

AshEcol: A spreadsheet of Ash-associated biodiversity



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Cover Photo: *Neckera crispa* on ash by David Genney, SNH

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Introduction

Back ground

Fraxinus excelsior (L.) (common ash) is an important woodland and non-woodland tree throughout the UK. It is threatened by an emerging invasive fungal pathogen commonly called ash dieback or *Chalara*. The likely mortality rate is still unknown, but widespread death of ash trees within the UK would lead to impacts on populations of associated species that in some way depend on ash to complete their life-cycle. Depending on the scale and extent of loss of ash trees, and the level of the dependence of the associated species, this may be in the form of local extinctions of the associated species, or declines in their abundance due to reduction in feeding/breeding or habitat.

Uses and users

This resource is provided for woodland managers to help them identify if they have ash-associated species on their sites and to provide advice on which alternative trees may be suitable replacements if the management objective is to maintain ash-associated biodiversity.

[A five step procedure](#) to develop management recommendations for ash associated species is provided.

[Instructions](#) on how to use this Excel file are included below.

Fifteen case studies where this process and database has been used are available at [weblink](#).

Spreadsheets

There are three data spreadsheets:

1. [Ash associated sp](#) - allows managers to identify which species present at the site are ash-associated and their level of association with ash.
2. [Assessment alternative trees](#) - allows managers to identify which alternative trees the ash-associated species will also use.
3. [Traits](#) - provides data on the traits (eg bark pH, tree height) of ash and the alternative trees.

Before each of these spreadsheets is a notes spreadsheet describing the columns within each spreadsheet. These should be referred to, to ensure correct interpretation of the data.

Further information

These spreadsheets combine the results of two projects:

- JNCC Report No:483 The potential ecological impact of ash dieback in the UK. Mitchell et al 2014 <http://jncc.defra.gov.uk/page-6322>
- NECR151 - Assessing and addressing the impacts of ash dieback on UK woodlands and trees of conservation importance (Phase 2) <http://publications.naturalengland.org.uk/publication/5273931279761408>

Ash-associated species spreadsheet

This spreadsheet lists all the ash-associated species identified by Mitchell et al (2014). It lists those invertebrate, fungi, bryophyte, lichen, mammal and bird species that use ash trees. Other species will also use the ash woodland habitat, but are dependent on the environmental conditions (light, moisture etc.) created by the ash trees rather than the trees themselves. The level of association with ash was recorded as 'obligate', 'high', 'partial', 'cosmopolitan' and 'uses' (Table 1). For some groups it was possible to define these categories based on the number of records of a species occurring on ash as opposed to other tree species. For other groups a more subjective assessment was made based on the available literature (see Table 2 in Notes_Ash associated sp spreadsheet for further details).

Table 1. Definitions of association with ash.

Value	Definition
Obligate	Unknown from other tree species
High	Rarely uses other tree species
Partial	Uses ash more frequently than its availability
Cosmopolitan	Uses ash as frequently as, or less than, its availability
Uses	Uses ash but the importance of ash for this species is unknown

Assessment of alternative tree species spreadsheet

One 'solution' to the potential loss of ash trees is to plant alternative tree species which could support ash-associated biodiversity. Forty-eight tree species have been assessed for their potential to support ash-associated species. The tree species chosen include all native tree species likely to occur on ash sites, plus a range of non-native species which have been proposed as possible alternatives where commercial production of ash is the primary objective of woodland management. Given that woodland managers may wish to use these species for commercial reasons, it is important to understand the potential ecological implications of these species.

This spreadsheet allows identification of which alternative trees ash-associated species may use. For each of 48 tree species we provide an assessment of their ability to support each of the 955 ash-associated species using the levels of association in Table 2. Not all of the tree species for which an assessment was made will be suitable alternatives for ash in native woodlands, if the aim is to support ash-associated biodiversity and site suitability (environmental conditions) and compatibility with other management objects (e.g. silvicultural objectives) should also be checked.

Table 2. Definitions of levels of association with alternative trees.

Value	Definition
Yes	Known to use this tree species.
Likely	Based on ecological knowledge of the species the ash-associated species is thought likely to use this tree species but there are no records of the species using this particular tree species. Site managers should be cautious when using this category as the level of confidence associated with it is lower than for the 'Yes' category.
Rare	The ash-associated species has very occasionally been recorded on this tree species but we advise that a precautionary approach is taken and that this tree species is not planted as an alternative to ash for this species as it is likely to do little to aid the survival of the species.
No	Known not to use this tree species.
Unknown	The use (or otherwise) of this tree is unknown

Traits spreadsheet

The traits of a tree are the characteristics of a tree e.g. bark pH, leaf shape, deciduous or conifer. These traits will influence which species use the tree and the environmental conditions created by the tree. If ash is lost from an ecosystem, to minimise subsequent changes, the tree species to replace it should have as many of the same characteristics or traits as ash as possible. No tree will, of course, match all the characteristics of ash but the 'Traits' spreadsheet provides an indication for some traits of how similar the alternative trees are to ash. A summary of how different tree traits may influence the species that use the tree and ecosystem functioning is shown in Table 1 in the spreadsheet Notes_traits.

Different tree species grow in different environmental conditions. One way to assess how similar alternative trees are to ash is to assess the similarity of their habitat preferences. For each of four variables (light, moisture, reaction and nitrogen) Ellenberg scores provide an ordinal scale (usually 1-9) describing the conditions in which the plant is most commonly found. These Ellenberg scores are described more fully in the Notes_traits spreadsheet.

A five step procedure to develop management recommendations for ash associated species

We recommend a five step procedure to identify which species present at a site are associated with ash and to develop management recommendations. Click [here](#) for further instructions on how to use AshEcol.

