# THE CONSERVATION VALUE OF SYCAMORE

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Over the past few years several articles have been published in the *Quarterly Review of Forestry* (eg Harris, 1987; Stern, 1992) and elsewhere (eg Taylor, 1985; Nicholson and Hare, 1986; Harris and Harris, 1991; Morton Boyd, 1992) concerning sycamore *(Acer pseudoplatanus)* and, in particular, its conservation value. Sycamore is only one of many alien species introduced to the British Isles that have become invasive. It has been the focus of much debate in Britain since the 17th century. Often this has been in the form of biased accounts.

The recent published accounts on the conservation value and invasiveness of sycamore have provided readers with a better coverage of the issues and facts relating to sycamore, although none of the papers is comprehensive. Any forester, conservationist or natural historian who has a keen or vested interest in the species should note the following points before relying too heavily on these papers:

**1.** Some authors do show clear bias for or against the species.

**2.** Jones' (1944) account in the *Biological Flora of the British Isles* is still the most comprehensive published paper, although now out of date.

**3.** All published accounts rely on a limited bibliography. More than 2,000 articles have been published on sycamore, of which about 200 contain information pertinent to its conservation value.

**4.** Most invasive species have both positive and negative impacts on the environment. Sycamore is no exception. However, the impact of an invader on the invaded ecological communities is difficult to determine accurately. Even if demonstrated, this impact can not easily be classified as positive or negative because the cultural, political, social and employment background of the observer will to a large extent determine the conclusions reached. Natural regeneration can be given as a simple example. To foresters the regeneration of a desirable species (eg sycamore) is judged positive but that of a forest weed (eg the rhododendron *Rhododendron ponticum*) as negative. To a manager of a 'natural' ecosystem the regeneration of any exotic species is seen as negative.

**5.** It must be remembered that little scientific work has been carried out in order to compare the value of sycamore and associated tree species with different taxonomic groups both in native and invaded ranges. Any statement on sycamore's wildlife value is therefore sketchy and possibly misleading. Similarly, most statements on the impact of sycamore on ecosystem structure and function are based on casual observations or evidence gathered for other purposes.

**6.** The impact of sycamore on species richness and population numbers will vary in space and time. A combination of the following factors will dramatically alter the impact of sycamore: tree height, distance between trees and age classes. For instance, on an Irish sand dune system a sea buckthorn *(Hippophae rhamnoides)* stand invaded by sycamore had a high number of breeding birds when the stand consisted of a mosaic of sea buckthorn and maturing sycamore (Nairn and Whatmough, 1978). However, as soon as the sycamore canopy closed at a height of about 10 m, both the number of species and the number of breeding pairs decreased dramatically.

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Other aspects the sycamore's conservation value are summarized below:

• Since sycamore invades many community types – dominated by trees such as alder, ash and birch all casting a relatively lower shade – it alters the below-canopy light regime. Sycamore reduces species richness when it produces a complete canopy and then the ground vegetation becomes largely restricted to bryophytes.

• It is often claimed that 'sycamore improves the soil' (eg Harris and Harris, 1992). However, no data for this are available in the British Isles. Elsewhere the evidence is inconclusive. On the Continent, it has been suggested that sycamore litter decomposition results in increased soil pH and lowered soil carbon/nitrogen ratio (Godart *et al,* 1984). Yet the C/N ratio of sycamore litter has been shown to be higher than the average of 21 broadleaved woody species, and its pH (4.3) the second lowest (Höhne, 1963).

• In terms of epiphytic lichens, sycamore has a very high species richness in its native range, whereas in Great Britain it is above average and only average in Ireland.

• Sycamore has few associated herbivorous insects. However, in spring its flowers are important to several insect species, particularly bees. Aphids are numerous on sycamore and constitute an important food source for birds. The impact of this food supply on either the number of birds present or the relative frequency of various bird species is unknown.

• Seeds can be a valuable source of food to small rodents when other foods are in short supply. This is of doubtful value because the regeneration of native trees partly fails because of these rodents. Otters favour sycamore and ash root systems to build their dens. Since the former species usually replace the latter on streambanks, the impact of sycamore can be said in this instance to be neutral.

• In urban areas, such as parks and alleys, there is a financial cost associated with the removal of unwanted young sycamores. Sycamore is also common along railway tracks in south-east England. Its large sticky leaves make it probably one of the main culprits causing autumn train delays.

• The sooty bark disease *(Cryptostroma corticale),* common in southern Britain on sycamore, is known to cause a type of pneumonia in humans. This may pose a – as yet unquantified – health hazard particularly if the British climate warms up.

We know little about how sycamore affects species richness and abundance in animal and plant communities in the British Isles. Comparative studies, specifically designed to assess its impact, must be initiated. For instance would the removal of sycamore from a particular habitat decrease species richness and diversity?

**7.** If control of sycamore is considered necessary, not all mature trees need to be removed. Predominantly male flowering individuals (which do not produce seeds) can be retained. These will increase habitat diversity without any detrimental effects. Male flowering sycamores can be identified any month of the year using shoot material, whereas predominantly male trees are distinguishable in the autumn by the production of seedless (parthenocarpic) fruits (see Binggeli, 1990 and 1992, for details).

**8.** Finally, it is important to emphasise that invasive species are now considered one of the greatest threats to the maintenance of the earth's biodiversity. With the increasing number of plant species, and particularly woody ones, grown for commercial (eg forestry, agroforestry), environmental (eg erosion prevention, shelterbelts) or ornamental purposes, more cases of biological invasions will occur

worldwide. Even if an agreement to eradicate exotic invading species was reached, the task of eradicating all of them would probably not be practical or possible. Therefore in any particular geographical region, human and financial resources must be targeted on species which most seriously affect biodiversity and the ever decreasing 'natural' vegetation.

In this respect, sycamore in the British Isles does not appear to deserve all the controversy commonly associated with it. However, it is important to stress that sycamore does alter the structure and function of many of the types of woodland (particularly, birch and alder woods) it invades. The species should be controlled if not eradicated from representative semi-natural woodlands.

Morton Boyd (1992) has made the following recommendations on dealing with sycamore in different habitat types:

a) *Ancient semi-natural woods* (ASNW): sycamore should not be introduced where it does not occur and it could be eliminated (if in small quantity) or its extent restricted by heavy thinning.

b) *Old mixed broadleaved-conifer woods:* no control unless close to an ASNW.

c) *Conifer plantations and either broadleaved or mixed conifer-broadleaved plantations without sycamore crop:* naturally seeded sycamore could be retained at the woodland edge.

A cost/benefit analysis of the impact of sycamore, as well as other invasive plants or animals, should be carried out for each site where management is thought to be necessary. The successional trends of the site must also be investigated carefully. The analysis should not limit itself to a particular site but should have a regional focus.

As part of a long-term research project on sycamore and woody plant invaders, many of these aspects have been investigated in detail in my recently completed D Phil thesis (Binggeli, 1992). The thesis also deals with sycamore reproductive biology and phenotypic variation, as well as its pattern of invasion in various plant communities. Readers requiring information on any aspect of sycamore biology and ecology may upon request receive relevant sections of the thesis and/or selected references from a computerised bibliography.

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