Turning

Dr Jo Clark in Paradise Wood

Theresa Thompson discovers more about an Oxfordshire project striving to save Britain's ash trees

Those whose memories stretch back to the 1970s will recall the devastation caused when an epidemic of Dutch Elm disease wiped out millions of elms in this country.

Now since its arrival in October 2012, a new fungal disease of trees has been steadily spreading west across the UK – ash dieback disease – that could yet see another iconic tree, the ash, lost to the British countryside.

Caused by the fungus Hymenoscyphus fraxineus (more often referred to as Chalara fraxinea), if the more than 120 million ash trees in Britain, are lost it will mean far more than a dramatic change to the landscape.

Ash trees provide many economic and biodiversity benefits. They are commercially important hardwood trees – ash wood is used for making tools, sport handles, and furniture.

And there are concerns for wildlife particularly as many species live only on ash trees; they may vanish too.

But the genetics of the trees offers hope.

"The elm tree came over with the Romans who used them as props for their vines. They only brought a few and they propagated them clonally, so they are all genetically very similar," said Dr Jo Clark, forestry research manager at the Earth Trust. "When Dutch Elm disease came there wasn't enough genetic diversity in the elm population to resist the disease."

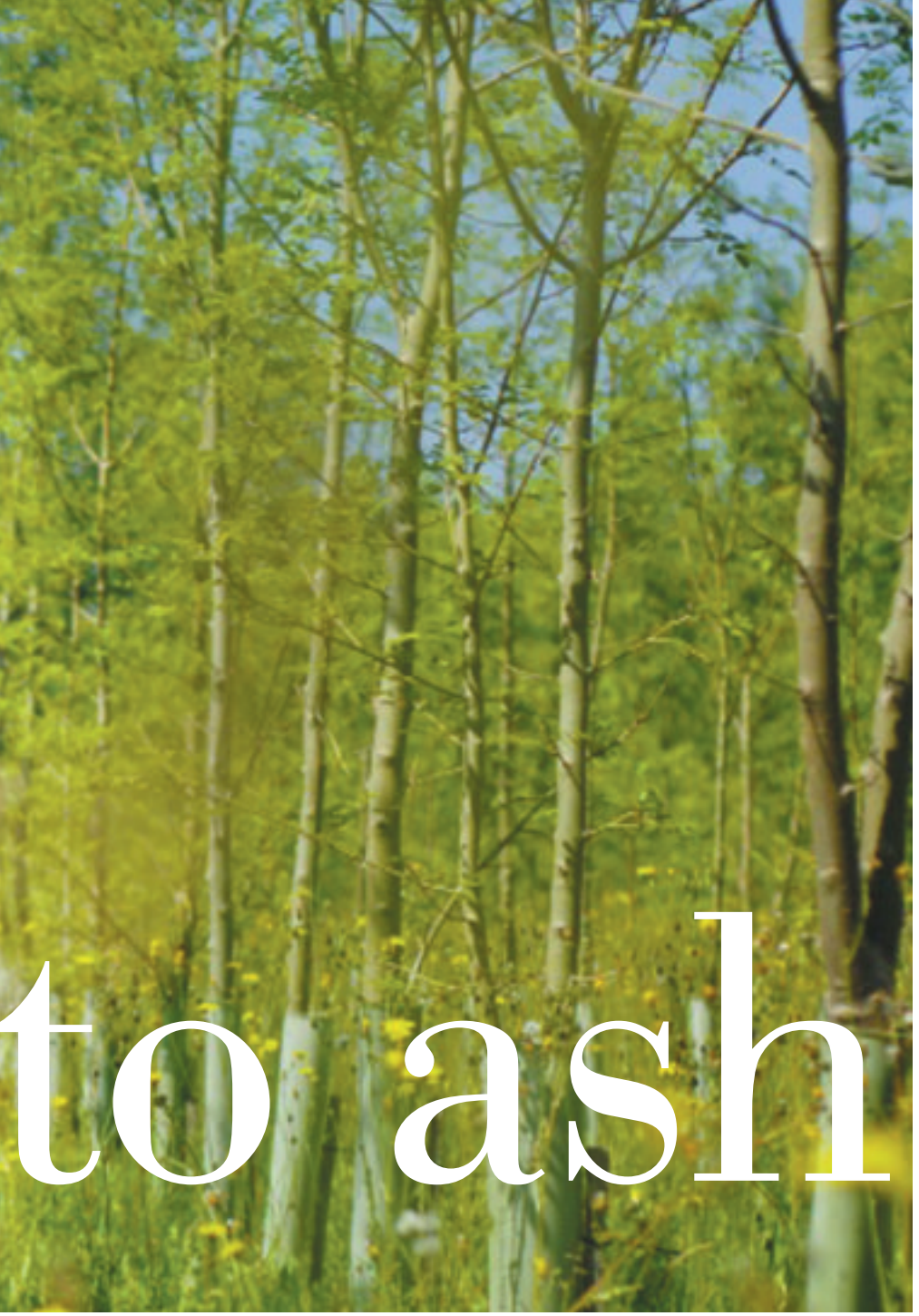
The ash is different. "Ash is a genetically diverse species. It came after the last Ice Age so the species has had time to become genetically diverse, which is why the breeding programme here at the Earth Trust can possibly work. It is a more hopeful situation.

