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Diagnosis and Control of Onion Diseases

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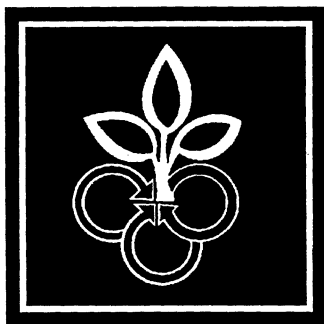
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PLANT · PATHOLOGY

PURDUE UNIVERSITY • WEST LAFAYETTE IN

Vegetable Diseases

Purdue University
Cooperative Extension Service

Diagnosis and Control of Onion Diseases

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Botrytis Leaf Blight

Introduction

Botrytis leaf blight, often termed "blast", is a foliar disease common to onion growing regions in eastern and midwestern states. The disease causes leaf spotting and tip dieback, and can adversely affect the maturity and quality of the bulbs.

Symptoms. Botrytis infection initially results in small, oval (1/4" in length), white spots on the leaves. These lesions often are surrounded by a halo of green water-soaked tissue. Leaf tissue within the spots eventually collapses and becomes tan colored. Numerous lesions on a single leaf result in dieback of the entire onion top, giving severely affected fields a "blasted" appearance.

Disease Cycle. Blast is caused by *Botrytis squamosa*, a fungus that overwinters with infected crop debris and in onion cull piles. These inoculum sources produce spores in late spring and summer that are wind-dispersed to other plants and fields. Cool summer temperatures (55°-75°F) and long periods of leaf surface wetness provide optimum environmental conditions for rapid leaf blighting. Leaves of older plants are more susceptible to blast infection than are the younger plants.

Disease Control. Destruction of cull piles and rotation out of onions for at least 2-3 years are important to help prevent the buildup of inoculum and reduce the likelihood of severe epidemics. Because these cultural practices are only partially effective, and no blast-resistant varieties are available, onion growers must rely

upon repeated application of protective fungicides for acceptable disease control. Some farmers in Michigan use a weather-based computer program to schedule fungicide applications, thereby eliminating unnecessary sprays.

Purple Blotch

Introduction

Purple blotch is a disease of onion and related crops caused by *Alternaria porri*, a fungus affecting tops and bulbs. The disease is prevalent throughout the onion growing regions of the Midwest. Yield losses attributed to *Alternaria* purple blotch are reported to approach 25%.

Symptoms. Symptoms first appear as small tan spots on leaves. The lesions become sunken and rapidly expand rapidly up and down the leaf. Individual lesions 1/4" - 3/4" in diameter frequently are surrounded by a band of purple tissue. Numerous leaf lesions contribute to collapse of the entire top. Wounds occurring at or shortly before harvest provide sites for *Alternaria* infection of onion bulbs.

Disease Cycle. The pathogen survives midwestern winters on infected crop debris. Spores are produced on the debris as warm, wet conditions occur in the spring. Wind and rain are responsible for dispersing spores to other plants and fields. Tops are more prone to infection as plants mature. Under favorable conditions, an unprotected crop can sustain a substantial amount of infection in a few weeks.

Disease Control. Crop rotation is important to prevent pathogen populations from building up to high levels. Rotations out of onions for 2-3 years are recommended. Most commercial onion crops must be protected from purple blotch by using repeated applications of protective fungicides.

Downy Mildew

Introduction

Downy mildew is a disease affecting onions and almost all related crops. The pathogen is a fungus (*Peronospora destructor*) that survives in Indiana fields. Early-season epidemics have resulted in severe yield losses.

Symptoms. Downy mildew is identified by a purple-brown mold occurring in irregular shaped patches on onion leaves. The mold represents thousands of spores produced by the fungus in wet or humid weather. Severely affected leaves collapse and die in a few days.

Disease Cycle. The downy mildew pathogen overwinters in infected crop residue and in soil as resistant spore-structures. It is also possible for the pathogen to be carried with the seed. During the growing season, the disease is spread by wind-dispersed spores which have been produced in cool-wet weather. Infection and spore production will continue throughout spring and early summer as long as favorable conditions persist.

Disease Control. Crop rotation and the use of disease-free seed are important in preventing severe, early-season epidemics. In growing regions where downy mildew is an annual threat to production, farmers rely on fungicides to reduce losses caused by mildew. Protective fungicides provide a moderate degree of control. If downy mildew is already established in a field, a systemic fungicide can be used to eradicate existing infections.

Neck Rot

Introduction

Neck rot is a common postharvest disease that is destructive to onions in transit or in storage. Damage can be severe in onions not cured or stored properly. The disease is caused by the fungus *Botrytis allii*.

Symptoms. Neck rot symptoms are marked by sunken, collapsed tissues around the neck of the onion bulb. Infected necks soon appear dried out, and a gray mold often occurs between the scales on the collapsed areas. Infection by the neck rot fungus often is followed by a watery soft-rot of the bulb.

Disease Cycle. The pathogen survives on dead onion tissue and as sclerotia (weather-resistant fungal structures) near the soil surface of fields previously planted to onions. During the spring and summer, sclerotia produce spores which are released into the air during moist weather. Successful infections occur only where spores land on cut or wounded areas of onion tissue.

Disease Control. Control of this disease is based on placing healthy, properly harvested bulbs into storage, and then maintaining a cool (32°F) dry environment in the storage facility. Field practices for prevention of neck rot include close plant spacing (12 plants per foot) and use of only moderate amounts of nitrogen fertilizer. Fungicide sprays on other diseases should be discontinued once bulbs have reached full size. At harvest, tops should be cut close to the bulb.

Onion Smut

Introduction

Onion smut is a disease common to temperate growing regions, especially where onions are grown from seed. Most onions and related crops are susceptible to smut.

Symptoms. Lesions appear as dark brown streaks running up and down the leaves. The streaks initially

appear as long blisters on the leaf surface. As the lesions mature, they turn brown and contain a mass of dark powdery spores that give the tops a sooty appearance. Diseased leaves may bend or twist abnormally and usually are shed prematurely. Smut infected plants normally are stunted and produce bulbs highly prone to soft rot.

Disease Cycle. The onion smut fungus (*Urocystis cepulac*) survives in soil as weather-resistant spores that may remain dormant indefinitely. Infection occurs in spring when spores infect young germinating seeds before the seedlings emerge from the soil. The fungus grows with the plant and causes the streaks to appear as true leaves develop and mature. Infection is not likely to occur at soil temperatures greater than 80°F.

Disease Control. Onion sets are not affected by the pathogen and therefore should be used wherever possible. In the rare event that onions are seeded to a field in the Indiana and surrounding states, an in-furrow treatment may be used to protect against smut infection.

Bacterial Soft Rot

Bacterial soft rot is a disease of stored onions. Shortly after the bacteria enter through neck tissues and/or wounds, affected tissues become pale yellow and watersoaked. Advanced cases of soft rot are associated with a watery rot and an unusually bad smell.

The bacteria enter only through wounds created by insect feeding, or bruising, during harvest or packing. Losses to bacterial soft rot may be kept to a minimum if extra care is taken during handling of the harvested crop, and storage facilities are maintained at cool, dry levels. The disease will spread in storage if moisture is allowed to develop on bulb surfaces in storage.