'Natives versus Aliens' – the relevance of the debate to urban forest management in Britain

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‘Natives versus aliens’: the relevance of the debate to urban forest management in Britain

Abstract

Since the 1970s, a debate has flourished among landscape professionals and others regarding the relative benefits of planting native or non-native trees in British towns and cities. It has led to some professionals advocating a ‘natives only’ or ‘natives are best’ approach to the selection of trees for urban areas. This initially prompted much debate and significant opposition from many other professionals who considered such an approach to be inappropriate. However, these ideas have recently resurfaced in the context of promoting biodiversity in urban areas.

This paper examines the relevance of the ‘natives versus aliens’ debate to urban forest management in Britain. It investigates a range of factors that can influence the selection of urban trees and, using the findings of some recent research, it explores how native species meet these requirements. In the light of this research it is clear that any automatic preference for native trees when planting in urban areas cannot be justified. We need a far more balanced and sustainable approach to urban tree selection that is based firmly on science.

Recent research has also shown that we need much more specific knowledge to adequately select trees for urban areas to deliver a wide range of environmental, economic and social benefits. This will contribute to improving the welfare of urban residents in what is essentially a human habitat, not a natural one. Lastly, the paper suggests signposts for the future development of this debate, taking into account the complex, wide-ranging factors which need to be considered when selecting appropriate species for British towns and cities.

Introduction to the ‘natives versus aliens’ debate

Keywords:

biodiversity, ecosystem services, identity, sustainability, urban climate adaptation, urban trees

While most people recognise the broad meaning of the concept of ‘native’, finding agreement on the detail is not easy (Webb, 1985). However, native species are generally regarded as those species which naturally colonised Britain after the retreat of the last Ice Age and before the creation of the English Channel, which ended the land bridge between Britain and continental Europe (Mitchell, 1981; Brown, 1997). Therefore, non-native species are those which were introduced into Britain, either intentionally or unintentionally, after this time. This ‘accident of history’ ensured a very limited period of about 4000 years for this natural colonisation and has resulted in a particularly sparse native British tree flora of little more than 30 species.

It is difficult to establish the precise origins of the debate about the relative benefits of planting native or non-native trees in Britain and their value in the landscape. However, reference to this topic can be found in literature going back hundreds of years (Gilpin, 1794). In the latter part of the 20th century, the debate has come to preoccupy many landscape professionals and conservationists with seemingly endless exchanges between those advocating ‘natives only’ or ‘natives are best’ policies and those who disagree. For the advocates of the former approach this has resulted in a widespread conservation ethic that can be rephrased as ‘Native is Good, Alien is Bad’ (Fenton, 1986).

Kendle and Rose (2000) present the ‘five common arguments’ concerning the importance of native plants and the dangers of introduced aliens or exotic species. They examine each of these claims in detail and highlight some of the generalisations and misconceptions used to support them. In their view, the subject is far more complex than these popular and often

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emotive views suggest. They conclude that in a complex environment superimposed on equally complex human history, culture, values and aspirations, it is impossible to characterise one group of plants as 'superior' to others. This is especially true when the classification system is as nebulous and value-laden as our definitions of 'native'.

The United Nations' International Year of Biodiversity held in 2010 intensified the debate on this topic and also served to encourage those wishing to promote a 'natives only' agenda. As well as preoccupying practitioners and academics, it also gained popular media attention and thus influenced public attitudes. Unfortunately, the media content has often been misinformed and overtly biased towards native species. A recent example appeared in an article from the British *Daily Mail* entitled 'The new knotweeds', based on a report published by the charity Plantlife (Thomas, 2010). Readers are given a 'warning over more alien plants set to wreak havoc' (Derbyshire, 2011). Four of the six plants featured as potentially invasive are fairly common trees, established in Britain for many decades, particularly in urban areas. While there may be difficulties with these species in some individual locations, they could hardly be described as the 'new knotweeds' (*Fallopia* spp.). However, the confusion between 'exotic', 'naturalised' and 'invasive' plants persists, not only in the popular media but also in academic work (Richardson *et al.*, 2000). Furthermore, in the vocabulary used to talk about exotic species generally, words abound which conjure up fear. Likewise, words used to describe action against the unwelcome plants often smack of military action (e.g. Krajik, 2005; Marris, 2005).