"We know there is tolerance in the ash population so it is possible to breed tolerant trees," said Jo, explaining the research and tree breeding programme ongoing for 20 years at Paradise Wood, the Earth Trust's national research woodland at Little Wittenham, south Oxfordshire. The Earth Trust has been developing populations of tree species including ash with resilience to existing and novel diseases and pests.

In collaboration with the Future Trees Trust and Forest Research (the research agency of the Forestry Commission), they have planted around 60,000 trees in Paradise Wood, which incidentally makes it the largest collection of hardwood forestry genetics trials in Britain.

They study a variety of broadleaved tree species there – oak, ash, beech, cherry, and walnut in the main – but ash is the one they have done the most work on.

"Of numerous trials at Paradise Wood, we have been working on improving the quality of ash trees for timber for 20 years," Jo said.



to ash

The ash

A healthy ash tree has a silvery grey bark (the pale grey colour of the bark is a possible origin of the name 'ash'), and develops fissures with age. Ash leaves are arranged in three to six pairs opposite one another on the stalk, with a single terminal leaf; they appear later than other trees (usually towards the end of April or the beginning of May) and are among the earliest to fall.

In an infected tree, the leaves suffer from necrosis, dying prematurely, and develop telling brown patches and dry curled leaf tips.

Ash produces scores of 'winged' fruits or seeds – those familiar bunches of brown 'keys' that stay attached to the tree most of the winter, providing a food source for birds like bullfinches, and once on the ground, mammals such as wood mice.

The ash is an important tree in terms of the role it plays in ecosystems. This is because ash woodland is open-canopied and that makes it the perfect habitat for a great number of species, from woodpeckers to bats to a multitude of insects. The airy canopy and early leaf fall also create prime conditions for wildflowers.

Research from Scotland shows just how much biodiversity ash supports. The James Hutton Institute discovered that 1,058 species have an 'association with ash' (birds, mammals, invertebrates, lichens, mosses, etc.). Of those, 44 occurred only on ash trees, and a further 62 were 'highly associated' with ash (that is, rarely found on other tree species).

Unfortunately, last October the disease was confirmed at Paradise Wood. It has been found at a few other sites in and around Oxfordshire as well.

The first case was confirmed in a nursery in Buckinghamshire on ash seedlings imported from the Netherlands. Not that ash dieback disease was unknown in this country.

Jo pointed out: "We have had ash dieback for decades. This current strain is much more pathogenic. The 'native' ash dieback is H. albidus, which the trees have evolved with, and so the impact is very minor, and very rarely kills the trees, unlike H. fraxineus."

The ash is Britain's third most common broadleaved tree, after oak and birch. Also called the common or European ash, Fraxinus excelsior is widely found across northern Europe, from the Arctic Circle to Turkey. The species is one of Europe's largest native deciduous trees. You see it almost everywhere, most conspicuously in hedgerows, in woodland (usually on the edges), copses, and scrubland, and it is widely planted as an ornamental tree in parks and large gardens.

Tall and graceful, strong and fast-growing, the ash colonises areas easily, so it is often the first to return where others have fallen or died, and it can grow in the most exposed places where most can't get a foothold.

Ash dieback disease is spread by airborne spores. It is a fungal wilt disease (it blocks the vascular tissues) and causes leaf loss, crown dieback, and lesions on the bark that ultimately kill the tree – either directly or by making the tree more susceptible to other diseases. Young trees are more at risk.

Evidence from Denmark, where ash dieback is more prevalent, indicates that approximately one per cent of trees show good tolerance to the disease. This offers hope that natural selection will produce disease-resistant trees.

"No tree has total disease-resistance," Jo said. "But some do seem to be able to partition off the diseased part. Quickly identifying those with disease-resistance and using them in a breeding programme enables us to rapidly produce resilient trees."

The Living Ash Project builds on this.

"Our aim is to find 400 trees with a high degree of tolerance to ash dieback and to start off a new tree breeding programme from them," said Jo, describing the five-year Defra funded Living Ash Project led by the Earth Trust with partners the Sylva Foundation, Forest Research, and Future Trees Trust.

Studies show that while some other tree species have characteristics similar to ash, none match the ash entirely. The oak, which is known to support more biodiversity than any other native tree, would still only support two-thirds of the species associated with ash trees.

"No one species can fill all the roles that ash fills – it is such an important tree in the UK in terms of the ecosystem," Jo concluded. "If ash goes, it'll be a landscape changer."

How to get involved

Ash Tag is a citizen science project, which invites everybody to help with the research. By monitoring a sample of trees, it will help scientists to understand more about ash dieback disease and identify tolerant trees right across the UK.

Free Ash Tag packs are available from the Sylva Foundation. The pack includes a numbered tree tag, a couple of aluminium nails to fix it to the tree, and step-by-step instructions on how to identify, measure, and tag the tree. But, stresses Jo, please remember that if it is on private land to check with the owner before tagging any tree.

See ashtag.org for details.