

Chapter 2: Management update on Chalara

Key facts: Chalara¹⁴



- Chalara dieback of ash is a disease caused by the fungus *Chalara fraxinea*¹⁵. The disease causes loss of leaves, dieback of the crown of the tree, and usually leads to tree death.¹⁶ (CR High)
- *Chalara fraxinea* has infected many species of ash worldwide, but with differing intensities¹⁷. (CR High)

¹⁴ Confidence ratings (CR) are used throughout the document in order to help the reader understand the data presented. Please see Annex C for further details. Confidence ratings have only been applied to completed projects

¹⁵ Kowalski T (2006). *Chalara fraxinea* sp. nov. associated with dieback of ash (*Fraxinus excelsior*) in Poland. Forest Pathology 36, 264-270.

¹⁶ Kowalski T and Holdenrieder O (2009). Pathogenicity of *Chalara fraxinea*. Forest Pathology 39, 1–7.

¹⁷ Forest Research (2012). *Rapid assessment of the need for a detailed Pest Risk Analysis for Chalara fraxinea*

- Common ash (*Fraxinus excelsior*) is the most severely affected species and is the only native species of ash in the UK. Young trees are particularly vulnerable to *Chalara fraxinea* and succumb to disease rapidly.¹⁸ (CR High)
- Infection is via air-borne spores produced from fruit bodies on leaf litter.¹⁹ (CR High)
- *Chalara fraxinea* infection starts primarily on leaves and is progressive over time with dieback and stem lesions usually manifesting in the next growing season. Leaf symptoms can be detected within two months of infection (experience from Denmark). (CR Medium)
- Natural spread is by wind-blown spores (ascospores) from the fruiting bodies.²⁰ Spread can also occur via the movement of infected material through trade. (CR High)
- The impact of *Chalara fraxinea* infection depends on tree age, provenance or genotype, location, weather and microclimate conditions and presence of honey fungus (*Armillaria*) or opportunistic secondary pathogens. Trees in forests are likely to be more affected because of the greater prevalence of honey fungus and favourable microclimates for spore production and infection. Trees cannot recover from infection, but larger trees can survive infection for a considerable time and some might not die. (CR Medium)
- Ash as a proportion of total GB woodlands is around 4.7percent (142k hectares as a proportion of 3 million hectares), and therefore the social and environmental value of ash is estimated at between £72 million and £124 million per year. Combined with the commercial value of ash, which is estimated at around £22

¹⁸ Kowalski T (2006). *Chalara fraxinea* sp. nov. associated with dieback of ash (*Fraxinus excelsior*) in Poland. Forest Pathology 36, 264-270 Forest Research (2012). [Rapid assessment of the need for a detailed Pest Risk Analysis for *Chalara fraxinea*](#)

¹⁹ Timmermann V, Børja I, Hietaka AM, Kirisits T and Solheim H (2011). Ash dieback: pathogen spread and diurnal patterns of ascospore dispersal, with special emphasis on Norway. EPPO Bulletin, 41: 14-20. doi: 10.1111/j.1365-2338.2010.02429.x

²⁰ (Kowalski T (2006). *Chalara fraxinea* sp. nov. associated with dieback of ash (*Fraxinus excelsior*) in Poland. Forest Pathology 36, 264-270. Kirisits T and Cech TL (2009). Zurücksterben der Esche in Österreich: Ursachen, Verlauf, Auswirkungen und mögliche Forstschutz- und Erhaltungsmaßnahmen. Kowalski T and Holdenrieder O (2008). A new fungal disease of ash in Europe. Schweiz. Z. Forstwes 159, 45–50. Queloz V, Grünig CR, Berndt R, Kowalski T, Sieber TN and Holdenrieder O (2010). [Cryptic speciation in *Hymenoscyphus albidus*](#). Forest Pathology. doi: 10.1111/j.1439-0329.2010.00645.x.

million per year, the total yearly value is estimated at between £94 million to £146 million.²¹ (CR Medium)

Government Policy

In response to the discovery of Chalara in October 2012, the Government - in collaboration with stakeholders - developed the Chalara Management Plan which was published in March 2013. This set out an approach to managing the disease with four objectives: (1) reducing the rate of spread; (2) building resistance to the disease; (3) encouraging citizen, landowner and industry engagement in surveillance, monitoring and action in tackling the problem of Chalara; and (4) building environmental and economic resilience. Details of progress against each of these are set out later in this chapter.

