

2006 Florida Plant Disease Management Guide: Onion¹

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Specific Common Diseases

Botrytis Leaf Blight/Blast (*Botrytis* spp./*Botrytis squamosa*)

Symptoms: Botrytis leaf blight (BLB), sometimes called blast, is caused by the fungus *B. squamosa*. While other species of *Botrytis* have been associated with disease of leaves and bulbs of onions, *B. squamosa* is generally regarded as the cause of leaf spots in onion foliage and sometimes in the outer scales of the bulb.

Botrytis neck rot, typically a post harvest disease, is likely to be caused by *B. allii* or *B. cinerea*. *B. cinerea*, a common pathogen of many other crops, also may produce leaf symptoms slightly similar to those caused by *B. squamosa* but such infections are more superficial and generally regarded as rare.

The generic name *Botrytis* refers to the portion of the cycle of *Botrytis* spp. during which the spores (conidia) are produced asexually. In addition, *Botrytis* spp. are capable of producing sexually-derived spores (ascospores) in the portion of the life cycle called *Botryotinia*.

The sources of spores that cause BLB in onions grown in Florida have not been determined. However, nearby onion plantings, volunteers, and old onion debris in fields or cull piles are probable sources of inocula. Asexually produced conidia are likely to be the principal type of inoculum. Conidia, dispersed mainly by wind, are produced abundantly, during cool, wet conditions on blighted leaves, and onion debris.

Sclerotia are embedded in bulb or leaf tissues on onions or may exist in soil after the onion tissue has completely decomposed. They provide a mechanism for long-term survival of this fungus. Sclerotia are somewhat elongated structures of compacted masses of fungal hyphae with a black outer rind and a white to gray interior that may be as large as several conidia. Sclerotia can produce sexually derived spores called ascospores. Ascospores are produced in microscopic sacs within mushroom-like structures (apothecia) that grow on the outside of sclerotia. Although ascospores can serve as inoculum for disease, they are probably more important as sources of new genetic variants for this fungus.

Botrytis leaf blight has been seen most commonly south of Gainesville in Florida. It is

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regarded as a cool, wet-weather disease. Some infection can occur with only seven hours of leaf wetness if temperatures are near the optimum range of 59°F to 68°F. As temperatures deviate from this optimum range, longer periods of leaf wetness are required for infection. For example, temperatures at 48°F and 79°F are conducive to infection, provided that leaf wetness periods increase to 10 hours. Levels of infection should be regarded as being most severe if leaf wetness periods approach 14 hours, provided that temperatures are in the optimum range.

Symptoms of BLB include whitish flecks on onion leaves. *Botrytis cinerea* can cause similar, but more superficial symptoms. This latter fungus, common in Florida, causes diseases in many broadleaf plants but is not known to cause disease in onions in Florida. Herbicides, thrips and ozone can induce symptoms that appear somewhat similar to those of BLB in onions. However, lesions of BLB often begin as distinct watersoaked areas that persist around mature lesions. With increasing severity of BLB, onion fields appear progressively more yellow in color.

Older (outer) leaves tend to be more susceptible to BLB than younger leaves. Conidial production is greatest on blighted and dead leaves. Small lesions in green leaves may not produce conidia. Because larger, more numerous lesions occur on older leaves, BLB appears more as a blight than as distinct spots on older leaves, particularly near the leaf tips. See Plant Pathology Fact Sheet PP-124.

Chemical Controls: See PPP-6.

Damping-off (*Fusarium* spp., *Pythium* spp.)

Symptoms: The seedlings are infected at or slightly below the soil line. When this occurs the tissue shrinks rapidly at or near the point of infection causing the above-ground parts of the plant to topple over. These areas of infection usually result in more-or-less circular spots of various sizes in the field.

Cultural Controls: Consists of preventing infection by cultural and other methods and by seed and soil treatment. Cover crops, grasses, and weeds should be turned under in sufficient time for the plant

material to decay prior to planting the onion seeds. Good drainage to prevent the seedlings standing in saturated or extremely wet soil, and the encouragement of favorable growing conditions all help in prevention of damping-off. See Plant Pathology Fact Sheet No. 1.

Chemical Controls: Use seeds with a seed treatment. See PPP-6.

Downy Mildew (*Peronospora destructor*)

Symptoms: This disease has not occurred frequently in Florida. Downy mildew is favored by humid weather conditions. The first symptoms are found by examining onion leaves early in the morning while the dew is still on the plants. The somewhat violet-colored furry growth on the surface of the leaf or seed stem is characteristic of the downy mildew disease. The affected leaves gradually become pale green and later yellowish, and the diseased parts collapse.

The fuzzy growth, which is the causal fungus, becomes widespread under conditions of high humidity. The disease usually starts in areas of the field where the dew remains longest and then spreads to surrounding areas. If the weather becomes dry with short dew periods and relatively low humidity, spread of the disease will slow significantly.

Infected plants often send out new leaves and partially recover. Downy mildew lesions on seed stems are circular and elongated and often affect only one side of the leaf. This weakening of one side of the leaf frequently causes it to break over.

Chemical Controls: See PPP-6.

Purple Blotch (*Alternaria porri*)

Symptoms: Bulbing onions, green onions, and leeks have been infected frequently in Florida, but other types are also susceptible. As disease severity increases, leaf size, bulb size, and bulb weight decrease drastically. Purple blotch (PB) occurs throughout the state and yield losses due to PB have been measured at more than 50 percent in Florida.

Symptoms induced by the fungus causing PB are of two types. Initially, flecks similar to those induced by the BLB fungus may occur in leaves. Later oval to football-shaped lesions appear, sometimes accompanied by linear yellow to brown streaks that progress from the main lesion. Individual lesions may be two or more inches long, light brown throughout or have a dark brown to purple central area surrounded by a light brown area. Lesions may contain alternating, concentric zones of dark and lighter tissue. The concentration of asexually produced spores (conidia) is greatest in the darker portions of the lesions. With increasing severity of PB, leaves become generally yellow to brown and lose erectness.

Conidial inoculum for initiating an epidemic can originate in nearby planting, volunteers, old, infected onion debris, and possibly other debris in the field. These spores are dispersed primarily by wind. Upon landing on a leaf, a spore germinates and then penetrates the leaf when the next leaf wetness period occurs. From such infections, new lesions may form in seven days or less.

Temperatures below 55°F are not conducive for infection by the fungus causing PB, but temperatures above 55°F contribute to the development of this disease. Long periods of leaf wetness and relative humidities above 90 percent generate higher probabilities for infection and disease occurrence. Leaf wetness periods of nine to eleven hours are adequate to promote spore production and infection. As periods of leaf wetness become longer, conditions for development of PB are improved. Emerging leaves become increasingly more susceptible to PB as the bulbs approach maturity. See Plant Pathology Fact Sheet PP-124.

Cultural Controls: Control of PB includes rotating crops with non-susceptible crops, accelerating decomposition of old onion debris in the field, destroying volunteers, and using healthy transplants.

Chemical Controls: Spraying with approved fungicides is often necessary. A sequence of spray treatments, delivered at five-to-seven day intervals, should be initiated when symptoms of PB first appear and leaf wetness periods exceed 11 hours. Spray

intervals can be lengthened during extended dry periods, when leaf wetness lasts for less than nine hours. Thoroughly covering onion leaves with the spray is essential to achieve control. With proper use of nozzle arrangements and spreader-stick adjuvants, excellent control of PB and Botrytis Blight can be achieved. See PPP-6.