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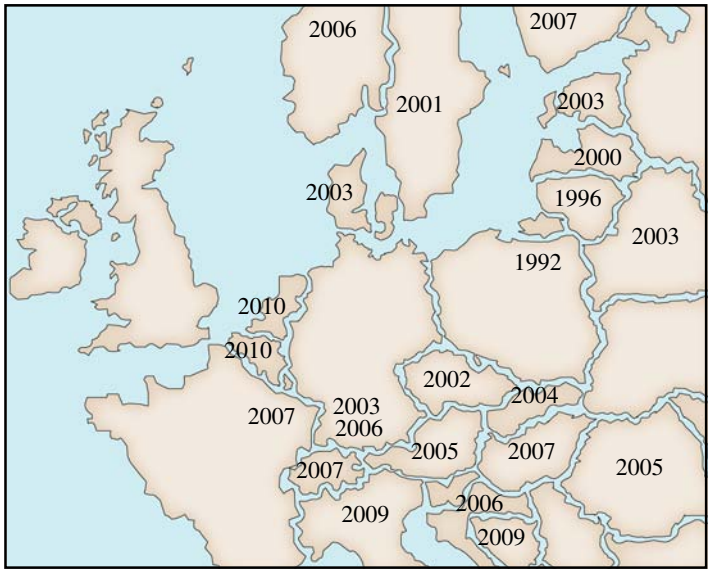
Saving our Ash trees

Ash is the third commonest broadleaved tree in Britain and makes up 16% of broad-leaved woodland in England. Ash dieback, a disease caused by the fungus *Chalara fraxinaea* threatens to kill 95% of all our 120 million ash trees.

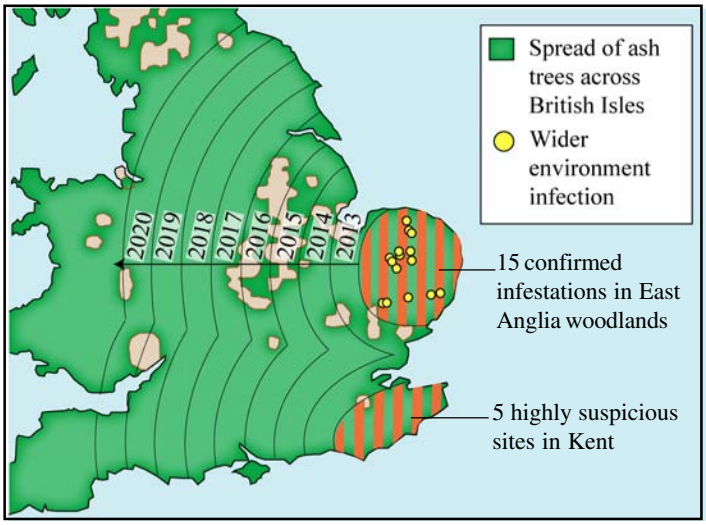
The disease has already killed or is killing 95% of ash trees in Denmark, Sweden and Germany. It is believed that the fungus was introduced to Eastern Europe by a traveler from Japan, where it lives harmlessly on the Asian species of ash. Since then, it has spread all over Europe (Fig.1).

Fig. 1 The spread of ash dieback



The fungus appears to have reached Britain in infected saplings that were imported but the spores could just have blown over in the wind. Scientists have already given up trying to stop it spreading across Britain. Fig.2 shows the anticipated spread.