A call for 'natives only' in landscape planting has often been associated with nationalistic sentiments (Sommer, 2003). While this can be an understandable reflection of national identity and pride, it can also be used to promote political or xenophobic views. At the political level, this raises questions as to the definition of 'native' in spatial terms. For example, to refer to a species as being 'native' to Northern Ireland (Browne, 1996) ignores the geographic entity of the island of Ireland in favour of a recent and purely political boundary that has no relevance to plant distribution. On a more disturbing level, emotive talk about promoting 'natives only' and 'eradicating alien species' can have a damaging impact on community landscape initiatives in a multicultural society (Johnston and Shimada, 2004).

Another reason to avoid being dogmatic is because research can reclassify plants. Many people are still unaware that the 'native' English elm (*Ulmus procera*), the main victim of Dutch Elm Disease, is now known to have been introduced by the Romans (Gil *et al.*, 2004). In the 1980s, there was an academic debate about whether sycamore (*Acer pseudoplatanus*) was actually a native tree (Denne, 1987; Harris, 1987). To the relief of many conservationists who have a well-known dislike of this tree, it now appears this is not the case.

Loss of biodiversity needs to be addressed and sound scientific knowledge has an invaluable role in achieving this. However, in pursuing this, it is important to realise that at least part of the 'natives versus aliens' debate is an emotional one (which does not invalidate it) rather than a scientific one (Fenton, 1986). Furthermore, those with a predisposition to always favour 'native' species would be wise to keep an open mind as they may have to radically change their preconceptions as new research emerges on some unexpected benefits of so-called 'alien' species (Hamilton, 2011).

The development of the debate in urban Britain

In the early 1970s, the 'natives versus aliens' debate began to focus increasingly on urban areas of Britain, prompted by the growing interest in the flora of derelict and abandoned urban landscapes that had been highlighted in some popular books (Mabey, 1973). While the plants that had colonised these areas included numerous exotics such as buddleia and sycamore, many conservationists were particularly interested in the native plants that had managed to become established.

The birth of urban ecology

In the 1970s, as the fascination with this 'flora of dereliction' increased, urban ecology developed into a recognisably separate discipline (Nicholson-Lord, 1987). The intellectual framework supplied by this new field of study then helped to prompt the emergence of an urban greening movement, partly underpinned by ideas that focused on urban wildlife and native species.

In response to what was perceived as the drab and increasingly inappropriate landscapes of many public open spaces, some landscape architects began advocating a more radical approach that contrasted sharply with management based on traditional 'horticultural' values (McHarg, 1969; Laurie, 1979). Influenced by recent developments in the Netherlands and Sweden, they began to promote 'an ecological approach to urban landscape design' that was seen as a refreshing contrast to the unimaginative and 'sterile' landscapes of the past (Ruff and Tregay, 1982). It was argued that by creating balanced plant communities of predominantly native species, and ensuring wide species interaction and diversity, high levels of nutrient recycling and

wildlife habitats, the environmental quality of cities could be significantly improved. This approach was also believed to bring reduced management costs in comparison with more formal landscapes.

Many local authorities (LAs) in Britain responded to this new focus on urban ecology and nature conservation by producing strategy documents designed to deliver this. Leicester, a large city in the East Midlands, was one of the first LAs to adopt a city-wide ecology strategy (Moughtin and Shirley, 2005). While it was called an ecology strategy and ostensibly focused on nature conservation, it also described itself as adopting an innovative approach to landscape planning and management for the city's full range of open spaces (Leicester City Council, 1989). Throughout the 1980s and 1990s, many other LAs followed Leicester's example and produced similar strategies. These also tended to emphasise the value of native species of trees and shrubs and advocate the limitation of exotics.

