



The Status of some Alien Trees and Shrubs in Britain

**(a report on a questionnaire to
BSBI vice-county recorders)**

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(a report on a questionnaire to BSBI vice-county recorders to be laid
before the BSBI Spring Conference in Berwick-upon-Tweed 9th-10th
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Introduction

Background

The tradition of botanical field-recording has on the whole been to ignore planted specimens. However the reality is that even for native species of trees and shrubs most populations include planted stock or their progeny. Thus, looking at a hedgerow ash tree, one soon finds oneself asking why one should agonise over whether it is planted or self-seeded and it is no surprise that the recording of the status of introductions for the first *Atlas* 1962 was uneven. The instructions for the *BSBI Monitoring Scheme* 1987-88 did not mention planted specimens (though clarification issued during 1987 specifically outlawed them). Once *Stace* was published in 1991 it became normal to record a much wider range of aliens though not necessarily planted specimens. The 1996 instruction booklet for the *New Atlas* asked for all the taxa in *Stace*, whether native or alien, to be recorded if found in ‘the wild’ with an indication of status. Alien trees and shrubs were to be marked as ‘Planted’ or ‘Established’ (covering both vegetative spread and reproduction by seed), giving the potential for more detailed analysis by status. In the event such analysis was impracticable, not least because it was evident that recording practice had been very uneven (figure 1). The instructions for the *Monitoring Scheme* repeat survey, *BSBI Local Change* 2003-04, sought to reinforce the recording of aliens, including planted specimens, but practice still varied, particularly as to where gardens and parks end and ‘the wild’ begins, and no measure of change since 1987-88 could be calculated for most trees and shrubs as planted specimens were recorded in 2003-04 but not in the earlier survey.

This lack of an agreed BSBI recording practice for trees and shrubs has become an embarrassment for plants that are such an important part of the landscape and the ecology of the countryside. In particular, little geographical data has been collected about the extent to which many common alien species regenerate in the wild. So, as a first step towards a new approach, a modest BSBI project was planned in 2008 based on a questionnaire to be sent to vice-county recorders. This is the report of that project.

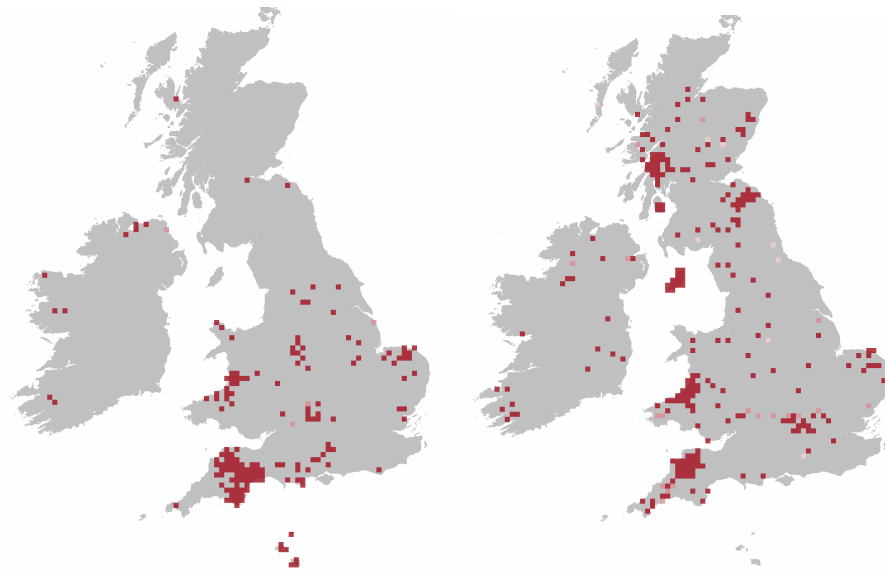


Figure 1: *New Atlas* distribution maps of X *Cupressocyparis leylandii* (left) and *Abies alba* (right), showing extensive recording from some vice-counties, but not from others, even if contiguous.

Aim of the Project

The aim of the project was to find out how recorders currently record alien trees and shrubs and to gather information about the status and distribution of a selection of such species.

