



Photograph: GAP Photos/Elke Borkowski

RESILIENT TREES

As the climate changes, attacks by pests and pathogens increase and the urbanisation of our green spaces continues relentlessly, which trees should we be planting now, to revitalise and help protect the landscapes in which we live?

WORDS: Barbara Segall



Threats and challenges to trees in the landscape and gardens are ever increasing. Climate change, with the increased likelihood of extreme events such as high temperatures, flooding and storm-level winds, is at the head of the list, with pests and pathogens keeping it close company. Combined, these factors suggest that new choices in the selection of trees that will survive or avoid the problems, are necessary.

Dr Henrik Sjöman, Senior Researcher at the Swedish University of Agriculture Science and Scientific Curator at Gothenburg Botanical Garden, explains that trees need to become established, healthy and attractive.

'Trees are recognised for delivering important ecosystem services in cities, especially in the context of climate change and the increased heat stress in urban environments.

'They offer a manifold of ecosystem services including regulating services, such as storm or water management, mitigation of urban heat island effect and air pollution, and carbon sequestration [; they also offer] cultural services, such as recreation and health benefits, and supporting services for wildlife habitats, and pollination. All are of high importance to achieve sustainable urban development and human wellbeing.'

Selecting the right tree

The Committee on Climate Change (CCC) has recommended that the British government adopt 2050 as its target date for achieving net-zero status. This was incorporated into the Climate Change Act (2008) in June 2019. To achieve this and to create a Nature Recovery Network across the length of England, the

government is committed to planting 30,000 hectares of trees each year until 2025.

However, in all cases, the trees need to be the right tree for the right situation, and well planted and maintained during the early years of establishment.

Species diversity and a mixture of native and non-native trees are essential factors in the choice of trees. Peter Jones, Garden Manager for Hardy and Ornamental at RHS Garden Wisley, is emphatic that planting a 'diverse range of trees, a mixture of native and non-native, would help mitigate plant, pathogen and climate change challenges, as well as increase the diversity of wildlife that could be attracted to garden and landscape situations'.

Other factors governing choice relate to available space for trees to thrive, soil and planting conditions, and the ornamental characteristics, including whether evergreen or deciduous are required. Peter favours trees that 'earn their keep', offering multiple ornament such as flowers, autumn foliage colour and interesting seedpods.

Dr John Grimshaw, Director of The Yorkshire Arboretum, is clear that 'we need to start now, selecting suitable trees to cope with the hotter, drier summers and warmer, wetter winters that are the "new normal". Procurement will be the challenge if we want to ensure that our landscapes remain viable and attractive.'

Heat islands

In built-up urban centres, hard surfaces create a much hotter environment and a drier situation which, in a more rural situation, is cooled down by greenery. Given the current high levels of heat in our towns and cities, many of the usual tree choices are no longer suitable, however,

and new varieties need to be sourced.

Dr Andrew Hiron, of Myerscough University, suggests that 'better evidence about geographic range, provenance and distribution of trees that thrive in similar but more southerly areas is needed'.

Andrew is also mindful that if alternatives are wanted, then the nursery trade, which has to invest in the capital costs of growing and providing the relevant materials, must be strategically supported by government and by the professional landscape sector.

Pests and pathogens

Pests such as oak processionary moth, horse chestnut leaf miner (*Cameraria ohridella*) and pathogens including honey fungus, *Phytophthora ramorum* or water mould, Chalara ash dieback (commonly now named *Hymenoscyphus fraxineus*) and Dutch elm disease, which has killed tens of millions of trees in Britain since the disease (*Ophiostoma novo-ulmi*) was accidentally introduced around the 1960s (forestresearch.gov.uk), force decisions about alternative selections.

Aesculus indica 'Sydney Pearce', with resilience to the horse chestnut leaf miner and offering similarly attractive flowers and foliage to *Aesculus hippocastanum*, is Peter Jones' suggestion as one such alternative. Walnuts *Juglans regia* and *J. nigra* are also useful in terms of shape and buttery autumn colour where ash might have been preferred.

Horticulturist and designer Andrew Fisher Tomlin FSGD rates *Zelkova serrata* (Japanese zelkova), a medium-sized spreading tree, useful for its drought tolerance but also for tolerating honey fungus.

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FOR NARROW STREETS, PAVED AND DENSELY PACKED GARDEN SPACES

- *Koelreuteria paniculata* (pictured left) – the species grows on bare rock in the Chinese mountains from where it originates, it tolerates cold winters, long warm summers and in a street situation, the columnar form 'Fastigiata' is a good choice. It grows to 19 to 26 feet, with bright green foliage turning to yellow in autumn. Also a good specimen tree for a small garden.
- *Lyonothamnus floribundus* – upright, narrow, evergreen tree from California that suits street situations. Not much found in mainstream designs as yet, but there are examples in streets near the Chelsea Physic Garden, London.
- *Ulmus* 'Columella' – an upright tree and a re-introduction of the elm.
- *Parrotia persica* 'Vanessa' – has an upright, fastigiate habit, good autumn colour.
- *Acer campestre* 'William Caldwell' – is fastigiate, with good autumn colour. Will suit a small garden space.



