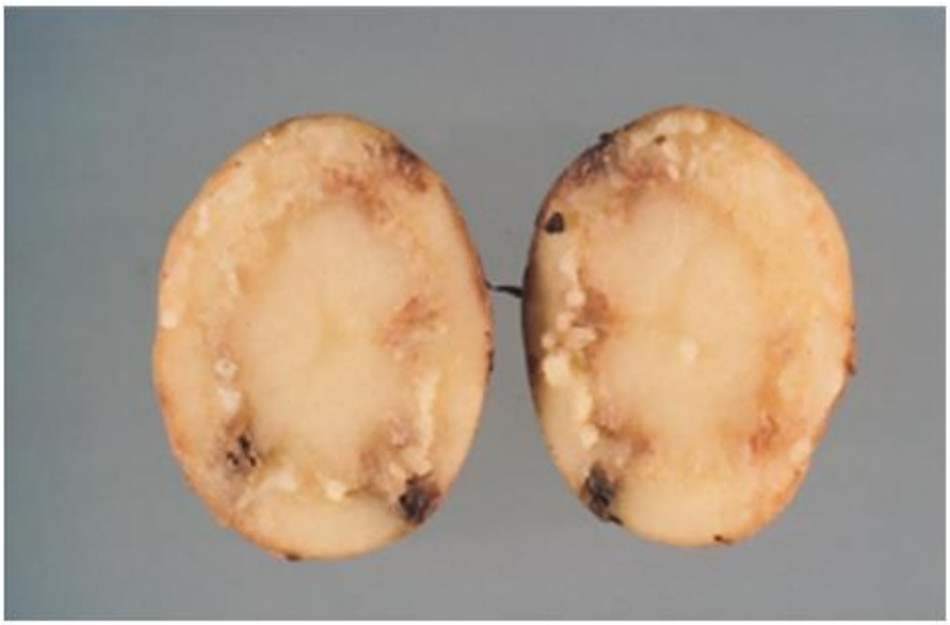
Department for Environment Food & Rural Affairs

Plant Pest Factsheet

Ring Rot of Potato

Clavibacter sepedonicus



Above Picture. Cheese-like rot symptoms caused by *Clavibacter sepedonicus* (ring rot of potato). © Fera Science Ltd.

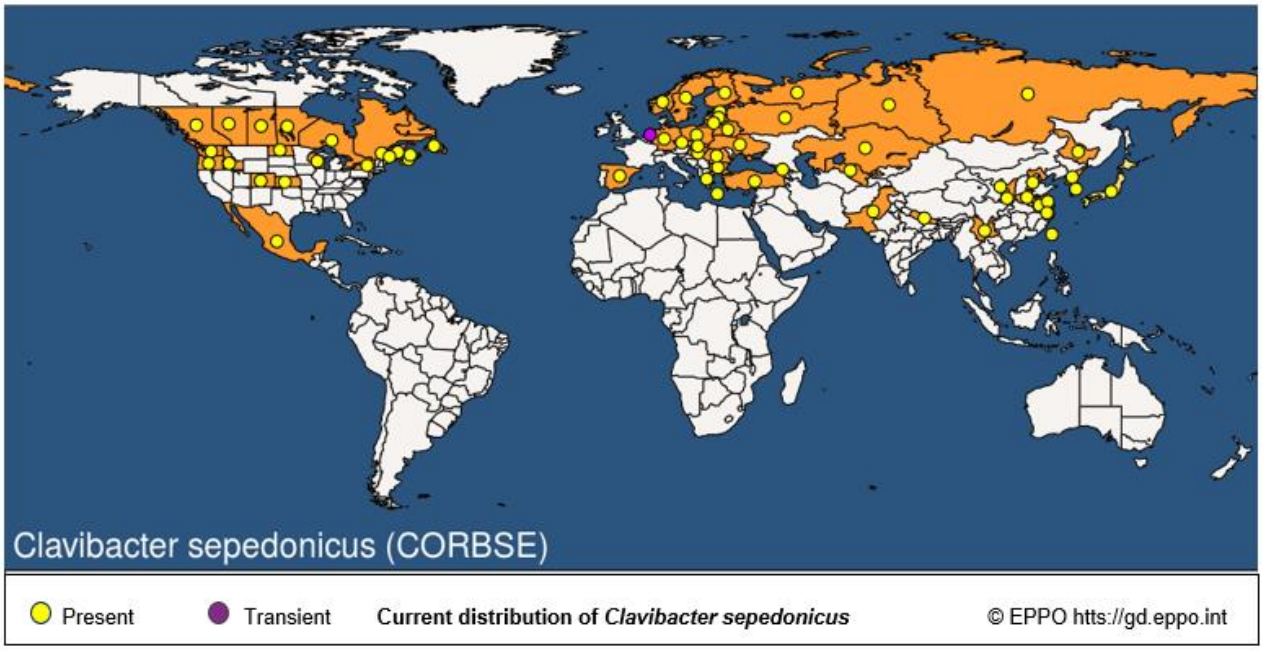
Background

Ring rot of potatoes is caused by a bacterial pathogen *Clavibacter sepedonicus* that can potentially cause serious loses to potato growers and potato seed producers.

