

### Mini data sheet on *Pseudomonas syringae* pv. *aesculi*

Added in 2009 - Deleted in 2014

**Reasons for deletion:**

*Pseudomonas syringae* pv. *aesculi* has been included in EPPO Alert List for more than 3 years and during this period no particular international action was requested by the EPPO member countries. In 2014, it was therefore considered that sufficient alert has been given and the pest was deleted from the Alert List.

*Pseudomonas syringae* pv. *aesculi* (a new disease of horse chestnut)

Why	Since the early 2000s, general decline and bleeding cankers of horse chestnut trees ( <i>Aesculus hippocastanum</i> ) have increasingly been observed in several European countries. Investigations have showed that a bacterium, <i>Pseudomonas syringae</i> pv. <i>aesculi</i> , was consistently associated with the disease and it is now considered that this bacterium is the main cause of this new disease. Considering the severity of the disease and its current spread in Europe, the EPPO Panel on Phytosanitary Regulations recommended adding <i>Pseudomonas syringae</i> pv. <i>aesculi</i> to the EPPO Alert List.
Where	<p><b>EPPO region:</b> Belgium, Czech Republic, France (Nord-Pas-de-Calais), Germany, Hungary, Ireland, Netherlands, Norway, and United Kingdom (England, Scotland, Wales).</p> <p><b>Asia:</b> India. This pathovar of <i>P. syringae</i> was first observed from <i>Aesculus indica</i> in India but no further information could be found on the extent or severity of the disease it may cause in India or in other Asian countries.</p> <p>In France, the first diseased trees were observed in 2001 in the city of Roubaix, and then in other locations in the Nord-Pas-de-Calais region (Villeneuve-d'Ascq, Lille, Tourcoing, Hellemmes, Mons-en-Baroeul, Lesquin, Noordpeene). At the same time, similar symptoms were also reported from Belgium. In the Netherlands, surveys carried out in 2007/2008 revealed that 30% of all horse chestnut trees were affected to a greater or lesser extent by the disease. Initially all infections were located in the western part of the Netherlands, but they are now seen across the whole country. In the United Kingdom: previous episodes of bleeding cankers of horse chestnut trees had been attributed in the 1970s to a <i>Phytophthora</i> sp. but these bleeding cankers were considered to be uncommon and only seen in the South of England. However, since 2003 an upsurge of the disease has been observed in the United Kingdom. From 4 cases reported in 2001, 60 were seen in 2003, 90 in 2004, 75 in 2005 and more than 110 were reported in 2006, and from locations as far north as Lancashire (north-west of England), and Glasgow and Fife (Scotland). In Germany, the presence of <i>P. syringae</i> pv. <i>aesculi</i> was confirmed in 2008 in one tree in Hamburg but the disease has been observed from other trees (without further details on their location in Germany).</p>
On which plants	<i>Aesculus</i> spp. (horse chestnuts). <i>A. hippocastanum</i> (both white and red cultivars) is the most affected species. In particular, <i>A. hippocastanum</i> cv. 'Baumanii' appears to be extremely susceptible the disease. Research is being carried out on the susceptibility of other species (e.g. <i>A. x mutabilis</i> , <i>A. flava</i> , <i>A. parviflora</i> and <i>A. pavia</i> ), with the additional aim of finding possible sources of resistance. Trees of all ages can be affected but younger trees (10-30 years) can succumb to the disease in 3 to 5 years.
Damage	Symptoms usually start with bleeding lesions: scattered drops of rusty-red, yellow-brown or almost black, gummy liquid ooze from patches of dying bark on the stems, branches or trunks. These lesions can be observed at the base of the tree or at approximately 1 metre high on the trunk (then extending upwards). Bleeding from infected tissues can be quite copious and under dry conditions it can leave a dark, brittle crust near the point of exit. Under the bark, mottled and orange-brown discolorations can be observed. Over the years, the areas of dead phloem and cambium underneath the bleeding areas may coalesce and

