Oats are a versatile field crop in Alabama in that they can be grazed as a forage or harvested for grain. Oats have a high feed value, they are useful in crop rotations, and they are marketable to the breakfast food industry.

Oats are susceptible to a large number of diseases that may damage or totally destroy individual fields. Oat diseases can cause severe economic losses because of their effects on yield and quality of grain and forage. The purpose of this publication is to discuss the symptoms and control of oat diseases commonly found in Alabama.

**Fungal Diseases**

**Crown Rust**

Crown rust (*Puccinia coronata*) of oats corresponds to the leaf rust of wheat, barley, and rye and is often called oat leaf rust. Crown rust is one of the most destructive of all oat diseases. Crown rust infection results in reduced yields, lower test weights, and increased lodging.

**Symptoms.** Crown rust appears as small, scattered, oval, orange-yellow pustules or masses of spores on the leaves. Most of the pustules are found on the leaf blades, but some occur on leaf sheaths, stems, and chaff. The spores turn black as the plant matures.

**Disease Cycle.** The crown rust fungus life cycle is complex, involving several spore stages with buckthorn bushes serving as the alternate host. Warm, moist weather favors rapid development and spread of the crown rust fungus, and moisture from dew or rain is likely to be held longer in dense stands of oats.

**Control.** Crown rust is controlled by use of resistant varieties, eradication of the alternate host, or planting early maturing varieties that generally suffer less rust damage than later maturing varieties. Information on the reaction of oats recommended for growth in Alabama to crown rust is contained in Circular ANR-458, “Integrated Pest Management (IPM) For Small Grains,” and the “Small Grain Variety Report,” published annually by the Alabama Agricultural Experiment Station (AAES).

**Stem Rust**

Oat stem rust (*Puccinia graminis f. sp. avenae*) is caused by a form of the stem rust fungus that infects oats but no other small grains. However, the fungus is able to attack wild oats, orchard grass, and meadow fescue. Stem rust is recognized by the elongated, ragged, brick-red pustules or spore masses it produces on stems, leaf sheaths, blades, chaff, beard, and young kernels. Stem rust is controlled by eradication of the common barberry, which serves as an alternate host, and planting of resistant and early maturing varieties.
Stem rust on oat leaves, caused by *Puccinia graminis* f. sp. *avenae.*

**Helminthosporium Leaf Spot**

Helminthosporium leaf spot (*Drechslera avenae*) is a common disease of oats in Alabama. This fungus attacks leaves and kernels. Because of the destruction of leaf tissue, photosynthesis is reduced in diseased plants, resulting in light or shriveled grain; direct attack of kernels by the fungus also results in light or shriveled kernels.

**Symptoms.** Oblong to elongate, reddish-brown spots appear on seedling leaves soon after emergence. Spots on stems may be long and narrow or broad and irregular in shape. The outer edges of the spots often are poorly defined, brown color merging gradually into yellow or reddish shades, which frequently spread over the greater part of an infected leaf blade. Oat heads may also become infected. The fungus enters the hulls surrounding the kernels and may even penetrate the kernels slightly. Diseased kernels turn brown at the basal stem.

**Disease Cycle.** Helminthosporium leaf spot fungus survives as spores or mycelium on crop debris and as spores on the seed, or as mycelium beneath the seed coat. When infected kernels germinate, the fungus renews growth or the spores on the seed germinate and infect the seedling leaves. Spores produced on these spots are dispersed by various means to other leaves of the same plant, as well as to other plants, and they produce new spots.

**Control.** Crop rotation should help in reducing the amount of inoculum and lessen losses from this disease. Resistance to Helminthosporium leaf spot is rare, but some varieties are less susceptible than others. Information on the reaction of adapted oat varieties to Helminthosporium leaf spot is contained in the AAES “Small Grain Variety Report.” Fungicide treatments on seed can also help but will not give complete control.