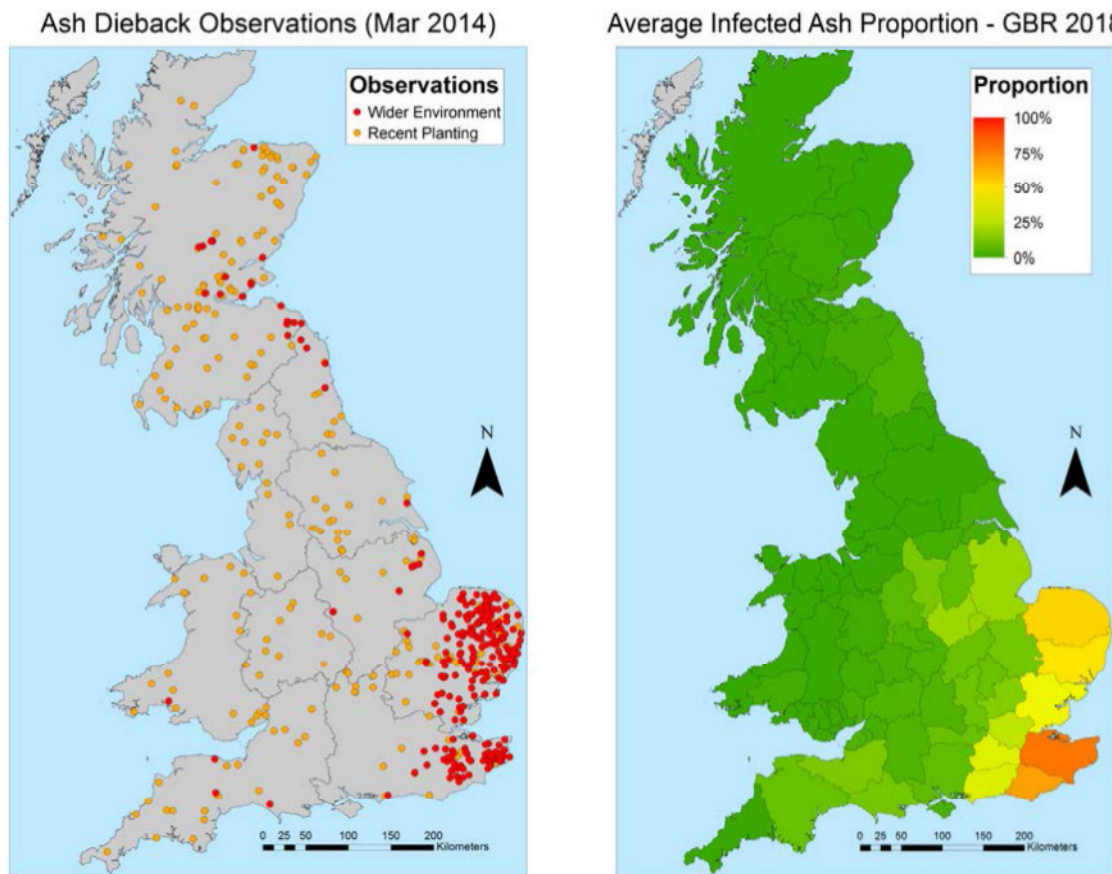
Improving our understanding of the disease

Over the last year the Government has sought to increase our collective knowledge and understanding of Chalara to inform potential management approaches and to mitigate impacts of the disease. It has commissioned an extensive programme of research that focuses on:

- Identifying and exploiting resistance (tolerance) for longer-term adaptation and resilience.

²¹ The direct commercial value of UK woodlands (reflected in GVA of timber and sawmilling as outlined above) is around £0.8bn per year (2012 prices). The social and environmental value of GB woodlands is estimated at £1.8bn per year (2012 prices), including the value of landscape, biodiversity, recreation and carbon sequestration (as outlined above). Therefore the total value of GB woodlands is around £2.6bn per year. Data on hectares of tree species are taken from Forestry Statistics 2013. The monetary values are derived from methods that are developing (as described in 'Chalara in Ash Trees; a Framework for Assessing Ecosystem Impacts and Appraising Options' (Defra 2013)), but nevertheless are useful, current indications of value. In future, values may be developed more specifically by geographical location, which will help to provide more accurate information on social and environmental value – e.g. to reflect where specifically in the country individual tree species are most prominent along with the amount of people who benefit from them. The method used to derive commercial value, is a developing method, but does try to reflect the value of individual tree species specifically – rather than simply using the proportion of overall forestry as a proxy for the proportion of GVA.

