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Oat Diseases

Michigan State University

Cooperative Extension Service

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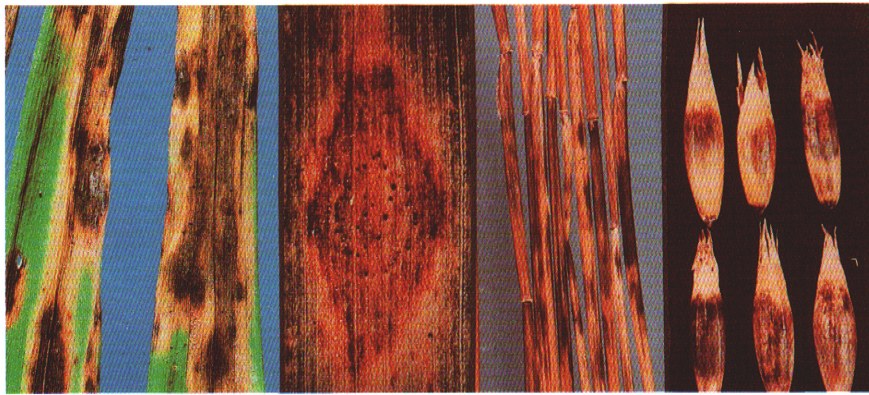
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2 pages

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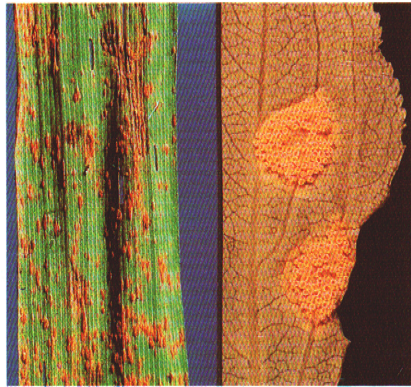
OAT DISEASES



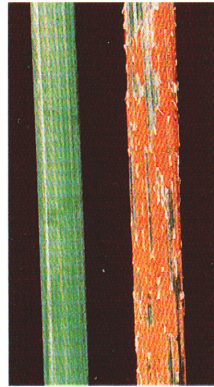
1. Septoria blight. L, leaf blotch with close up of lesion with pycnidia; C, culm lesions; R, kernel blight



