

BLEEDING CANKER OF HORSE CHESTNUT

QUESTIONS & ANSWERS

APRIL 2008

1. What is the history and significance of horse chestnut?

Horse chestnut (*Aesculus hippocastanum*) is a native of the Balkans region of south-eastern Europe. It is believed to have been introduced to Great Britain in the 1500s. Exactly how many there are in Great Britain is unknown - we know there are approximately half a million in woodland situations, plus an unknown number in other situations such as streets, parks, gardens and farmland. They are much-loved features of many parts of the British landscape, and their large seeds are the "conkers" used for the game of the same name. Although conkers are not edible by humans, they are used by cottage industries, more especially in other countries, as ingredients in products such as soaps and cosmetics. The timber of horse chestnuts has no economic value.

2. What is a bleeding canker?

A bleeding canker is like a "running sore" consisting of an area of dying bark on a tree's trunk or branches that oozes, or "bleeds", liquid. There are many different pathogens, or disease-causing organisms, that can cause bleeding cankers, and cankers can occur on many species of tree.

3. What causes bleeding canker of horse chestnut?

Phytophthora citricola and *Phytophthora cactorum*, which are well-known fungus-like organisms from the large *Phytophthora* genus, have been causing bleeding cankers on horse chestnuts (and other tree species, such as lime) in Great Britain for several decades. Infection rates from these pathogens remained at a low level and therefore did not cause concern. However, over the past few years there has been a significant increase in reports of bleeding canker of horse chestnut, and in the vast majority of samples analysed since this increase began, *Phytophthora* pathogens have not been found. Instead, a bacterium recently identified as *Pseudomonas syringae* pathovar *aesculi* has been found to be the cause, and is causing us the most concern.

4. Where did *Pseudomonas syringae* pathovar *aesculi* originate?

It has only previously been known to infect the leaves of Indian horse chestnut (*Aesculis indica*), a native of the north-west Himalayan region of the Indian sub-continent.

5. Where else is *Pseudomonas syringae* pathovar *aesculi* found?

At least two other European countries (The Netherlands and Germany) have confirmed *Pseudomonas syringae* pv *aesculi* as the cause of bleeding canker of horse chestnut there. Trees showing similar symptoms have also been reported in other western European countries, including France and Belgium, but not yet confirmed as *Pseudomonas syringae* pv *aesculi*.

6. How did it get to Great Britain?

We cannot be sure, but the most likely route is that it came in on trees intended for planting in Britain.

7. Is there anything that can be done for a sick tree?

There is no chemical treatment currently available to cure or arrest the development of bleeding canker. Moreover, some trees with trunk infections retain healthy-looking crowns and might not deteriorate further. In some trees the disease progression can be very slow, or even cease, with trees showing signs of recovery as vigorous callus development occurs at the edge of wounds created when bark has been killed by the disease.

8. What's the future for horse chestnut trees in Britain? Does this mean the beginning of the end for them here?

It is too early to say. We know that some trees survive bleeding canker, some die, and some have to be felled for public safety reasons when the condition weakens the trunk or a branch to a point where it is in danger of falling. There is also anecdotal evidence of uninfected trees being found very close to trees that have been heavily infected for some time, suggesting that some horse chestnut trees might have a genetically inherited ability to resist the pathogens that cause bleeding canker. We hope to be able to conduct research into apparently resistant varieties to scientifically assess this hypothesis. If it is true, it would hold out hope that seeds from these trees might form the basis of future planting stock from which future generations of the species might be grown so that we can continue to enjoy horse chestnut trees in the British landscape.

9. What does this mean for conker production?

There are still hundreds of thousands of healthy horse chestnut trees in Britain, so there should be plenty of conkers to satisfy demand for the foreseeable future.

10. Is this another Dutch elm disease?

No, we believe it is very different. The landscape impact of bleeding canker of horse chestnut is likely to be much less severe than the impact of Dutch elm disease, because there are probably fewer than 2 million horse chestnut trees in Britain, whereas there were tens of millions of elm trees. In addition, the Dutch elm disease fungus is spread very rapidly by elm bark beetles as they fly from infected trees to healthy trees to feed and, in so doing, transfer the disease. Compounding this, elm trees often have shared root systems, especially in hedgerows, and the root systems of adjacent elm trees can graft themselves to each other. So if one tree becomes infected, the disease can spread via the roots to neighbouring trees as well. As a result we estimate that Britain lost more than 30 million elms over three decades.

11. Should we stop planting horse chestnut trees?

This is a decision for individual land managers to make based on their own objectives and priorities. In coming to a decision, we would advise them to weigh the risks that their trees might not survive against the possibility that among the trees they plant might be some which, thanks perhaps to genetic variation, will prove resistant to this pathogen. The seeds from such trees could help to form the basis of resistant planting stock for the future. We would also emphasise the importance of appropriate site selection and good tree care.

