

Sycamore - *Acer pseudoplatanus*

Introduction

Sycamore (*Acer pseudoplatanus*) has been a controversial species in British forestry and woodland conservation. Classification as both non-native and 'invasive' has led to concerns of its impacts on native and ancient woodland..

The purpose of this paper is to outline:

- background to sycamore and its status in the UK
- current positions within government and its agencies on the status and management of sycamore
- evidence of the conservation impacts and value of sycamore – in particular in relation to ancient semi-natural woodland (ASNW)
- the Woodland Trust's position

Sycamore in the UK

Sycamore is a deciduous tree, native throughout central and southern Europe and is naturalised throughout the lowlands of northern Europe. It is commonly found in beech, beech–fir and hornbeam-oak woodland mixed singly with these species, and often associated with ash^{1, 2}.

Non-native species are defined as ...“species introduced (ie by human action) outside its natural past or present distribution”³.

Naturalised species are deemed as those which ...“occur as a self-sustaining population, persisting for more than four years, not dependent on repeated reintroduction”.

In the UK sycamore is a non-native naturalised species. The lack of a fossil pollen record⁴ and evidence from historical records supports the view of sycamore as a non-native species. Opinions vary, but the 16th century is widely suggested as when sycamore arrived in the UK^{5, 6,7}

Regeneration

Sycamore has wind dispersed fruits which are released in the autumn and generally carry over a short distance (30-85 metres) although greater distances up to several kilometers are recorded. The fruits are highly perishable and those which fail to germinate die soon after shedding⁸ (Gosling, 2002).

Sycamore regenerates vigorously under moderate shade with little ground flora, but seedlings fail to survive under its own dense canopy or that of other shade bearing trees, such as beech. Thinning of shade bearing trees can lead to a flush of sycamore regeneration and the creation of an understorey of pole stage trees, which may lead to the impression of sycamore invasion. Subsequent canopy closure dramatically reduces the rate of growth of the sycamore.



Association with ash has been shown to reflect a cyclical alternation between ash and sycamore^{9,10}. Whereas sycamore regeneration is sensitive to low light levels and fails to establish under its own canopy, it is able to regenerate under an ash canopy. Conversely ash, which is more shade tolerant, is less affected by canopy cover. Where sycamore regenerates under the canopy of ash or in thinned stands its growth is rapid and can compete with ash, although this is quickly reduced by falling light levels. In other circumstances ash out competes sycamore.

Evidence suggests that sycamore does not colonise undisturbed woodland^{11,12}, even where woodland is surrounded with old established trees that have been producing seed for many years¹³. However, disturbance through road construction, drains, or disturbance by fire, landslide, windthrow or felling can result in colonisation of the open ground by sycamore¹⁴. Survey of the long term ecological changes to British woodland shows no marked change in the frequency of major woodland tree and shrub species, including sycamore, since 1971¹⁵.

Sycamore is a gap species in woodland, exploiting the disturbed areas following tree fall or, in managed woodland, following thinning or other operations which increase light levels. In undisturbed woodland it may decline in abundance, particularly in relation to ash.

Conservation value

Once thought as having little conservation value, evidence suggests that sycamore can provide important wildlife habitat and has been shown to support a number of red data book species¹⁶. The base rich bark of sycamore is valuable for epiphytes¹⁷, including communities of Lobarion lichens¹⁸. Sycamore is insect pollinated and provides a pollen and nectar source for insects. Sap sucking aphids on sycamore leaves provide a valuable food source for Dormice at a critical time of year¹⁹.



Policy background

Sycamore has been seen as a highly invasive species of limited conservation value and a threat to our native wildlife²⁰, although this appears to be based on little empirical evidence. The impression of invasiveness is reinforced by the vigorous regeneration along ride sides and in clearing – those areas most visually accessible to people.

As a result, its removal, particularly from ancient woodland, has been seen as a conservation necessity and formed part of the attainment of favourable status for woodland Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs)²¹. It is also identified as an action under various habitat action plans²².

Non-native species have been identified as the third most important factor affecting delivery of Habitat Action Plans (HAPs), and the fifth most important affecting Species Action Plans (SAPs), limiting progress in 14 HAPs and 30 SAPs²³.

In 2008 the 'Invasive non-native Species Framework strategy for Great Britain'²⁴ was produced in response to global decisions under the Convention on Biological Diversity, and within the context of the European Strategy on Invasive Alien Species developed in 2003 under the Bern Convention. The framework also takes account of the 'EU Action Plan to 2010 and Beyond', which aims to halt the loss of biodiversity by 2010. Member States are obliged to develop national strategies on invasive alien species. 'Invasive non-native species'

are defined as “species whose introduction and/or spread threaten biological diversity or have other unforeseen impacts”.

