- High value timber.
- Tolerant of heat.

The tree and its features



Juglans regia provides shade in an urban courtyard. It this species is used in paved situations, high quality rooting environments must be provided.

© Henrik Sjöman



Left: Male catkins and female flowers (towards the top left) of *Juglans regia*. © Andrew Hirons

Right: Characteristic green husks of *Juglans regia* that protect the walnut inside.

© Duncan Slater

Juniperus communis (Common juniper)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Paved

Tree size and crown characteristics

<10M

Highly variable in height, exceptionally up to 15m but much more typically, less than 10m.

Highly variable in crown form, tree forms are conical, but form largely depends on cultivar.

A dense crown.

Natural habitat

A vast natural range including the entire circumpolar sub-arctic boreal zone as well as mountain zones further south. A pioneer species that grows on a wide range of soils from sea level right up to 2400m. Favours open sites but will occur as part of the understorey of some conifer forests, providing there is adequate light. Requires open ground or very light shade to perform well.

Environmental tolerance

Intolerant to shade.

Drought tolerant.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female strobili are usually held on separate trees (dioecious) and are inconspicuous. Pollination usually occurs in late spring.

EARLY AUTUMN

Small round fleshy cones, 6-9mm in diameter typically ripen in two to three years after pollination. Black with a bluish bloom.

Evergreen conifer with needle leaves.

Single-stemmed. Reddish-brown bark that often peels in long strips.

Issues to be aware of

No substantial issues to be aware of. Male *J. communis* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Tree form	'Hibernica'.

Notes

- Fruits are good for birds.
- Used in the making of Gin.

The tree and its features



Left: A mature tree form of *Juniperus communis*.
© Henrik Sjöman

Right: Although, often rather shrub-like *Juniperus communis* can make a useful small tree. © Henrik Sjöman



Left: Small needle leaves of *Juniperus communis*.
© Duncan Slater

Right: The fruits of *Juniperus communis* are good for birds, but also have great merit as an ingredient in gin.
© Duncan Slater

Juniperus scopulorum (Rocky mountain juniper)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

<10M

Capable of reaching 15m in favourable conditions but, more typically, gets to around 8m.

A conical to irregular crown form.

A dense crown.

Natural habitat

Native to the US, particularly Rocky Mountain region, and southwestern Canada. Found as a climax species in open woodland but is capable of being a pioneer tree, colonising open ground from sea level to around 2700m. Particularly at home on steep rocky slopes, dry ridges and sandy soils. Prefers calcareous conditions, but is adaptable to a range of soils, providing they are well drained.

Environmental tolerance

Intolerant to shade.

Drought tolerant.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female strobili are usually held on separate trees (dioecious) and are inconspicuous. Pollination usually occurs in late spring.

LATE AUTUMN

Small round fleshy cones, 6-8mm in diameter, mature in late autumn the second year after pollination. Black with a bluish bloom, often persisting on the tree for over a year.

Evergreen conifer with scale leaves.

Single-stemmed. Brown to grey bark that has small plates when mature.

Issues to be aware of

No substantial issues to be aware of. Male *J. scopulorum* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Upright	‘Blue arrow’.

Notes

– Fruits are good for birds.

The tree and its features



Juniperus scopulorum ‘Blue arrow’ is a useful upright conifer for small gardens, parks and paved environments. It has attractive, blue-green foliage, as can be seen here.

© Andrew Hirons

Juniperus virginiana (Eastern red cedar)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Small garden | Coastal | Transport corridor

Tree size and crown characteristics

15-25M

Capable of reaching 30m in favourable conditions but much more typically gets to around 20m.

A conical to columnar crown form.

A dense crown.

Natural habitat

Native and widespread in the eastern US and southeastern Canada. A pioneer tree capable of colonising open ground from sea level to around 1500m. Also occurs in open, lightly shaded mixed forest stands. Frequently found on rocky ridge tops and exposed, dry, upland sites. Adaptable to a wide range of soils, including calcareous, providing they are well drained.

Environmental tolerance

Intolerant to shade.

Drought tolerant.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female strobili are usually held on separate trees (dioecious) and are inconspicuous. Pollination usually occurs in late spring.

LATE AUTUMN

Small round fleshy cones, 3-6mm in diameter, mature in late autumn. Black with a bluish bloom. Cones open the following spring.

Evergreen conifer with scale leaves at maturity. Juvenile foliage is awl-shaped and will occur across the whole crown on young trees or only on younger stems on more mature trees.

Single-stemmed. Dark-brown to grey bark that often peels in long fibrous strips.

Issues to be aware of

Noted as having a shallow root system. Male *J. virginiana* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species type	'Canaertii'.

Notes

- Fruits are good for birds.
- Noted as having good tolerance to saline conditions in the soil and air.

The tree and its features



A mature *Juniperus virginiana* growing by a roadside. This is one of the best tree junipers for a range of planting scenarios.

© Henrik Sjöman

Koelreuteria paniculata (Golden rain tree)

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A large tree growing up to 18m.

A globular crown.

A moderately dense crown.

Natural habitat

Native to China where it is a gap coloniser and a tree of sparse forests. It particularly enjoys hot, dry valley slopes and has few soil requirements providing it is well-drained. In the British Isles it requires a warm microclimate to perform well.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Terminal, pyramidal clusters of yellow flowers appear in late summer. Very attractive.

LATE AUTUMN

Inflated three-valve capsule hosting black pea-like seeds mature in late autumn. They do not always fully ripen in cooler climates and will often persist on the tree through winter.

Deciduous broadleaved tree with pinnate, sometimes also having partially bipinnate, leaves. Excellent yellow autumn colour.

Single-stemmed. Grey-brown bark becomes slightly fissured with age.

Issues to be aware of

This species is invasive in warm-temperate environments, but this is not currently a problem in the British Isles.

Notable varieties

Orange-red leaves	‘Coral Sun’.
Upright	‘Fastigiata’.
Long flowering	‘September’.

Notes

- A worthy street tree that is underused at present.
- Observed to have some tolerance to salt and air pollution.

The tree and its features





Left: A mature *Koelreuteria paniculata* growing in a woodland clearing. © Andrew Hirons

Right: A young *Koelreuteria paniculata* flowering in late summer. © Henrik Sjöman





Left: Pinnate leaves are an attractive feature of *Koelreuteria paniculata*. © Andrew Hirons

Right: The fruits of *Koelreuteria paniculata* are an unusual three-valved capsule. © Duncan Slater

Laburnum anagyroides (Common laburnum)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree less than 10m tall.

An obovoid crown that can reach 8m wide given enough space. Can also be quite bushy in appearance.

A moderately dense crown.

Natural habitat

Native to central and south Europe. Found on forest margins and gaps in remnant woodland dominated by *Quercus pubescens*. Laburnum associate with specialist soil bacteria to fix atmospheric nitrogen. For this reason, they can perform well on sites with poor nutrition.

Environmental tolerance

Intolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Abundant, yellow, pendant flowers cover the tree in late spring.

EARLY AUTUMN

Pendant seedpods about 8cm long covered in silky hairs. Poisonous.

Deciduous broadleaved tree with pinnate leaves.

Available as a small single-stemmed tree or a small multi-stem tree. Green-brown bark, relatively smooth.

Issues to be aware of

This species is poisonous so careful consideration must be given to site selection.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Very well adapted to a cool-temperate climate despite its origins.
- Slow growth and slow to establish.
- Containerised stock appear to establish more readily than rootballed (balled and burlapped) stock.
- Observed to have some tolerance to salt.

The tree and its features



A flowering *Laburnum anagyroides* providing real impact to a garden.
© Duncan Slater





Left: The pendant clusters of flowers are abundant in late spring. © Duncan Slater

Right: Pendant seedpods of *Laburnum anagyroides* provide some interest in autumn but are poisonous.
© Duncan Slater

Laburnum x *watereri* (Hybrid laburnum)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree less than 10m tall.

An obovoid crown that can reach 8m wide given enough space. Can also be quite bushy in appearance.

A moderately dense crown.

Natural habitat

A hybrid between *Laburnum anagyroides* and *Laburnum alpinum*. Laburnum associate with specialist soil bacteria to fix atmospheric nitrogen. For this reason, they can perform well on sites with poor nutrition.

Environmental tolerance

Intolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Abundant, yellow, pendant flowers cover the tree in late spring.

EARLY AUTUMN

Pendant seedpods about 8cm long covered in silky hairs. Poisonous.

Deciduous broadleaved tree with pinnate leaves.

A single-stemmed tree. Green-brown bark.

Issues to be aware of

This species is poisonous so careful consideration must be given to site selection.

Notable varieties

Hybrid-type habit	'Vossii'.

Notes

- 'Vossii' is probably the best laburnum cultivar for parks and small gardens. However, it is slightly less drought tolerant.
- Slow growth and slow to establish.
- Containerised stock appear to establish more readily than rootballed (balled and burlapped) stock.
- Observed to have some tolerance to salt.

The tree and its features



A mature *Laburnum* x *watereri* 'Vossii' flowering in late spring.

© Henrik Sjöman



The pendant flower clusters of *Laburnum* x *watereri* are longer than *L. anagyroides* so have more visual impact.

© Andrew Hirons

Larix decidua (Common larch)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m.

A conical crown, often becoming irregular with age.

A moderately dense crown.

Natural habitat

Native to the high mountains of central Europe, 600-2500m. Generally confined to rocky slopes near the timberline. However, it grows best on deep, moist soils that are well drained. Will not perform well on calcareous or peaty soils.

Environmental tolerance

Intolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female strobili appear in late spring but are inconspicuous.

LATE AUTUMN

Cones (1.5-3.5cm in length) are reddish and attractive when young. They mature in late autumn to a yellowish-brown.

A deciduous conifer with needle leaves. The young green foliage and golden yellow autumn colour are particularly attractive.

Single-stemmed. Bark is grey-brown, becoming fissured and scaly with age.

Issues to be aware of

Potentially a very large tree so needs space to develop.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– All *Larix* are sensitive to air pollution.

The tree and its features





Left: A mature *Larix decidua*. © Henrik Sjöman

Right: *Larix decidua* is one on the few deciduous conifers; their needle leaves are replaced each year.
© Duncan Slater





Left: The grey-brown bark of *Larix decidua* becomes fissured with age.
© Duncan Slater

Right: The female flower of *Larix decidua*.
© Duncan Slater

Larix kaempferi (Japanese larch)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 35m.

A conical crown, often becoming irregular with age. To about 10m in diameter.

A moderately dense crown.

Natural habitat

Native to the Japanese Alps, 500-2900m. A pioneer tree and forest tree of the sub-alpine zone. Predominantly found on moist (mesic) sites. Never found on peaty sites and will not perform well on calcareous soils.

Environmental tolerance

Intolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female strobili appear in late spring but are inconspicuous.

LATE AUTUMN

Cones (1.5-3.5cm in length) are reddish and attractive when young. They mature in late autumn to a yellowish-brown.

A deciduous conifer with needle leaves. The young green foliage and golden yellow autumn colour are particularly attractive.

Single-stemmed. Bark is grey-brown, becoming fissured and scaly with age.

Issues to be aware of

Potentially a very large tree so needs space to develop.

Notable varieties

Contorted form	‘Diana’.
Weeping	‘Pendula’.

Notes

- All *Larix* are sensitive to air pollution.
- There are numerous dwarf varieties that are useful for small gardens.

The tree and its features



The attractive open-grown form of *Larix kaempferi*.
© Duncan Slater





Left: Inconspicuous male flowers of *Larix kaempferi* appear with rosettes of new needles in late spring.
© Duncan Slater

Right: The green summer foliage turns golden-yellow in autumn. © Andrew Hirons

Larix x *marschlinsii* (Hybrid larch)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m.

A conical crown, often becoming irregular with age. To about 10m in diameter.

A moderately dense crown.

Natural habitat

A hybrid between *Larix decidua* and *L. kaempferi*.

Environmental tolerance

Intolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female strobili appear in late spring but are inconspicuous.

LATE AUTUMN

Cones are reddish purple and attractive when young. They mature in late autumn to a yellowish-brown.

A deciduous conifer with needle leaves. The young green foliage and golden yellow autumn colour are particularly attractive.

Single-stemmed. Bark is grey-brown, becoming fissured and scaly with age.

Issues to be aware of

Potentially a very large tree so needs space to develop.

Notable varieties

The hybrid is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Syn *Larix* x *eurolepsis*.
- Displays excellent 'hybrid vigour' and is generally tougher and faster to establish than either parent.
- All *Larix* are sensitive to air pollution.

The tree and its features



Left: A mature *Larix* x *marschlinsii*.
© Duncan Slater

Right: *Larix* x *marschlinsii* displays excellent 'hybrid vigour'. © Andrew Hirons



Left: Rosettes of new needles on *Larix* x *marschlinsii*.
© Andrew Hirons

Right: Cones of *Larix* x *marschlinsii* can be an attractive feature.
© Andrew Hirons

Ligustrum japonicum (Japanese tree privet)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

<10M

A small tree to 8m.

A globular to irregular crown.

A dense crown.

Natural habitat

Native to temperate forests of Japan and the Korean penninsula.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Prominent, creamy-white pyramidal flower clusters are highly attractive in late summer.

EARLY WINTER

Clusters of dark blue-black oblong fruits are prominent in early winter.

Evergreen broadleaved tree with simple glossy leaves.

Single-stemmed. Relatively smooth, light-grey bark.

Issues to be aware of

Clusters of fruit may cause issues with paved surfaces in some situations, but often the birds helpfully feed on this tree, reducing this potential problem.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



Ligustrum japonicum is a useful evergreen broadleaved tree for paved sites and small gardens.

© Barcham Trees





Left: *Ligustrum japonicum* has clusters of white flowers that are very welcome in late summer.

© Barcham Trees

Right: Clusters of small dark fruits add interest in winter.

© Barcham Trees

Ligustrum lucidum (Chinese privet)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

<10M

A small tree to 10m.

A globular to irregular crown.

A dense crown.

Natural habitat

Native to temperate forests of China.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Prominent, creamy-white pyramidal flower clusters are highly attractive in late summer.

EARLY WINTER

Clusters of dark blue-black oblong fruits are prominent in early winter.

Evergreen broadleaved tree with simple glossy leaves.

Single-stemmed. Relatively smooth, light-grey bark.

Issues to be aware of

Invasive in warmer climates. Clusters of fruit may cause issues with paved surfaces in some situations, but often the birds helpfully feed on this tree, reducing this potential problem.

Notable varieties

Variegated leaves	‘Varigata’.

Notes

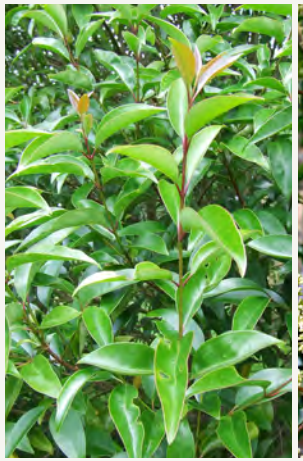
– This tree species is invasive in warm-temperate climates but generally this is not problematic in cool-temperate climates.

The tree and its features



Ligustrum lucidum is a useful evergreen broadleaved tree for paved sites and small gardens.

© Henrik Sjöman





Left: New glossy leaves of *Ligustrum lucidum*.

© Duncan Slater

Right: Clusters of creamy-white flowers provide interest in late summer.

© Barcham Trees

Liquidambar styraciflua (Sweetgum)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS | Transport corridor

Tree size and crown characteristics

15-25M

A potentially massive tree capable of reaching 30m. In the British Isles, it is capable of forming a large tree.

Conical for much of its life, becoming more ovoid with age.

A moderately dense crown.

Natural habitat

Native to eastern US and high elevations in parts of Central America. A pioneer tree of disturbed habitats. Predominantly found in swamp margins, floodplains, and low woods, 0-900m. Prefers moist, deep acidic soil but is fairly adaptable to a range of soils.

Environmental tolerance

Intolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Fairly inconspicuous male and female flowers occur separately on the same tree in late spring. Of little ornamental value.

EARLY AUTUMN

Spikey capsules (gum-balls) form after flowering, are prominent by early autumn and may well persist into winter.

Deciduous broadleaved tree with simple palmate leaves. Spectacular autumn colour: reds, oranges and yellows.

Single-stemmed. Dark-grey bark, becoming deeply fissured with age. Young stems have corky wings.

Issues to be aware of

Fruit litter can cause a problem on paved surfaces, but this is rarely a significant problem in the British climate. *L. styraciflua* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Excellent autumn colour	‘Lane Roberts’, ‘Thea’, ‘Worplesdon’, ‘Burgundy’.
Columnar	‘Slender Silhouette’.
Cut leaf	‘Stella’, ‘Stared’.
Varieigated leaves	‘Manon variegata’, ‘Aurea’.

Notes

- The use of known cultivar is essential if a predicable form is required.
- ‘Worplesdon’ has been selected for the British climate.
- All cultivars have good autumn colour.
- An excellent, fast-growing, versatile tree for green infrastructure.
- *Liquidambar* spp. are known to be high emitters of Biogenic Organic Compounds (BVOCs).
- Observed to have some tolerance to salt and air pollution.

The tree and its features



Left: A mature *Liquidambar styraciflua* in a park. © Andrew Hirons

Right: *Liquidambar styraciflua* provides excellent autumn colour to a landscape. © Henrik Sjöman



Left: Leaves of *Liquidambar styraciflua* are superficially similar to some maples. © Andrew Hirons

Right: Spikey capsules of *Liquidambar styraciflua* can cause a nuisance when the fall on paved surfaces. © Andrew Hirons

Liriodendron tulipifera (Tulip tree)

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 40m in its natural habitat. Smaller but still large in cultivation.

An ovoid crown, becoming a little irregular with age.

A moderately dense crown.

Natural habitat

Native to the eastern North America from southern Canada to the gulf of Mexico. Occurs on deep, fertile, moist soils on slopes (0-1500m) alongside streams and on swamp margins, providing there is good drainage.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Yellow-green tulip-shaped flowers emerge on mature trees in early summer.

EARLY AUTUMN

Winged seeds held in a tight cone-like aggregate that fall away from a central stalk.

Deciduous broadleaved tree with simple leaves. Leaves turn yellow in autumn.

Single-stemmed. Green-brown bark, becoming deeply fissured with age.

Issues to be aware of

Potentially a very large tree.

Notable varieties

Variegated leaves	'Aureomarginatum'.
Upright	'Fastigiatum'.

Notes

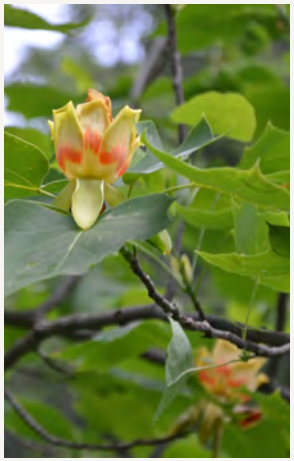
- Fast growing tree that readily establishes.
- Good for bees. Seeds are also eaten by birds and small mammals.

The tree and its features



Liriodendron tulipifera is a fast growing tree when grown in a high-quality rooting zone.
© Henrik Sjöman





Left: The leaves of *Liriodendron tulipifera* have an interesting shape and turn yellow in autumn.
© Andrew Hirons

Right: On mature trees, tulip-shaped flowers appear in early summer. © Henrik Sjöman

Magnolia acuminata (Cucumber tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

>25M

A potentially massive tree capable of reaching 30m in height.

An ovoid crown that becomes very broad, to around 20m, with maturity.

A moderately dense crown.

Natural habitat

Native to the eastern US and southeastern Canada. Found in mixed deciduous forests on moist slopes with deep, rich, well-drained soils. Known to cope with a range of soil pH, providing they are not too extreme (<pH 5 or >pH 8).

Environmental tolerance

Moderately tolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Light yellow flowers emerge in late spring just after the leaves emerge. Attractive but not the most prominent of the magnolias.

EARLY AUTUMN

A cone-like aggregate of follicles that at an early stage of development resemble small cucumbers. Maturing to pinkish-red in early autumn.

Deciduous broadleaved tree with simple leaves. Capable of producing very attractive golden yellow foliage in autumn.

Single-stemmed. Brown, slightly fissured bark, becoming darker and scaly with age.

Issues to be aware of

Unless a 'small tree' variety is used, this species is capable of becoming a massive tree so requires space to thrive.

Notable varieties

The 'species-type' tree does not have any widely available cultivars. However, smaller cultivars are available – see notes.

Notes

- *Magnolia acuminate* is a parent of many yellow-flowered magnolia cultivars.
- The var *subcordata* group (e.g. 'Koban Dori' and 'Miss Honeybee') are considerably smaller than the species so have use potential for small gardens.
- *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Left: A mature *Magnolia acuminata* flowering in a park situation. © Andrew Hirons

Right: The attractive yellow flowers of *Magnolia acuminata*. © Andrew Hirons



The large, yellow flowers of *Magnolia acuminata* emerge in late spring after the leaves.
© Andrew Hirons

Magnolia denudata (Yulan magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree up to 12m.

An irregular to globular crown capable of getting about 9m wide.

A moderately dense crown.

Natural habitat

Native to moist woodlands of central China. Prefers relatively deep, moist, nutrient-rich, mildly acidic soil but will also tolerate calcareous conditions as well.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Creamy white flowers open in early spring before the leaves emerge. Highly ornamental.

EARLY AUTUMN

Follicles held on a central spindle in a cone-like structure turn red by early autumn. Attractive.

Deciduous broadleaved tree with simple leaves.

A multi-stemmed or single-stemmed tree. Bark is light grey and relatively smooth.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Yellow flower	'Yellow River'.

Notes

- Flowers are vulnerable to late frosts.
- Will also flower in light shade.
- *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Magnolia denudata flowering prolifically on a paved site. This species will require a high quality rooting environment if it is to thrive in paved locations.

© Henrik Sjöman



The flowers of *Magnolia denudata* open before the leaves emerge in spring.

© Andrew Hirons

Magnolia ‘Elizabeth’ (Hybrid magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree up to 15m.

A conical to irregular crown capable of getting about 8m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia acuminata* and *M. denudata*.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Pale yellow flowers open in late spring to reveal red stamens. Highly ornamental.

LATE SUMMER

Fruits, if apparent, are of little ornamental value.

Deciduous broadleaved tree with simple leaves. Young leaves have a coppery colour.

A multi-stemmed tree. Bark is light grey and relatively smooth.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

– *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Magnolia ‘Elizabeth’ has attractive, pale, yellow flowers that open in late spring, just before the leaves expand.

© Henrik Sjöman

Magnolia ‘Galaxy’ (Hybrid magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree up to 9m.

<10M

An ovoid crown capable of getting about 7m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia liliiflora* ‘Nigra’ and *M. sprengeri* var. *sprengeri* ‘Diva’. Adaptable to quite poor quality soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Pink-purple flowers open in late spring. Highly ornamental.

LATE SPRING

Fruits, if apparent, are of little ornamental value.

LATE SUMMER

Deciduous broadleaved tree with simple leaves.

A single-stemmed tree. Bark is light grey and relatively smooth.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

– *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The pink-purple flowers of *Magnolia* ‘Galaxy’ are spectacular in late spring as the leaves expand.

© Henrik Sjöman

Magnolia grandiflora (Southern magnolia)

Use potential

Park

Tree size and crown characteristics

15-25M

A potentially massive tree capable of reaching 30m. Typically only forming a large tree in cultivation.

An ovoid crown that can become broad, up to 15m, over time.

A dense crown.

Natural habitat

Native to the southeastern US. Found on coastal plains, moist slopes and ravines up to 120m. Requires a warm microclimate with a moist soil to do well in the British Isles.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Large white flowers appear in early summer. Very attractive but not profuse.

EARLY AUTUMN

Follicles held on a central spindle in a cone-like structure turn red by early autumn. Attractive.

Evergreen broadleaved tree with simple leaves.

Single-stemmed. Dark grey bark, smooth at first, becomes scaly with age.

Issues to be aware of

Creates a very dry shade beneath its crown. As an evergreen broadleaved tree it does create some leaf litter throughout the year.

Notable varieties

Species-type	'Gallissonière'.

Notes

- 'Gallissonière' has good cold-hardiness for the British Isles.
- *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The evergreen, broadleaved tree *Magnolia grandiflora* provides dense shade as well as large flowers in early summer.

© Henrik Sjöman



The large, white flowers of *Magnolia grandiflora* appear in early summer, after many other magnolia species have finished flowering.

© Andrew Hirons

Magnolia ‘Heaven Scent’ (Hybrid magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree up to 12m.

A globular crown capable of getting about 10m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia liliiflora* ‘Nigra’ and *M.* x *veitchii*.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Rose-purple flowers open in late spring. Highly ornamental.

LATE SUMMER

Fruits, if apparent, are of little ornamental value.

Deciduous broadleaved tree with simple leaves.

A single-stemmed tree. Bark is light grey and relatively smooth.

Issues to be aware of

No substantial issues to be aware of.

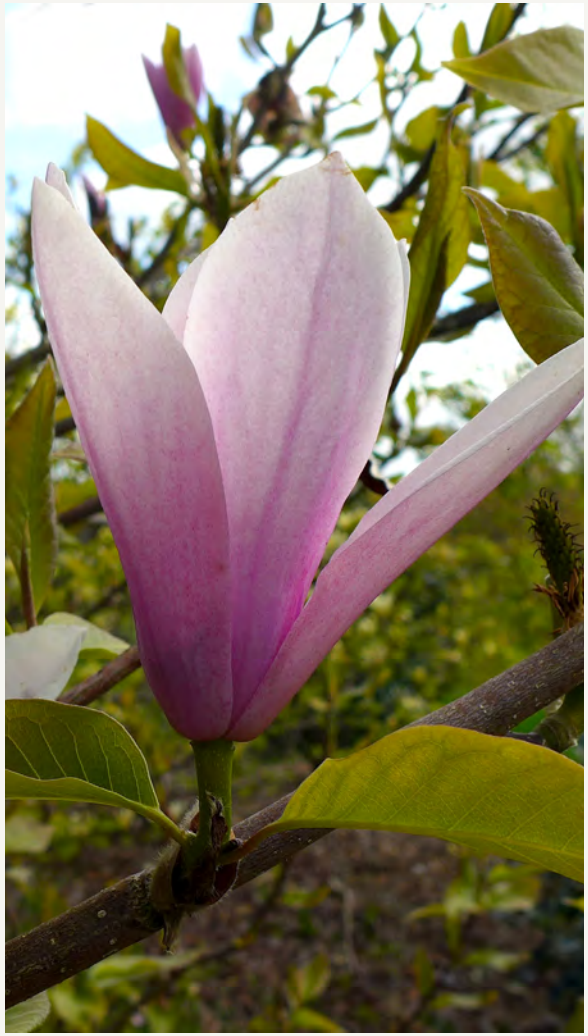
Notable varieties

Not applicable: a single cultivar profile.

Notes

– *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Magnolia ‘Heaven Scent’ has rose-purple flowers that open in late spring with the expanding leaves This medium sized tree is useful for small gardens and parks.

© Harry Watkins

Magnolia kobus (Kobushi magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A large tree capable of reaching 24m in its natural habitat, more typically up to 12m in cultivation.

An ovoid crown that gets 6-8m wide.

A moderately dense crown.

Natural habitat

Native to temperate forests of Japan and South Korea. Adaptable to a wide range of soils including calcareous soils, providing they are not too dry and are humus-rich.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

White flowers emerge before the leaves in early spring.

EARLY AUTUMN

Follicles held on a central spindle in a cone-like structure turn brown by early autumn.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Smooth dark grey bark.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

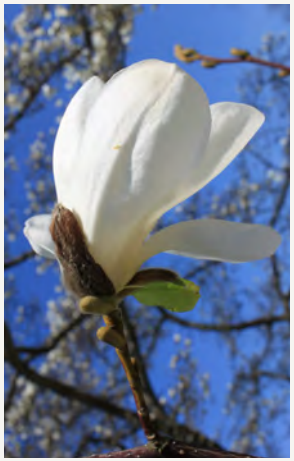
- Flowering only really becomes profuse when plants get to 20-30 years.
- *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Magnolia kobus in full bloom is spectacular in early spring. © Henrik Sjöman





Left: The white flowers of *Magnolia kobus* emerge before the leaves in spring.
© Henrik Sjöman

Right: A beautiful flower of *Magnolia kobus*.
© Henrik Sjöman

Magnolia x *loebneri* (Loebner magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree that reached 5-8m depending on the cultivar.

<10M

An ovoid crown that gets about 4-6m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia kobus* and *M. stellata*. Adaptable to a wide range of soils, including calcareous soils, providing they are well-drained.

Environmental tolerance

Moderately tolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

White or purple-pink flowers emerge in early spring before the leaves. Fragrant.

LATE SUMMER

Fruits, if apparent, are of little ornamental value.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Grey bark, smooth when young, becoming rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Purple-pink flowers	‘Leonard Messel’, ‘Raspberry Fun’.
White flowers	‘Merrill’, ‘Star Bright’.

Notes

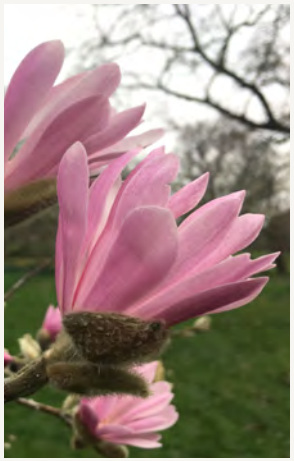
- Although quite early flowering the flowers are quite frost resistant.
- *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The white-flowered *Magnolia* x *loebneri* ‘Star Bright’ performing well in a shady planting bed.
© Harry Watkins





Left: The white flower of *Magnolia* x *loebneri* ‘Star Bright’. © Harry Watkins

Right: The pink flower of *Magnolia* x *loebneri* ‘Raspberry Fun’.
© Harry Watkins

Magnolia x *soulangeana* (Saucer magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree that reaches 6-12m depending on the cultivar.

An ovoid crown that gets about 4-6m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia denudata* and *M. liliiflora*. Adaptable to a wide range of soils providing they are moist and well aerated.

Environmental tolerance

Moderately tolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Depending on the cultivar. White, pink, purple, reddish-purple flowers emerge in early spring before the leaves. Fragrant.

LATE SUMMER

Fruits, if apparent, are of little ornamental value.

Deciduous broadleaved tree with simple leaves. Autumn colour can be golden-brown.

Single-stemmed or multi-stemmed. Grey bark, smooth when young, becoming rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

White flowers	‘Lennei Alba’.
Purple flowers	‘Rustica Rubra’.
Pink flowers	‘Verbanica’.
Deep purple-red flowers	‘Burgundy’.

Notes

- Flowers can be sensitive to frosts.
- *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

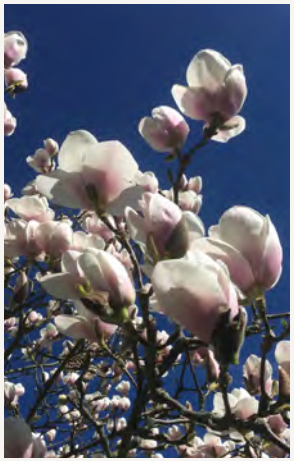
The tree and its features



Magnolia x *soulangeana* in flower is a spectacular sight in early spring. A good range of cultivars provide differences in flower colour.

© Henrik Sjöman





Left: A white-flowered cultivar of *Magnolia* x *soulangeana*. © Henrik Sjöman

Right: *Magnolia* x *soulangeana* flowers before the leaves emerge in spring.

© Harry Watkins

Magnolia ‘Spectrum’ (Hybrid magnolia)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree up to 8m.

<10M

An ovoid to globular crown capable of getting about 8m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia liliiflora* ‘Nigra’ and *M. sprengeri* var. *sprengeri* ‘Diva’. Adaptable to quite poor quality soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Reddish-purple flowers open in late spring. Highly ornamental.

LATE SUMMER

Fruits, if apparent, are of little ornamental value.

Deciduous broadleaved tree with simple leaves.

A single-stemmed tree. Bark is light grey and relatively smooth.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

– *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Many magnolia cultivars such as this *Magnolia* ‘Spectrum’ flower from a young age.

© Harry Watkins



A beautiful flower of *Magnolia* ‘Spectrum’.

© Harry Watkins

Magnolia ‘Star Wars’ (Hybrid magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree up to 5m. <10M

A globular crown capable of getting about 5m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia campbellii* and *M. liliiflora*.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Deep pink-purple flowers open in early spring before the leaves. Highly ornamental and fragrant. EARLY SPRING

Fruits, if apparent, are of little ornamental value. LATE SUMMER

Deciduous broadleaved tree with simple leaves.

A multi-stemmed tree. Bark is light grey and relatively smooth.

Issues to be aware of

No substantial issues to be aware of.

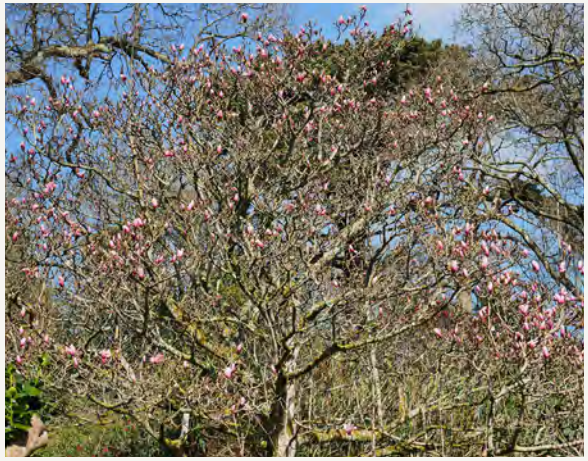
Notable varieties

Not applicable: a single cultivar profile.

Notes

– *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Magnolia ‘Star Wars’ flowering in early spring shortly before the leaves emerge.

© Caerhays Estate



Flowers on *Magnolia* ‘Star Wars’ may also be seen developing later in the year, up to early autumn.

© Caerhays Estate

Magnolia stellata (Star magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree that reaches 7m.

An ovoid to globular crown that gets about 4-6m wide.

A moderately dense crown.

Natural habitat

Native to temperate forests of Japan between 50-600m. Typically found in riparian habitats, in quite marshy areas near lakes and ponds, or on the hillsides above streams. Requires a moist soil, preferably mildly acidic but will tolerate calcareous soils if it is kept well mulched.

Environmental tolerance

Moderately tolerant to shade.

Sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

White or creamy flowers with quite narrow tepals emerge in early spring before the leaves. Some cultivars have a pink flush. Fragrant.

EARLY AUTUMN

Follicles held on a central spindle in a cone-like structure turn reddish by early autumn.

Deciduous broadleaved tree with simple leaves.

Single-stemmed or multi-stemmed. Grey bark, smooth when young, becoming rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Flowers can be sensitive to frosts.
- *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Magnolia stellata is an excellent magnolia for slightly wetter conditions.

© Harry Watkins



The white flowers of *Magnolia stellata* appear delicate with their narrow tepals.

© Harry Watkins

Magnolia ‘Susan’ (Hybrid magnolia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree up to 5m.

A globular crown capable of getting about 5m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia liliiflora* ‘Nigra’ and *M. stellata* ‘Rosea’. Prefers mildly acidic soil.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Deep pink-purple flowers open in late spring before the leaves. Highly ornamental and fragrant.

LATE SUMMER

Fruits, if apparent, are of little ornamental value.

Deciduous broadleaved tree with simple leaves.

A multi-stemmed tree. Bark is light grey and relatively smooth.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

– *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The highly ornamental pink-purple flowers of *Magnolia* ‘Susan’.

© Harry Watkins

Magnolia ‘Yellow Bird’
(Hybrid magnolia)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree up to 12m.

A conical to irregular crown capable of getting about 9m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Magnolia* x *brooklynensis* ‘Eva Maria’ and *M. acuminata* var. *subcordata*.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Lemon-yellow flowers open in late spring. Highly ornamental.

LATE SUMMER

Fruits, if apparent, are of little ornamental value.

Deciduous broadleaved tree with simple leaves. Young leaves have a coppery colour.

A multi-stemmed tree. Bark is light grey and relatively smooth.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

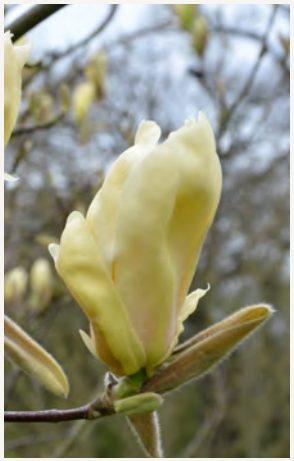
- Tends to bloom later than Magnolia ‘Elizabeth’ so helps to avoid later frost damage to flowers.
- *Magnolia* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A young tree of *Magnolia* ‘Yellow Bird’.
© Harry Watkins





Left: The vibrant yellow flower of *Magnolia* ‘Yellow Bird’.
© Harry Watkins

Right: *Magnolia* ‘Yellow Bird’ is one of the later flowering magnolias so often avoids cold injury from frost.
© Henrik Sjöman

Malus baccata
(Siberian crabapple)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m.

An ovoid to irregular crown.

A moderately dense crown.

Natural habitat

Native to Siberia.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

White flowers emerge from a pink bud in late spring. Highly ornamental.

EARLY AUTUMN

Glossy purple-red to brownish-purple fruits are prominent during autumn. Persisting into winter. Highly ornamental.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark brown relatively smooth bark.

Issues to be aware of

Fruit litter may cause an issue on some sites.

Notable varieties

Narrow crown	‘Street Parade’.

Notes

– Good for bees and other pollinating insects.

The tree and its features



A young *Malus baccata* in a garden planting.

© Andrew Hirons



After an excellent flowering display, small crabapples start to develop.

© Andrew Hirons

Malus cultivars
(Apples and crabapples)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree capable of reaching around 5m.

An ovoid to irregular crown.

A moderately dense crown.

Natural habitat

Hybrids and cultivars. Adaptable to a wide range of soils providing that they are not too dry and does not become waterlogged.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

White, red or pink lowers emerge in late spring. Highly ornamental.

EARLY AUTUMN

Fruits are most prominent during autumn. Persisting into winter. Highly ornamental.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark brown relatively smooth bark.

Issues to be aware of

Fruit litter may cause an issue on some sites.

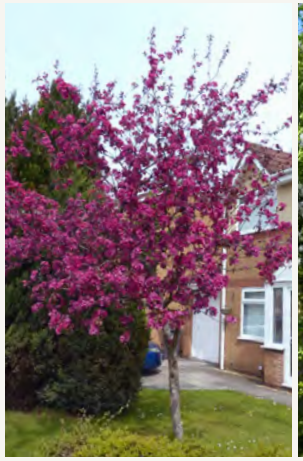
Notable varieties

Edible	‘Bramley Seedling’, ‘Cox’s Orange Pippin’, ‘Egremont Russett’, ‘Golden Delicious’, ‘Howgate Wonder’.
Pink flowers	‘Donald Wyman’, ‘James Grieve’, ‘Rudolph’.
Red flowers	‘Director Moerland’.
White flowers	‘Evereste’, ‘John Downie’, ‘Golden Hornet’.

Notes

- Numerous cultivars are available so it is best to talk to your nursery about the best variety for your needs.
- Good for bees and other pollinating insects.

The tree and its features





Left: *Malus* ‘Rudolph’ is spectacular in late spring.
© Andrew Hirons

Right: *Malus* ‘Evereste’ in full bloom in late spring.
© Andrew Hirons





Left: A number of pink-flowered cultivars, such as this *Malus* ‘Rudolph’ are available. © Andrew Hirons

Right: Many *Malus* cultivars flower prolifically, such as this *Malus* ‘Evereste’.
© Andrew Hirons

Malus hupehensis (Chinese crabapple)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree capable of reaching 7m.

<10M

An irregular crown.

A moderately dense crown.

Natural habitat

Native to China and Taiwan. Found in forest margins, slopes and valley thickets, predominantly between 1700-1900m but up to 2900m. Adaptable to a wide range of soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

White flowers emerge from a pink bud in late spring. Highly ornamental.

LATE SPRING

Glossy, translucent, dark red fruits are prominent during autumn. Persisting into winter. Highly ornamental.

EARLY AUTUMN

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark brown relatively smooth bark.

Issues to be aware of

Fruit litter may cause an issue on some sites.

Notable varieties

Species-type habit — ‘Arie Mauritz’.

Notes

- Good resistance to scab and mildew.
- Good for bees and other pollinating insects.

The tree and its features



A mature *Malus hupehensis*.

© Andrew Hirons





Left: The leaves of *Malus hupehensis* have good resistance to scab and mildew.

© Andrew Hirons

Right: Glossy, dark, red fruits often persist into winter.

© Duncan Slater

Malus sylvestris (European crabapple)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree capable of reaching 7m. <10M

A globular crown.

A moderately dense crown.

Natural habitat

Native to Europe, including the British Isles. Found in forest margins and on slopes. Adaptable to a wide range of soils providing they are nutrient-rich.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

White flowers emerge from a pink bud in late spring. Highly ornamental. LATE SPRING

Greenish-yellow fruits with a reddish blush are prominent during autumn. Persisting into winter. Highly ornamental. EARLY AUTUMN

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark brown relatively smooth bark.

Issues to be aware of

Fruit litter may cause an issue on paved sites.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

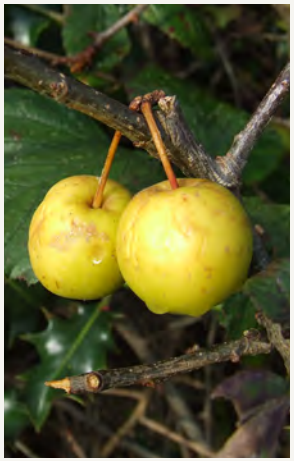
– Good for bees and other pollinating insects.

The tree and its features



A mature *Malus sylvestris* in full flower.
© Duncan Slater





Left: White flowers emerge from a pink bud, in late spring. © Duncan Slater

Right: *Malus sylvestris* has greenish-yellow fruits that are prominent in autumn.
© Duncan Slater

Malus toringo
(Toringo crabapple)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree capable of reaching 5m.

A globular crown.

A moderately dense crown.

Natural habitat

Native to Japan. Found in forest margins and on slopes. Adaptable to a wide range of soils providing they are nutrient-rich.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Light pink or white flowers emerge from a purplish-red bud in late spring. Highly ornamental.

EARLY AUTUMN

Yellow-orange fruits are prominent during autumn. Persisting into winter. Highly ornamental.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark brown relatively smooth bark.

Issues to be aware of

Fruit litter may cause an issue on paved sites.

Notable varieties

Species-type habit	‘Brouwers Beauty’.
Pink flowers	‘Scarlett’.

Notes

– Syn *Malus sieboldii*. Good for bees and other pollinating insects.

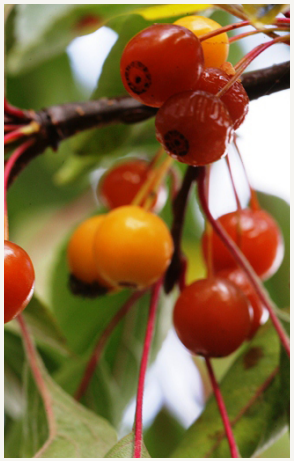
The tree and its features



New leaves of *Malus toringo* often emerge with reddish hues.

© Tim Baxter





Left: White flowers of *Malus toringo*.

© Barcham Trees

Right: The glossy red-orange fruits of *Malus toringo* add interest in autumn and winter.

© Barcham Trees

Malus trilobata
(Lebanese wild apple)

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m.

A conical crown.

A dense crown.

Natural habitat

Native to warm-temperate southeastern Europe and western Asia. Found in deciduous scrub, oak and pine forests on slopes 150-350m. Adaptable to a wide range of soils providing they are nutrient-rich.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

White flowers emerge from a white buds in early summer. Highly ornamental.

EARLY AUTUMN

Red fruits are prominent during autumn. Persisting into winter. Highly ornamental.

Deciduous broadleaved tree with simple leaves. Excellent red autumn colour.

Single-stemmed. Grey-brown relatively smooth bark.

Issues to be aware of

Fruit litter may cause an issue on paved sites.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Syns *Eriolobus trilobatus* and *Sorbus trilobata*. Excellent potential as a street tree.
- Good for bees and other pollinating insects.

The tree and its features



A tree with numerous possible names. *Malus trilobata* is an underutilised tree with great potential or urban environments.

© Barcham Trees

Malus yunnanensis (Yunnan crabapple)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree capable of reaching 10m.

An ovoid crown, quite conical when young.

A moderately dense crown.

Natural habitat

Native to China. Adaptable to a wide range of soils providing they are nutrient-rich.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of white flowers emerge from a white buds in late spring. Highly ornamental.

EARLY AUTUMN

Red or yellow fruits are prominent during autumn. Persisting into winter. Highly ornamental.

Deciduous broadleaved tree with simple leaves. Excellent red autumn colour.

Single-stemmed. Grey-brown relatively smooth bark.

Issues to be aware of

Fruit litter may cause an issue on paved sites.

Notable varieties

Species-type habit	var. *veitchii*.

Notes

- An excellent alternative for *Malus tschonoskii* as it is much more resistant to disease.
- Good for bees and other pollinating insects.

The tree and its features



Left: A mature *Malus yunnanensis* performing well in open woodland. © Tim Baxter

Right: Simple leaves turn red in autumn.
© Tim Baxter



The fruits of *Malus yunnanensis* are yellow or red in colour.
© Tim Baxter

Maytenus boaria
(Chilean mayten)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Small garden | Coastal | Transport corridor

Tree size and crown characteristics

<10M

A large tree up to 25m. In cultivation, trees tend to be less than 10m.

An ovoid crown.

An open crown.

Natural habitat

Native to Chile and north-western Argentina. Found in a wide range of conditions from dry grasslands to wet mountain slopes and even quite saline scrub areas. 0-4000m. Adaptable to a wide range of soils.

Environmental tolerance

Estimated intolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers are separate but occur on the same tree. Inconspicuous amongst the evergreen foliage.

LATE SUMMER

Red capsules ripen in late summer, attractive but not prominent.

Evergreen broadleaved tree with simple leaves.

Single-stemmed in cultivation although scrubby forms may be found in the wild. Bark is grey and becomes platy with age.

Issues to be aware of

Spreads by root suckers so this needs to be considered.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- An underutilised tree.
- Observed to have some tolerance to salt.

The tree and its features





Left: A *Maytenus boaria*, containerised in a urban garden.
© Hillier Nurseries

Right: A mature, open-grown *Maytenus boaria*.
© Hillier Nurseries



The flowers of *Maytenus boaria* provide some seasonal interest but they are relatively inconspicuous amongst the evergreen foliage.
© Hillier Nurseries

Mespilus germanica (Medlar)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree capable of reaching around 8m.

<10M

An irregular crown form.

A moderately dense crown.

Natural habitat

Native to Europe, the Caucasus and western Asia. Found on forest margins and open woodland. Adaptable to a wide range of soils, including calcareous. Both cold-hardy and heat resistant.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

White flowers held at the end of the shoots appear in late spring.

LATE SPRING

Russet brown fruits are an attractive feature in during autumn. Edible when they are over-ripe and have partially decayed.

LATE AUTUMN

Deciduous broadleaved tree with simple leaves. Often turning an attractive golden-brown in autumn.

Single-stemmed, but young plants can be rather bushy.

Issues to be aware of

Fruit litter may become an issue on paved surfaces.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

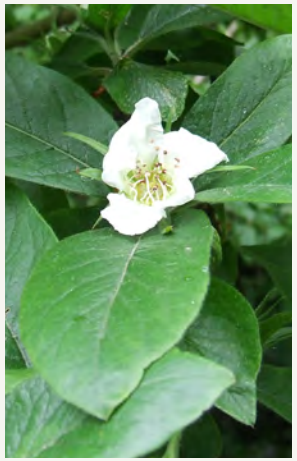
Notes

- Slow growing and slow to establish.
- Good for bees and other pollinating insects.

The tree and its features



Mespilus germanica can be grown as a small tree, but it may take on a rather bushy appearance.
© Henrik Sjöman





Left: Attractive white flowers appear after the leaves in late spring. © Duncan Slater

Right: The russet-brown fruits of *Mespilus germanica* are only edible when they are over-ripe.
© Henrik Sjöman

Metasequoia glyptostroboides (Dawn redwood)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

A massive tree capable of reaching 35m.

>25M

A conical crown.

A moderately dense crown.

Natural habitat

Native to China.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

Male and female flowers are held separately on the same tree. Inconspicuous with little ornamental merit.

LATE SPRING

Cones ripen over about a year.