**Septoria Leaf Blotch**

Septoria leaf blotch of oats (*Septoria avenae*), also known as speckled blotch and Septoria black stem, can occur on any above-ground part of the oat plant. The causal fungus survives in crop debris and on infected seed. Loss from this disease can be high.

**Symptoms.** Leaf symptoms are typically chocolate brown to tan colored lesions surrounded by flesh to yellow colored halos of necrotic tissue that blends into green leaf tissue. The spots often coalesce to form irregular blotches. Small black fruiting bodies (pycnidia) may be scattered over lesions. Leaf sheaths as culms can also be infected. Culm lesions develop into the black stem phase. The damage done by Septoria on susceptible varieties results largely from shriveled kernels and lodging.
Septoria leaf blotch on oat leaves and culms, caused by *Septoria avenae*.

**Disease Cycle.** Septoria is carried over from one season to the next as mycelium and pycnidia on diseased straw or stubble and on seed. Leaf infections are favored by cool, wet weather. Microconidia (spores) that are produced in the early spring cause the initial leaf lesions. Spores from these lesions are washed by rain or dew down the leaf blades, giving rise to sheath and stem infections.

**Control.** Crop rotation and plowing under old stubble should help reduce this disease. Seed treatment with triadimenol can provide some early season control, which may lessen disease the following spring. Oat varieties show some differences in their reaction to Septoria blight. This information is contained in the AAES "Small Grain Variety Report" and in Extension Circular ANR-458, "IPM For Small Grains."

**Powdery Mildew**

Powdery mildew (*Erysiphe graminis avenae*), although it is considered to be a major disease of wheat and barley, is rarely seen on oats. The fungus is an external parasite appearing as patches of white fluffy mycelium on the lower leaves and leaf sheaths. As the disease progresses, the patches become powdery and turn gray or brown. If control measures are needed, use resistant varieties.

Powdery mildew on oat leaves caused by *Erysiphe graminis avenae*.

**Loose Smut**

Loose smut (*Ustilago avenae*) rarely causes serious problems. The use of resistant varieties and fungicide seed dressings tends to keep this disease in check. However, loose smut has the potential to cause significant yield losses if control measures are not followed.

**Symptoms.** Oat heads infected with the loose smut fungus are brownish black in color as compared to the normal green color of healthy heads. Infected spikelets become masses of black spores surrounded by a delicate, white membrane. This membrane soon ruptures, releasing the spores. Usually all heads on an infected plant are smutted. It is difficult to distinguish healthy from diseased plants before heading out. Diseased plants are often overlooked at harvest because they are shorter than healthy plants and by this time they have lost their mass of spores.
Loose smut on oat heads, caused by *Ustilago avenae*.

**Disease Cycle.** The spores of the loose smut fungus are spread mainly by wind. When spores land on a healthy head some germinate immediately, growing into the hulls or into the seed coats, while other spores that do not germinate immediately remain on the seed. When infected seed germinate, the fungus is activated and starts growing within the plant, keeping pace with the growing plant, and by heading time it has replaced the oat spikelets with masses of black spores. Infection takes place between flowering and the time the grain is ready for harvest. Humid weather and cool to moderate temperatures (60° to 72°F) favor infection.

**Control.** Loose smut can be controlled by seed treatments with systemic fungicides such as carboxin or triadimenol. Contact fungicides such as captan and thiram are ineffective against loose smut. Fungicide seed dressings and rates labeled for loose smut control of oats are found in Circulars ANR-458, “IPM For Small Grains,” and ANR-500, “Alabama Pesticide Handbook.” Do not use seed from fields that had smut as seed sources. The use of certified, disease-free seed and disease resistant varieties will also help prevent losses to loose smut.

### Scab

The scab disease that affects oats is identical with the one that affects wheat, barley, and rye; oats are the least susceptible. The scab fungi (*Fusarium* species) attacks the seedlings as they emerge from the soil and the heads as the plant matures. Grain infected by scab fungi may produce substances (mycotoxins) that are toxic to humans and non-ruminant animals.

