

Diseases of Barley, Rye, and Triticale in Alabama

Barley, rye, and triticale are cereal crops grown in Alabama either as a winter grain or as winter grazing. This publication summarizes the major diseases and control measures of these crops that are commonly found in the state.

Root And Crown Diseases

Take-All Root Rot

Take-all root rot, caused by the fungus *Gaeumannomyces graminis* var. *tritici*, is one of the most serious root rotting diseases of barley, wheat, rye, and triticale. The fungus survives in crop stubble.

Infections can occur anytime during a growing season. Early infection causes the most damage, because both roots and culms are affected. Infections when the plant is approaching maturity are usually confined to root tissue and cause only minor damage. Root infection is favored by cool, moist soil conditions.

Symptoms. The most obvious symptom of take-all root rot is the development of white heads during the grain filling period. Infection usually attacks patches of plants that become stunted. Roots of affected plants are dark brown to black because of fungal invasion. As the plant matures, its roots become rotten and brittle until the plant can be easily pulled from the soil.

Control. Barley, triticale, and rye are all susceptible to take-all root rot. In order of susceptibility, wheat is

most susceptible, followed by barley, oats, triticale, and rye, which is least susceptible. Crop rotation is the best control for take-all root rot. Care must be taken to eliminate all grass species from the rotation, because the fungus can survive on a variety of grass species. Other control measures include the use of nitrogen fertilizer in the ammoniacal form, particularly in areas where the soil pH is acidic, to lessen the disease. Nitrogen in the nitrate form may increase the severity of the disease.

Common Root Rot And Seedling Blight

Common root rot is caused by one or more fungi. Depending on the location, fungal pathogens associated with diseases of root and crown tissue include *Cochliobolus sativus*, *Fusarium culmorum*, and *F. graminearum*. In Alabama, *C. sativus* is frequently isolated from small grains. It survives as thick walled conidia in the soil.

Symptoms. Developing seedlings may be killed, or they may be stunted, with brownish roots and coleoptiles. Older plants have small, oval, and brown lesions on roots, the lower leaf sheath, or the subcrown internode.

Control. Using clean, certified seed can reduce seedling infections. Fungicide seed treatments can also aid in controlling seedborne infections. A fungicide with a broad spectrum of activity appears to work best. Ask your county Extension office for information on seed treat-

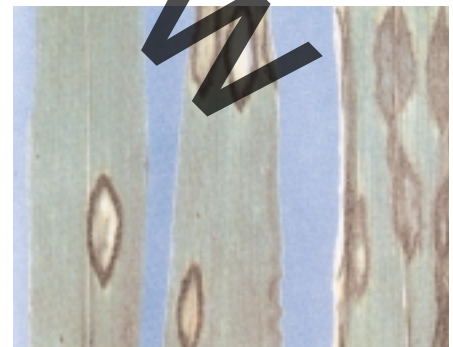
ment fungicides and "IPM For Small Grains." Maintain proper soil fertility levels to promote vigorous root growth.

Foliar Diseases

Scald

Scald is caused by the fungus *Rhynchosporium secalis*; it is a disease of both barley and rye. Yield loss occurs primarily through reduced kernel weight. In severe infections, both the number of kernels per head and the number of heads per plant may be reduced. The pathogen is carried from season to season on infected plant debris and through infected seed. The disease spreads within a crop by rain that splashes spores from the lesions on infected plants onto leaves of uninfected plants.

Symptoms. Scald is easily recognized by the pale gray or bluish-gray lesions on leaves. As the infection advances, the centers of lesions dry out and bleach, becoming light gray, tan, or white with dark brown edges.



Scald on barley (courtesy T. Khan).

Control. Scald is controlled by rotation with nonhost crops such as a forage legume or plowing under infected residue. No cultivar with a high degree of resistance has been found.

Net Blotch

Net blotch is caused by the fungus *Drechslera teres*. It can cause disease in barley, rye, and triticale. The net blotch fungus is carried from season to season on infected crop residue and seed.



Net blotch on barley (courtesy T. Khan).

Symptoms. Net blotch symptoms appear as a distinctive dark brown reticulate (netting) pattern that develops in the otherwise light brown lesion.

Control. Resistant varieties offer the best means of control. Use of pathogen-free seed or seeds treated with a fungicide can prevent the introduction of the pathogen into clean fields.

Spot Blotch

Spot blotch, caused by *Cochliobolus sativus*, is a common foliar disease of small grains in Alabama. It is favored by warm, humid weather. Yield losses can be as high as 36 percent.

Symptoms. Spots develop on leaves and leaf sheaths at all stages of plant development. Lesions are round to oblong, with a definite margin varying in size. The spots may continue to enlarge and coalesce to form blotches that cover large areas of the leaf. Older lesions are olive-colored because of sporulation of the fungus.

Control. Spot blotch is best controlled by resistant varieties. The use of pathogen-free seed or a fungicide seed treatment can reduce seedborne or soilborne inoculum.

Powdery Mildew

Powdery mildew is caused by the fungus *Erysiphe graminis*. The pathogen attacks barley, rye, and triticale. The fungus survives as cleistothecia (black fungal fruiting bodies) in plant debris. With fall rains, spores are released from cleistothecia, and they infect nearby plants. Spores produced on these plants may be carried by winds a long distance and infect other plants.



Powdery mildew on barley (courtesy T. Khan).

Symptoms. Symptoms appear as pure white, fluffy growth on the surface of the leaf. This growth enlarges rapidly and individual colonies coalesce, producing so many spores that the leaf appears powdery. Infection leads to premature yellowing and later death of the leaf.

