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Arkansas Plant Health Clinic Newsletter

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Onion

Black Mold

Black Mold, caused by *Aspergillus niger*, is a common problem on onions during transit or storage. Symptoms are a balck discoloration on the neck, shallow black lesions on the outer scales, and streaks of black underneath the outer scales. In extreme cases, the entire surface of the bulb turns black and shrivels. Infection usually starts in the neck, the fungus gaining entry through wounds as the tops break over or are cut at maturity. Infection may also occur through infected onion seed. Occasionally, there are no outward symptoms, but when a bulb is sliced in two, a black or gray discoloration is seen in the center areas of the bulb, usually extending from the neck to the center. Opportunistic bacteria will sometimes follow Black Mold infections causing a soft rot. Careful handling of bulbs to avoid bruising when harvesting, transporting, or storing, greatly reduces infection. Existing Black mold will not spread if onions are stored at 34°F to 59°F.

Onion Black Mold-*Aspergillus niger*

Photo by Sherrie Smith University of Arkansas Cooperative Extension

Onion Black Mold-*Aspergillus niger*

Photo by Sherrie Smith University of Arkansas Cooperative Extension

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Onion Black Mold-*Aspergillus niger*

Photo by Sherrie Smith University of Arkansas Cooperative Extension

Smudge

Smudge of onion is a fungal disease caused by *Colletotrichum circinans*. Smudge is more commonly found on white onions, but no varieties are immune. Symptoms are black circular lesions with concentric rings on the dried wrapper scales of the onions. The fruiting structures of the fungus have stiff bristles (setae) that may be seen with a hand lens. Smudge may induce premature sprouting of the onion in storage, as well as negatively impacting marketability due to the unsightly dark lesions. Control involves a multi-pronged approach. Crop rotations with at least 3 years between onion crops is recommended. Good field drainage, clean seeds and transplants, proper drying and storage reduce Smudge. Onions should be stored at 32°F with less than 70% relative humidity. Boscalid+pyraclostrobin (Pristine), Chlorothalonil (Bravo Ultrex, Bravo Weatherstik), and Pyraclostrobin (Cabrio) are labeled for use on onion. Homeowners may use a garden fungicide containing chlorothalonil.

Onion Smudge- *Colletotrichum circinans*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

White Tip

Members of the onion family, including onions, garlic, chives and leeks are all susceptible to White Tip, caused by Phytophthora porri when environmental conditions are favorable for disease development This pathogen is soil-borne and spreads through water-splash or leaf contact with soil. Disease typically occurs after

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bouts of prolonged cool, wet weather. Symptoms are yellowing of the leaf tips followed by white water-soaked lesions. Leaves become distorted, shrivel, and eventually dieback. Often the base or whole bulb becomes soft, and water soaked. Infection is prevented by a 3-year crop rotation with non-host plants, avoiding sprinkler irrigation, and planting in well-drained sites that are not prone to waterlogging. Some control can be achieved through application of azoxystrobin, trifloxystrobin, metalaxyl-M, or dimethomorph based fungicides, although wet soil conditions reduce efficacy.

Onion White Tip-*Phytophthora porri*

Photo by Raven Bough, formerly University of Arkansas Cooperative Extension

White Rot

Typically, onions are set out in February and March in Arkansas. Although easy to grow in most locations, on ground with a history of White Rot losses may reach 100%. All members of the Allium family are susceptible to White Rot, caused by *Sclerotium cepivorum*, including chives, shallots, leeks, onion, and garlic. Crop losses can be severe in fields with a history of the disease. Infected plants are usually stunted with yellowed foliage. White fluffy mycelial growth on the stem plate extends around the base of the bulb, moving up the bulb and inward through the storage leaves, causing a soft rot. Small, black, poppy seed-sized sclerotia form in the dying tissues. The sclerotia can remain dormant in the soil for up to 15 years until the roots of host plants begin to grow nearby. Sclerotia then germinate, and the mycelia typically grow up to several inches through the soil to attack the roots and bulb of the plant. However, sclerotia have been known to cause bulb decay when located as deep as 12 inches below the bulbs. Sclerotia can be spread throughout a planting area by flood water, equipment, or on plant material. This is a very difficult disease to control. Fungicides provide only marginal control when inoculum levels are high, and conditions are conducive for disease development. Rovral 75WG and Folicur 3.6F are labeled for use in commercial fields. Wider spacing between plants can slow the spread of White rot. Homeowners with small plots may consider replacing the soil altogether. Soil solarization may have some benefits. The area to be solarized should be raked clean, thoroughly wetted, and clear

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plastic placed over the area. The plastic should be left in place for 4-6 weeks. Warm season flooding of the soil has been found to greatly reduce the number of sclerotia as this is a cool season pathogen. Boots and tools should be cleaned to prevent accidently moving the pathogen to new areas. Gardeners who grow onions in infected soils have less infection generally by planting seed instead of onion sets. This is because the seedlings have a smaller root mass, thus fewer chemical signals, at the time temperatures are optimal for disease development.

