



# Blackleg & Soft Rot of Potato

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## IMPORTANCE

Blackleg and bacterial soft rot can cause serious damage to potato crops in commercial fields and residential gardens. Early losses occur when seed pieces decay prior to sprout emergence, resulting in missing hills. Later infections cause stems to decay and potatoes to rot in the ground and/or storage. Blackleg and soft rot are caused by the same organisms, with stem infections called blackleg and tuber infections called soft rot.



**FIGURE 1.** BLACKLEG RESULTS IN BLACKENED STEMS NEAR THE SOIL SURFACE AND COLLAPSE OF POTATO PLANTS IN THE FIELD.

## SYMPTOMS

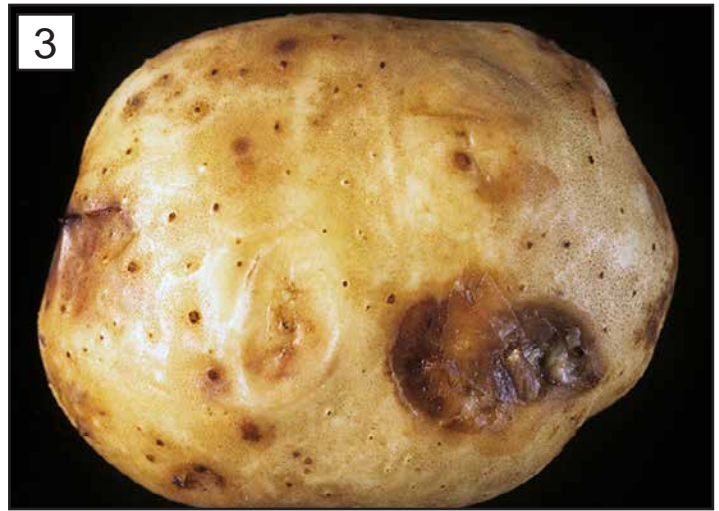
Infected seed potatoes decay in the ground causing sprouts to fail to emerge from the soil. Stems of plants that do emerge develop water-soaked lesions originating below ground and extending upward. Diseased plants become stunted and developing leaves become curled and yellow-green in color. Leaves turn a distinct yellow color as infections progress, and plants gradually die. Decaying stems turn black, the symptom that gives the disease its name (FIGURES 1 & 2). Stems tend to become slimy in wet weather, becoming hollow and dried with the onset of dry weather. When developing tubers become infected, they succumb to a slimy, soft rot (FIGURES 3 & 4).

## CAUSE & DISEASE DEVELOPMENT

Blackleg can be caused by various species of bacteria within the genera *Pectobacterium* (common in the U.S.) and *Dickeya* (more aggressive and common in Europe, but with some presence in the U.S.). These organisms were formerly within the genus *Erwinia*.

Contaminated seed tubers are the most common source of inoculum for plantings. However, once these bacteria multiply and leak into the soil, they become available to infect other plants and can be spread by infested soil, irrigation water, and insects. The bacteria overwinter in decaying plant debris. Cool wet weather initially induces disease development in tubers, while high temperatures encourage disease once plants emerge.

Infections occur when bacteria from contaminated seed tubers move into lower stems or enter tubers through wounds. Abundant moisture at the surface of the



**FIGURE 2.** BLACKLEG INFECTIONS CAUSE POTATO STEMS TO DECAY AND BLACKEN, A CHARACTERISTIC SYMPTOM OF THIS DISEASE. **FIGURE 3.** DEVELOPING POTATO TUBERS INFECTED WITH THE BACTERIAL SOFT ROT PATHOGEN DEVELOP A SOFT DECAY, EVIDENT HERE ON THE TUBER SURFACE. **FIGURE 4.** AS BACTERIAL SOFT ROT ADVANCES INTERNALLY, A SLIMY DECAY OCCURS. BACTERIAL SOFT ROT MAY DEVELOP IN THE FIELD OR IN STORAGE.

wounded tissue is needed for infection, and continued moisture or high humidity after infection causes disease spread. Decay of seed pieces in the soil by fungi and other organisms may also provide conditions for disease to develop. Harvest and storage operations can also contaminate tubers, resulting in soft rot in storage.

## DISEASE MANAGEMENT

Blackleg and soft rot are managed using a combination of cultural and chemical tools.

### Planting

- Rotate out of potatoes for 1 to 2 years; do not follow potatoes with potatoes.
- Purchase quality, certified disease-free seed pieces from a reputable dealer. Although not all seed certification programs screen specifically for blackleg, seed pieces free of other diseases may be at lower risk of developing blackleg in the planting. Do not use saved seed tubers.
- Purchase seed tubers that have been treated with a fungicide to control other seed-piece decay organisms (such as *Fusarium*) that can predispose tubers to blackleg.

- Store seed tubers at 40°F prior to planting; however, allow time for seed to become physiologically active by warming at 65°F to 70°F for 2 to 3 weeks before planting.
- Plant whole seed tubers, if possible, to reduce seed-piece decay. If cutting seed, disinfect tools with a sanitizer.
- Allow cut seed pieces time to dry, but plant within 6 hours.
- Plant in well-drained sites.
- Avoid bruising seed tubers during planting.

### Production

- Avoid injury to plants and tubers during production.
- Maintain adequate levels of calcium in the soil during production. Tubers grown in low levels of calcium are more susceptible to soft rot in the field and during storage.
- Scout fields regularly and remove and destroy infected plants, tubers, and surrounding soil. Do not compost.
- Avoid excessive irrigation and cultivation practices that allow water to stand in rows.

## Harvest & storage

- Wait until potatoes mature before harvest. When vines are completely dead, potato skins are thick and do not wound easily.
- Harvest potatoes during dry weather.
- Avoid bruising, wounding, and unnecessary exposure to the sun when potatoes are harvested.
- Discard damaged and diseased potatoes before storage.
- Wash potatoes in chlorinated water or other sanitizing solution if blackleg was identified in the field. Washing reduces the amount of decay organisms on tubers; however, potatoes need to dry completely before packing for storage.

## ADDITIONAL RESOURCES

- Home Vegetable Gardening in Kentucky (ID-128)  
<http://www.ca.uky.edu/agc/pubs/id/id128/id128.pdf>
- Southeast U.S. Vegetable Crop Handbook (SEVEW)  
<https://www.aces.edu/blog/topics/vegetable-crops/southeastern-us-vegetable-crop-handbook/>
- Vegetable Production Guide for Commercial Growers (ID-36)  
<https://www2.ca.uky.edu/agcomm/pubs/id/id36/id36.pdf>

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**Editor:** Cheryl Kaiser, Plant Pathology Extension Support

**Photos:** Sandra Menasha, Cornell Cooperative Extension, Suffolk County, New York (1); Margaret McGrath, Cornell University (2), Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org (3 & 4)

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