LATE WINTER

Deciduous conifer. Needles turn a bronze-orange brown in autumn giving seasonal interest.

Single-stemmed. Reddish brown bark, peeling in long strips. Often becoming silvery-grey with age.

Issues to be aware of

M. glyptostroboides release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Yellow foliage	‘Goldrush’.
Narrow crown	‘Sheridan Spire’.

Notes

- Fast growing and easy to establish. However, can be somewhat sensitive to drought during the establishment phase.
- Observed to have some tolerance to air pollution and have some tolerance to salt.
- This is a deciduous conifer so expect the needles to fall off in autumn.

The tree and its features





Left: *Metasequoia glyptostroboides* maintains a conical crown into maturity. © Duncan Slater

Right: The needle leaves are deciduous. They turn a bronze-orange colour in autumn. © Henrik Sjöman





Left: Mature trees often have fluted stems with attractive, reddish-brown bark. © Henrik Sjöman

Right: Small fruiting cones mature about a year after pollination.
© Duncan Slater

Morus alba (White mulberry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m, although often less than 10m.

A globular crown, becoming rather broad.

A moderately dense crown.

Natural habitat

Native to hillside forests in central and north China. Widely cultivated. Enjoys calcareous soil but will grown on a wide range of soils. Prefers a warm microclimate.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers typically held on separate trees (dioecious) and are of little ornamental value. Late spring.

LATE SUMMER

Fruit cluster held on a short stalk ripening in late summer. Edible.

Deciduous broadleaved tree with simple leaves. Some leaves have very attractive lobes which enhances the visual impact of the foliage.

Single-stemmed. Bark is light grey, acquiring shallow fissures with age.

Issues to be aware of

Fruit may cause an issue on paved surfaces in some situations. Fruitless varieties are available.
Male *M. alba* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Fruitless	‘Fruitless’.
Cut leaf	‘Lacinata’.
Upright	‘Pyramidalis’.
Large-leaved	‘Macrophylla’ (syn ‘Platinifolia’).
Weeping	‘Pendula’.

Notes

- Host plant of the silkworm so vital for the silk industry.
- Observed to have some tolerance to salt.

The tree and its features



A broad-spreading *Morus alba* provides useful shade in a paved environment.

© Henrik Sjöman



Leaves and immature fruit of *Morus alba*. These fruits ripen in late summer and are edible.

© Henrik Sjöman

Morus nigra (Black mulberry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m, although often less than 10m.

A globular crown, becoming rather broad.

A moderately dense crown.

Natural habitat

Origins have been lost due to such an extensive time of cultivation (thousands of years) but probably native to western Asia. Enjoys calcareous soil but will grown on a wide range of soils. Prefers a warm microclimate.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers typically held on separate trees (dioecious) and are of little ornamental value. Late spring.

LATE SUMMER

Dark red to black unstalked fruit cluster ripening in late summer. Edible.

Deciduous broadleaved tree with simple leaves. Rough leaves help to distinguish from *Morus alba*.

Single-stemmed. Bark is light grey, becoming rough with age.

Issues to be aware of

Fruit may cause an issue on paved surfaces in some situations.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



The broad-spreading crown of *Morus nigra*.
© Henrik Sjöman





Left: Large, simple leaves of *Morus nigra* are rougher than those of *Morus alba*. © Henrik Sjöman

Right: Edible fruit clusters of *Morus nigra* ripen in late summer.
© Duncan Slater

Nothofagus antarctica (Antarctic beech)

Use potential

Park

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m.

An ovoid crown.

A moderately dense crown.

Natural habitat

Native to Chile and Argentina. Found on marginal sites, often with poor soils such as those created by fresh lava and ash deposits. It also grows on steep slopes, moorlands and gravelly river-beds, 0-1700m.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Male and female flowers (catkins) occur separately on the same plant in early summer. Inconspicuous with little ornamental merit.

LATE SUMMER

Nutlets found in late summer but of little ornamental value.

Deciduous broadleaved tree with simple leaves. Good red autumn colour.

Single-stemmed. Dark grey bark, strongly and irregularly fissured.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Is rather bushy on unfavourable sites.

The tree and its features



Left: A young *Nothofagus antarctica* tree growing in a park. © Duncan Slater

Right: *Nothofagus antarctica* develops a red colour in autumn. © Duncan Slater



Nothofagus antarctica is one of the few tree species from South America that we can plant in the British Isles. © Henrik Sjöman

Nyssa sylvatica (Black tupelo)

Use potential

Park

Tree size and crown characteristics

A large tree capable of reaching 25m.

15-25M

A conical crown, becoming ovoid at maturity. Up to 12m wide.

A moderately dense crown.

Natural habitat

Native to the eastern US. Found in well-drained upland woods and rich deciduous forests to about 1250m. Prefers deep rich mildly acidic soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

Inconspicuous greenish flowers appear in late spring.

LATE SPRING

Bluish-black ovoid drupes ripen by early autumn.

EARLY AUTUMN

Deciduous broadleaved tree with simple leaves. Excellent red-orange autumn colour.

Single-stemmed. Dark grey bark, becoming fissured with age.

Issues to be aware of

Few issues recorded for this species but this species has been known to produce root suckers.

Notable varieties

Species-type habit	'Wildfire', 'Wisley Bonfire'.
Red young leaves	'Red Red Wine'.
Weeping	'Autumn Cascades'.

Notes

- Flowers are very good for bees despite being rather inconspicuous.
- Quite difficult to transplant so it takes some time to establish, but well worth being patient with.

The tree and its features





Left: A young *Nyssa sylvatica* tree.
© Henrik Sjöman

Right: A mature *Nyssa sylvatica* displaying autumn colour.
© Henrik Sjöman





Left: The leaves of *Nyssa sylvatica* turn an excellent red colour in autumn. © Andrew Hirons

Right: Small drupe fruits ripen in early autumn and are good for birds.
© Henrik Sjöman

Olea europaea (Olive)

Use potential

Park
Paved
Small garden
Coastal

Tree size and crown characteristics

<10M

A small tree up to 10m.

An irregular to globular crown form.

A dense crown.

Natural habitat

Probably native to southeastern Europe, western Asia and parts of north-eastern Africa but so long in cultivation that actual origins have been obscured. Requires warm to hot environments to thrive.

Environmental tolerance

Estimated to be partially tolerant to shade.

Tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Small clusters of yellow-white flowers appear in early summer. Fairly inconspicuous.

EARLY SUMMER

Ovoid drupes (olive) about 1-3cm long ripen after about a year, however, fruits may not fully ripen in the British Isles climate.

Evergreen broadleaved tree with simple leaves. Upper leaf surface is grey-green whilst the lower surface is silvery-grey.

Single-stemmed. Dark brown-grey bark becoming rough with age.

Issues to be aware of

O. europaea release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Must be in a warm microclimate if it is to do well in the British Isles.
- Observed to have some tolerance to salt.

The tree and its features



Left: The natural form of a young *Olea europaea*. © Duncan Slater

Right: An *Olea europaea* growing in a stone terracing as part of an olive grove in Spain. © Andrew Hirons



Left: These robust, leathery leaves are green on the upper side but silvery underneath. © Duncan Slater

Right: Immature olives – the lack of summer heat often means that olives never ripen in the British Isles. © Duncan Slater

Ostrya carpinifolia (Hop hornbeam)

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m.

A globular, occasionally irregular or ovoid crown. Capable of becoming 12m wide.

A moderately dense crown.

Natural habitat

Native to southern Europe and western Asia, including the Caucasus. Found as a component of a wide range of warm-temperate deciduous forests, including coastal forests on the Balkan peninsula. Found on a wide range of soils, including calcareous.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers (catkins) found separately on the same tree. Attractive.

LATE SUMMER

Nutlets enclosed in papery husk and held in pendulous (hop-like) clusters. Turning from light green to brown by late summer. Very attractive.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Grey bark, smooth when young but flaking with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features





Left: A mature *Ostrya carpinifolia* growing in a large garden. © Andrew Hirons

Right: Male catkins of *Ostrya carpinifolia* appear with the leaves in late spring. © Andrew Hirons





Left: The rough textured, flaking bark helps to distinguish it from *Carpinus betulus*. © Andrew Hirons

Right: The characteristic fruit of *Ostrya carpinifolia* is attractive throughout much of summer. © Duncan Slater

Parrotia persica (Persian ironwood)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Tree size and crown characteristics

10-15M

A large tree capable of growing up to 25m in its native range but rarely exceeding 12m in cultivation.

An irregular form, often rather broad but much depends on the cultivar.

A moderately dense crown.

Natural habitat

Native to western Asia in the temperate deciduous forest up to 1400m, forming pure thickets or mixed stands. Prefers open, dry, sunny sites and grows mainly on low-lying plains and mountain foothills on mildly acidic humus-rich forest soil. However, known to be tolerant of calcareous soils. Very heat tolerant and cold-hardy throughout the British Isles.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Moderately tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE WINTER

Small clusters of flowers appear before the leaves in late winter. Attractive.

EARLY AUTUMN

Spiked seed capsule fully develops by early autumn. Rather inconspicuous.

Deciduous broadleaved tree with simple leaves. One of the first species to show autumn colour. Excellent reds, oranges and yellows from late summer and through autumn.

Single- and multi-stemmed trees available. Light grey with exfoliating flakes revealing more coloured, purplish, young bark beneath. Attractive.

Issues to be aware of

This species does develop root suckers, but they are rarely problematic. A rather shrubby tree unless the 'tree form' cultivar is selected.

Notable varieties

Tree form	'Vanessa'.
Weeping	'Pendula'.

Notes

- 'Vanessa' makes a great street tree but other cultivars are too shrubby for use in streets and should be planted in parks or large gardens.
- Quite a slow-growing tree.

The tree and its features



A tree form of *Parrotia persica*.
© Henrik Sjöman



Left: *Parrotia persica* is one of the first species to show colour in autumn. © Henrik Sjöman

Right: Small clusters of attractive flowers appear in late winter.
© Andrew Hirons

Paulownia tomentosa (Foxglove tree)

Use potential

Park

Paved

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m.

A globular, occasionally ovoid crown form.

A moderately dense crown.

Natural habitat

Native to China found as a pioneer of disturbed sites and on forest margins to 1800m. Prefers sunny, sheltered locations but can tolerate a wide range of soils, including calcareous.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Upright light-purple flower spikes cover the crown just before the leaves appear in late spring. Highly ornamental.

LATE AUTUMN

Ovoid woody capsules mature by late autumn and can persist into winter on the tree, after they have split and shed their seeds.

Deciduous broadleaved tree with large simple leaves.

Single-stemmed. Grey-brown bark. Young stems are velvety with a dense covering of hair.

Issues to be aware of

In warm-temperate regions this species has been reported as invasive, but this is not likely to be a problem in cooler regions, such as the British Isles. Wood is rather brittle so avoid exposed locations.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Very fast to establish and fast growing.
- Flowers are partially formed at the end of summer so are at risk of cold-injury during severe spring frosts, this can reduce the impact of potentially spectacular spring flowering. Warm, sheltered microclimates are, therefore, preferable.

The tree and its features



Paulownia tomentosa in full bloom in paved environment.

© GreenBlue Urban



Left: Large, upright flower spikes cover the crown in late spring, before the leaves appear.

© Andrew Hirons

Right: Large, simple leaves with immature fruits.

© Andrew Hirons

Phellodendron amurense (Amur cork tree)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of growing to 15m.

A squat obovoid crown becoming broad at the top of the crown.

A moderately dense crown.

Natural habitat

Native to China, Manchuria, Mongolia and the Korean peninsula. Found in sparse forests and open exposed slopes. Adaptable to a wide range of soils.

Environmental tolerance

Intolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers occur on separate trees (dioecious). Yellowish-green in late spring but inconspicuous.

LATE SUMMER

Pollinated flowers on female trees develop reddish-black to black clusters of berries by late summer. These often persist into winter.

Deciduous broadleaved tree with pinnate leaves. Very attractive foliage. Autumn colour is yellow but often short-lived as leaves fall quite early.

Single-stemmed. Light-brown corky bark, deeply fissured on mature trees.

Issues to be aware of

This species has been noted as invasive in some parts of the US but not currently noted as an issue in the British Isles.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- A very cold-hardy tree that can add a exotic look to cold climates.
- Slow growing and slow establish, but capable of becoming a fantastic open grown specimen.
- Beware of the crown becoming very wide, so give plenty of space.
- Buy a large stock size, as saplings seem more sensitive to frost.

The tree and its features



A mature *Phellodendron amurense* growing in a park.
© Henrik Sjöman





Left: Deeply fissured, corky bark is an attractive feature of *Phellodendron amurense*. © Henrik Sjöman

Right: The flowers of *Phellodendron amurense* are attractive but not prominent amongst the foliage.
© Duncan Slater

Picea abies (Norway spruce)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 60m.

A conical crown.

A dense crown.

Natural habitat

Native to northern and central Europe (not including the British Isles) as far east as the Ural mountains. Found as a semi-pioneer and a climax species between 400-2450m in coniferous or mixed coniferous-deciduous woodland. Requires cool, well-drained soils but can cope with a wide range of soil types including those with low-nutrient levels.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

EARLY WINTER

Hanging seed cones mature to reddish-brown by the winter following pollination, persisting on the tree for some time. Attractive.

Evergreen conifer tree with needle leaves.

Single-stemmed. Grey platy bark detaching in scales to reveal brown patches.

Issues to be aware of

Potentially a very large tree.

Notable varieties

Weeping	'Inversa'.

Notes

- This species is very sensitive to weed competition as a newly planted tree. Therefore, mulching will be critical to aid establishment.
- In nature, it only acts as a pioneer when associated with a nurse species, such as *Betula pendula*.
- Sensitive to urban pollution so should be restricted to rural and park situations.

The tree and its features





Left: A mature *Picea abies* maintains a strongly conical form. © Henrik Sjöman

Right: New growth is an attractive fresh green and contrasts with older, darker foliage. © Andrew Hirons





Left: Bark becomes platy and rough with age. © Duncan Slater

Right: Young cones of *Picea abies* are attractive. © Henrik Sjöman

Picea breweriana (Brewer spruce)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m. Usually smaller in cultivation but still potentially massive.

A conical crown.

A dense crown.

Natural habitat

Native to a small regions of the Klamath and Siskiyou mountains in the western US, 530-2290m. It is found on mountain slopes and in ravines at lower elevation in pure stands or as part of a mixed-species conifer forest. Capable of growing on low fertility soils, including serpentine soils, but always requires good soil aeration.

Environmental tolerance

Moderately tolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) in late spring.

EARLY WINTER

Hanging seed cones are purple when young. They mature to brown by the winter following pollination, persisting on the tree for some time. Attractive throughout development.

Evergreen conifer tree with needle leaves. This spruce has particularly attractive pendant foliage so is often known as weeping spruce.

Single-stemmed. Scaly bark at maturity with newly exposed bark starting a reddish-brown colour but later turning grey.

Issues to be aware of

Potentially a very large tree.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Sensitive to urban pollution so should be restricted to rural and park situations.
- A slow growing tree, especially when young – but worth the wait. Consider a larger stock size if instant impact is required.

The tree and its features



Left: A young *Picea breweriana* developing its characteristic drooping foliage. © Duncan Slater

Right: The needle leaves of *Picea breweriana*. © Duncan Slater



Male flowers of *Picea breweriana* are of little ornamental merit. © Duncan Slater

Picea omorika (Serbian spruce)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m.

A very narrow conical crown. Growing to about 4m wide.

A dense crown.

Natural habitat

Native to the Dinaric Alps on the Balkan peninsula, 300-1700m. Found on steep rocky slopes and ravines. Will grow on a wide range of soils, including calcareous.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

EARLY WINTER

Hanging seed cones turn from purple to reddish-brown by the winter following pollination, persisting on the tree for some time. Attractive.

Evergreen conifer tree with needle leaves.

Single-stemmed. Grey platy bark detaching in scales to reveal brown patches.

Issues to be aware of

Potentially a very large tree. Shallow rooting so may interfere with surface infrastructure. Known to be sensitive to wind exposure.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

The tree and its features



The narrow conical form of *Picea omorika* is very attractive when this species is planted in groups.

© Henrik Sjöman





Left: The inconspicuous male 'flower' of *Picea omorika*.

© Duncan Slater

Right: A female 'flower' of *Picea omorika*, pretty, but hard to spot.

© Duncan Slater

Picea orientalis (Caucasian spruce)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 60m.

A conical crown. Growing to about 5m wide.

A dense crown.

Natural habitat

Native to western Asia, 1000-2000m, in mixed forests. Will grow on a wide range of soils, including calcareous, providing they are well-drained.

Environmental tolerance

Estimated to be tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

EARLY WINTER

Hanging seed cones turn from purple to light-brown by the winter following pollination, persisting on the tree for some time. Attractive.

Evergreen conifer tree with needle leaves.

Single-stemmed. Grey platy bark detaching in scales to reveal brown patches.

Issues to be aware of

Potentially a very large tree.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

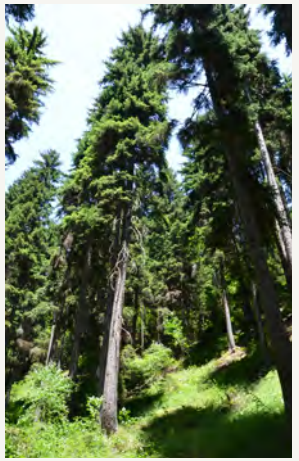
- Tolerant of warm microclimates so is a better choice for many urban sites than *Picea abies*.

The tree and its features



Picea orientalis growing in their native environment in the Caucasus mountains.

© Henrik Sjöman





Left: *Picea orientalis* can become massive trees so are best confined to park environments.

© Henrik Sjöman

Right: Needle leaves of *Picea orientalis*.

© Henrik Sjöman

Picea pungens (Colorado blue spruce)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 50m.

A very narrow conical crown. Growing to about 5m wide.

A dense crown.

Natural habitat

Native to the lower montane forests of the Rocky Mountains in the US, 1800-3000m. Predominantly found in riparian areas. Adaptable to a wide range of soils, including calcareous.

Environmental tolerance

Tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

EARLY WINTER

Hanging seed cones turn from light green to yellow-grey by the winter following pollination, persisting on the tree for some time. Attractive.

Evergreen conifer tree with needle leaves.

Single-stemmed. Grey platy bark detaching in scales to reveal brown patches.

Issues to be aware of

Potentially a very large tree.

Notable varieties

Blue needles	‘Hoopsii’, ‘Blue Diamond’, ‘Glauca’.

Notes

– Tolerant of warm microclimates so is a better choice for many urban sites than *Picea abies*.

The tree and its features



Left: A semi-mature *Picea pungens* ‘Glauca’
© Henrik Sjöman

Right: A young *Picea pungens* ‘Glauca’.
© Henrik Sjöman



Left: A number of blue needled cultivars exist. These make attractive trees and are always smaller than the species-type. © Duncan Slater

Right: The male ‘flower’ of *Picea pungens* ‘Glauca’.
© Duncan Slater

Picea sitchensis (Sitka spruce)

Use potential

Park

Coastal

Tree size and crown characteristics

>25M

A massive tree capable of reaching 96m. A real forest giant. Smaller in cultivation.

A conical crown.

A dense crown.

Natural habitat

Native to the pacific west coast of North America, 0-1190m. It is found close to the coast in regions characterised by temperate rainforest. Pure stands exist in areas with abundant salt spray and in pioneer situations but it is also common in mixed conifer stands. Prefers deep, moist, acid soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) in late spring.

EARLY WINTER

Hanging seed cones are purple-green when young and mature to light brown by the winter following pollination. They persist on the tree for some time. Attractive.

Evergreen conifer tree with needle leaves.

Single-stemmed. Relatively smooth, grey bark, darkening and becoming scaly with age.

Issues to be aware of

Potentially a very large tree. Has the potential to display invasive characteristics in temperate oceanic climates.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Sensitive to urban pollution so should be restricted to rural and park situations.
- Although mostly used for forestry, it can make an attractive amenity tree, providing it is given sufficient space to develop.
- If planted in appropriate conditions, it readily establishes and displays fast growth.

The tree and its features





Left: *Picea sitchensis* can make an attractive tree in open environments. © Duncan Slater

Right: Mature *Picea sitchensis* maintain their conical form. © Duncan Slater





Left: The female 'flower' of *Picea sitchensis*. © Duncan Slater

Right: The male 'flower' of *Picea sitchensis*. © Duncan Slater

Pinus nigra (Black pine)

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

>25M — A massive tree capable of reaching 40m.

Conical when young, becoming much broader at maturity.

A dense crown.

Natural habitat

Native to mountain forests of central and southern Europe. Grows on steep rocky slopes. Adaptable to a wide range of soils, including calcareous and those of low nutrient content. Also tolerant of coastal conditions.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING — Inconspicuous flowers (strobili) appear in late spring.

LATE AUTUMN — Seed cones ripen in the autumn of their second year after pollination. They are shed the following spring about two years after the initial flowering event.

Evergreen conifer tree with needle leaves.

Single-stemmed. Dark grey-brown platy bark, deeply fissured with age.

Issues to be aware of

Potentially a very large tree.

Notable varieties

Single stem	subsp. *laricio* (Corsican pine).
Broader crown	subsp. *nigra* (Austrian pine).
Narrow crown	'Pyramidalis'.

Notes

- Tolerant of air pollution and salt.
- An extremely robust species for urban conditions.

The tree and its features



Mature *Pinus nigra* lining a road. This is a versatile species.
© Henrik Sjöman





Left: *Pinus nigra* can develop into massive trees, as this mature stand demonstrates.
© Henrik Sjöman

Right: The male 'flower' of *Pinus nigra* subsp, *nigra*.
© Duncan Slater

Pinus pinaster (Maritime pine)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Coastal

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m.

Conical when young, becoming much broader at maturity.

A dense crown.

Natural habitat

Native to coastal forests of Mediterranean basin. A pioneer of coastal sites, particularly dry, sandy soils. Occurs up to 2000m in the mountains of north Africa. Adaptable to a wide range of soils, including calcareous, very sandy soils and those of low nutrient content. Cold hardy to about -12°C so some locations may be challenging in severe winters.

Environmental tolerance

Intolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

EARLY AUTUMN

Seed cones ripen in the autumn of their second year after pollination. They persist on the tree for several years.

Evergreen conifer tree with needle leaves.

Single-stemmed. Dark red-brown platy bark, deeply fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Prefers a warm microclimate.
- Tolerant of air pollution.

The tree and its features



Needle leaves of *Pinus pinaster*. This is a useful species that can cope with challenging conditions but it does require a warm microclimate to thrive.

© Barcham Trees

Pinus pinea (Stone pine)

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m.

Conical to globular when young, becoming vase shaped or umbrella-like at maturity.

A dense crown.

Natural habitat

Natural range is obscured as a result of extensive cultivation but thought to be native to the Iberian peninsula. Now grows most extensively around the Mediterranean and parts of western Asia. Prefers mildly acidic, sandy soils but will grow on calcareous sites. Growth is rather limited on loam and clay soils. Occurs up to 1000m. Capable of growing on coastal sites.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

EARLY SUMMER

Seed cones ripen in the summer of their third year after pollination. They persist on the tree for several years. Edible seeds.

Evergreen conifer tree with needle leaves.

Single-stemmed. Dark red-brown platy bark, deep vertical fissures develop with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Prefers a warm microclimate and is tolerant to heat.
- Known to be tolerant of air pollution.
- Cultivated for centuries for its edible ‘pine nuts’.

The tree and its features



Pinus pinea has attractive crowns. This young globular crown will take on a more umbrella-like form at maturity.

© Duncan Slater



A young planting of *Pinus pinea* in a garden.

© Duncan Slater

Pinus radiata (Monterey pine)

Use potential

Park

Coastal

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m.

A conical crown broadening with age and becoming irregular.

A dense crown.

Natural habitat

Native to coastal forests of California, US. Adaptable to a wide range of soil textures but prefers acid soils. Can cope with soils of low nutrient content.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

EARLY SUMMER

Seed cones take a full two years to ripen after pollination. They persist on the tree for several years singly or in clusters of up to five.

Evergreen conifer tree with needle leaves.

Single-stemmed. Grey to reddish-brown platy bark, deeply fissured with age.

Issues to be aware of

Potentially a very large tree.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Tolerant of air pollution.
- Naturalised in some parts of the world beyond its natural range, which is quite restricted.
- Very fast growing.

The tree and its features



An imposing *Pinus radiata* in a large garden.
© Andrew Hirons





Left: The crown of *Pinus radiata* showing its abundant cone production. © Andrew Hirons

Right: Different generations of cones can be seen on the same branch.
© Andrew Hirons

Pinus strobus (Eastern white pine)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 80m. Smaller in cultivation.

A conical crown broadening with age.

A dense crown.

Natural habitat

Native to eastern North America, from the southern margins of the boreal belt in Canada to the southern Appalachian mountains. Usually as part of moist (mesic) forest communities in pure or mixed stands 0-1500m.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

LATE SUMMER

Seed cones ripen in the summer of their second year after pollination. Cones tend to be dropped after seeds have been released.

Evergreen conifer tree with needle leaves, in bundles of five.

Single-stemmed. Dark grey-brown platy bark, deeply fissured with age.

Issues to be aware of

Potentially a very large tree.

Notable varieties

Narrow crown	'Fastigiata'.

Notes

– Not very tolerant of salt-laden winds but shows good tolerance to air pollution.

The tree and its features



A mature *Pinus strobus* makes a very attractive open-grown tree.

© Henrik Sjöman

Pinus sylvestris (Scots pine)

Use potential

Park

Paved

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m.

A conical crown broadening with age and becoming irregular.

A moderately dense crown.

Natural habitat

Native to a large region of Europe and northern Asia. From Portugal and Ireland in the west to the Russia Far East and from northern Norway as far south as the Sierra Nevada range in Spain. Capable of growing on a range of marginal sites too challenging for other species. These include poor acidic soils, sandy soils and rocky outcrops. Also capable of performing well on coastal sites.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

LATE AUTUMN

Seed cones ripen in the autumn of their second year after pollination. Cones tend to be dropped after seeds have been released.

Evergreen conifer tree with needle leaves.

Single-stemmed. Dusky pink-orange-rusty brown bark on the upper portion of the stem with papery flakes, darky grey and fissured on the lower portion of the stem. Attractive.

Issues to be aware of

Potentially a very large tree.

Notable varieties

Narrow crown	'Fastigiata'.

Notes

- Much slower to establish that *Pinus nigra*, but it is more ornamental than *P. nigra* because of the attractive young bark.
- Tolerant of air pollution and salt-laden winds. However, *Pinus nigra* and *P. radiata* generally perform better on coastal sites.

The tree and its features



Pinus sylvestris is an attractive native conifer that is capable of establishing in a wide range of environments.

© Henrik Sjöman



Left: Needle leaves of *Pinus sylvestris* come in pairs.

© Duncan Slater

Right: The female 'flower' of *Pinus sylvestris* are inconspicuous.

© Duncan Slater

Pinus wallichiana (Bhutan pine)

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 50m. Much smaller in cultivation.

A conical crown broadening with age.

A moderately dense crown.

Natural habitat

Native to the Himalaya region. Found in pure stands and mixed forests, 1500-3500m on steep slopes.

Environmental tolerance

Intolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Inconspicuous flowers (strobili) appear in late spring.

LATE AUTUMN

Seed cones ripen in the autumn of their second year after pollination. Cones tend to be dropped after seeds have been released.

Evergreen conifer tree with needle leaves. Bundles of five 10-20cm long needles give the crown a soft texture. Needles covered with a bluish frosting. Very attractive.

Single-stemmed. Dark grey bark becoming rougher and developing shallow fissures with age.

Issues to be aware of

Potentially a very large tree.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Tolerant of air pollution.

The tree and its features





Left: *Pinus wallichiana* is a highly ornamental pine. © Duncan Slater

Right: Seed cones ripen in the second year after pollination. © Henrik Sjöman



The long needles in bundles of five give the crown of *Pinus wallichiana* a soft texture. © Andrew Hirons

Platanus x *hispanica* (London plane)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS | Transport corridor

Tree size and crown characteristics

>25M — A massive tree capable of reaching 40m.

A globular to ovoid crown form. Capable of becoming very wide, up to 25m+.

A moderately dense crown.

Natural habitat

A hybrid between *Platanus orientalis* and *P. occidentalis*. Tolerant to a wide range of soil textures but prefers mildly acidic soils. Very tolerant of hard surfaces and urban conditions in general.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING — Male and female flowers held separately but on the same tree. Relatively inconspicuous in late spring.

LATE SUMMER — Spherical, spikey fruit about 2.5cm in diameter, held on stalks in groups of two to four. Prominent from late summer, persisting into winter.

Deciduous broadleaved tree with simple palmate leaves.

Single-stemmed. A highly attractive bark: grey with exfoliating flakes that reveal green and cream patches underneath.

Issues to be aware of

Potentially a very large tree. Hairs associated with the young leaves and fruits can cause respiratory problems. Pollen is also allergenic. Fallen leaves take a long time to rot so can persist in the landscape for some time after they are shed.

Notable varieties

Hybrid-type habit	'Louisa Lead', 'Malburg'.
Compact crown	'Alpen's Globe'.
Narrower crown	'Huissen', 'Pyramidalis'.
Strong vertical trunk	'Bloodgood', 'Mr X', 'Tremonia'.
Variegated leaves	'Suttneri'.

Notes

- Very tolerant to pruning.
- *Platanus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).
- Observed to have some tolerance to salt and air pollution.

The tree and its features



Platanus x *hispanica* is an incredibly tough hybrid with proven credentials in urban conditions.
© Duncan Slater



The winter silhouettes of *Platanus* x *hispanica* are very attractive.
© Henrik Sjöman

Platanus orientalis (Oriental plane)

Use potential

Park | Paved | SuDS | Transport corridor

Tree size and crown characteristics

>25M — A massive tree capable of reaching 30m.

A globular to ovoid crown form. Capable of becoming very wide, up to 25m+.

A moderately dense crown.

Natural habitat

Native to Balkan peninsula and western Asia, predominantly found in mountain riparian zones that are often characterised by dry riverbeds in the summer. Tolerant to a wide range of soil textures but prefers mildly acidic soils. Very tolerant of hard surfaces and urban conditions in general.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING — Male and female flowers held separately but on the same tree. Relatively inconspicuous in late spring.

LATE SUMMER — Spherical, spikey fruit about 2.5cm in diameter, held on stalks in groups of two to six. Prominent from late summer, persisting into winter.

Deciduous broadleaved tree with simple palmate leaves.

Single-stemmed. A highly attractive bark: grey with exfoliating flakes that reveal green and cream patches underneath.

Issues to be aware of

Potentially a very large tree. Hairs associated with the young leaves and fruits can cause respiratory problems. Pollen is also allergenic. Fallen leaves take a long time to rot so can persist in the landscape for some time after they are shed.

Notable varieties

Hybrid-type habit	‘Digitata’.
Ornamental leaf	‘Digitata’.
Compact crown	‘Minaret’.

Notes

- Very tolerant to pruning.
- *Platanus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Platanus orientalis is capable of developing a very broad crown so should be planted in plenty of space.
© Andrew Hirons





Left: The mottled bark of *Platanus orientalis* is an attractive feature, all year round. © Andrew Hirons

Right: Simple palmate leaves and spherical fruit held in bunches of two to six.
© Andrew Hirons

Populus alba (White poplar)

Use potential

Park

Coastal

Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 40m. Typically less than 20m in the British Isles.

An ovoid crown.

A moderately dense crown.

Natural habitat

Native to central and southern Europe, north Africa and, western and central Asia. A pioneer species that grows on a wide range of moist and riparian habitats providing seasonal fluctuations in the water table are not extreme. Adaptable to a wide range of soils, including calcareous.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (catkins) appear on separate trees (dioecious) in early spring. Fairly inconspicuous.

EARLY SUMMER

Seed capsule developed from fertilised female catkins and ripens by early summer. Only on female trees.

Deciduous broadleaved tree with simple leaves. The underside of the leaf is covered with a thick mat of white hairs (indumentum) providing a very attractive leaf – particularly striking against a dark sky.

Single-stemmed in cultivation but may be multi-stemmed in the wild. Grey bark with very attractive diamond-shaped lenticels on the trunk, becoming rougher with age.

Issues to be aware of

Produces abundant root suckers, which may be problematic in some landscapes. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Silvery leaves	'Nivea'.
Broad columnar	'Raket'.

Notes

- Fast growing and easy to establish.
- Tolerant of exposed, windy sites.
- *Populus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).
- Observed to have some tolerance to salt.

The tree and its features



Populus alba provides excellent contrast against a dark background.
© Duncan Slater





Left: A thick mat of hairs give *Populus alba* its characteristic white leaves. © Duncan Slater

Right: The male catkins of *Populus alba* appear in early spring.
© Duncan Slater

Populus x *canadensis* (Hybrid poplar)

Use potential

Park

Coastal

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m.

An ovoid to globular crown.

A moderately dense crown.

Natural habitat

A hybrid between *Populus nigra* and *P. deltoides*.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (catkins) appear on separate trees in early spring. Fairly inconspicuous.

EARLY SUMMER

Seed capsules if developed from fertilised female catkins ripen by early summer. Only on female trees of some cultivars. Often sterile.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark-grey bark becoming fissured with age.

Issues to be aware of

Produces root suckers, which may be problematic in some landscapes. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Yellow leaves	‘Serotina Aurea’.
Coastal plantings	‘Ellert’, ‘Koster’, ‘Robusta’.

Notes

- Fast growing and easy to establish.
- Tolerant of exposed, windy sites.
- Many cultivars are sensitive to leaf rust diseases and or cankers.
- *Populus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).
- Observed to have some tolerance to salt.

The tree and its features



Populus x *canadensis* is a fast growing tree that readily establishes.

© Henrik Sjöman

Populus x *candicans* (Ontario poplar)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m.

An ovoid crown.

A moderately dense crown.

Natural habitat

A hybrid of obscure origin. One parent is almost certain to be *Populus balsamifera*.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Female catkins appear in late spring. Fairly inconspicuous.

No fruit from this female clone.

Deciduous broadleaved tree with simple leaves. The variegated form is attractive.

Single-stemmed. Grey bark, becoming fissured with age.

Issues to be aware of

Produces root suckers which may be problematic in some landscapes. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Variegated leaves	‘Aurora’.

Notes

- Fast growing and easy to establish.
- Vulnerable to a bacteria canker disease.
- *Populus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The hybrid poplar *Populus* x *candicans* is best known for the cultivar ‘Aurora’ which has randomly variegated leaves.

© Barcham Trees

Populus nigra (Black poplar)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Coastal

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m.

An ovoid to irregular crown.

A moderately dense crown.

Natural habitat

Native to Europe (not Scandinavia), north Africa and, western Asia: 0-4000m. A pioneer species colonise floodplains, other riparian zones and moist, open habitats. Adaptable to a wide range of soils, including calcareous.

Environmental tolerance

Partially tolerant to shade.

Sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (catkins) appear on separate trees (dioecious) in early spring. Fairly inconspicuous.

EARLY SUMMER

Seed capsule developed from fertilised female catkins and ripens by early summer. Only on female trees.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark-grey bark becoming deeply fissured with age.

Issues to be aware of

Produces root suckers, which may be problematic in some landscapes. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

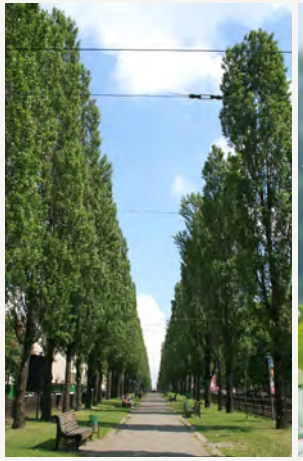
Notable varieties

Upright	'Italica', 'Thevestina', 'Plantierensis'.
Male	'Brandaris', 'Vereecken'.
Female	'Wolterson'.

Notes

- Fast growing and easy to establish.
- Tolerant of exposed, windy sites.
- Heat tolerant so useful for warm microclimates that are not too dry.
- *Populus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).
- Observed to have some tolerance to salt and air pollution.

The tree and its features





Left: An avenue of *Populus nigra* 'Italica' providing shade for a pathway. © Henrik Sjöman

Right: Vigourous young shoots of *Populus nigra*. © Andrew Hirons



A group of mature *Populus nigra* displaying their broad crowns in the evening light. © Barcham Trees

Populus tremula (Eurasian aspen)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Coastal

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m.

An ovoid to globular crown.

A moderately dense crown.

Natural habitat

Native to Europe, Algeria and throughout much of Russia and northern Asia, up to 2000m. A pioneer species found on a wide range of habitats. Performs best on well-drained, loamy, calcareous soils with the water table within 1.5m of the surface. However, will grow quite well on a wide range of soil textures and pH. Can tolerate extreme cold, to -30°C.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE WINTER

Male and female flowers (catkins) appear on separate trees in late winter. Fairly inconspicuous.

EARLY SUMMER

Seed capsules develop from fertilised female catkins and ripen by early summer. A downy fluff helps to disperse seeds. Only on female trees.

Deciduous broadleaved tree with simple leaves. A flattened petiole means that the leaves flutter even in light winds. Provides a golden-yellow autumn colour.

Single-stemmed in cultivation but may be multi-stemmed in the wild. Light-grey to greenish-grey bark with very attractive diamond-shaped lenticels on the trunk, becoming rougher with age.

Issues to be aware of

Produces abundant root suckers, which may be problematic in some landscapes. Downy fluff associated with seeds can cause a nuisance during periods of seed dispersal – selecting male cultivars mitigates this. However, male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Upright	'Erecta'.
No fruit	'Erecta'.

Notes

- Fast growing and easy to establish.
- Tolerant of exposed, windy sites.
- *Populus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).
- Observed to have some tolerance to salt.

The tree and its features



Populus tremula providing beautiful autumnal colours to a landscape.

© Henrik Sjöman





Left: The simple leaves flutter in the wind.

© Andrew Hirons

Right: The male catkins of *Populus tremula* emerge in late winter.

© Duncan Slater

Prunus 'Accolade' (Hybrid cherry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree to 8m.

An obovoid crown to 5m wide.

A moderately dense crown.

Natural habitat

Of garden origin, a hybrid between *Prunus sargentii* and *P.* x *subhirtella*. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Pink flowers held in small clusters appear in early spring. Highly ornamental.

LATE SUMMER

Small (1 cm diameter) drupe (cherry) fruits ripen and turn dark red in late summer. Generally, very few fruits.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning yellow.

Single-stemmed. Grey-brown bark, becoming rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are good for wildlife.
- Observed to have some tolerance to salt.

The tree and its features



Prunus 'Accolade' flowering in an urban planting bed.

© Henrik Sjöman



Prunus 'Accolade' flowers profusely in early spring.

© Henrik Sjöman

Prunus avium (Wild cherry)

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree that grows to 25m.

A globular to broad ovoid crown. Up to around 8m wide.

A moderately dense crown.

Natural habitat

Native to central Europe (including the British Isles) and western Asia. Found on the margins of temperate forests, up to 1900m. It can cause thickets via root suckers. *Prunus avium* enjoys deep, light, silty, nutrient-rich, mildly acidic soils but can adapt calcareous soils.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

White flowers in clusters of two to six appear in late spring with the emergence of new leaves. Highly attractive.

LATE SUMMER

Dark red drupes (cherries) ripen in late summer. Edible.

Deciduous broadleaved tree with simple leaves. In autumn the leaves turn red and yellow.

Single-stemmed in cultivation, occasionally multi-stemmed in the wild. Young stems have shiny brownish bark with prominent lenticels, in older stems the bark comes darker, rougher and develops fissures.

Issues to be aware of

Fruit litter may cause issues on paved surfaces – sterile cultivars mitigate this.

Notable varieties

Double-flowers	‘Plena’.
Sterile	‘Plena’.
Tasty fruits	‘Kordia’.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are excellent for birds.
- Observed to have some tolerance to air pollution. Can be considered for transport corridors if planted well away from the salt-spray zone.

The tree and its features



Prunus avium flowers in late spring, seen here in an urban plantation.

© Henrik Sjöman



The attractive white flowers are good for bees and other pollinating insects.

© Duncan Slater

Prunus cerasifera (Cherry plum)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Paved
Small garden
Transport corridor

Tree size and crown characteristics

<10M
A small tree that grows to 8m.
A globular crown. Up to around 5m wide.
A dense crown.

Natural habitat

Native to central Europe and western Asia. Found on the margins of temperate forests and gravelly slopes up to 2000m. It can cause thickets via root suckers. Can cope with a wide range of soil texture and pH, including calcareous, providing they are well drained.

Environmental tolerance

Partially tolerant to shade.
Tolerant to drought.
Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING
White or pink flowers appear in early spring generally before the emergence of new leaves. Highly attractive.
LATE SUMMER
Dark red drupes (cherries) ripen in late summer but are not prolific. Edible.

Deciduous broadleaved tree with simple leaves.

Single-stemmed in cultivation, occasionally multi-stemmed in the wild. Dark brown bark, roughening with age.

Issues to be aware of

If the true species is used, fruit litter can be a problem on paved sites, however, cultivars tend to fruit less. Root suckers may be a problem in some situations.

Notable varieties

Purple-leaved	‘Nigra’, ‘Pissardii’.
Narrow crown	‘Crimson Point’.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Very tolerant to heat.
- Flowers are good for bees and other pollinating insects.
- Fruits are excellent for birds.
- Observed to have some tolerance to salt.

The tree and its features



One of the first cherries to bloom in spring is *Prunus cerasifera* ‘Nigra’, seen here in a planting bed.
© Henrik Sjöman





Left: Pink flowers emerge with, or just before, the leaves. © Henrik Sjöman

Right: The red-purple leaves provide interest throughout the growing season.
© Andrew Hirons

Prunus domestica (Common plum)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree that grows to 10m.

A globular crown up to around 5m wide.

A moderately dense crown.

Natural habitat

Origins obscured by cultivation, most likely southern Europe. Can cope with a wide range of soil texture and pH, providing they are well drained.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

White flowers appear in early spring generally before the emergence of new leaves. Highly attractive.

LATE SUMMER

Dark red drupes (plums) ripen in late summer. Edible.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark brown bark, roughening with age.

Issues to be aware of

Fruit litter can be a problem on paved sites. Root suckers may be a problem in some situations.

Notable varieties

Damson	‘Hauszwetsche’.
Greengage	‘Reine-Claude d’Oullins’.
Plum	‘Victoria’.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are excellent for wildlife, if left.

The tree and its features



Left: *Prunus domestica* ‘Victoria’ growing amongst other orchard trees. © Andrew Hirons

Right: Simple leaves of *Prunus domestica*. © Andrew Hirons



This immature plum will ripen in late summer. © Andrew Hirons

Prunus dulcis (Almond)

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

<10M

A small tree that grows to 10m.

A globular crown up to around 5m wide.

A moderately dense crown.

Natural habitat

Origins obscured by cultivation, most likely southern Europe, western and central Asia. Can cope with a wide range of soil texture providing it is warm and well-drained.

Environmental tolerance

Estimated to be intolerant to shade.

Tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

White flowers, solitary or paired, appear in early spring before the emergence of new leaves. Highly attractive.

LATE SUMMER

Drupes with a leathery hull protecting a woody shell, within which is an edible seed (almond). They ripen in late summer, if at all (in the British Isles).

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Dark brown bark, roughening with age.

Issues to be aware of

Root suckers may be a problem in some situations.

Notable varieties

Double flowered	'Alba Plena'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Requires a warm microclimate and is tolerant of heat.
- Flowers are good for bees and other pollinating insects.
- Numerous pests and diseases affect *Prunus dulcis* so specify with caution.

The tree and its features



The attractive white flower of *Prunus dulcis* appears in early spring.

© Barcham Trees

Prunus fruticosa (Steppe cherry)

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

<10M

A small tree that grows to 2m but is often grafted onto a standard to provide a 'lollipop' tree up to 4m.

A small globular crown up to around 2.5m wide.

A moderately dense crown.

Natural habitat

Native to eastern Europe, Caucasia and Siberia. Naturally a shrub or small tree of steppe and forest-steppe zones, found on forest margins. Can cope with a wide range of soil texture providing it is warm and well-drained.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

White flowers in clusters of two to four appear in late spring. Not prolific but attractive.

LATE SUMMER

Small, deep red-purple drupe (cherry) fruits ripen by late summer. Edible but sour.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning red-orange.

Single-stemmed. Dark brown bark with prominent yellow lenticels, roughening with age.

Issues to be aware of

Root suckers may be a problem in some situations.

Notable varieties

Lollipop	'Globosa'.

Notes

- Also known as *Prunus* x *eminiens* 'Umbraculifera'.
- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are good for wildlife.
- Species is planted for soil stabilisation and habitat restoration.

The tree and its features



A mature *Prunus fruticosa* 'Globosa' maintains a small globular crown and flowers in late spring.

© Barcham Trees



A small group of *Prunus frucitcosa* 'Globosa' in a restricted urban planting bed. The compact form of this cultivar makes it useful for relatively small planting sites.

© Henrik Sjöman

Prunus laurocerasus (Cherry laurel)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A shrub or small tree up to 8m in height.

A globular crown, becoming quite broad, to 5m.

A dense crown.

Natural habitat

Native to forests of the Caucasus and Balkan peninsula. Found as an understorey shrub or small tree. Adaptable to a wide range of soils, including calcareous.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Upright flower spikes containing numerous individual flowers appear in late spring.

EARLY AUTUMN

Clusters of small drupe (cherry) fruits turning black in early autumn when ripe. Inedible.

Evergreen broadleaved tree with simple, glossy leaves.

Multi-stemmed and single-stemmed (if buying the tree forms). Grey bark, relatively smooth but roughening with age.

Issues to be aware of

Leaves, fruits and seeds are poisonous, containing hydrogen-cyanide. This species is vigorous and potentially invasive. Be careful not to plant close to other shrubs, as it is likely to rapidly dominate them.

Notable varieties

Rounded shrub form	'Rotundifolia'.
Tree form	'Novita', 'Magnoliifolia'.
Large leaves	'Magnoliifolia'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Good for bees and other insects.
- Very useful for screening.
- Will take very hard pruning.

The tree and its features



Often more shrubby than tree-like, but *Prunus laurocerasus* is useful for screening and very robust. © Duncan Slater





Left: *Prunus laurocerasus* is an evergreen broadleaved tree with glossy leaves. © Andrew Hirons

Right: The upright flower spikes of *Prunus laurocerasus* appear in late spring but are not exceptional, compared to other trees flowering at that time. © Duncan Slater

Prunus lusitanica (Portugal laurel)

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

10-15M

A medium tree up to 15m in height.

A globular to broad ovoid crown.

A dense crown.

Natural habitat

Native to the Iberian Peninsula. Found in the understorey or forest margins. Adaptable to a wide range of soils, including calcareous, providing they fertile and well drained.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Upright flower spikes containing numerous individual flowers appear in early summer.

EARLY AUTUMN

Clusters of small drupe (cherry) fruits turning black in early autumn when ripe. Inedible.

Evergreen broadleaved tree with simple, glossy leaves.

Multi-stemmed and single-stemmed (if buying the tree forms). Grey bark, relatively smooth but roughening with age.

Issues to be aware of

This species is potentially invasive.

Notable varieties

Small, narrow leaves	'Angustifolia'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Good for bees and other insects.
- Very useful for screening.
- Will take very hard pruning but is susceptible to silver leaf disease (*Chondrostereum purpureum*).

The tree and its features



A globular crown of a mature *Prunus lusitanica* provides deep shade.

© Duncan Slater



Prunus lusitanica has attractive, drooping flower spikes that appear in early summer. These are accentuated by the dark evergreen foliage.

© Andrew Hirons

Prunus maackii (Manchurian cherry)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree to 12m.

An ovoid crown form.

A moderately dense crown.

Natural habitat

Native to Manchuria, the Korean peninsular and eastern Russia. Found in the understorey of fairly open forests on mid-elevation slopes, 500-600m. Adaptable to a range of soil types, providing they are well drained.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Small, upright clusters of flowers appear in late spring. They tend not to be abundant. Fragrant.

LATE SUMMER

Small (about 5mm in diameter) drupe (cherry) fruit ripen in late summer, turning black.

Deciduous broadleaved tree with simple leaves.

Single- and multi-stemmed tree. Very attractive amber to bronze peeling bark.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Good bark	'Amber Beauty'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Seed propagated trees are very variable in terms of bark colour so use of known cultivar is essential.
- Very cold-hardy.