Photographs: Dr Henrik Sjöman, GAP Photos/Annie Green-Armytage, Rob Whitworth

FOR LONG, HOT, DRY SUMMERS

- *Alnus cordata* (Italian alder; pictured left) – tolerant of a wide range of soils including shallow soils and urban pollution. Copes with flooded situations in winter and also with very dry situations.
- *Quercus trojana*, *Q. libani* and many other oaks from Mediterranean climates – tolerant of drought and suitable for parks or large settings.



FOR ROOFTOP GARDENS

- Multi-stemmed forms of shrubby trees such as *Tamarix tetrandra* (tamarisk), *Arbutus unedo* (strawberry tree; pictured top). Similarly, *Acer tataricum*, a multi-stemmed acer that grows in challenging conditions in the steppe forests of Romania. These cope with exposure, are drought tolerant and slow growing in contained situations. Need aftercare by garden owner *et al*.
- *Malus trilobata* (Lebanese crab apple) – a slow-growing, upright shrubby tree.
- *Punica granatum* (pomegranate; pictured above) – has fruit and flowers and is more of a shrub than a tree but will do well on a rooftop in warm temperate parts of the country and in inner cities. In cold winters, it will struggle.

FOR FLOOD-PRONE SITES

- *Liquidambar styraciflua* (sweetgum; see page 27) – is moderately tolerant to waterlogging and drought.
- *Alnus cordata* (Italian alder) – tolerant of a wide range of soils including shallow soils and urban pollution. Copes with flooded situations in winter and also with very dry situations.
- Some willows such as *Salix alba daphnoides* (pictured right) – will survive in water-logged soils.
- *Quercus palustris* – tolerant of drought, water-logged soils and shade.
- *Taxodium distichum* (swamp cypress) – tolerant to waterlogging and moderately sensitive to drought conditions.

Photographs: Hillier; GAP Photos/Annie Green-Armytage



FOR ROADSIDES AND HEDGEROWS

- *Ulmus* 'Lutece', *Ulmus* 'New Horizon' and *Ulmus minor* 'Ademuz' (pictured above) – new disease-resistant elms that replace ash and restore aspects of the landscape lost due to the devastation of Dutch elm disease.
- *Tilia tomentosa* (silver lime), *T. mongolica* (Mongolian lime) and *T. americana* (American lime) – salt tolerance and roadside pollution.

USEFUL RESOURCES

Dr Andrew Hirons will be among the speakers at the Northern Ireland Heritage Gardens Trusts' 28th Annual Conference on 29 October 2022, the theme of which is 'Planting for tomorrow's world - A global perspective'; nihgt.org

Gardening in a Changing World: Plants, people, and the climate crisis (published October 2022, by Pimpernel Press), by pre-registered SGD member Darryl Moore (a review will appear in the November issue of the *Journal*)

Plant Healthy Scheme, planthealthy.org.uk/

TDAG Tree Species Selection Guide, tdag.org.uk/tree-species-selection-for-green-infrastructure.html

Arboricultural Association, trees.org.uk/

Trees and Shrubs Online, treesandshrubsonline.org

The Forestry Commission, assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057842/WoodlandsTreesForests.pdf

'Identify a tree pest or disease – an overview', gov.uk/guidance/identify-a-tree-pest-or-disease-overview

England Trees Action Plan 2021 to 2024, gov.uk/government/publications/england-trees-action-plan-2021-to-2024

Forest Research, including Urban Trees Services, forestresearch.gov.uk

SUMMARY NOTES

Establishment

The right trees need to be chosen, planted well and maintained during the early years of establishment to ensure their ongoing health and beauty. Trees need care for the first two years at least, and this should take the form of staking, watering and keeping the bases free of weeds. Peter Jones says that one of the best watering aids for tree establishment is the Treegator® Watering Bag, which can be wrapped around the tree, zipped up and filled with six to nine gallons of water once a week. The water drips slowly, keeping the tree watered.

Nursery challenges

Plant passports, quarantine measures, availability of alternatives and Brexit have been identified as some of the challenges faced by tree nurseries. The Plant Healthy Scheme, which came into force in June 2022, is a year-long pilot scheme to trial a bio-secure procurement requirement as part of the England Woodland Creation Offer and the Tree Health pilot grant schemes. Tree

suppliers will have to show that they meet the biosecurity standard set out within the Plant Health Management Standard. Its main aim is to reduce the threat of notifiable pests and pathogens being spread via the movement of live plants.

Expert support

There are many sources of tree-related information for designers and landscapers, not least the catalogues of reputable nurseries and the specialist knowledge of the nursery staff. Trees should, if possible, be British grown or, if imported, should have had appropriate quarantine periods and documented reviews.

Tree species selection information is also available from the Trees and Design Action Group online publication, Tree Species Selection for Green Infrastructure, which is co-authored by Dr Andrew Hirons and Dr Henrik Sjöman.

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