Opposition to the 'natives are best' agenda

While recognising the high nature conservation value of some native species, especially in rural areas, many landscape professionals had major reservations about promoting mainly native trees and trying to create extensive areas of semi-natural landscapes in urban areas. Henry Arnold (1992), an eminent American landscape architect, challenged the approach in terms of its relevance to urban design and questioned the value of plant ecology in formulating rules for planting in cities.

In Britain, a paper in the *Arboricultural Journal* reflected the views of an increasing number of LA tree officers by challenging the appropriateness of this approach to urban landscape in what were essentially human habitats (Johnston, 1983). Another critical British paper had a greater impact as it was published in *Ecos*, a journal widely read and respected by the ecology and conservation sector (Fenton, 1986). Although it did not focus specifically on urban areas, it ignited some vigorous debate on the overall topic. Perhaps aware of the growing opposition to a strict 'natives only' agenda being applied to towns and cities rather than just rural areas, arguments in favour of this approach for urban landscapes began to be couched in the more subtle 'natives are best' agenda.

Just as that debate was escalating, an event occurred that brought it into a very practical focus. In the early hours of 16 October 1987, hurricane-force winds swept across the South and East of England destroying some 15 million trees (Ogley, 1988). 'The Hurricane' (also called The Great Storm) ensured that trees and tree planting suddenly gained national attention to an unprecedented extent. While rural areas also suffered, much of the public and media attention focused on its impact in towns and cities. Some prominent conservation groups saw this as an opportunity to promote their 'natives are best' agenda. While trying to cope with a massive clear-up operation, several LA tree officers in London were irritated by phone calls from the London Wildlife Trust asking for assurances that at least 60% of street tree replacements would be native trees (Johnston, 1991). They regarded this demand for quotas, a logical development of the 'natives are best' agenda, as totally inappropriate in urban planting schemes.

Following the widespread negative reaction among urban landscape professionals to this 'natives are best' agenda, the debate subsided. However, in the past decade it has been reignited and many of the old arguments are being recited again.

Re-emergence of the 'natives are best' agenda

The basic ideas that initially motivated the ecological approach to urban landscape design and the urban wildlife movement were understandable. However, these ideas seemed to get 'hijacked' into an agenda that had little to do with the original ideas or the different requirements of multifunctional urban landscapes. Something similar is happening again.

Concern worldwide about diminishing biodiversity has been translated into local initiatives to reverse this decline and protect and restore threatened species and habitats. Under the Natural Environment and Rural Communities (NERC) Act 2006, LAs in England and Wales have a major role to play in the conservation of biodiversity (The Wildlife Trusts, 2007). Local Biodiversity Action Plans (BAPs) are a key part of this. While concerns about global biodiversity may be well founded, this is once again in danger of being seized upon to promote a 'natives are best' agenda for urban areas in Britain. Even worse, there is a danger of taking this to the extreme of proposing quotas for native trees in urban planting schemes.

Some BAPs include general statements and policies that favour the planting of native species of trees, shrubs and other plants, often with little thought as to whether this is an urban or rural location. The Local Biodiversity Action Plan for Belfast in Northern Ireland has a particularly stark and uncompromising stand in favour of native species (Belfast City Council, 2007). In a section of the document entitled 'Why are native species important', the last paragraph states:

While priority should be given to native species, it is recognised that under special circumstance non-natives will be important. Examples of this include features in historic landscapes or special collections such as those in Belfast Zoo or the Botanic Gardens.

The idea that in a major urban area such as Belfast non-native trees and shrubs should be confined to 'special areas' is not only inappropriate and even slightly sinister, it also fails to take account of the reality of the situation. Like almost every city in the developed world, Belfast already has huge numbers of non-native trees in street, parks, open spaces and private gardens (Segoviano, 1995).

This general preference for native species in many BAPs may be having an influence on LA tree strategies, even those that cover predominantly or exclusively urban areas. In the Tree Strategy for Arun District Council (2005), the section on biodiversity contains the sweeping statement that 'native species of tree create more [biodiversity] benefit than non-native species.' Then, in the section on meeting the objectives of the strategy, it states: 'use of native species is preferred wherever planting takes place. Non-natives species will be restricted to formal parks.'

