Black Rot of Sweetpotato

Caused by Ceratocystis fimbriata Ellis & Halst.

Introduction

Black rot is a disease of sweetpotato caused by the fungus *Ceratocystis fimbriata*. It was a significant problem in United States and Louisiana sweetpotato production before 1970. But after an integrated program of sanitation and fungicidal control was implemented, the disease was rarely seen in the southeastern U.S. However, black rot re-emerged as a problem along the East Coast around 2012, and in 2015 black rot occurred in multiple states on farms where it had not been a problem. This disease has resulted in significant losses in storage. The recent re-emergence of black rot has prompted renewed efforts to manage this disease.

Fig. 1. Two black rot lesions on an O'Henry storage root.

Biology

Black rot can develop on any part of the plant below ground and at any stage of crop production, but it is most frequently noticed on roots in storage. The early symptoms on storage roots can be difficult to differentiate from other diseases and consist of small circular spots that may at first appear brown to greenish black. These spots continue to enlarge and become dark brown to black as the disease progresses (Fig 1). The rot is relatively firm and dry and often restricted to the cortex outside the vascular ring until very late stages of infection. Eventually, white-to-gray fuzzy growth appears on the surface near the center of the lesion. Within that growth occurs the most diagnostic sign of black rot: small black fruiting bodies called perithecia, but in some cases these appear very late or not at all. The perithecia have a very long black neck that can be seen with low-power magnification sticking up from the root (Fig. 2). Spores of the fungus are exuded out the neck of the perithecia and collect in a sticky drop at the end of the neck (Fig. 3). This sticky spore mass can adhere to any surface that is contacted, thereby contaminating harvest equipment, pallet boxes, water in dump tanks, packing lines, conveyers, etc. and spreading the pathogen to any healthy roots that subsequently contact the contaminated equipment.

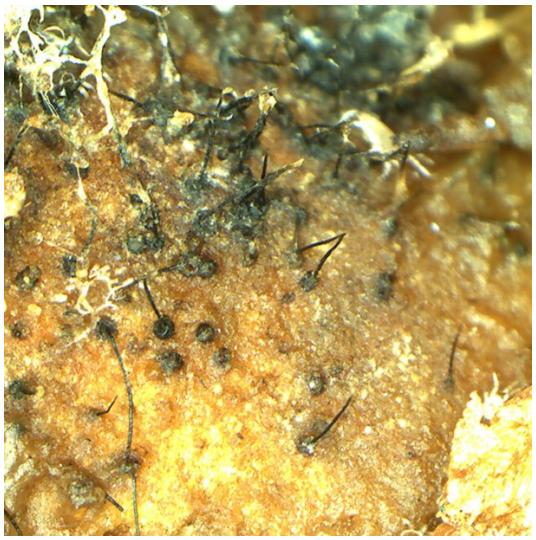

Fig. 2. Perithecia of Ceratocystis fimbriata *on the surface of a black rot lesion.*

"Seed" roots with black rot will likely produce sprouts that may rot from the point of attachment of the root upwards or may develop lesions on the stem below the soil surface (Fig. 4). Affected plants may not show aboveground symptoms in the plant bed, or if severely affected, the plants may be stunted and have yellowed leaves (see Fig. 5).

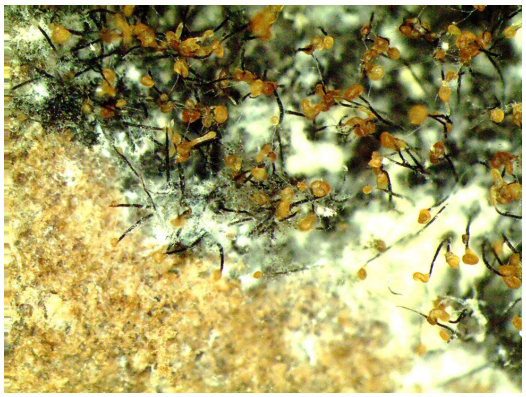

Fig. 3. Perithecia with orangish-brown, sticky drops containing masses of ascospores.

Epidemiological Concerns

Black rot can become a severe problem for several reasons:

- The pathogen produces large numbers of spores on infected roots. The incidence can increase dramatically whenever storage roots are handled
- *C. fimbriata* can spread from infected "seed" roots to sprouts and from infected sprouts to healthy plants during cutting and handling of transplants
- The pathogen can persist on surfaces of contaminated equipment and thereby contaminate any healthy sweetpotatoes that subsequently come in contact with these surfaces
- The fungus can survive in soil for up to about 30 months and can also infect morning glories growing as weeds in rotation crops.

Fig. 4. Pulled sweetpotato slips with black rot lesions on the underground portion of the stem.

Fig. 5. Yellow lower leaves on plants grown from slips with black rot.

Management Recommendations

- Do not bed or transplant sweetpotatoes into land where black rot-infected sweetpotatoes were grown during the previous three years.
- Use only "seed" roots free of black rot and other diseases.
- Cut transplants at least one inch above the surface of the soil.
- Treat seed roots and transplants with an effective fungicide such as thiabendazole (Mertect) following all directions on the label. Complete coverage of the "seed" roots is very important.
- Cure roots immediately after harvest for 5-7 days at 85°F and 90% relative humidity.
- Avoid handling sweetpotatoes with black rot to avoid contaminating equipment.
- Sanitize any equipment that has come in contact with black rot-infected sweetpotatoes by first washing the equipment, treating it with an effective sanitizing chemical, and then rinsing it with water.

Summary

Clearly the best approach to dealing with black rot is to avoid bringing it onto your farm.

Black rot can develop over a wide range of temperatures, and soil moisture. It can become much worse when infected roots are pre-sprouted at warm temperatures so it is important before pre-sprouting seed to be sure that it is free of disease. Insects and rodents can spread black rot in storage, and to the extent possible, they should be controlled.

Finally, it is important to never feed black rot-infected sweetpotatoes to animals. The black rot fungus and other secondary fungi induce the sweetpotato to produce toxins such as ipomeamarone and ipomeanols that have caused serious poisoning and death of cattle.

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