Figure 1: Current outbreaks of Chalara in recently planted sites and the wider environment (left pane) as of March 2014 and the predicted proportion of ash trees that are expected to be infected by 2018 (right pane)²⁴



Progress and next steps

Since the publication of the Chalara Management Plan in March 2013 the Government has worked with stakeholders to implement commitments in this plan. The information below sets out progress against each of these objectives.

²⁴ This map is the result of a large number of stochastic simulations and shows the average proportion of ash in each county that predicted to be infected in 2018.

Objective 1: Reducing the rate of spread

Given what the recent modelling is predicting and our current knowledge of the pathogen's biology, the Government continues to believe there is benefit in seeking to reduce the rate of spread of the disease where it remains cost effective to do so, and whilst our scientific understanding is still evolving.

Monitoring and surveillance: Since the publication of the March 2013 Plan, Fera and the FC have carried out further surveillance and monitoring to provide intelligence on the rate of spread of Chalara. By the end of June 2013 they had completed inspections at all suspect recently planted sites that could be identified in the high risk counties. These counties were predominately in the east of England where infection had previously been found. Nationally, trees at 1,600 sites were inspected.

In summer 2013 the Forestry Commission issued an advisory note to woodland owners to encourage them to inspect plantings of ash in the age range of 6 to 20 years. This recognised that large quantities of ash were imported from parts of continental Europe where the disease had been present before 2007 and this could mean that the disease was present on a very small proportion of plants imported from the continent at least 10 years ago. Results from this survey and other reports identified isolated outbreaks in the wider environment detected further west in Devon, Somerset, Dorset, Derbyshire and Pembrokeshire, which were associated with older plantings from the late 1990s onwards. These observations are most readily explained by the possibility that the trees were infected prior to planting. This is because at each location the planted trees appear to exhibit the oldest signs of infection and there is no other obvious explanation how the trees could have become infected at those locations 10 or more years ago.

During September 2013 the FC conducted a second wider environment Chalara survey. This work was concentrated on the eastern side of the country to assess the spread of the disease from known points of infection. Sites showing visual symptoms of infection were then confirmed by laboratory analysis of samples. Observed spread in the east has been relatively modest; however, noticeable decline was observed in the overall condition of some mature trees suggesting that these trees were infected with Chalara several years prior to the first observations of the disease in 2012.

In the future FC and Fera will continue to monitor spread of Chalara by following up on reports assessed as highly suspect in 10km squares not currently known to be infected. The Government, in consultation with stakeholders, will consider what further surveillance work is needed on Chalara, in light of the fact that our understanding of the disease is still evolving, but balancing this against surveillance needs on other pests and pathogens and where resources can best be deployed.

- Promoting removal of infected ash and replanting of recently established young ash:** The Government continues to pursue a voluntary approach to managing the disease and does not believe there is a market for ash, and is therefore not encouraging planting of this species. In line with this, the Government is supporting the removal of young, recently planted ash and replacement with alternative species through the England Woodland Grant Scheme (EWGS). Since the publication of the 2013 Chalara Management Plan the Government has funded the removal of infected ash trees in areas that were deemed higher priority counties. These were counties where Chalara had not previously been observed in the wider environment, and therefore removing young infected ash trees in these counties is likely to help slow the spread and be cost effective. Contracts for work totalling £120,000 have been agreed. These higher priority counties are likely to change in the future given spread of the disease into these areas. The FC will publish further guidance on the approach for 2014/15 in April 2014.
- The Government believes that over time, landowners and woodland managers should consider replacing young, recently planted ash with alternative species at the earliest opportunity. In 2014/15 the Government will continue to support action to remove recently planted infected ash trees in priority counties. The Government will also protect and improve the resilience of woods by supporting nationally the replacement of ash in woodlands affected by Chalara with alternative species using funds from the RDPE. Taking action in this way will help to improve the resilience of our woodlands and ensure minimal loss of woodland cover. In areas of particular importance for biodiversity, alternative management strategies may be appropriate.
- In addition landowners who have planted young ash trees on sites through the Higher Level Stewardship (HLS) funding, that subsequently become infected with Chalara, during the course of the agreement can invoke force majeure, and make an application to replant infected ash with alternative species until the end of 2014. Further information can be found at <http://www.naturalengland.org.uk/ourwork/enjoying/ashdiebackfeature.aspx>. HLS agreement holders should contact Natural England as soon as they are aware of the presence of the disease on their holding.