12. Could the organisms that cause bleeding canker of horse chestnut infect other species?

We know that *Phytophthora cactorum* and *Phytophthora citricola* do infect other species, such as lime and sycamore. Tree and plant species that might be potential hosts of *Pseudomonas syringae* pv *aesculi* still need to be tested to determine whether it can infect them.

13. Is climate change involved?

We do not yet know enough about *Pseudomonas syringae* pathovar *aesculi* in Britain to know whether climate change is a factor.

14. Are there any other pests or diseases that affect horse chestnut trees in Britain?

Yes, there is a moth and a fungal disease that occur on horse chestnuts.

The moth is horse chestnut leaf miner (*Cameraria ohridella*), a tiny moth that lays its eggs in the leaves. The larvae that emerge from the eggs then tunnel through the leaves, which causes the leaves to turn brown in July and August and fall off, as though autumn had come early. However, leaf miner

does no serious harm to the trees' health, and they do flush again the following year, so we encourage owners to seek expert advice before rushing to fell their trees in the belief that they are dead. Gathering up and burning the leaves, or composting them under four inches of soil or six inches of other plant material in autumn, can destroy the over-wintering eggs and help to reduce the number of larvae that emerge the following year. Leaf miner was first found in Britain in 2002, in the London area, and is so far confined mostly to southern and central England, but it is spreading north and west. It was first recorded in Macedonia in 1985 and has spread across much of Europe since then.

The fungal infection is leaf blotch (*Guignardia aesculi*), a fungal pathogen that attacks the leaves and causes reddish or dull brown blotches with bright yellow borders around the perimeter. The blotches are usually at the tips or edges of leaves. From a distance the symptoms look similar to the leaf miner's, but examined closely they are easily distinguishable from leaf miner marks by the bright yellow borders. Again, leaf blotch does the tree no significant harm, so we advise owners not to jump to the conclusion that their trees are dying without first getting expert advice.

We are monitoring the progress of these pests and diseases and working with other researchers here and abroad to understand them better in order to be able to provide management advice for tree owners.

15. Is anyone else doing research on these problems?

The lead research into *Pseudomonas syringae* pv *aesculi* is being conducted in The Netherlands. For further information, visit www.kastanjeziekte.wur.nl

16. Should we be worried?

It is always a cause for concern when significant numbers of a particular tree species appear to be under threat. The greatest importance of horse chestnut trees in Britain is cultural - they are a much-loved feature of the landscape in many parts of Britain, and of course they are the source of conkers. For these reasons they would be missed by many people if we were to lose significant numbers of them.

However, we also need to remember that trees and woodland live in cycles of natural phenomena such as climate, weather, and pests and diseases. These cycles can be measured in years and even decades, and there is a limit to what human intervention can do to influence their outcomes. The most important thing we can do is to research and understand the causes so that we can provide appropriate management advice for tree owners and woodland managers. It is also important that we remain vigilant against accidentally importing new and damaging pests and diseases from outside Great Britain.

17. What is the Forestry Commission going to do next?

We will carefully consider the results of the survey and investigate further some of the symptomatic trees before deciding what further steps we can take.

However, there is a limit to what can be done to combat diseases of trees, apart from encouraging tree owners and woodland managers to practise good woodland management and tree care to ensure maximum tree health. The healthier a tree is, the better it is able to withstand attack by pests and pathogens. Therefore the main thrust of our work is likely to be to gain as much understanding of the condition as possible so that we can provide appropriate advice to owners on how to manage affected trees and how to prevent the spread of the organisms that cause the problem.

The main features of good tree care and woodland management are:

- matching trees to the planting site, i.e. plant species that are best suited to the characteristics of the site, such as the soil type, weather, sunshine hours, wind strength, drainage etc. This ensures that the tree is subjected to a minimum of stress from environmental factors;
- planting trees of local provenance and origin. Research and experience have shown that using seeds that are descended from trees that have inhabited a particular locality for centuries are best adapted to local conditions and prove the most resistant to harmful insects and diseases. (However, since horse chestnut trees arrived in Britain only about 500 years ago, there is a limit to how well adapted they can be to local conditions here); and
- following best practice in woodland management and tree care, such as thinning, weed control and minimising damage by mammals such as grey squirrels, cattle, sheep and deer.

18. What should people do if they see symptoms of bleeding canker?

We are not asking the public to report symptomatic trees to us at present. Tree owners and woodland managers who are concerned might wish to consult the Forest Research website for more information at www.forestresearch.gov.uk/bleedingcanker. Anyone concerned that an infected tree might present a threat to public safety should notify the local Council.

19. Where can I get more information?

- The full report of the survey of bleeding canker of horse chestnut is available in the Plant Health area of the Forestry Commission website;

- A [press release](#) about bleeding canker of horse chestnut is available from the News area of the Forestry Commission's website;
- more scientific information about bleeding canker is available from the [Forest Research website](#);
- Further information about leaf blotch is available from the [Forest Research website](#).
- A press release about horse chestnut leaf miner is available from the [News area](#) of the Forestry Commission website; and further scientific information is available on the [Forest Research website](#).

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