

Rhizoctonia Potato Disease

Introduction

Rhizoctonia potato disease is an important constraint to potato production. The disease can cause qualitative losses, not only through the development of black scurf on tubers (Figure 1), but also in some instances other blemishes such as 'elephant hide' (Figure 2), deformed tubers and cracks (Figure 3). Yield can also be reduced through stem and stolon infection early in the season (Figure 4). In severe infections, complete stem death can occur. Direct losses (by weight) of up to 30% have been reported.

Key Facts

- Up to 30% of potato yield have been reported as direct losses (by weight) in relation to Rhizoctonia potato disease.
- Rhizoctonia potato disease can cause multiple impairments such as, black scurf on tubers, blemishes such as 'elephant hide', deformed tubers and cracks, small lesions no larger than 5mm and in some cases stem death can occur.
- The main causal agent of the disease is a fungus called *Rhizoctonia solani* which is closely related to a group of species called *Rhizoctonia* (BNR).
- The key AGs (anastomosis groups) to be aware of is: AG3, AG5, AG8 and AG2-1. However, worldwide other AGs have been recorded on potatoes.
- Rhizoctonia potato disease can be transmitted through infested seed and soil.



Figure 1. Black scurf on a potato tuber caused by *Rhizoctonia Solani*

Causal Agent

The disease is caused by the fungus *Rhizoctonia solani* and a closely related group of species termed binucleate *Rhizoctonia* (BNR). *Rhizoctonia solani* is a diverse species.

Isolates of the fungus can be assigned to one of the 13 genetically distinct anastomosis groups (AGs).

Each AG has different characteristics in terms of host range, survival, disease transmission and in some instances fungicide sensitivity.

In the UK, the following AGs are associated with potatoes:-

AG3

This is the predominant AG occurring in potatoes in temperate countries. AG3 can cause severe stem and stolon canker in addition to high levels of black scurf in tubers. It can also infect the roots of the potato plant. In some instances it is associated with tuber deformations and elephant hide symptoms.

AG5

AG5 has also been recorded in potatoes but infrequently in the UK. It can cause stem canker and black scurf, although not as severe as AG3. It has also been recorded causing deformed tubers and other blemish type symptoms. AG5 has been recorded on several different hosts, including cereals and weed species.

AG8

In experiments AG8 appears to exclusively infect the roots of potatoes. In glass house and field trials in the UK, very high level of root infection were observed but no stem canker or black scurf was present. Little is known about its occurrence as a disease in potato crops in the UK although it has been detected in potato fields. AG8 has been reported in the UK causing disease in wheat and barley.

AG2-1

AG2-1 is a highly diverse group. It has been reported on a wide range of hosts including brassicas, cereals and sugar beet. In the UK it has been associated with very severe stem canker of potatoes, more so than AG3 in some instances. However, other isolates cause exceptionally mild symptoms, such as very low levels of black scurf (if any) and only small, narrow lesion on stems.

Other AGs

A BNR species has been ground in a UK potato crop causing a minor blemish on tubers. In experimental conditions this caused small, narrow lesions on stems (Figure 5). Worldwide several other AGs have been recorded on potato including AG2-2, AG4, AG7 and AG9. AG4 has been found on other crops in the UK such as bean and brassicas.



Figure 2. Severe elephant hide (also called giraffe neck) symptoms on a potato tuber caused by *Rhizoctonia solani*



Figure 3. Cracking and mild elephant hide symptoms associated with *Rhizoctonia solani*.



Figure 4. Potato stems infected with *Rhizoctonia solani* AG3



Figure 5. Potato stem showing small lesions no larger than 5 mm after infection with a binucleate species of *Rhizoctonia* (BNR).

Control

The disease can be transmitted through infested seed and soil. As some AGs survive on alternative crops, crop rotation may not always be fully effective. Knowledge of the AGs present in the soil can give a good indication of disease risk, although environmental factors and soil type also influence disease severity.

Fera recommends when testing soil for Rhizoctonia using real-time PRC that the screen included AG3, AG5, AG8 and AG2-11 in the first instance. Further tests for additional AGs are available on request.

Contact Details

For more information on how to submit samples, to obtain prices or to discuss bespoke testing for Rhizoctonia please email the Crop Health Team on crophealth@fera.co.uk, call +44 (0)300 100 0322, or visit our website at www.fera.co.uk/crop-health.

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Authors

J.W. Woodhall and J.C. Peters

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