The stated objectives were:

- Common alien species – which are naturalised and which are just planted? Which are planted *en masse*? Are there any regional differences?
- Rarer species – are there any that are naturalising?
- Habitats - what habitats are colonised by naturalising species? Trees and shrubs are clearly most often found in woodland but those colonizing moorland, coastal or wetland habitats are of particular interest. (Colonisation by trees and shrubs will change a habitat to scrub or woodland, so it is the habitat before such colonisation that is of most interest)
- Fashion – what changes in fashion are evident in the species planted? What species that were planted in the past are hardly ever planted now?

Method

A questionnaire, together with instructions for its completion, was sent to all vice-county recorders. The questionnaire asked for information about 148 species. It was in the form of an Excel spreadsheet that could be filled in and returned electronically. Columns were provided to record native and planted

status and the extent of regeneration and naturalisation. There were further columns for comments.

The target species for the questionnaire were chosen with the emphasis on species which may self-seed and naturalise. The selection included:

- 100 commonly planted neophyte species listed in the ‘Coverage’ chapter of the *New Atlas*, table 5.9
- Some neophytes extra to the above, in particular well-naturalised species
- Some native and archaeophyte species that are native or long-established only in part of Britain but are now more widespread than formerly.

Some categories of widely naturalised plants were omitted from the selection: native willows, roses and brambles; native climbers and ericaceous shrubs; most introduced willows and poplars and most *Cotoneaster* species; ground-cover sub-shrubs (such as *Vinca*) unless suspected of naturalising widely and most of the scarcer planted species usually found only as specimen trees in parks etc.

The spreadsheet of responses was used to produce data for mapping the species using DMAP. The multiple responses were converted into a single code showing the highest of the following sequence: absent, planted only (with three frequencies, specimen trees, non-commercial planting and forestry), planted and regenerating (self-seeding, narrowly-established, naturalised), native.

Captions to the maps were written in the light of feedback from the vice-counties in the comment columns of the questionnaire. A selection of these maps and captions form the main body of this report and give pointers to issues of interest, but the limited scope of the questionnaires preclude much in the way of definitive outcomes.

Indices of planting and regeneration were calculated from the averages (means) of the responses for each species and were used to rank the species.

Results

Completed questionnaires were received from 48 vice-counties, ranging from the Channel Islands in the south to West Sutherland in the north, west to east from Scilly to East Suffolk, and including two from Ireland.

Native species

35 species were reported as being native in at least some v.cc., with the native distribution reported closely following that in the *New Atlas*. However in some species, *Ribes spp.* in particular, naturalised populations are so widespread that the distinction between native and alien populations becomes almost meaningless and opinions differ. All of these species were also reported as being planted with many being included in amenity plantings, commonly on roadsides. Many v.cc. reported that these plantings included alien varieties, i.e. not of local or even British provenance. Some plantings may be of 'lookalike' species rather than varieties. In v.c.11 non-native varieties or lookalike species were mentioned for *Viburnum opulus*, *V. lantana* and *Cornus sanguinea*. Non-native varieties of *Acer campestre* were recorded in seven vice-counties, and implied in many more.

Naturalised species

112 species were reported to be naturalised somewhere. These included 16 species that were naturalised in just one v.c..

The species most widely reported as naturalised, with the percentage of v.cc., were: *Acer pseudoplatanus*, 73%, *Buddleja davidii*, 71%, *Rhododendron ponticum*, 71%, *Fallopia japonica*, 69%, *Cotoneaster horizontalis*, 50%, *Cotoneaster simonsii*, 46%, *Symphoricarpos albus*, 44%, *Quercus cerris*, 42%, *Ribes nigrum*, 38%, *Rubus armeniacus*, 38%. The only possible surprise here is the extent to which *Quercus cerris* Turkey Oak is naturalised.

Regeneration short of naturalisation

All 148 species included in the project were recorded as regenerating somewhere to some extent, whether vegetatively or by seed. This is a remarkable result even given the bias in the sample of species selected.

The species most widely reported as regenerating are similar to those most widely reported as naturalised with the addition of three of the species that spread vegetatively to form large patches: *Fallopia japonica*, *F. sachalinensis* and *Spiraea agg.*

The ten species least reported as regenerating, were: *Cedrus libani*, *C. deodara*, *Nothofagus alpina*, *Chamaecyparis pisifera*, *Pinus strobus*, *Cedrus atlantica*, *Sequoiadendron giganteum*, *Araucaria araucana*, *Nothofagus obliqua* and *Laburnum alpinum*.

