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Diseases of Potato: Bacterial Ring Rot

Michigan State University

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Ag Facts

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# Diseases of Potato: Bacterial Ring Rot

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Bacterial ring rot is one of the most serious of all potato diseases. Bacterial ring rot is caused by the gram positive bacterium *Corynebacterium sepedonicum*, and is a highly infectious disease found in all major potato growing areas. If found in seed fields, the disease will cause rejection of the fields for certification, no matter how little is present. It causes yield reduction and storage rots.



Figure 1. Infected plants initially exhibit wilting and rolling of the lower leaves.

## Symptoms

Foliar symptoms appear late in the growing season, particularly during hot, dry weather. Infected plants initially exhibit wilting and rolling of the lower leaves (Fig. 1). As with other potato wilt diseases, some, but not all stems on a plant may show symptoms. Leaves on affected stems first turn pale green, followed by development of chlorotic (yellow) areas bounded by green veins. The chlorotic areas later become necrotic (brown) and the leaves begin to curl upward (Fig. 2).

Infected stems are usually shorter than healthy stems, and leaves tend to be closer together and twisted. This may lead to a rosette appearance of the affected part of the plant. The vascular tissue becomes discolored during later stages of the disease, and thick exudate may be expressed out of the cut end of stems. Under cool, wet conditions, plants may remain symptomless.

There is a tremendous range in the symptoms exhibited by tubers

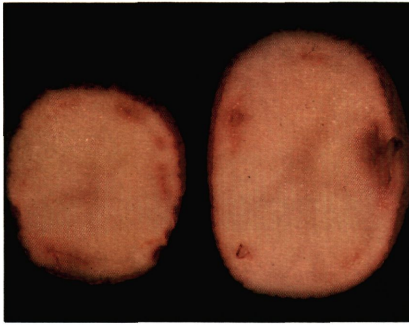


Figure 2. Chlorotic areas have become necrotic (brown). Note the leaves curling upward.

harvested from plants exhibiting foliar ring rot symptoms. They may be badly decayed, or may exhibit no external symptoms at all. Tuber symptoms generally begin after foliar wilting is seen. Early tuber symptoms, which are found at the stem end, consist of a slight yellow to brown discoloration of

the vascular ring (Fig. 3). Later, a yellow to pale brown, odorless rot develops, which has a crumbly to cheesy consistency. Squeezing the cut end of the tuber produces a cheesy exudate from the discolored areas of the vascular ring. As the vascular tissue decays, the inner part of the tuber often





**Figure 3. Early tuber symptoms consist of slight yellow to brown discoloration of the vascular ring.**

separates from the tuber skin, resulting in a brown colored cavity (Fig. 4). This often results in external skin cracking on the tubers and may cause total breakdown of the tuber, leaving only an outer shell (Fig. 5). Under cool growing conditions, tubers may remain symptomless even though the plant is infected.

These symptoms provide good evidence for the presence of ring rot. However, confirming diagnoses must be made by laboratory tests.

## Spread

The ring rot bacterium does not overwinter in the soil in a free living form, but can overwinter in infected tubers left in the field. Volunteer plants arising from infected tubers can serve as a source of infection the following year. One of the primary sources of infection is bacteria which overwinter in infected tubers in storage.

## Control

To control the disease, follow these steps:

1. Use certified seed. Certification agencies have a zero tolerance level on ring rot. This is your best protection against introducing the disease into your fields.
2. Clean all equipment, storage
3. Clean and disinfect all equipment, tools, shoes, etc. before moving into a clean field, storage area, etc. from a field or area suspected or known to be contaminated with ring rot.
4. Remove all infected potatoes and potatoes suspected of being contaminated by the bacterium from your operation.
5. Practice adequate rotation of crops and destroy all volunteers in potato fields known to have had ring rot the previous year. Plant on clean ground. Practice at least a two year rotation.
6. Keep seed lots separate. Use new bags for seed storage or store seed in disinfected storage bins.



**Figure 4. The brown color cavity is the result of decaying vascular tissue.**

surfaces, etc. with steam or hot pressurized water. Disinfect with quarternary ammonium compounds, Lysol, soluble copper sulfate, phenol-containing materials, or chlorine compounds. Care must be taken to make sure all surfaces come into contact with the disinfectant, and that the disinfectant remains on the surface for the proper amount of time.



**Figure 5. Decay of tissue often results in total breakdown of the tuber.**

Ring rot is a highly contagious disease. Symptomless, infected tubers can be as good a source of infection as tubers with obvious symptoms, and any lot of potatoes known or suspected of having ring rot should not be used as seed. The bacterium will also survive in dried slime on equipment, bags, boxes, storage bin walls and any other surfaces that may have come into contact with the organism or infected plants or tubers.

The ring rot bacterium can spread from tuber to tuber very quickly. The primary means of spread are seed piece cutting knives and planters—particularly the pick-type planter. Wounds on tubers caused by handling may also serve as entry sites for the bacterium. The disease can also be spread in the field by machinery, which may injure the plant and cause infectable wounds.

*Acknowledgement: Figures 1, 2, 4 and 5 courtesy of W. J. Hooker.*