The disease is favoured by cool climates and could easily establish under UK conditions. In the USA, yield losses in individual crops due to diseased plants and tuber rotting have been as high as 50%. If the disease were to become established in the UK, the effect on our seed-potato industry would be substantial, especially the knock-on effect for exports. Once established, the costs of control would also be high because the disease is difficult to eradicate; the bacterium can survive in a dry state for many years contaminating boxes, machinery, and stores. Control of this disease therefore requires vigilance from all sectors of the industry, from growers through to merchants, packers, and retailers. For these reasons it is a listed quarantine disease of potato in the UK.

Geographical Distribution

Clavibacter sepedonicus is widespread in Canada, with reports from Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Nova Scotia, Ontario, Prince Edward Island, Québec and Saskatchewan; restricted to certain states in the USA, with reports from Colorado, Idaho, Kansas, Maine, New York, North Dakota, Oregon, Washington and Wisconsin; and there have been some reports from parts of Mexico. As well as the Americas, it is also found in parts of Asia (China, Japan, Kazakhstan, North and South Korea, Nepal, Pakistan, Taiwan, Uzbekistan, the Asian part of Russia and Turkey). Ring rot of potato is also found across Europe and has been reported from the following countries: Bulgaria, Czech Republic, Estonia, Finland, Germany, Greece, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia and Sweden. *Clavibacter sepedonicus* is currently absent from the UK, although it has been intercepted several times on imported ware potatoes. There have been outbreaks in the UK with the first occurring in 2003/4 on a farm in Wales and a further outbreak in ware potato crops in 2013. The outbreaks were both linked to the import of infected seed potatoes from Europe and were successfully eradicated.



Host Plants

Natural infections of the disease only occur on potatoes (*Solanum tuberosum*). Symptomless infection of sugar beet (*Beta vulgaris var. sacchariferia*) roots and seed have been recorded. Other members of the Solanaceae (tomatoes - *Solanum lycopersicum* and aubergines - *Solanum melongena*) are also susceptible by artificial inoculation

Description

Infections of ring rot in tubers can often be latent i.e. symptomless. The disease can cause plants to wilt but symptoms are much more likely to be observed in infected tubers. Figures 1 to 6 show a range of symptoms for ring rot of potato in tubers.

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 (**Fig 1**). 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 (**Figs 2 & 3**). External symptoms are not common but in severe cases symptoms can be observed, the skin of the potato may appear slightly sunken, dry and cracked the tubers may also start to mummify. Infected tubers can also be invaded by secondary pathogens leading to complete breakdown of the tuber.(**Figs 4 & 5**).

It is important to note that infection is very often symptomless and so without testing infection can go undetected; the bacterium is also very persistent in the environment and can survive on surfaces and equipment for long periods of time. Wilting symptoms in the foliage may very occasionally be evident late in the season but are often masked by the natural senescence of the crop. There are also many other possible causes of wilting (**Fig 6**).

Figure 1. Early tuber symptoms. Vascular tissue has a glassy, water-soaked appearance.

Figure 2. Close up of bacterial ooze emerging from an infected tuber.

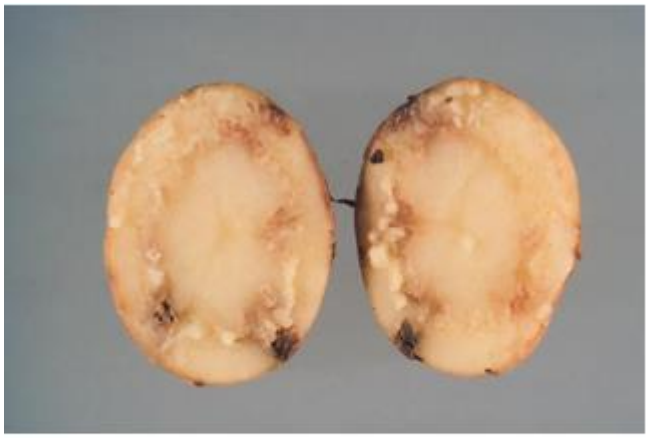


Figure 3. Cheese-like rot of the vascular ring.

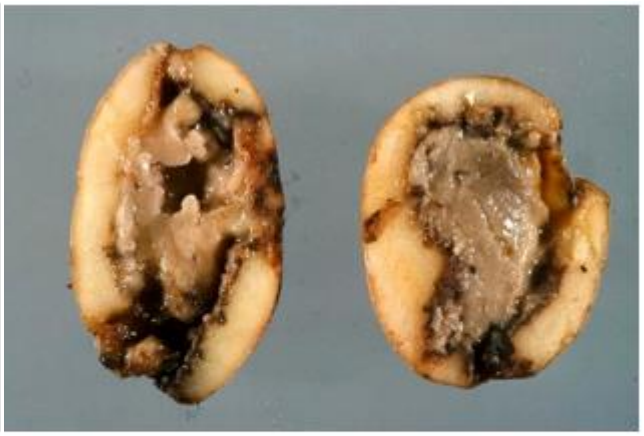


Figure 4. Later stage of infection. Extensive tuber rot and breakdown with internal hollowing.