**Symptoms.** The hulls of infected spikelets are gray and may be covered by pink mycelium; in severe cases they may be shriveled and rough in appearance. The hulls do not turn brown. Seedlings from infected seed are stunted, and many of them turn yellow and die. Roots of scab-infected seedlings are apt to be rotted and to be reddish-brown in color. Purplish-black fruiting bodies of the fungi can be seen on infected joints.

**Disease Cycle.** The scab fungi survive on host residues, grass, cornstalks, grain sorghum, and small grains. Spores from these sources are carried by air currents to oat heads. The fungus infects the seedhead at flowering. Warm humid weather favors disease development.

**Control.** Crop rotations with at least a 1-year break from cereal and grass cultivation are advised. Plowing to bury crop residues is also desirable, since the fungal pathogens survive best on surface debris. Fungicide seed treatments can reduce carryover of scab fungi on seed. Recommended fungicide seed treatments are listed in Circulars ANR-458, “IPM For Small Grains,” and ANR-500, “Alabama Pesticide Handbook.”

### Anthracnose

Anthracnose of oats (*Colletotrichum graminicola*) is caused by the same fungus that causes anthracnose on wheat, rye, barley, and other grasses. The fungus attacks the leaves, leaf sheaths, joints, and heads as well as the roots, crowns, and basal stem tissues.

**Symptoms.** On oat leaves, anthracnose lesions are elongate, often lens-shaped, and reddish-brown in color. After leaf tissue dies, the fungus produces black fruiting bodies in the spots. Infected basal and crown tissue initially is bleached in appearance, but later turns brown and becomes speckled with black fruiting bodies.

**Disease Cycle.** Spores of the anthracnose fungus are spread by wind and rain to healthy plants. The fungus overwinters as spores or as mycelium on seed, straw, and stubble of small grains and wild grasses.

**Control.** Control measures include crop rotations, plowing under crop debris, and maintaining proper soil fertility.
Seed And Seedling Diseases

Several fungi such as *Bipolaris sorokiniana*, *Fusarium*, and *Pythium* spp. are able to cause seed and seedling diseases in oats, thereby affecting yields by reducing seed emergence and thinning stands.

**Symptoms.** Yellowing of leaves followed by stunting are typical symptoms of seedling disease. Diseased plants may gradually turn green as the season progresses, but they may never fully recover. On roots, water-soaked translucent areas, which later turn reddish brown in color, are evident. Fungi such as *Pythium* may attack the seed before it germinates or kill the young seedling before it emerges from the soil. Diseased plants usually occur in patches or in linear streaks in the field.

**Disease Cycle.** These fungi survive in soil on crop debris or on seed. Their spores are spread by wind, water, or on the seed. Initial infections often occur when the seeds are germinating in soil a few days after planting. *Pythium* spores require wet soil for germination, from which special structures (germ tubes) are produced that are capable of infecting root tissue. A well-drained and prepared seedbed should enhance stand establishment of oats and lessen losses from root and seedling diseases.

**Control.** Seedling diseases can be controlled by maintaining nitrogen and overall fertility levels according to soil test recommendations and by delaying planting seed until the middle of November when soil temperatures favor rapid seed germination and seedling growth. Please consult Circular ANR-497, “Planting Small Grains,” for recommended production practices for oats. Fungicide seed treatments are also useful in protecting seed from seed and soil-borne fungi. Information on fungicide seed treatments is contained in Circulars ANR-458, “IPM For Small Grains,” and ANR-500, “Alabama Pesticide Handbook.”

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**Bacterial Diseases**

**Halo Blight**

Halo blight (*Pseudomonas coronafaciens*) is one of the most common bacterial diseases of oats. While typically a leaf disease, halo blight can also occur on the leaf sheaths and chaff. Although there have been occasional outbreaks of halo blight, average losses from this disease are small.

