Phytophthora ramorum and *Phytophthora kernoviae* diseases on bilberry (*Vaccinium myrtillus*)

A threat to our woodlands, heathlands and historic gardens

PLANT DISEASE FACTSHEET

Very early symptom showing a brown lesion developing around the leaf node

What is it and where is it found?

Phytophthora is a devastating fungus-like organism that causes damage to a wide range of trees and plants. Recently two species of *Phytophthora* – *Phytophthora ramorum* and *Phytophthora kernovia*e – have been causing damage to our environment.

Why the concern?

Initial findings of the disease were predominantly confined to ornamental plants in nurseries. Since then, findings in the wider environment have continued to spread across the UK after initially being concentrated in the South West. With a large and varied host range, if left unchecked they may change our landscape with the loss of many trees, shrubs and heathland plants.

fera
The Food and Environment Research Agency

Where is it found?

P. ramorum was first identified in 1995 causing the death of oak and tanoak trees in the coastal counties of California in the USA. It was first detected in the UK in 2002 in the nursery trade and has since spread to the wider environment including historic gardens, parks, woodlands and heathlands.

The first finding of *P. ramorum* on the heathland plant *Vaccinium myrtillus* (bilberry/blaeberry) in the wild was confirmed in January 2009. More recently, in August 2009, the pathogen was identified on Japanese larch trees at sites in South West England.

P. kernoviae was first discovered in 2003 causing severe damage to rhododendron and beech trees in Cornwall. The disease has been found in woodlands, gardens and a small number of nurseries with outbreaks mainly confined to the South West. In December 2007 *P. kernoviae* was confirmed on bilberry at a woodland site in Cornwall and in February 2008 in open heathland.

Very early symptom showing a brown lesion developing around the leaf node

Very early symptom development showing a dark brown/black, lesion. Lesions can develop at any point along the stem, not just at leaf nodes or buds

Current situation

There are currently 22 discrete outbreaks of *P. ramorum* or *P. kernoviae* on bilberry in England and Wales (as of 30/04/2012). Of these, there are 10 outbreaks of *P. ramorum* on bilberry nationally compared to 13 outbreaks of *P. kernoviae* (one site affected by both pathogens). *P. ramorum* is occurring predominantly on bilberry in woodland whereas *P. kernoviae* is more prevalent on bilberry in open heathland. Approximately 70% of the outbreaks on bilberry are in Cornwall, the majority of which are outbreaks of *P. kernoviae* in open heathland. Although the number of sites affected nationally is small, there is an upward trend since the first findings in 2007/08.

Disease spread has been shown to be predominantly via localised splash dispersal but also in wind-driven rain, via run off or on footwear and vehicles. Evidence for long distance dispersal in the absence of rain is limited. Inoculum can also survive in soil, litter and in watercourses.

Bilberry is highly susceptible to *P. ramorum* and *P. kernoviae* and symptoms can develop within 2 days of infection under warm conditions. In tests on susceptibility of a range of hosts to *P. ramorum* and *P. kernoviae* the orders of susceptibility were as follows:

P. ramorum: viburnum > rhododendron > **bilberry** >pieris > camellia > magnolia
P. kernoviae: pieris > **bilberry** > rhododendron > magnolia

Monitoring work using bilberry bait plants to detect peak periods for sporulation and infection shows that bilberry is susceptible all year round and that infections will take place whenever there are prolonged conditions of high humidity. Temperature does not appear to be a limiting factor for

P. ramorum but laboratory studies indicate that *P. kernoviae* may be more environmentally sensitive. Monitoring has shown that vaccinium plants are capable of supporting high levels of sporulation by *P. kernoviae* of over 1600 spores per cm^2 of stem and that peaks in sporulation occur in the late autumn (November). This means that bilberry could be a primary source of spores and therefore further spread of the disease in the environment.

Latest work at Fera on modelling local epidemics can describe current epidemic development and could be used for future prediction at a range of spatial scales from local to national. Latest outputs are based on measurements of when conducive weather has taken place and are being used to target when surveillance work should be undertaken.

Disease management

Timely management action is proven to limit disease spread and following evaluation in small scale trials, recommendations are now available for disease containment strategies for infected bilberry in both woodland and heathland environments. These strategies are supported by the availability of standard operating procedures for biosecurity and waste disposal (including composting), all backed up by extensive research.

Recommended management actions are not available as full documents due to the need for some further work on logistics, but the options can be summarised as follows:

Table 1. Summary of options for disease management of outbreaks on bilberry*

Outbreak type	Outbreak extent	Disease management options
Infected heathland	Limited	Spot treatment with an approved herbicide
Infected heathland	Widespread	Burn and then spot treat with an approved herbicide
		Cut and remove material and then spot treat with an approved herbicide
Infected woodland	Limited	Spot treatment with an approved herbicide Spot burn
		Cut and remove material
Infected woodland	Widespread	Treatment with an approved herbicide Cut and remove material and then spot treat with an approved herbicide

***Sourced from defra Research Project PH0601 (http://randd.defra)**

Advisory Information

Phytophthora ramorum and *Phytophthora kernoviae* are quarantine diseases and Defra needs to be notified of any findings so action can be taken against them. If you suspect that such a pest or disease is present, you should report it immediately to your local Plant Health and Seeds Inspector (contact details below).

Regional teams are working to identify and eradicate outbreaks of the diseases as part of a wide-reaching programme to manage the impact of *Phytophthora ramorum* and *Phytophthora kernoviae* in the UK. This programme is being run by the Food and Environment Research Agency (Fera), on behalf of the Department for Environment, Food and Rural Affairs (Defra).

If you discover any plants showing the symptoms illustrated in this leaflet:

- Make a note of the location
- Take a photograph if possible
- Don’t touch the plant or take a cutting
- Use the contact information below

Telephone: 01904 465625
Email: planthealth.info@fera.gsi.gov.uk

The Food and Environment Research Agency (Fera). October 2012

The Food and Environment Research Agency
Sand Hutton, York
YO41 1LZ, UK
Tel +44 (0)1904 462 000
Fax +44 (0)1904 462 111
E-mail info@fera.gsi.gov.uk
www.defra.gov.uk/fera