Control. The use of resistant varieties is the best method of disease control. The fungicide seed treatment Baytan can offer early season protection for 8 to 10 weeks after planting.

See Circular ANR-458, "IPM for Small Grains," for a listing of labeled seed treatment fungicides.

Leaf Rust

Leaf rust is a common disease on many cereal crops. The disease is caused by the *Puccinia fungus*—*Puccinia hordei* on barley, *Puccinia reconita* on triticale and rye. Leaf rust is favored by moist weather and temperatures ranging from 55° to 75°F.



Leaf rust on barley (courtesy T. Khan).

Symptoms. Leaf rust symptoms appear as small, round, light orange-brown pustules on the leaf blade and leaf sheath. They may also occur on heads of very susceptible cultivars in the advanced stages of an epidemic. Brown, oblong pustules appear later in the season.

Control. Resistant varieties are the most practical control measure. Foliar fungicide—labeled only for barley and rye—can be effective against leaf rust. But, because of the limited acreage of these crops, fungicide use would be expensive.

Septoria Leaf And Glume Blotch

The septoria leaf and glume blotch disease complex is a common disease of rye, barley, and triticale. Septoria leaf blotch on barley is caused by the fungus *Septoria avenae* f. sp. *triticea*, and on rye and triticale by *S. tritici*. Glume blotch of rye, barley, and triticale is caused by *S. nodorum*. Septoria diseases are favored by warm, wet weather. Spores produced during wet weather are spread by splashing rain, and they initiate infections throughout the year.



Septoria blotch on triticale.



Septoria on glumes of triticale.

Symptoms. The symptoms of septoria leaf blotch are lesions on leaves and leaf sheaths that are grayish green and turn light tan with age. Lesions vary in size. Eventually, the lesions merge and may cover the whole area of the leaf. The leaf margins often pinch and roll and be-

come dry. Pycnidia (fungal fruiting bodies) appear as small, black specks within the lesions. The symptoms of glume blotch start out as brown or grayish spots on the leaf blade and leaf sheath. Later in the season oval or lens-shaped, red-brown spots develop along the leaf blade and sheath and affect the entire leaf. Spots may develop on the glumes and awns after heading. If seed is infected, pycnidia may develop on the seed surface.

Control. Control measures include use of pathogen-free seed; use of seed protectant fungicide; and destruction of infected host residue through deep plowing, or crop rotation, preferably with a nongrass crop. There are no known cultivars resistant to the septoria disease complex. Some varieties may differ in susceptibility. See the *Alabama Performance Comparison of Small Grain Varieties* (Alabama Agricultural Experiment Station) for the disease reactions of small grain varieties in your area.

Loose Smut

Smut diseases are caused by fungi that live as parasites on the host plant and produce soot-like spores in grains or ears. Smut fungi may be borne either on the inside or outside of the seed. On barley and rye, loose smut is caused by the fungus *Ustilago tritici*. Triticale is thought to be resistant to loose smut.



Loose smut on barley (courtesy T. Khan).

Symptoms. Infected seed appear normal. However, when it germinates, the fungus becomes active and grows slowly in the growing point of the plant. Diseased plants appear normal until heading but may be taller and mature earlier than surrounding healthy plants. The fungus then grows rapidly and forms a compact spore mass to replace the cereal head. The black powdery spores blow away to leave a bare stalk. The spores are released as the rest of the crop is flowering, and they infect the developing grains of healthy heads, remaining dormant in the grain until that seed is sown the next season.

Control. Loose smut is controlled by treating seed with a systemic fungicide that penetrates the developing seedling to kill the internal infection. For information on fungicide seed treatments, see "IPM For Small Grains" for appropriate seed treatment fungicides.

Virus Diseases

Barley Yellow Dwarf

Barley Yellow Dwarf Virus (BYDV) can infect barley, wheat, oats, triticale, and rye as well as several grasses. It is transmitted by aphid species that have fed on infected plants. The occurrence of BYDV therefore depends on conditions favorable for aphid build-up and movement, such as cool, moist weather that favors grass and cereal growth as well as aphid multiplication and migration.

Symptoms. BYDV normally infects scattered single plants in a crop or causes small, circular patches of stunted plants. The disease begins as yellowing, which starts at the tip of the leaf and progresses down. Infection of young plants may cause stunting, reduced grain formation, and grain filling. Late infection may not cause stunting but it may still reduce yield.



Barley yellow dwarf on barley (courtesy T. Khan).

Control. There are no known BYDV-resistant cultivars. Controlling the aphids in the field with insecticides can reduce the incidence of barley yellow dwarf and increase yields. However, the economics of this practice must be carefully

weighed, because BYDV may be spread by insects that escape treatment or that emigrate from untreated areas. BYDV is best controlled by late-fall planting so that the small grain seedling avoids periods of high aphid activity.

Wheat Soilborne Mosaic

Wheat soilborne mosaic was first reported on wheat in Alabama around 1988. Wheat soilborne mosaic attacks wheat, rye, and barley. The virus is transmitted by the soilborne fungus *Polymyxa graminis*. The disease is most often found in low-lying, wet areas of fields.

Symptoms. Symptoms of wheat soilborne mosaic range from mild green to prominent yellow leaf mosaics. Stunting as well as rosetting may occur to some extent with some strains. Warming spring temperatures slow and eventually stop disease development, thus confining symptoms to lower leaves.

Control. Losses to barley seem to be minor. There is no information on resistance of barley and rye to this disease.

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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.

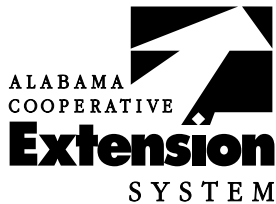
The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency and the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide,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

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

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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