The tree and its features



Prunus maackii is an attractive medium tree with a range of seasonal interest, including good autumn colour. © Henrik Sjöman





Left: The amber-bronze, peeling bark of *Prunus maackii* provides year-round interest. © Henrik Sjöman

Right: Small, upright clusters of flowers add interest in late spring, but are often not abundant and are somewhat hidden by the new foliage. © Henrik Sjöman

Prunus 'Okame' (Hybrid cherry)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree to 8m.

<10M

An obovoid crown to 5m wide.

A moderately dense crown.

Natural habitat

Of garden origin, a hybrid between *Prunus campanulata* and *P. incisa*. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Pink flowers held in small clusters appear in early spring. Highly ornamental.

EARLY SPRING

Sterile, no fruit.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning orange-red.

Single-stemmed. Grey-brown bark, becoming rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are good for wildlife.

The tree and its features



Prunus 'Okame' is spectacular in early spring.

© Barcham Trees



The pink flowers are prolific in early spring. However, they are also sterile so no fruit is produced, removing issues relating to fruit-fall later in the year.

© Barcham Trees

Prunus padus (Bird cherry)

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree that grows to 18m.

An ovoid crown. Up to around 6m wide.

A moderately dense crown.

Natural habitat

Native to central Europe (including the British Isles), and temperate Asia. Found on floodplains and the margins of moist temperate forests up to 2000m. Enjoys deep, nutrient-rich, mildly acidic soils but can adapt calcareous soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

White flowers in drooping spikes appear in late spring. Highly ornamental.

LATE SUMMER

Black drupes (cherries) 5-7mm in diameter ripen in late summer. Inedible.

Deciduous broadleaved tree with simple leaves.

Single-stemmed in cultivation, occasionally multi-stemmed in the wild. Grey-brown relatively smooth bark.

Issues to be aware of

Fruit litter may cause issues on paved surfaces. Root suckers can often be a problem.

Notable varieties

Pyramidal	‘Albertii’.
Large flower spikes	‘Watererii’.
Compact	‘Nana’, ‘Colorata’.
Reddish leaves	‘Colorata’.

Notes

- The most waterlogging tolerant Prunus in this guide.
- Flowers are good for bees and other pollinating insects.
- Fruits are excellent for birds.

The tree and its features



A recently established *Prunus padus* in full flower.
© Henrik Sjöman



Drooping spikes of white flowers emerge in late spring and are excellent for bees and other pollinating insects.
© Henrik Sjöman

Prunus ‘Pandora’ (Hybrid cherry)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree to 6m. <10M

An obovoid crown to 5m wide.

A moderately dense crown.

Natural habitat

Of garden origin, a hybrid between *Prunus pendula* f. *ascendens* ‘Rosea’ and *P.* x *yedoensis*. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Pink flowers held in small clusters appear in early spring before the emergence of leaves. Highly ornamental. EARLY SPRING

Small (1cm diameter) drupe (cherry) fruits ripen and turn red in late summer. Generally, very few fruits. LATE SUMMER

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning orange-red.

Single-stemmed. Grey-brown bark, becoming rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are good for wildlife.

The tree and its features



A semi-mature *Prunus* ‘Pandora’ in full bloom in a park situation.
© Henrik Sjöman





Left: Light pink flowers appear in small clusters in early spring. © Barcham Trees

Right: *Prunus* ‘Pandora’ has good autumn colour with leaves turning orange-red.
© Duncan Slater

Prunus sargentii (Sargent's cherry)

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

10-15M

A large tree to 20m in the wild, typically around 12m in cultivation.

A globular to obovoid crown form.

A moderately dense crown.

Natural habitat

Native to the mountains of northern Japan and the Korean peninsula. Found in the foothills and on steep, open slopes. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Profuse pink flowers held in small clusters appear in early spring before the emergence of leaves.

LATE SUMMER

Small (about 1cm diameter) drupe (cherry) ripening to black in late summer.

Deciduous broadleaved tree with simple leaves. Leaves emerge a bronze colour, turn green during summer and then provide an excellent autumn display with leaves turning red-orange.

Single- and multi-stemmed trees available. Smooth, somewhat glossy dark brown bark.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Species-type habit	'Charles Sargent'.
Narrow crown	'Rancho'.

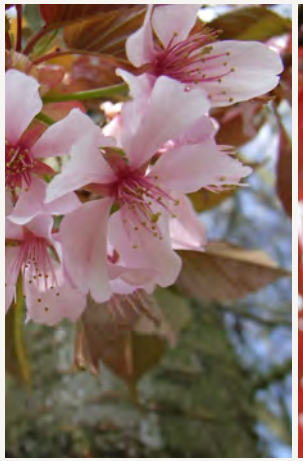
Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are excellent for birds.
- Observed to have some tolerance to salt.

The tree and its features



Prunus sargentii is one of the few cherries that are suitable for paved environments.
© Henrik Sjöman





Left: Pink flowers held in small clusters appear just before the leaves in early spring. © Duncan Slater

Right: *Prunus sargentii* is one of the few cherries that are suitable for paved environments.
© Henrik Sjöman

Prunus x *schmittii* (Hybrid cherry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

10-15M

A medium tree to 15m.

An obovoid crown to 4-5m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Prunus avium* and *P. canescens*. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Pink flowers held in small clusters appear in late spring as the leaves expand. Attractive.

Sterile, no fruit.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning yellow-orange.

Single-stemmed. Attractive glossy red-brown bark with prominent bands of lenticels.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The hybrid is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.

The tree and its features



Prunus x *schmittii* flowers in late spring. However, as the flowers are sterile, there is no fruit litter produced.

© Henrik Sjöman





Left: The bark, at least on younger trees, is an attractive glossy, brown colour with bands of lenticels.

© Barcham Trees

Right: Leaves of *Prunus* x *schmittii*.

© Barcham Trees

Prunus serrula (Tibetan cherry)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A medium tree to 15m in the wild but typically to around 8m in cultivation.

A globular crown.

A moderately dense crown.

Natural habitat

Native to mountain slopes of western China. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

White flowers held in small clusters appear in late spring as the leaves expand. Not abundant but attractive.

LATE SUMMER

Small (1cm diameter) drupe (cherry) fruits ripen and turn red in late summer.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning red.

Single- and multi-stemmed trees available. Striking copper-bronze shiny, peeling bark with prominent bands of lenticels.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Species-type habit	'Tibetica'.
Excellent bark	'Dorothy Clive'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are excellent for birds.
- Quality of the bark may deteriorate as the tree matures but it is still very worthwhile.

The tree and its features



A semi-mature *Prunus serrula* in a park situation.
© Duncan Slater





Left: Beautiful copper-bronze bark featuring prominent lenticels gives *Prunus serrula* year-round interest.
© Barcham Trees

Right: Small clusters of white flowers appear as the leaves expand in late spring. © Barcham Trees

Prunus serrulata (Japanese cherry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

A medium tree to 12m.

10-15M

Typically a globular to obovoid crown form but highly dependant on cultivar.

A moderately dense crown.

Natural habitat

Of garden origin, predominantly within Japan. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated. They do not stand up well to hard surfaces and are sensitive to exposed, windy sites.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

White, pink or yellow flowers held in small clusters appear in late spring as the leaves expand. Highly ornamental.

LATE SPRING

Mostly sterile, seldom fruiting.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning red.

Single- and multi-stemmed trees available. Fairly smooth brown bark, becoming rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

White flowered	‘Jo-nioi’, ‘Tai Haku’, ‘Sunset Boulevard’ (pink edges).
Pink flowered	‘Fugenzo’, ‘Hokusai’, ‘Kanzan’, ‘Pink Perfection’, ‘Red Burgundy’, ‘Shogetsu’.
Yellow flowered	‘Ukon’.
Upright	‘Amanogawa’.
Gently weeping	‘Shirotae’ (white flowered).
Red leaved	‘Red Burgundy’.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- As so many cultivars of Japanese flowering cherries exist, for the fine details of form and flower, it is best to talk to your nursery.

The tree and its features



Prunus serrulata cultivars are all of garden origin and spectacular in late spring when they flower profusely.

© Andrew Hirons



Prunus serrulata ‘Kanzan’ has spectacular pink flowers in late spring.

© Andrew Hirons

Prunus x *subhirtella* (Hybrid cherry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

A medium tree to 15m.

10-15M

An obovoid crown to 5m wide.

A moderately dense crown.

Natural habitat

A hybrid between *Prunus incisa* and *P. pendula*. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Pink flowers held in small clusters appear in early spring. Some cultivars flower through winter. Attractive.

Sterile, no fruit.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning red-orange.

Single-stemmed. Dark brown bark, unexceptional.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Spring flowering	‘Fukubana’.
Winter flowering	‘Autumnalis’, ‘Autumnalis Rosea’.

Notes

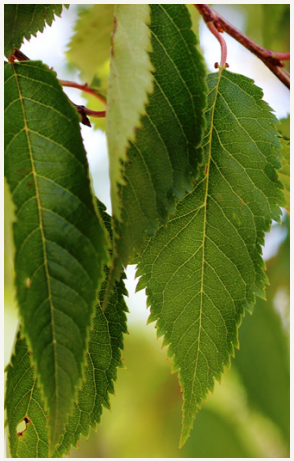
- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- One of the few options if you want flowers in winter.

The tree and its features



Prunus x *subhirtella* in full flower. This hybrid has spring and winter flowering cultivars.
© Henrik Sjöman





Left: *Prunus* x *subhirtella* ‘Autumnalis Rosea’ flowers during late winter.
© Barcham Trees

Right: *Prunus* x *subhirtella* leaves emerge after the flowers. © Barcham Trees

Prunus 'Umineko' (Hybrid cherry)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree to 8m.

<10M

A narrow obovoid crown when young but can spread to about 5m at maturity.

A moderately dense crown.

Natural habitat

Of garden origin, a hybrid between *Prunus incisa* and *P. speciosa*. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

White flowers held in small clusters appear in early spring with the leaves. Highly ornamental.

EARLY SPRING

Sterile, no fruit.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning reddish-purple.

Single-stemmed. Grey-brown smooth bark, becoming slightly rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Not applicable: a single cultivar profile.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.

The tree and its features



A young *Prunus* 'Umineko' has small cluster of white flowers in early spring.

© Henrik Sjöman

Prunus x *yedoensis* (Yoshino cherry)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree to 15m.

An obovoid crown to 8m wide.

A moderately dense crown.

Natural habitat

Of garden origin, thought to be a hybrid between *Prunus* x *subhirtella* and *P. speciosa*. Prefers well aerated, humus rich, mildly acid soils. However, adaptable to a wide range of soils, including calcareous, providing they are well aerated.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Bluish-white flowers held in small clusters appear in early spring. Highly ornamental.

LATE SUMMER

Small (1cm diameter) drupe (cherry) fruits ripen and turn black in late summer.

Deciduous broadleaved tree with simple leaves. Good autumn colour with leaves turning yellow.

Single-stemmed. Grey-brown bark, becoming rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Broad weeping	'Ivensii', 'Shidare-yoshino'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Flowers are good for bees and other pollinating insects.
- Fruits are good for wildlife.

The tree and its features



The attractive form of this *Prunus* x *yedoensis* makes an excellent choice for this enclosed garden.

© Barcham Trees



Prunus x *yedoensis* flowers prolifically with small clusters of blueish-white flowers in early spring.

© Barcham Trees

Pseudotsuga menziesii (Douglas fir)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching over 100m in favourable conditions. Usually smaller but still massive in cultivation.

A conical crown that gets about 10m wide at maturity.

A dense crown.

Natural habitat

Native to the western North America. Predominantly occurring at low to mid elevations, 0-2800m across a range of habitats. An important component of temperate rainforest in the pacific northwest but also found in riparian corridors in drier regions further south and at alpine timberlines. A pioneer tree after fire, but also found in mid- and late-successional stages. Adaptable to a wide range of soil types providing they are moist and well-drained.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (strobili) are found separately on the same trees. Inconspicuous. Peak pollination usually occurs in early spring.

LATE AUTUMN

Seed cones open in late autumn and persist into winter. Attractive but not highly ornamental.

Evergreen conifer with needle leaves.

Single-stemmed. Bark is brown to dark grey, becoming platy and deeply fissured with reddish-brown ridges at maturity.

Issues to be aware of

Potentially a very large tree.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- A very important timber tree but has potential as an amenity in park environments.
- One of the few evergreen conifers that readily establishes and grows rapidly while young.
- A great Christmas tree when young.

The tree and its features





Left: *Pseudotsuga menziesii* is an attractive conifer, but has the potential to become very large. © Duncan Slater

Right: The needle leaves of *Pseudotsuga menziesii*. © Andrew Hirons





Left: The bark of *Pseudotsuga menziesii* is quite variable, often becoming deeply fissured. © Duncan Slater

Right: The male 'flowers' of *Pseudotsuga menziesii* release their pollen in early spring. © Duncan Slater

Pterocarya fraxinifolia (Caucasian wing-nut)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m in its natural habitat.

A potentially very broad spreading globular crown that can get as wide as it is tall.

A dense crown.

Natural habitat

Native to western Asia, particularly the Caucasus and northern Iran. Found in wooded lowlands, wet meadows, riparian corridors and mountain slopes, up to 1000m. Requires fertile, moist, mineral soils but can cope with a range of soil pH, providing it is not too extreme.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Pendulous male and female catkins found separately on the same tree. Attractive but relatively inconspicuous.

LATE SUMMER

Long (about 40cm) pendulous fruiting catkins holding a series of nutlets with two semi-circular wings become prominent in late summer. Attractive.

Deciduous broadleaved tree with large pinnate leaves.

Generally single-stemmed in cultivation, but often appears multi-stemmed as a result of numerous root suckers. Deeply fissured, rough bark at maturity.

Issues to be aware of

This species produces numerous root suckers; this may be an issue in some situations.
Also a potentially very large, broad-spreading tree.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Very fast growing once established.
- One of the few temperate trees with naked buds.

The tree and its features



A mature *Pterocarya fraxinifolia* in a park situation.
© Andrew Hirons





Left: Large, pinnate leaves of *Pterocarya fraxinifolia*.
© Andrew Hirons

Right: Long pendulous fruiting catkins can be seen through much of summer and make an interesting feature. © Andrew Hirons

Pterocarya stenoptera (Chinese wing-nut)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m in its natural habitat.

A globular to ovoid crown.

A dense crown.

Natural habitat

Native to China, Taiwan, Japan and the Korean peninsula. Found on in moist woodlands, riparian corridors and mountain slopes, up to 1500m. Requires fertile, moist, mineral soils but can cope with a range of soil pH, providing it is not too extreme.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Pendulous male and female catkins found separately on the same tree. Attractive but relatively inconspicuous.

LATE SUMMER

Long (about 20cm) pendulous fruiting catkins holding a series of nutlets with two forward-pointing wings become prominent in late summer. Attractive and persistent into winter.

Deciduous broadleaved tree with large pinnate leaves.

Single-stemmed. Deeply fissured, rough bark at maturity.

Issues to be aware of

This species may produce root suckers when severely stressed but this is much less of a problem than with *P. fraxinifolia*.

Notable varieties

Cut leaf	'Fern Leaf'.

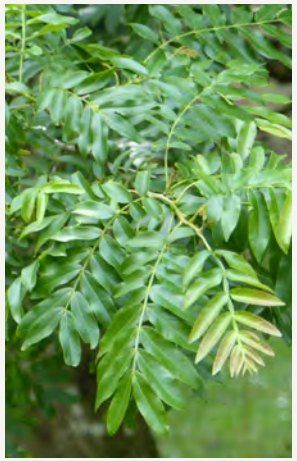
Notes

– Very fast growing once established.

The tree and its features



A mature *Pterocarya stenoptera* growing in a park situation. Root suckers are rarely a problem with this species.
© Andrew Hirons





Left: Large, pinnate leaves of *Pterocarya stenoptera*.
© Andrew Hirons

Right: Long pendulous fruiting catkins can be seen for much of the summer and are an attractive feature of *Pterocarya stenoptera*. © Andrew Hirons

Pyrus calleryana (Callery pear)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Small garden | Coastal | Transport corridor

Tree size and crown characteristics

10-15M

A medium tree capable of growing to 15m.

An ovoid crown, typically less than 8m in width.

A dense crown.

Natural habitat

Native to China, Japan and Vietnam. Found on slopes, plains, forest margins and thickets; 100-1800m. Adaptable to a wide range of mineral soils, preferring calcareous soils but will tolerate a range of soil pH, providing it is not too extreme.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of white flowers appear in late spring. These are very attractive but smell unpleasant.

EARLY AUTUMN

Small (1cm diameter) round pome fruits ripen by early autumn. Many cultivars are sparsely fruiting.

Deciduous broadleaved tree with simple, glossy leaves. Excellent red autumn colour.

Single-stemmed. Grey-brown bark roughens and becomes slightly flaky with age. The species type has some thorns on twigs and branches; these are absent in many cultivars.

Issues to be aware of

This species smells rather unpleasant at flowering. Thorns may be a problem on some cultivars however most are thorn-less.

Notable varieties

Species-type habit	‘Aristocrat’.
Narrow conical	‘Chanticleer’.
Strongly upright	‘Capital’.
Excellent autumn colour	‘Autumn Blaze’, ‘Redspire’.

Notes

- Observed to have some tolerance to salt and air pollution.
- The widely available cultivar ‘Bradford’ should be avoided because it has weak wood and is prone to biomechanical failure.
- A versatile but perhaps overused tree.

The tree and its features

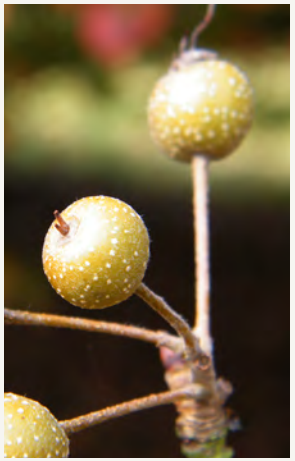




Left: *Pyrus calleryana* ‘Chanticleer’ is a proven tree for paved environments. © Henrik Sjöman

Right: The narrowly conical form of *Pyrus calleryana* ‘Chanticleer’ make it a useful urban tree. © Henrik Sjöman





Left: *Pyrus calleryana* has clusters of white flowers that look attractive but smell unpleasant. © Duncan Slater

Right: Pome fruits of *Pyrus calleryana* are rarely problematic.
© Duncan Slater

Pyrus communis (Common pear)

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

10-15M

A medium tree capable of growing to 15m.

An ovoid crown, typically less than 8m in width.

A dense crown.

Natural habitat

Pyrus communis is of unclear origin, probably a hybrid of *Pyrus nivalis* and *P. cordata*. Naturalised across much of Europe, including the British Isles. Adaptable to a wide range of mineral soils, preferring calcareous soils but will tolerate a range of soil pH, providing it is not too extreme.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of white flowers appear in late spring. These are very attractive but smell unpleasant.

LATE AUTUMN

Pear-shaped pome fruits, about 5cm in length, ripen by late autumn. Edible, but generally not that tasty.

Deciduous broadleaved tree with simple, glossy leaves. Good autumn colour, with shades of red and orange.

Single-stemmed. Dark grey-brown bark roughens and becomes blocky with age.

Issues to be aware of

Fruit litter may be a problem on paved sites.

Notable varieties

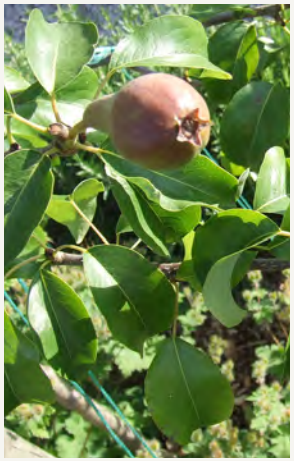
Narrow conical	'Beech Hill'.
Larger sub-species	subsp. *caucasia*.
Good fruit	'Conference'.

The tree and its features



Pyrus communis flowering in late spring.
© Henrik Sjöman





Left: *Pyrus communis* has clusters of small, white, unpleasant smelling, flowers that appear in late spring.
© Henrik Sjöman

Right: Immature fruit of *Pyrus communis*. This will mature by late autumn. © Duncan Slater

Pyrus salicifolia (Willow-leaved pear)

Use potential

Park

Small garden

Coastal

Tree size and crown characteristics

<10M

A small tree capable of growing to 8m.

A weeping crown, typically less than 5m in width.

A dense crown.

Natural habitat

Native to western Asia and Russia. Found on steppe margins. Adaptable to a wide range of mineral soils, preferring calcareous soils but will tolerate a range of soil pH, providing it is not too extreme.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Clusters of white flowers appear in late spring with the emergence of the leaves. Attractive.

LATE AUTUMN

Pear-shaped pome fruits, about 3cm in length, ripen by late autumn. Of little value and barely edible.

Deciduous broadleaved tree with simple leaves. Silvery-grey leaf hairs cover both sides of the young leaves but are lost on the upper side as the leaves mature. Highly ornamental.

Single-stemmed. Dark grey-brown bark roughens and becomes blocky with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Weeping	‘Pendula’.

Notes

- Needs intensive training in the nursery if this species is to become a ‘tree’.
- Usually only available as the ‘Pendula’ cultivar. This is only marginally different from the species-type habit, but is more strongly weeping.

The tree and its features



Pyrus salicifolia is an attractive, small, weeping tree.

© Henrik Sjöman





Left: The willow-like leaves of *Pyrus salicifolia*.

© Andrew Hirons

Right: *Pyrus salicifolia* has clusters of small, white flowers that appear in late spring.

© Duncan Slater

Quercus acutissima (Sawtooth oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Paved
Small garden
Transport corridor

Tree size and crown characteristics

10-15M

A large tree capable of growing to 20m in its native environment, typically less than 15m in the British Isles.

A broad ovoid crown getting up to around 10m wide.

A dense crown.

Natural habitat

Native to temperate and warm-temperate parts of Japan, China, the Korean peninsula, northern Thailand, northern Vietnam and the Himalaya region. An early successional oak, capable of acting as a pioneer as well as forming a forest canopy between 100-2200m. Prefers mildly acid to neutral soil.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Not known to fruit substantially in the British Isles. In its native region, acorns mature in the early autumn of the year following pollination.

Deciduous broadleaved tree with simple leaves. A yellow-brown autumn colour with leaves on young trees the leaves often persisting into winter.

Single-stemmed. Brown-grey bark becomes fissured and rough with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Well suited to street environments as it has moderate tolerance to drought and some salt tolerance but requires space as it can become quite broad with age.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The simple leaves of *Quercus acutissima*. This oak promises to be useful for a range of situations in future environments.

© Andrew Hirons

Quercus bicolor (Swamp white oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS | Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of growing to 38m in its native environment, typically less than 20m in the British Isles.

A broad ovoid to globular crown capable of getting as wide as it is tall.

A moderately dense crown.

Natural habitat

Native to moist temperate forests of the north-eastern United States of America, occasional populations southeastern Canada. Found in moist, poorly drained soils, often on the fringes of swamps. Also capable of growing on moist slopes and uplands to 1000m. Prefers mildly acid to neutral soil. Can cope well with soil pans and compaction.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

LATE AUTUMN

Not known to fruit substantially in the British Isles. In its native region, acorns mature by late autumn.

Deciduous broadleaved tree with simple leaves. Characterised by the difference in colour between the upper (green) and the lower (much paler grey-green) leaf surfaces – hence *bicolor*. A good crimson autumn colour.

Single-stemmed. Dark grey bark becomes fissured and shaggy with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Upright hybrid	'Regal Prince' (*Q. bicolor* x *Q. robur* 'Fastigiata').

Notes

- Well suited to urban environments as it has moderate tolerance to drought and waterlogging, good tolerance to soil compaction and some salt tolerance.
- Requires space as it can become quite broad with age; 'Regal Prince' a good choice for smaller spaces.
- Capable of rooting quite deeply.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A stand of *Quercus bicolor* in an urban park. These trees will also look great in autumn.

© Henrik Sjöman



The leaves of *Quercus bicolor*. The have a much paler underside of the leaf, hence the name.

© Andrew Hirons

Quercus x *bimondorum* (Hybrid oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

10-15M

A medium tree capable of growing to 15m.

A columnar crown when young, becoming more ovoid with age. To about 5m wide.

A dense crown.

Natural habitat

A hybrid between *Quercus alba* and *Q. robur*. Adaptable to a wide range of soils, including calcareous soils, providing they are not too heavy.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

LATE AUTUMN

Acorns mature by late autumn.

Deciduous broadleaved tree with simple leaves. A good crimson autumn colour, inherited from *Quercus alba*.

Single-stemmed. Light brown bark becoming fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Hybrid type	'Crimschmidt' (Syn 'Crimson Spire').

Notes

- Observed to have some tolerance to salt and air pollution.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Quercus x *bimondorum* 'Crimschmidt' has excellent potential as urban tree. It has a good columnar form and provides excellent autumn colour.

© J. Frank Schmidt & Son Co.

Quercus castaneifolia (Chestnut-leaved oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of growing to 30m.

A globular crown. In open parkland it is capable of getting almost as wide as it is tall.

A dense crown.

Natural habitat

Native to western Asia, particularly the Caucasus region. Found on plateaus and warm, sunny mountain slopes up to about 1500m. Found on well-drained, relatively deep, mildly acidic and calcareous soils. Prefers a warm microclimate.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn of the year following pollination.

Deciduous broadleaved tree with simple leaves bearing a resemblance to *Castanea sativa* – hence the name *castaneifolia*.

Single-stemmed. Light brown bark becoming fissured with age.

Issues to be aware of

Capable of becoming a very large tree so this species needs space to grow.

Notable varieties

Broad columnar to ovoid	'Green Spire'.

Notes

- Observed to have some tolerance to salt and air pollution.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A mature *Quercus castaneifolia* with a fantastic globular crown.

© Andrew Hirons



The attractive chestnut-like leaves of *Quercus castaneifolia*.

© Andrew Hirons

Quercus cerris (Turkey oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

>25M — A massive tree capable of growing to 35m.

A globular crown. In open parkland it is capable of getting almost as wide as it is tall.

A moderately dense crown.

Natural habitat

Native to warm-temperate forests of southern Europe and western Asia, including coastal sites. A pioneer oak, capable of colonising open ground as well as forming a part of a forest canopy, up to 2000m in warm regions. Found on well-drained, mildly acidic and calcareous soils. Prefers a warm microclimate.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING — Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN — Acorns mature by early autumn of the year following pollination.

Deciduous broadleaved tree with simple leaves. A yellow-brown autumn colour, but not spectacular.

Single-stemmed. Dark grey bark becoming fissured with age.

Issues to be aware of

Capable of becoming a very large tree so this species needs space to grow. This is a host of the knopper gall (*Andricus quercuscalicis*) that can cause significant damage to the acorn crop of other oaks such as *Quercus robur*.

Notable varieties

Broad pyramidal	'Marvellous', 'Wodan'.
Variegated leaf	'Argenteovariegata'.
Cut leaf	'Summer Veil'.

Notes

- Observed to have some tolerance to salt and air pollution.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A group of semi-mature *Quercus cerris* in a small urban park.

© Henrik Sjöman



Left: Attractive autumnal leaves of *Quercus cerris*.

© Henrik Sjöman

Right: The acorn cups of *Quercus cerris* have a hairy appearance.

© Duncan Slater

Quercus coccinea (Scarlet oak)

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of growing to 30m. Typically closer to 20m in cultivation.

A globular crown, capable of getting almost as wide as it is tall in open environments.

A moderately dense crown.

Natural habitat

Native to eastern United States on well-drained slopes, dry uplands and ridges, often on low fertility, acid, shallow, rocky soils. Prefers warm microclimates.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn of the year following pollination.

Deciduous broadleaved tree with deeply lobed simple leaves. A brilliant scarlet colour that can last for 6-8 weeks. On young trees, leaves persist through winter.

Single-stemmed. Dark grey bark becoming fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Excellent autumn colour	'Splendens'.

Notes

- Observed to have some tolerance to salt and air pollution.
- Drought tolerance is at least partly derived from its ability to root deeply so where rooting depth is constrained it will not exhibit such good tolerance to drought.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

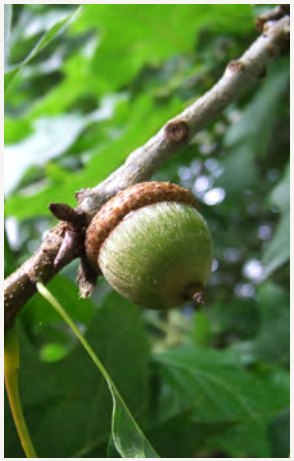
The tree and its features



Quercus coccinea requires a warm microclimate but can become a stately tree, as seen here in a park environment.

© Henrik Sjöman





Left: The scarlet autumn colours of *Quercus coccinea*.

© Henrik Sjöman

Right: Acorns of *Quercus coccinea* mature the year following pollination.

© Duncan Slater

Quercus frainetto (Hungarian oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of growing to 35m. Typically closer to 25m in cultivation.

A globular crown, capable of getting almost as wide as it is tall in open environments.

A moderately dense crown.

Natural habitat

Native to warm-temperate deciduous forests of southeastern Europe, particularly the Balkan Peninsula. Also found on wooded steppe margins. Found naturally on calcareous and mildly acidic soils, preferring loamy textures. Enjoys warm microclimates, especially in regions cooler than its natural range (such as the British Isles).

Environmental tolerance

Estimated to be moderately tolerant to shade.

Tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn the year of pollination. Only occasional crops of acorns produced on cultivated trees.

Deciduous broadleaved tree with very attractive lobed, simple leaves. Yellow-orange autumn colour.

Single-stemmed. Grey bark becoming fissured with age.

Issues to be aware of

Capable of becoming a very large tree so this species needs space to grow.

Notable varieties

Compact upright habit	'Hungarian Crown'.
Ovoid	'Forest Green', 'Trump'.

Notes

- Observed to have some tolerance to salt and air pollution.
- Drought tolerance is at least partly derived from its ability to root deeply so where rooting depth is constrained it will not exhibit such good tolerance to drought.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features





Left: The globular form of *Quercus frainetto* in a paved environment. © Henrik Sjöman

Right: The lobed leaves of *Quercus frainetto* are particularly attractive. © Henrik Sjöman





Left: Grey, fissured bark of *Quercus frainetto*. © Duncan Slater

Right: The acorns of *Quercus frainetto*. These are sparsely produced on most cultivated varieties. © Duncan Slater

Quercus x *hispanica* (Spanish oak)

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of growing to 30m.

A globular crown, capable of getting almost as wide as it is tall in open environments.

A moderately dense crown.

Natural habitat

A hybrid between *Quercus cerris* and *Q. suber*. Adaptable to a range of soil types providing they are well drained and not too organic. Reported to prefer calcareous soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn in the year following pollination.

An evergreen broadleaved tree with a semi-evergreen habit: immediately after new leaf emergence, old leaves fall. Leave longevity is essentially a year and a leafless period is not very apparent.

Single-stemmed. Thick dark-grey bark, becoming deeply fissured at maturity.

Issues to be aware of

Capable of becoming a very large tree so this species needs space to grow.

Notable varieties

Hybrid-type habit	‘Lucombeana’, ‘Fulhamensis’.
More upright	‘Wageningen’.
Compact	‘Waasland’.

Notes

- Observed to have some tolerance to salt and air pollution.
- Drought tolerance is at least partly derived from its ability to root deeply so where rooting depth is constrained it will not exhibit such good tolerance to drought.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The vast, globular crown of *Quercus* x *hispanica*.
© Barcham Trees





Left: *Quercus* x *hispanica* has thick, leathery leaves and a semi-evergreen habitat. © Barcham Trees

Right: The flowers (male shown) emerge in late spring, but are fairly inconspicuous.
© Duncan Slater

Quercus ilex (Holm oak)

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of growing to 25m.

A globular crown, capable of getting almost as wide as it is tall in open environments.

A dense crown.

Natural habitat

Native to the Mediterranean basin region and western Asia. Found in pure or mixed forest and is particularly well adapted for coastal sites. Adaptable to a wide range of soils, including calcareous, providing they are well drained and not too organic.

Environmental tolerance

Moderately tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn the year of pollination.

An evergreen broadleaved tree: older leaves are shed during early summer.

Single-stemmed. Thick dark-grey bark, becoming fissured and platy at maturity.

Issues to be aware of

Is considered to be invasive, particularly in warm-temperate regions.

Notable varieties

Upright	'Fordii'.

Notes

- Observed to have some tolerance to salt and air pollution.
- Drought tolerance is at least partly derived from its ability to root deeply so where rooting depth is constrained it will not exhibit such good tolerance to drought.
- It is also possible to use this species as a hedging plant.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A mature *Quercus ilex* provides deep shade with its dense, globular crown.
© Andrew Hirons





Left: *Quercus ilex* has evergreen leaves. Older leaves tend to be shed during early summer. © Andrew Hirons

Right: Acorns of *Quercus ilex* mature the autumn after pollination.
© Duncan Slater

Quercus palustris (Pin oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS | Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of growing to 25m.

A pyramidal crown when young, developing a broad, globular crown at maturity.

A moderately dense crown.

Natural habitat

Native to the eastern United States. It acts as a pioneer tree in lowland woods, riparian zones, swamp margins and poorly-drained uplands, to 1000m. Does well on a wide range of soil textures but requires acidic soil and will not perform well on calcareous soils.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn in the year following pollination.

Deciduous broadleaved tree with simple leaves. Excellent crimson-red autumn colour.

Single-stemmed. Grey-brown bark, smooth when young, developing shallow fissures with age.

Issues to be aware of

With age the lower lateral branches tend to hang down so crown lifting is often requires where clearance is necessary.

Notable varieties

Species-type habit	'Helmond', 'Woodside Splendor'.
Upright	'Green Pillar'.
Dwarf	'Green Dwarf', 'Swamp Pygmy'.
Broad weeping	'Pendula'.

Notes

- Observed to have some tolerance to salt and air pollution.
- Although this species is moderately tolerant to flooding, it is quite sensitive to prolonged periods of flooding during the growing season.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A young *Quercus palustris* growing in a park situation. They maintain a pyramidal crown for much of their development.

© Andrew Hirons





Left: Grey bark becomes more fissured with age.

© Duncan Slater

Right: *Quercus palustris* leaves are deeply lobed. They will display excellent autumn colours.

© Duncan Slater

Quercus petraea (Sessile oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

>25M — A massive tree capable of growing to 35m.

A globular to broad ovoid crown. Capable of becoming almost as wide as it is high.

A moderately dense crown.

Natural habitat

Native to Europe, including the British Isles, and western Asia. It has a broad distribution across a range of cool-temperate forests. Capable of tolerating nutrient-poor, rocky soils typical of upland sites. Requires well-drained, acid to neutral soils.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING — Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN — Acorns mature by early autumn the year of pollination.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Grey-brown bark, becoming fissured with age.

Issues to be aware of

Capable of becoming a very large tree on sites that are not too exposed and open, therefore requires lots of space.

Notable varieties

Entire (unlobed) leaves	'Mespilifolia'.

Notes

- Observed to have some tolerance to salt and air pollution.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The globular crown of a *Quercus petraea* in a park situation.

© Duncan Slater





Left: The leaves of *Quercus petraea*.

© Andrew Hirons

Right: The acorns of *Quercus petraea* mature the autumn after pollination.

© Duncan Slater

Quercus phellos (Willow oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | SuDS | Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of growing to 35m. Rarely above 20m in cultivation.

A pyramidal crown when young, developing an ovoid to globular crown at maturity. Potentially >10m in diameter.

A dense crown.

Natural habitat

Native to the eastern United States. Found in a range of habitats, principally in riparian zones, on floodplains and lowland woods, but also found on some poorly drained upland sites (up to 400m) that have strong seasonal variability in water availability. Does well on a wide range of soil textures but requires acidic soil and will not perform well on calcareous soils.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn in the year following pollination.

Deciduous broadleaved tree with simple, unlobed leaves. Deciduous in cool-temperate environments, in warmer regions this species is best described as semi-evergreen: immediately after new leaf emergence, old leaves fall. Occasionally a good yellow autumn colour is displayed.

Single-stemmed. Grey-brown bark, smooth when young, developing shallow fissures with age.

Issues to be aware of

Capable of becoming a very large tree so this species needs space to grow.

Notable varieties

Species-type habit	'Hightower'.

Notes

- Observed to have some tolerance to salt and air pollution.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Quercus phellos in a park situation. This species has potential to be used much more widely.
© Barcham Trees





Left: *Quercus phellos* make good street trees as cultivars tend to maintain a compact form. © Barcham Trees

Right: The willow-like leaves of *Quercus phellos*. Depending on the climate this species is either semi-evergreen or deciduous. © Barcham Trees

Quercus robur (Pedunculate oak)

Use potential

Park

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of growing to 35m.

A globular to broad ovoid crown. Capable of becoming almost as wide as it is high.

A moderately dense crown.

Natural habitat

Native to Europe, including the British Isles, and western Asia. It has a broad distribution across a range of lowland cool-temperate forests. Adaptable to a wide range of soils, providing they are acidic, nutrient-rich, not too organic and are reasonably well drained.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn the year of pollination.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Grey-brown bark, becoming fissured with age.

Issues to be aware of

Capable of becoming a very large tree on sites that are not too exposed and open, therefore, requires lots of space.

Notable varieties

Upright	‘Fastigiate Koster’.
Broadly weeping	‘Pendula’.
Yellow leaves	‘Concordia’.

Notes

- Observed to have some tolerance to salt and air pollution.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A majestic *Quercus robur* in a open-grown situation.
© Henrik Sjöman





Left: The rather inconspicuous flowers (male shown) of *Quercus robur* emerge with the new leaves.
© Duncan Slater

Right: The acorns of *Quercus robur* mature the autumn after pollination. © Duncan Slater

Quercus rubra (Red oak)

Use potential

Park

Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of growing to 35m. Rarely above 20m in cultivation.

A globular to broad ovoid crown at maturity. Potentially >10m in diameter.

A moderately dense crown.

Natural habitat

Native to the temperate deciduous forests of the eastern United States. Predominantly found in moist forest communities and moist slopes, up to 1800m. Does well on a wide range of soil textures but requires acidic or neutral soil with good soil depth and moderate to high fertility. Will not perform well on poorly drained (aerated) sites or calcareous soils.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn in the year following pollination.

Deciduous broadleaved tree with simple, lobed leaves. Very attractive red autumn colour occasionally it has a more yellow colour.

Single-stemmed. Grey-brown bark, smooth when young, developing shallow fissures with age.

Issues to be aware of

Capable of becoming a very large tree so this species needs space to grow.

Notable varieties

Yellow leaves	'Aurea', 'Magic Fire'.

Notes

- Observed to have some tolerance to salt and air pollution.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A large *Quercus rubra* growing in a park situation. This tree will look great as the leaves turn red in autumn.

© Andrew Hirons



The attractive lobed leaves of *Quercus rubra*.

© Andrew Hirons

Quercus suber (Cork oak)

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of growing to 18m.

An irregular crown.

A dense crown.

Natural habitat

Native to the Mediterranean basin. Found in open woodlands on slopes up to 1000m. Soil must be well drained and preferably acidic but it is adaptable to a range of soil texture. Requires a warm microclimate.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn the year of pollination.

Evergreen broadleaved tree with simple leaves. Leaf longevity is generally two to three years.

Single-stemmed. Attractive, thick, corky bark is deeply fissured at maturity.

Issues to be aware of

Will not perform well in the colder regions of the British Isles.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Observed to have some tolerance to salt and air pollution.
- Cork is traditionally harvested from this species.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

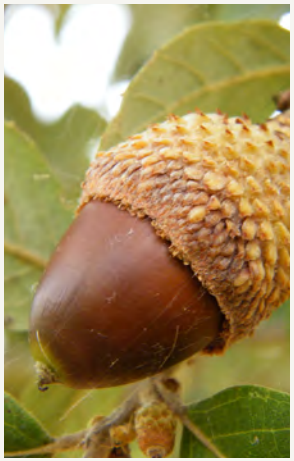
The tree and its features



A stand of *Quercus suber*, seen here growing in southern Spain. The lower portion of the bark has been harvested for its cork.

© Andrew Hirons





Left: The corky bark of *Quercus suber*.

© Duncan Slater

Right: Acorns of *Quercus suber* mature the autumn after pollination.

© Duncan Slater

Quercus x *turneri* (Turner's oak)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

10-15M

A medium tree capable of growing to 15m.

A globular crown.

A moderately dense crown.

Natural habitat

A hybrid between *Quercus ilex* and *Q. robur*. Requires good soil aeration but is adaptable to a range of soil textures.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers held separately on the same tree, emerging in late spring with the leaves. Female flowers are inconspicuous, male catkins are attractive but not prominent.

EARLY AUTUMN

Acorns mature by early autumn the year of pollination.

Evergreen broadleaved tree with simple leaves. This hybrid is best described as semi-evergreen: leaf longevity is essentially a year and a leafless period is neither very apparent nor very short. Leaf longevity is generally longer on the 'Pseudoturneri' type.

Single-stemmed. Grey-brown bark becomes fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Fully evergreen	'Pseudoturneri'.

Notes

- Observed to have some tolerance to salt and air pollution.
- *Quercus* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Quercus x *turneri* displaying its globular crown in a park situation.

© Andrew Hirons



Quercus x *turneri* is an evergreen to semi-evergreen oak with simple, lobed leaves.

© Andrew Hirons

Rhus typhina (Staghorn sumac)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Transport corridor

Tree size and crown characteristics

<10M

A medium tree capable of growing to 15m but generally <8m in cultivation.

A vase shaped crown form.

A moderately dense crown.

Natural habitat

Native to north-eastern United States and south eastern Canada. A pioneer of open ground and forest margins where it forms thickets, especially on sandy or rocky soils up to 1500m. Adaptable to a wide range of soil textures but prefers acid to neutral soil.

Environmental tolerance

Intolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Male and female flowers occur on separate trees (dioecious). Attractive upright clusters of flowers appear in early summer.

LATE SUMMER

Conical, crimson, fruit clusters mature in late summer and persist well into winter. Only occurring on the female plants but highly attractive and of value to wildlife.

Deciduous broadleaved tree with compound leaves. Excellent autumn colour is provided when leaves turn to red or orange.

Multi-stemmed individuals are more common but single-stemmed specimens are also available. Bark eventually becomes quite scaly but the real interest in the stems comes from the stout velvety twigs that resemble antlers, hence the name.

Issues to be aware of

The species produces root suckers so it should be planted where this characteristic will not be problematic.

Notable varieties

Cut leaves	'Dissecta', 'Laciniata'.

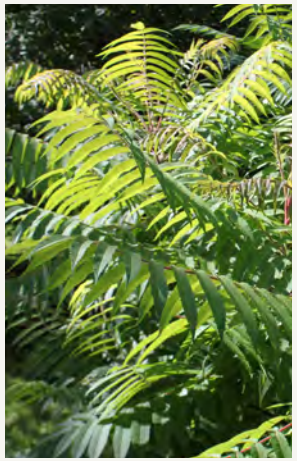
Notes

- Observed to have some tolerance to salt and air pollution.
- Individuals are quite short-lived (<50 years) but clonal colonies can live much longer.

The tree and its features



Rhus typhina growing in containers within a paved environment. The vase-shaped crowns suit this application well.
© Henrik Sjöman





Left: The pinnate leaves of *Rhus typhina* are attractive, especially in autumn. © Andrew Hirons

Right: *Rhus typhina* has upright clusters of flowers that appear in early summer.
© Andrew Hirons

Robinia pseudoacacia
(False acacia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching around 25m.

A vase shaped crown form.

An open crown.

Natural habitat

Native to the Appalachian mountains in the eastern United States. A pioneer tree found in forest margins and riparian corridors up to about 1000m. Adaptable to a wide range of soils, providing the pH is not extreme and it is well drained.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Fragrant, white or creamy flowers emerge in pendulous clusters in early summer. Highly ornamental.

EARLY AUTUMN

Seed pods mature in early autumn and persist into winter.

Deciduous broadleaved tree with pinnately compound leaves. In some years a good yellow autumn colour can be observed.

Single-stemmed. Grey bark that becomes deeply fissured and rough with age. Pairs of spines are associated with the leaves.

Issues to be aware of

Spines are found on this species but a number of cultivars lack spines so are preferable for many planting locations. Potentially invasive, particularly in warmer climates, as it produces prolific root suckers.

Notable varieties

Straight central trunk	‘Appalachia’.
Irregular to ovoid	‘Bessoniana’.
Upright	‘Pyramidalis’.
Compact round	‘Umbraculifera’.
Yellow leaves	‘Frisia’.
Big leaves	‘Unifoliola’.

Notes

- Highly variable if grown from seed, choose a cultivar if particular properties are desired.
- In cultivation is readily establishes and grows fast.
- *Robinia pseudoacacia* tends to have rather brittle wood: exposed windy sites are best avoided.
- ‘Bessoniana’, ‘Pyramidalis’ and ‘Umbraculifera’ are scarcely thormed.
- Observed to have some tolerance to salt and air pollution.

The tree and its features



The open crowns of *Robinia pseudoacacia* provide dappled shade for this lawn and veranda.
© Henrik Sjöman





Left: The pinnate leaves of *Robinia pseudoacacia*.
© Duncan Slater

Right: *Robinia pseudoacacia* has fragrant, pendulous clusters of white flowers that appear in early summer.
© Andrew Hirons

Salix alba (White willow)

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m.

An irregular crown.

An open crown.

Natural habitat

Native to much of Europe, temperate Asia and parts of north Africa. A pioneer species of riparian environments, commonly found growing along riverbanks. Is very adaptable to different soil types but does require moist conditions if it is going to perform well.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers (catkins) are held on separate trees (dioecious). They appear in late spring, are attractive but fairly inconspicuous.

EARLY SUMMER

Small capsule fruit ripens very quickly by early summer.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Some of the cultivars have highly ornamental coloured young stems. Mature bark is grey-brown and deeply fissured.

Issues to be aware of

Shallow rooting, especially in wet soil so consider this when selecting appropriate sites.
Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

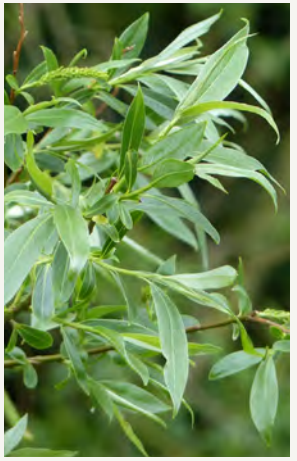
Scarlet stems	'Chermesina'.
Male (no fruits)	'Belders', 'Liempde'.

Notes

- Highly variable if grown from seed, choose a cultivar if particular properties are desired.
- Easy to establish and fast to grow.
- Female plants are good for bees and other pollinating insects.
- Can be very successfully maintained as a pollard, but this will require on-going maintenance commitments.
- *Salix* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features





Left: *Salix alba* is one of the larger willows.
© Duncan Slater

Right: The narrow leaves of *Salix alba*.
© Andrew Hirons





Left: *Salix alba* flowers (male shown) in late spring, but they are fairly inconspicuous amongst the new leaves.
© Duncan Slater

Right: The small capsule fruit ripens by early summer.
© Duncan Slater

Salix babylonica (Weeping willow)

Use potential

Park

Tree size and crown characteristics

A large tree capable of reaching 20m.

15-25M

A weeping crown.

An open crown.

Natural habitat

Native central and north China. A key riparian species, found growing along riverbanks. Very widely cultivated beyond its natural range. Is very adaptable to different soil types but does require moist conditions if it is going to perform well. A little sensitive to the cold, but suitable for southern parts of the British Isles.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

Male and female flowers (catkins) are held on separate trees (dioecious). They appear in late spring, are attractive but fairly inconspicuous.

LATE SPRING

Small capsule fruit ripens very quickly by early summer.

EARLY SUMMER

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Grey-brown bark is relatively smooth on younger stems but becomes deeply and irregularly fissured at maturity. The main ornamental feature of this tree is its graceful weeping form.

Issues to be aware of

Shallow rooting, especially in wet soil so consider this when selecting appropriate sites. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Twisted branches	'Tortuosa' (Syn *Salix matsudana* 'Tortuosa').

Notes

- Easy to establish and fast to grow.
- Female plants are good for bees and other pollinating insects.
- *Salix* x *sepulcralis* 'Chrysocoma' is less sensitive to the cold and generally makes a better 'weeping willow' in most parts of the British Isles.
- Tolerant of heat, providing it is in well watered conditions.
- *Salix* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The weeping crowns of *Salix babylonica* are especially attractive. This species will require a high quality rooting environment if they are to perform well in a paved environment (shown). © Henrik Sjöman



The flowers (female shown) of *Salix babylonica* appear in late spring but are fairly inconspicuous amongst the new foliage.
© Duncan Slater

Salix caprea (Goat willow)

Use potential

Park

Tree size and crown characteristics

<10M

A medium tree capable of reaching 15m, however, typically less than 10m.

