Ash dieback

British ash trees may resist dieback disease, research reveals

Ground-breaking genetic analysis shows native trees may be more resistant than Danish ones to the deadly fungus that has spread across Europe

Damian Carrington

@dpcarrington

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Ash dieback disease has already affected 90% of trees in Denmark. Photograph: Andrew Hasson/REX/Shutterstock

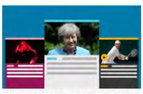
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British ash trees seem to have better resistance against a deadly fungus which is devastating trees across Europe, according to research which has decoded the DNA of the species for the first time.

The ash dieback fungus has spread rapidly since it first arrived in England in 2012 and the latest data shows it is now found in more than half of the country. It has already affected 90% of trees in Denmark and threatens to all but wipe out ash trees, one of Europe's most common trees.

The new genetic research is now driving efforts to breed ash trees with high resistance to the fungus, although this will take years due to the slow-growing nature of trees.



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However, the research also indicates that trees that are resistant to ash dieback may be more susceptible to another deadly threat – the emerald ash borer. This beetle has caused catastrophic damage to ash trees in north America and is spreading from Russia towards western Europe.

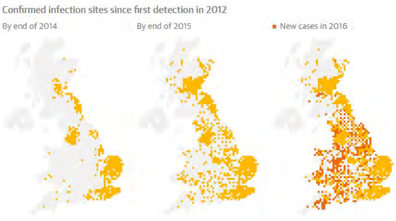
"This is the first time a plant genome has been rapidly sequenced in response to an emerging disease threat," said project leader Richard Buggs, at Queen Mary University of London.

The research shows that British ash trees may be significantly more resistant than Danish trees but Buggs said: "Only time will tell – it's a very novel [genetic] method. We don't want people saying ash dieback doesn't matter or it's all going to be fine – we do still need to worry about it."

The work, conducted by a team of 30 scientists and published in the journal Nature, produced a detailed genome for a British ash tree from the Cotswolds and also sequenced 37 other ash trees from around Europe to assess the diversity of the species. The Cotswold tree has now contracted ash dieback, which Buggs said added useful knowledge to the project.

The scientists used all the information to improve the genetic markers which enable assessment of resistance to ash dieback. They then screened about 100 British ash trees and found that, while few were immune, many were tougher than those in Denmark.

How ash dieback has spread



Guardian graphic | Source: Forestry Commission

The Living Ash Project, funded by the government, is already examining ash trees to select resistant specimens. The new genetic revelations are a boost to the project and provide hope of avoiding recent predictions that a "double whammy" of ash dieback and emerald ash borer would wipe out almost all ash trees across Europe.

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The discovery that trees with resistance to ash dieback may produce fewer chemicals that ward off insects such as the emerald ash borer emphasises that the project to breed tougher trees will have to proceed carefully, said Buggs, who also works at the Royal Botanical Gardens at Kew.

"It emphasises how difficult it might be in the end to breed a tree that is resistant to both," he said. "But on the positive side, there are trees in China which seem to be resistant to both, and both the problems ultimately came from East Asia." Another research project looking at those Chinese trees is underway.

"Ash dieback disease has spread across Europe in less than 10 years, so there is some urgency," said Prof Ian Bancroft, at the University of York and part of the research team. Another team member, Prof Allan Downie, at the John Innes Centre, said: "This work represents significant new progress in our understanding of ash dieback disease [and] has been breath-taking in its speed."

There is no cure for ash dieback, which spreads on the wind or by the importing of infected saplings, and is already killing many millions of trees across Europe. Symptoms include cankers on the bark and damaged leaves. There are about 90 million ash trees in the UK, with more than 1,000 species, from wildflowers to butterflies, reliant on the ecosystem it provides.

But Buggs said the new genetic discoveries gave grounds for cautious optimism: "I feel more hopeful now than I did in 2012."

Plants diseases and pests are spreading around the world due to global trade and climate change. In July, the government's official climate change advisers warned that the dangers posed by new diseases and pests invading the UK as temperatures rise require urgent research.

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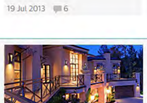

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