Step 1: Gather information on biodiversity recorded for the site

- Using the National Biodiversity Network (www.nbn.org.uk/), extract species records for the site /or the 10km square site lies within. Select surveys of all taxa groups.
- Use any other survey data available to fill any obvious gaps

Step 2: Identify ash-associated species present on the site and short-list those for site management to target

- Using the [ash-associated spreadsheet](#), identify which of the site's species are associated with ash.
- Short-list those species that are a priority for management action i.e. the higher conservation priority species which are also vulnerable to ash dieback. Species considered vulnerable to ash dieback at each site are generally those ash-associated species where the association (definitions in [Table 1](#)) is classed as either 'high', 'partial' or 'obligate'; species that are classed as 'cosmopolitan' or 'uses', are excluded.

Step 3: Identify tree and shrub species that could act as alternatives to ash to provide habitat for the ash-associated species

- Using the [assessment of alternative trees spreadsheet](#), identify the alternative tree and shrub species that would support the short-listed ash-associated species identified in step 2.

Step 4: Assess the site

- Determine the amount and distribution of each tree and shrub species present and how they will respond to management.
- Assess the factors at the site which are likely to have a significant influence on the choice of methods to manage the site
- Identify the range of tree and shrub species with the potential to grow at the site (e.g. from NVC and the ESC tools) and cross-reference this with your list of alternative tree and shrub species (from step 3 above) to select those which should be encouraged by natural regeneration or planting.

Step 5: Select the most appropriate management method

- Considering the constraints identified in step 4, assess the potential of the site for management when silviculture best practice is followed
- Identify the most appropriate method of management according to the site's objectives and potential for management and aim to maximise the ash-associated biodiversity.

How to use the spreadsheets

In Excel the filters are the arrows at the top of each column, these may be used to select values within the cells in that column. Exactly how the filters work may vary between different versions of Excel.

It is assumed that you have available a list of the species present at your site. Ideally any species should only occur once on this list, and the species should be grouped together by species groups for example:

- Bryophytes
- Birds
- Fungi
- Invertebrates
- Lichens
- Mammals

It is still possible to use these spreadsheets if the species are not grouped in this way but it will speed it up if they are. (If your list is held electronically eg in Word or Excel it should be possible to sort or order the species by species group or alphabetically which may help).

Ideally you should know the Latin names of the species present at your site. The spreadsheets in AshEcol list English names where available but for some species there are no English names.

Identify ash-associated species present on the site and short-list those for site management to target ([Step 2](#) from above):

- a) Open the 'ash associated sp' spreadsheet
- b) Select one species group that you are interested in eg bryophytes using the filter at the top of the 'Group' column
- c) Select all species listed that are present at your site (using the filter at the top of the column called 'Species – Latin'. If a species is not listed then it has not been identified as being associated with ash.
- d) Put an 'x' in the column called 'Presence' for all the species you have selected
- e) Select the next species group you are interested in and then select the species present at your site, again putting an 'x' in the column called 'Presence' for all species selected.
- f) Repeat for all species groups/species at your site
- g) You should end up with 'x' against all species that occur on ash that are present at your site.
- h) Filter on the presence column to show only those species present at your site (those species with an 'x').
- i) Use the column 'Level association with ash' to see how highly associated with ash the species present on your site are.
- j) Read the comments column for additional information on how the species uses ash or other notes on its occurrence.

- k) Short-list those species that are a priority for management action (See [Step 2](#) above). This short listing maybe done based on the level of association with ash and/or the species conservation status. The spreadsheet shows if the species has a conservation status (BAP species, Red Data Book, IUCN, Birds of Conservation Concern). However there may also be other local or site prioritises which influence which species should be prioritised or other non-ash-associated species whose management is a priority at the site. If making the assessment based on the level of association with ash then high and partially associated species should be prioritised.
- l) Obligate species by definition only use ash, however some obligate species use dead wood, if this is the case (see column 'Uses dead wood') maintaining ash dead wood with in the woodland for as long as possible may aid these species.

Identify tree and shrub species that could act as alternatives to ash to provide habitat for the ash-associated species ([Step 3](#) from above)

- m) Open the 'Assessment of alternative trees' spreadsheet
- n) Select the species short-listed in step k using the filter on the column 'Species – Latin'
- o) If you have an older version of Excel the filters may not allow you to select more than one species at a time. To overcome this select one species at a time and then place an X in the Note column for species you are interested in (The x will need to be dragged down to cover all 48 tree species for each ash-associated species). Then filter on the Note column and those species you have selected will be shown.
- p) Filter on the 'Association' column to show 'Yes' and this will then list only those tree species that the species you have selected are known to use. If you filter on 'Yes' and 'Likely' this will show all trees which the species selected are likely to use but there is a lower level of confidence in the data associated with the 'Likely' category.
- q) If the tree species is shaded green it is native to the UK, if orange it is not native to the UK.
- r) Read the comments column to obtain additional information on how the ash-associated species uses the alternative tree. Note that it may use the alternative tree for a different reason than it uses ash (step j); for example spotted flycatcher uses elder but the comments column shows this it only uses elder for feeding on the berries, thus if you are wanting to create suitable breeding habitat for spotted flycatcher this may not be a suitable alternative tree.
- s) Continue with [Step 4](#) listed above.

An alternative way to use this spreadsheet is to select the tree species you wish to plant (use filter at the top of 'Tree alternative_Latin' or 'Tree alternative_English'), this will then show the level of association of the ash-associated species with the tree species you are considering planting.

Examples of how to use AshEcol

Further details of how the 5 step procedure and the Excel files may be used are available in Chapter 9 of the Natural England report 'Assessing and addressing the impacts of ash dieback on UK woodlands and trees of conservation importance (Phase 2)' [weblink](#) and in the case studies [weblink](#).