An irregular rather bushy crown.

An open crown.

Natural habitat

Native to much of Europe (including the British Isles) and temperate Asia. A pioneer of disturbed sites, forest margins and meadows. Often found alongside roads. Prefers a well-drained soil but is highly adaptable with regards to soil type.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (catkins) are held on separate trees (dioecious). They appear in early spring before the leaves and are highly ornamental.

LATE SPRING

Small capsule fruit ripens very quickly by late spring.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Grey-brown bark becomes irregularly fissured with age.

Issues to be aware of

Seed dispersion can cause a minor annoyance but this is fairly short-lived. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Weeping	'Pendula'.
Large female flowers	'Mas'.

Notes

- Easy to establish and fast to grow.
- Although noted to be partially tolerant to shade, it performs best in full sun.
- Female plants are good for bees and other pollinating insects.
- *Salix* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A large open-grown *Salix caprea*. This species is a pioneer of disturbed sites and will readily establish.
© Henrik Sjöman





Left: The male catkins of *Salix caprea* are particularly attractive in early spring. © Henrik Sjöman

Right: Small capsule fruit ripens in late spring and releases downy seed.
© Andrew Hirons

Salix daphnoides (Violet willow)

Use potential

Park

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m.

An ovoid crown that gets to about 6m in diameter.

An open crown.

Natural habitat

Native to Europe. Most frequently associates with upland riparian corridors on alluvial soils, occasionally associated with lowland rivers. Requires moist soil but is adaptable to a wide range of soil types.

Environmental tolerance

Partially tolerant to shade.

Sensitive to drought.

Moderately tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (catkins) are held on separate trees (dioecious). They appear in early spring before the leaves and are highly ornamental.

LATE SPRING

Small capsule fruit ripens very quickly by late spring.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Young stems are a very attractive purple-violet with a white bloom. Mature bark is grey-brown and becomes irregularly fissured with age.

Issues to be aware of

Seed dispersion can cause a minor annoyance but this is fairly short-lived. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Male	'Aglaia'.

Notes

- Easy to establish and fast to grow.
- Female plants are good for bees and other pollinating insects.
- A good candidate for coppicing so that the attractive young stems are renewed.
- *Salix* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features





Left: A young *Salix daphnoides* in a park environment.
© Duncan Slater

Right: The simple, narrow leaves of *Salix daphnoidies*.
© Duncan Slater



The male catkins of *Salix daphnoides* are highly ornamental in early spring.
© Duncan Slater

Salix pentandra (Bay-leaved willow)

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree capable of reaching 18m.

A globular crown that can get to around 10m in diameter.

An open crown.

Natural habitat

Native to Europe, including the British Isles, and western Asia. Found around boggy areas, wet meadows and swampy valleys and other areas with high water tables up to the altitudinal treeline. Also found occasionally in lowland floodplains. Requires wet soil but is adaptable to a wide range of soil types.

Environmental tolerance

Intolerant to shade.

Sensitive to drought.

Tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers (catkins) are held on separate trees (dioecious). They appear in late spring before the leaves.

LATE SUMMER

Small capsule fruit ripens by late summer and are retained on the tree into winter.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Young stems are a very attractive purple-violet with a white bloom. Mature bark is grey-brown and becomes irregularly fissured with age.

Issues to be aware of

Not at all suitable for dry sites. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

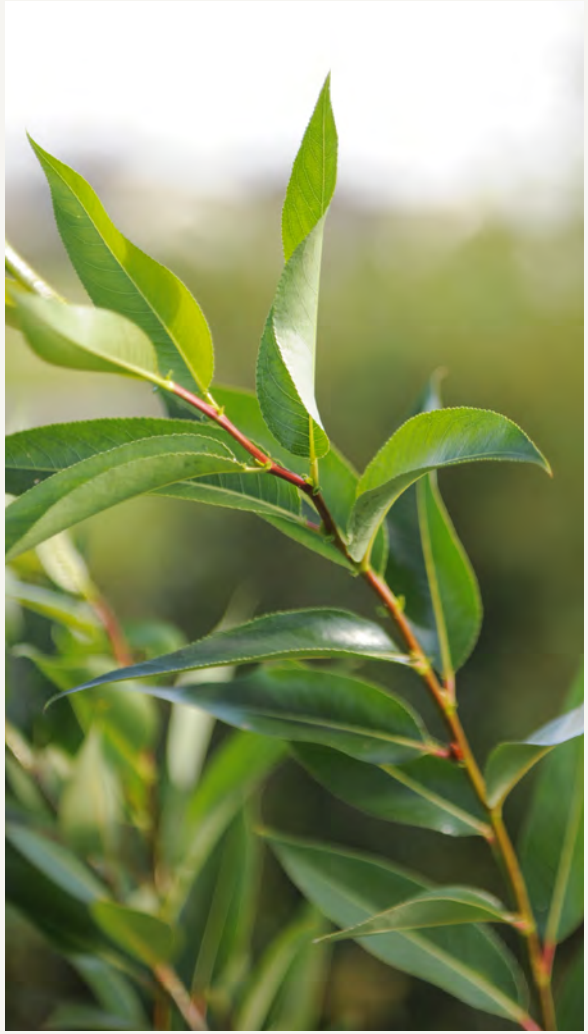
Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Easy to establish and fast to grow.
- Female plants are good for bees and other pollinating insects.
- High altitude individuals take on a shrub form.
- *Salix* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The leaves of *Salix pentandra*. This is a useful tree for wet soils.

© Henrik Sjöman

Salix x *sepulcralis* (Weeping willow)

Use potential

Park

Tree size and crown characteristics

A large tree capable of reaching 20m.

15-25M

A weeping crown.

An open crown.

Natural habitat

A hybrid between *Salix alba* var. *vitellina* and *S. babylonica*. Is very adaptable to different soil types but does require moist conditions if it is going to perform well.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be sensitive to drought.

Estimated to be moderately tolerant to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers (catkins) are held on separate trees (dioecious). They appear in late spring, are attractive but fairly inconspicuous.

EARLY SUMMER

Small capsule fruit ripens very quickly by early summer.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. The main ornamental feature of this tree is its graceful weeping form.

Issues to be aware of

Shallow rooting, especially in wet soil so consider this when selecting appropriate sites. Male trees release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Weeping	'Chrysocoma'.

Notes

- Easy to establish and fast to grow.
- Female plants are good for bees and other pollinating insects.
- Makes a better 'weeping willow' in most parts of the British Isles than *S. babylonica* as it is less sensitive to the cold.
- *Salix* spp. are also known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



The weeping form of *Salix* x *sepulcralis* is highly ornamental. In moist areas, it will establish and perform well.

© Duncan Slater



Left: Narrow, simple leaves of *Salix* x *sepulcralis*.

© Duncan Slater

Right: The flowers (female shown) of *Salix* x *sepulcralis* are inconspicuous amongst the new spring leaves.

© Duncan Slater

Sequoia sempervirens (Coastal redwood)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Coastal

Tree size and crown characteristics

>25M

A massive tree capable of reaching over 100m in its natural habitat, generally less than 50m in Europe.

A conical crown, relatively slender in relation to its height.

A dense crown.

Natural habitat

Native to coastal sites in northern California and southern Oregon on the west coast of the United States. Performs best on nutrient rich, deep, alluvial soils but is fairly adaptable to soil type providing shallow calcareous soils are avoided.

Environmental tolerance

Tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

Male and female reproductive parts are held separately and are of no ornamental merit.

Small (2-3cm) seed cones mature about a year after pollination. Of little ornamental merit.

Evergreen conifer tree with needle leaves.

Single-stemmed. Mature bark is reddish-brown, thick, roughly fibrous and relatively soft. Attractive, but not highly ornamental.

Issues to be aware of

A potentially massive tree.

Notable varieties

Blue-green leaves	'Winter Blue'.

Notes

– Once established this is a fast-growing tree.

The tree and its features





Left: The conical crown of *Sequoia sempervirens*.
© Henrik Sjöman

Right: A small seed cone of *Sequoia sempervirens*.
© Duncan Slater



In their native environment (shown), and elsewhere, *Sequoia sempervirens* can become massive. In fact, this species is currently the worlds tallest.
© Henrik Sjöman

Sequoiadendron giganteum
(Giant sequoia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching over 100m in its natural habitat, generally less than 50m in Europe.

A conical crown, relatively slender in relation to its height.

A dense crown.

Natural habitat

Native to California in the United States. A pioneer species that performs best on nutrient rich, deep, alluvial soils but is fairly adaptable to soil type.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

Male and female reproductive parts are held separately and are of no ornamental merit.

Small (2-3cm) seed cones mature about two years after pollination. Of little ornamental merit.

Evergreen conifer tree with needle leaves.

Single-stemmed. Mature bark is reddish-brown, thick, roughly fibrous and relatively soft. Attractive but not highly ornamental.

Issues to be aware of

A potentially massive tree.

Notable varieties

Blue-green leaves	‘Glaucum’.
Broadly weeping	‘Barabits Requiem’.

Notes

– Sensitive to salt and air pollution.

The tree and its features





Left: A mature *Sequoiadendron giganteum* in a forest. © Henrik Sjöman

Right: As young trees the crowns of *Sequoiadendron giganteum* are strongly conical. © Duncan Slater



The thick bark of *Sequoiadendron giganteum* has evolved to protect the tree from forest fires. © Henrik Sjöman

Sorbus aria (Whitebeam)

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

10-15M

A large tree capable of reaching 22m but much more typically less than 15m.

An ovoid crown that gets around 6m in diameter.

A moderately dense crown.

Natural habitat

Native to Europe, including the British Isles. Found predominantly on dry, calcareous soils around woodland margins, in open woodland and on mountain slopes to 1800m. Although it prefers calcareous soils, it is capable of growing quite well on acidic soils providing they are well drained and not dominated by clay.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Abundant convex clusters of white flowers appear in late spring. Highly ornamental.

LATE SUMMER

Clusters of red berries (pomes) ripen by late summer. Excellent for birds.

Deciduous broadleaved tree with simple leaves. The underside of the leaf is covered with white hairs adding interest during the summer.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Species-type	‘Magnifica’, ‘Majestica’.
Larger leaves	‘Gigantea’.
Silvery-white leaves	‘Lutescens’.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- The cultivar ‘Lutescens’ can suffer from early leaf drop.

The tree and its features



Sorbus aria is a slow-growing, drought tolerant native species with a range of ornamental features.

© Henrik Sjöman





Left: The leaves of *Sorbus aria*.

© Henrik Sjöman

Right: Convex clusters of white flowers cover *Sorbus aria* in late spring.

© Andrew Hirons

Sorbus x *arnoldiana* (Hybrid Sorbus)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m.

An ovoid crown that gets around 5m in diameter.

A moderately dense crown.

Natural habitat

A hybrid between *Sorbus aucuparia* and *S. discolor*. Prefers organic, acid soils, but also performs well on sandy soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Convex clusters of white flowers appear in late spring. Highly ornamental.

LATE SUMMER

Clusters of yellow berries (pomes) ripen by late summer.

Deciduous broadleaved tree with pinnate leaves. Generally an excellent yellow-orange-red autumn colour.

Single-stemmed. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Hybrid-type	‘Schouten’.
Pyramidal	‘Golden Wonder’.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.

The tree and its features



The hybrid *Sorbus* x *arnoldiana* has attractive clusters of yellow berries in late summer and autumn. The leaves also provide good autumn colour.

© Barcham Trees

Sorbus aucuparia (Rowan)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A large tree capable of reaching 22m but much more typically less than 15m.

An ovoid crown that gets around 6m in diameter.

A moderately dense crown.

Natural habitat

Native to Europe, including the British Isles, and temperate Asia as far east as the Kamchatka peninsular. A pioneer tree found scattered in woodlands, forest margins, mountain slopes and cliffs up to the treeline around 2000m. Found on a wide range of soils, from moderately acidic to calcareous, but generally preferring light, acid soils. Requires good soil aeration. Extremely tolerant of wind exposure.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Convex clusters of white flowers appear in late spring. Highly ornamental.

LATE SUMMER

Clusters of red berries (pomes) ripen by late summer. Excellent for birds and small mammals.

Deciduous broadleaved tree with pinnate leaves. Generally an excellent yellow-orange-red autumn colour.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Species-type	'Cardinal Royal', 'Sheerwater Seedling', 'Rossica Major'.
Cut leaves	'Asplenifolia'.
Larger leaves and fruit	'Edulis' (Syn var. *Edulis*).
Golden fruit	'Golden Wonder'.
Upright	'Fastigiata', 'Streetwise'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Sensitive to competition from turf-grass.
- Excellent for bees and other pollinating insects.

The tree and its features



The abundant red fruit of *Sorbus aucuparia* provides interest in late summer. It is also excellent for wildlife.
© Duncan Slater





Left: *Sorbus aucuparia* has highly ornamental convex clusters of white flowers in late spring.
© Andrew Hirons

Right: Clusters of red, berry-like fruit ripen in late summer. © Andrew Hirons

Sorbus cashmiriana (Kashmir rowan)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree capable of reaching 8m.

An irregular crown that gets around 4m in diameter.

A moderately dense crown.

Natural habitat

Native to the Himalaya region. Found in the subalpine zone on mountain slopes.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Convex clusters of light-pink flowers appear in late spring. Highly ornamental.

LATE SUMMER

Clusters of white berries (pomes) ripen by late summer. Excellent for birds and small mammals.

Deciduous broadleaved tree with pinnate leaves. Generally, a decent yellow-orange-red autumn colour.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.
- Reported to be vulnerable to fireblight (*Erwynia amylovora*).

The tree and its features



Sorbus cashmiriana has clusters of light pink flowers in late spring.

© Tim Baxter



Clusters of white berry-like fruit are very attractive as they ripen in late summer and persist into autumn.

© Barcham Trees

Sorbus commixta (Japanese rowan)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m.

An ovoid crown that gets around 4m in diameter.

A moderately dense crown.

Natural habitat

Native to China, Japan, Korea, the Kurile Islands and Sakhalin. Found in mountain woodlands.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Convex clusters of white flowers appear in late spring. Highly ornamental.

LATE SUMMER

Clusters of orange-red berries (pomes) ripen by late summer. Excellent for birds and small mammals.

Deciduous broadleaved tree with pinnate leaves. An excellent yellow-orange-red autumn colour.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Species-type	'Olympic Flame' (Syn 'Dodong'), 'Jermyns'.
Upright	'Embley'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.
- Easy to establish and fast growing as a young tree.

The tree and its features





Left: *Sorbus commixta* is a medium-sized tree for parks and small garden situations. © Duncan Slater

Right: A young *Sorbus commixta* showing spectacular colours in autumn. © Henrik Sjöman





Left: The pinnate leaves turn a fantastic yellow-red-orange in autumn. © Henrik Sjöman

Right: Clusters of orange-red berry-like fruit make *Sorbus commixta* useful for wildlife in late summer and autumn. © Duncan Slater

Sorbus discolor (Chinese rowan)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree capable of reaching 10m. <10M

An ovoid crown that gets around 5m in diameter.

A moderately dense crown.

Natural habitat

Native to China, found in mixed deciduous forests, predominantly on sunny south-facing slopes 1500-2000m. Prefers well-aerated, slightly acidic soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Pyramidal clusters of white flowers appear in late spring. Highly ornamental. LATE SPRING

Clusters of white berries (pomes) blushed with crimson ripen by late summer. LATE SUMMER

Deciduous broadleaved tree with pinnate leaves. Generally an excellent yellow-orange-red autumn colour.

Single-stemmed. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects. Syn *Sorbus pekinensis* and *S. hupehensis*.
- Fruits are very attractive for birds.

The tree and its features



Left: A mature *Sorbus discolor* in a park situation.
© Andrew Hirons

Right: Light shade of a woodland margin provides a good environment of this young *Sorbus discolor*. © Tim Baxter



Clusters of white berry-like fruit blushed with crimson ripen in late summer and are a distinctive feature of *Sorbus discolor*.
© Andrew Hirons

Sorbus intermedia
(Swedish whitebeam)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Small garden | Coastal | Transport corridor

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m.

An ovoid crown that gets around 6m in diameter.

A moderately dense crown.

Natural habitat

Native to the Baltic region of Europe, particularly southern Sweden. Naturalised in the British Isles and Ireland. Found in forest margins, in open woodland and on mountain slopes to around 1000m. Also found extensively on coastal sites. Although it prefers calcareous soils, it is capable of growing quite well on acidic soils providing they are well drained and not dominated by clay.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Abundant convex clusters of white flowers appear in late spring. Highly ornamental.

EARLY AUTUMN

Clusters of red berries (pomes) ripen by early autumn. Excellent for birds.

Deciduous broadleaved tree with simple, lobed leaves. The underside of the leaf is covered with white hairs adding interest during the summer. Leaves turn yellow in autumn.

Single-stemmed in cultivation but also found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Regular form	'Brouwers'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.
- Tolerant to salt and air pollution.

The tree and its features



Sorbus intermedia is suitable for a wide range of planting situations. Shown here as a roadside avenue.

© Henrik Sjöman





Left: Young leaves of *Sorbus intermedia*.

© Andrew Hirons

Right: Convex clusters of white flowers cover *Sorbus intermedia* in late spring and are highly ornamental.

© Andrew Hirons

Sorbus 'Joseph Rock' (Hybrid Sorbus)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 15m.

An ovoid crown that gets around 4m in diameter.

A moderately dense crown.

Natural habitat

A cultivar of obscure origin, now thought to be a hybrid of *Sorbus monbeigii* and *S. commixta*. Adaptable to a wide range of soil.

Environmental tolerance

Estimated to be partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Convex clusters of white flowers appear in late spring. Highly ornamental.

LATE SUMMER

Clusters of yellow berries (pomes) that fade to white with a pink flush around the calyx. They ripen by late summer. Excellent for wildlife.

Deciduous broadleaved tree with pinnate leaves. An excellent orange-red autumn colour.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Not applicable: a single cultivar profile.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.
- Reported to be very sensitive to bacterial fireblight (*Erwynia amylovora*). This is a particular problem in southern England.

The tree and its features



Sorbus 'Joseph Rock' is a useful medium tree for a range of situations. It has more drought tolerance than many other rowans.
© Duncan Slater





Left: The fine, pinnate foliage can be seen with clusters of yellow berry-like fruit in late summer. © Barcham Trees

Right: Yellow berry-like fruits help to distinguish *Sorbus* 'Joseph Rock' and are attractive in late summer and autumn. © Barcham Trees

Sorbus latifolia
(Broad-leaved whitebeam)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m.

An ovoid crown that gets around 6m in diameter.

A moderately dense crown.

Natural habitat

A naturally occurring hybrid between *Sorbus aria* and *S. torminalis*. Native to central Europe, naturalised in the British Isles. Found in open woodland. Adaptable to a wide range of soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Abundant convex clusters of white flowers appear in late spring. Highly ornamental.

EARLY AUTUMN

Clusters of orangey berries (pomes) ripen by early autumn. Excellent for wildlife.

Deciduous broadleaved tree with simple, shallowly lobed leaves. The underside of the leaf is covered with white hairs adding interest during the summer. Leaves turn yellow in autumn.

Single-stemmed in cultivation but also found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Pyramidal	'Henk Vink', 'Atrovirens'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.
- This hybrid has good tolerance to air pollution.

The tree and its features



Sorbus latifolia has clusters or orange berries that ripen in early autumn.

© Henrik Sjöman

Sorbus pseudohupehensis (Hupeh rowan)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m.

An ovoid crown that gets around 5m in diameter.

A moderately dense crown.

Natural habitat

Native to China, found dense forests, gullies, shaded slopes and thickets 300-3800m. Prefers well-aerated, slightly acidic soils.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Pyramidal clusters of white flowers appear in late spring. Highly ornamental.

LATE SUMMER

Clusters of pink berries (pomes) ripen by late summer. See notes for addition information.

Deciduous broadleaved tree with pinnate leaves. An excellent red autumn colour.

Single-stemmed, often multi-stemmed in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.
- The pink-fruited tree, often sold in the nursery trade as *Sorbus hupehensis*, should be called *Sorbus pseudohupehensis*. The similar white-fruited tree should be called *Sorbus glabriuscula*. A similar tree with white fruits flushed with crimson is *Sorbus discolor*.

The tree and its features



Sorbus pseudohupehensis is adorned with pink berries in late summer.

© Tim Baxter

Sorbus thibetica (Tibetan whitebeam)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m.

An ovoid crown that gets around 15m in diameter.

A moderately dense crown.

Natural habitat

Native to the Himalayan region, particularly, western China, Bhutan and Myanmar. Found in forests, on slopes, stream banks and shrubby thickets; 2400-3800m. Adaptable to a wide range of soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Abundant convex clusters of white flowers appear in late spring. Highly ornamental.

EARLY AUTUMN

Clusters of scarlet berries (pomes) ripen by early autumn. Excellent for birds.

Deciduous broadleaved tree with simple leaves. The underside of the leaf is covered with white hairs adding interest during the summer.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Compact form	'John Mitchell'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.

The tree and its features



A mature *Sorbus thibetica* growing in a park situation.

© Andrew Hirons



The simple leaves and pollinated flowers of *Sorbus thibetica*. Clusters of scarlet berry-like fruit will ripen by early autumn.

© Andrew Hirons

Sorbus x thuringiaca (Hybrid Sorbus)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m.

An ovoid crown that gets around 6-8m in diameter.

A moderately dense crown.

Natural habitat

A rare but naturally occurring hybrid between *Sorbus aria* and *S. aucuparia*: native to Europe, including the British Isles. Found predominantly in open woodland and cliffs on both acid and calcareous soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Abundant convex clusters of white flowers appear in late spring. Highly ornamental.

EARLY AUTUMN

Clusters of red berries (pomes) ripen by early autumn. Excellent for birds.

Deciduous broadleaved tree with leaves that have an interesting intermediate form between simple and pinnate. The underside of the leaf is covered with whitish hairs, adding further interest during summer.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

Upright	'Fastigiata'.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.
- 'Fastigiata' also tends to be less than 10m, making it a good choice for compact situations.

The tree and its features



Sorbus x *thuringiaca* is a tough, attractive tree. Seen here with abundant red berry-like fruit in early autumn.

© Henrik Sjöman



Left: *Sorbus* x *thuringiaca* has convex clusters of white flowers that cover the crown in late spring.

© Duncan Slater

Right: Clusters of red berry-like fruit ripen in early autumn.

© Barcham Trees

Sorbus torminalis (Wild service tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Coastal

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m, but more typically around 15m.

An ovoid crown that gets around 15m in diameter.

A moderately dense crown.

Natural habitat

Native to Europe (including the British Isles), western Asia and parts of north Africa. Found in open woodland, rocky slopes, cliffs and disturbed sites, up to around 1600m. Adaptable to a wide range of soils, including clays, providing they are reasonably fertile.

Environmental tolerance

Partially tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Abundant convex clusters of white flowers appear in late spring. Highly ornamental.

EARLY AUTUMN

Clusters of brownish-orange berries (pomes) ripen by early autumn. Excellent for birds.

Deciduous broadleaved tree with simple, variably lobed leaves. Good autumn colour with leaves turning yellow to deep red.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic. Produces root suckers and is capable of forming thickets.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

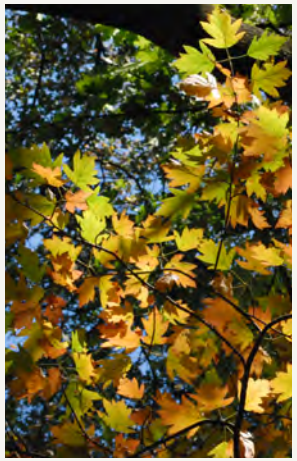
- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.

The tree and its features



A mature *Sorbus torminalis* will often maintain a compact, ovoid crown.

© Andrew Hirons





Left: Yellow autumn leaves of *Sorbus torminalis*.

© Henrik Sjöman

Right: *Sorbus torminalis* has convex clusters of white flowers in late spring.

© Henrik Sjöman

Sorbus vilmorinii (Vilmorin's rowan)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree capable of reaching 6m.

An ovoid crown that gets around 4m in diameter.

A moderately dense crown.

Natural habitat

Native to China. Found in a range of habitats, including mountain slopes, mixed forests, riparian corridors, grasslands and bamboo thickets; 2800-4400m.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Convex clusters of white flowers appear in early summer. Highly ornamental.

EARLY AUTUMN

Clusters of crimson (pomes) that fade to white with a crimson flecks. They ripen by early autumn and persist into winter. Good for wildlife.

Deciduous broadleaved tree with delicate pinnate leaves. An excellent deep red autumn colour.

Single-stemmed in cultivation but often found as a multi-stemmed tree in the wild. Smooth grey bark, becoming slightly rougher with age.

Issues to be aware of

Fruit litter may be a nuisance in some scenarios but the berries usually get eaten before they become problematic.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Extremely sensitive to poor soil aeration so should not be planted in heavy, frequently waterlogged or compacted soil.
- Excellent for bees and other pollinating insects.
- Fruits are very attractive for birds.
- Reported to be very sensitive to bacterial fireblight (*Erwynia amylovora*). This is a particular problem in southern England.

The tree and its features



A mature *Sorbus vilmorinii* makes an excellent small tree for gardens.
© Duncan Slater





Left: The fine, pinnate leaves of *Sorbus vilmorinii* are especially attractive when they turn red in autumn.
© Duncan Slater

Right: *Sorbus vilmorinii* has convex clusters of white flowers in early summer. © Duncan Slater

Stewartia pseudocamellia (Japanese stewartia)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A large tree capable of reaching 18m. More typically less that 12m in cultivation.

An ovoid crown.

A moderately dense crown.

Natural habitat

Native to Japan and the Korean peninsula. Found in open to dense mixed woodlands of mountainous regions: between 175-1450m. Prefers acid soils that have plenty of organic matter, are well aerated and consistently moist.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

White flowers with yellow stamens appear in early summer. Highly ornamental.

LATE AUTUMN

A woody capsule develops by late autumn and often persists on the tree for some time.

Deciduous broadleaved tree with simple leaves. In autumn they develop a deep red or orange colour and are very attractive.

Single-stemmed. An attractive, mottled bark. Older, platy grey bark peels to reveal patches of rusty-orange or pinkish young bark. Highly ornamental, especially as a winter silhouette.

Issues to be aware of

Planting sites need to be carefully selected, as this can be a tricky species to establish.

Notable varieties

Good autumn colour	'Koreana' (syn var. *Koreana*).

Notes

- Sensitive to salt and air pollution.
- Excellent for bees and other insects.
- These are quite challenging to cultivate and grow so they tend to be quite expensive as a result.

The tree and its features





Left: *Stewartia pseudocamellia* makes an attractive tree for parks and small gardens. © Andrew Hirons

Right: The winter silhouette of *Stewartia pseudocamellia* is attractive. © Andrew Hirons





Left: The bark of *Stewartia pseudocamellia* is mottled with pinks, yellows, oranges and greys. © Andrew Hirons

Right: The highly ornamental flowers of *Stewartia pseudocamellia* appear in early summer. © Andrew Hirons

Stewartia sinensis (Chinese stewartia)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A medium tree capable of reaching 15m. More typically less that 10m in cultivation.

An ovoid crown.

A moderately dense crown.

Natural habitat

Native to central and eastern China. Found in mixed woodlands between 500-2200m. Prefers acid soils that have plenty of organic matter, are well aerated and consistently moist.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Fragrant white flowers with yellow stamens appear in early summer. Highly ornamental.

LATE AUTUMN

A woody capsule develops by late autumn and often persists on the tree for some time.

Deciduous broadleaved tree with simple leaves. In autumn they develop a deep red or orange colour and are very attractive.

Single-stemmed. An attractive, dusky pink to brown peeling bark. Highly ornamental, especially as a winter silhouette.

Issues to be aware of

Planting sites need to be carefully selected, as this can be a tricky species to establish.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Sensitive to salt and air pollution.
- Excellent for bees and other insects.
- These are quite challenging to cultivate and grow so they tend to be quite expensive as a result.

The tree and its features



Stewartia sinensis in a park situation.
© Andrew Hirons





Left: The dusky-pink and brown exfoliating bark of *Stewartia sinensis* is very attractive.
© Andrew Hirons

Right: The white flowers of *Stewartia sinensis* appear in early summer. © Andrew Hirons

Styphnolobium japonicum (Japanese pagoda tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

10-15M

A large tree, capable of reaching 25m, most cultivars are notably smaller, typically less than 15m.

A globular crown to vase shaped that can get 15-18m wide.

A moderately dense crown.

Natural habitat

Native to central and western China and the Korean peninsula. Found on open disturbed sites, woods and thickets typically on rocky mountain slopes. Adaptable to a wide range of soils providing that they are not too organic (very peaty). This species is also capable of fixing atmospheric nitrogen (with symbiotic *Rhizobium* sp.) so does well on impoverished soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Loose, open clusters of creamy white flowers appear in late summer. Highly ornamental.

LATE AUTUMN

Seed-pods mature by late autumn, but are rarely seen in the British Isles as they require more summer heat to develop properly.

Deciduous broadleaved tree with pinnate leaves. The leaves turn yellow in autumn.

Single-stemmed. Grey bark becomes fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Globular	‘Millstone’.
Regular ovoid	‘Princeton Upright’.
Straight stem	‘Regent’.
Weeping	‘Pendula’.
Yellow twigs and leaves	‘Golden Standard’.

Notes

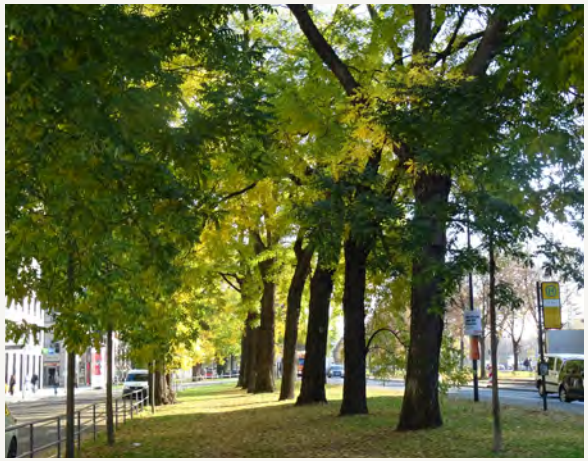
- Syn *Sophora japonica*.
- Seed propagated trees are very variable in terms of size, growth habit and seasonal properties. The use of known cultivar is essential if a predicable form is required.
- Observed to have some tolerance to salt and air pollution.
- Excellent for bees and other insects.
- Noted to have good tolerance to salt and air pollution.
- Styphnolobium japonicum is known to be a high emitter of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



Styphnolobium japonicum makes an excellent tree for paved environments.

© Henrik Sjöman



In autumn, the leaves of *Styphnolobium japonicum* turn yellow.

© Keith Sacre

Styrax japonicus
(Japanese snowball tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A medium tree capable of reaching 12m.

An irregular crown that can be wider than it is tall: to around 15m.

A moderately dense crown.

Natural habitat

Native to Japan, China, the Korean peninsula, Myanmar, Laos, Taiwan and the Philippines. Found in well-drained lowland forests as part of the understorey or on forest margins. Requires well-aerated soil, preferably high in organic matter.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Pendulous clusters of fragrant, bell-shaped white flowers appear in early summer. Highly ornamental.

EARLY AUTUMN

A dry, ovoid drupe covered with star-shaped hairs matures by early autumn.

Deciduous broadleaved tree with simple leaves.

Single-stemmed in cultivation, but often a multi-stemmed tree in the wild. Smooth grey bark becomes slightly fissured with age.

Issues to be aware of

Fruits are poisonous.

Notable varieties

Narrow conical crown	'June Snow'.

Notes

- Sensitive to salt and air pollution.
- Excellent for bees and other pollinating insects.

The tree and its features





Left: *Styrax japonicus* growing happily on a woodland margin. © Duncan Slater

Right: Spring leaves of *Styrax japonicus*, these become darker over time. © Andrew Hirons





Left: *Styrax japonicus* has very attractive pendulous clusters of white flowers in early summer. © Duncan Slater

Right: The drupe fruit of *Styrax japonicus*. © Duncan Slater

Syringa x *chinensis* (Chinese lilac)

Use potential

Park

Small garden

Tree size and crown characteristics

A small tree capable of reaching 5m. <10M

A squat globular form, becoming as wide as it is tall.

A moderately dense crown.

Natural habitat

A hybrid between *Syringa protolaciniata* (Syn *S. persica*) and *S. vulgaris*. Requires well-drained soil, rich in organic matter but is adaptable to a range of soil pH providing it is not too extreme.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

Pink-purple flowers held in loose, upright or gentle drooping, clusters in late spring. Highly ornamental. LATE SPRING

A capsule fruit ripens in late summer but is of little ornamental value. LATE SUMMER

Deciduous broadleaved tree with simple leaves.

Multi-stemmed. Brown-grey bark becomes rough with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Excellent flowering	'Sangeana'.

Notes

– *Syringa* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).

The tree and its features



A flowering bed of *Syringa* x *chinensis*. This hybrid can be trained to become a small tree.

© Henrik Sjöman



The pink-purple flowers of *Syringa* x *chinensis* are spectacular in late spring.

© Henrik Sjöman

Syringa reticulata (Japanese tree lilac)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park | Paved | Small garden | Transport corridor

Tree size and crown characteristics

<10M

A small tree capable of reaching 9m.

An ovoid crown form, becoming about 5m wide at maturity.

A moderately dense crown.

Natural habitat

Native to China, Japan, the Korean Peninsula and eastern Russia. Found in mixed forests on slopes, forest margins and grassland fringes; 100-1200m. Requires well-drained soil, rich in organic matter but is adaptable to a range of soil pH providing it is not too extreme.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Cream-coloured flowers held in loose, upright or gentle drooping, clusters in early summer. Highly ornamental and pleasantly fragrant.

EARLY AUTUMN

A capsule fruit ripens in early autumn but is of little ornamental value.

Deciduous broadleaved tree with simple leaves. Often the leaves turn a purple colour in autumn.

Single-stemmed or multi-stemmed. Reddish-brown glossy bark that gentle exfoliates on young stems. Lenticels are also prominent giving the stems additional interest.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Compact upright crown	‘Ivory Silk’, ‘City of Toronto’.

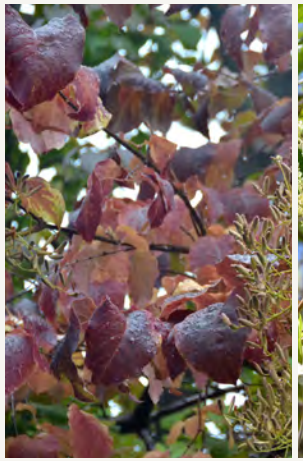
Notes

- The species is very variable in size and habit. If you require particular characteristics, use a cultivar.
- Slow growing and slow to establish.
- This should really be referred to as *Syringa reticulata* subsp. *reticulata*. However, the subsp. *amurensis* is not widely available so the precise nomenclature is of lesser importance.
- *Syringa* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).
- Observed to have some tolerance to salt.

The tree and its features



Syringa reticulata make an excellent small tree for a range of planting scenarios. The cultivar ‘Ivory Silk’ is shown here.
© Henrik Sjöman





Left: The leaves of *Syringa reticulata* turn a deep purple in autumn. © Henrik Sjöman

Right: *Syringa reticulata* has loose clusters of cream flowers in early summer.
© Henrik Sjöman

Syringa vulgaris (Common lilac)

Use potential

Park

Small garden

Tree size and crown characteristics

<10M

A small tree capable of reaching 6m.

An ovoid crown form, becoming about 4m at maturity.

A moderately dense crown.

Natural habitat

Native to southeastern Europe, particularly the Balkan Peninsular. Found on mountain slopes (often on limestone) and rocky river banks. Requires well-drained soil, rich in organic matter but is adaptable to a range of soil pH. Grows well on calcareous soils.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Lilac-coloured flowers held in loose, upright or gentle drooping, clusters in late spring or early summer. Highly ornamental and pleasantly fragrant.

EARLY AUTUMN

A capsule fruit ripens in early autumn but is of little ornamental value.

Deciduous broadleaved tree with simple leaves.

Single-stemmed or multi-stemmed. Grey rather stringy bark, often gently spiralling, is interesting but not spectacular.

Issues to be aware of

The species and some cultivars produce root suckers.

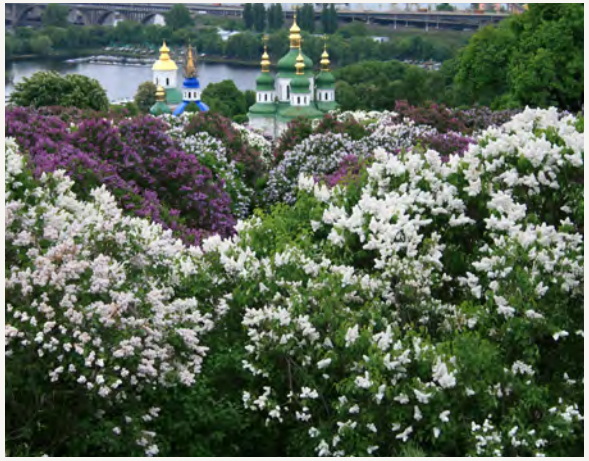
Notable varieties

Magenta flowers	‘Ruhm von Horstenstein’.
Purple flowers	‘Ludwid Spath’.
White flowering	‘Alice Harding’.
Double white flowers	‘Madame Lemoine’.

Notes

- There are a huge number of cultivars; only a few widely available cultivars are named here. Contact your nursery for detailed information on other cultivars.
- *Syringa* spp. are known to be high emitters of Biogenic Volatile Organic Compounds (BVOCs).
- Flowering time is rather dependent on cultivar. Most are late spring or early summer.

The tree and its features



The flowers of *Syringa vulgaris* come in many different colours and are spectacular in early summer.

© Henrik Sjöman





There are a vast number of cultivars for this species. This results in a range of flower colours, such as the pink and white flowers shown here, and variation in flowering time.

© Duncan Slater

Tamarix gallica (French tamarisk)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M
A small tree capable of growing to 10m.

An irregular, rather bushy crown that gets almost as wide as it is tall.

An open crown.

Natural habitat

Native of south western Europe and north Africa. Found predominantly on coastal sites and on saline soils. Prefers sandy soils and requires well-drained soils. Potentially a little frost sensitive, but capable of growing well in mild parts of the British Isles.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SUMMER
Numerous small clusters of pink flowers create plumes of flower in late summer. Highly ornamental.

LATE AUTUMN
Capsules containing the seed develop by late autumn. Of little ornamental merit.

Deciduous broadleaved tree with small scaly leaves. This genus is superficially reminiscent of some conifers but it is actually an angiosperm tree.

Naturally, most frequently seen as a multi-stemmed tree but some nurseries prune to develop a single-stemmed habit. Brown bark slightly fissured bark on mature stems, light green to purplish bark on younger stems and twigs.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Good for bees and other pollinating insects.
- Observed to have some tolerance to salt.

The tree and its features



Tamarix gallica has frothy clusters of pink flowers in late summer. This species is an excellent choice for coastal locations.

© Duncan Slater

Tamarix ramosissima (Salt cedar)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M
A small tree capable of growing to about 8m.

An irregular, rather bushy crown that gets about 5m wide.

An open crown.

Natural habitat

Native of southern Europe, western and central Asia. Found predominantly on coastal sites and on saline soils. Prefers sandy soils and requires well-drained soils.

Environmental tolerance

Intolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SUMMER
Numerous small clusters of pink flowers create plumes of flower in late summer. Highly ornamental.

LATE AUTUMN
Capsules containing the seed develop by late autumn. Of little ornamental merit.

Deciduous broadleaved tree with small scaly leaves. This genus is superficially reminiscent of some conifers but it is actually an angiosperm tree.

Naturally, most frequently seen as a multi-stemmed tree but some nurseries prune to develop a single-stemmed habit.

Issues to be aware of

Known to be invasive in warm climates, but this is not currently a problem in the British Isles.

Notable varieties

Species-type	‘Pink Cascade’.
Red flowers	‘Rubra’.

Notes

- Good for bees and other pollinating insects.
- Also sold as *Tamarix aestivalis*.
- Observed to have some tolerance to salt.

The tree and its features



A young shoot of *Tamarix ramosissima* with small scaly leaves and flower buds. These flowers appear in late summer, when little else is flowering.

© Andrew Hirons

Tamarix tetrandra
(Four-stamen tamarisk)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park
Small garden
Coastal
Transport corridor

Tree size and crown characteristics

<10M
A small tree capable of growing to about 4m.

An irregular, rather bushy crown that gets about as wide as it is tall.

An open crown.

Natural habitat

Native of south eastern Europe. Found predominantly on coastal sites and on saline soils. Prefers sandy soils and requires well-drained soils.

Environmental tolerance

Estimated to be intolerant to shade.

Estimated to be tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER
Numerous small clusters of pink flowers create plumes of flower in early summer. Highly ornamental.

EARLY AUTUMN
Capsules containing the seed develop by early autumn. Of little ornamental merit.

Deciduous broadleaved tree with small scaly leaves. This genus is superficially reminiscent of some conifers but it is actually an angiosperm tree.

Naturally, most frequently seen as a multi-stemmed tree but some nurseries prune to develop a single-stemmed habit. Dark grey bark slightly fissured bark on mature stems, reddish brown bark on younger stems and twigs.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Good for bees and other pollinating insects.
- Observed to have some tolerance to salt.

The tree and its features



The highly ornamental pink flowers of *Tamarix tetrandra* appear in early summer.
© Duncan Slater

Taxodium distichum (Swamp cypress)

Use potential

Park

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of growing up to 40m tall in its native habitat. Typically smaller in cultivation.

A conical crown that gets to around 8m wide. Becomes more irregular in very mature specimens.

A moderately dense crown.

Natural habitat

Native to south-central and southeastern North America. Found in low elevations (<500m) and coastal plains, primarily in riparian corridors, swamps and seasonally flooded areas. Capable of growing on very wet sites but will perform well on moist sites with better soil aeration.

Environmental tolerance

Partially tolerant to shade.

Moderately sensitive to drought.

Tolerant to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (strobili) are separate but found on the same tree. Highest level of pollination occurs in early spring. Inconspicuous.

LATE WINTER

Clusters of small (1.5-4cm diameter) cones mature about a year after pollination. Green and fleshy when young, brown and woody at maturity.

Deciduous conifer with alternate needles. In autumn the needles of this conifer turn bronze-brown before being shed.

Single-stemmed. Light brown-grey bark exfoliating in long fibrous strips at maturity.

Issues to be aware of

Produces adaptive knee-roots, or pnematophores, in very wet conditions. These are an interesting characteristic but may be problematic if sited near hard surfaces. *T. distichum* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type	'Nutans'.
Broad weeping	'Cascade Falls', 'Pendulum'.

Notes

- Observed to have some tolerance to salt and air pollution, hence its value for transport corridors.
- This is a deciduous conifer, its needles are meant to fall off.

The tree and its features



The conical form of *Taxodium distichum* (centre) with soft spring foliage.

© Andrew Hirons



In their natural environment, *Taxodium distichum* can survive long periods of waterlogging.

© Henrik Sjöman

Taxus baccata (Common yew)

Use potential

Park

Small garden

Tree size and crown characteristics

10-15M

A large tree capable of reaching 18m but mostly less than 15m in cultivation.

An irregular crown, quite variable in shape. Often fairly globular in the open and up to 15m wide.

A dense crown.

Natural habitat

Native to Europe (including the British Isles), western Asia and north Africa. Occasionally found in pure stands, but more frequently part of the understorey of temperate forests, particularly on steep, sunny slopes on calcareous soils. Adaptable to a range of soil textures, but is not associated with very organic, peaty soils.

Environmental tolerance

Tolerant to shade.

Tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (strobili) usually found on separate trees. Inconspicuous. Peak pollination usually occurs in early spring.

EARLY AUTUMN

Small nut-like seeds mostly enclosed in a red, fleshy cup. Contrasting well with the dark green foliage in early autumn. Female trees only.

Evergreen conifer tree with dark green needle leaves.

Single-stemmed. Brownish-red bark, exfoliating in irregular plates. Attractive.

Issues to be aware of

Leaves and seeds are poisonous. Male *T. baccata* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Upright	'Fastigiata'.
Upright golden	'Fastigiata Aurea' (Syn 'Fastigiata Aureomarginata').

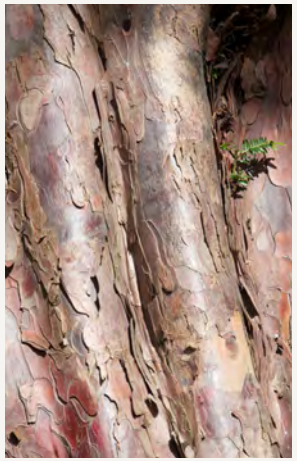
Notes

- Slow growing.
- Also used as a hedging plant.
- Noted to have good tolerance to air pollution.
- Excellent for dry shade.

The tree and its features



Taxus baccata performs well in the shade of other trees.
© Andrew Hirons





Left: The bark of *Taxus baccata* is an attractive brownish-red and exfoliates in small plates. © Andrew Hirons

Right: *Taxus baccata* has evergreen needle leaves. The seeds are enclosed in fleshy red cups.
© Andrew Hirons

Tetradium daniellii (Chinese bee tree)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m.

A globular crown. Quite broad spreading, to about 10m wide.

A moderately dense crown.

Natural habitat

Native to China and the Korean Peninsula. Found as part of the forest understorey but more frequently on forest margins and in thickets on open slopes; up to 3200m. Tolerant of a wide range of climates and soils. Known to perform well on calcareous and acid soils as well as a range of soil textures, from clay to sand. Avoid planting on exposed, windy sites.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Loose, convex to pyramidal clusters of white flowers appear in late summer. Male and female flowers held on separate individuals (dioecious). Very attractive and fragrant.

EARLY AUTUMN

Reddish-purple seed-pods develop soon after flowering in early autumn. The split to reveal black seed that are good for birds.

Deciduous broadleaved tree with dark green pinnate leaves.

Single-stemmed. Smooth grey bark becomes rougher with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Strong flowering	var. *hupehensis*.

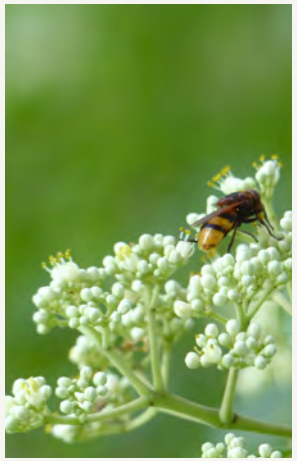
Notes

- Syn *Euodia daniellii*, *E. hupehensis*.
- Excellent for bees and other pollinating insects because of its late flowering – hence the common name.
- One of the few temperate trees to have naked buds.

The tree and its features



Tetradium daniellii is a useful tree for park environments as it helps extend the flowering season.
© Henrik Sjöman





Left: The clusters of white flowers make *Tetradium daniellii* very attractive to insects in late summer.
© Andrew Hirons

Right: Reddish-purple seed pods give *Tetradium daniellii* interest in autumn. © Duncan Slater

Thuja plicata
(Western red cedar)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

15-25M

A massive tree capable of reaching 60m, most cultivars are considerably smaller, around 15-25m.

A conical crown that typically gets 4-5m wide. Becomes more irregular with age if grown in the open.

A dense crown.

Natural habitat

Native to the pacific coast of western North America in mixed conifer forests; 0–2000m. Adaptable to a wide range of soil types, including calcareous.

Environmental tolerance

Tolerant to shade.

Moderately tolerant to drought.

Moderately sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (strobili) found separately on the same tree. Inconspicuous. Peak pollination usually occurs in early spring.

EARLY AUTUMN

Small ovate cones (10-12mm) ripen by late autumn. Fairly inconspicuous.

Evergreen conifer tree with scale leaves.

Single-stemmed. Brownish-red bark, peeling of in stringy fibres. Attractive but not highly ornamental.

Issues to be aware of

Potentially a large, dense tree. *T. plicata* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Species-type habit	‘Excelsa’.
Regular-slender habit	‘Atrovirens’.
Upright	‘Fastigiata’.

Notes

- Also used as a hedging plant.
- Noted to have good tolerance to air pollution.
- Could be considered for a transport corridor if well away from the likely salt-spray zone.

The tree and its features



An avenue of *Thuja plicata*. This species is sensitive to saline soils so should only be used as a roadside tree if this is not likely to be an issue.

© Henrik Sjöman



The dense crowns of *Thuja plicata* provide deep shade beneath.