**Symptoms.** Halo blight symptoms first appear as small, pale green, oval spots with slightly sunken centers. As the tissue in the center of a spot dies, the color changes to gray or brown. The clear or light yellow tissue around the dead center resembles a halo and gives the disease its name. A halo may be extensive and run as streaks down the entire length of a leaf. On chaff, symptoms appear as small spots surrounded by a light green to yellowish-green halo; on glumes, the tissue between the veins turns yellow and becomes translucent.

**Disease Cycle.** The halo blight bacterium survives on oat seed, crop debris, and in soil. The disease is favored by cool, wet weather. Wind and rain spread the bacteria from plant to plant as well as to different parts of the same plant. Insects may play an important role in spreading halo blight bacteria.

**Control.** Halo blight is not normally a serious disease of oats. If control measures are needed, crop rotation, plowing under crop debris, and using certified seed should lessen disease.
Bacterial Stripe Blight

Bacterial stripe (*Pseudomonas syringae* pv. *striafaciens*) is widely distributed in oats but rarely causes serious problems. Symptoms appear as small, water-soaked lesions on leaves. These lesions may coalesce into stripes or blotches, which may extend the length of the leaf blade. These stripes often have narrow, yellowish margins. As the stripes age they turn a translucent rusty brown. The bacterium is seedborne and can survive in infected crop stubble for up to 2 years. During periods of cool wet weather, the bacteria are blown or splashed onto leaves. Warm dry weather prevents further spread. If control measures are needed, crop rotation, plowing under crop debris, and using certified seed should lessen disease.

Virus Diseases

Soilborne Oat Mosaic

Soilborne oat mosaic is a serious viral disease of oats. The distribution and prevalence of this disease on oats in Alabama is not known. Soilborne oat mosaic is caused by a virus that has at least two strains. Yields can be reduced up to 50 percent in some susceptible varieties.

**Symptoms.** Light green to yellow dashes and streaks paralleling the axis of the leaf and sometimes a necrotic mottling are typical symptoms of soilborne oat mosaic. Some strains of the virus may cause lesions that are spindle-shaped with light green to ash-gray borders and green centers.

Disease Cycle. Oat soilborne mosaic is caused by a virus that is believed to be vectored by the soil fungus *Polymyxa graminis*. Circumstantial evidence suggests that the virus is transmitted to the plant when the fungus vector invades the roots.

Control. The most effective control of oat soilborne mosaic is use of resistant varieties. Information on the susceptibility of oat varieties recommended for growth in Alabama is not available. This disease may be reduced by delaying planting until late fall or early winter or by crop rotation.

Barley Yellow Dwarf

Barley yellow dwarf, also known as red leaf, is a virus disease that can cause serious damage to oats, wheat, barley, and many grasses.

**Symptoms.** Leaves of oat plants infected with barley yellow dwarf turn red to purple in color and tend to twist or curl inward. The green tissue of diseased plants may be a darker green than that of healthy plants. Plants infected early may be severely dwarfed and premature death may result.

Disease Cycle. The barley yellow dwarf virus is spread by aphids. Aphids acquire the virus by feeding on infected plants. From 1 to 4 days later the aphids are able to transmit the virus to healthy plants. The virus survives between small grain crops in a variety of annual and perennial grasses.

Control. No oat varieties that are highly resistant to barley yellow dwarf are known. Check the AAES “Small Grain Variety Report” for listing of the disease reaction of oat varieties recommended in your area to barley yellow dwarf. Delaying planting until late fall or early winter to avoid high aphid activity may lessen the disease.
Young oat plants infected with barley yellow dwarf virus.

Use pesticides only according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended only if they are registered with the Environmental Protection Agency or the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide, check with your county Extension agent for the latest information.

Trade names are used only to give specific information. The Alabama Cooperative Extension Service does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

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