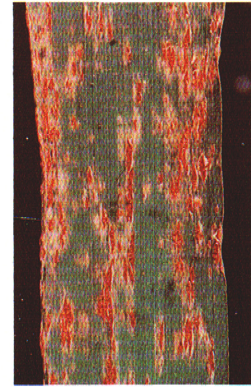
2. Smut



3. Crown rust. L, uredial stage; R, aecial stage on *Rhynchospora* leaf



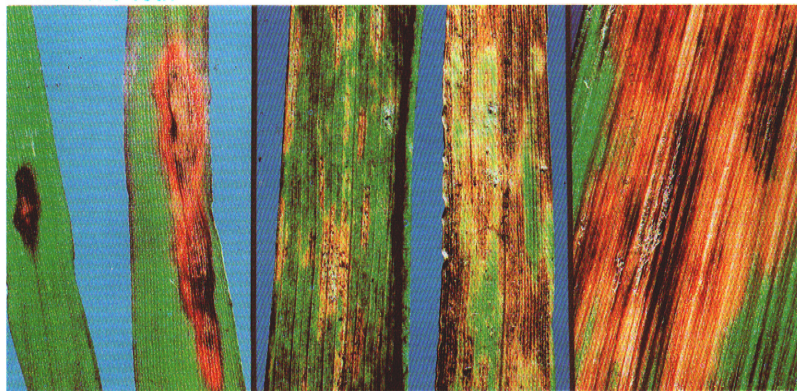
4. Stem rust on culms



5. Stem rust on leaf



6. Bacterial stripe and halo blights. L, leaf and R, plant symptoms



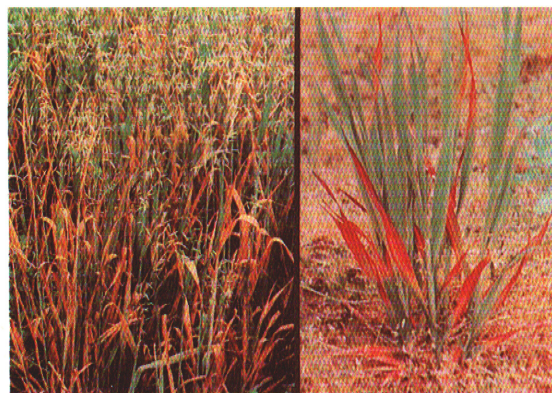
7. Helminthosporium leaf blotch



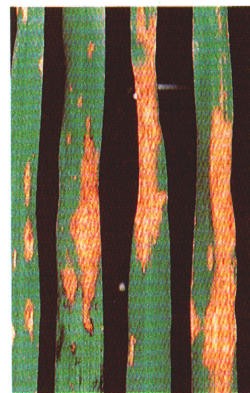
8. Downy mildew or crazy top



9. Anthracnose on culms



10. Yellow dwarf



11. Physiologic leaf spot



12. Gray speck



13. Pythium seedling blight

OAT DISEASES

1. **Septoria Blight** or disease (also called Septoria black stem, leaf blotch, speckled blotch, and speckled leaf blotch) is caused by the fungus *Septoria avenae* f. sp. *avenae* (perfect stage, *Leptosphaeria avenaria*). Round to elongate or diamond-shaped, yellow to light or dark brown blotches, with a dull brown margin, form first on the lower leaves then spread upward. Speck-sized black pycnidia later form in the centers of older blotches as infected leaf tissue dies. Grayish-brown to shiny black lesions develop mostly on the upper parts of stems beneath infected leaf sheaths. Diseased plants commonly lodge near maturity. Yellow to dark brown lesions occur on the outer glumes. Dark brown or black lesions may extend to the lemma and palea and eventually the groat of the kernel. The *Septoria* fungus overwinters in crop debris.

2. **Smut**. Two smuts commonly infect oats: covered smut, caused by fungus *Ustilago kollerii*; and loose smut, caused by the closely related fungus *Ustilago avenae*. Dark brown to black, powdery masses of smut spores replace the grain and often the awns and glumes. The spores of covered smut are contained within a whitish-gray membrane which is somewhat more persistent than that of loose smut. All spikelets and panicles become infected; smutted panicles do not spread as much as healthy ones. Infected plants are shorter than healthy ones and are easily overlooked at harvest since the mass of spores is quickly scattered by wind and rain leaving a denuded panicle which is hard to see. Both smut fungi are seed-borne and constitute the only source of inoculum. Plants are susceptible to infection only in the seedling stage.

3. **Crown Rust**, caused by the fungus *Puccinia coronata*, is a long-cycled rust that has species of buckthorn (*Rhamnus*) as an alternate host. Uredial pustules are round-to-oblong and appear bright orange-yellow on oat leaves, sheaths, stems and panicles. The uredia burst open to release orange masses of urediospores which infect other oat plants. If severe, infected stems may lodge. As the oat plant matures, grayish-black telia form in a ring around old uredia or may develop independently. The telia remain covered indefinitely by the epidermis. In the spring, teliospores germinate to form basidiospores that infect nearby buckthorn leaves to form bright orange-to-yellow pycnia. Opposite the pycnial spots, usually on the lower leaf surface, aecia later appear as raised, orange cluster cups that produce golden-yellow aeciospores that infect nearby oat plants, completing the disease cycle. The fungus overwinters as teliospores in oat debris in the north and in the uredial stage on oats in the southern USA and Mexico. The urediospores are blown northward as the season progresses.

4 & 5. **Stem Rust**, caused by the fungus *Puccinia graminis* f. sp. *avenae*, is a long-cycled rust (like Crown Rust 3 above) that has the common barberry (*Berberis vulgaris*) as the alternate host. Uredia and telia occur on oat stems, leaves, sheaths, and panicles. Uredial pustules are large, oblong, dark reddish-brown, and soon release masses of rust-colored urediospores that infect other oat plants. The black, usually oblong telia form in and around the uredia, especially on the stems and sheaths of maturing plants. The dark teliospores are exposed by rupturing of the epidermis. In the spring, teliospores germinate to form basidiospores that infect nearby common barberry leaves. Pycnia appear as bright orange-to-yellow spots in early spring. Later, on the opposite side of the leaf, the aecia develop as raised, orange cluster cups. These cups produce golden-yellow aeciospores that infect nearby oat plants, completing the disease cycle. The fungus overwinters as teliospores in oat debris in the north and in the uredial stage on oats in the southern USA and Mexico. The urediospores are blown northward as the season progresses.