Felling of mature ash trees: The Government will not, in general, be encouraging the felling of mature ash in either urban or rural situations as part of the action to slow the rate of spread of the disease. However, there may be particular circumstances where landowners and woodlands managers should consider replacing older, more mature ash trees once they have succumbed to disease with alternative species. For example:

- If landowners and bodies such as local authorities, the Highways Agency or Network Rail believe infected trees on their property are a health and safety risk then they will be responsible for them as for any other diseased tree.
- In isolated outlying areas of infection in the wider environment.

Currently it is not possible to predict whether or how long, infected trees will survive. In European countries where the disease is more prevalent, mature ash trees have been found to survive for many years after infection. The retention of mature trees also maximises the potential for regeneration of a new population of disease resistant trees. The Government will keep the policy on mature trees under review as our collective understanding of the disease continues to evolve and the disease progresses.

Movement restrictions: UK emergency legislation has been in place since October 2012. Given the evolving situation, the legislation has been kept under review but retained to date as part of the overall management approach. In line with their obligations, it is anticipated that the European Commission will wish to establish a common position on Chalara, before autumn 2014. This would include the recognition of EU Protected Zones for any areas of the EU which wished to retain freedom from the disease, which could include parts of the UK (though not England, where Chalara is established in parts). One consequence would be that national legislation would need to be revoked at the same time that any EU legislation was introduced and any remaining statutory movement controls restricted to material being moved into and within Protected Zones. The Government will keep this under review as the position with the EU evolves.

Treatments²⁵: The 2013 Chalara Management Plan set out an approach to scientifically test potential treatments. The Government continues to advise against expecting to find a treatment for Chalara which can be widely applied to protect or treat infected woodlands. Whilst there is currently no known means of eradicating Chalara, treatments may have a role, in protecting individual trees such as heritage or amenity trees; including trees in gardens and parkland trees, or groups of trees or

²⁵ This section summarises insights which are emerging from current projects. These projects are still underway and findings have not yet been peer reviewed. Findings may be subject to change as further analysis and research is undertaken.

level of damage or rate of spread in some circumstances. The Government is continuing, through scientific testing, to explore whether treatments may have a role in protecting individual trees or groups of trees.

Fera, in collaboration with an expert group and industry has identified and tested 17 chemical treatments against the Chalara pathogen. Fourteen of these chemicals are registered for use in the UK, although none are currently approved for use in woodland or nurseries²⁶.

<http://www.fera.defra.gov.uk/plants/plantHealth/pestsDiseases/documents/fungicideListForScreening20March2013.pdf>

Interim results indicated that the Chalara pathogen was sensitive to many of the chemicals tested and highly sensitive to four. Further research is under way to test the level of control that can be achieved using the most promising chemicals under field conditions.

Chemical treatments cannot fully eradicate the pathogen from infected trees and therefore they are likely only to be useful in protecting specific, high value trees through repeated treatments. The outputs of this research will need to be used alongside other research to understand the potential benefits that chemical treatments may have in managing the impacts of ash dieback or slowing the spread of the disease

In addition, further analysis and research will be needed to understand whether chemical treatments can form part of a sustainable, practical and cost-effective management strategy that will not impact adversely on the environment or biodiversity.

²⁶ Laboratory bioassays have tested the potency of each chemical against the Chalara pathogen by defining the half maximal effective concentration (EC50) for each chemical. The EC50 concentration is point at which the chemical is producing half of its maximum effect. An EC50 at or below 0.1 parts per million (ppm) demonstrates that the pathogen is highly sensitive to the chemical

Objective 2: Developing resistance to the disease in the ash population

The Government believes the best hope of securing the environmental future of the ash tree lies in understanding and, identifying durable resistance or (tolerance) to Chalara, and facilitating the spread of that resistance sustainably in our ash populations. As part of this, the 2013 Chalara Management Plan committed to take forward a programme of research to identify and exploit resistance in UK ash trees, and potentially those elsewhere.

Resistance may be conferred by reduced risk of infection (low susceptibility) or an ability to withstand infection (tolerance) the latter may not be apparent for a number of years. Identification of trees less susceptible or able to tolerate Chalara infection could potentially provide a route to maintaining ash trees as part of UK woodlands as well as limiting the impact on biodiversity.