© Henrik Sjöman

Tilia americana (American basswood)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m in its natural habitat. Typically smaller in cultivation.

A broad ovoid crown that can become at least 20m wide.

A moderately dense crown.

Natural habitat

Native to eastern US and south eastern Canada. Found in rich, moist deciduous forest, shady north and easterly facing slopes; 50-1500m. Prefers nutrient-rich, loamy soils but will also grow on quite sandy soils. Tolerant of a range of soil pH, but grows poorly on nitrogen deficient sites. Requires a warm microclimate to perform well in the British Isles.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Drooping cluster of creamy-white flowers, held on a narrow leaf-like bract, emerge in early summer. Attractive, but not spectacular.

EARLY AUTUMN

Clusters of rounded, thick-shelled, nut-like fruits, about 10mm in diameter, held on a narrow leaf-like bract. Ripening in early autumn (rarely in the British Isles).

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

Potentially a very large broad tree. Capable of producing abundant suckers around the base of the tree.

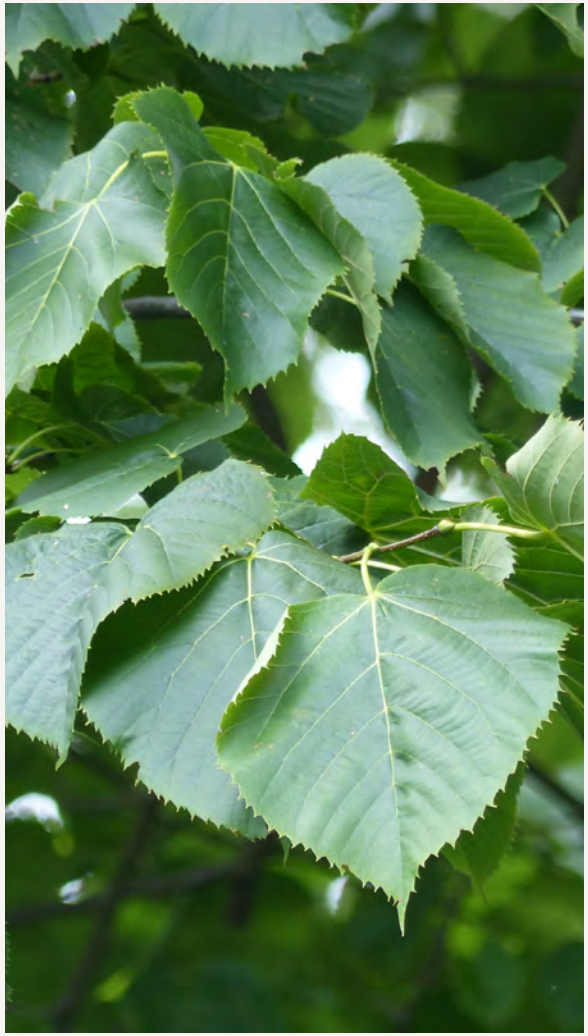
Notable varieties

Species-type habit	‘Moltkei’.
More compact crowns	‘American Sentry’, ‘Nova’, ‘Redmond’.

Notes

– Excellent for bees and other pollinating insects.

The tree and its features



The large leaves of *Tilia americana*. This species is capable of becoming a massive tree.

© Andrew Hirons

Tilia cordata (Small-leaved lime)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Coastal

Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m in its natural habitat.

A broad ovoid to globular crown that can become at least 15m wide.

A moderately dense crown.

Natural habitat

Native to Europe (including the British Isles) and western Asia. Found as part of lowland forest communities, in climates where annual rainfall is typically 500-700mm. In the warmer drier (more southerly) parts of its range it is more restricted to riparian communities and shady, north-facing slopes. Also found on steep slopes, screes and sea cliffs. Adaptable to a wide range of soils.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Drooping cluster of creamy-white flowers, held on a narrow leaf-like bract, emerge in early summer. Attractive, but not spectacular.

EARLY AUTUMN

Clusters of rounded, thin-shelled, nut-like fruits, about 5mm in diameter, held on a narrow leaf-like bract. Ripening in early autumn (rarely in the British Isles).

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

Regular pyramidal growth	'Greenspire', 'Rancho', 'Streetwise'.
Orange twigs	'Winter Orange'.
Good hybrid	*Tilia cordata* x *T. mongolica* 'Harvest Gold'.

Notes

- Growth habit varies a great deal within the species, therefore, it is recommended that cultivars are used.
- Excellent for bees and other pollinating insects.
- Noted to have good tolerance to air pollution and salt spray.
- The hybrid (*Tilia cordata* x *T. mongolica* 'Harvest Gold') is worth considering if a compact form is required.
- Not prone to aphid infestation unless stressed.

The tree and its features



A young *Tilia cordata* establishing in a park situation.

© Andrew Hirons



The flowers of *Tilia cordata* appear in early summer and are attractive to insects.

© Andrew Hirons

Tilia x *euchlora* (Caucasian lime)

Use potential

Park

Coastal

Transport corridor

Tree size and crown characteristics

15-25M

A large tree capable of reaching 20m.

A broad ovoid to globular crown that can become at least 15m wide.

A moderately dense crown.

Natural habitat

A hybrid of somewhat obscure origin, most likely, *Tilia cordata* x *T. dasystyla*. Adaptable to a wide range of soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Drooping cluster of creamy-white flowers, held on a narrow leaf-like bract, emerge in early summer. Attractive, but not spectacular.

EARLY AUTUMN

Clusters of ovoid, thin-shelled, nut-like fruits, about 6mm in diameter, held on a narrow leaf-like bract. Sterile.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The hybrid is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

– Not prone to aphid infestation, unless stressed.

The tree and its features



Left: A semi-mature *Tilia* x *euchlora* displaying an ovoid crown. © Duncan Slater

Right: A mature *Tilia* x *euchlora* with its lower branches left in place. © Andrew Hirons



Tilia x *euchlora* leaves.
© Andrew Hirons

Tilia x *europaea* (Common lime)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m.

A broad ovoid to globular crown that can become at least 15m wide.

A moderately dense crown.

Natural habitat

A hybrid of *Tilia cordata* x *T. platyphyllos*. Adaptable to a wide range of soils.

Environmental tolerance

Moderately tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Drooping cluster of creamy-white flowers, held on a narrow leaf-like bract, emerge in early summer. Attractive, but not spectacular.

EARLY AUTUMN

Clusters of ovoid, thin-shelled, nut-like fruits, about 8mm in diameter, held on a narrow leaf-like bract.

Deciduous broadleaved tree with simple leaves. Good yellow autumn colour.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

Produces abundant suckers around its base. Prone to aphid infestations which leads to sticky 'honey dew' residues beneath the crown and superficial sooty mould fungi on the leaves. This is particularly a problem if the tree is stressed, as in many street environments.

Notable varieties

Broad conical crown	'Pallida'.
Rounded crown	'Zwart Linde'.
Yellow spring leaves	'Wratislaviensis'.

Notes

- Tolerant to air pollution so could be considered for a transport corridor if well away from the likely salt-spray zone.
- Widely planted as street tree but it does not have the drought tolerance to perform well, hence the recognised problems associated with aphids.
- Excellent for bees and other pollinating insects.

The tree and its features



An avenue of *Tilia* x *europaea* 'Pallida' As with many *Tilia* species, they are best reserved for park environments despite being widely planted in streets.

© Andrew Hirons



Leaves of *Tilia* x *europaea*. These are prone to aphid infestations, particularly when the tree is stressed.

© Andrew Hirons

Tilia henryana (Henry's lime)

Use potential

Park

Small garden

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m in its natural habitat, typically around 15m in cultivation.

A broad ovoid to globular crown that can become around 8m wide.

A moderately dense crown.

Natural habitat

Native to China where it has a fairly sparse distribution. Found in forests often classified as sub-tropical broadleaved or tropical broad-leaved but occurs at sufficient altitude in the mountains (up to 2000m) that it appears colder tolerant down to about -20°C (at maturity). Adaptable to a range of soils providing they are not too extreme in texture or pH and are well-aerated. Enjoys summer heat so a warm microclimate is preferable.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Drooping clusters of creamy-white flowers, held on a narrow leaf-like bract, emerge in late summer. Attractive, but not spectacular.

LATE AUTUMN

Clusters of rounded, thin-shelled, ribbed, nut-like fruits, about 6mm in diameter, held on a narrow leaf-like bract. Ripening by late autumn.

Deciduous broadleaved tree with simple leaves. Very attractive leaves, emerging bronze-red and developing bristly margins.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Excellent for bees and other pollinating insects.
- The latest flowering Tilia cultivated in the British Isles.

The tree and its features



Left: A young *Tilia henryana*.
© Henrik Sjöman

Right: *Tilia henryana* growing well in a woodland clearing.
© Andrew Hirons



One of the most attractive features of *Tilia henryana* is its bristly margined leaves.
© Andrew Hirons

Tilia mongolica (Mongolian lime)

Use potential

Park

Paved

Small garden

Tree size and crown characteristics

10-15M

A large tree capable of reaching 25m in its natural habitat. Much smaller in cultivation, around 10m.

A broad ovoid to globular crown that gets to about 8m wide.

A moderately dense crown.

Natural habitat

Native to Mongolia and China. Found on forested mountain slopes, in climates where annual rainfall is typically 500-600mm and mean summer temperatures of around 20°C. Found on acidic brown earth soils and on screes, however, noted to be adaptable to a range of soil types in cultivation. Will form shrub-like thickets as well as more substantial trees within a deciduous forest community.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Drooping cluster of creamy-white flowers, held on a narrow leaf-like bract, emerge in late summer. Attractive, but not spectacular.

LATE AUTUMN

Clusters of oval, thin-shelled, nut-like fruits, about 5mm in diameter, held on a narrow leaf-like bract. Ripening in late autumn (rarely in the British Isles).

Deciduous broadleaved tree with simple, lobed and coarsely toothed leaves. Develops a good yellow autumn colour, particularly after a hot summer.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

No substantial issues to be aware of.

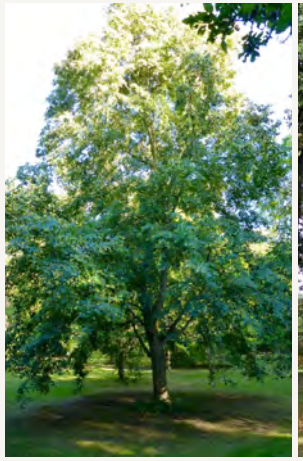
Notable varieties

Good hybrid	*Tilia cordata* x *T. mongolica* 'Harvest Gold'.

Notes

- Very cold-hardy.
- Slow growing.
- Excellent for bees and other pollinating insects.
- The hybrid (*Tilia cordata* x *T. mongolica* 'Harvest Gold') is a useful compact hybrid.
- Not prone to aphid infestation.

The tree and its features





Left: A semi-mature *Tilia mongolica* displaying an ovoid crown. © Andrew Hirons

Right: In autumn, *Tilia mongolica* often develops a good yellow colour, adding to its value. © Duncan Slater





Left: The leaves of *Tilia mongolica* have attractive toothed margins. © Andrew Hirons

Right: The flowers of *Tilia mongolica* appear in late summer and provide an excellent resource for insects. © Andrew Hirons

Tilia oliveri
(Chinese white lime)

Use potential

Park

Tree size and crown characteristics

15-25M

A large tree capable of reaching 25m in its natural habitat.

A broad ovoid to globular crown that gets to about 8m wide.

A moderately dense crown.

Natural habitat

Native to China. Found in mixed mountain forests; 1300-2300m.

Environmental tolerance

Estimated to be moderately tolerant to shade.

Estimated to be moderately sensitive to drought.

Estimated to be sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Drooping cluster of creamy-white flowers, held on a narrow leaf-like bract, emerge in early summer. Attractive, but not spectacular.

EARLY AUTUMN

Clusters of oval, thin-shelled, nut-like fruits, about 8mm in diameter, with ribs and a warty surface. Held on a narrow leaf-like bract. Ripening in early autumn (rarely in the British Isles).

Deciduous broadleaved tree with simple leaves, green on upper surface, white beneath as a result of a dense covering of leaf hairs.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

No substantial issues to be aware of.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Excellent for bees and other pollinating insects.
- Not prone to aphid infestation.

The tree and its features



A mature *Tilia oliveri* growing in a park situation and displaying a broad globular crown.

© Andrew Hirons



The leaves of *Tilia oliveri* have white undersides to their leaves, making them particularly attractive as they flutter in the breeze. The flowers in early summer are very attractive to bees and other pollinating insects.

© Andrew Hirons

Tilia platyphyllos (Large-leaved lime)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 40m in its natural habitat.

A broad ovoid to globular crown that can become at least 20m wide.

A moderately dense crown.

Natural habitat

Native to Europe (including the British Isles) and western Asia. Found as part of forest communities on hills and mountains (up to 1500m) in climates where annual rainfall is typically above 600mm per year and mean summer temperatures around 16-22°C. In the warmer drier (more southerly) parts of its range it is more restricted to riparian communities and shady, north-facing slopes. Found well-drained, weak to strongly calcareous soils. However, it also shows tolerance to mildly acidic soils.

Environmental tolerance

Tolerant to shade.

Moderately sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SUMMER

Drooping cluster of creamy-white flowers, held on a narrow leaf-like bract, emerge in early summer. Attractive, but not spectacular.

EARLY AUTUMN

Clusters of rounded, nut-like fruits, about 9mm in diameter, with five ribs. Held on a narrow leaf-like bract. Ripening in early autumn.

Deciduous broadleaved tree with simple leaves.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

Capable of becoming a very large tree so requires plenty of space.

Notable varieties

Upright-pyramidal	‘Delft’, ‘Örebro’, ‘Streetwise’.
Upright-fastigiate	‘Fastigiata’.
Red twigs	‘Rubra’, ‘Prince’s Street’.
Yellow twigs	‘Aurea’.
Cut-leaved	‘Laciniata’.

Notes

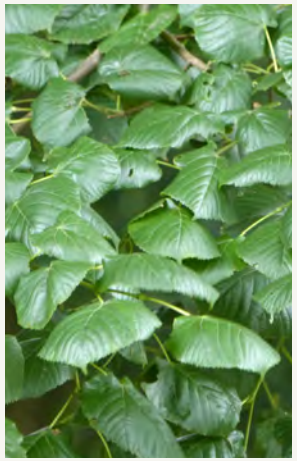
– Excellent for bees and other pollinating insects.
– Not prone to aphid infestation, unless stressed.

The tree and its features



Whilst it is often planted as a street tree, *Tilia platyphyllos* requires high-quality rooting environments to perform well.

© Henrik Sjöman





Left: Simple leaves of *Tilia platyphyllos*. © Andrew Hirons

Right: The creamy flowers of *Tilia platyphyllos* appear in early summer and are attractive to bees and other pollinating insects.

© Duncan Slater

Tilia tomentosa (Silver lime)

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m in its natural habitat.

A broad ovoid to globular crown that can become at least 15m wide.

A moderately dense crown.

Natural habitat

Native to southeastern Europe, particularly the Balkan peninsula, and western Asia. Found as part of forest communities, from the coast up to 1300m, in climates where annual rainfall is typically above 600mm per year and average daily maximum summer temperatures are around 26-27°C. Found well-drained, light, calcareous soils. However, it also shows tolerance to other soil types.

Environmental tolerance

Moderately tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SUMMER

Drooping cluster of creamy-white flowers, held on a narrow leaf-like bract, emerge in late summer. Attractive, but not spectacular.

LATE AUTUMN

Clusters of oval, nut-like fruits, about 7mm in diameter, with a warty surface. Held on a narrow leaf-like bract. Ripening in late autumn.

Deciduous broadleaved tree with simple leaves. The underside of the leaf is covered with white hairs giving a silvery appearance – hence the common name.

Single-stemmed. Thin, smooth grey-green bark becomes darker, rougher and fissured with age.

Issues to be aware of

Capable of become a very large tree so requires plenty of space.

Notable varieties

Broadly pyramidal	'Brabant', 'Doornik', 'Sterling Silver'.
Shorter than species	'Sterling Silver' ('Wandell').
Weeping	'Petiolaris'.

Notes

- Good for pollinating insects.
- Not prone to aphid infestation.

The tree and its features



A small stand of *Tilia tomentosa*. This species has greater drought tolerance than most other *Tilia* species so is useful for urban sites.

© Andrew Hirons



The leaves of *Tilia tomentosa* have silvery undersides to their leaves. Here the leaves are shown with the flowers in late summer.

© Andrew Hirons

Tsuga canadensis (Eastern hemlock)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Tree size and crown characteristics

>25M

A massive tree capable of reaching 30m, exceptionally up to 50m.

A conical crown that gets about 8m wide at maturity.

A dense crown.

Natural habitat

Native to north-eastern US and southeastern Canada. A late-successional species native to cool moist, mixed forests, usually on upland sites; 600-1800m. It will grow on various soil textures, providing that they are well-drained but has a preference for acidic soil.

Environmental tolerance

Tolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (strobili) are found separately on the same trees. Inconspicuous. Peak pollination usually occurs in early spring.

EARLY AUTUMN

Seed cones open in early autumn and persist into winter. Attractive but relatively inconspicuous.

Evergreen conifer with needle leaves. The crown is striking in late spring when the light green of the new growth contrasts against the dark green of the previous years' foliage.

Single-stemmed. Rough, scaly bark, even when young. Becoming deeply fissured with age.

Issues to be aware of

Potentially a very large tree.

Notable varieties

Weeping	'Pendula'.

Notes

- Slow growing and slow to establish.
- Sensitive to heat, drought, wind, salt spray, air pollution and soil compaction. This tree is strictly a tree for cool, moist parklands. Probably best suited to the north-western parts of the British Isles.

The tree and its features



Left: *Tsuga canadensis* is tolerant to shade and seen here growing well in a forest understorey. © Henrik Sjöman

Right: A young *Tsuga canadensis* showing a conical crown. © Andrew Hirons



The new growth of *Tsuga canadensis* needle leaves contrasts with the older, darker needles. © Andrew Hirons

Tsuga heterophylla (Western hemlock)

Use potential

Park

Tree size and crown characteristics

>25M

A large canopy tree capable of reaching 75m in favourable conditions. Typically, smaller in cultivation

A conical crown that gets about 8m wide at maturity.

A dense crown.

Natural habitat

Native to the north-western North America. Native to cool temperate rainforests of low to mid elevations, 0-1830m. Capable of growing on nutrient-poor, acid soils, providing that they are well-drained. However, it requires a cool, high rainfall location to perform well.

Environmental tolerance

Tolerant to shade.

Sensitive to drought.

Sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Male and female flowers (strobili) are found separately on the same trees. Inconspicuous. Peak pollination usually occurs in early spring.

EARLY AUTUMN

Seed cones open in early autumn and persist into winter. Attractive but relatively inconspicuous.

Evergreen conifer with needle leaves. The crown is striking in late spring when the light green of the new growth contrasts against the dark green of the previous years' foliage.

Single-stemmed. Rough, scaly bark, even when young. Becoming deeply fissured with age.

Issues to be aware of

Potentially a very large tree. This species has a very shallow root system so is particularly vulnerable to ground-surface disturbance.

Notable varieties

The species is available, however, no notable cultivated varieties are widely available. Consult your preferred tree nursery for options.

Notes

- Sensitive to heat, drought, wind, salt spray, air pollution and soil compaction. This tree is strictly a tree for cool, moist parklands. Probably best suited to the north-western parts of the British Isles.
- A much faster growing tree than *Tsuga canadensis*.

The tree and its features



Left: *Tsuga heterophylla* showing its ability to grow well amongst other trees. © Andrew Hirons

Right: The needle leaves of *Tsuga heterophylla* have a soft textured appearance. © Andrew Hirons



Left: The new growth of *Tsuga heterophylla* needle leaves contrasts with the older, darker needles.
© Andrew Hirons

Right: The small seed cones of *Tsuga heterophylla*.
© Duncan Slater

Ulmus – resistant cultivars (Elms)

Use potential

Park | Paved | Coastal | Transport corridor

Tree size and crown characteristics

15-25M

Generally, large trees up to around 20m but some cultivars may be shorter.

Of variable crown form, depending on the cultivar. Generally to around 6-8m wide.

A moderately dense crown.

Natural habitat

The threat from Dutch Elm Disease is ongoing, the cultivars noted here are less susceptible to the disease. These hybrid elms are often of complex parentage so are not identified here. They are generally tolerant to a wide range of soil textures, but prefer calcareous soils.

Environmental tolerance

Estimated to be partially tolerant to shade.

Estimated to be moderately tolerant to drought.

Estimated to be moderately sensitive to waterlogging.

Ornamental qualities

EARLY SPRING

Small flowers produced in dense clusters appear in early spring before the leaves emerge. Of limited ornamental merit.

EARLY SUMMER

Clusters of flat-winged nutlets mature by early summer. Mostly sterile.

Deciduous broadleaved tree with simple leaves. Many cultivars have a good yellow autumn colour.

Single-stemmed. Smooth grey bark becomes rougher and deeply fissured with age, sometimes taking on a platy appearance.

Issues to be aware of

Ulmus release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Ovoid	‘Clusius’.
Columnar	‘Lobel’.
Vase-shaped	‘Lutèce’.
Globular	‘Dodoens’.
Conical	‘New Horizon’, ‘Rebona’.
Upright	‘Columella’.

Notes

- Easy to establish and fast growing.
- All have good tolerance to salt and air pollution so are good for transport corridors and streets, providing they have a good soil volume. The cultivars here are also tolerant of coastal conditions.

The tree and its features



An avenue of young Dutch elm disease resistant *Ulmus* growing vigorously in an urban park.

© Andrew Hirons



An upright resistant *Ulmus* cultivar (probably ‘Columella’) performing well in a paved environment.

© Andrew Hirons

Zelkova serrata
(Japanese zelkova)

Contents page
Alphabetical Index

Tree Selector
Use potential
Mature size
Crown form
Crown density
Environmental tolerance
Ornamental qualities

Use potential

Park

Paved

Transport corridor

Tree size and crown characteristics

15-25M

A massive tree capable of growing to 30m in its natural habitat. Typically less that 20m in cultivation.

Vase shaped crown, occasionally more globular. Growing to about 10m wide.

A moderately dense crown.

Natural habitat

Native to China, Japan, the Korean peninsula and Taiwan. Found in lowland to mountain forests between 500-2000m, usually in riparian habitats, ravines and shady slopes. It prefers calcareous, rich, moist soils but can cope with a range of soils, providing they are well-drained.

Environmental tolerance

Partially tolerant to shade.

Moderately tolerant to drought.

Sensitive to waterlogging.

Ornamental qualities

LATE SPRING

Male and female flowers appear separately in small clusters on the current year's shoots in late spring. Of little ornamental merit.

EARLY AUTUMN

Roundish drupes about 3mm in diameter ripen by early autumn. Of little ornamental merit.

Deciduous broadleaved tree with simple leaves with serrated margins. Often developing a good red-orange autumn colour.

Single-stemmed and multi-stemmed trees available. Smooth grey bark.

Issues to be aware of

Produces root suckers. *Z. serrata* release a lot of pollen so have high allergenicity potential during the flowering period.

Notable varieties

Broad-vase crown	'Green Vase', 'Village Green'.

Notes

– Observed to have good salt and air pollution tolerance.

The tree and its features



Zelkova serrata growing well in a park situation.
© Andrew Hirons



Leaves of *Zelkova serrata*. These develop a good orange colour in autumn.
© Andrew Hirons

Tree Selector

- Use potential
- Mature size
- Crown form
- Crown density
- Environmental tolerance
- Ornamental qualities

Use the symbols to go to a Profile page, and the top menu to return.

All species listed are suitable for planting in parks

In addition to the information in this document, a Supplementary Database is available to download. This Excel-based tool allows users to create a species shortlist using multiple categorical filters. Download from here

Paved

- *Acer buergerianum* (Trident maple)
- *Acer campestre* (Field maple)
- *Acer cappadocicum* (Caucasian maple)
- *Acer x freemanii* (Freeman's maple)
- *Acer monspessulanum* (Montpellier maple)
- *Acer platanoides* (Norway maple)
- *Acer rubrum* (Red maple)
- *Acer tataricum* (Tatarian maple)
- *Acer x zoeschense* (Zoeschen maple)
- *Ailanthus altissima* (Tree of heaven)
- *Alnus cordata* (Italian alder)
- *Alnus x spaethii* (Spaeth alder)
- *Arbutus unedo* (Strawberry tree)
- *Carpinus betulus* (Hornbeam)
- *Carpinus japonica* (Japanese hornbeam)
- *Cedrus atlantica* (Atlas cedar)
- *Cedrus deodara* (Himalayan cedar)
- *Cedrus libani* (Cedar of Lebanon)
- *Celtis australis* (Nettle tree)
- *Celtis occidentalis* (Common hackberry)
- *Cercis siliquastrum* (Judas tree)
- *Cornus mas* (Cornelian cherry dogwood)
- *Corylus colurna* (Turkish hazel)
- *Cupressus arizonica* (Arizona cypress)
- *Cupressus macrocarpa* (Monterey cypress)
- *Cupressus sempervirens* (Mediterranean cypress)
- *Elaeagnus angustifolia* (Russian olive)
- *Eucommia ulmoides* (Guttapercha)
- *Ginkgo biloba* (Maidenhair tree)
- *Gleditsia triacanthos* (Honey locust)
- *Hippophaë salicifolia* (Willow-leaved sea buckthorn)
- *Juniperus communis* (Common juniper)
- *Juniperus scopulorum* (Rocky mountain juniper)
- *Juniperus virginiana* (Eastern red cedar)
- *Koelreuteria paniculata* (Golden rain tree)
- *Ligustrum japonicum* (Japanese tree privet)
- *Ligustrum lucidum* (Chinese privet)
- *Liquidambar styraciflua* (Sweetgum)
- *Malus trilobata* (Lebanese wild apple)
- *Maytenus boaria* (Chilean mayten)
- *Olea europaea* (Olive)
- *Ostrya carpinifolia* (Hop hornbeam)
- *Parrotia persica* (Persian ironwood)
- *Paulownia tomentosa* (Foxglove tree)
- *Pinus nigra* (Black pine)
- *Pinus pinea* (Stone pine)
- *Pinus sylvestris* (Scots pine)
- *Platanus x hispanica* (London plane)
- *Platanus orientalis* (Oriental plane)
- *Prunus cerasifera* (Cherry plum)
- *Prunus dulcis* (Almond)
- *Prunus fruticosa* (Steppe cherry)
- *Prunus sargentii* (Sargent's cherry)
- *Prunus x schmittii* (Hybrid cherry)
- *Pyrus calleryana* (Callery pear)
- *Quercus acutissima* (Sawtooth oak)
- *Quercus bicolor* (Swamp white oak)
- *Quercus x bimondorum* (Hybrid oak)
- *Quercus castaneifolia* (Chestnut-leaved oak)
- *Quercus cerris* (Turkey oak)
- *Quercus coccinea* (Scarlet oak)
- *Quercus frainetto* (Hungarian oak)
- *Quercus x hispanica* (Spanish oak)
- *Quercus ilex* (Holm oak)
- *Quercus palustris* (Pin oak)
- *Quercus petraea* (Sessile oak)
- *Quercus phellos* (Willow oak)
- *Quercus suber* (Cork oak)
- *Quercus x turneri* (Turner's oak)
- *Robinia pseudoacacia* (False acacia)
- *Sorbus aria* (Whitebeam)
- *Sorbus intermedia* (Swedish whitebeam)
- *Sorbus* 'Joseph Rock' (Hybrid Sorbus)
- *Sorbus latifolia* (Broad-leaved whitebeam)
- *Sorbus thibetica* (Tibetan whitebeam)
- *Sorbus x thuringiaca* (Hybrid Sorbus)
- *Sorbus torminalis* (Wild service tree)
- *Styphnolobium japonicum* (Japanese pagoda tree)
- *Syringa reticulata* (Japanese tree lilac)
- *Tilia mongolica* (Mongolian lime)
- *Tilia tomentosa* (Silver lime)
- *Ulmus* – resistant cultivars (Elms)
- *Zelkova serrata* (Japanese zelkova)

SuDS

- *Acacia dealbata* (Silver wattle)
- *Acer x freemanii* (Freeman's maple)
- *Acer negundo* (Box elder)
- *Acer rubrum* (Red maple)
- *Acer saccharinum* (Silver maple)
- *Acer x zoeschense* (Zoeschen maple)
- *Alnus cordata* (Italian alder)
- *Alnus incana* (Grey alder)
- *Alnus x spaethii* (Spaeth alder)
- *Gleditsia triacanthos* (Honey locust)
- *Liquidambar styraciflua* (Sweetgum)
- *Platanus x hispanica* (London plane)
- *Platanus orientalis* (Oriental plane)
- *Quercus bicolor* (Swamp white oak)
- *Quercus palustris* (Pin oak)
- *Quercus phellos* (Willow oak)

Small garden

- *Abies koreana* (Korean fir)
- *Acer capillipes* (Red snake-bark maple)
- *Acer davidii* (Père David's maple)
- *Acer griseum* (Paperbark maple)
- *Acer japonicum* (Full moon maple)
- *Acer palmatum* (Japanese maple)
- *Acer rufinerve* (Grey-budded snake-bark maple)
- *Acer shirasawanum* (Shirasawa's maple)
- *Acer tataricum* (Tatarian maple)
- *Acer tataricum subsp. ginnala* (Amur maple)
- *Acer triflorum* (Three-flowered maple)
- *Aesculus parviflora* (Dwarf horse chestnut)
- *Aesculus pavia* (Red buckeye)
- *Amelanchier alnifolia* (Alder-leaved serviceberry)
- *Amelanchier arborea* (Downey serviceberry)
- *Amelanchier canadensis* (Canadian serviceberry)
- *Amelanchier lamarckii* (Serviceberry)
- *Aralia elata* (Angelica tree)
- *Arbutus unedo* (Strawberry tree)
- *Betula nigra* (River birch)
- *Betula utilis* subsp. *albosinensis* (Chinese red birch)

Use the symbols to go to a Profile page, and the top menu to return.

All species listed are suitable for planting in parks

Small garden continued

- *Betula utilis* subsp. *jacquemontii* (White-barked Himalayan birch)
- *Betula utilis* subsp. *utilis* (Himalayan birch)
- *Buxus sempervirens* (Box)
- *Cercis canadensis* (North American redbud)
- *Cercis siliquastrum* (Judas tree)
- x *Chitalpa tashkentensis* (Chitalpa)
- *Clerodendrum trichotomum* (Harlequin glorybower)
- *Cornus alternifolia* (Alternate leaf dogwood)
- *Cornus 'Eddie's white wonder'* (Hybrid dogwood)
- *Cornus florida* (Flowering dogwood)
- *Cornus kousa* (Chinese dogwood)
- *Cornus mas* (Cornelian cherry dogwood)
- *Corylus avellana* (Hazel)
- *Corylus colurna* (Turkish hazel)
- *Corylus maxima* (Filbert)
- *Cotoneaster frigidus* (Tree cotoneaster)
- *Crataegus* x *grignonensis* (Grignon hawthorn)
- *Crataegus laevigata* (Woodland hawthorn)
- *Crataegus* x *lavalleei* (Lavallée hawthorn)
- *Crataegus* x *media* (Red thorn)
- *Crataegus monogyna* (Common hawthorn)
- *Crataegus* x *persimilis* (Broad-leaved cockspur thorn)
- *Cydonia oblonga* (Common quince)
- *Elaeagnus angustifolia* (Russian olive)
- *Euonymus europaeus* (Common spindle tree)
- *Ficus carica* (Common fig)
- *Hamamelis* x *intermedia* (Hybrid witch hazel)
- *Heptacodium miconioides* (Seven-son flower)
- *Ilex* x *altaclerensis* group (Hybrid holly)
- *Ilex aquifolium* (European holly)
- *Ilex* x *aquipernyi* 'Dragon Lady' (Hybrid holly)
- *Ilex* x *koehneana* 'Chestnut Leaf' (Chestnut leaved holly)
- *Ilex* 'Nellie R. Stevens' (Hybrid holly)
- *Juniperus communis* (Common juniper)
- *Juniperus scopulorum* (Rocky mountain juniper)
- *Juniperus virginiana* (Eastern red cedar)
- *Laburnum anagyroides* (Common laburnum)
- *Laburnum* x *watereri* (Hybrid laburnum)
- *Ligustrum japonicum* (Japanese tree privet)
- *Ligustrum lucidum* (Chinese privet)
- *Magnolia acuminata* (Cucumber tree)
- *Magnolia denudata* (Yulan magnolia)
- *Magnolia* 'Elizabeth' (Hybrid magnolia)
- *Magnolia* 'Galaxy' (Hybrid magnolia)
- *Magnolia* 'Heaven Scent' (Hybrid magnolia)
- *Magnolia kobus* (Kobushi magnolia)
- *Magnolia* x *loebneri* (Loebner magnolia)
- *Magnolia* x *soulangeana* (Saucer magnolia)
- *Magnolia* 'Spectrum' (Hybrid magnolia)
- *Magnolia* 'Star Wars' (Hybrid magnolia)
- *Magnolia stellata* (Star magnolia)
- *Magnolia* 'Susan' (Hybrid magnolia)
- *Magnolia* 'Yellow Bird' (Hybrid magnolia)
- *Malus baccata* (Siberian crabapple)
- *Malus cultivars* (Apples and crabapples)
- *Malus hupehensis* (Chinese crabapple)
- *Malus sylvestris* (European crabapple)
- *Malus toringo* (Toringo crabapple)
- *Malus trilobata* (Lebanese wild apple)
- *Malus yunnanensis* (Yunnan crabapple)
- *Maytenus boaria* (Chilean mayten)
- *Mespilus germanica* (Medlar)
- *Olea europaea* (Olive)
- *Phellodendron amurense* (Amur cork tree)
- *Prunus* 'Accolade' (Hybrid cherry)
- *Prunus cerasifera* (Cherry plum)
- *Prunus domestica* (Common plum)
- *Prunus dulcis* (Almond)
- *Prunus fruticosa* (Steppe cherry)
- *Prunus laurocerasus* (Cherry laurel)
- *Prunus lusitanica* (Portugal laurel)
- *Prunus maackii* (Manchurian cherry)
- *Prunus* 'Okame' (Hybrid cherry)
- *Prunus* 'Pandora' (Hybrid cherry)
- *Prunus sargentii* (Sargent's cherry)
- *Prunus* x *schmittii* (Hybrid cherry)
- *Prunus serrula* (Tibetan cherry)
- *Prunus serrulata* (Japanese cherry)
- *Prunus* x *subhirtella* (Hybrid cherry)
- *Prunus* 'Umineko' (Hybrid cherry)
- *Prunus* x *yedoensis* (Yoshino cherry)
- *Pyrus calleryana* (Callery pear)
- *Pyrus communis* (Common pear)
- *Pyrus salicifolia* (Willow-leaved pear)
- *Quercus acutissima* (Sawtooth oak)
- *Rhus typhina* (Staghorn sumac)
- *Sorbus aria* (Whitebeam)
- *Sorbus* x *arnoldiana* (Hybrid Sorbus)
- *Sorbus aucuparia* (Rowan)
- *Sorbus cashmiriana* (Kashmir rowan)
- *Sorbus commixta* (Japanese rowan)
- *Sorbus discolor* (Chinese rowan)
- *Sorbus intermedia* (Swedish whitebeam)
- *Sorbus* 'Joseph Rock' (Hybrid Sorbus)
- *Sorbus pseudohupehensis* (Hupeh rowan)
- *Sorbus thibetica* (Tibetan whitebeam)
- *Sorbus* x *thuringiaca* (Hybrid Sorbus)
- *Sorbus vilmorinii* (Vilmorin's rowan)
- *Stewartia pseudocamellia* (Japanese stewartia)
- *Stewartia sinensis* (Chinese stewartia)
- *Styrax japonicus* (Japanese snowball tree)
- *Syringa* x *chinensis* (Chinese lilac)
- *Syringa reticulata* (Japanese tree lilac)
- *Syringa vulgaris* (Common lilac)
- *Tamarix gallica* (French tamarisk)
- *Tamarix ramosissima* (Salt cedar)
- *Tamarix tetrandra* (Four-stamen tamarisk)
- *Taxus baccata* (Common yew)
- *Tilia henryana* (Henry's lime)
- *Tilia mongolica* (Mongolian lime)

Coastal

- *Acer monspessulanum* (Montpellier maple)
- *Acer pseudoplatanus* (Sycamore)
- *Acer tataricum* (Tatarian maple)
- *Acer tataricum subsp. ginnala* (Amur maple)
- *Ailanthus altissima* (Tree of heaven)
- *Alnus cordata* (Italian alder)
- *Alnus incana* (Grey alder)
- *Alnus* x *spaethii* (Spaeth alder)
- *Amelanchier canadensis* (Canadian serviceberry)
- *Araucaria araucana* (Monkey puzzle)
- *Cercis siliquastrum* (Judas tree)
- *Crataegus* x *grignonensis* (Grignon hawthorn)
- *Crataegus laevigata* (Woodland hawthorn)
- *Crataegus* x *lavalleei* (Lavallée hawthorn)
- *Crataegus* x *media* (Red thorn)
- *Crataegus monogyna* (Common hawthorn)
- *Crataegus* x *persimilis* (Broad-leaved cockspur thorn)
- *Cupressus macrocarpa* (Monterey cypress)
- x *Cuprocyparis leylandii* (Leyland cypress)
- *Elaeagnus angustifolia* (Russian olive)
- *Euonymus europaeus* (Common spindle tree)
- *Gleditsia triacanthos* (Honey locust)

Use the symbols to go to a Profile page, and the top menu to return.

All species listed are suitable for planting in parks

Coastal continued

- ***Hippophaë salicifolia*** (Willow-leaved sea buckthorn)
- ***Ilex* x *altaclerensis* group** (Hybrid holly)
- ***Ilex aquifolium*** (European holly)
- ***Ilex* x *aquipernyi* 'Dragon Lady'** (Hybrid holly)
- ***Ilex* x *koehneana* 'Chestnut Leaf'** (Chestnut leaved holly)
- ***Ilex* 'Nellie R. Stevens'** (Hybrid holly)
- ***Juniperus virginiana*** (Eastern red cedar)
- ***Maytenus boaria*** (Chilean mayten)
- ***Olea europaea*** (Olive)
- ***Ostrya carpinifolia*** (Hop hornbeam)
- ***Picea sitchensis*** (Sitka spruce)
- ***Pinus nigra*** (Black pine)
- ***Pinus pinaster*** (Maritime pine)
- ***Pinus pinea*** (Stone pine)
- ***Pinus radiata*** (Monterey pine)
- ***Populus alba*** (White poplar)
- ***Populus* x *canadensis*** (Hybrid poplar)
- ***Populus nigra*** (Black poplar)
- ***Populus tremula*** (Eurasian aspen)
- ***Prunus lusitanica*** (Portugal laurel)
- ***Pyrus calleryana*** (Callery pear)
- ***Pyrus communis*** (Common pear)
- ***Pyrus salicifolia*** (Willow-leaved pear)
- ***Quercus cerris*** (Turkey oak)
- ***Quercus ilex*** (Holm oak)
- ***Quercus petraea*** (Sessile oak)
- ***Sequoia sempervirens*** (Coastal redwood)
- ***Sorbus intermedia*** (Swedish whitebeam)
- ***Sorbus latifolia*** (Broad-leaved whitebeam)
- ***Sorbus torminalis*** (Wild service tree)
- ***Tamarix gallica*** (French tamarisk)
- ***Tamarix ramosissima*** (Salt cedar)
- ***Tamarix tetrandra*** (Four-stamen tamarisk)
- ***Tilia cordata*** (Small-leaved lime)
- ***Tilia* x *euchlora*** (Caucasian lime)
- ***Tilia tomentosa*** (Silver lime)
- ***Ulmus* – resistant cultivars** (Elms)

Transport corridor

- ***Acer buergerianum*** (Trident maple)
- ***Acer campestre*** (Field maple)
- ***Acer rubrum*** (Red maple)
- ***Acer tataricum*** (Tatarian maple)
- ***Acer tataricum* subsp. *ginnala*** (Amur maple)
- ***Ailanthus altissima*** (Tree of heaven)
- ***Alnus glutinosa*** (Common alder)
- ***Alnus incana*** (Grey alder)
- ***Alnus* x *spaethii*** (Spaeth alder)
- ***Amelanchier arborea*** (Downey serviceberry)
- ***Betula nigra*** (River birch)
- ***Betula pendula* subsp. *pendula*** (Silver birch)
- ***Celtis australis*** (Nettle tree)
- ***Crataegus* x *grignonensis*** (Grignon hawthorn)
- ***Crataegus laevigata*** (Woodland hawthorn)
- ***Crataegus* x *lavalleei*** (Lavallée hawthorn)
- ***Crataegus* x *media*** (Red thorn)
- ***Crataegus monogyna*** (Common hawthorn)
- ***Crataegus* x *persimilis*** (Broad-leaved cockspur thorn)
- ***Cupressus arizonica*** (Arizona cypress)
- **x *Cuprocyparis leylandii*** (Leyland cypress)
- ***Elaeagnus angustifolia*** (Russian olive)
- ***Eucalyptus gunnii* subsp. *gunnii*** (Cider gum)
- ***Eucommia ulmoides*** (Guttapercha)
- ***Euonymus europaeus*** (Common spindle tree)
- ***Ginkgo biloba*** (Maidenhair tree)
- ***Gleditsia triacanthos*** (Honey locust)
- ***Gymnocladus dioica*** (Kentucky coffee tree)
- ***Hippophaë salicifolia*** (Willow-leaved sea buckthorn)
- ***Juniperus virginiana*** (Eastern red cedar)
- ***Koelreuteria paniculata*** (Golden rain tree)
- ***Liquidambar styraciflua*** (Sweetgum)
- ***Maytenus boaria*** (Chilean mayten)
- ***Ostrya carpinifolia*** (Hop hornbeam)
- ***Pinus nigra*** (Black pine)
- ***Pinus pinaster*** (Maritime pine)
- ***Pinus pinea*** (Stone pine)
- ***Pinus radiata*** (Monterey pine)
- ***Platanus* x *hispanica*** (London plane)
- ***Platanus orientalis*** (Oriental plane)
- ***Populus alba*** (White poplar)
- ***Populus nigra*** (Black poplar)
- ***Populus tremula*** (Eurasian aspen)
- ***Prunus cerasifera*** (Cherry plum)
- ***Pyrus calleryana*** (Callery pear)
- ***Quercus acutissima*** (Sawtooth oak)
- ***Quercus bicolor*** (Swamp white oak)
- ***Quercus* x *bimondorum*** (Hybrid oak)
- ***Quercus castaneifolia*** (Chestnut-leaved oak)
- ***Quercus cerris*** (Turkey oak)
- ***Quercus coccinea*** (Scarlet oak)
- ***Quercus frainetto*** (Hungarian oak)
- ***Quercus* x *hispanica*** (Spanish oak)
- ***Quercus ilex*** (Holm oak)
- ***Quercus palustris*** (Pin oak)
- ***Quercus petraea*** (Sessile oak)
- ***Quercus phellos*** (Willow oak)
- ***Quercus robur*** (Pedunculate oak)
- ***Quercus rubra*** (Red oak)
- ***Quercus suber*** (Cork oak)
- ***Quercus* x *turneri*** (Turner's oak)
- ***Rhus typhina*** (Staghorn sumac)
- ***Robinia pseudoacacia*** (False acacia)
- ***Sorbus intermedia*** (Swedish whitebeam)
- ***Sorbus latifolia*** (Broad-leaved whitebeam)
- ***Styphnolobium japonicum*** (Japanese pagoda tree)
- ***Syringa reticulata*** (Japanese tree lilac)
- ***Tamarix gallica*** (French tamarisk)
- ***Tamarix ramosissima*** (Salt cedar)
- ***Tamarix tetrandra*** (Four-stamen tamarisk)
- ***Taxodium distichum*** (Swamp cypress)
- ***Tilia cordata*** (Small-leaved lime)
- ***Tilia* x *euchlora*** (Caucasian lime)
- ***Tilia tomentosa*** (Silver lime)
- ***Ulmus* – resistant cultivars** (Elms)
- ***Zelkova serrata*** (Japanese zelkova)

Use the symbols to go to a Profile page, and the top menu to return.



>25M

A massive tree (capable of reaching >25m)

- *Abies concolor* (White fir)
- *Abies grandis* (Grand fir)
- *Abies nordmanniana* (Nordmann fir)
- *Abies procera* (Noble fir)
- *Aesculus hippocastanum* (Horse chestnut)
- *Aesculus indica* (Indian horse chestnut)
- *Ailanthus altissima* (Tree of heaven)
- *Alnus incana* (Grey alder)
- *Araucaria araucana* (Monkey puzzle)
- *Castanea sativa* (Sweet chestnut)
- *Cedrus atlantica* (Atlas cedar)
- *Cedrus deodara* (Himalayan cedar)
- *Cedrus libani* (Cedar of Lebanon)
- *Chamaecyparis lawsoniana* (Lawson cypress)
- *Cryptomeria japonica* (Japanese cedar)
- *Cupressus macrocarpa* (Monterey cypress)
- *Fagus orientalis* (Oriental beech)
- *Fagus sylvatica* (Common beech)
- *Juglans nigra* (Black walnut)
- *Juglans regia* (Common walnut)
- *Larix decidua* (Common larch)
- *Larix kaempferi* (Japanese larch)
- *Larix* x *marschlinsii* (Hybrid larch)
- *Magnolia acuminata* (Cucumber tree)
- *Metasequoia glyptostroboides* (Dawn redwood)
- *Picea abies* (Norway spruce)
- *Picea breweriana* (Brewer spruce)
- *Picea omorika* (Serbian spruce)
- *Picea orientalis* (Caucasian spruce)
- *Picea pungens* (Colorado blue spruce)
- *Picea sitchensis* (Sitka spruce)
- *Pinus nigra* (Black pine)
- *Pinus pinaster* (Maritime pine)
- *Pinus radiata* (Monterey pine)
- *Pinus strobus* (Eastern white pine)
- *Pinus sylvestris* (Scots pine)
- *Platanus* x *hispanica* (London plane)
- *Platanus orientalis* (Oriental plane)
- *Populus* x *canadensis* (Hybrid poplar)
- *Populus nigra* (Black poplar)
- *Populus tremula* (Eurasian aspen)
- *Pseudotsuga menziesii* (Douglas fir)
- *Pterocarya fraxinifolia* (Caucasian wing-nut)
- *Pterocarya stenoptera* (Chinese wing-nut)
- *Quercus castaneifolia* (Chestnut-leaved oak)
- *Quercus cerris* (Turkey oak)
- *Quercus* x *hispanica* (Spanish oak)
- *Quercus petraea* (Sessile oak)
- *Quercus robur* (Pedunculate oak)
- *Salix alba* (White willow)
- *Sequoia sempervirens* (Coastal redwood)
- *Sequoiadendron giganteum* (Giant sequoia)
- *Taxodium distichum* (Swamp cypress)
- *Tilia americana* (American basswood)
- *Tilia cordata* (Small-leaved lime)
- *Tilia* x *europaea* (Common lime)
- *Tilia platyphyllos* (Large-leaved lime)
- *Tilia tomentosa* (Silver lime)
- *Tsuga canadensis* (Eastern hemlock)
- *Tsuga heterophylla* (Western hemlock)



15-25M

A large tree (mature size of 15-25m)

- *Abies fraseri* (Fraser fir)
- *Acer buergerianum* (Trident maple)
- *Acer cappadocicum* (Caucasian maple)
- *Acer* x *freemanii* (Freeman's maple)
- *Acer negundo* (Box elder)
- *Acer platanoides* (Norway maple)
- *Acer pseudoplatanus* (Sycamore)
- *Acer rubrum* (Red maple)
- *Acer saccharinum* (Silver maple)
- *Acer saccharum* (Sugar maple)
- *Acer* x *zoeschense* (Zoeschen maple)
- *Aesculus* x *carnea* (Red horse chestnut)
- *Aesculus flava* (Yellow buckeye)
- *Alnus cordata* (Italian alder)
- *Alnus glutinosa* (Common alder)
- *Alnus* x *spaethii* (Spaeth alder)
- *Betula ermanii* (Stone birch)
- *Betula lenta* (Cherry birch)
- *Betula maximowicziana* (Monarch birch)
- *Betula papyrifera* (Paper birch)
- *Betula pendula* subsp. *pendula* (Silver birch)
- *Betula pendula* subsp. *szechuanica* (Chinese white birch)
- *Betula pubescens* (Downy birch)
- *Betula utilis* subsp. *utilis* (Himalayan birch)
- *Carpinus betulus* (Hornbeam)
- *Carya illinoinensis* (Pecan)
- *Carya ovata* (Shagbark hickory)
- *Catalpa speciosa* (Northern catalpa)
- *Celtis australis* (Nettle tree)
- *Celtis occidentalis* (Common hackberry)
- *Cercidiphyllum japonicum* (Katsura tree)
- *Corylus colurna* (Turkish hazel)
- *Cupressus arizonica* (Arizona cypress)
- *Cupressus sempervirens* (Mediterranean cypress)
- x *Cuprocyparis leylandii* (Leyland cypress)
- *Davidia involucrata* (Pocket handkerchief tree)
- *Eucalyptus gunnii* subsp. *gunnii* (Cider gum)
- *Eucommia ulmoides* (Guttapercha)
- *Ginkgo biloba* (Maidenhair tree)
- *Gleditsia triacanthos* (Honey locust)
- *Gymnocladus dioica* (Kentucky coffee tree)
- *Ilex aquifolium* (European holly)
- *Juniperus virginiana* (Eastern red cedar)
- *Koelreuteria paniculata* (Golden rain tree)
- *Liquidambar styraciflua* (Sweetgum)
- *Liriodendron tulipifera* (Tulip tree)
- *Magnolia grandiflora* (Southern magnolia)
- *Nyssa sylvatica* (Black tupelo)
- *Ostrya carpinifolia* (Hop hornbeam)
- *Paulownia tomentosa* (Foxglove tree)
- *Pinus pinea* (Stone pine)
- *Pinus wallichiana* (Bhutan pine)
- *Populus alba* (White poplar)
- *Populus* x *candicans* (Ontario poplar)
- *Prunus avium* (Wild cherry)
- *Prunus padus* (Bird cherry)
- *Quercus bicolor* (Swamp white oak)
- *Quercus coccinea* (Scarlet oak)
- *Quercus frainetto* (Hungarian oak)
- *Quercus ilex* (Holm oak)
- *Quercus palustris* (Pin oak)
- *Quercus phellos* (Willow oak)
- *Quercus rubra* (Red oak)
- *Quercus suber* (Cork oak)
- *Robinia pseudoacacia* (False acacia)
- *Salix babylonica* (Weeping willow)
- *Salix pentandra* (Bay-leaved willow)

Use the symbols to go to a Profile page, and the top menu to return.