Not surprisingly, the trees showing the least regeneration were those that occur as specimen trees rather than in plantations. These include the three cedars and *Sequoiadendron giganteum*. A single *Cedrus libani* sapling, near the parent tree, was noted in v.c.17.

Planted species

The ten most widely planted species were familiar forest trees, all of them conifers: *Picea abies*, *Picea sitchensis*, *Larix x marschlinii*, *Larix decidua*, *Larix kaempferi*, *Pinus contorta*, *Tsuga heterophylla*, *Abies grandis*, *Thuja plicata* and *Pseudotsuga menziesii*. This list broadly parallels the Forestry Commission's figures (Forestry Commission 2008), although the proportion of *Picea abies* is lower in comparison with other species in the FC figures. The most planted forestry tree in the FC table is *P. sitchensis*. The *New Atlas* describes *P. sitchensis* as increasingly planted in the lowlands, but recorders have reported that plantations here are not necessarily successful (v.cc. 11 and 54). Although *P. sitchensis* does not feature in the top ten regenerating species (above), recorders in north and west Britain have reported it colonising open moorland and bog as well as track-sides and rocky ground. There it has been flagged as having become a pest weed species (e.g. v.cc. 3, 4, 44, 45, 46, 97 and 104). Even in lowland v.c.11, where commercial plantations are described as unsuccessful, it is more frequently recorded as self-sown than *P. abies*. All these ten conifers regenerate freely in suitable conditions (with *Abies grandis* as yet possibly a partial exception), but it is the spruces and *Pinus contorta* which are particularly reported outside their plantations.

Two willow hybrids, *Salix x mollissima* and *S. x calodendron*, noted in the literature as being planted *en masse* for biomass production, were included in the questionnaire. They were each recorded from 21 v.cc., but few of the records related to biomass plantings.

Habitats

Alien trees have colonised a wide range of habitats, including some of the most remote (e.g. *Picea sitchensis* on upland moorland). However, the most widely reported habitats are to a greater or lesser extent artificial. Some species have not got much further than where they were originally planted (*Rhus*), some have been transported by human means to roadside verges and edges of woodland, where garden waste has been dumped (*Forsythia*), some have spread by their own means, vegetatively or by seed, along corridors, such as rivers, roads and railways (*Buddleja*, *Fallopia japonica*), others are most frequently naturalised in urban areas (*Acer platanoides*). Other than the conifers mentioned above, only a few have penetrated semi-natural habitats (*Acer pseudoplatanus* and *A. platanoides* in the woodland canopy and *Rhododendron*

ponticum and *Prunus laurocerasus* in the understorey). The currants *Ribes spp.* are something of a special case in view of the mix of native and introduced populations mentioned above.

Dispersal

The most abundantly self-sown species are those that are dispersed by wind (*Acer pseudoplatanus*, *Buddleja davidii*, *Picea sitchensis*). Birds are responsible for the dispersal of species with fleshy fruits (e.g. *Cotoneaster spp.*), and these may be transported far from their original source. *Cotoneaster simonsii* is widely naturalised in upland areas. Squirrels have been implicated in the distribution various ‘nuts’, e.g. *Juglans regia* in eight vice-counties, *Aesculus hippocastanum* in v.cc. 6 and 64 and *Quercus spp.* in v.c. 18. Surprisingly, squirrels are not mentioned for *Castanea sativa*, which is widely reported as naturalised in the lowlands (15 v.cc.).

Additional species

The recorders were invited to list any additional species thought to be spreading. No significant findings arose. The most widely recorded additional taxon was *Hebe x franciscana* from seven v.cc..

Discussion

The selection of maps and captions that form the main body of this report give pointers to several issues of interest. Firstly, some species self-seed so readily that they become invasive. While this is widely recognised for *Acer pseudoplatanus*, *Buddleja davidii*, *Fallopia japonica*, *Rhododendron ponticum*, *Symphoricarpos albus*, and even the oaks *Quercus cerris* and *Q. ilex*, there has been much less attention given to problems from conifers especially *Picea abies*, *P. sitchensis* and *Pinus contorta*. Indeed the risks to conservation from the spread of *Picea sitchensis* as a weed are suggested as the most significant finding of this report. *Rubus spectabilis* is reported as a problem in Northern Ireland and may become so in other areas.

