

Ring Rot of Potato

Why the concern?

This is a quarantine disease of potato that is listed in the EC Plant Health Directive and is notifiable in the UK. Yield losses are caused by tuber rotting and in individual U.S. crops have been as high as 50%. If it were to become established in the UK, the effect on our seed-potato industry would be substantial, especially for exports. Once established, the costs of control would also be high. Control of this disease requires vigilance from all sectors of the industry, from growers through to merchants, packers and retailers.

What is it?

Ring rot is caused by the bacterium *Clavibacter michiganensis* subsp. *sepedonicus*. It is found in parts of North America and is also established in northern and eastern Europe. Within the EC, there have been findings in most member states. There have also been outbreaks in a number of the countries that will be joining the Community in 2004. There had been no outbreaks in the UK prior to a finding in Wales in November 2003. The disease is favoured by cool climates and could easily establish under UK conditions.



SCOTTISH EXECUTIVE



What does it look like?

The disease can cause plants to wilt but symptoms are much more likely to be observed in tubers.



Early tuber symptoms. Vascular tissue has a glassy, watersoaked appearance.



Close up of bacterial ooze emerging from the vascular ring of an infected tuber.



Cheese-like rot of the vascular ring.



Later stage of infection. Extensive tuber rot and breakdown with internal hollowing.



Severe infection. Cracking and mummification of the tuber.



Wilting and yellowing of infected potato leaf.

- Tuber symptoms can be seen when tubers are cut across the heel end (where the tuber was attached to the stolon). In the early stages the tissues around the vascular ring appear glassy and water soaked. As infection progresses the vascular ring becomes discoloured and a soft cheese-like rot develops around the vascular ring (hence the name “ring” rot). If a cut tuber is squeezed a cheese-like ooze emerges. External symptoms are not common but in severe cases the skin of the potato may crack and ooze can emerge from the heel end and eyes, causing soil to adhere.
- Wilting symptoms may occur late in the season and are often masked by the natural senescence of the crop.
- Symptom expression occurs at different rates in different varieties and is affected by temperature and other environmental conditions. Some varieties hardly ever express symptoms.

How does it spread?

- Disease spread is largely via infected seed potato tubers. Ring rot can pass through one or more field generations without causing symptoms and latently infected tubers are an important means of spreading the disease. Laboratory tests can detect latent infection in a sample, but small samples may miss low levels of infection.
- Direct contact can spread infection from diseased to healthy tubers, particularly if the latter are damaged.
- Cutting, grading and handling of seed tubers is an ideal means of spreading ring rot within and between potato stocks.
- The bacterium can survive for at least a month on machinery and much longer if the machinery dries rapidly and is kept under dry conditions after contamination. Sharing equipment and machinery that is used to harvest, grade or process seed and ware potatoes therefore poses a very high risk of cross-infection between different growers. The bacterium survives much less well under moist conditions.
- Bacteria can also survive and remain infectious for several years on potato bags, boxes, store walls and other surfaces that have been contaminated by rotting ooze. Although these are not the main means of disease transmission, it can make eradication of the disease very difficult.
- The bacterium is able to overwinter in the soil, usually in association with groundkeepers (unharvested potatoes from the previous crop) and debris from infected crops. Infected groundkeepers lifted with an otherwise clean seed or ware crop can infect that crop.
- Contaminated potato waste is another possible source of infection.
- Ring rot, in contrast to brown rot, is not known to be spread long distances by water. The pathogen can survive in water for more than a month but there is no known aquatic weed host to build up inoculum levels. There is however clear evidence that contaminated wash water from infected tuber lots can transmit the pathogen to subsequent lots washed in the same water.

What is being done to help?

- **Legislation**

Under the terms of the EC Plant Health Directive and the Plant Health (Great Britain) Order 1993, importation of material carrying this disease is prohibited. In addition, a specific control directive (93/85/EEC) for the disease lays down measures aimed at preventing its spread wherever it is found and, if possible, eradicating it.

- **Survey**

Defra Plant Health and Seeds Inspectors (PHSIs) and SEERAD Inspectors carry out an annual survey of seed and ware potato stocks, including those grown from both UK and non-UK seed. Samples are tested for latent infection by the disease at the Central Science Laboratory (for England and Wales) and the Scottish Agricultural Science Agency (for Scotland).

- **Import inspections**

Consignments of imported ware potatoes are inspected by the PHSI. Samples are taken for testing at the Central Science Laboratory for the disease.

What can you do?

Plant only classified seed

All classified seed potatoes produced in the EC must have been derived from material found free from these diseases. Source seed with extreme care.

Control groundkeepers

Potato groundkeepers are a key factor in the long-term survival of the disease. Their control removes an important source of disease inoculum.

Practise good hygiene

Regularly clean and disinfect all machinery, equipment, containers, vehicles and storage facilities used during potato production.

Don't spread disease with waste

Discarded potatoes and potato processing waste could harbour the disease. Dispose of all potato waste in accordance with the Code of Practice for the Management of Agricultural and Horticultural Waste (PB 3580).

Keep a good look out

If you see any of the symptoms described above you must immediately contact your local Defra Plant Health and Seeds Inspector or the PHSI HQ, York

Tel: 01904 455174 Fax: 01904 455197

Email: planthealth.info@defra.gsi.gov.uk

or, in Scotland, contact your local SEERAD Area Office or SEERAD HQ, Edinburgh

Tel: 0131 244 6352 Fax: 0131 244 6509/6539

Email: plant.health@scotland.gsi.gov.uk