	<p>extend until they girdle the entire trunk or branch. Symptoms on the tree crown then become visible, typically consisting of leaf yellowing, premature leaf drop, and eventually tree death. For example in the United Kingdom, on the basis of a survey carried out in 2007, it was estimated that 35 000 to 50 000 trees were affected and probably a few thousand have already been felled as a result of the disease. Recent studies have showed that the bacterium is able to infect the aerial woody parts of its host directly which may explain its success as a tree pathogen causing large-scale epidemics.</p> <p>Pictures of symptoms can be viewed on the Internet:  <a href="http://www.forestry.gov.uk/fr/INFD-6L4GBT">http://www.forestry.gov.uk/fr/INFD-6L4GBT</a>  <a href="http://www.kastanjeziekte.wur.nl/uk/index_uk.htm">http://www.kastanjeziekte.wur.nl/uk/index_uk.htm</a></p>
Transmission	<p>So far, the epidemiology of the disease remains unknown. <i>P. syringae</i> could be isolated from the surfaces of horse chestnut leaves and branches, as well as on flowers and various parts of the fruits. Bacteria were also detected in rainwater in the vicinity of diseased trees. However more studies are needed to determine the possible role of water, insects, or even human activities (e.g. pruning) in disease transmission.</p>
Pathway	<p>Plants for planting of <i>Aesculus</i> spp., plant parts (e.g. foliage, wood, seeds)? soil?</p>
Possible risks	<p>Horse chestnut trees (<i>Aesculus</i> spp.) are widely planted across the EPPO region, mainly as amenity trees in parks and gardens or along the roads but they can also be found in woodlands. As the epidemiology of the disease is largely unknown, few control measures can be recommended. However, prophylactic measures can probably be taken to prevent disease spread (e.g. avoid as much as possible pruning, pruning equipment should be disinfected, diseased plant material should be transported in closed containers, incinerated or carefully composted). Data is generally lacking on the geographical distribution, biology and epidemiology of the disease. Considering the significant tree mortality which has already been observed in north-western Europe, it is desirable to prevent any further spread of <i>P. syringae</i> pv. <i>aesculi</i> as this pathogen represents a major threat to amenity trees, woodlands and nurseries.</p>
Source(s)	<p>Bardoux S, Rousseau P (2007) Le dépérissement bactérien du marronnier. <i>Phytoma - La Défense des Végétaux</i> no. 605, 22-23.</p> <p>Durgapal JC, Singh B (1980) Taxonomy of pseudomonads pathogenic to horse chestnut, wild fig and wild cherry in India. <i>Indian Phytopathology</i> 33, 533-535 (abst.).</p> <p>Mertelik J, Kloudova K, Pankova I, Krejzar V, Kudela V (2013) Occurrence of horse chestnut bleeding canker caused by <i>Pseudomonas syringae</i> pv. <i>aesculi</i> in the Czech Republic. <i>Forest Pathology</i>, doi:10.1111/efp.12021</p> <p>NPPO of Germany (2011-02).</p> <p>NPPO of Hungary (2013-08).</p> <p>NPPO of Ireland (2010-09).</p> <p>Talgø V, Spies Perminow JI, Sletten A, Bente Brurberg M, Herrero ML, Strømeng GM, Arne Stensvand A (2012) Fungal and bacterial diseases on horse chestnut in Norway. <i>Journal of Agricultural Extension and Rural Development</i> 4(9), 256-258.</p> <p>Schmidt O, Dujesiefken D, Stobbe H, Moreth U, Kehr R, Schroder T (2008) <i>Pseudomonas syringae</i> pv. <i>aesculi</i> associated with horse chestnut bleeding canker in Germany. <i>Forest Pathology</i> 38(2), 124-128.</p> <p>Steele H, Laue BE, MacAskill GA, Hendry SJ, Green S (2010) Analysis of the natural infection of European horse chestnut (<i>Aesculus hippocastanum</i>) by <i>Pseudomonas syringae</i> pv. <i>aesculi</i>. <i>Plant Pathology</i> 59(6), 1005-1013.</p> <p>Webber JF, Parkinson NM, Rose J, Stanford H, Cook RTA, Elphinstone JG (2008) Isolation and identification of <i>Pseudomonas syringae</i> pv. <i>aesculi</i> causing bleeding canker of horse chestnut in the UK. <i>Plant Pathology</i> 57(2), p 368.</p> <p>INTERNET (last retrieved 2009-06)</p> <p>JKI web site (DE). New disease of horse chestnut <i>Pseudomonas syringae</i> pv. <i>aesculi</i> (in German). <a href="http://www.jki.bund.de/nr_932586/DE/Aktuelles/aktschadorg/rosskastaniensterben/rosskastaniensterben_inhalt.html">http://www.jki.bund.de/nr_932586/DE/Aktuelles/aktschadorg/rosskastaniensterben/rosskastaniensterben_inhalt.html</a></p> <p>Forestry Commission (GB). Bleeding canker of horse chestnut. <a href="http://www.forestry.gov.uk/fr/INFD-6KYBGV">http://www.forestry.gov.uk/fr/INFD-6KYBGV</a></p> <p>Société française d'arboriculture. La lettre de l'arboriculture no. 43 2006. <a href="http://www.sfa-asso.fr/download/28489_article-marronnier.pdf">http://www.sfa-asso.fr/download/28489_article-marronnier.pdf</a></p> <p>University of Wageningen (NL). Working Group Aesculaap. Horse chestnut bleeding disease. <a href="http://www.kastanjeziekte.wur.nl/uk/index_uk.htm">http://www.kastanjeziekte.wur.nl/uk/index_uk.htm</a></p>