A recent attempt to promote native trees and other plants for residential gardens gained national prominence. In 2008, the *Daily Mail* reported that Monty Don, the presenter of BBC TV's 'Gardeners World', had declared that British gardeners should only use native plants in their gardens (Camber, 2008). This reversion to the strict 'natives only' agenda prompted widespread opposition, particularly from gardeners and professional horticulturists (Appleby, 2008).

The British government's recently launched 'The Big Tree Plant', an initiative to plant one million new trees in towns and cities in England, also seems to have been influenced by the 'natives are best' agenda. While this initiative is specifically about tree planting in urban areas, there are various links on its website to advisory material on tree planting which clearly state a preference for planting native trees.

How appropriate are native species for urban Britain?

When the 'natives versus aliens' debate emerged among landscape professionals in the 1970s, our knowledge of the many benefits of urban trees was at an early stage. Furthermore, much of that initial research had been conducted in North America and was not widely known among relevant British professionals (Robinette, 1972). This may have encouraged a rather limited perspective of those benefits with a heavy emphasis on the role of urban trees in ecology and nature conservation. With more extensive research in recent years, there is now a far more detailed understanding of the many environmental, economic and social benefits of urban trees (NUFU, 2005; Hiemstra *et al*., 2008; Forest Research, 2010). Furthermore, thanks largely to the internet, much of that research is freely available.

The ways in which that research is applied are also changing. The urban forest manager now has to ensure that the trees and woodlands in our towns and cities deliver a wide range of benefits for the people who live and work there. In difficult financial times, there are also major considerations about the cost of delivering those benefits and whether management priorities reflect value for money. In the light of research, current management imperatives and the re-emergence of the 'natives versus aliens' debate, the authors believe it is time to assess that debate's relevance to modern urban forest management, asking in particular whether a general preference for so-called native trees in urban areas can be justified in Britain.

In recent years, the 'natives are best' agenda when applied to urban areas in Britain has been challenged by a wide range of academics and an increasing amount of relevant research. It is worth highlighting some of this by examining a range of factors that can influence the selection of urban trees and explore how native species meet these requirements.

Biodiversity and conservation

Biodiversity literally means the variety of life on Earth. It is normally applied to the variety of life in any given ecosystem and is often regarded as a measure of the health of that ecosystem. To simply equate biodiversity with native species is to misunderstand the true meaning of biodiversity. Then, to use biodiversity as an argument for promoting the 'native are best' agenda for trees in urban areas is a clear distortion of the term.

An examination of the current urban tree population in Britain reveals this is extremely diverse due to the presence of non-native trees. An astonishing 1360 different taxa have been recorded in public urban sites (Johnson, 2005). Data from the government's *Trees in Towns II* report show that non-native trees have a very high profile in our urban landscapes (Britt and Johnston, 2008). If the aim is to promote biodiversity in urban areas, why just select those few native tree species that are likely to thrive in the intensely demanding urban environment? This will restrict biodiversity and limit the delivery of a wide range of tree benefits in different site conditions.

One of the 'golden rules' of tree selection for urban areas is to maintain a diversity of tree species for sound management reasons. Since tree pests and diseases tend to be selective, a landscape with a variety of species will typically suffer fewer losses when an outbreak does occur. Frank Santamour's (1990) '10–20–30' formula to develop a diverse tree population within the urban forest is straightforward: no more than 10% of any species, 20% of any genus or 30% of any family. If choice was limited to only native species, this would be almost impossible to apply and also ensure a healthy and vibrant urban forest.

In order to meet the requirement to favour 'native' trees that appears in many BAPs, some landscape architects and tree officers have chosen cultivars of native species such as *Quercus robur* 'Fastigiata', *Tilia cordata* 'Greenspire' and *Sorbus aucuparia* 'Joseph Rock' (Sacre, 2011, pers. comm.) in streets and other restricted urban spaces. These trees have a crown form or size more suited to some narrow streets than the original species (Figure 1). However, they are specifically bred and genetically identical cultivars that cannot be described as native trees in the conventional use of that term. Indeed, many of them have been purchased as containerised trees from overseas suppliers. This seems a strange way to meet biodiversity objectives.