6. **Bacterial Stripe and Halo Blights** commonly occur together on oat leaves following cool, wet and windy weather. Bacterial stripe, caused by the bacterium *Pseudomonas striafaciens*, first appears as sunken, water-soaked dots which later enlarge into water-soaked blotches or stripes, that become a translucent rusty-brown. Halo blight, caused by *Pseudomonas coronafaciens*, first appears as small, pale,

green, oval-to-oblong, water-soaked spots on the leaves, that later turn yellow to light brown. Severely infected leaves turn brown and die back. The bacteria causing both diseases overwinter on seed and in crop debris.

7. **Helminthosporium Leaf Blotch** is caused by the fungus *Helminthosporium avenae* (perfect stage, *Pyrenophora avenae*). Oblong-to-elongate, light reddish-brown spots develop on seedling leaves. On older leaves the lesions start as small brown flecks that develop into elongated blotches or stripes. The outer edges of the lesions are yellow or reddish. Sometimes infected leaves are withered without forming well-defined lesions. Infected kernels turn brown at the basal end. The fungus is seed-borne and also overwinters on oat residue.

8. **Downy Mildew** usually occurs only in wet areas of a field. It is caused by the fungus *Sclerospora (Sclerophthora) macrospora*. Infected plants are stiff, upright, stunted to dwarfed, and tiller excessively. The upper leaves may be curled about the panicles which are often curled, twisted and deformed into a cluster of tangled spikelets (crazy top) that resembles 2,4-D injury and produces no viable seed. The fungus is seed-borne and can survive from year to year as oospores in host residue and in soil.

9. **Anthraxnose**, caused by the fungus *Colletotrichum graminicola*, produces reddish-brown, lens-shaped lesions on the leaves. Infected crowns and stems become bleached then brown. Diseased tissue becomes covered with minute dark acervuli which appear as "pin cushions" under magnification. Panicles on diseased plants produce light-weight shriveled grain. The fungus overwinters as mycelium or spores on crop residue.

10. **Yellow Dwarf** or red leaf is caused by the barley yellow dwarf virus. Yellowish-green spots and blotches form in the leaves. The lesions soon enlarge, merge, and turn various shades of yellow-red, orange, red, or reddish-brown. Eventually, entire leaves turn dull orange or red; usually from the tip backward and from the margins inward. Early-infected plants may be severely dwarfed and die early or produce heads with numerous blasted spikelets. The virus overseasons in perennial grasses and is transmitted by a dozen species of aphids after feeding on diseased plants.

11. **Physiologic Leaf Spot**, in some cases at least, is associated with an inability of oat leaves to recover from water-soaking due to high humidity. The condition is accentuated by rapid drying along with an abrupt change from a cool-moist to a warm-dry environment. The symptoms vary on different oat varieties. Typically, the leaf spots are round to elongate or irregular in shape and from ash-gray to a straw color. Distinct concentric areas of different shades of color may be present. Most commercially-grown oat varieties have good resistance to this disorder.

12. **Gray Speck** is caused by a deficiency of available manganese in the soil. It is a problem in alkaline-organic and other low-manganese soils that have a high pH. Light-green to gray-brown spots and streaks form in the leaves. If severe, yields are reduced and the entire plant may become yellow and stunted. Control is by application of manganese salts to the soil or by spraying the plants with a weak solution of manganese sulfate. Certain oat varieties are much more tolerant of manganese deficiency than are others.

13. **Pythium Seedling Blight** is caused by several species of the *Pythium* fungus. Seeds or seedlings are often killed before emergence. Seedlings that do emerge are stunted and yellowed with water-soaked translucent areas in the roots that later turn a reddish-brown. Some infected plants recover but usually are never as vigorous as healthy plants. The causal fungi overseasons in infected crop residue or soil.

For chemical and cultural control suggestions, a list of resistant varieties and other control measures, consult the Extension Plant Pathologist at your land-grant university or your county extension office.

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