Fig. 2 Anticipated spread of ash dieback

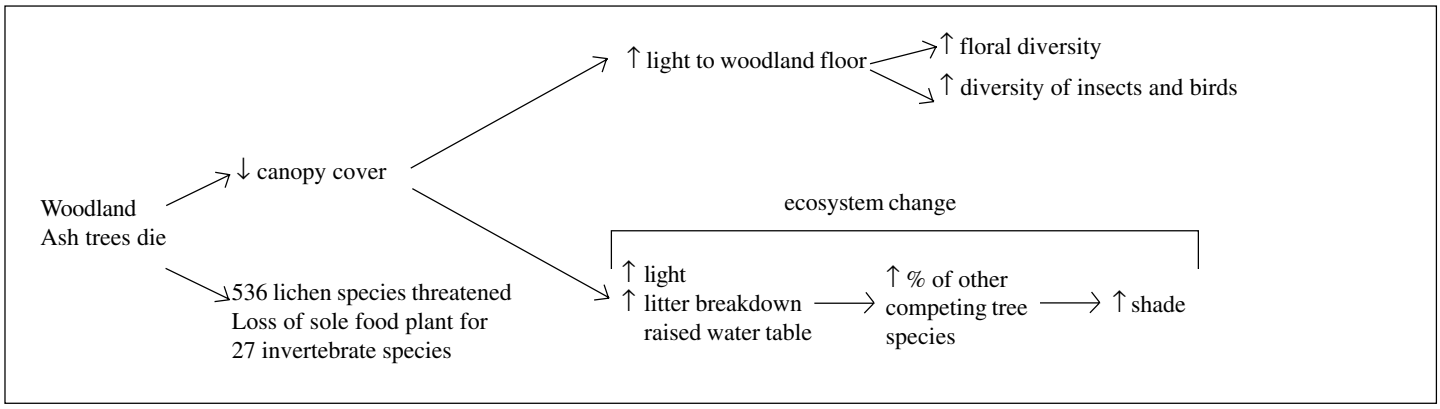


The importance of ash trees

Ash trees are important both as single trees in the landscape and as woodland habitat. In England there are approximately 1000 SSSIs containing woodland and two thirds of these comprise mixed ash woodland. Ecologically then, ash dieback could be extremely damaging.

Fig. 3 shows some of the possible consequences of widespread ash death.

Fig. 3 Consequences of ash dieback



Ash is a particularly important host tree for lichen - at least 536 species of lichen grow on ash trees and of these, 220 are nationally rare or scarce and 84 are listed as critically endangered, endangered, vulnerable or near-threatened. 101 species are listed as internationally important and 50 are priority species listed within the UK Biodiversity Action Plan.

Ash trees are the sole food plant of 27 species of invertebrates e.g. Centre-barred Sallow (*Atethmia centrago)* (Fig. 4)

Fig. 4 Centre-barred Sallow eats only ash leaf buds and flowers

Whether these species will adapt or become locally extinct is uncertain but it seems very likely that there will be impacts on many food chains.

Possible solutions

Table 1 outlines possible solutions and their potential problems.

Table 1 What can be done?

Action	Problems/likelihood of success
Fell diseased trees and establish *cordon sanitaires*	Practically impossible, expensive (who would pay?) and we can't stop the wind blowing. However, the government intend to fell some areas and to prevent the movement of ash saplings to areas which haven't yet been affected
Injects stems with fungicide	Impractical even if a suitable fungicide was developed
Mass spraying of woodlands with fungicide	Could wipe out other fungi – essential decomposers etc.
Identify trees that have natural resistance to the fungus and breed from them	About 5% of ash trees are expected to have this natural resistance and this approach seems the best bet
Stop importing and planting trees, encourage natural regeneration instead	Could be a useful approach where healthy trees remain but is slow and unpredictable. The government want the EU to introduce much stricter regulation of plant imports
Active restocking of large gaps with species offering conservation benefits	Will be important in areas where soil and light conditions are critical for local conservation

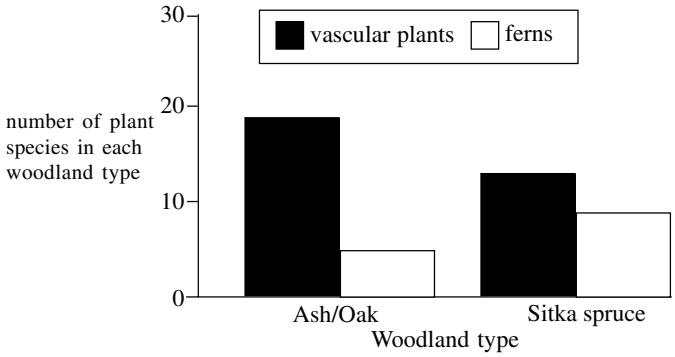
Developing resistant ash

"Plus trees" – those with natural genetic resistance to the fungus and displaying other positive characteristics – have been identified across Europe. Seed from these trees is being grown in seedling seed orchards in England. These trees could be used to repopulate devastated areas.

The Forestry Commission are working with the Earth Trust to grow these "super ash" at Paradise wood in Didcot, Oxfordshire. They selected 7000 of the best, most genetically diverse ash trees that they could find across Europe, including England. The next step is to identify the most resilient individuals and use them in a breeding programme.

Practice Question

Students investigated plant species richness in two types of woodland: a deciduous woodland comprising mainly Ash and Oak and a coniferous plantation containing only Sitka spruce. Plants were classified either as shade-tolerant mosses or as vascular plants – mainly ferns and flowering plants. The graph shows the results.



(a) Describe the trends shown (2)

(b) How might higher plant species diversity influence animal species diversity? (2)

Markscheme

(a) more vascular plant species under Ash/Oak than under Spruce;
more fern species present under Spruce than under Oak/Ash;
more vascular plant species in total than fern species in each woodland;
more similar number of ferns and vascular plants in Spruce than under Oak/Ash;

(b) Higher plant species diversity increases niches/food supply/nesting sites/cover;
Leading to higher animal species diversity;

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