Onion White Rot-*Sclerotium cepivorum*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Onion White Rot- *Sclerotium cepivorum*

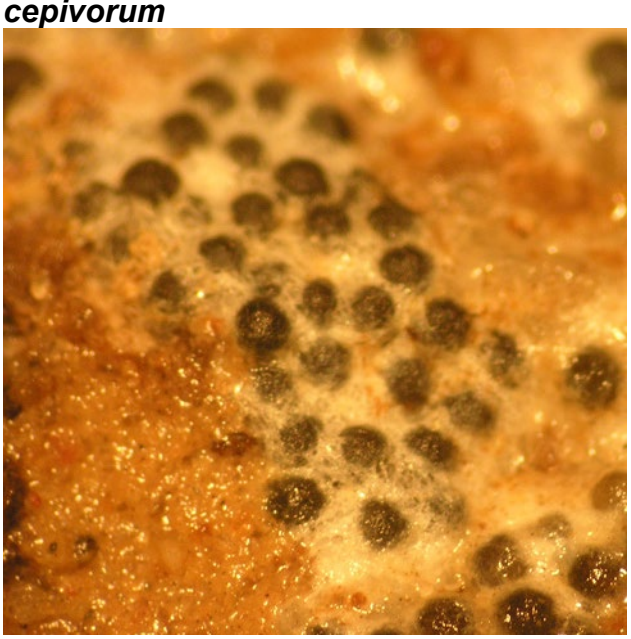

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

Downy Mildew

Onion crops are in the ground in many parts of the state. Downy mildew, caused by *Peronospora destructor*, affects all Allium crops: onions; garlic; chives; and shallots. This disease can be very destructive during periods of cool, humid weather. Initial symptoms are elongated, slightly paler patches on the leaves. The patches turn light brown to tan with a grayish-violet fuzzy growth during wet weather. The diseased section of the leaf eventually turns yellow/brown, collapsing and folding over. Seed stem lesions are circular or elongate, often only on one side of the stem. This causes the stem to break over from the weight of the seed head, resulting in the withering of the

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seeds. Systemically infected plants produce bulbs that are soft and shriveled, with the outer fleshy scale becoming amber colored, wrinkled and watery. Other infected bulbs remain firm but sprout prematurely. The foliage of such bulbs is an abnormal light green color. Downy mildew overwinters on volunteer onion plants and persists on stored bulbs and seeds. Spores are blown or splashed up onto new plants in the spring. For infection to occur, relative humidity must be greater than 95%. New spores are produced at night. Typically, the infection cycle is characterized by latent periods of 9-16 days and 1-2 days of sporulation. Foliage in the field may be destroyed during/after 4 infection cycles. Cultural controls are critical in controlling Downy mildew. All crop debris, volunteer plants, and unthrifty bulbs should be removed and destroyed. A strict crop rotation schedule should be followed, with 3-4 years between Allium crops. Good drainage in the field is essential. It is recommended that rows face the same direction as prevailing winds to help avoid prolonged leaf wetness. For the same reason, overhead irrigation must be avoided. Fungicides such as Pristine, or Cabrio, or Revus are available to commercial growers. Fungicide applications must be frequent as new foliage is constantly being produced. Homeowners must depend on practicing good sanitation and crop rotation.

Onion Downy Mildew-*Peronospora destructor*

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

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Onion Downy mildew-*Peronospora destructor*

Photo by Howard F. Schwartz, Colorado State University, Bugwood.org

Purple Blotch
by Jason Pavel

Purple Blotch of onion, caused by the fungus *Alternaria porri,* can be severe during prolonged wet, warm conditions. Onions, garlic, leeks, and other related Allium species are susceptible. All parts of the plant may be affected. Symptoms start on older leaves as elongate, small, shrunken whitish spots with a purple center. As the lesions age, concentric light and dark zones develop over the purple area. The lesions or blotches may enlarge to over 4 inches long. Badly affected leaves wilt and die. Bulbs are infected when spores enter neck wounds, usually at harvest. Lesions on bulbs are dark yellow to wine-red spongy areas that rot the outer or inner onion scales. The fungus is spread through the field by splashing water and wind and overwinters on plant debris. Cultural controls begin with using clean seed and transplants. At least a three-year crop rotation to non-host such as small grains and corn should be followed. Cull piles, onion debris, and volunteers should be eliminated from the field. Avoid excessive amounts of nitrogen and dense plantings of late maturing varieties. Wait to harvest until necks bend over naturally. Cabrio 20EG, Pristine, Scala SC, Inspire Super, Quadris Top, and Fontelis are labeled for onion. Homeowners may use Ortho Garden Disease Control, or Bonide Fung-onil, or Hi-Yield Vegetable and Flower Fungicide, or Garden Tech Daconil Concentrate.