Figure 1 A fastigiate oak used as a street tree.

One of the most common arguments in favour of selecting native trees for urban areas is their conservation value in encouraging associated wildlife. Conservationists are often keen to quote data in support of this. The statement that an oak tree can support over 400 species of invertebrates frequently appears in conservation literature (Alexander *et al*., 2006) and in some BAPs (Rushmore Borough Council, 2009) and LA tree strategies, even for urban areas (Manchester City Council, 2006). However, conservationists themselves recognise that no one tree on one site supports this number and a wide range of factors can influence any tree's ability to realise its conservation potential (Alexander *et al*., 2006). While the conservation value of many of our native trees may be significant in urban woodland, most of our urban forest is comprised of individual and small groups of trees in close proximity to buildings, streets, traffic, utility services, etc. An oak in a busy city centre street with paved surfaces, high levels of pollution and poor soil conditions will support a very limited number of species of invertebrates.

It should be remembered that native tree species also vary considerably in their potential to support wildlife and in comparison to oak (*Quercus robur* and *Quercus petraea*) some have a relatively poor ability (Alexander *et al*., 2006). At the same time, many non-native trees can have a surprising high potential. To reduce all this to a simple 'natives are good, aliens are bad' approach is to ignore the complexity of the research evidence.

Size of the planted area and wildlife gardening

Even at an early stage in the promotion of an ecological approach to urban landscapes design, it was appreciated that the size of an area was a significant consideration in achieving the desired outcome (Cole, 1982). Since the creation of semi-natural habitats requires the removal of urban constraints, the problems of space arises (Johnston, 1983). Plant diversity and innate stability tend to increase with the size of the habitat. Conversely, the smaller the habitat created, the greater the management input required to maintain diversity and stability and to control the effects of public use. It has been suggested that a small woodland ecosystem of less than 1.0 ha with associated ground flora should only be attempted where there is a definite commitment to frequent and sensitive management and public access is restricted owing to isolation or positive control (Cole, 1982). How can this be reconciled with low maintenance costs and providing public amenity? Indeed, making space in our built environment for even one large-growing tree is proving increasing difficult, let alone woodland, and has promoted a trend towards small ornamental trees which offer quite limited benefits (TDAG, 2010).

While it may be accepted that trying to establish significant areas of semi-natural woodland using native species is problematic in urban areas, many conservationists would argue that native species are best when planning the revegetation of extensive areas of brownfield land. However, according to studies undertaken by Forest Research, this is often not the case (Moffat, 2006). Even if woodland creation and increased biodiversity are major long-term aims, there are excellent reasons for using non-native species in many situations.

Over the past few decades, conservationists have tried to encourage the public to participate in 'wildlife gardening' (Baines, 1985; Lavelle and Lavelle, 2007). This promotes the planting of native tree species in residential gardens, stressing their value to nature conservation and biodiversity. If successful, this could have a major impact on the composition of the urban forest because residential zones can account for more than 60% of urban land area in the UK (BUGS, 2007) and trees in private gardens usually account for the vast majority of trees in residential areas (Britt and Johnston, 2008).

The Biodiversity of Urban Gardens in Sheffield (BUGS) project has undertaken some extensive research to understand the role of domestic gardens in enhancing biodiversity, to explore what factors affect biodiversity in urban gardens and how effective 'wildlife gardening' is. The BUGS 1 project focused on the city of Sheffield (Thompson *et al.*, 2003; Garston, *et al*., 2005), while BUGS 2 is looking at the same issues in five cities across the UK (Loram *et al.*, 2008). Far from justifying any 'natives are best' approach, the research often highlights the role of non-native plants in promoting biodiversity and supporting wildlife.

Another recent study entitled *London's Small Parks and Squares – A Place for Nature?* (Sibley *et al*., 2005) surveyed more than 290 green spaces in central London, investigating what made good sites for birds as an indicator of biodiversity. The most important element was to provide birds with the kind of habitats they required: shrubberies and 'woodland edge' cover for smaller birds, open ground for pigeons, and ivy clad trees. The overall results of the survey did not generally bring out a strong link between bird diversity and the presence of native trees and shrubs, with the exception of the house sparrow. For traditional gardens, vegetation structure is more important than species composition in determining bird diversity. The presence of trees or shrubs with edible fruits, regardless of whether they are native species, is likely to be significant for fruit-eating species.