Defra has commissioned research to identifying relevant trees as well as developing genetic tools to allow incorporation of resistance into breeding material. Ash trees within UK woodlands are being monitored for signs of reduced susceptibility and seed is being collected and maintained for future use. The level of susceptibility can only be monitored in areas where the disease is already present. As a result, Forest Research established and will monitor a mass screening trial in which ash saplings from across the UK and elsewhere have been planted in areas at high risk from Chalara to allow more rapid identification of those less susceptible to the disease. This screening and monitoring will continue until at least 2018. Genetic research is producing maps of the ash tree genome. These maps will be a valuable tool in identifying the location of genes involved in resistance and identifying genetic markers for use by breeders. The research is also attempting to understand the process by which some trees are less susceptible.

Techniques for rapid propagation are also being investigated so that resistant trees can be made available more quickly than they would be with traditional breeding.

Objective 3: Encouraging citizen, landowner and industry engagement in surveillance, monitoring and action in tackling the problem

The 2013 Chalara Management Plan, referred to a wide range of activities to promote citizen science which are now part of our wider approach to tree health and these are set out in detail in Chapter 1 of this Plan under public awareness and wider engagement.

Objective 4: Building resilience in woodland and associated industries

As part of this, the 2013 Chalara Management Plan committed the Government to work with stakeholders to build resilience in woodlands and associated industries.

Environmental resilience: Environmental resilience can be defined as the capacity of the system to resist damage and recover quickly when challenged by environmental pressure.

The impact of Chalara on England's tree population will continue to evolve. Taking into account the current and predicted spread and impact of the disease the Government will continue to balance action we take now based on the information available, with future action when further evidence is available to make better informed decisions.

The 2013 Chalara Management Plan, made commitments to help build environmental resilience in the following areas:

Non-woodland Trees: Ash is a significant feature of the non-woodland landscape. It is found in various locations ranging from gardens, hedgerows, along roads and railways, in urban and rural parkland. Given the diversity of areas where ash is found, the impact of dealing with Chalara will be experienced by many different types of landowner, including those not used to dealing with tree issues before. This could range from private individuals, to large infrastructure companies and public guardians of the landscape.

The Government is working with The Tree Council to better understand the impacts of Chalara in non-woodland situations. Representatives from The Tree Council's, 180 member organisations including local authority planning officers, the landscape and tree sectors, plus commercial, charity and government organisations are being consulted as part of this work which focuses on:

- The numbers of non-woodland ash and where they are located - this will provide us with a clearer picture about where non-woodland ash is and help to better understand the number of trees that could be potentially affected.
- The management issues relating to non-woodland ash, including hedgerow trees, ancient ash trees, planning issues, protected trees, and tree safety. Given that non-woodland trees feature in a variety of settings a clearer picture is needed about how these trees are currently managed.

- Continental research on the impacts of Chalara. Given that Chalara is already widespread in much of Europe, there is much we can learn from these countries experience on non-woodland trees.
- Ash trees are growing in a variety of non-woodland settings, such as urban areas, public and private gardens, and transport routes. If in the future an ash tree in one of these settings is found to have Chalara, approaches to managing this will need to be developed to ensure public safety.

This work is intended to help build our understanding about the nature of the potential spread, in order to consider what management approaches and other policies may be needed. The Government will look at what guidance is needed to support the wide range of audiences that will require information on how to manage ash in non-woodland areas. The Government will continue to work with The Tree Council and other interested parties to further develop this work.

Ecological impacts of Chalara in woodlands: The 2013 Chalara Management Plan set out plans by the Joint Nature Conservation Committee (JNCC) and associated countryside agencies to review of the potential ecological impacts of ash dieback. The research explored the impacts of the potential loss of ash trees in England's woodlands and how this will impact on the other species which use ash as a food source or, habitat, and the study also looked at potential management responses to this. A report of the first phase of this research was published in January 2014.²⁷ In summary, to-date the work has found the following:

- 1058 species have all or part of their lifecycle associated with ash trees in the UK. Of these, 45 have only been recorded on ash trees and are therefore considered obligate; a further 62 are highly associated but have also been recorded on other species.
- No single tree species will be able to fill the niche provided by ash trees, in terms of both its ecosystem characteristics (e.g. nutrient cycling and light penetration properties that influence other ground cover) and biodiversity contribution.

²⁷ http://jncc.defra.gov.uk/page_6459