This is reflected in Natural England’s audit of non-native species. Whilst the audit recognises the difficulty in understanding the effects of sycamore it nonetheless includes it in the table of 21 non-native species, from a long list of more than 2700, with serious negative effects. Specifically it classifies its impact as a competitor and being “aesthetically bad”.

The ‘GB non-native species secretariat’²⁵, the coordinating body under the framework, brings together countryside agencies and other stakeholders from across GB in an attempt to ensure consistency of approach in non-native species policy. Their web site provides fact sheets on non-native species – at present no fact sheet exists for sycamore.

Removal of sycamore from woodland

Removal of sycamore from ancient woodland and other woodland of conservation concern is often justified on the basis of its non-native invasive status, the dense shade cast and its impact on woodland flora²⁶; sycamore is compared to beech and hawthorn in terms of shade^{27, 28}.



However, species are not themselves ‘invasive’, it is individual populations of species that are invasive in particular circumstances – that is it is a biogeographical rather than a taxonomic phenomenon²⁹. It is also argued that ‘invasive’ should give consideration to ‘impact’ – the likelihood that the spread of a species will cause environmental and economic harm³⁰.

Consideration of what constitutes ‘invasive’ is important in understanding a response to sycamore, and indeed other species, including native species. Both native and non-native species, as they increase their range in response to climate change, are capable of negative impacts.

The review of policy on non-native species undertaken by DEFRA in 2003³¹ stated that ...“Many introduced non-native species do not become invasive and action must be targeted towards species likely to cause problems, based on thorough, transparent risk analyses. This should include impact assessment, cost estimation and cost-benefit analyses to agreed criteria”.

George Peterken, in a review of the effects of non-native tree species on woodland flora, concluded that sycamore had not had a detrimental impact³². More recent surveys of ravine woodland also concluded that the ground flora under sycamore was as rich as that under ash¹.

The contention that sycamore is invasive is not supported by evidence. Sycamore appears less invasive than has historically been stated, particularly on undisturbed sites. This position is logically supported by the evidence that it does not colonise undisturbed woodland and its frequency in British woodland has remained stable over the last 40 years¹⁵.

Sycamore is ‘invasive’, or an early coloniser, to disturbed sites, however, it does not appear to be more generally invasive or a threat to ancient woodland on undisturbed sites. Nonetheless, while sycamore remains classified as both ‘non-native’ and ‘invasive’, its control will continue to be seen by some as necessary.

Guidance for SSSIs continues to emphasise the need for tree and shrub species to be predominantly native (c.95%). However there is growing recognition of the need to focus on the degree to which a particular species changes the nature of the site. For instance the LIFE Ravine Project's approach to sycamore control is based on maintaining the tree canopy and minimising disturbance³³.

Whilst there is no suggestion of attempting to remove sycamore entirely from Britain, efforts to eradicate it at a site level may have the opposite effect, increasing site disturbance and favouring regeneration.



Disturbance to both the canopy and the ground by felling is also likely to have an adverse impact on ground flora as a result of the compounding factor of soil nutrient enrichment from pollution. Combined with increased light levels there is evidence that this disturbance will increase the abundance of ruderal species at the expense of woodland specialists³⁴.

Even where regeneration of seedlings is occurring, the apparent abundance may be short lived as a result of increasing shade leading to low competitive ability, or to early predation. Climate change could further reduce the competitiveness of sycamore as it is only moderately drought tolerant³⁵ and may suffer the effects of low summer rainfall particularly in the southern and eastern parts of Britain. An additional climate change impact on sycamore might result from an increase in sooty bark disease, which may further reduce its frequency and competitiveness.

Woodland Trust position

Consideration of non-native species and invasive species is outlined in our approach to woodland management and in our position statement on conservation of native species³⁶.

Our woodland management approach says... 'when considering the need to control a species, its native or non-native status is unimportant. The key issue is whether it is causing significant on-going habitat change or loss of species, additional to that of climate change. However, even where this is the case, remedial action is only undertaken if it can be sustained'.

The evidence suggests that except where there is disturbance sycamore is unlikely to cause significant on-going habitat change. On this basis the need to control sycamore should be questioned. Where it is deemed control is necessary, strategies should focus on the need to maintain the woodland canopy and avoid disturbance in order to reduce the impact and spread of sycamore.