Urban design, air quality and climate change

Many proponents of the 'natives are best' agenda in urban planting also stress the importance of a 'natural' arrangement of these plants – so-called 'ecological' or 'naturalistic' landscapes. However, many landscape architects and other relevant professionals do not subscribe to this approach and regard it as severely limiting in terms of delivering a liveable urban landscape. A high-profile example of this 'ecological' approach was the William Curtis Ecological Park, which was created in 1976 and survived until 1985 (Figure 2). While this was a delightful naturalistic landscape in the heart of London, much used by schoolchildren studying nature conservation, some of its supporters wanted to promote this approach as a general prescription for urban landscapes (Nicholson-Lord, 1987). In *Trees in Urban Design* by Henry Arnold (1992), widely regarded to be one of the world's great books on urban design, Arnold argues against this approach and shows how trees can be used extensively as a fundamental urban design element, collectively and imaginatively. He believes that 'naturalistic' landscapes run counter to good landscape design and that the great urban spaces of the world owe their existence to artists who have consciously transformed nature. He emphasises the need for order rather than chaos in urban design and basic physical design principles.

It has long been established that urban trees and woodland can have a beneficial impact on air quality in our towns and cities and consequently on human health (Bernatzky, 1978). Trees can remove pollutants, especially ozone, nitrogen oxide and particulate matter from the air. Not all trees are equally effective and the impact of different trees on the reduction of different pollutants is a complex subject. What is not widely known is that some trees have a negative impact on air quality, mainly through the emission of volatile organic compounds (VOCs). Researchers at Lancaster University's Centre for Ecology and Hydrology have attempted to produce a scoring system that focuses on the ability of different trees to improve air quality (Stewart *et al.*, undated). Known as the Urban Tree Air Quality Score (UTAQS), it measures the ability of trees on a scale ranging from 'Best' (trees with the greatest capacity to improve air quality) through to 'Worst' (trees with the potential to worsen air quality). Trees listed in the 'Worst' category in a brochure to publicise this work are crack willow, English oak, goat willow, poplar, red oak, sessile oak and white willow. It should be noted that all but one of these is a native tree.

Arguably the greatest challenge that humans face in this century is that of climate change, which will impact across the globe. Temperatures in our towns and cities are going to

Figure 2 The William Curtis Ecological Park in the heart of London, photographed in 1982.

continue to rise, although the rate and extent of this will depend on many factors. Trees that previously thrived in urban areas may start to decline and better adapted species of trees will have to be planted. Recent research has shown that trees can play a vital role in urban climate adaptation, with the larger-growing tree species providing significantly greater benefits for urban cooling (Ennos, 2010). The choice of species to meet this requirement, and still survive in demanding urban locations, will over-ride any considerations about native or non-native species.

Climate change will also have a significant impact on water availability across the country (Knox *et al.*, 2008). Lack of water and increased periods of drought will put further strain on existing trees and new plantings will need to favour more drought-resistant species. The ability of trees to cool urban temperatures is also dependent on adequate access to water for evapotranspiration. Some urban areas will see an increase in flooding incidents as extreme weather patterns develop. The role of trees in Sustainable Urban Drainage Systems (SUDS) to regulate water run-off, promote rainfall infiltration and control pollution and sediment retention are now widely recognised (Forest Research, 2010). However, while research highlights species selection as a very significant criterion in SUDS, there is little consideration about whether species are native or non-native (Gammie, 2011, pers. comm.). The broader the range of species to choose from, the better the chance of selecting trees that will survive and function adequately in these usually very demanding environments.

