

What's happening?

Since August 2009, significant numbers of Japanese larch trees have begun to show symptoms of needle loss and dieback in Devon, Cornwall and Somerset. The number of trees affected, and the apparent speed of the decline is a cause for concern – some trees are already dead. Smaller numbers of broadleaf trees associated with the larch were found to have symptoms of bleeding cankers, and closer examination by Forest Research scientists revealed that these broadleaf trees were infected with *Phytophthora ramorum*. This is the fungus-like pathogen responsible for the phenomenon known as “sudden oak death” in the USA, where it has killed millions of trees including the native American tanoak.

P. ramorum had previously been found on a number of sites in Great Britain, but until now it has mostly affected shrubs such as rhododendron and more latterly the heathland plant, bilberry (*Vaccinium myrtillus*). Despite its popular name, our native oak species, sessile and pedunculate oaks, have not proved to be particularly susceptible to sudden oak death. A small number of other tree species, especially beech, have been affected but only where they are growing in very close proximity to *P. ramorum* infected rhododendron.

Recently, *P. ramorum* has also been isolated from a small sample of the dead and dying Japanese larch in Devon, Cornwall and Somerset. Some of the findings are unusual because the affected trees are not close to infected rhododendron – the usual source of infection in woodlands. If it is confirmed more widely that *P. ramorum* is causing the larch dieback now being seen in south west England, it will be the most serious case of this disease affecting trees in Britain.

This is the first time that we are primarily concerned about Japanese larch plantations in a forest and woodland environment rather than individual garden, parkland or amenity trees.

What are the symptoms?

Infection by *P. ramorum* on the Japanese larch can take two forms. Shoots and foliage can be affected, visible as wilted, withered shoot tips with blackened needles. The infected shoots shed their needles prematurely. Trees with branch dieback have numerous resinous cankers on the branches and upper trunk. *P. ramorum* has also been isolated from some of the dying or dead bark on the affected branches and trunks.

Where exactly is it happening?

We have so far identified four main areas: in east Cornwall, around Plymouth, in north west Devon and west Somerset, with further sites under investigation in mid Devon.

Which forests has it been found in?

Infection by *P. ramorum* on Japanese larch has been found in a mix of privately owned and publicly managed forests. Infected sites managed by the Forestry Commission include Largin Wood in Cornwall, Plym Woods east of Plymouth and Canonteign Woods near Exeter.

These sites are quite far apart from each other. Is this significant?

The distance between the sites could be significant if it reflects the spread of *P. ramorum* from site to site over several miles. However, the dieback could be correlated with factors common to all these sites such as climatic conditions/events, elevation and aspect, as well as the tree species growing on the sites, so the more or less simultaneous appearance of dieback on trees on sites at a distance from each other would not be so significant.

What are you doing about it?

We are working closely with the scientists in our own Forest Research agency as well as colleagues in Defra and the Food and Environment Research Agency (Fera), to confirm the extent of *P. ramorum* involvement in the dieback of the Japanese larch and whether any other agents could have a significant role.

Is it definitely *P. ramorum*?

We have isolated *P. ramorum* from the foliage of several Japanese larch trees, and from the bark of a smaller number of Japanese larch trees. In some cases, both the foliage and bark of the same tree are infected with *P. ramorum*. However, we need to do more tests to confirm that *P. ramorum* is the main cause of the wider outbreak of larch dieback, and to check if any other agents are involved.

Is *Phytophthora kernoviae* involved?

There have been no findings of *P. kernoviae* in any of the newly identified hosts of *P. ramorum* (i.e. Japanese larch, western hemlock or birch). Although they are both in the genus *Phytophthora*, *P. ramorum* and *P. kernoviae* are only very distantly related. And it does not automatically follow that the host of one will be a host to the other.

How is it being spread?

P. ramorum can spread in a number of ways. Movement of infected plants is the most frequent route for long distance spread, although an unlikely pathway in this instance. We also know that *Phytophthoras* can be inadvertently spread on the footwear of walkers and hikers, and this could be a possible pathway for spread. However, drawing on experience in California and Oregon, research indicates that there can be long distance spread over several miles in rain mists and air currents. This allows occasional long distance jumps in forest areas.