15-25M

A large tree
continued

- ***Salix* x *sepulcralis*** (Weeping willow)
- ***Sorbus latifolia*** (Broad-leaved whitebeam)
- ***Sorbus torminalis*** (Wild service tree)
- ***Tetradium daniellii*** (Chinese bee tree)
- ***Thuja plicata*** (Western red cedar)
- ***Tilia* x *euchlora*** (Caucasian lime)
- ***Tilia henryana*** (Henry's lime)
- ***Tilia oliveri*** (Chinese white lime)
- ***Ulmus* – resistant cultivars** (Elms)
- ***Zelkova serrata*** (Japanese zelkova)



10-15M

A medium tree (mature size of 10-15m)

- ***Abies koreana*** (Korean fir)
- ***Acacia dealbata*** (Silver wattle)
- ***Acer campestre*** (Field maple)
- ***Acer capillipes*** (Red snake-bark maple)
- ***Acer davidii*** (Père David's maple)
- ***Acer griseum*** (Paperbark maple)
- ***Acer japonicum*** (Full moon maple)
- ***Acer monspessulanum*** (Montpellier maple)
- ***Acer rufinerve*** (Grey-budded snake-bark maple)
- ***Acer tataricum*** (Tatarian maple)
- ***Acer triflorum*** (Three-flowered maple)
- ***Aesculus pavia*** (Red buckeye)
- ***Amelanchier arborea*** (Downey serviceberry)
- ***Aralia elata*** (Angelica tree)
- ***Betula nigra*** (River birch)
- ***Betula utilis* subsp. *albosinensis*** (Chinese red birch)
- ***Betula utilis* subsp. *jacquemontii*** (White-barked Himalayan birch)
- ***Buxus sempervirens*** (Box)
- ***Carpinus japonica*** (Japanese hornbeam)
- ***Catalpa bignonioides*** (Indian bean tree)
- ***Catalpa* x *erubescens*** (Hybrid catalpa)
- ***Cladrastis kentukea*** (Yellow wood)
- ***Cornus controversa*** (Wedding cake tree)
- ***Crataegus monogyna*** (Common hawthorn)
- ***Elaeagnus angustifolia*** (Russian olive)
- ***Eucalyptus pauciflora* group** (Snow gums)
- ***Ilex* x *altaclerensis* group** (Hybrid holly)
- ***Ilex* x *koehneana* 'Chestnut Leaf'** (Chestnut leaved holly)
- ***Magnolia denudata*** (Yulan magnolia)
- ***Magnolia* 'Elizabeth'** (Hybrid magnolia)
- ***Magnolia* 'Heaven Scent'** (Hybrid magnolia)
- ***Magnolia kobus*** (Kobushi magnolia)
- ***Magnolia* x *soulangeana*** (Saucer magnolia)
- ***Magnolia* 'Yellow Bird'** (Hybrid magnolia)
- ***Malus baccata*** (Siberian crabapple)
- ***Malus trilobata*** (Lebanese wild apple)
- ***Morus alba*** (White mulberry)
- ***Morus nigra*** (Black mulberry)
- ***Nothofagus antarctica*** (Antarctic beech)
- ***Parrotia persica*** (Persian ironwood)
- ***Phellodendron amurense*** (Amur cork tree)
- ***Prunus lusitanica*** (Portugal laurel)
- ***Prunus maackii*** (Manchurian cherry)
- ***Prunus sargentii*** (Sargent's cherry)
- ***Prunus* x *schmittii*** (Hybrid cherry)
- ***Prunus serrulata*** (Japanese cherry)
- ***Prunus* x *subhirtella*** (Hybrid cherry)
- ***Prunus* x *yedoensis*** (Yoshino cherry)
- ***Pyrus calleryana*** (Callery pear)
- ***Pyrus communis*** (Common pear)
- ***Quercus acutissima*** (Sawtooth oak)
- ***Quercus* x *bimondorum*** (Hybrid oak)
- ***Quercus* x *turneri*** (Turner's oak)
- ***Salix daphnoides*** (Violet willow)
- ***Sorbus aria*** (Whitebeam)
- ***Sorbus* x *arnoldiana*** (Hybrid Sorbus)
- ***Sorbus aucuparia*** (Rowan)
- ***Sorbus commixta*** (Japanese rowan)
- ***Sorbus intermedia*** (Swedish whitebeam)
- ***Sorbus* 'Joseph Rock'** (Hybrid Sorbus)
- ***Sorbus pseudohupehensis*** (Hupeh rowan)
- ***Sorbus thibetica*** (Tibetan whitebeam)
- ***Sorbus* x *thuringiaca*** (Hybrid Sorbus)
- ***Stewartia pseudocamellia*** (Japanese stewartia)
- ***Styphnolobium japonicum*** (Japanese pagoda tree)
- ***Styrax japonicus*** (Japanese snowball tree)
- ***Taxus baccata*** (Common yew)
- ***Tilia mongolica*** (Mongolian lime)



<10M

A small tree (mature size of <10m)

- ***Acer palmatum*** (Japanese maple)
- ***Acer shirasawanum*** (Shirasawa's maple)
- ***Acer tataricum subsp. ginnala*** (Amur maple)
- ***Aesculus parviflora*** (Dwarf horse chestnut)
- ***Amelanchier alnifolia*** (Alder-leaved serviceberry)
- ***Amelanchier canadensis*** (Canadian serviceberry)
- ***Amelanchier lamarckii*** (Serviceberry)
- ***Arbutus unedo*** (Strawberry tree)
- ***Cercis canadensis*** (North American redbud)
- ***Cercis siliquastrum*** (Judas tree)
- x ***Chitalpa tashkentensis*** (Chitalpa)
- ***Clerodendrum trichotomum*** (Harlequin glorybower)
- ***Cornus alternifolia*** (Alternate leaf dogwood)
- ***Cornus 'Eddie's white wonder'*** (Hybrid dogwood)
- ***Cornus florida*** (Flowering dogwood)
- ***Cornus kousa*** (Chinese dogwood)
- ***Cornus mas*** (Cornelian cherry dogwood)
- ***Corylus avellana*** (Hazel)
- ***Corylus maxima*** (Filbert)
- ***Cotoneaster frigidus*** (Tree cotoneaster)
- ***Crataegus* x *grignonensis*** (Grignon hawthorn)

Use the symbols to go to a Profile page, and the top menu to return.



<10M

A small tree
continued

- ***Crataegus laevigata*** (Woodland hawthorn)
- ***Crataegus* x *lavalleei*** (Lavallée hawthorn)
- ***Crataegus* x *media*** (Red thorn)
- ***Crataegus* x *persimilis*** (Broad-leaved cockspur thorn)
- ***Cydonia oblonga*** (Common quince)
- ***Diospyros kaki*** (Chinese persimmon)
- ***Euonymus europaeus*** (Common spindle tree)
- ***Ficus carica*** (Common fig)
- ***Halesia carolina*** (Carolina silverbell)
- ***Hamamelis* x *intermedia*** (Hybrid witch hazel)
- ***Heptacodium miconioides*** (Seven-son flower)
- ***Hippophaë salicifolia*** (Willow-leaved sea buckthorn)
- ***Ilex* x *aquipernyi* 'Dragon Lady'** (Hybrid holly)
- ***Ilex* 'Nellie R. Stevens'** (Hybrid holly)
- ***Juniperus communis*** (Common juniper)
- ***Juniperus scopulorum*** (Rocky mountain juniper)
- ***Laburnum anagyroides*** (Common laburnum)
- ***Laburnum* x *watereri*** (Hybrid laburnum)
- ***Ligustrum japonicum*** (Japanese tree privet)
- ***Ligustrum lucidum*** (Chinese privet)
- ***Magnolia* 'Galaxy'** (Hybrid magnolia)
- ***Magnolia* x *loebneri*** (Loebner magnolia)
- ***Magnolia* 'Spectrum'** (Hybrid magnolia)
- ***Magnolia* 'Star Wars'** (Hybrid magnolia)
- ***Magnolia stellata*** (Star magnolia)
- ***Magnolia* 'Susan'** (Hybrid magnolia)
- ***Malus cultivars*** (Apples and crabapples)
- ***Malus hupehensis*** (Chinese crabapple)
- ***Malus sylvestris*** (European crabapple)
- ***Malus toringo*** (Toringo crabapple)
- ***Malus yunnanensis*** (Yunnan crabapple)
- ***Maytenus boaria*** (Chilean mayten)
- ***Mespilus germanica*** (Medlar)
- ***Olea europaea*** (Olive)
- ***Prunus* 'Accolade'** (Hybrid cherry)
- ***Prunus cerasifera*** (Cherry plum)
- ***Prunus domestica*** (Common plum)
- ***Prunus dulcis*** (Almond)
- ***Prunus fruticosa*** (Steppe cherry)
- ***Prunus laurocerasus*** (Cherry laurel)
- ***Prunus* 'Okame'** (Hybrid cherry)
- ***Prunus* 'Pandora'** (Hybrid cherry)
- ***Prunus serrula*** (Tibetan cherry)
- ***Prunus* 'Umineko'** (Hybrid cherry)
- ***Pyrus salicifolia*** (Willow-leaved pear)
- ***Rhus typhina*** (Staghorn sumac)
- ***Salix caprea*** (Goat willow)
- ***Sorbus cashmiriana*** (Kashmir rowan)
- ***Sorbus discolor*** (Chinese rowan)
- ***Sorbus vilmorinii*** (Vilmorin's rowan)
- ***Stewartia sinensis*** (Chinese stewartia)
- ***Syringa* x *chinensis*** (Chinese lilac)
- ***Syringa reticulata*** (Japanese tree lilac)
- ***Syringa vulgaris*** (Common lilac)
- ***Tamarix gallica*** (French tamarisk)
- ***Tamarix ramosissima*** (Salt cedar)
- ***Tamarix tetrandra*** (Four-stamen tamarisk)

Use the symbols to go to a Profile page, and the top menu to return.



Globular

- *Acacia dealbata* (Silver wattle)
- *Acer campestre* (Field maple)
- *Acer griseum* (Paperbark maple)
- *Acer japonicum* (Full moon maple)
- *Acer monspessulanum* (Montpellier maple)
- *Acer negundo* (Box elder)
- *Acer palmatum* (Japanese maple)
- *Acer saccharinum* (Silver maple)
- *Acer saccharum* (Sugar maple)
- *Acer shirasawanum* (Shirasawa's maple)
- *Acer triflorum* (Three-flowered maple)
- *Aesculus* x *carnea* (Red horse chestnut)
- *Aesculus hippocastanum* (Horse chestnut)
- *Aesculus indica* (Indian horse chestnut)
- *Aesculus parviflora* (Dwarf horse chestnut)
- *Aesculus pavia* (Red buckeye)
- *Ailanthus altissima* (Tree of heaven)
- *Amelanchier alnifolia* (Alder-leaved serviceberry)
- *Amelanchier lamarckii* (Serviceberry)
- *Arbutus unedo* (Strawberry tree)
- *Betula ermanii* (Stone birch)
- *Betula lenta* (Cherry birch)
- *Buxus sempervirens* (Box)
- *Celtis australis* (Nettle tree)
- *Celtis occidentalis* (Common hackberry)
- *Cercis canadensis* (North American redbud)
- *Cercis siliquastrum* (Judas tree)
- x *Chitalpa tashkentensis* (Chitalpa)
- *Cladrastis kentukea* (Yellow wood)
- *Clerodendrum trichotomum* (Harlequin glorybower)
- *Cornus florida* (Flowering dogwood)
- *Cornus kousa* (Chinese dogwood)
- *Cornus mas* (Cornelian cherry dogwood)
- *Corylus avellana* (Hazel)
- *Corylus maxima* (Filbert)
- *Cotoneaster frigidus* (Tree cotoneaster)
- *Crataegus* x *grignonensis* (Grignon hawthorn)
- *Crataegus laevigata* (Woodland hawthorn)
- *Crataegus* x *lavalleei* (Lavallée hawthorn)
- *Crataegus* x *media* (Red thorn)
- *Crataegus monogyna* (Common hawthorn)
- *Crataegus* x *persimilis* (Broad-leaved cockspur thorn)
- *Cydonia oblonga* (Common quince)
- *Davidia involucrata* (Pocket handkerchief tree)
- *Diospyros kaki* (Chinese persimmon)
- *Elaeagnus angustifolia* (Russian olive)
- *Euonymus europaeus* (Common spindle tree)
- *Fagus orientalis* (Oriental beech)
- *Fagus sylvatica* (Common beech)
- *Ficus carica* (Common fig)
- *Gymnocladus dioica* (Kentucky coffee tree)
- *Juglans nigra* (Black walnut)
- *Juglans regia* (Common walnut)
- *Koelreuteria paniculata* (Golden rain tree)
- *Ligustrum japonicum* (Japanese tree privet)
- *Ligustrum lucidum* (Chinese privet)
- *Magnolia* 'Heaven Scent' (Hybrid magnolia)
- *Magnolia* 'Star Wars' (Hybrid magnolia)
- *Magnolia* 'Susan' (Hybrid magnolia)
- *Malus sylvestris* (European crabapple)
- *Malus toringo* (Toringo crabapple)
- *Morus alba* (White mulberry)
- *Morus nigra* (Black mulberry)
- *Ostrya carpinifolia* (Hop hornbeam)
- *Paulownia tomentosa* (Foxglove tree)
- *Platanus* x *hispanica* (London plane)
- *Platanus orientalis* (Oriental plane)
- *Prunus avium* (Wild cherry)
- *Prunus cerasifera* (Cherry plum)
- *Prunus domestica* (Common plum)
- *Prunus dulcis* (Almond)
- *Prunus fruticosa* (Steppe cherry)
- *Prunus laurocerasus* (Cherry laurel)
- *Prunus lusitanica* (Portugal laurel)
- *Prunus sargentii* (Sargent's cherry)
- *Prunus serrula* (Tibetan cherry)
- *Prunus serrulata* (Japanese cherry)
- *Pterocarya fraxinifolia* (Caucasian wing-nut)
- *Pterocarya stenoptera* (Chinese wing-nut)
- *Quercus castaneifolia* (Chestnut-leaved oak)
- *Quercus cerris* (Turkey oak)
- *Quercus coccinea* (Scarlet oak)
- *Quercus frainetto* (Hungarian oak)
- *Quercus* x *hispanica* (Spanish oak)
- *Quercus ilex* (Holm oak)
- *Quercus palustris* (Pin oak)
- *Quercus petraea* (Sessile oak)
- *Quercus robur* (Pedunculate oak)
- *Quercus rubra* (Red oak)
- *Quercus* x *turneri* (Turner's oak)
- *Salix pentandra* (Bay-leaved willow)
- *Styphnolobium japonicum* (Japanese pagoda tree)
- *Syringa* x *chinensis* (Chinese lilac)
- *Tetradium daniellii* (Chinese bee tree)



Ovoid

- *Acer buergerianum* (Trident maple)
- *Acer cappadocicum* (Caucasian maple)
- *Acer* x *freemanii* (Freeman's maple)
- *Acer platanoides* (Norway maple)
- *Acer pseudoplatanus* (Sycamore)
- *Acer rubrum* (Red maple)
- *Acer* x *zoeschense* (Zoeschen maple)
- *Aesculus flava* (Yellow buckeye)
- *Amelanchier arborea* (Downey serviceberry)
- *Betula maximowicziana* (Monarch birch)
- *Betula nigra* (River birch)
- *Betula papyrifera* (Paper birch)
- *Betula utilis* subsp. *albosinensis* (Chinese red birch)
- *Betula utilis* subsp. *jacquemontii* (White-barked Himalayan birch)
- *Betula utilis* subsp. *utilis* (Himalayan birch)
- *Carpinus betulus* (Hornbeam)
- *Carya illinoinensis* (Pecan)
- *Carya ovata* (Shagbark hickory)
- *Castanea sativa* (Sweet chestnut)
- *Catalpa* x *erubescens* (Hybrid catalpa)
- *Catalpa speciosa* (Northern catalpa)

Use the symbols to go to a Profile page, and the top menu to return.

Ovoid
continued

- *Cercidiphyllum japonicum* (Katsura tree)
- *Cornus 'Eddie's white wonder'* (Hybrid dogwood)
- *Eucalyptus gunnii* subsp. *gunnii* (Cider gum)
- *Eucommia ulmoides* (Guttapercha)
- *Ginkgo biloba* (Maidenhair tree)
- *Gleditsia triacanthos* (Honey locust)
- *Liriodendron tulipifera* (Tulip tree)
- *Magnolia acuminata* (Cucumber tree)
- *Magnolia* 'Galaxy' (Hybrid magnolia)
- *Magnolia grandiflora* (Southern magnolia)
- *Magnolia kobus* (Kobushi magnolia)
- *Magnolia* x *loebneri* (Loebner magnolia)
- *Magnolia* x *soulangeana* (Saucer magnolia)
- *Magnolia* 'Spectrum' (Hybrid magnolia)
- *Magnolia stellata* (Star magnolia)
- *Malus baccata* (Siberian crabapple)
- *Malus cultivars* (Apples and crabapples)
- *Malus yunnanensis* (Yunnan crabapple)
- *Maytenus boaria* (Chilean mayten)
- *Nothofagus antarctica* (Antarctic beech)
- *Nyssa sylvatica* (Black tupelo)
- *Populus alba* (White poplar)
- *Populus* x *canadensis* (Hybrid poplar)
- *Populus* x *candicans* (Ontario poplar)
- *Populus nigra* (Black poplar)
- *Populus tremula* (Eurasian aspen)
- *Prunus maackii* (Manchurian cherry)
- *Prunus padus* (Bird cherry)
- *Pyrus calleryana* (Callery pear)
- *Pyrus communis* (Common pear)
- *Quercus acutissima* (Sawtooth oak)
- *Quercus bicolor* (Swamp white oak)
- *Quercus* x *bimondorum* (Hybrid oak)
- *Quercus phellos* (Willow oak)
- *Salix daphnoides* (Violet willow)
- *Sorbus aria* (Whitebeam)
- *Sorbus* x *arnoldiana* (Hybrid Sorbus)
- *Sorbus aucuparia* (Rowan)
- *Sorbus commixta* (Japanese rowan)
- *Sorbus discolor* (Chinese rowan)
- *Sorbus intermedia* (Swedish whitebeam)
- *Sorbus* 'Joseph Rock' (Hybrid Sorbus)
- *Sorbus latifolia* (Broad-leaved whitebeam)
- *Sorbus pseudohupehensis* (Hupeh rowan)
- *Sorbus thibetica* (Tibetan whitebeam)
- *Sorbus* x *thuringiaca* (Hybrid Sorbus)
- *Sorbus torminalis* (Wild service tree)
- *Sorbus vilmorinii* (Vilmorin's rowan)
- *Stewartia pseudocamellia* (Japanese stewartia)
- *Stewartia sinensis* (Chinese stewartia)
- *Syringa reticulata* (Japanese tree lilac)
- *Syringa vulgaris* (Common lilac)
- *Tilia americana* (American basswood)
- *Tilia cordata* (Small-leaved lime)
- *Tilia* x *euchlora* (Caucasian lime)
- *Tilia* x *europaea* (Common lime)
- *Tilia henryana* (Henry's lime)
- *Tilia mongolica* (Mongolian lime)
- *Tilia oliveri* (Chinese white lime)
- *Tilia platyphyllos* (Large-leaved lime)
- *Tilia tomentosa* (Silver lime)

Obovoid

- *Acer capillipes* (Red snake-bark maple)
- *Acer davidii* (Père David's maple)
- *Acer rufinerve* (Grey-budded snake-bark maple)
- *Acer tataricum* (Tatarian maple)
- *Acer tataricum subsp. ginnala* (Amur maple)
- *Laburnum anagyroides* (Common laburnum)
- *Laburnum* x *watereri* (Hybrid laburnum)
- *Phellodendron amurense* (Amur cork tree)
- *Prunus* 'Accolade' (Hybrid cherry)
- *Prunus* 'Okame' (Hybrid cherry)
- *Prunus* 'Pandora' (Hybrid cherry)
- *Prunus* x *schmittii* (Hybrid cherry)
- *Prunus* x *subhirtella* (Hybrid cherry)
- *Prunus* 'Umineko' (Hybrid cherry)
- *Prunus* x *yedoensis* (Yoshino cherry)

Conical

- *Abies concolor* (White fir)
- *Abies fraseri* (Fraser fir)
- *Abies grandis* (Grand fir)
- *Abies koreana* (Korean fir)
- *Abies nordmanniana* (Nordmann fir)
- *Abies procera* (Noble fir)
- *Alnus cordata* (Italian alder)
- *Alnus glutinosa* (Common alder)
- *Alnus incana* (Grey alder)
- *Alnus* x *spaethii* (Spaeth alder)
- *Araucaria araucana* (Monkey puzzle)
- *Cedrus atlantica* (Atlas cedar)
- *Cedrus deodara* (Himalayan cedar)
- *Cedrus libani* (Cedar of Lebanon)
- *Chamaecyparis lawsoniana* (Lawson cypress)
- *Corylus colurna* (Turkish hazel)
- *Cryptomeria japonica* (Japanese cedar)
- *Cupressus arizonica* (Arizona cypress)
- *Cupressus macrocarpa* (Monterey cypress)
- *Ilex* x *altaclerensis* group (Hybrid holly)
- *Ilex aquifolium* (European holly)
- *Ilex* x *aquipernyi* 'Dragon Lady' (Hybrid holly)
- *Ilex* x *koehneana* 'Chestnut Leaf' (Chestnut leaved holly)
- *Ilex* 'Nellie R. Stevens' (Hybrid holly)
- *Juniperus communis* (Common juniper)
- *Juniperus scopulorum* (Rocky mountain juniper)
- *Juniperus virginiana* (Eastern red cedar)
- *Larix decidua* (Common larch)
- *Larix kaempferi* (Japanese larch)
- *Larix* x *marschlinsii* (Hybrid larch)
- *Liquidambar styraciflua* (Sweetgum)
- *Magnolia* 'Elizabeth' (Hybrid magnolia)
- *Magnolia* 'Yellow Bird' (Hybrid magnolia)
- *Malus trilobata* (Lebanese wild apple)
- *Metasequoia glyptostroboides* (Dawn redwood)
- *Picea abies* (Norway spruce)
- *Picea breweriana* (Brewer spruce)
- *Picea omorika* (Serbian spruce)
- *Picea orientalis* (Caucasian spruce)
- *Picea pungens* (Colorado blue spruce)
- *Picea sitchensis* (Sitka spruce)
- *Pinus nigra* (Black pine)
- *Pinus pinaster* (Maritime pine)
- *Pinus strobus* (Eastern white pine)

Use the symbols to go to a Profile page, and the top menu to return.



Conical continued

- ***Pinus sylvestris*** (Scots pine)
- ***Pinus wallichiana*** (Bhutan pine)
- ***Pseudotsuga menziesii*** (Douglas fir)
- ***Sequoia sempervirens*** (Coastal redwood)
- ***Sequoiadendron giganteum*** (Giant sequoia)
- ***Taxodium distichum*** (Swamp cypress)
- ***Thuja plicata*** (Western red cedar)
- ***Tsuga canadensis*** (Eastern hemlock)
- ***Tsuga heterophylla*** (Western hemlock)



Columnar

- ***Betula pendula* subsp. *pendula*** (Silver birch)
- ***Betula pendula* subsp. *szechuanica*** (Chinese white birch)
- ***Cupressus sempervirens*** (Mediterranean cypress)
- x ***Cuprocyparis leylandii*** (Leyland cypress)



Irregular

- ***Betula pubescens*** (Downy birch)
- ***Catalpa bignonioides*** (Indian bean tree)
- ***Cornus alternifolia*** (Alternate leaf dogwood)
- ***Cornus controversa*** (Wedding cake tree)
- ***Halesia carolina*** (Carolina silverbell)
- ***Hippophaë salicifolia*** (Willow-leaved sea buckthorn)
- ***Magnolia denudata*** (Yulan magnolia)
- ***Malus hupehensis*** (Chinese crabapple)
- ***Mespilus germanica*** (Medlar)
- ***Olea europaea*** (Olive)
- ***Parrotia persica*** (Persian ironwood)
- ***Pinus radiata*** (Monterey pine)
- ***Quercus suber*** (Cork oak)
- ***Salix alba*** (White willow)
- ***Salix caprea*** (Goat willow)
- ***Sorbus cashmiriana*** (Kashmir rowan)
- ***Styrax japonicus*** (Japanese snowball tree)
- ***Tamarix gallica*** (French tamarisk)
- ***Tamarix ramosissima*** (Salt cedar)
- ***Tamarix tetrandra*** (Four-stamen tamarisk)
- ***Taxus baccata*** (Common yew)
- ***Ulmus* – resistant cultivars** (Elms)



Weeping

- ***Pyrus salicifolia*** (Willow-leaved pear)
- ***Salix babylonica*** (Weeping willow)
- ***Salix* x *sepulcralis*** (Weeping willow)



Vase shaped

- ***Amelanchier canadensis*** (Canadian serviceberry)
- ***Aralia elata*** (Angelica tree)
- ***Carpinus japonica*** (Japanese hornbeam)
- ***Eucalyptus pauciflora* group** (Snow gums)
- ***Hamamelis* x *intermedia*** (Hybrid witch hazel)
- ***Heptacodium miconioides*** (Seven-son flower)
- ***Pinus pinea*** (Stone pine)
- ***Rhus typhina*** (Staghorn sumac)
- ***Robinia pseudoacacia*** (False acacia)
- ***Zelkova serrata*** (Japanese zelkova)

Use the symbols to go to a Profile page, and the top menu to return.



A dense crown

- ***Abies concolor*** (White fir)
- ***Abies fraseri*** (Fraser fir)
- ***Abies grandis*** (Grand fir)
- ***Abies koreana*** (Korean fir)
- ***Abies nordmanniana*** (Nordmann fir)
- ***Abies procera*** (Noble fir)
- ***Acer buergerianum*** (Trident maple)
- ***Acer campestre*** (Field maple)
- ***Acer capillipes*** (Red snake-bark maple)
- ***Acer japonicum*** (Full moon maple)
- ***Acer monspessulanum*** (Montpellier maple)
- ***Acer platanoides*** (Norway maple)
- ***Acer pseudoplatanus*** (Sycamore)
- ***Acer saccharum*** (Sugar maple)
- ***Acer shirasawanum*** (Shirasawa's maple)
- ***Acer tataricum subsp. ginnala*** (Amur maple)
- ***Aesculus* x *carnea*** (Red horse chestnut)
- ***Aesculus flava*** (Yellow buckeye)
- ***Aesculus hippocastanum*** (Horse chestnut)
- ***Aesculus indica*** (Indian horse chestnut)
- ***Aesculus parviflora*** (Dwarf horse chestnut)
- ***Aesculus pavia*** (Red buckeye)
- ***Araucaria araucana*** (Monkey puzzle)
- ***Arbutus unedo*** (Strawberry tree)
- ***Buxus sempervirens*** (Box)
- ***Carpinus betulus*** (Hornbeam)
- ***Castanea sativa*** (Sweet chestnut)
- ***Cedrus atlantica*** (Atlas cedar)
- ***Cedrus deodara*** (Himalayan cedar)
- ***Cedrus libani*** (Cedar of Lebanon)
- ***Chamaecyparis lawsoniana*** (Lawson cypress)
- x ***Chitalpa tashkentensis*** (Chitalpa)
- ***Cladrastis kentukea*** (Yellow wood)
- ***Cotoneaster frigidus*** (Tree cotoneaster)
- ***Crataegus* x *grignonensis*** (Grignon hawthorn)
- ***Crataegus laevigata*** (Woodland hawthorn)
- ***Crataegus* x *lavalleei*** (Lavallée hawthorn)
- ***Crataegus* x *media*** (Red thorn)
- ***Crataegus monogyna*** (Common hawthorn)
- ***Crataegus* x *persimilis*** (Broad-leaved cockspur thorn)
- ***Cryptomeria japonica*** (Japanese cedar)
- ***Cupressus arizonica*** (Arizona cypress)
- ***Cupressus macrocarpa*** (Monterey cypress)
- ***Cupressus sempervirens*** (Mediterranean cypress)
- x ***Cuprocyparis leylandii*** (Leyland cypress)
- ***Cydonia oblonga*** (Common quince)
- ***Fagus orientalis*** (Oriental beech)
- ***Fagus sylvatica*** (Common beech)
- ***Ficus carica*** (Common fig)
- ***Ilex* x *altaclerensis* group** (Hybrid holly)
- ***Ilex aquifolium*** (European holly)
- ***Ilex* x *aquipernyi* 'Dragon Lady'** (Hybrid holly)
- ***Ilex* x *koehneana* 'Chestnut Leaf'** (Chestnut leaved holly)
- ***Ilex* 'Nellie R. Stevens'** (Hybrid holly)
- ***Juniperus communis*** (Common juniper)
- ***Juniperus scopulorum*** (Rocky mountain juniper)
- ***Juniperus virginiana*** (Eastern red cedar)
- ***Ligustrum japonicum*** (Japanese tree privet)
- ***Ligustrum lucidum*** (Chinese privet)
- ***Magnolia grandiflora*** (Southern magnolia)
- ***Malus trilobata*** (Lebanese wild apple)
- ***Olea europaea*** (Olive)
- ***Picea abies*** (Norway spruce)
- ***Picea breweriana*** (Brewer spruce)
- ***Picea omorika*** (Serbian spruce)
- ***Picea orientalis*** (Caucasian spruce)
- ***Picea pungens*** (Colorado blue spruce)
- ***Picea sitchensis*** (Sitka spruce)
- ***Pinus nigra*** (Black pine)
- ***Pinus pinaster*** (Maritime pine)
- ***Pinus pinea*** (Stone pine)
- ***Pinus radiata*** (Monterey pine)
- ***Pinus strobus*** (Eastern white pine)
- ***Prunus cerasifera*** (Cherry plum)
- ***Prunus laurocerasus*** (Cherry laurel)
- ***Prunus lusitanica*** (Portugal laurel)
- ***Pseudotsuga menziesii*** (Douglas fir)
- ***Pterocarya fraxinifolia*** (Caucasian wing-nut)
- ***Pterocarya stenoptera*** (Chinese wing-nut)
- ***Pyrus calleryana*** (Callery pear)
- ***Pyrus communis*** (Common pear)
- ***Pyrus salicifolia*** (Willow-leaved pear)
- ***Quercus acutissima*** (Sawtooth oak)
- ***Quercus* x *bimondorum*** (Hybrid oak)
- ***Quercus castaneifolia*** (Chestnut-leaved oak)
- ***Quercus ilex*** (Holm oak)
- ***Quercus phellos*** (Willow oak)
- ***Quercus suber*** (Cork oak)
- ***Sequoia sempervirens*** (Coastal redwood)
- ***Sequoiadendron giganteum*** (Giant sequoia)
- ***Taxus baccata*** (Common yew)
- ***Thuja plicata*** (Western red cedar)
- ***Tsuga canadensis*** (Eastern hemlock)
- ***Tsuga heterophylla*** (Western hemlock)



A moderately dense crown

- ***Acacia dealbata*** (Silver wattle)
- ***Acer cappadocicum*** (Caucasian maple)
- ***Acer davidii*** (Père David's maple)
- ***Acer* x *freemanii*** (Freeman's maple)
- ***Acer griseum*** (Paperbark maple)
- ***Acer negundo*** (Box elder)
- ***Acer palmatum*** (Japanese maple)
- ***Acer rubrum*** (Red maple)
- ***Acer rufinerve*** (Grey-budded snake-bark maple)
- ***Acer tataricum*** (Tatarian maple)
- ***Acer triflorum*** (Three-flowered maple)
- ***Acer* x *zoeschense*** (Zoeschen maple)
- ***Ailanthus altissima*** (Tree of heaven)
- ***Alnus cordata*** (Italian alder)
- ***Alnus* x *spaethii*** (Spaeth alder)
- ***Amelanchier alnifolia*** (Alder-leaved serviceberry)
- ***Amelanchier arborea*** (Downey serviceberry)
- ***Amelanchier canadensis*** (Canadian serviceberry)
- ***Amelanchier lamarckii*** (Serviceberry)
- ***Aralia elata*** (Angelica tree)
- ***Carpinus japonica*** (Japanese hornbeam)
- ***Carya illinoinensis*** (Pecan)

Use the › symbols to go to a Profile page, and the top menu to return.



A moderately dense crown
continued

- *Carya ovata* (Shagbark hickory)
- *Catalpa bignonioides* (Indian bean tree)
- *Catalpa* x *erubescens* (Hybrid catalpa)
- *Catalpa speciosa* (Northern catalpa)
- *Celtis australis* (Nettle tree)
- *Celtis occidentalis* (Common hackberry)
- *Cercidiphyllum japonicum* (Katsura tree)
- *Cercis canadensis* (North American redbud)
- *Cercis siliquastrum* (Judas tree)
- *Clerodendrum trichotomum* (Harlequin glorybower)
- *Cornus alternifolia* (Alternate leaf dogwood)
- *Cornus 'Eddie's white wonder'* (Hybrid dogwood)
- *Cornus florida* (Flowering dogwood)
- *Cornus kousa* (Chinese dogwood)
- *Cornus mas* (Cornelian cherry dogwood)
- *Corylus avellana* (Hazel)
- *Corylus colurna* (Turkish hazel)
- *Corylus maxima* (Filbert)
- *Davidia involucrata* (Pocket handkerchief tree)
- *Diospyros kaki* (Chinese persimmon)
- *Elaeagnus angustifolia* (Russian olive)
- *Eucommia ulmoides* (Guttapercha)
- *Euonymus europaeus* (Common spindle tree)
- *Ginkgo biloba* (Maidenhair tree)
- *Gymnocladus dioica* (Kentucky coffee tree)
- *Halesia carolina* (Carolina silverbell)
- *Hamamelis* x *intermedia* (Hybrid witch hazel)
- *Heptacodium miconioides* (Seven-son flower)
- *Hippophaë salicifolia* (Willow-leaved sea buckthorn)
- *Juglans nigra* (Black walnut)
- *Juglans regia* (Common walnut)
- *Koelreuteria paniculata* (Golden rain tree)
- *Laburnum anagyroides* (Common laburnum)
- *Laburnum* x *watereri* (Hybrid laburnum)
- *Larix decidua* (Common larch)
- *Larix kaempferi* (Japanese larch)
- *Larix* x *marschlinsii* (Hybrid larch)
- *Liquidambar styraciflua* (Sweetgum)
- *Liriodendron tulipifera* (Tulip tree)
- *Magnolia acuminata* (Cucumber tree)
- *Magnolia denudata* (Yulan magnolia)
- *Magnolia* 'Elizabeth' (Hybrid magnolia)
- *Magnolia* 'Galaxy' (Hybrid magnolia)
- *Magnolia* 'Heaven Scent' (Hybrid magnolia)
- *Magnolia kobus* (Kobushi magnolia)
- *Magnolia* x *loebneri* (Loebner magnolia)
- *Magnolia* x *soulangeana* (Saucer magnolia)
- *Magnolia* 'Spectrum' (Hybrid magnolia)
- *Magnolia* 'Star Wars' (Hybrid magnolia)
- *Magnolia stellata* (Star magnolia)
- *Magnolia* 'Susan' (Hybrid magnolia)
- *Magnolia* 'Yellow Bird' (Hybrid magnolia)
- *Malus baccata* (Siberian crabapple)
- *Malus cultivars* (Apples and crabapples)
- *Malus hupehensis* (Chinese crabapple)
- *Malus sylvestris* (European crabapple)
- *Malus toringo* (Toringo crabapple)
- *Malus yunnanensis* (Yunnan crabapple)
- *Mespilus germanica* (Medlar)
- *Metasequoia glyptostroboides* (Dawn redwood)
- *Morus alba* (White mulberry)
- *Morus nigra* (Black mulberry)
- *Nothofagus antarctica* (Antarctic beech)
- *Nyssa sylvatica* (Black tupelo)
- *Ostrya carpinifolia* (Hop hornbeam)
- *Parrotia persica* (Persian ironwood)
- *Paulownia tomentosa* (Foxglove tree)
- *Phellodendron amurense* (Amur cork tree)
- *Pinus sylvestris* (Scots pine)
- *Pinus wallichiana* (Bhutan pine)
- *Platanus* x *hispanica* (London plane)
- *Platanus orientalis* (Oriental plane)
- *Populus alba* (White poplar)
- *Populus* x *canadensis* (Hybrid poplar)
- *Populus* x *candicans* (Ontario poplar)
- *Populus nigra* (Black poplar)
- *Populus tremula* (Eurasian aspen)
- *Prunus* 'Accolade' (Hybrid cherry)
- *Prunus avium* (Wild cherry)
- *Prunus domestica* (Common plum)
- *Prunus dulcis* (Almond)
- *Prunus fruticosa* (Steppe cherry)
- *Prunus maackii* (Manchurian cherry)
- *Prunus* 'Okame' (Hybrid cherry)
- *Prunus padus* (Bird cherry)
- *Prunus* 'Pandora' (Hybrid cherry)
- *Prunus sargentii* (Sargent's cherry)
- *Prunus* x *schmittii* (Hybrid cherry)
- *Prunus serrula* (Tibetan cherry)
- *Prunus serrulata* (Japanese cherry)
- *Prunus* x *subhirtella* (Hybrid cherry)
- *Prunus* 'Umineko' (Hybrid cherry)
- *Prunus* x *yedoensis* (Yoshino cherry)
- *Quercus bicolor* (Swamp white oak)
- *Quercus cerris* (Turkey oak)
- *Quercus coccinea* (Scarlet oak)
- *Quercus frainetto* (Hungarian oak)
- *Quercus* x *hispanica* (Spanish oak)
- *Quercus palustris* (Pin oak)
- *Quercus petraea* (Sessile oak)
- *Quercus robur* (Pedunculate oak)
- *Quercus rubra* (Red oak)
- *Quercus* x *turneri* (Turner's oak)
- *Rhus typhina* (Staghorn sumac)
- *Sorbus aria* (Whitebeam)
- *Sorbus* x *arnoldiana* (Hybrid Sorbus)
- *Sorbus aucuparia* (Rowan)
- *Sorbus cashmiriana* (Kashmir rowan)
- *Sorbus commixta* (Japanese rowan)
- *Sorbus discolor* (Chinese rowan)
- *Sorbus intermedia* (Swedish whitebeam)
- *Sorbus* 'Joseph Rock' (Hybrid Sorbus)
- *Sorbus latifolia* (Broad-leaved whitebeam)
- *Sorbus pseudohupehensis* (Hupeh rowan)
- *Sorbus thibetica* (Tibetan whitebeam)
- *Sorbus* x *thuringiaca* (Hybrid Sorbus)
- *Sorbus torminalis* (Wild service tree)
- *Sorbus vilmorinii* (Vilmorin's rowan)
- *Stewartia pseudocamellia* (Japanese stewartia)
- *Stewartia sinensis* (Chinese stewartia)
- *Styphnolobium japonicum* (Japanese pagoda tree)
- *Styrax japonicus* (Japanese snowball tree)
- *Syringa* x *chinensis* (Chinese lilac)
- *Syringa reticulata* (Japanese tree lilac)
- *Syringa vulgaris* (Common lilac)
- *Taxodium distichum* (Swamp cypress)
- *Tetradium daniellii* (Chinese bee tree)
- *Tilia americana* (American basswood)
- *Tilia cordata* (Small-leaved lime)
- *Tilia* x *euchlora* (Caucasian lime)
- *Tilia* x *europaea* (Common lime)
- *Tilia henryana* (Henry's lime)
- *Tilia mongolica* (Mongolian lime)
- *Tilia oliveri* (Chinese white lime)
- *Tilia platyphyllos* (Large-leaved lime)

Use the symbols to go to a Profile page, and the top menu to return.



A moderately dense crown continued

- ***Tilia tomentosa*** (Silver lime)
- ***Ulmus* – resistant cultivars** (Elms)
- ***Zelkova serrata*** (Japanese zelkova)



An open crown

- ***Acer saccharinum*** (Silver maple)
- ***Alnus glutinosa*** (Common alder)
- ***Alnus incana*** (Grey alder)
- ***Betula ermanii*** (Stone birch)
- ***Betula lenta*** (Cherry birch)
- ***Betula maximowicziana*** (Monarch birch)
- ***Betula nigra*** (River birch)
- ***Betula papyrifera*** (Paper birch)
- ***Betula pendula* subsp. *pendula*** (Silver birch)
- ***Betula pendula* subsp. *szechuanica*** (Chinese white birch)
- ***Betula pubescens*** (Downy birch)
- ***Betula utilis* subsp. *albosinensis*** (Chinese red birch)
- ***Betula utilis* subsp. *jacquemontii*** (White-barked Himalayan birch)
- ***Betula utilis* subsp. *utilis*** (Himalayan birch)
- ***Cornus controversa*** (Wedding cake tree)
- ***Eucalyptus gunnii* subsp. *gunnii*** (Cider gum)
- ***Eucalyptus pauciflora* group** (Snow gums)
- ***Gleditsia triacanthos*** (Honey locust)
- ***Maytenus boaria*** (Chilean mayten)
- ***Robinia pseudoacacia*** (False acacia)
- ***Salix alba*** (White willow)
- ***Salix babylonica*** (Weeping willow)
- ***Salix caprea*** (Goat willow)
- ***Salix daphnoides*** (Violet willow)
- ***Salix pentandra*** (Bay-leaved willow)
- ***Salix* x *sepulcralis*** (Weeping willow)
- ***Tamarix gallica*** (French tamarisk)
- ***Tamarix ramosissima*** (Salt cedar)
- ***Tamarix tetrandra*** (Four-stamen tamarisk)

Environmental tolerance

Continued next page

Use the symbols to go to a Profile page, and the top menu to return.

Tolerant to shade

- ***Abies concolor*** (White fir)
- ***Abies fraseri*** (Fraser fir)
- ***Abies grandis*** (Grand fir)
- ***Abies koreana*** (Korean fir)
- ***Abies nordmanniana*** (Nordmann fir)
- ***Acer palmatum*** (Japanese maple)
- ***Acer platanoides*** (Norway maple)
- ***Acer pseudoplatanus*** (Sycamore)
- ***Acer rufinerve*** (Grey-budded snake-bark maple)
- ***Acer saccharum*** (Sugar maple)
- ***Aesculus flava*** (Yellow buckeye)
- ***Aesculus pavia*** (Red buckeye)
- ***Amelanchier arborea*** (Downey serviceberry)
- ***Buxus sempervirens*** (Box)
- ***Cornus alternifolia*** (Alternate leaf dogwood)
- ***Cornus 'Eddie's white wonder'*** (Hybrid dogwood)
- ***Cornus florida*** (Flowering dogwood)
- ***Fagus orientalis*** (Oriental beech)
- ***Fagus sylvatica*** (Common beech)
- ***Magnolia grandiflora*** (Southern magnolia)
- ***Picea abies*** (Norway spruce)
- ***Picea omorika*** (Serbian spruce)
- ***Picea orientalis*** (Caucasian spruce)
- ***Picea pungens*** (Colorado blue spruce)
- ***Prunus laurocerasus*** (Cherry laurel)
- ***Sequoia sempervirens*** (Coastal redwood)
- ***Taxus baccata*** (Common yew)
- ***Thuja plicata*** (Western red cedar)
- ***Tilia americana*** (American basswood)
- ***Tilia cordata*** (Small-leaved lime)
- ***Tilia platyphyllos*** (Large-leaved lime)
- ***Tsuga canadensis*** (Eastern hemlock)
- ***Tsuga heterophylla*** (Western hemlock)

Moderately tolerant to shade

- ***Acacia dealbata*** (Silver wattle)
- ***Acer buergerianum*** (Trident maple)
- ***Acer campestre*** (Field maple)
- ***Acer davidii*** (Père David's maple)
- ***Acer x freemanii*** (Freeman's maple)
- ***Acer griseum*** (Paperbark maple)
- ***Acer japonicum*** (Full moon maple)
- ***Acer rubrum*** (Red maple)
- ***Acer saccharinum*** (Silver maple)
- ***Acer shirasawanum*** (Shirasawa's maple)
- ***Acer tataricum*** (Tatarian maple)
- ***Acer triflorum*** (Three-flowered maple)
- ***Acer x zoeschense*** (Zoeschen maple)
- ***Aesculus x carnea*** (Red horse chestnut)
- ***Aesculus hippocastanum*** (Horse chestnut)
- ***Aesculus indica*** (Indian horse chestnut)
- ***Aesculus parviflora*** (Dwarf horse chestnut)
- ***Amelanchier alnifolia*** (Alder-leaved serviceberry)
- ***Arbutus unedo*** (Strawberry tree)
- ***Carpinus betulus*** (Hornbeam)
- ***Carya ovata*** (Shagbark hickory)
- ***Castanea sativa*** (Sweet chestnut)
- ***Celtis australis*** (Nettle tree)
- ***Celtis occidentalis*** (Common hackberry)
- ***Cercis canadensis*** (North American redbud)
- ***Cercis siliquastrum*** (Judas tree)
- ***Chamaecyparis lawsoniana*** (Lawson cypress)
- ***Cladrastis kentukea*** (Yellow wood)
- ***Cornus controversa*** (Wedding cake tree)
- ***Cornus kousa*** (Chinese dogwood)
- ***Cornus mas*** (Cornelian cherry dogwood)
- ***Corylus avellana*** (Hazel)
- ***Corylus maxima*** (Filbert)
- ***Crataegus x lavalleei*** (Lavallée hawthorn)
- ***Cryptomeria japonica*** (Japanese cedar)
- ***Davidia involucrata*** (Pocket handkerchief tree)
- ***Euonymus europaeus*** (Common spindle tree)
- ***Halesia carolina*** (Carolina silverbell)
- ***Hamamelis x intermedia*** (Hybrid witch hazel)
- ***Heptacodium miconioides*** (Seven-son flower)
- ***Ilex x altaclerensis* group** (Hybrid holly)
- ***Ilex aquifolium*** (European holly)
- ***Ilex x aquipernyi* 'Dragon Lady'** (Hybrid holly)
- ***Ilex x koehneana* 'Chestnut Leaf'** (Chestnut leaved holly)
- ***Ilex* 'Nellie R. Stevens'** (Hybrid holly)
- ***Ligustrum japonicum*** (Japanese tree privet)
- ***Ligustrum lucidum*** (Chinese privet)
- ***Magnolia acuminata*** (Cucumber tree)
- ***Magnolia kobus*** (Kobushi magnolia)
- ***Magnolia x loebneri*** (Loebner magnolia)
- ***Magnolia x soulangeana*** (Saucer magnolia)
- ***Magnolia stellata*** (Star magnolia)
- ***Metasequoia glyptostroboides*** (Dawn redwood)
- ***Nyssa sylvatica*** (Black tupelo)
- ***Ostrya carpinifolia*** (Hop hornbeam)
- ***Parrotia persica*** (Persian ironwood)
- ***Picea breweriana*** (Brewer spruce)
- ***Picea sitchensis*** (Sitka spruce)
- ***Pinus strobus*** (Eastern white pine)
- ***Platanus x hispanica*** (London plane)
- ***Platanus orientalis*** (Oriental plane)
- ***Prunus padus*** (Bird cherry)
- ***Quercus frainetto*** (Hungarian oak)
- ***Quercus ilex*** (Holm oak)
- ***Sorbus pseudohupehensis*** (Hupeh rowan)
- ***Stewartia pseudocamellia*** (Japanese stewartia)
- ***Stewartia sinensis*** (Chinese stewartia)
- ***Styphnolobium japonicum*** (Japanese pagoda tree)
- ***Tilia x euchlora*** (Caucasian lime)
- ***Tilia x europaea*** (Common lime)
- ***Tilia henryana*** (Henry's lime)
- ***Tilia mongolica*** (Mongolian lime)
- ***Tilia oliveri*** (Chinese white lime)
- ***Tilia tomentosa*** (Silver lime)

Use the symbols to go to a Profile page, and the top menu to return.