Secondly, there are interesting geographical patterns in the v.cc. where species self-seed most readily. While there is correlation with the v.cc. where the species are most widely planted, as plantings are in general based on good information as to where they might prosper, self-seeding is often in a narrower range than the plantings. This is evident with such species as *Castanea sativa*, *Leycesteria formosa*, *Prunus lusitanica* and *Sambucus racemosa*.

Of the many other species that self-seed or spread vegetatively a few have attracted our attention as regenerating more than one might have expected. These include *Acer platanoides*, *Lycium barbarum agg.*, and *Ribes sanguineum*.

In contrast some species self-seed very rarely. For the cedars *Cedrus spp.*, *Araucaria araucana*, *Sequoiadendron giganteum* and *X Cupressocyparis leylandii* this is what one might have come to expect. Perhaps more interesting is that all these have been observed self-seeding somewhere. The poor reproductive success of *Nothofagus spp.* is less expected.

Recording bias in the responses received is relatively low, much lower than in the *New Atlas*. However it must be emphasised that this relates to the 48 recorders who have taken trouble with the questionnaire and that, even for these, it relates to their response and not necessarily to their regular recording practice. It is thought that there is still a high level of confusion and apathy in relation to the recording of alien trees and shrubs. Much of this stems from a lack of guidance on objectives and methods and it should be noted that we do not present suggestions on this difficult subject in this report. It is difficult because there is a need to record more than recorders are in general currently in the habit of recording and, if more is to be recorded, they need clarity as to how the data is to be captured and made available for analysis in our computer recording software. This matter is to be discussed further at the BSBI Spring Conference.

We hope that this report has demonstrated that there is much still to be learned about how alien trees and shrubs are faring in the countryside and that there is good botanising to be had in their pursuit.

Acknowledgements

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Appendix

Case Study: *Picea sitchensis* Sitka Spruce as a weed

The questionnaire responses for Sitka included such striking comment on its ability to seed into a variety of habitats that we have made limited additional enquiry seeking to gain insight into the issue and report here on our findings.

Roger Smith notes a problem in Soussons Plantation on Dartmoor, Devon. Here a plantation was established on an *Erica ciliaris* site. Sitka has seeded into the clearing where the *Erica* grows and a work party was organised to clear the saplings. Arthur Chater, Cardiganshire finds self-seeding mainly in open ground within plantations where *Tsuga heterophylla* may be as plentiful as pines and spruces if it occurs. In the Scottish Borders Michael Braithwaite removed Sitka found on Dogden Moss in the rand of a raised bog 2km from the nearest plantation. He notes Sitka as so abundant in the rides of some plantations that hedge cutting machinery has been used to keep the rides open and it has also colonised scalloped edges to the plantations. At Carrifran, Dumfriesshire there is an ambitious wildwood restoration project in an upland valley; here Philip Ashmole reports Sitka as a significant problem seeding into the young oaks 1km from a plantation against the prevailing wind. Michael Braithwaite has observed Sitka near Oban scattered in oak woodland preserved along burn-sides within conifer plantations and also in ungrazed wetlands nearby. Jim McIntosh, Perthshire notes Sitka as an occasional problem especially on high ground and where it is rocky. Antony Braithwaite visited Arberlour-on-Spey, Moray where spruce and pine was a problem on a grouse moor where the grazing had been relaxed. Stephen Bungard reports scattered Sitka on Raasay where there are two large plantations. He adds 'however, Loch na Leanna in NG5846 is near a forestry plantation that was felled a few years ago. It is a fine lochan with palmate newts and the locally rare *Nuphar lutea*. All the little islands in it have Sitka. The north side of it has many small Sitka trees now. I counted over 30 in 15 square metres in April 2009. There is quite a large area that will become a Sitka forest in due course and the lochan will be changed for ever'.

To summarise, several conifers colonise freely if they have a chance, including Norway Spruce and some of the pines, but on the whole they seem restricted to rocky slopes, track and road sides and plantations, though pines have long been a problem on lowland heath in the south and on raised bogs in the north. Sitka seems more catholic in its habitats, colonising into wetland and deciduous woodland even where there has been no habitat disturbance. Sheep and deer seem able to keep all conifers in check by grazing if there are enough of them around, but if grazing is relaxed seedlings soon establish beyond a size which attract the attention of sheep and deer.