Onion Purple Blotch-*Alternaria porri*

Photo by Scott Harford

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Onion Purple Blotch-*Alternaria porri*

Photo by Sherrie Smith University of Arkansas Cooperative Extension

Onion Purple Blotch spores-*Alternaria porri*

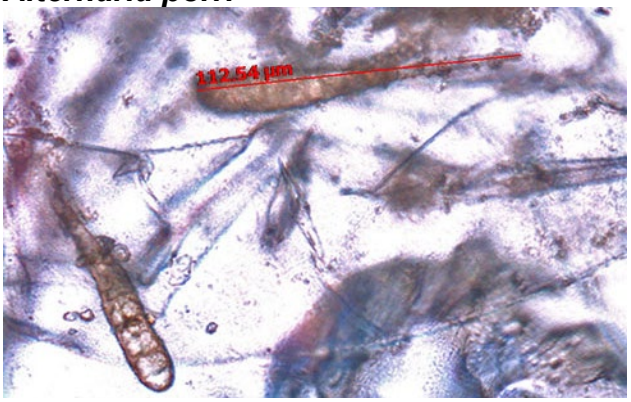

Photo by Sherrie Smith University of Arkansas Cooperative Extension

Bulb Mites

Bulb Mites in the genera *Rhyzoglyphus* and *Tyrophogus* have a wide host range, feeding on onions, garlic, ornamental alliums, amaryllis, crocus, freesia, gladiolus, hyacinth, iris, lily, narcissus, and tulip, preferring those bulbs with loose fleshy scales. They also feed on a number of vegetable crops. Bulb Mites are shiny, creamy white, mites that range in size from 0.02 to 0.04 inches (0.5 to 1 mm) long and look like tiny pearls with legs. They usually occur in clusters in damaged areas under the root plate of onion bulbs or garlic cloves. They can infest bulbs in storage or in the field. They are most damaging when plant growth is slowed by cold, wet weather, and they are most active when the humidity is high and the temperature is between 60° and 80°F, becoming inactive at temperatures below 50°F and above 90°. When conditions are favorable for reproduction, numbers can rise rapidly. Bulb mite eggs are white, minute and lay singly on

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the bulbs. They hatch in 2 to 7 days. A female may lay 50 to 100 eggs at the rate of six to eight per day. The entire life cycle may be completed in 2 to 4 weeks. Their feeding activity penetrates the outer layer of bulb tissue and allows fungal and bacterial pathogens to enter the clove. Seriously infested cloves often will not sprout and rot in the field. Stand may be reduced, and plants stunted. Control is mainly cultural. Rotate out of garlic and onions for at least 4 years. Garlic and onions should be planted only in fields where crop residues are completely decomposed, as they will persist on crop residues. Cole crops especially may harbor large bulb mite populations. They are particularly fond of cauliflower. Flood irrigation in the winter may lower mite populations. Hot water seed treatment may reduce mite infestation but can reduce germination. Put seed in water heated to 130°F 10-20 minutes, or 140°F for 10-15 minutes. Predator mites of the genus Stratiolaelaps may be useful in controlling bulb mites.

Garlic/Onion Bulb Mites - *Rhyzoglyphus* sp.

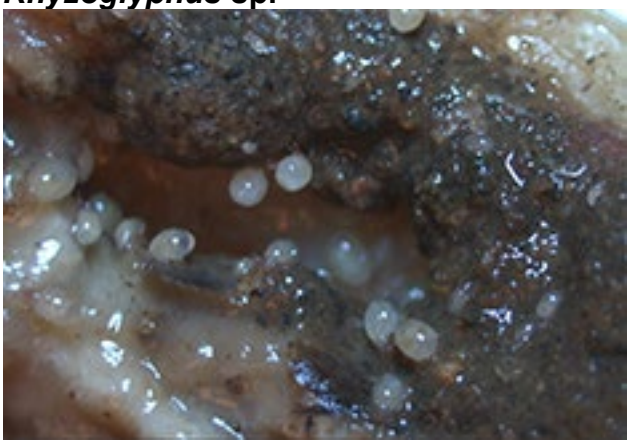

Photo by Sherrie Smith, University of Arkansas Cooperative Extension

This bulletin from the Cooperative Extension Plant Health Clinic (Plant Disease Clinic) is an electronic update about diseases and other problems observed in our lab each month. Input from everybody interested in plants is welcome and appreciated.

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