What other species is it affecting/does it affect?

Up until now, only a small number of trees have been affected with the potentially lethal bleeding cankers caused by *P. ramorum*. Beech is the most frequently affected tree, but several individuals of Turkey oak and various species of exotic red oak have also been found as well as a single individual of sessile oak (*Quercus petraea*). In the areas with Japanese larch showing dieback, several broadleaf species have now been identified with *P. ramorum* bleeding lesions or cankers on their trunks. Affected trees include beech, sweet chestnut, birch, Turkey oak, *Nothofagus* and sessile oak. In addition to Japanese larch,

another commercial conifer species, western hemlock, has been found with resinous stem cankers also caused by *P. ramorum*. The larch, hemlock and birch are new hosts.

Are European or hybrid larch species at risk?

At the moment, we have only observed symptoms on Japanese larch (*Larix kaempferi*).

What does it mean for the local forestry and timber industries?

At present, until we have greater clarity on the extent to which *P. ramorum* is involved and how many sites are affected, it is uncertain what it means for local forestry and timber industries.

What measures will you be considering?

Until we have answers to a number of questions, in particular the extent to which *P. ramorum* may be involved, the interim measures we will be putting in place will follow a precautionary principle. As well as removing and destroying any Rhododendron on the infected sites, the removal and destruction of other sporulating hosts will also need to be considered. We shall also be putting in place biosecurity measures to ensure that the disease is not inadvertently spread from infected sites on footwear, vehicles or equipment used in forestry operations.

Will public access be restricted in infected areas?

Not necessarily. Each site will be looked at separately and the risk of disease spread from it assessed. Users will be advised of the most appropriate course of action, e.g. keeping to marked paths and keeping dogs on leads.

Are there any precautions we should take when visiting affected areas?

For the moment, we are asking people to take the same precautions as we have asked at any site where the disease has been found. Visitors should stay on footpaths and keep dogs on short leads. Removing soil and mud from footwear before leaving sites is also a wise precaution.

Will forest owners have to fell their trees early?

If Forest Research determine that the disease can be spread from infected trees i.e. that spores are produced, then felling of symptomatic trees may need to be considered.

How does it affect the timber? Is it still usable?

There is no evidence yet to suggest that the presence of *P. ramorum* in the wood of any infected tree makes it unusable.

Will you be imposing movement restrictions on timber and logs from the area?

We are still trying to find out whether moving wood, particularly logs, from infected trees is a risk. Interim safeguards to guard against this possibility will be discussed with site owners and mill owners on a case by case basis.

Will you be advising forest managers not to plant larch/other affected species in future?

It is too early to be able to give any firm recommendations.

Will you be imposing further import controls?

This is something we are looking into but the final decision will need to be taken at a European level and will be informed by the results of the ongoing research.

Is there any chemical treatment that could be used?

Until we are clearer about the exact cause of the larch dieback, no treatments can be recommended. Currently there are no chemical treatments available that can be deployed against *P. ramorum* which has been found infecting trees in the natural environment.

Will you be using money from the government's £25 million fund for Phytophthora management to deal with this problem?

Yes: research into this new development is already underway and is being funded from the Defra programme. Clearance of infected rhododendron and other sporulating hosts in the understory can also be paid for out of the fund. In addition we are supporting surveillance and diagnosis from this fund.

Where should worried woodland owners go for advice?

We shall be keeping the Forestry Commission's Plant Health website www.forestry.gov.uk/pramorom updated and worried tree owners should look there first.

If owners or managers suspect that their woodlands may be infected then they should contact the South West England Office on 01626 890666.

If owners of individual garden, parkland or amenity trees think that they may be infected they should contact the Forest Research Tree Health Disease Diagnostic Advisory Service on 01420 23000. At this point in time we are primarily concerned about Japanese larch plantations in a forest and woodland environment rather than individual garden, parkland or amenity trees.