Partially tolerant to shade

- ***Abies procera*** (Noble fir)
- ***Acer capillipes*** (Red snake-bark maple)
- ***Acer cappadocicum*** (Caucasian maple)
- ***Acer monspessulanum*** (Montpellier maple)
- ***Acer negundo*** (Box elder)
- ***Acer tataricum* subsp. *ginnala*** (Amur maple)
- ***Ailanthus altissima*** (Tree of heaven)
- ***Alnus cordata*** (Italian alder)
- ***Alnus glutinosa*** (Common alder)
- ***Alnus incana*** (Grey alder)
- ***Amelanchier canadensis*** (Canadian serviceberry)
- ***Amelanchier lamarckii*** (Serviceberry)
- ***Aralia elata*** (Angelica tree)
- ***Araucaria araucana*** (Monkey puzzle)
- ***Betula lenta*** (Cherry birch)
- ***Betula utilis* subsp. *albosinensis*** (Chinese red birch)
- ***Betula utilis* subsp. *jacquemontii*** (White-barked Himalayan birch)
- ***Betula utilis* subsp. *utilis*** (Himalayan birch)
- ***Carpinus japonica*** (Japanese hornbeam)
- ***Catalpa bignonioides*** (Indian bean tree)
- ***Catalpa* x *erubescens*** (Hybrid catalpa)
- ***Catalpa speciosa*** (Northern catalpa)
- ***Cedrus atlantica*** (Atlas cedar)
- ***Cedrus deodara*** (Himalayan cedar)
- ***Cedrus libani*** (Cedar of Lebanon)
- ***Cercidiphyllum japonicum*** (Katsura tree)
- x ***Chitalpa tashkentensis*** (Chitalpa)
- ***Cotoneaster frigidus*** (Tree cotoneaster)
- ***Crataegus* x *grignonensis*** (Grignon hawthorn)
- ***Crataegus laevigata*** (Woodland hawthorn)
- ***Crataegus* x *media*** (Red thorn)
- ***Crataegus* x *persimilis*** (Broad-leaved cockspur thorn)
- ***Diospyros kaki*** (Chinese persimmon)
- ***Eucommia ulmoides*** (Guttapercha)
- ***Ficus carica*** (Common fig)
- ***Ginkgo biloba*** (Maidenhair tree)
- ***Gymnocladus dioica*** (Kentucky coffee tree)
- ***Juglans regia*** (Common walnut)
- ***Koelreuteria paniculata*** (Golden rain tree)
- ***Liriodendron tulipifera*** (Tulip tree)
- ***Magnolia denudata*** (Yulan magnolia)
- ***Magnolia* 'Elizabeth'** (Hybrid magnolia)
- ***Magnolia* 'Galaxy'** (Hybrid magnolia)
- ***Magnolia* 'Heaven Scent'** (Hybrid magnolia)
- ***Magnolia* 'Spectrum'** (Hybrid magnolia)
- ***Magnolia* 'Star Wars'** (Hybrid magnolia)
- ***Magnolia* 'Susan'** (Hybrid magnolia)
- ***Magnolia* 'Yellow Bird'** (Hybrid magnolia)
- ***Malus baccata*** (Siberian crabapple)
- ***Malus cultivars*** (Apples and crabapples)
- ***Malus hupehensis*** (Chinese crabapple)
- ***Malus sylvestris*** (European crabapple)
- ***Malus toringo*** (Toringo crabapple)
- ***Malus trilobata*** (Lebanese wild apple)
- ***Malus yunnanensis*** (Yunnan crabapple)
- ***Mespilus germanica*** (Medlar)
- ***Morus alba*** (White mulberry)
- ***Morus nigra*** (Black mulberry)
- ***Nothofagus antarctica*** (Antarctic beech)
- ***Olea europaea*** (Olive)
- ***Paulownia tomentosa*** (Foxglove tree)
- ***Pinus nigra*** (Black pine)
- ***Pinus pinea*** (Stone pine)
- ***Pinus radiata*** (Monterey pine)
- ***Populus alba*** (White poplar)
- ***Populus nigra*** (Black poplar)
- ***Populus tremula*** (Eurasian aspen)
- ***Prunus* 'Accolade'** (Hybrid cherry)
- ***Prunus avium*** (Wild cherry)
- ***Prunus cerasifera*** (Cherry plum)
- ***Prunus lusitanica*** (Portugal laurel)
- ***Prunus maackii*** (Manchurian cherry)
- ***Prunus* 'Okame'** (Hybrid cherry)
- ***Prunus* 'Pandora'** (Hybrid cherry)
- ***Prunus sargentii*** (Sargent's cherry)
- ***Prunus* x *schmittii*** (Hybrid cherry)
- ***Prunus serrula*** (Tibetan cherry)
- ***Prunus serrulata*** (Japanese cherry)
- ***Prunus* x *subhirtella*** (Hybrid cherry)
- ***Prunus* 'Umineko'** (Hybrid cherry)
- ***Prunus* x *yedoensis*** (Yoshino cherry)
- ***Pseudotsuga menziesii*** (Douglas fir)
- ***Pterocarya fraxinifolia*** (Caucasian wing-nut)
- ***Pterocarya stenoptera*** (Chinese wing-nut)
- ***Pyrus communis*** (Common pear)
- ***Quercus acutissima*** (Sawtooth oak)
- ***Quercus bicolor*** (Swamp white oak)
- ***Quercus* x *bimondorum*** (Hybrid oak)
- ***Quercus castaneifolia*** (Chestnut-leaved oak)
- ***Quercus cerris*** (Turkey oak)
- ***Quercus coccinea*** (Scarlet oak)
- ***Quercus* x *hispanica*** (Spanish oak)
- ***Quercus palustris*** (Pin oak)
- ***Quercus petraea*** (Sessile oak)
- ***Quercus phellos*** (Willow oak)
- ***Quercus robur*** (Pedunculate oak)
- ***Quercus rubra*** (Red oak)
- ***Quercus suber*** (Cork oak)
- ***Quercus* x *turneri*** (Turner's oak)
- ***Salix caprea*** (Goat willow)
- ***Salix daphnoides*** (Violet willow)
- ***Sequoiadendron giganteum*** (Giant sequoia)
- ***Sorbus aria*** (Whitebeam)
- ***Sorbus* x *arnoldiana*** (Hybrid Sorbus)
- ***Sorbus aucuparia*** (Rowan)
- ***Sorbus cashmiriana*** (Kashmir rowan)
- ***Sorbus commixta*** (Japanese rowan)
- ***Sorbus discolor*** (Chinese rowan)
- ***Sorbus intermedia*** (Swedish whitebeam)
- ***Sorbus* 'Joseph Rock'** (Hybrid Sorbus)
- ***Sorbus latifolia*** (Broad-leaved whitebeam)
- ***Sorbus thibetica*** (Tibetan whitebeam)
- ***Sorbus* x *thuringiaca*** (Hybrid Sorbus)
- ***Sorbus torminalis*** (Wild service tree)
- ***Sorbus vilmorinii*** (Vilmorin's rowan)
- ***Styrax japonicus*** (Japanese snowball tree)
- ***Syringa* x *chinensis*** (Chinese lilac)
- ***Syringa vulgaris*** (Common lilac)
- ***Taxodium distichum*** (Swamp cypress)
- ***Tetradium daniellii*** (Chinese bee tree)
- ***Ulmus* – resistant cultivars** (Elms)
- ***Zelkova serrata*** (Japanese zelkova)

Use the symbols to go to a Profile page, and the top menu to return.



Intolerant to shade

- *Alnus* x *spaethii* (Spaeth alder)
- *Betula ermanii* (Stone birch)
- *Betula maximowicziana* (Monarch birch)
- *Betula nigra* (River birch)
- *Betula papyrifera* (Paper birch)
- *Betula pendula* subsp. *pendula* (Silver birch)
- *Betula pendula* subsp. *szechuanica* (Chinese white birch)
- *Betula pubescens* (Downy birch)
- *Carya illinoinensis* (Pecan)
- *Clerodendrum trichotomum* (Harlequin glorybower)
- *Corylus colurna* (Turkish hazel)
- *Crataegus monogyna* (Common hawthorn)
- *Cupressus arizonica* (Arizona cypress)
- *Cupressus macrocarpa* (Monterey cypress)
- *Cupressus sempervirens* (Mediterranean cypress)
- x *Cuprocyparis leylandii* (Leyland cypress)
- *Cydonia oblonga* (Common quince)
- *Elaeagnus angustifolia* (Russian olive)
- *Eucalyptus gunnii* subsp. *gunnii* (Cider gum)
- *Eucalyptus pauciflora* group (Snow gums)
- *Gleditsia triacanthos* (Honey locust)
- *Hippophaë salicifolia* (Willow-leaved sea buckthorn)
- *Juglans nigra* (Black walnut)
- *Juniperus communis* (Common juniper)
- *Juniperus scopulorum* (Rocky mountain juniper)
- *Juniperus virginiana* (Eastern red cedar)
- *Laburnum anagyroides* (Common laburnum)
- *Laburnum* x *watereri* (Hybrid laburnum)
- *Larix decidua* (Common larch)
- *Larix kaempferi* (Japanese larch)
- *Larix* x *marschlinsii* (Hybrid larch)
- *Liquidambar styraciflua* (Sweetgum)
- *Maytenus boaria* (Chilean mayten)
- *Phellodendron amurense* (Amur cork tree)
- *Pinus pinaster* (Maritime pine)
- *Pinus sylvestris* (Scots pine)
- *Pinus wallichiana* (Bhutan pine)
- *Populus* x *canadensis* (Hybrid poplar)
- *Populus* x *candicans* (Ontario poplar)
- *Prunus domestica* (Common plum)
- *Prunus dulcis* (Almond)
- *Prunus fruticosa* (Steppe cherry)
- *Pyrus calleryana* (Callery pear)
- *Pyrus salicifolia* (Willow-leaved pear)
- *Rhus typhina* (Staghorn sumac)
- *Robinia pseudoacacia* (False acacia)
- *Salix alba* (White willow)
- *Salix babylonica* (Weeping willow)
- *Salix pentandra* (Bay-leaved willow)
- *Salix* x *sepulcralis* (Weeping willow)
- *Syringa reticulata* (Japanese tree lilac)
- *Tamarix gallica* (French tamarisk)
- *Tamarix ramosissima* (Salt cedar)
- *Tamarix tetrandra* (Four-stamen tamarisk)

Environmental tolerance

Continued next page

Use the › symbols to go to a Profile page, and the top menu to return.

Tolerant to drought

- ***Acer monspessulanum*** (Montpellier maple)
- ***Acer tataricum*** (Tatarian maple)
- ***Ailanthus altissima*** (Tree of heaven)
- ***Alnus cordata*** (Italian alder)
- ***Arbutus unedo*** (Strawberry tree)
- ***Buxus sempervirens*** (Box)
- ***Cedrus atlantica*** (Atlas cedar)
- ***Cedrus deodara*** (Himalayan cedar)
- ***Cedrus libani*** (Cedar of Lebanon)
- ***Celtis australis*** (Nettle tree)
- ***Cercis siliquastrum*** (Judas tree)
- ***Crataegus laevigata*** (Woodland hawthorn)
- ***Crataegus x media*** (Red thorn)
- ***Crataegus monogyna*** (Common hawthorn)
- ***Crataegus x persimilis*** (Broad-leaved cockspur thorn)
- ***Cupressus arizonica*** (Arizona cypress)
- ***Cupressus macrocarpa*** (Monterey cypress)
- ***Cupressus sempervirens*** (Mediterranean cypress)
- ***x Cuprocyparis leylandii*** (Leyland cypress)
- ***Elaeagnus angustifolia*** (Russian olive)
- ***Eucommia ulmoides*** (Guttapercha)
- ***Ginkgo biloba*** (Maidenhair tree)
- ***Gleditsia triacanthos*** (Honey locust)
- ***Ilex aquifolium*** (European holly)
- ***Juniperus communis*** (Common juniper)
- ***Juniperus scopulorum*** (Rocky mountain juniper)
- ***Juniperus virginiana*** (Eastern red cedar)
- ***Koelreuteria paniculata*** (Golden rain tree)
- ***Olea europaea*** (Olive)
- ***Pinus nigra*** (Black pine)
- ***Pinus pinea*** (Stone pine)
- ***Pinus sylvestris*** (Scots pine)
- ***Prunus cerasifera*** (Cherry plum)
- ***Prunus domestica*** (Common plum)
- ***Prunus dulcis*** (Almond)
- ***Prunus fruticosa*** (Steppe cherry)
- ***Pyrus calleryana*** (Callery pear)
- ***Quercus acutissima*** (Sawtooth oak)
- ***Quercus bicolor*** (Swamp white oak)
- ***Quercus cerris*** (Turkey oak)
- ***Quercus coccinea*** (Scarlet oak)
- ***Quercus frainetto*** (Hungarian oak)
- ***Quercus x hispanica*** (Spanish oak)
- ***Quercus ilex*** (Holm oak)
- ***Quercus palustris*** (Pin oak)
- ***Quercus suber*** (Cork oak)
- ***Robinia pseudoacacia*** (False acacia)
- ***Sorbus aria*** (Whitebeam)
- ***Sorbus latifolia*** (Broad-leaved whitebeam)
- ***Sorbus x thuringiaca*** (Hybrid Sorbus)
- ***Sorbus torminalis*** (Wild service tree)
- ***Syringa reticulata*** (Japanese tree lilac)
- ***Tamarix gallica*** (French tamarisk)
- ***Tamarix ramosissima*** (Salt cedar)
- ***Tamarix tetrandra*** (Four-stamen tamarisk)
- ***Taxus baccata*** (Common yew)

Moderately tolerant to drought

- ***Abies concolor*** (White fir)
- ***Acacia dealbata*** (Silver wattle)
- ***Acer buergerianum*** (Trident maple)
- ***Acer campestre*** (Field maple)
- ***Acer cappadocicum*** (Caucasian maple)
- ***Acer x freemanii*** (Freeman's maple)
- ***Acer negundo*** (Box elder)
- ***Acer platanoides*** (Norway maple)
- ***Acer rubrum*** (Red maple)
- ***Acer saccharinum*** (Silver maple)
- ***Acer saccharum*** (Sugar maple)
- ***Acer tataricum subsp. ginnala*** (Amur maple)
- ***Acer triflorum*** (Three-flowered maple)
- ***Acer x zoeschense*** (Zoeschen maple)
- ***Alnus x spaethii*** (Spaeth alder)
- ***Araucaria araucana*** (Monkey puzzle)
- ***Carpinus betulus*** (Hornbeam)
- ***Carpinus japonica*** (Japanese hornbeam)
- ***Carya ovata*** (Shagbark hickory)
- ***Castanea sativa*** (Sweet chestnut)
- ***Celtis occidentalis*** (Common hackberry)
- ***Cercis canadensis*** (North American redbud)
- ***Chamaecyparis lawsoniana*** (Lawson cypress)
- ***x Chitalpa tashkentensis*** (Chitalpa)
- ***Clerodendrum trichotomum*** (Harlequin glorybower)
- ***Cornus florida*** (Flowering dogwood)
- ***Cornus mas*** (Cornelian cherry dogwood)
- ***Corylus colurna*** (Turkish hazel)
- ***Crataegus x grignonensis*** (Grignon hawthorn)
- ***Crataegus x lavalleei*** (Lavallée hawthorn)
- ***Cryptomeria japonica*** (Japanese cedar)
- ***Cydonia oblonga*** (Common quince)
- ***Euonymus europaeus*** (Common spindle tree)
- ***Ficus carica*** (Common fig)
- ***Gymnocladus dioica*** (Kentucky coffee tree)
- ***Heptacodium miconioides*** (Seven-son flower)
- ***Hippophaë salicifolia*** (Willow-leaved sea buckthorn)
- ***Ilex x altaclerensis* group** (Hybrid holly)
- ***Ilex x aquipernyi* 'Dragon Lady'** (Hybrid holly)
- ***Ilex x koehneana* 'Chestnut Leaf'** (Chestnut leaved holly)
- ***Ilex* 'Nellie R. Stevens'** (Hybrid holly)
- ***Laburnum anagyroides*** (Common laburnum)
- ***Ligustrum japonicum*** (Japanese tree privet)
- ***Ligustrum lucidum*** (Chinese privet)
- ***Liquidambar styraciflua*** (Sweetgum)
- ***Malus trilobata*** (Lebanese wild apple)
- ***Malus yunnanensis*** (Yunnan crabapple)
- ***Maytenus boaria*** (Chilean mayten)
- ***Mespilus germanica*** (Medlar)
- ***Metasequoia glyptostroboides*** (Dawn redwood)
- ***Morus alba*** (White mulberry)
- ***Morus nigra*** (Black mulberry)
- ***Ostrya carpinifolia*** (Hop hornbeam)
- ***Parrotia persica*** (Persian ironwood)
- ***Paulownia tomentosa*** (Foxglove tree)
- ***Phellodendron amurense*** (Amur cork tree)
- ***Picea orientalis*** (Caucasian spruce)
- ***Picea pungens*** (Colorado blue spruce)
- ***Pinus pinaster*** (Maritime pine)
- ***Pinus radiata*** (Monterey pine)
- ***Platanus x hispanica*** (London plane)
- ***Platanus orientalis*** (Oriental plane)
- ***Prunus lusitanica*** (Portugal laurel)
- ***Prunus sargentii*** (Sargent's cherry)
- ***Prunus x schmittii*** (Hybrid cherry)

Use the symbols to go to a Profile page, and the top menu to return.

Moderately tolerant to drought continued

- *Quercus* x *bimondorum* (Hybrid oak)
- *Quercus castaneifolia* (Chestnut-leaved oak)
- *Quercus petraea* (Sessile oak)
- *Quercus phellos* (Willow oak)
- *Quercus* x *turneri* (Turner's oak)
- *Rhus typhina* (Staghorn sumac)
- *Sequoia sempervirens* (Coastal redwood)
- *Sequoiadendron giganteum* (Giant sequoia)
- *Sorbus intermedia* (Swedish whitebeam)
- *Sorbus* 'Joseph Rock' (Hybrid Sorbus)
- *Sorbus thibetica* (Tibetan whitebeam)
- *Styphnolobium japonicum* (Japanese pagoda tree)
- *Syringa* x *chinensis* (Chinese lilac)
- *Syringa vulgaris* (Common lilac)
- *Thuja plicata* (Western red cedar)
- *Tilia mongolica* (Mongolian lime)
- *Tilia tomentosa* (Silver lime)
- *Ulmus* – resistant cultivars (Elms)
- *Zelkova serrata* (Japanese zelkova)

Moderately sensitive to drought

- *Abies fraseri* (Fraser fir)
- *Abies grandis* (Grand fir)
- *Abies koreana* (Korean fir)
- *Abies nordmanniana* (Nordmann fir)
- *Abies procera* (Noble fir)
- *Acer capillipes* (Red snake-bark maple)
- *Acer davidii* (Père David's maple)
- *Acer griseum* (Paperbark maple)
- *Acer japonicum* (Full moon maple)
- *Acer palmatum* (Japanese maple)
- *Acer pseudoplatanus* (Sycamore)
- *Acer rufinerve* (Grey-budded snake-bark maple)
- *Acer shirasawanum* (Shirasawa's maple)
- *Aesculus* x *carnea* (Red horse chestnut)
- *Aesculus flava* (Yellow buckeye)
- *Aesculus hippocastanum* (Horse chestnut)
- *Aesculus indica* (Indian horse chestnut)
- *Alnus glutinosa* (Common alder)
- *Alnus incana* (Grey alder)
- *Amelanchier alnifolia* (Alder-leaved serviceberry)
- *Amelanchier arborea* (Downey serviceberry)
- *Amelanchier canadensis* (Canadian serviceberry)
- *Amelanchier lamarckii* (Serviceberry)
- *Aralia elata* (Angelica tree)
- *Betula lenta* (Cherry birch)
- *Betula nigra* (River birch)
- *Betula utilis* subsp. *albosinensis* (Chinese red birch)
- *Betula utilis* subsp. *jacquemontii* (White-barked Himalayan birch)
- *Betula utilis* subsp. *utilis* (Himalayan birch)
- *Carya illinoinensis* (Pecan)
- *Catalpa bignonioides* (Indian bean tree)
- *Catalpa* x *erubescens* (Hybrid catalpa)
- *Catalpa speciosa* (Northern catalpa)
- *Cladrastis kentukea* (Yellow wood)
- *Cornus controversa* (Wedding cake tree)
- *Cornus 'Eddie's white wonder'* (Hybrid dogwood)
- *Corylus avellana* (Hazel)
- *Corylus maxima* (Filbert)
- *Cotoneaster frigidus* (Tree cotoneaster)
- *Davidia involucrata* (Pocket handkerchief tree)
- *Diospyros kaki* (Chinese persimmon)
- *Eucalyptus gunnii* subsp. *gunnii* (Cider gum)
- *Eucalyptus pauciflora* group (Snow gums)
- *Fagus orientalis* (Oriental beech)
- *Fagus sylvatica* (Common beech)
- *Halesia carolina* (Carolina silverbell)
- *Hamamelis* x *intermedia* (Hybrid witch hazel)
- *Juglans nigra* (Black walnut)
- *Juglans regia* (Common walnut)
- *Laburnum* x *watereri* (Hybrid laburnum)
- *Larix decidua* (Common larch)
- *Larix kaempferi* (Japanese larch)
- *Larix* x *marschlinsii* (Hybrid larch)
- *Liriodendron tulipifera* (Tulip tree)
- *Magnolia denudata* (Yulan magnolia)
- *Magnolia* 'Elizabeth' (Hybrid magnolia)
- *Magnolia* 'Galaxy' (Hybrid magnolia)
- *Magnolia grandiflora* (Southern magnolia)
- *Magnolia* 'Heaven Scent' (Hybrid magnolia)
- *Magnolia kobus* (Kobushi magnolia)
- *Magnolia* 'Spectrum' (Hybrid magnolia)
- *Magnolia* 'Star Wars' (Hybrid magnolia)
- *Magnolia* 'Susan' (Hybrid magnolia)
- *Magnolia* 'Yellow Bird' (Hybrid magnolia)
- *Malus baccata* (Siberian crabapple)
- *Malus cultivars* (Apples and crabapples)
- *Malus hupehensis* (Chinese crabapple)
- *Malus sylvestris* (European crabapple)
- *Malus toringo* (Toringo crabapple)
- *Nothofagus antarctica* (Antarctic beech)
- *Nyssa sylvatica* (Black tupelo)
- *Picea abies* (Norway spruce)
- *Picea omorika* (Serbian spruce)
- *Picea sitchensis* (Sitka spruce)
- *Pinus strobus* (Eastern white pine)
- *Pinus wallichiana* (Bhutan pine)
- *Populus alba* (White poplar)
- *Populus tremula* (Eurasian aspen)
- *Prunus* 'Accolade' (Hybrid cherry)
- *Prunus avium* (Wild cherry)
- *Prunus laurocerasus* (Cherry laurel)
- *Prunus maackii* (Manchurian cherry)
- *Prunus* 'Okame' (Hybrid cherry)
- *Prunus padus* (Bird cherry)
- *Prunus* 'Pandora' (Hybrid cherry)
- *Prunus serrula* (Tibetan cherry)
- *Prunus serrulata* (Japanese cherry)
- *Prunus* x *subhirtella* (Hybrid cherry)
- *Prunus* 'Umineko' (Hybrid cherry)
- *Prunus* x *yedoensis* (Yoshino cherry)
- *Pseudotsuga menziesii* (Douglas fir)
- *Pterocarya fraxinifolia* (Caucasian wing-nut)
- *Pterocarya stenoptera* (Chinese wing-nut)
- *Pyrus communis* (Common pear)
- *Pyrus salicifolia* (Willow-leaved pear)
- *Quercus robur* (Pedunculate oak)
- *Quercus rubra* (Red oak)
- *Salix caprea* (Goat willow)
- *Sorbus* x *arnoldiana* (Hybrid Sorbus)
- *Sorbus aucuparia* (Rowan)
- *Sorbus cashmiriana* (Kashmir rowan)
- *Sorbus commixta* (Japanese rowan)
- *Sorbus discolor* (Chinese rowan)
- *Sorbus pseudohupehensis* (Hupeh rowan)
- *Sorbus vilmorinii* (Vilmorin's rowan)
- *Styrax japonicus* (Japanese snowball tree)
- *Taxodium distichum* (Swamp cypress)
- *Tetradium daniellii* (Chinese bee tree)
- *Tilia americana* (American basswood)
- *Tilia cordata* (Small-leaved lime)

Use the symbols to go to a Profile page, and the top menu to return.



Moderately sensitive to drought continued

- ***Tilia* x *euchlora*** (Caucasian lime)
- ***Tilia* x *europaea*** (Common lime)
- ***Tilia henryana*** (Henry's lime)
- ***Tilia oliveri*** (Chinese white lime)
- ***Tilia platyphyllos*** (Large-leaved lime)



Sensitive to drought

- ***Aesculus parviflora*** (Dwarf horse chestnut)
- ***Aesculus pavia*** (Red buckeye)
- ***Betula ermanii*** (Stone birch)
- ***Betula maximowicziana*** (Monarch birch)
- ***Betula papyrifera*** (Paper birch)
- ***Betula pendula* subsp. *pendula*** (Silver birch)
- ***Betula pendula* subsp. *szechuanica*** (Chinese white birch)
- ***Betula pubescens*** (Downy birch)
- ***Cercidiphyllum japonicum*** (Katsura tree)
- ***Cornus alternifolia*** (Alternate leaf dogwood)
- ***Cornus kousa*** (Chinese dogwood)
- ***Magnolia acuminata*** (Cucumber tree)
- ***Magnolia* x *loebneri*** (Loebner magnolia)
- ***Magnolia* x *soulangeana*** (Saucer magnolia)
- ***Magnolia stellata*** (Star magnolia)
- ***Picea breweriana*** (Brewer spruce)
- ***Populus* x *canadensis*** (Hybrid poplar)
- ***Populus* x *candicans*** (Ontario poplar)
- ***Populus nigra*** (Black poplar)
- ***Salix alba*** (White willow)
- ***Salix babylonica*** (Weeping willow)
- ***Salix daphnoides*** (Violet willow)
- ***Salix pentandra*** (Bay-leaved willow)
- ***Salix* x *sepulcralis*** (Weeping willow)
- ***Stewartia pseudocamellia*** (Japanese stewartia)
- ***Stewartia sinensis*** (Chinese stewartia)
- ***Tsuga canadensis*** (Eastern hemlock)
- ***Tsuga heterophylla*** (Western hemlock)

Use the symbols to go to a Profile page, and the top menu to return.



Tolerant to waterlogging

- *Alnus glutinosa* (Common alder)
- *Salix alba* (White willow)
- *Salix pentandra* (Bay-leaved willow)
- *Taxodium distichum* (Swamp cypress)



Moderately tolerant to waterlogging

- *Acacia dealbata* (Silver wattle)
- *Acer cappadocicum* (Caucasian maple)
- *Acer x freemanii* (Freeman's maple)
- *Acer negundo* (Box elder)
- *Acer rubrum* (Red maple)
- *Acer saccharinum* (Silver maple)
- *Alnus cordata* (Italian alder)
- *Alnus incana* (Grey alder)
- *Alnus x spaethii* (Spaeth alder)
- *Amelanchier arborea* (Downey serviceberry)
- *Betula nigra* (River birch)
- *Betula pubescens* (Downy birch)
- *Carya illinoinensis* (Pecan)
- *Eucalyptus gunnii* subsp. *gunnii* (Cider gum)
- *Gleditsia triacanthos* (Honey locust)
- *Halesia carolina* (Carolina silverbell)
- *Liquidambar styraciflua* (Sweetgum)
- *Magnolia stellata* (Star magnolia)
- *Platanus x hispanica* (London plane)
- *Platanus orientalis* (Oriental plane)
- *Populus nigra* (Black poplar)
- *Prunus padus* (Bird cherry)
- *Pterocarya fraxinifolia* (Caucasian wing-nut)
- *Pterocarya stenoptera* (Chinese wing-nut)
- *Quercus bicolor* (Swamp white oak)
- *Quercus palustris* (Pin oak)
- *Quercus phellos* (Willow oak)
- *Salix babylonica* (Weeping willow)
- *Salix daphnoides* (Violet willow)
- *Salix x sepulcralis* (Weeping willow)



Moderately sensitive to waterlogging

- *Abies fraseri* (Fraser fir)
- *Abies grandis* (Grand fir)
- *Abies koreana* (Korean fir)
- *Abies nordmanniana* (Nordmann fir)
- *Acer buergerianum* (Trident maple)
- *Acer campestre* (Field maple)
- *Acer capillipes* (Red snake-bark maple)
- *Acer davidii* (Père David's maple)
- *Acer griseum* (Paperbark maple)
- *Acer japonicum* (Full moon maple)
- *Acer palmatum* (Japanese maple)
- *Acer platanoides* (Norway maple)
- *Acer pseudoplatanus* (Sycamore)
- *Acer rufinerve* (Grey-budded snake-bark maple)
- *Acer shirasawanum* (Shirasawa's maple)
- *Acer tataricum* (Tatarian maple)
- *Acer tataricum subsp. ginnala* (Amur maple)
- *Acer triflorum* (Three-flowered maple)
- *Acer x zoeschense* (Zoeschen maple)
- *Aesculus x carnea* (Red horse chestnut)
- *Aesculus flava* (Yellow buckeye)
- *Aesculus hippocastanum* (Horse chestnut)
- *Aesculus indica* (Indian horse chestnut)
- *Ailanthus altissima* (Tree of heaven)
- *Amelanchier canadensis* (Canadian serviceberry)
- *Amelanchier lamarckii* (Serviceberry)
- *Araucaria araucana* (Monkey puzzle)
- *Betula utilis* subsp. *albosinensis* (Chinese red birch)
- *Betula utilis* subsp. *jacquemontii* (White-barked Himalayan birch)
- *Betula utilis* subsp. *utilis* (Himalayan birch)
- *Celtis australis* (Nettle tree)
- *Celtis occidentalis* (Common hackberry)
- *Cercidiphyllum japonicum* (Katsura tree)
- *Clerodendrum trichotomum* (Harlequin glorybower)
- *Cornus controversa* (Wedding cake tree)
- *Cryptomeria japonica* (Japanese cedar)
- *Davidia involucrata* (Pocket handkerchief tree)
- *Diospyros kaki* (Chinese persimmon)
- *Eucalyptus pauciflora* group (Snow gums)
- *Eucommia ulmoides* (Guttapercha)
- *Euonymus europaeus* (Common spindle tree)
- *Gymnocladus dioica* (Kentucky coffee tree)
- *Hamamelis x intermedia* (Hybrid witch hazel)
- *Heptacodium miconioides* (Seven-son flower)
- *Hippophaë salicifolia* (Willow-leaved sea buckthorn)
- *Juniperus communis* (Common juniper)
- *Ligustrum japonicum* (Japanese tree privet)
- *Ligustrum lucidum* (Chinese privet)
- *Magnolia kobus* (Kobushi magnolia)
- *Maytenus boaria* (Chilean mayten)
- *Nothofagus antarctica* (Antarctic beech)
- *Nyssa sylvatica* (Black tupelo)
- *Parrotia persica* (Persian ironwood)
- *Phellodendron amurense* (Amur cork tree)
- *Picea abies* (Norway spruce)
- *Pinus sylvestris* (Scots pine)
- *Populus x canadensis* (Hybrid poplar)
- *Populus x candicans* (Ontario poplar)
- *Populus tremula* (Eurasian aspen)
- *Quercus frainetto* (Hungarian oak)
- *Quercus robur* (Pedunculate oak)
- *Salix caprea* (Goat willow)
- *Sorbus vilmorinii* (Vilmorin's rowan)
- *Styrax japonicus* (Japanese snowball tree)
- *Syringa reticulata* (Japanese tree lilac)

Environmental tolerance

Continued next page

Use the › symbols to go to a Profile page, and the top menu to return.



Moderately sensitive to waterlogging continued

- *Tetradium daniellii* (Chinese bee tree)
- *Thuja plicata* (Western red cedar)
- *Ulmus* – resistant cultivars (Elms)



Sensitive to waterlogging

- *Abies concolor* (White fir)
- *Abies procera* (Noble fir)
- *Acer monspessulanum* (Montpellier maple)
- *Acer saccharum* (Sugar maple)
- *Aesculus parviflora* (Dwarf horse chestnut)
- *Aesculus pavia* (Red buckeye)
- *Amelanchier alnifolia* (Alder-leaved serviceberry)
- *Aralia elata* (Angelica tree)
- *Arbutus unedo* (Strawberry tree)
- *Betula ermanii* (Stone birch)
- *Betula lenta* (Cherry birch)
- *Betula maximowicziana* (Monarch birch)
- *Betula papyrifera* (Paper birch)
- *Betula pendula* subsp. *pendula* (Silver birch)
- *Betula pendula* subsp. *szechuanica* (Chinese white birch)
- *Buxus sempervirens* (Box)
- *Carpinus betulus* (Hornbeam)
- *Carpinus japonica* (Japanese hornbeam)
- *Carya ovata* (Shagbark hickory)
- *Castanea sativa* (Sweet chestnut)
- *Catalpa bignonioides* (Indian bean tree)
- *Catalpa* x *erubescens* (Hybrid catalpa)
- *Catalpa speciosa* (Northern catalpa)
- *Cedrus atlantica* (Atlas cedar)
- *Cedrus deodara* (Himalayan cedar)
- *Cedrus libani* (Cedar of Lebanon)
- *Cercis canadensis* (North American redbud)
- *Cercis siliquastrum* (Judas tree)
- *Chamaecyparis lawsoniana* (Lawson cypress)
- x *Chitalpa tashkentensis* (Chitalpa)
- *Cladrastis kentukea* (Yellow wood)
- *Cornus alternifolia* (Alternate leaf dogwood)
- *Cornus 'Eddie's white wonder'* (Hybrid dogwood)
- *Cornus florida* (Flowering dogwood)
- *Cornus kousa* (Chinese dogwood)
- *Cornus mas* (Cornelian cherry dogwood)
- *Corylus avellana* (Hazel)
- *Corylus colurna* (Turkish hazel)
- *Corylus maxima* (Filbert)
- *Cotoneaster frigidus* (Tree cotoneaster)
- *Crataegus* x *grignonensis* (Grignon hawthorn)
- *Crataegus laevigata* (Woodland hawthorn)
- *Crataegus* x *lavalleei* (Lavallée hawthorn)
- *Crataegus* x *media* (Red thorn)
- *Crataegus monogyna* (Common hawthorn)
- *Crataegus* x *persimilis* (Broad-leaved cockspur thorn)
- *Cupressus arizonica* (Arizona cypress)
- *Cupressus macrocarpa* (Monterey cypress)
- *Cupressus sempervirens* (Mediterranean cypress)
- x *Cuprocyparis leylandii* (Leyland cypress)
- *Cydonia oblonga* (Common quince)
- *Elaeagnus angustifolia* (Russian olive)
- *Fagus orientalis* (Oriental beech)
- *Fagus sylvatica* (Common beech)
- *Ficus carica* (Common fig)
- *Ginkgo biloba* (Maidenhair tree)
- *Ilex* x *altaclerensis* group (Hybrid holly)
- *Ilex aquifolium* (European holly)
- *Ilex* x *aquipernyi* 'Dragon Lady' (Hybrid holly)
- *Ilex* x *koehneana* 'Chestnut Leaf' (Chestnut leaved holly)
- *Ilex* 'Nellie R. Stevens' (Hybrid holly)
- *Juglans nigra* (Black walnut)
- *Juglans regia* (Common walnut)
- *Juniperus scopulorum* (Rocky mountain juniper)
- *Juniperus virginiana* (Eastern red cedar)
- *Koelreuteria paniculata* (Golden rain tree)
- *Laburnum anagyroides* (Common laburnum)
- *Laburnum* x *watereri* (Hybrid laburnum)
- *Larix decidua* (Common larch)
- *Larix kaempferi* (Japanese larch)
- *Larix* x *marschlinsii* (Hybrid larch)
- *Liriodendron tulipifera* (Tulip tree)
- *Magnolia acuminata* (Cucumber tree)
- *Magnolia denudata* (Yulan magnolia)
- *Magnolia* 'Elizabeth' (Hybrid magnolia)
- *Magnolia* 'Galaxy' (Hybrid magnolia)
- *Magnolia grandiflora* (Southern magnolia)
- *Magnolia* 'Heaven Scent' (Hybrid magnolia)
- *Magnolia* x *loebneri* (Loebner magnolia)
- *Magnolia* x *soulangeana* (Saucer magnolia)
- *Magnolia* 'Spectrum' (Hybrid magnolia)
- *Magnolia* 'Star Wars' (Hybrid magnolia)
- *Magnolia* 'Susan' (Hybrid magnolia)
- *Magnolia* 'Yellow Bird' (Hybrid magnolia)
- *Malus baccata* (Siberian crabapple)
- *Malus cultivars* (Apples and crabapples)
- *Malus hupehensis* (Chinese crabapple)
- *Malus sylvestris* (European crabapple)
- *Malus toringo* (Toringo crabapple)
- *Malus trilobata* (Lebanese wild apple)
- *Malus yunnanensis* (Yunnan crabapple)
- *Mespilus germanica* (Medlar)
- *Metasequoia glyptostroboides* (Dawn redwood)
- *Morus alba* (White mulberry)
- *Morus nigra* (Black mulberry)
- *Olea europaea* (Olive)
- *Ostrya carpinifolia* (Hop hornbeam)
- *Paulownia tomentosa* (Foxglove tree)
- *Picea breweriana* (Brewer spruce)
- *Picea omorika* (Serbian spruce)
- *Picea orientalis* (Caucasian spruce)
- *Picea pungens* (Colorado blue spruce)
- *Picea sitchensis* (Sitka spruce)
- *Pinus nigra* (Black pine)
- *Pinus pinaster* (Maritime pine)
- *Pinus pinea* (Stone pine)
- *Pinus radiata* (Monterey pine)
- *Pinus strobus* (Eastern white pine)
- *Pinus wallichiana* (Bhutan pine)
- *Populus alba* (White poplar)

Use the symbols to go to a Profile page, and the top menu to return.



Sensitive to waterlogging
continued

- *Prunus* 'Accolade' (Hybrid cherry)
- *Prunus avium* (Wild cherry)
- *Prunus cerasifera* (Cherry plum)
- *Prunus domestica* (Common plum)
- *Prunus dulcis* (Almond)
- *Prunus fruticosa* (Steppe cherry)
- *Prunus laurocerasus* (Cherry laurel)
- *Prunus lusitanica* (Portugal laurel)
- *Prunus maackii* (Manchurian cherry)
- *Prunus* 'Okame' (Hybrid cherry)
- *Prunus* 'Pandora' (Hybrid cherry)
- *Prunus sargentii* (Sargent's cherry)
- *Prunus* x *schmittii* (Hybrid cherry)
- *Prunus serrula* (Tibetan cherry)
- *Prunus serrulata* (Japanese cherry)
- *Prunus* x *subhirtella* (Hybrid cherry)
- *Prunus* 'Umineko' (Hybrid cherry)
- *Prunus* x *yedoensis* (Yoshino cherry)
- *Pseudotsuga menziesii* (Douglas fir)
- *Pyrus calleryana* (Callery pear)
- *Pyrus communis* (Common pear)
- *Pyrus salicifolia* (Willow-leaved pear)
- *Quercus acutissima* (Sawtooth oak)
- *Quercus* x *bimondorum* (Hybrid oak)
- *Quercus castaneifolia* (Chestnut-leaved oak)
- *Quercus cerris* (Turkey oak)
- *Quercus coccinea* (Scarlet oak)
- *Quercus* x *hispanica* (Spanish oak)
- *Quercus ilex* (Holm oak)
- *Quercus petraea* (Sessile oak)
- *Quercus rubra* (Red oak)
- *Quercus suber* (Cork oak)
- *Quercus* x *turneri* (Turner's oak)
- *Rhus typhina* (Staghorn sumac)
- *Robinia pseudoacacia* (False acacia)
- *Sequoia sempervirens* (Coastal redwood)
- *Sequoiadendron giganteum* (Giant sequoia)
- *Sorbus aria* (Whitebeam)
- *Sorbus* x *arnoldiana* (Hybrid Sorbus)
- *Sorbus aucuparia* (Rowan)
- *Sorbus cashmiriana* (Kashmir rowan)
- *Sorbus commixta* (Japanese rowan)
- *Sorbus discolor* (Chinese rowan)
- *Sorbus intermedia* (Swedish whitebeam)
- *Sorbus* 'Joseph Rock' (Hybrid Sorbus)
- *Sorbus latifolia* (Broad-leaved whitebeam)
- *Sorbus pseudohupehensis* (Hupeh rowan)
- *Sorbus thibetica* (Tibetan whitebeam)
- *Sorbus* x *thuringiaca* (Hybrid Sorbus)
- *Sorbus torminalis* (Wild service tree)
- *Stewartia pseudocamellia* (Japanese stewartia)
- *Stewartia sinensis* (Chinese stewartia)
- *Styphnolobium japonicum* (Japanese pagoda tree)
- *Syringa* x *chinensis* (Chinese lilac)
- *Syringa vulgaris* (Common lilac)
- *Tamarix gallica* (French tamarisk)
- *Tamarix ramosissima* (Salt cedar)
- *Tamarix tetrandra* (Four-stamen tamarisk)
- *Taxus baccata* (Common yew)
- *Tilia americana* (American basswood)
- *Tilia cordata* (Small-leaved lime)
- *Tilia* x *euchlora* (Caucasian lime)
- *Tilia* x *europaea* (Common lime)
- *Tilia henryana* (Henry's lime)
- *Tilia mongolica* (Mongolian lime)
- *Tilia oliveri* (Chinese white lime)
- *Tilia platyphyllos* (Large-leaved lime)
- *Tilia tomentosa* (Silver lime)
- *Tsuga canadensis* (Eastern hemlock)
- *Tsuga heterophylla* (Western hemlock)
- *Zelkova serrata* (Japanese zelkova)

Use the symbols to go to a Profile page, and the top menu to return.

For information relating to ornamental bark, please see individual species profiles.

Peak flowering times

EARLY SPRING

- *Acacia dealbata* (Silver wattle)
- *Acer* x *freemanii* (Freeman's maple)
- *Acer japonicum* (Full moon maple)
- *Acer negundo* (Box elder)
- *Acer platanoides* (Norway maple)
- *Acer rubrum* (Red maple)
- *Acer saccharinum* (Silver maple)
- *Alnus cordata* (Italian alder)
- *Alnus glutinosa* (Common alder)
- *Alnus incana* (Grey alder)
- *Amelanchier arborea* (Downey serviceberry)
- *Ginkgo biloba* (Maidenhair tree)
- *Magnolia denudata* (Yulan magnolia)
- *Magnolia kobus* (Kobushi magnolia)
- *Magnolia* x *loebneri* (Loebner magnolia)
- *Magnolia* x *soulangeana* (Saucer magnolia)
- *Magnolia* 'Star Wars' (Hybrid magnolia)
- *Magnolia stellata* (Star magnolia)
- *Populus alba* (White poplar)
- *Populus* x *canadensis* (Hybrid poplar)
- *Populus nigra* (Black poplar)
- *Prunus* 'Accolade' (Hybrid cherry)
- *Prunus cerasifera* (Cherry plum)
- *Prunus domestica* (Common plum)
- *Prunus dulcis* (Almond)
- *Prunus* 'Okame' (Hybrid cherry)
- *Prunus* 'Pandora' (Hybrid cherry)
- *Prunus sargentii* (Sargent's cherry)
- *Prunus* x *subhirtella* (Hybrid cherry)
- *Prunus* 'Umineko' (Hybrid cherry)
- *Prunus* x *yedoensis* (Yoshino cherry)
- *Pseudotsuga menziesii* (Douglas fir)
- *Salix caprea* (Goat willow)
- *Salix daphnoides* (Violet willow)
- *Taxodium distichum* (Swamp cypress)
- *Taxus baccata* (Common yew)
- *Thuja plicata* (Western red cedar)
- *Tsuga canadensis* (Eastern hemlock)
- *Tsuga heterophylla* (Western hemlock)
- *Ulmus* – resistant cultivars (Elms)

Peak flowering times

LATE SPRING

- *Acer buergerianum* (Trident maple)
- *Acer campestre* (Field maple)
- *Acer capillipes* (Red snake-bark maple)
- *Acer cappadocicum* (Caucasian maple)
- *Acer davidii* (Père David's maple)
- *Acer griseum* (Paperbark maple)
- *Acer monspessulanum* (Montpellier maple)
- *Acer palmatum* (Japanese maple)
- *Acer pseudoplatanus* (Sycamore)
- *Acer rufinerve* (Grey-budded snake-bark maple)
- *Acer saccharum* (Sugar maple)
- *Acer shirasawanum* (Shirasawa's maple)
- *Acer tataricum* (Tatarian maple)
- *Acer tataricum subsp. ginnala* (Amur maple)
- *Acer triflorum* (Three-flowered maple)
- *Aesculus* x *carnea* (Red horse chestnut)
- *Aesculus flava* (Yellow buckeye)
- *Aesculus hippocastanum* (Horse chestnut)
- *Amelanchier alnifolia* (Alder-leaved serviceberry)
- *Amelanchier canadensis* (Canadian serviceberry)
- *Amelanchier lamarckii* (Serviceberry)
- *Betula ermanii* (Stone birch)
- *Betula lenta* (Cherry birch)
- *Betula maximowicziana* (Monarch birch)
- *Betula nigra* (River birch)
- *Betula papyrifera* (Paper birch)
- *Betula pendula* subsp. *pendula* (Silver birch)
- *Betula pendula* subsp. *szechuanica* (Chinese white birch)
- *Betula pubescens* (Downy birch)
- *Betula utilis* subsp. *albosinensis* (Chinese red birch)
- *Betula utilis* subsp. *jacquemontii* (White-barked Himalayan birch)
- *Betula utilis* subsp. *utilis* (Himalayan birch)
- *Buxus sempervirens* (Box)
- *Carpinus betulus* (Hornbeam)
- *Carpinus japonica* (Japanese hornbeam)
- *Carya illinoinensis* (Pecan)
- *Carya ovata* (Shagbark hickory)
- *Celtis australis* (Nettle tree)
- *Celtis occidentalis* (Common hackberry)
- *Cercidiphyllum japonicum* (Katsura tree)
- *Cercis canadensis* (North American redbud)
- *Cercis siliquastrum* (Judas tree)
- *Chamaecyparis lawsoniana* (Lawson cypress)
- *Cornus 'Eddie's white wonder'* (Hybrid dogwood)
- *Cornus florida* (Flowering dogwood)
- *Crataegus* x *grignonensis* (Grignon hawthorn)
- *Crataegus laevigata* (Woodland hawthorn)
- *Crataegus* x *lavalleei* (Lavallée hawthorn)
- *Crataegus* x *media* (Red thorn)
- *Crataegus monogyna* (Common hawthorn)
- *Crataegus* x *persimilis* (Broad-leaved cockspur thorn)
- *Cydonia oblonga* (Common quince)
- *Davidia involucrata* (Pocket handkerchief tree)
- *Eucalyptus pauciflora* group (Snow gums)
- *Eucommia ulmoides* (Guttapercha)
- *Euonymus europaeus* (Common spindle tree)
- *Fagus orientalis* (Oriental beech)
- *Fagus sylvatica* (Common beech)
- *Halesia carolina* (Carolina silverbell)
- *Hippophaë salicifolia* (Willow-leaved sea buckthorn)
- *Ilex* x *altaclerensis* group (Hybrid holly)
- *Ilex aquifolium* (European holly)
- *Ilex* x *aquipernyi* 'Dragon Lady' (Hybrid holly)
- *Ilex* x *koehneana* 'Chestnut Leaf' (Chestnut leaved holly)
- *Ilex* 'Nellie R. Stevens' (Hybrid holly)
- *Juglans nigra* (Black walnut)
- *Juglans regia* (Common walnut)
- *Juniperus communis* (Common juniper)
- *Juniperus scopulorum* (Rocky mountain juniper)
- *Juniperus virginiana* (Eastern red cedar)
- *Laburnum anagyroides* (Common laburnum)
- *Laburnum* x *watereri* (Hybrid laburnum)
- *Larix decidua* (Common larch)
- *Larix kaempferi* (Japanese larch)
- *Larix* x *marschlinsii* (Hybrid larch)
- *Liquidambar styraciflua* (Sweetgum)
- *Magnolia acuminata* (Cucumber tree)
- *Magnolia* 'Elizabeth' (Hybrid magnolia)
- *Magnolia* 'Galaxy' (Hybrid magnolia)
- *Magnolia* 'Heaven Scent' (Hybrid magnolia)
- *Magnolia* 'Spectrum' (Hybrid magnolia)
- *Magnolia* 'Susan' (Hybrid magnolia)
- *Magnolia* 'Yellow Bird' (Hybrid magnolia)
- *Malus baccata* (Siberian crabapple)

Use the symbols to go to a Profile page, and the top menu to return.