This supports the view in our woodland management approach (based on managing woods primarily for their biodiversity value) that our ancient semi-natural woods should be allowed to develop naturally.

In woods that are being actively managed for either conservation e.g. coppicing, or for timber, regeneration of sycamore is likely, and canopy composition will have to be manipulated by regular interventions. Woodland species will be a function of management choices.

Conclusion

Sycamore's reputation as an invasive non-native tree of limited conservation value seems ill founded. In its native range it exists as a tree distributed singly through various woodland types. Its relatively perishable seed and intolerance of shade limits its regeneration to canopy gaps and areas of disturbance. There is no evidence to support the contention that

sycamore is increasing in frequency in British woodland. British woodland generally, or that at site level it is increasing except where there has been site disturbance.

Based on the available evidence sycamore should not be regarded as a threat to undisturbed woodland and may provide an important resource for nature conservation, especially for particular groups of epiphytes. It is at least as rich in species supported as many native trees.

Any need to control sycamore – for instance in response to achieving favourable status on designated sites – should be based on minimizing intervention and thus maintaining canopy cover and reducing the likelihood of disturbance.

References

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- ¹ Riddle, N. (2005) *Ash (Fraxinus excelsior L) and sycamore (Acer pseudoplatanus) alternations study*, MSc Thesis, Staffordshire University, available as pdf file at: <http://thor/sites/wt/policy/pa/evidenceteam/Shared%20Documents/Biodiversity%20and%20Conservation%20practice/Sycamore%20Msc%20Riddle.pdf>
- ² Peterken, G.F. (1996) *Natural woodland – ecology and conservation in northern temperate regions*, Cambridge University press, Cambridge, pp.35-36
- ³ English Nature (2005) *Audit of non-native species*, English Nature research reports No. 662 download at: http://www.nonnativespecies.org/01_Fact_File/documents/Audit_of_non-native_species_in%20England.pdf
- ⁴ Morton-Boyd, J. (1993) Sycamore and Conservation. *Tree News*, Summer 1993 pp 14-16.
- ⁵ Jones, E.W. (1945b). *Biological flora of the British Isles - .Acer L.* *J. Ecol.*32, pp. 215-237.
- ⁶ Rackham, O. (2001) *Trees and woodland in the British Landscape*, Phoenix press, New York, p.4
- ⁷ Mitchell, A. (1974) *A field guide to trees the of Britain and northern Europe*, Collins, London, pp.331-4
- ⁸ Gosling, P. (2002). *Handling and Storing Acorns & Chestnuts and Sycamore Fruits*. Practice Note 12. Forestry Commission. Edinburgh.
- ⁹ Waters, T.L & Savill, P.S. (1991). 'Ash and Sycamore Regeneration and the Phenomenon of their alteration', *Forestry*. 65. 4, pp. 417.433. Oxford University Press. Abstract available at: <http://forestry.oxfordjournals.org/cgi/content/abstract/65/4/417>
- ¹⁰ Owen, D.J. (1993). *Regeneration and Alternation of Ash and Sycamore in the Derbyshire Peak District*, Unpublished, Birmingham University.
- ¹¹ Morecroft, M., Stokes, V.J., Taylor, M.E. and Morrison, J.I.L (2008) 'Effects of climate and management history on the distribution and growth of sycamore (*Acer pseudoplatanus* L.) in a southern British woodland in comparison to native competitors', *Forestry*, Vol. 81, No. 1, 2008.
- ¹² Kirby, K.J. Thomas, R.C. & Dawkins, H.C. (1996) 'Monitoring of changes in tree and shrub layers in Wytham Woods (Oxfordshire), 1974-1991', *Forestry*, 69. 4, pp. 319-334. Oxford University Press. Abstract available at: <http://forestry.oxfordjournals.org/cgi/content/abstract/69/4/319>
- ¹³ Waters, T.L. (1992). *The Ecology of Sycamore (Acer pseudoplatanus L.) Regeneration and its Interaction with Ash (Fraxinus excelsior)*' Ph.D Thesis. Oxford Forestry Institute.

