



Extension FactSheet

Plant Pathology, 2021 Coffey Road, Columbus, OH 43210-1087

Cephalosporium Stripe of Wheat

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Cephalosporium stripe of wheat was first reported in North America in 1955. However, it had been reported as early as 1930 in Japan. It has been found in all midwest and northwest states, because these regions have wet and cool fall weather plus freezing and thawing during the winter. In Ohio, the disease is found more often in fields with clay soils, in particular, those soils that tend to be more acid and low in organic matter.

The disease can be especially severe when wheat is grown under limited rotations, such as continuous relay cropping of wheat and soybeans, or when wheat is preceded by a susceptible cereal crop like winter barley, rye, triticale, or spelt. Several grasses are also susceptible, but wheat is the major economic host. The incidence of infected plants may be as high as 80 percent, and yields may be reduced by 50 percent or more. Yield loss results from premature death of tillers, reduced seed set and reduced seed size.

Stripe is caused by the soil borne fungus *Cephalosporium gramineum*. This fungus is the only true vascular wilt pathogen of wheat. It invades the vascular system and interferes with the transport of water and nutrients between roots and leaves.

Symptoms

Diseased plants may be more prevalent in wetter, lower areas of the field, or in areas with higher clay content. Frequently, affected plants appear randomly distributed. Usually, plants in low wet spots are more severely infected, making the disease more evident in these areas.

Two phases of this disease may be found in heavily diseased fields. Under high fungal populations, a seedling blight phase may be recognized. In late winter or early spring, leaves of infected plants may show a mild mosaic-like yellowing. These young plants wilt and die without developing typical stripe symptoms. Frequently, plant stand is erratic and surviving plants are stunted. More characteristic leaf symptoms occur during jointing and heading of the wheat plant. Typical symptoms on leaves include chlorotic interveinal stripes which extend the length of the leaf blade, bordered by brown, necrotic stripes. The veins within these brown striped areas are darkened. These

symptoms are most obvious on the younger, upper leaves since the lower leaves may have died prematurely. A diagnostic feature of the disease is the presence of darkened veins extending from the lower stem (culm) along the leaf sheath and into the blade. Usually one or two stripes (rarely three) with discolored veins are present per leaf. It should be noted that not all tillers of the diseased plant develop stripe symptoms. After seed maturation, near harvest, the disease is very difficult to identify. Darkened vascular bundles and nodes are the only visible symptoms on mature plants. Plants thus affected will be stunted, have white heads, and ripen prematurely.

The Fungus

The fungus causing Cephalosporium stripe has two names and two spore stages. *Cephalosporium gramineum* is the most common name used because the morphology of the spore producing structures (conidiophores) in culture fit the morphological description of "Cephalosporium." However, in mid to late fall, on diseased straw in the field, the conidiophores are grouped into definite fruiting structures called sporodochia.

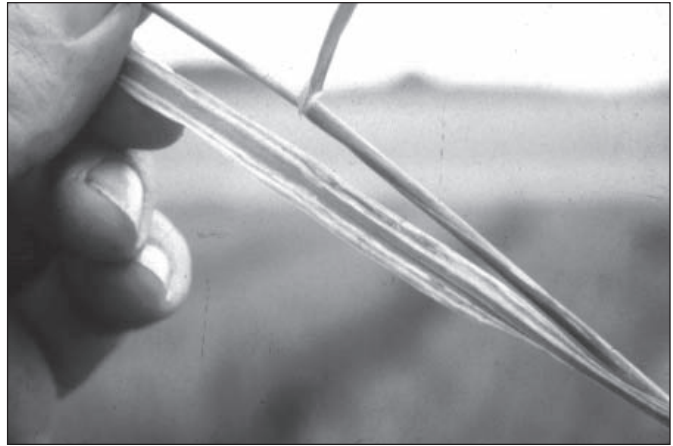


Figure 1. Characteristic symptoms of Cephalosporium stripe include broad yellow and brown stripes extending the length of the leaf blade which stand out in contrast to green areas of the leaf.

This saprophytic stage, known as *Hymenula cerealis*, can be found at the base of old straw as raised, yellow-brown structures 1/25 inch in diameter, covered with glistening mounds of slime-bound spores.

Disease Cycle

Stripe is favored by wet soil, freezing injury to roots and repeated cropping to small grains. Excessive soil and surface water from October through December favors the disease. Soils with high moisture retaining capacities are most likely to harbor the soil-borne fungus. In cool wet soil, the fungus sporulates profusely. The surface water carries the spores to the roots of the susceptible wheat plant. The fungus enters the roots by way of injuries. Root injuries caused by heaving during freezing and thawing of wet soil, or those caused by root feeding insects are most favorable for ingress of the fungus. Once inside wheat roots conidia germinate, produce conidiophores which in turn produce a new crop of conidia that are carried up into the vascular system. The conidia lodge and germinate at nodes and in leaves. The effects of the disease are brought about by the fungus blocking the vascular system, thus preventing normal movement of water and nutrients.

The fungus survives between susceptible cereal crops in infested residues. Tillage and harvest operations return the wheat debris and the fungus to the soil. The fungus survives on or within 3 inches of the soil surface. Soil pH in the range of 4.0 to 6.0 prolongs fungal survival and may increase incidence of the disease.

Control

1. Little is known about the resistance of wheat varieties to Cephalosporium stripe. All varieties recommended for Ohio are thought to be susceptible.
2. Crop rotation is essential for control of stripe. Normally a two to three years rotation away from wheat will prevent build up of the fungus in the soil. In fields with yield limiting levels of the disease, the field should not be planted to wheat, or any other winter cereal crop for 3 to 4 years. Crop rotations with corn or legumes are recommended.
3. Proper management of crop residues is also important. If the infested straw and stubble of the wheat crop are destroyed, the fungus dies. Infested residues should be plowed down deeply as soon as possible after harvest, since this enhances decomposition of wheat debris. Straw baled from diseased fields should not be spread with manure on fields to be planted to wheat, as the fungus survives in the wheat straw that remains on or near the soil surface.
4. Weed control is important because the fungus also infects other grasses. Elimination of these weed species may help decrease inoculum levels.
5. Late planting of winter wheat, mid to late October, may reduce the incidence of the disease. Late planting limits fall root growth, thus minimizing sites for injury and infection. Very late planting, however, should be avoided because of loss of stand due to winter kill. Delayed planting should only be used when trying to avoid the disease in a field known to have Cephalosporium stripe.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Keith L. Smith, Director, Ohio State University Extension.

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