Peak flowering times continued

LATE SPRING

- *Malus cultivars* (Apples and crabapples)
- *Malus hupehensis* (Chinese crabapple)
- *Malus sylvestris* (European crabapple)
- *Malus toringo* (Toringo crabapple)
- *Malus yunnanensis* (Yunnan crabapple)
- *Maytenus boaria* (Chilean mayten)
- *Mespilus germanica* (Medlar)
- *Metasequoia glyptostroboides* (Dawn redwood)
- *Morus alba* (White mulberry)
- *Morus nigra* (Black mulberry)
- *Nyssa sylvatica* (Black tupelo)
- *Ostrya carpinifolia* (Hop hornbeam)
- *Paulownia tomentosa* (Foxglove tree)
- *Phellodendron amurense* (Amur cork tree)
- *Picea abies* (Norway spruce)
- *Picea breweriana* (Brewer spruce)
- *Picea omorika* (Serbian spruce)
- *Picea orientalis* (Caucasian spruce)
- *Picea pungens* (Colorado blue spruce)
- *Picea sitchensis* (Sitka spruce)
- *Pinus nigra* (Black pine)
- *Pinus pinaster* (Maritime pine)
- *Pinus pinea* (Stone pine)
- *Pinus radiata* (Monterey pine)
- *Pinus strobus* (Eastern white pine)
- *Pinus sylvestris* (Scots pine)
- *Pinus wallichiana* (Bhutan pine)
- *Platanus x hispanica* (London plane)
- *Platanus orientalis* (Oriental plane)
- *Populus x candicans* (Ontario poplar)
- *Prunus avium* (Wild cherry)
- *Prunus fruticosa* (Steppe cherry)
- *Prunus laurocerasus* (Cherry laurel)
- *Prunus maackii* (Manchurian cherry)
- *Prunus padus* (Bird cherry)
- *Prunus x schmittii* (Hybrid cherry)
- *Prunus serrula* (Tibetan cherry)
- *Prunus serrulata* (Japanese cherry)
- *Pterocarya fraxinifolia* (Caucasian wing-nut)
- *Pterocarya stenoptera* (Chinese wing-nut)
- *Pyrus calleryana* (Callery pear)
- *Pyrus communis* (Common pear)
- *Pyrus salicifolia* (Willow-leaved pear)
- *Quercus acutissima* (Sawtooth oak)
- *Quercus bicolor* (Swamp white oak)
- *Quercus x bimondorum* (Hybrid oak)
- *Quercus castaneifolia* (Chestnut-leaved oak)
- *Quercus cerris* (Turkey oak)
- *Quercus coccinea* (Scarlet oak)
- *Quercus frainetto* (Hungarian oak)
- *Quercus x hispanica* (Spanish oak)
- *Quercus ilex* (Holm oak)
- *Quercus palustris* (Pin oak)
- *Quercus petraea* (Sessile oak)
- *Quercus phellos* (Willow oak)
- *Quercus robur* (Pedunculate oak)
- *Quercus rubra* (Red oak)
- *Quercus suber* (Cork oak)
- *Quercus x turneri* (Turner's oak)
- *Salix alba* (White willow)
- *Salix babylonica* (Weeping willow)
- *Salix pentandra* (Bay-leaved willow)
- *Salix x sepulcralis* (Weeping willow)
- *Sorbus aria* (Whitebeam)
- *Sorbus x arnoldiana* (Hybrid Sorbus)
- *Sorbus aucuparia* (Rowan)
- *Sorbus cashmiriana* (Kashmir rowan)
- *Sorbus commixta* (Japanese rowan)
- *Sorbus discolor* (Chinese rowan)
- *Sorbus intermedia* (Swedish whitebeam)
- *Sorbus* 'Joseph Rock' (Hybrid Sorbus)
- *Sorbus latifolia* (Broad-leaved whitebeam)
- *Sorbus pseudohupehensis* (Hupeh rowan)
- *Sorbus thibetica* (Tibetan whitebeam)
- *Sorbus x thuringiaca* (Hybrid Sorbus)
- *Sorbus torminalis* (Wild service tree)
- *Syringa x chinensis* (Chinese lilac)
- *Zelkova serrata* (Japanese zelkova)

Peak flowering times

EARLY SUMMER

- *Abies concolor* (White fir)
- *Abies fraseri* (Fraser fir)
- *Abies grandis* (Grand fir)
- *Abies koreana* (Korean fir)
- *Abies nordmanniana* (Nordmann fir)
- *Abies procera* (Noble fir)
- *Acer x zoeschense* (Zoeschen maple)
- *Aesculus indica* (Indian horse chestnut)
- *Aesculus pavia* (Red buckeye)
- *Ailanthus altissima* (Tree of heaven)
- *Araucaria araucana* (Monkey puzzle)
- *Catalpa bignonioides* (Indian bean tree)
- *Catalpa speciosa* (Northern catalpa)
- *Cedrus deodara* (Himalayan cedar)
- x *Chitalpa tashkentensis* (Chitalpa)
- *Cladrastis kentukea* (Yellow wood)
- *Cornus alternifolia* (Alternate leaf dogwood)
- *Cornus controversa* (Wedding cake tree)
- *Cornus kousa* (Chinese dogwood)
- *Cotoneaster frigidus* (Tree cotoneaster)
- *Diospyros kaki* (Chinese persimmon)
- *Elaeagnus angustifolia* (Russian olive)
- *Gleditsia triacanthos* (Honey locust)
- *Gymnocladus dioica* (Kentucky coffee tree)
- *Liriodendron tulipifera* (Tulip tree)
- *Magnolia grandiflora* (Southern magnolia)
- *Malus trilobata* (Lebanese wild apple)
- *Nothofagus antarctica* (Antarctic beech)
- *Olea europaea* (Olive)
- *Prunus lusitanica* (Portugal laurel)
- *Rhus typhina* (Staghorn sumac)
- *Robinia pseudoacacia* (False acacia)
- *Sorbus vilmorinii* (Vilmorin's rowan)
- *Stewartia pseudocamellia* (Japanese stewartia)
- *Stewartia sinensis* (Chinese stewartia)
- *Styrax japonicus* (Japanese snowball tree)
- *Syringa reticulata* (Japanese tree lilac)
- *Syringa vulgaris* (Common lilac)
- *Tamarix tetrandra* (Four-stamen tamarisk)
- *Tilia americana* (American basswood)
- *Tilia cordata* (Small-leaved lime)
- *Tilia x euchlora* (Caucasian lime)
- *Tilia x europaea* (Common lime)
- *Tilia oliveri* (Chinese white lime)
- *Tilia platyphyllos* (Large-leaved lime)

Use the symbols to go to a Profile page, and the top menu to return.



LATE SUMMER

Peak flowering times

- ***Aesculus parviflora*** (Dwarf horse chestnut)
- ***Aralia elata*** (Angelica tree)
- ***Castanea sativa*** (Sweet chestnut)
- ***Catalpa x erubescens*** (Hybrid catalpa)
- ***Cedrus atlantica*** (Atlas cedar)
- ***Clerodendrum trichotomum*** (Harlequin glorybower)
- ***Koelreuteria paniculata*** (Golden rain tree)
- ***Ligustrum japonicum*** (Japanese tree privet)
- ***Ligustrum lucidum*** (Chinese privet)
- ***Styphnolobium japonicum*** (Japanese pagoda tree)
- ***Tamarix gallica*** (French tamarisk)
- ***Tamarix ramosissima*** (Salt cedar)
- ***Tetradium daniellii*** (Chinese bee tree)
- ***Tilia henryana*** (Henry's lime)
- ***Tilia mongolica*** (Mongolian lime)
- ***Tilia tomentosa*** (Silver lime)



EARLY AUTUMN

Peak flowering times

- ***Cedrus libani*** (Cedar of Lebanon)
- ***Heptacodium miconioides*** (Seven-son flower)



LATE AUTUMN

Peak flowering times

- ***Arbutus unedo*** (Strawberry tree)
- ***Eucalyptus gunnii* subsp. *gunnii*** (Cider gum)



EARLY WINTER

Peak flowering times

None available



LATE WINTER

Peak flowering times

- ***Alnus x spaethii*** (Spaeth alder)
- ***Cornus mas*** (Cornelian cherry dogwood)
- ***Corylus avellana*** (Hazel)
- ***Corylus colurna*** (Turkish hazel)
- ***Corylus maxima*** (Filbert)
- ***Hamamelis x intermedia*** (Hybrid witch hazel)
- ***Parrotia persica*** (Persian ironwood)
- ***Populus tremula*** (Eurasian aspen)

Use the symbols to go to a Profile page, and the top menu to return.



Peak fruiting times

EARLY SPRING

None available



Peak fruiting times

LATE SPRING

- *Salix caprea* (Goat willow)
- *Salix daphnoides* (Violet willow)



Peak fruiting times

EARLY SUMMER

- *Acer* x *freemanii* (Freeman's maple)
- *Acer rubrum* (Red maple)
- *Acer saccharinum* (Silver maple)
- *Amelanchier arborea* (Downey serviceberry)
- *Amelanchier lamarckii* (Serviceberry)
- *Betula nigra* (River birch)
- *Olea europaea* (Olive)
- *Pinus pinea* (Stone pine)
- *Pinus radiata* (Monterey pine)
- *Populus alba* (White poplar)
- *Populus* x *canadensis* (Hybrid poplar)
- *Populus nigra* (Black poplar)
- *Populus tremula* (Eurasian aspen)
- *Salix alba* (White willow)
- *Salix babylonica* (Weeping willow)
- *Salix* x *sepulcralis* (Weeping willow)
- *Ulmus* – resistant cultivars (Elms)



Peak fruiting times

LATE SUMMER

- *Abies concolor* (White fir)
- *Abies koreana* (Korean fir)
- *Abies procera* (Noble fir)
- *Acacia dealbata* (Silver wattle)
- *Acer buergerianum* (Trident maple)
- *Acer campestre* (Field maple)
- *Acer japonicum* (Full moon maple)
- *Acer monspessulanum* (Montpellier maple)
- *Acer negundo* (Box elder)
- *Acer platanoides* (Norway maple)
- *Acer pseudoplatanus* (Sycamore)
- *Acer rufinerve* (Grey-budded snake-bark maple)
- *Alnus cordata* (Italian alder)
- *Alnus glutinosa* (Common alder)
- *Alnus incana* (Grey alder)
- *Amelanchier alnifolia* (Alder-leaved serviceberry)
- *Amelanchier canadensis* (Canadian serviceberry)
- *Buxus sempervirens* (Box)
- *Cercidiphyllum japonicum* (Katsura tree)
- *Magnolia* 'Elizabeth' (Hybrid magnolia)
- *Magnolia* 'Galaxy' (Hybrid magnolia)
- *Magnolia* 'Heaven Scent' (Hybrid magnolia)

- *Magnolia* x *loebneri* (Loebner magnolia)
- *Magnolia* x *soulangeana* (Saucer magnolia)
- *Magnolia* 'Spectrum' (Hybrid magnolia)
- *Magnolia* 'Star Wars' (Hybrid magnolia)
- *Magnolia* 'Susan' (Hybrid magnolia)
- *Magnolia* 'Yellow Bird' (Hybrid magnolia)
- *Maytenus boaria* (Chilean mayten)
- *Morus alba* (White mulberry)
- *Morus nigra* (Black mulberry)
- *Nothofagus antarctica* (Antarctic beech)
- *Ostrya carpinifolia* (Hop hornbeam)
- *Phellodendron amurense* (Amur cork tree)
- *Pinus strobus* (Eastern white pine)
- *Platanus* x *hispanica* (London plane)
- *Platanus orientalis* (Oriental plane)
- *Prunus* 'Accolade' (Hybrid cherry)
- *Prunus avium* (Wild cherry)
- *Prunus cerasifera* (Cherry plum)
- *Prunus domestica* (Common plum)
- *Prunus dulcis* (Almond)
- *Prunus fruticosa* (Steppe cherry)
- *Prunus maackii* (Manchurian cherry)
- *Prunus padus* (Bird cherry)

- *Prunus* 'Pandora' (Hybrid cherry)
- *Prunus sargentii* (Sargent's cherry)
- *Prunus serrula* (Tibetan cherry)
- *Prunus* x *yedoensis* (Yoshino cherry)
- *Pterocarya fraxinifolia* (Caucasian wing-nut)
- *Pterocarya stenoptera* (Chinese wing-nut)
- *Rhus typhina* (Staghorn sumac)
- *Salix pentandra* (Bay-leaved willow)
- *Sorbus aria* (Whitebeam)
- *Sorbus* x *arnoldiana* (Hybrid Sorbus)
- *Sorbus aucuparia* (Rowan)
- *Sorbus cashmiriana* (Kashmir rowan)
- *Sorbus commixta* (Japanese rowan)
- *Sorbus discolor* (Chinese rowan)
- *Sorbus* 'Joseph Rock' (Hybrid Sorbus)
- *Sorbus pseudohupehensis* (Hupeh rowan)
- *Syringa* x *chinensis* (Chinese lilac)

Use the symbols to go to a Profile page, and the top menu to return.



EARLY AUTUMN

Peak fruiting times

- ***Abies fraseri*** (Fraser fir)
- ***Abies grandis*** (Grand fir)
- ***Abies nordmanniana*** (Nordmann fir)
- ***Acer capillipes*** (Red snake-bark maple)
- ***Acer cappadocicum*** (Caucasian maple)
- ***Acer davidii*** (Père David's maple)
- ***Acer griseum*** (Paperbark maple)
- ***Acer palmatum*** (Japanese maple)
- ***Acer saccharum*** (Sugar maple)
- ***Acer shirasawanum*** (Shirasawa's maple)
- ***Acer tataricum*** (Tatarian maple)
- ***Acer tataricum subsp. ginnala*** (Amur maple)
- ***Acer triflorum*** (Three-flowered maple)
- ***Acer x zoeschense*** (Zoeschen maple)
- ***Aesculus x carnea*** (Red horse chestnut)
- ***Aesculus flava*** (Yellow buckeye)
- ***Aesculus hippocastanum*** (Horse chestnut)
- ***Aesculus indica*** (Indian horse chestnut)
- ***Aesculus parviflora*** (Dwarf horse chestnut)
- ***Aesculus pavia*** (Red buckeye)
- ***Ailanthus altissima*** (Tree of heaven)
- ***Alnus x spaethii*** (Spaeth alder)
- ***Araucaria araucana*** (Monkey puzzle)
- ***Betula ermanii*** (Stone birch)
- ***Betula lenta*** (Cherry birch)
- ***Betula maximowicziana*** (Monarch birch)
- ***Betula papyrifera*** (Paper birch)
- ***Betula pendula* subsp. *pendula*** (Silver birch)
- ***Betula pendula* subsp. *szechuanica*** (Chinese white birch)
- ***Betula pubescens*** (Downy birch)
- ***Betula utilis* subsp. *albosinensis*** (Chinese red birch)
- ***Betula utilis* subsp. *jacquemontii*** (White-barked Himalayan birch)
- ***Betula utilis* subsp. *utilis*** (Himalayan birch)
- ***Carpinus betulus*** (Hornbeam)
- ***Carpinus japonica*** (Japanese hornbeam)
- ***Catalpa bignonioides*** (Indian bean tree)
- ***Catalpa speciosa*** (Northern catalpa)
- ***Cedrus atlantica*** (Atlas cedar)
- ***Cedrus deodara*** (Himalayan cedar)
- ***Cedrus libani*** (Cedar of Lebanon)
- ***Celtis australis*** (Nettle tree)
- ***Celtis occidentalis*** (Common hackberry)
- ***Cercis canadensis*** (North American redbud)
- ***Cercis siliquastrum*** (Judas tree)
- ***Cladrastis kentukea*** (Yellow wood)
- ***Cornus alternifolia*** (Alternate leaf dogwood)
- ***Cornus controversa*** (Wedding cake tree)
- ***Cornus florida*** (Flowering dogwood)
- ***Cornus kousa*** (Chinese dogwood)
- ***Cornus mas*** (Cornelian cherry dogwood)
- ***Corylus avellana*** (Hazel)
- ***Corylus colurna*** (Turkish hazel)
- ***Corylus maxima*** (Filbert)
- ***Cotoneaster frigidus*** (Tree cotoneaster)
- ***Crataegus x grignonensis*** (Grignon hawthorn)
- ***Crataegus laevigata*** (Woodland hawthorn)
- ***Crataegus x lavalleei*** (Lavallée hawthorn)
- ***Crataegus monogyna*** (Common hawthorn)
- ***Crataegus x persimilis*** (Broad-leaved cockspur thorn)
- ***Elaeagnus angustifolia*** (Russian olive)
- ***Eucommia ulmoides*** (Guttapercha)
- ***Euonymus europaeus*** (Common spindle tree)
- ***Fagus orientalis*** (Oriental beech)
- ***Fagus sylvatica*** (Common beech)
- ***Halesia carolina*** (Carolina silverbell)
- ***Hamamelis x intermedia*** (Hybrid witch hazel)
- ***Hippophaë salicifolia*** (Willow-leaved sea buckthorn)
- ***Ilex x altaclerensis* group** (Hybrid holly)
- ***Juglans nigra*** (Black walnut)
- ***Juglans regia*** (Common walnut)
- ***Juniperus communis*** (Common juniper)
- ***Laburnum anagyroides*** (Common laburnum)
- ***Laburnum x watereri*** (Hybrid laburnum)
- ***Liquidambar styraciflua*** (Sweetgum)
- ***Liriodendron tulipifera*** (Tulip tree)
- ***Magnolia acuminata*** (Cucumber tree)
- ***Magnolia denudata*** (Yulan magnolia)
- ***Magnolia grandiflora*** (Southern magnolia)
- ***Magnolia kobus*** (Kobushi magnolia)
- ***Magnolia stellata*** (Star magnolia)
- ***Malus baccata*** (Siberian crabapple)
- ***Malus cultivars*** (Apples and crabapples)
- ***Malus hupehensis*** (Chinese crabapple)
- ***Malus sylvestris*** (European crabapple)
- ***Malus toringo*** (Toringo crabapple)
- ***Malus trilobata*** (Lebanese wild apple)
- ***Malus yunnanensis*** (Yunnan crabapple)
- ***Nyssa sylvatica*** (Black tupelo)
- ***Parrotia persica*** (Persian ironwood)
- ***Pinus pinaster*** (Maritime pine)
- ***Prunus laurocerasus*** (Cherry laurel)
- ***Prunus lusitanica*** (Portugal laurel)
- ***Pyrus calleryana*** (Callery pear)
- ***Quercus acutissima*** (Sawtooth oak)
- ***Quercus castaneifolia*** (Chestnut-leaved oak)
- ***Quercus cerris*** (Turkey oak)
- ***Quercus coccinea*** (Scarlet oak)
- ***Quercus frainetto*** (Hungarian oak)
- ***Quercus x hispanica*** (Spanish oak)
- ***Quercus ilex*** (Holm oak)
- ***Quercus palustris*** (Pin oak)
- ***Quercus petraea*** (Sessile oak)
- ***Quercus phellos*** (Willow oak)
- ***Quercus robur*** (Pedunculate oak)
- ***Quercus rubra*** (Red oak)
- ***Quercus suber*** (Cork oak)
- ***Quercus x turneri*** (Turner's oak)
- ***Robinia pseudoacacia*** (False acacia)
- ***Sorbus intermedia*** (Swedish whitebeam)
- ***Sorbus latifolia*** (Broad-leaved whitebeam)
- ***Sorbus thibetica*** (Tibetan whitebeam)
- ***Sorbus x thuringiaca*** (Hybrid Sorbus)
- ***Sorbus torminalis*** (Wild service tree)
- ***Sorbus vilmorinii*** (Vilmorin's rowan)
- ***Styrax japonicus*** (Japanese snowball tree)
- ***Syringa reticulata*** (Japanese tree lilac)
- ***Syringa vulgaris*** (Common lilac)
- ***Tamarix tetrandra*** (Four-stamen tamarisk)
- ***Taxus baccata*** (Common yew)
- ***Tetradium daniellii*** (Chinese bee tree)
- ***Thuja plicata*** (Western red cedar)
- ***Tilia americana*** (American basswood)
- ***Tilia cordata*** (Small-leaved lime)
- ***Tilia x euchlora*** (Caucasian lime)
- ***Tilia x europaea*** (Common lime)
- ***Tilia oliveri*** (Chinese white lime)
- ***Tilia platyphyllos*** (Large-leaved lime)
- ***Tsuga canadensis*** (Eastern hemlock)
- ***Tsuga heterophylla*** (Western hemlock)
- ***Zelkova serrata*** (Japanese zelkova)

Use the symbols to go to a Profile page, and the top menu to return.

Peak fruiting times

LATE AUTUMN

- ***Aralia elata*** (Angelica tree)
- ***Arbutus unedo*** (Strawberry tree)
- ***Carya illinoinensis*** (Pecan)
- ***Carya ovata*** (Shagbark hickory)
- ***Castanea sativa*** (Sweet chestnut)
- ***Catalpa x erubescens*** (Hybrid catalpa)
- ***Chamaecyparis lawsoniana*** (Lawson cypress)
- ***Clerodendrum trichotomum*** (Harlequin glorybower)
- ***Cydonia oblonga*** (Common quince)
- ***Davidia involucrata*** (Pocket handkerchief tree)
- ***Diospyros kaki*** (Chinese persimmon)
- ***Ginkgo biloba*** (Maidenhair tree)
- ***Gleditsia triacanthos*** (Honey locust)
- ***Gymnocladus dioica*** (Kentucky coffee tree)
- ***Ilex aquifolium*** (European holly)
- ***Ilex x aquipernyi*** **'Dragon Lady'** (Hybrid holly)
- ***Ilex x koehneana*** **'Chestnut Leaf'** (Chestnut leaved holly)
- ***Ilex*** **'Nellie R. Stevens'** (Hybrid holly)
- ***Juniperus scopulorum*** (Rocky mountain juniper)
- ***Juniperus virginiana*** (Eastern red cedar)
- ***Koelreuteria paniculata*** (Golden rain tree)
- ***Larix decidua*** (Common larch)
- ***Larix kaempferi*** (Japanese larch)
- ***Larix x marschlinsii*** (Hybrid larch)
- ***Mespilus germanica*** (Medlar)
- ***Paulownia tomentosa*** (Foxglove tree)
- ***Pinus nigra*** (Black pine)
- ***Pinus sylvestris*** (Scots pine)
- ***Pinus wallichiana*** (Bhutan pine)
- ***Pseudotsuga menziesii*** (Douglas fir)
- ***Pyrus communis*** (Common pear)
- ***Pyrus salicifolia*** (Willow-leaved pear)
- ***Quercus bicolor*** (Swamp white oak)
- ***Quercus x bimondorum*** (Hybrid oak)
- ***Stewartia pseudocamellia*** (Japanese stewartia)
- ***Stewartia sinensis*** (Chinese stewartia)
- ***Styphnolobium japonicum*** (Japanese pagoda tree)
- ***Tamarix gallica*** (French tamarisk)
- ***Tamarix ramosissima*** (Salt cedar)
- ***Tilia henryana*** (Henry's lime)
- ***Tilia mongolica*** (Mongolian lime)
- ***Tilia tomentosa*** (Silver lime)

Peak fruiting times

EARLY WINTER

- ***Heptacodium miconioides*** (Seven-son flower)
- ***Ligustrum japonicum*** (Japanese tree privet)
- ***Ligustrum lucidum*** (Chinese privet)
- ***Picea abies*** (Norway spruce)
- ***Picea breweriana*** (Brewer spruce)
- ***Picea omorika*** (Serbian spruce)
- ***Picea orientalis*** (Caucasian spruce)
- ***Picea pungens*** (Colorado blue spruce)
- ***Picea sitchensis*** (Sitka spruce)

Peak fruiting times

LATE WINTER

- ***Metasequoia glyptostroboides*** (Dawn redwood)
- ***Taxodium distichum*** (Swamp cypress)

Exemplar species: *Betula pendula* ‘Youngii’ is a weeping cultivar of a popular native species. The selection of appropriate cultivars can maximise the impact of public green spaces.



© Andrew Hirons

Bibliography

Andersson, F.A. (ed.) (2005) *Coniferous forests: Ecosystems of the world, Volume 6*. Elsevier. Amsterdam, The Netherlands.

Andrews, S. (2007) Tree of the year: *Parrotia*. International Dendrological Society Yearbook. International Dendrological Society. pp.6-37.

Ashburner, K. and McAllister, H.A. (2013) The genus *Betula*: A taxonomic revision of birches. A Botanical Magazine Monograph. Kew Publishing, London, UK.

Atkinson, M.D., 1992. *Betula pendula* Roth (*B. verrucosa* Ehrh.) and *B. pubescens* Ehrh. *Journal of Ecology*, 80(4), pp.837-870.

Bailes, C. (2006) *Hollies for gardeners*. Timber Press. Portland. US.

Barker, P.A. (1984) *Eucommia ulmoides*: A tree for urban areas. *Journal of Arboriculture*. 10(8). pp. 233-235.

Barnes, B.V. (1991) Deciduous forests of North America. In: Röhrig, E. and Ulrich, B. (eds.) *Temperate deciduous forests: Ecosystems of the world, Volume 7*. Elsevier. Amsterdam, The Netherlands.

Bassuk, N., Curtis, D.F., Marranca, B.Z. and Neal, B. (2009) *Recommended Urban Trees: Site assessment and tree selection for stress tolerance*. Urban Horticulture Institute. Cornell University. Ithaca, US.

Bean, W.J. (1976) *Trees and shrubs hardy in the British Isles, Volume I A–C*, Eighth edition. John Murray, London, UK.

Bean, W.J. (1978) *Trees and shrubs hardy in the British Isles, Volume II D–M*, Eighth edition. John Murray, London, UK.

Bean, W.J. (1976) *Trees and shrubs hardy in the British Isles, Volume III N–Rh*, Eighth edition. John Murray, London, UK.

Bean, W.J. (1980) *Trees and shrubs hardy in the British Isles, Volume IV Ri–Z*, Eighth edition. John Murray, London, UK.

Bennett, J. (2002) *Lilacs for the garden*. Firefly Books. Buffalo, US.

Bobrowski, M., Gerlitz, L. and Schickhoff, U. (2017) Modelling the potential distribution of *Betula utilis* in the Himalaya. *Global Ecology and Conservation*, *11*, pp.69-83.

Brendel, O. and Cochard, H. (2011) *How plant species cope with water stress*. In: Birot, Y. Gracia, C. and Palahi, M. (eds.) Water for Forest and People in the Mediterranean: A Challenging Balance. European Forest Institute, Joensuu, Finland. pp 76–80.

Brinson, M.M. (1990) Riverine forests. In: Lugo, A.E. Brinson, M.M. and Brown, S. (eds.) *Forested Wetlands*. Elsevier. Amsterdam, The Netherlands. pp.87-141.

Bunting, A. (2016) *The plant lover's guide to Magnolias*. Timber Press. Portland, US.

Callaway, D.J. (1994) *The world of Magnolias*. Timber Press. Portland, US.

Cappiello, P. and Shadow, D. (2005) *Dogwoods*. Timber Press. Portland, US.

Ching, K.K. (1991) Temperate deciduous forests in east Asia. In: Röhrig, E. and Ulrich, B. (eds.) *Temperate deciduous forests: Ecosystems of the world, Volume 7*. Elsevier. Amsterdam, The Netherlands.

Choat, B., Jansen, S., Brodribb, T.J., Cochard, H., Delzon, S., Bhaskar, R., Bucci, S.J., Feild, T.S., Gleason, S.M., Hacke, U.G. and Jacobsen, A.L. (2012) Global convergence in the vulnerability of forests to drought. *Nature*, *491*(7426), pp.752-756.

Coombes, A.J. and Debreczy, Z. (2011) *The book of leaves*. New Holland, London, UK.

Costello, L.R., Perry, E.J. Matheny, N.P., Henry, J.M. and Geisel, P.M. (2003) *Abiotic disorders of landscape plants: A diagnostic guide* University of California Agriculture and Natural Resources. Richmond, US.

Costello, L. R., Hagen, B.W. and Jones, K.S. (2011) *Oaks in the urban landscape: Selection, care and preservation*. University of California Agriculture and Natural Resources. Richmond, US.

Crawford, M. (2015) *Trees for gardens, orchards and permaculture*. Permanent Publications. East Meon, UK.

De Jaegere, T., Hein, S. and Claessens, H. (2016) A review of the characteristics of small-leaved lime (*Tilia cordata* Mill.) and their implications for silviculture in a changing climate. *Forests*, *7*(56): 1-21.

Deak-Sjöman, J.D., Hirons, A.D. and Sjöman, H. (2016) Branch area index of solitary trees: Understanding its significance in regulating ecosystem services. *Journal of Environmental Quality*, *45*(1), pp.175-187.

Debreczy, Z. and Rácz, I. (2011) *Conifers Around the World; Conifers of temperate zones and adjacent regions*, Volume 1. DendroPress, Budapest, Hungary.

Debreczy, Z. and Rácz, I. (2011) *Conifers Around the World; Conifers of temperate zones and adjacent regions*, Volume 2. DendroPress, Budapest, Hungary.

Dickmann, D.I. (2002) An overview of the genus *Populus*. In: Dickmann, D.I., Isebrands, J.G., Eckenwalder, J.E. and Richardson, J. (eds.) *Poplar culture in North America*. NRC Research Press. Ottawa, Canada.

Dickmann, D.I. and Kuzovkina, J. (2014) Poplars and willows of the world, with emphasis on silviculturally important species. In: Isebrands, J.G. and Richardson, J. (eds.) *Poplars and willows: trees for society and the environment*. CABI. Oxford, UK.

Dirr, M.A. (2016) *Dirr's encyclopedia of trees and shrubs*. Timber Press. Portland, US.

Dzhangaliev, A.D., Salova, T.N. and Turekhanova, P.M. (2003) The wild fruit and nut plants of Kazakhstan. *Horticultural Reviews*. 29: 305-371.

eFloras (2018). Published on the Internet http://www.efloras.org [accessed January 2018] Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.

Farrar, J.L. (2017) *Trees in Canada*. Natural Resources Canada, Canadian Forest Service and Fitzhenry & Whiteside Limited. Markham, Canada.

Fiala, J.L. (1994) *Flowering crabapples: The genus Malus*. Timber Press. Portland, US.

Fiala, J.L. and Vrughtman, F. (2008) *Lilacs: A gardener's encyclopaedia*. Timber Press. Portland, US.

Flint, H.L. (1997) *Landscape plants for eastern North America: exclusive of Florida and the immediate Gulf Coast, Second edition*. John Wiley & Sons. New York, US.

Galle, F.C. (1997) *Hollies: The genus Ilex*. Timber Press. Portland, US.

Gardiner, J. (2000) *Magnolias: A gardener's guide*. Timber Press. Portland, US.

Garkoti, S.C. (2008) Estimates of biomass and primary productivity in a high-altitude maple forest of the west central Himalayas. *Ecological Research*, *23*(1), pp.41-49.

Gayraud, A. (2013) A monograph of the genus *Cornus*. Giorgio Tesi. Pistoia, Italy.

Glenz, C., Schlaepfer, R., Iorgulescu, I. and Kienast, F. (2006) Flooding tolerance of Central European tree and shrub species. *Forest Ecology and Management*, *235*(1-3), pp.1-13.

Glover, M. (2012) *Time for trees: A guide to species selection for the UK, Third edition*. Barcham Trees PLC, Ely, UK.

Gut, B. (2008) *Trees in Patagonia*. Birkhäuser Verlag AG. Basel, Switzerland.

Hightshoe, G.L. (1987) *Native trees shrubs, and vines for urban and rural America: a planting design manual for environmental designers*. Van Nostrand Reinhold Company, New York, US.

Hillier, J.G. and Lancaster, R. (eds.) (2014) *The Hillier manual of trees and shrubs, Eighth edition*. Hillier Nurseries and the Royal Horticultural Society. London, UK.

Hogan, S. (2008) *Trees for all seasons: Broadleaved evergreens for temperate climates*. Timber Press. Portland, US.

Hong, D.Y. and Blackmore, S. (eds.) (2015) *Plants of china: A companion to the flora of china*. Cambridge University Press. Cambridge, UK.

Houtman, R. (ed.) (2015) *Van Den Berk on Trees, Second edition*. Boomkwekerij Gebr. Van Den Berk B.V. Sint-Oedenrode, The Netherlands.

Hsu, E., Boland, T. and Camelbeke, K. (2008) *Stewartia in cultivation. The Plantsman*. 7(2): 78-87

Isebrands, J.G. and Richardson, J. (eds.) (2014) *Poplars and willows: trees for society and the environment*. CABI. Oxford, UK.

Jahn, G. (1991) Temperate deciduous forests of Europe. In: Röhrig, E. and Ulrich, B. (eds.) *Temperate deciduous forests: Ecosystems of the world, Volume 7*. Elsevier. Amsterdam, The Netherlands.

Jones, E.W. (1945) *Acer pseudo-platanus. Journal of Ecology 32*(2), pp. 220-237

Katsuki, T. and Luscombe, D. (2013) *Larix kaempferi. The IUCN Red List of Threatened Species 2013*: e.T42312A2971556. http://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T42312A2971556.en

Keeley, J.E. (1979) Population differentiation along a flood frequency gradient: physiological adaptations to flooding in *Nyssa sylvatica. Ecological Monographs*, *49*(1), pp.89-108.

Knees, S. and Gardner, M. (2011) *Abies nordmanniana. The IUCN Red List of Threatened Species 2011*: e.T42293A10679078. http://dx.doi.org/10.2305/IUCN.UK.2011- 2.RLTS.T42293A10679078.en

Kim, Y.-S., Chang, C.-S., Kim, C.-S. and Gardner, M. (2011) *Abies koreana. The IUCN Red List of Threatened Species 2011*: e.T31244A9618913. http://dx.doi.org/10.2305/IUCN.UK.2011- 2.RLTS.T31244A9618913.en

Kim, E.S., Oh, C.H., Park, H.C., Lee, S.H., Choi, J., Lee, S.H., Cho, H.B., Lim, W., Kim, H. and Yoon, Y.K., 2016. Disturbed regeneration of saplings of Korean fir (Abies koreana Wilson), an endemic tree species, in Hallasan National Park, a UNESCO Biosphere Reserve, Jeju Island, Korea. *Journal of Marine and Island Cultures*, *5*(1), pp.68-78.

Kolbek, J., Šrůtek, M. and Box, E.O. (2003) Forest vegetation of northeast Asia. Kluwer Academic Publishers. Dordrecht, The Netherlands.

Koller, G.L. (1978) New trees for urban landscapes. *Arnoldia*, *38*(5). pp157-172.

Koller, G.L. (1986) Seven-son flower from Zhejiang: Introducing the versatile ornamental shrub *Heptacodium jasminoides* Airy Shae. *Arnoldia*, *46*(4), pp.1-14.

Kowarik, I. and Säumel, I. (2007) Biological flora of central Europe: *Ailanthus altissima* (Mill.) Swingle. *Perspectives in Plant Ecology, Evolution and Systematics*, *8*(4), pp.207-237.

Kozlowski G. and Gratzfeld J. (2013) *Zelkova – an ancient tree. Global status and conservation action*. Natural History Museum Fribourg, Switzerland.

Krussmann, G. (1984) *Manual of cultivated broad-leaved trees and shrubs, Volume I. A–D*. Timber Press, Beverton, US.

Krussmann, G. (1985) *Manual of cultivated broad-leaved trees and shrubs, Volume II. E–Pro*. Timber Press, Portland, US.

Krussmann, G. (1985) *Manual of cultivated conifers, Second edition*. Timber Press, Portland, US.

Krussmann, G. (1986) *Manual of cultivated broad-leaved trees and shrubs, Volume III. Pru–Z*. Timber Press, Portland, US.

Kuitert, W. (1999) *Japanese flowering cherries*. Timber Press. Portland, US.

Lane, C. (2005) *Witch hazels*. Royal Horticultural Society plant collector guide. Timber Press, Portland US.

Le Hardÿ de Beaulieu, A. (2003) *An illustrated guide to maples*. Timber Press. Portland, US.

Lens, F., Picon-Cochard, C., Delmas, C.E., Signarbieux, C., Buttler, A., Cochard, H., Jansen, S., Chauvin, T., Doria, L.C., Del Arco, M. and Delzon, S., (2016) Herbaceous angiosperms are not more vulnerable to drought-induced embolism than angiosperm trees. *Plant Physiology*, pp.661-667.

Leuschner, C. and Ellenberg, H. (2017) *Ecology of central European Forests: Vegetation ecology of central Europe, Volume I*. Springer International Publishing. Cham, Switzerland.

Masaki, T., Suzuki, W., Niiyama, K., Iida, S., Tanaka, H. and Nakashizuka, T., 1992. Community structure of a species-rich temperate forest, Ogawa Forest Reserve, central Japan. *Vegetatio*, *98*(2), pp.97-111.

McAllister, H. (2005) *The genus Sorbus: Mountain ash and other rowans*. Royal Botanic Gardens. Kew, UK.

Menitsky, Y.L. (2005) *Oaks of Asia*. Science Publishers. Enfield, US.

Meyer, P. (1992) The snowbells of Korea. *Arnoldia*, *52*(1), pp.2-8.

Miller, H.A. and Lamb, S.H. (1985) *Oaks of North America*. Naturegraph Publishers. Happy Camp, US.

More, D. and White, J. (2013) *Illustrated trees of Britain and Europe, Second edition*. Bloomsbury, London, UK.

Nelson, G., Earle, C.J. and Spellenberg, R. (2014) *Trees of Eastern North America*. Princeton University Press. Princeton, US.

Newsholme, C. (2003) *Willows: The genus Salix*. Timber Press. Portland, US.

Nicolle, D. (2006) *Eucalypts of Victoria and Tasmania*. Bloomings Books. Melbourne, Australia.

Nicolle, D. (2016) *Smaller Eucalypts for planting in Australia: Their selection, cultivation and management*. Dean Nicolle. Adelaide, Australia.

Nicolle, D. (2016) *Taller Eucalypts for planting in Australia: Their selection, cultivation and management*. Dean Nicolle. Adelaide, Australia.

Niinemets, Ü. and Valladares, F. (2006) Tolerance to shade, drought, and waterlogging of temperate Northern Hemisphere trees and shrubs. *Ecological monographs*, *76*(4), pp.521-547.

Otaga, K. (1965) A dendrological study on the Japanese Aceraceae with special reference to geographical distribution. *Bulletin of the Tokyo University Forests*, *60*, pp.1-99.

Pavlik, B.M., Muick, P.C., Johnson, S.G. and Popper, M. (1991) *Oaks of California*. Chachuma Press. Los Olivos, US.

Phipps, J.B. (2003) *Hawthorns and medlars*. Royal Horticultural Society plant collectors guide. Timber Press, Portland, US.

Pigott, D. (2012) *Lime-trees and basswoods: a biological monograph of the genus Tilia*. Cambridge University Press. Cambridge, UK.

Praciak, A., Pasiecznik, N., Sheil, D., van Heist, M., Sassen, M., Correia, C.S., Dixon, C., Fyson, G.E., Rushforth, K. and Teeling, C. (2013) *The CABI encyclopedia of forest trees*. CABI, Oxford, UK.

Rajasekaran, A. and Joginder, S. (2009) Ethnobotany of Indian horse chestnut (*Aesculus indica*) in Mandi district, Himachal Pradesh. *Indian Journal of Traditional Knowledge*, *8*(2), pp.285-286.

Rhodes, L. and Maxted, N. (2016) *Malus hupehensis. The IUCN Red List of Threatened Species 2016*: e.T34901A50670723. http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T34901A50670723.en

Rich, T., Houston, L., Robertson, A. and Proctor, M. (2010) *Whitebeams, rowans and service trees of Britain and Ireland: A monograph of British and Irish Sorbus L.*. B.S.B.I Handbook No. 14. Botanical Society of the British Isles. London, UK.

Richardson, J., Isebrands, J.G. and Ball, J.B. (2014) Ecology and physiology of poplars and willows. In: Isebrands, J.G. and Richardson, J. (eds.) *Poplars and willows: trees for society and the environment*. CABI. Oxford, UK.

Röhrig, E. (1991) Deciduous forests of the near east. In: Röhrig, E. and Ulrich, B. (eds.) (1991) *Temperate deciduous forests: Ecosystems of the world, Volume 7*. Elsevier. Amsterdam, The Netherlands.

Röhrig, E. and Ulrich, B. (eds.) (1991) *Temperate deciduous forests: Ecosystems of the world, Volume 7*. Elsevier. Amsterdam, The Netherlands.

Russell K. (2003) EUFORGEN Technical Guidelines for genetic conservation and use for wild cherry *(Prunus avium)*. *International Plant Genetic Resources Institute*. Rome, Italy.

Sagheb-Talebi, K., Pourhashemi, M. and Sajedi, T. (2014) *Forests of Iran: A Treasure from the Past, a Hope for the Future*. Springer. Berlin, Germany.

Samson, R., Ningal, T.F., Tiwary, A., Grote, R., Fares, S., Saaroni, H., Hiemstra, J.A., Zhiyanski, M., Vilhar, U., Cariñanos, P. and Järvi, L. (2017) Species-Specific Information for Enhancing Ecosystem Services. In: Pearlmutter, D., Calfapietra, C., Samson, R., O'Brien, L., Ostoić, S.K., Sanesi, G. and del Amo, R.A. (eds.) *The urban forest: cultivating green infrastructure for people and the environment (Vol. 7).* Springer. Berlin, Germany.

Schmaltz, J. (1991) Deciduous forests of southern South America. in: Röhrig, E. and Ulrich, B. (eds.) *Temperate deciduous forests: Ecosystems of the world, Volume 7*. Elsevier. Amsterdam, The Netherlands.

Sefidi, K., Mohadjer, M.R.M., Etemad, V. and Copenheaver, C.A. (2011) Stand characteristics and distribution of a relict population of Persian ironwood (*Parrotia persica* CA Meyer) in northern Iran. *Flora-Morphology, Distribution, Functional Ecology of Plants*, *206*(5), pp.418-422.

Sjöman, H. and Slagstedt, J. (eds.) (2015) Träd I urbana landskap. Författarna och Studentlitteratur. Lund, Sweden. [In Swedish]

Sjöman, H. and Slagstedt, J. (2015) *Stadsträdslexikon*. Författarna och Studentlitteratur. Lund, Sweden. [In Swedish]

Sjöman, H., Hirons, A.D. and Bassuk, N.L. (2015) Urban forest resilience through tree selection—Variation in drought tolerance in Acer. *Urban Forestry & Urban Greening*, *14*(4), pp.858-865.

Sjöman, H., Hirons, A.D. and Bassuk, N.L. (2018) Magnolias as urban trees – a preliminary evaluation of drought tolerance in seven magnolia species. *Arboricultural Journal*, pp.1-10.

Spellenberg, R., Earle, C.J. and Nelson, G. (2014) *Trees of Western North America*. Princeton University Press. Princeton, US.

Sponberg, S.P. (1974) A review of deciduous-leaved species of *Stewartia* (Theaceae). *Journal of the Arnold Arboretum*, *55*(2): pp.182-214.

Stettler, R., Bradshaw, T., Heilman, P. and Hinckley, T. (eds.) (1996) *Biology of Populus and its implications for management and conservation*. NRC Research Press. Ottawa, Canada.

Sternberg, G. and Wilson, J.W. (2004) *Native trees for North American landscapes*. Timber Press. Portland, US.

Sudworth, G.B. (1967) *Forest trees of the Pacific slope*. Dover, New York, US.

Thomas, P.A., El~Barghathi, M. and Polwart, A. (2007) Biological flora of the British Isles: *Juniperus communis* L. *Journal of Ecology*, *95*(6), pp.1404-1440.

Trowbridge, P., Bassuk, N. (2004) *Trees in the Urban Landscape, Site Assessment, Design and Installation*. John Wiley & Sons. Hoboken, US.

Upson, T. (2014) *Tetradium daniellii*, Rutaceae. *Curtis's Botanical Magazine*. 31(1): pp.48-57.

Vann, D.R. (2005) Physiological ecology of *Metasequoia glyptostroboides* Hu *et* Cheng. In: LePage, B.A., Williams, C.J. and Yang, H. (eds.) (2005) *The geobiology and ecology of Metasequoia*. Springer. Dordrecht, The Netherlands. pp.305-333.

Van Auken, O.W., Ford, A.L. and Allen, J.L. (1981) An ecological comparison of upland deciduous and evergreen forests of central Texas. *American Journal of Botany*, pp.1249-1256.

van Gelderen, D.M., De Jong, P.C. and Oterdoom, H.J. (1994) *Maples of the world*. Timber Press. Portland, US.

Veblen, T.T., Armesto, J.J., Burns, B.R., Kitzberger, T., Lara, A., León, B. and Young, K.R. (2005) The coniferous forests of South America. In: Andersson, F.A. (ed.) *Coniferous forests: Ecosystems of the world, Volume 6*. Elsevier. Amsterdam, The Netherlands.

Vincent, M.A., 2004. *Tetradium daniellii* (Korean evodia; rutaceae) as an escape in North America. *Michigan Botanist*, *43*, pp.21-24.

Wei, X.Z., Jiang, M.X., Huang, H.D., Yang, J.Y. and Yu, J., 2010. Relationships between environment and mountain riparian plant communities associated with two rare tertiary-relict tree species, Euptelea pleiospermum (Eupteleaceae) and Cercidiphyllum japonicum (Cercidiphyllaceae). *Flora-Morphology, Distribution, Functional Ecology of Plants*, *205*(12), pp.841-852.

Zale, P.J. (2018) Insights from a sole survivor: *Quercus castaneifolia*. *Arnoldia 75*(3). pp.35-43.

Exemplar species: *Elaeagnus angustifolia* has silvery foliage that provides a beautiful contrast against the sky, buildings or other vegetation. It is a versatile species capable of performing well on challenging sites.



© Henrik Sjöman

Revisions Log

Issue 1.2 – September 2018

i) Corrections of typographical errors.
ii) Removal of a 'Note' on page 333, *Tilia tomentosa*, to reflect the current thinking that this species is not toxic to bees. (Thanks to Edward Baker for providing evidence for this revision).

Issue 1.3 – January 2019

i) Minor changes to a few icons to correct inconsistencies with the associated text.
ii) *Tree Selector* revised to reflect changes in (i).
iii) Missing reference added to page 34.
iv) Launch of the Excel based spreadsheet of supplementary data.

Issue 1.4 – October 2025

i) Minor changes to correct typographical errors.
ii) Launch of French and Dutch translations.
iii) Minor corrections made to ensure consistency with translated versions.

Trees & Design Action Group

www.tdag.org.uk

Issue EN 1.4/2025

Design: reduction.org