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- ¹⁴ Boyd, J.M. (1993). 'Sycamore - A Review of its Status in Conservation in Great Britain', *Arboricultural Journal*, 17, pp. 425-435.
- ¹⁵ Kirby, K.J, Smart, S.M., Black, H.I.J, Bunce, R.G.H., Corney, P.M., Smithers, R.J. (2005), *Long-term ecological changes in British woodland (1971-2001)*, English Nature Research Report Number 653, English Nature, Peterborough
- ¹⁶ Whitehead, P.F. (2005). 'The Coleoptera associated with Sycamore (*Acer pseudoplatanus* L.), with reference to Sooty Bark Disease and Bredon Hill, Worcestershire', *Entomologist's Gazette* 56, pp. 107 -127.
- ¹⁷ Stern, R.C. (1989) 'Sycamore in Wessex', *Forestry*, 62(4):365-382, downloaded at: <http://forestry.oxfordjournals.org/cgi/content/abstract/62/4/365>
- ¹⁸ Scottish Natural Heritage. *The effects of woodland management on bryophytes and lichens in the western Highlands*, Information and Advisory Note Number 121, downloaded at: <http://www.snh.org.uk/publications/on-line/advisorynotes/121/121.htm>
- ¹⁹ Juskaitis, R. (2007) Feeding by Common Dormouse: a review, *Acta Zoologica Lituanica*, Volumen 17, Numerus 2, pp 151-9 http://www.ekoi.lt/uploads/docs/AZL_2007_02_151-159%20psl.pdf
- ²⁰ Rackham, O. (2001) *Trees and woodland in the British Landscape*, Phoenix press, New York, p.134
- ²¹ <http://www.jncc.gov.uk/page-3566>
- ²² Northumberland National Park ancient woodland habitat action plan, available at: <http://www.northumberlandnationalpark.org.uk/habitatactionplanwoodland.pdf>
- ²³ Ferris, R. and Bainbridge, I. (2005) *Strategy for non-native species research*, Biodiversity Research Advisory Group, September 2005, downloaded at: http://www.jncc.gov.uk/pdf/BRAG_NNS_NonNativeSpeciesResearchStrategy.pdf
- ²⁴ DEFRA (2008) *The Invasive Non-Native Species Framework Strategy for Great Britain*, downloaded at: http://www.nonnativespecies.org/documents/Invasive_NNS_Framework_Strategy_GB_E.pdf
- ²⁵ http://www.nonnativespecies.org/O1_Fact_File/
- ²⁶ Waltham Forest, Woodland and urban forest habitat, downloaded at: <http://www.walthamforest.gov.uk/index/environment/land/biodiversity/bio-acid-woodland.htm>
- ²⁷ Harmer, R. (1994) Natural Regeneration of Broadleaved Trees in Britain: II. Seed Production and Predation, *Forestry*. 67. 4, pp. 275-286, Oxford University Press, abstract available at: <http://forestry.oxfordjournals.org/cgi/content/abstract/67/4/275-a>
- ²⁸ Rackham, O. (2001) *Trees and woodland in the British Landscape*, Phoenix press, New York, p.134
- ²⁹ Colautti, R.I and Maclsaac, H.J. (2004) 'A neutral terminology to define 'invasive' species, *Diversity and Distributions*, 10, pp.135-141, downloaded at: <http://web2.uwindsor.ca/courses/biology/macisaac/rob.pdf>
- ³⁰ Davis, M.A and Thompson, K. (2001) 'Invasion Terminology: Should ecologists define their terms differently than others? No, not if we want to be of any help!', *Bulletin of the Ecological Society of America*, 82, p.206, downloaded at: <http://www.macalester.edu/~davis/BullReply1.pdf>

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- ³¹ DEFRA (2003) *Review of non-native species policy: report of the working group*, <http://www.defra.gov.uk/wildlife-countryside/resprog/findings/non-native/index.htm>
- ³² Peterken, G.F. (2001) Ecological effects of introduced tree species in Britain, *Forest Ecology and Management*, 141, 1-2, pp. 31-42
- ³³ Peak District Dales sycamore control strategy, Ravine woodLIFE project, downloaded at: <http://www.ravinewoodlife.org.uk/downloads/Ravine%20WoodLIFE%20Sycamore%20Control%20Strategy.doc>
- ³⁴ Townsend, M. (2006) 'Long term ecological changes to British Woodland (1971-2001) – lies, damn lies and statistics (now the press release)', *ECOS*, 27,1,pp. 90-95
- ³⁵ Peterken, G.F. (1996) *Natural woodland – ecology and conservation in northern temperate regions*, Cambridge University press, Cambridge, p.336
- ³⁶ The Woodland Trust, position statement, downloaded at: <http://thor/sites/wt/policypa/Lists/WT%20Policies%20and%20Position%20Statements/Attachments/25/025%20Native%20species%20January%202003.pdf>