A3796

Onion disorder: Smut

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Onion smut can be a serious disease of onions, leeks, and shallots. It's caused by the fungi *Urocystis cepulae* and *U. colchici.* This disease infects plants only as seedlings, killing them early in the season or leaving them in a weakened vegetative state for the rest of the growing season. Chives and some ornamental species of *Allium* are resistant. It has not been found on garlic, wild garlic, and other *Allium* species that produce bulblets.

Symptoms and effects

The first visible symptoms of onion smut appear as brown to black, elongated blisters on cotyledons and young leaves. A single lesion may cover an entire leaf causing it to curve downward. These blisters or lesions contain the black fruiting bodies (chlamydospores) of the fungus. When a mature lesion is pressed with a fingernail, thousands of chlamydospores spill out of the lesion as a black oily to dusty mass. The fungus progresses inward from leaf to leaf at the base of the plant. Most infected seedlings die within 3–5 weeks after germination. This is an early and important feature of smut injury. Plants are usually stunted and may die slowly.

If young infected plants survive, the disease often becomes systemic. Such plants remain vegetative for the entire growing season. If bulbs form, they become covered with blackish striped lesions and are open to attack by secondary organisms.

Some infected seedlings recover from the infection when they shed their first leaves during the second month of growth. When the infected foliage has dried, or the pustules have been emptied of spores, there may be no further advance of the disease for the remainder of the season. However, the bulbs produced by these plants will still have black smut streaks from the initial infection. Smut does not cause a rot during storage, but smutted bulbs shrink more rapidly and are more subject to attack by other organisms than healthy ones.

Disease cycle

The smut fungus survives as spores in the soil for many years. Smut spores are spread locally by farm equipment, human activity, surface drainage water, and windborne soil. Smut can also be spread by infected onion sets and transplants grown in smut infested soils. Onions are susceptible to infection by the smut fungus shortly after germination and remain susceptible through the development of the first true leaf. Afterwards plants become resistant. Cold, damp weather in the spring can delay plant emergence and prolong the period of susceptibility to smut infection.

Plants that survive seedling infections often fail to form bulbs. The bulbs that do develop become covered with blackish lesions and are subject to attack by secondary organisms.

Control

To control onion smut on small farms, plant disease-free sets or transplants that have already developed their first true leaf and are no longer susceptible. The first true leaf is the one that grows straight upward. The cotyledon leaf, or flag leaf emerges in the knee stage and continues to grow at a right angle.

On large-scale farms, practice crop rotation to prevent the gradual buildup in the soil by the smut fungus.

Currently, no onion varieties are resistant to smut.

Seed treatment with specific fungicides is an effective control measure. Furrow treatment with fungicides registered specifically for this use also helps to reduce early season infection.

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