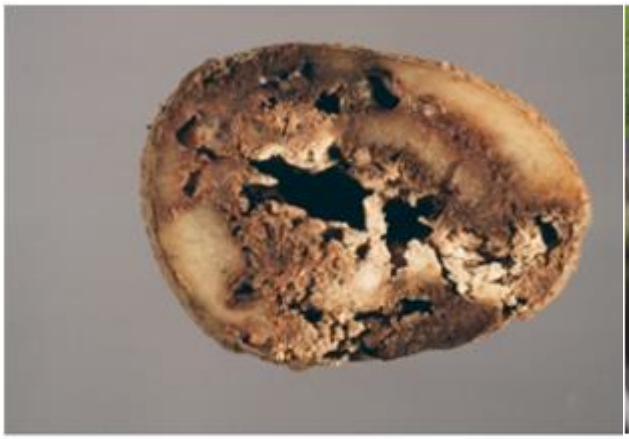


Figure 5. Severe infection. Cracking and mummification of the tuber.

Figure 6. Wilting and yellowing of infected potato leaf.

Dispersal and Detection

The most important mode of spread of this disease is through infected seed potato tubers. *Clavibacter sepedonicus* can pass through one or more field generations without causing symptoms, with latently infected tubers an important means of spreading the disease. Laboratory tests can detect latent infection in a sample but sampling a small number of tubers is unlikely to detect low levels of infection.

The pathogen can easily spread within and between potato stocks during cutting, grading and handling of tuber seeds. Direct contact with infected tubers, contaminated surfaces and equipment (boxes, graders, stores etc…) can spread infection particularly if the tubers are damaged. Small wounds or cracked surfaces are all entry points for the bacterium.

Pest Management and Reporting

What is being done to help?

Legislation: Importation of material carrying this disease into GB is prohibited under the Plant Health (Amendment etc.) (EU Exit) Regulations 2020 with equivalent requirements for Northern Ireland. There are also specific requirements for potatoes (seed and ware) and for all plants with roots, grown in open air, to mitigate the risk of this disease arriving in the UK. In addition, the potato ring rot contingency plan lays down measures aimed at preventing its spread wherever it is found and, if possible, eradicating it.

Import inspections. Consignments of seed potatoes imported to England and Wales are inspected by the PHSI. Samples are taken for official testing for the disease. Equivalent arrangements apply in Scotland and Northern Ireland.

The Plant Health Service (APHA, Defra and Fera Science Ltd in England and Wales, with equivalents in Scotland and Northern Ireland) carry out official surveillance and are trained in responding to an outbreak of potato ring rot in line with the measures set out in the UK contingency plan.

Import inspections. Consignments of ware potatoes imported to England and Wales are inspected by the PHSI. Samples are taken and tested for the disease at the Fera Science Ltd Laboratory. Equivalent arrangements apply in Scotland and Northern Ireland.

What can you do?

Plant only certified potato seed. All seed potatoes marketed in England and Wales must be classified under the Seed Potato Classification Scheme (SPCS), with similar arrangements elsewhere in UK. When sourcing seed potatoes, source from certified material. From July 2021, you cannot market EU seed potatoes in GB.

Do not be tempted to plant “ware potatoes” (potatoes destined for human consumption) as seed potatoes. Planting non-certified seed potatoes poses a real threat to the UK potato industry. The planting of ware potatoes increases the risk of introducing potato pests and disease that the UK is currently free from, such as: Brown rot and *Epitrix* potato flea beetles. The accidental introduction of any of these pests and diseases could be disastrous for the UK’s potato industry, resulting in yield losses, unmarketability of tubers and possible losses of UK exports.

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

Do not spread disease. Discarded potatoes and potato processing waste could harbour the disease.

Suspected outbreaks of Ring rot of potato or any other non-native plant pest should be reported to the relevant authority:

For **England and Wales**, contact your local **APHA Plant Health and Seeds Inspector** or the **PHSI Headquarters**, York.

Tel: 0300 1000 313 (please select option 3 when calling)

Email: planthealth.info@apha.gov.uk

For **Scotland**, contact the **Scottish Government's Horticulture and Marketing Unit:**

Agricultural crops contact the local RPID officer:
http://www.gov.scot/Topics/farmingrural/Agriculture/AOcontacts/contacts

For non-agricultural crops, email: hort.marketing@gov.scot

For **Northern Ireland**, contact the **DAERA Plant Health Inspection Branch:**

Tel: 0300 200 7847 Email: planthealth@daera-ni.gov.uk

Web: https://www.daera-ni.gov.uk/topics/plant-and-tree-health

For additional information on UK Plant Health please see:

https://planthealthportal.defra.gov.uk/pests-and-diseases/uk-plant-health-risk-register/

https://planthealthportal.defra.gov.uk/

https://www.gov.uk/plant-health-controls

http://www.gov.scot/Topics/farmingrural/Agriculture/plant/PlantHealth/PlantDiseases

https://www.daera-ni.gov.uk

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