

## Potato Ring Rot: Management Approaches

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Ring rot on potato can be managed successfully by the exclusive use of disease-free seed, and the maintenance of a strict sanitation program. Although these measures are seemingly straightforward, in practice they can be complicated to employ. This is because the goals are to eradicate the causal bacterium (*Clavibacter sepidonicum*) from all phases of seed potato production, and from all production surfaces. Only in this way can healthy tubers be obtained, and then protected from potential contamination.

In the Columbia Basin, potato growers generally do not have a lot of experience with ring rot. The disease cycle is different from some of the more commonly-encountered potato diseases like late blight, black dot, Verticillium wilt, powdery scab, or white mold which have either multiple secondary inoculum sources or propagules that persist for long periods in soil. It is important to remember that ring rot bacteria survive between seasons mainly in infected seed tubers or on dried slime contaminating the surfaces of crates, bins, burlap sacks, truck beds, and harvesting and grading machinery, for as long as 2-5 years. Survival occurs even at below-freezing temperatures. Wounds are required for the bacteria to penetrate potato seed pieces, and this is why the bacterium is readily transmitted during seed cutting operations.

Precautions must be taken to try to eradicate the bacterium from all phases of potato production. During seed handling this means cleaning and discarding all trash left from previous seasons, including tubers, vines, soil, broken boxes, and old bags from seed storages. Once cleaned, storage bins, walls, and floors should be thoroughly washed with a high-pressure washer using hot (100 °F), soapy water, and rinsed well. After washing, a disinfectant should be applied according to label directions. It is necessary to wash all surfaces before applying disinfectants because they are generally not effective on dirty surfaces, and are inactivated by organic material and soil. Disinfectants must be in contact with the moistened treated surface for at least 10 minutes to be effective. A foaming agent added to some disinfectants can help retain the chemical on vertical surfaces, and since porous surfaces retain larger populations of bacteria than smooth surfaces, porous surfaces require extra attention.

Sanitation during seed cutting and planting applies to all containers, tools, and implements (including knives, cutters, graders, truck-beds, planters, etc.) that seed tubers may contact. Cutting equipment should preferably be cleaned each day, and definitely between seed lots. Open-cell sponge rollers that absorb water (and bacteria) are best avoided—water impermeable closed cell rollers are preferable. Workers need adequate wash facilities so they do not inadvertently introduce the bacteria into cutting areas.

Certified seed potatoes grown in the U.S. and Canada are produced under regulations mandating zero tolerance for ring rot. Seed lots known to be contaminated with ring rot bacteria should NEVER be planted, and even seed lots only exposed to the pathogen may be at risk, so use them with caution or not at all. Picker planters can spread the bacteria significantly during planting. Ring rot symptoms can be latent (the tubers and/or plants are infected, but do not show symptoms), and often symptoms do not appear until late in the growing season. Thus, during the growing season, be vigilant for any signs of disease. Initial diagnosis is usually based on foliar or tuber symptoms, but laboratory tests should always be used to confirm a diagnosis.

When ring rot does occur on a commercial potato farm, the infected tubers should be handled separately, with attempts to minimize the number of potential exposed surfaces. If less than 5% of the plants are affected, harvest can be successful. However, the harvest should be delayed to allow infected tubers to decay in the field rather than in storage, and marketable tubers from infested fields should be moved through acceptable channels as soon as possible. Disposal of infected tubers should be according to good cull potato management practices. After all infected tubers have been removed from the farm, crop and soil debris should be scraped from the surfaces of all potato handling equipment, truck-beds and storages. A thorough clean-up and followed by the use of disinfectants must be undertaken to reduce the risk to next-year's crop. In addition to using chemical disinfectants, painting wooden surfaces can cover and seal-in some disease-causing organisms. Covering earthen walls with plastic sheeting can prevent direct contact with potatoes. Removing the top few inches of soil and/or adding a few inches of new soil may effectively remove or seal-in pathogens on earthen floors. Steam cleaning can eliminate bacteria from equipment. As a final measure, potatoes should not be planted for two years in any field in which the disease was present, and control of volunteer potatoes is advised.

A wide variety of disinfectants are available for use in potato storages and on equipment. Soil, clay and organic material may render a disinfectant less effective. Most disinfectants require that the treated surfaces remain wet up to 10 minutes for full activity. Addition of a wetting agent may aid in achieving coverage and penetration. Solutions should be changed frequently to avoid neutralization. Following disinfection procedures, rinse the surface well and remove excess water. Many disinfectant brand names are available, and most are effective when used properly. However, ALWAYS FOLLOW THE LABEL DIRECTIONS AND WORKER SAFETY PROTECTIONS.

#### References

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