Signposts for the future

In the light of the research outlined above and other relevant studies, it is clear that an automatic preference for native trees when planting in urban areas cannot be justified. We need a far more balanced and sustainable approach to urban tree selection, based firmly on science rather than emotion or prejudice. In essence, what we need to do in any given location is to match the benefits we require from urban trees with the species that are best able to deliver this. Of course, in practice the matter is rather more complex. While a species may be excellent at delivering certain benefits, it may also have some other qualities that make it unsuitable for a particular site. Tree selection is almost always a balance between trying to achieving the desired effect together with having the least possible negative impact.

In a changing world, growing conditions for urban trees seem to become increasingly demanding. Climate, soil conditions, pests and diseases, and lack of space above and below ground are just some of the factors that are in danger of drastically reducing the number of trees in our towns and cities. In order to plan for extensive and vibrant urban forests in the future, we need to take account of these changes, and respond to them with appropriate tree selection. This needs to be a long-term view for perhaps the next 100 years, the possible lifespan for some large-growing urban trees.

Environmental assessments and ecosystem services

Landscape and other relevant professionals need to be better informed about the benefits of urban trees and how best these can be achieved. In recent years, we have seen the development of some assessment criteria that attempt to give guidance on tree and plant selection in different locations and situations.

In the UK, BREEAM (BRE Environmental Assessment Method) is the leading and most widely used environmental assessment method for buildings. It claims to set the standard for best practice in sustainable design and has become the *de facto* measure used to describe a building's environmental performance (BRE, 2009). The BREEAM Communities Scheme aims to help planners and developers improve, measure and independently certify the sustainability of development proposals at the planning stage (BRE, 2011).

BREEAM assessments emphasise and encourage the use of native plants, referring in BREEAM Communities to quotas of native trees (BRE, 2011). This is a concern because it does not appear to take account of urban conditions in Britain and of the need for a far more flexible approach to deliver environmental, social and economic benefits for those who live and work in our towns and cities. The authors believe that the BREEAM approach is too simplistic and it needs to be revised to take account of relevant research on the selection, planting and management of urban trees.

'Ecosystem services' is a term that is increasingly used to describe a multitude of processes and resources supplied by natural ecosystems to the benefit of humans and the overall environment. However, care should be taken when applying this to the urban and built environment where these ecosystems have been highly disrupted and/or regulated by human activity. The authors propose that, in terms of tree species selection, the approach to decisions regarding tree species should be as balanced as possible taking into account all relevant factors while still following best practice of an ecosystems services approach. This may entail the selection of non-native species as being more suitable for streets and hard-surfaced areas, while parks, green spaces and gardens could accommodate a greater variety of both native and non-native species.

As we learn more about the many benefits which trees can deliver in the urban realm and also how trees behave in various locations, the factors to take into account when selecting appropriate species are getting more complex. However, we need to consider these factors if we are to make the right choices for long-term tree growth and achieve the significant increases in our urban forest cover which climate change and other challenges require. Furthermore, all this needs to be reflected in the content of BAPs and other relevant strategies.

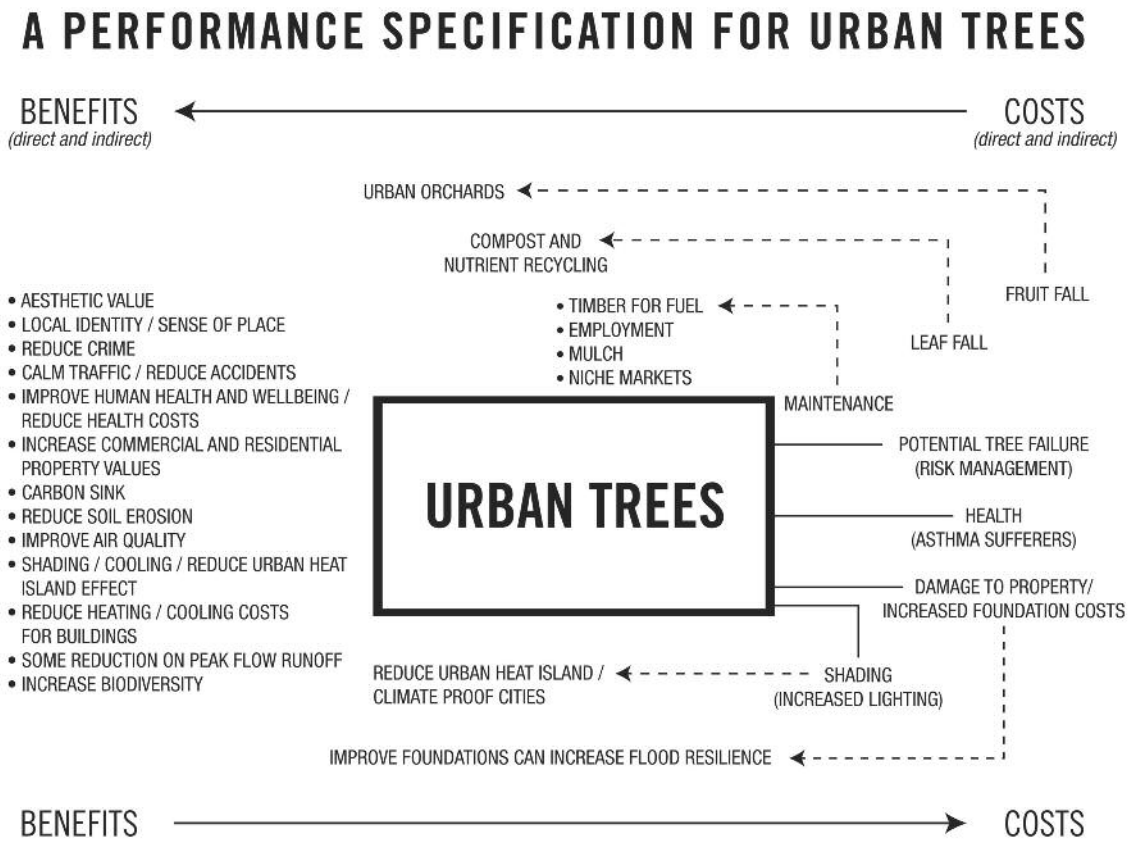
Urban tree score

The report from the Centre for Ecology and Hydrology ((Stewart *et al.*, undated) proposed the creation of an 'urban tree score' where the benefits of trees as well as their disadvantages (such as damaging property and high maintenance requirement) were incorporated onto a scale. This approach seems a good model for adding in all the social, environmental and economic benefits of various tree species and the costs they can incur such as tree maintenance, leaf fall, possible increased construction expenditure and potential property damage. We can then give a score for trees in different locations such as streets, parks, industrial estates and residential gardens. In this way we might really find the right place for the right tree and take a positive step towards ensuring we are making choices which will deliver the greatest number of long-term benefits to outweigh any possible disadvantages. Figure 3 is an attempt to present diagrammatically the essence of this approach for a performance specification for urban trees.

Conclusion

The city is not a natural habitat but a human habitat which displays a unique heritage of landscapes involving a mix of native and non-native tree species. The 'natives only' or 'natives are best' approaches which have recently resurfaced are evidence of a biocentric view that has limited relevance to the modern city. The advocates of these approaches appear intent on reversing some 2000 years of gardening tradition in Britain by reverting to some kind of idyllic past of semi-natural landscapes that existed before humans engaged in built development. This will inevitably lead to

Figure 3 A performance specification for urban trees.



urban landscapes with quite limited environmental, economic and social benefits. Furthermore, this would occur at a time when we need greater not less flexibility in responding to the ever-increasing challenges of establishing and maintaining healthy and vibrant urban forests in the built environment.

The aim of urban forestry is to improve the welfare of urban residents; the planting and care of trees is a means to that end, not an end in itself (Johnston, 1985). The 'natives only' and 'natives are best' agendas are a reversal of this position which attempts to put the promotion of a particular group of plants in our towns and cities before the welfare of their urban residents. This may be another example of what Alston Chase (1995) describes as the 'rising tyranny of ecology'.

Recent research has shown that we need much more specific research on the selection of urban trees in the future to meet a wide range of environmental, economic and social objectives. Only then can we make intelligent, holistic assessments on species choice and whether these should be native or non-native contributions to the urban forest.

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