Black Chaff of Wheat
Xanthomonas translucens pv. *translucens* and *Xanthomonas translucens* pv. *undulosa*

Host: Wheat (*Triticum* spp.)

Disease common names: Black chaff, bacterial streak, or bacterial leaf streak of wheat. Black chaff of other cereals and grasses is called black chaff, bacterial stripe, or bacterial blight.

Pathogens: *Xanthomonas translucens* pv. *undulosa* causes black chaff of wheat. The related pathovar *Xanthomonas translucens* pv. *translucens* also infects wheat (*Triticum* spp.), rye (*Secale cereale*), and triticale, a hybrid (*Triticum* × *Secale*); *Xanthomonas translucens* pv. *undulosa* infects only wheat (*Triticum* spp.).

Other pathovars of *Xanthomonas translucens* and their hosts: *Xanthomonas translucens* pv. *arrhenatheri*) infects false oatgrass (*Arrhenatherum elatius*), *Xanthomonas translucens* pv. *cerealis* infects wheatgrass (*Agropyron* spp.; *Elytrigia* spp.) and brome grass (*Bromus* spp.). *Xanthomonas translucens* pv. *graminis* infects ryegrass (*Lolium multiflorum*), orchard grass (*Dactylis glomerata*), and fescue (*Festuca* spp.). *Xanthomonas translucens* pv. *hordei* infects barley (*Hordeum vulgare*). *Xanthomonas translucens* pv. *phlei* infects timothy grass (*Phleum pratense*). *Xanthomonas translucens* pv. *phleipratensis* also infects timothy grass. *Xanthomonas translucens* pv. *poae* infects rough bluegrass (*Poa trivialis*). *Xanthomonas translucens* pv. *secalis* infects rye (*Secale cereale*).

Disease Cycle

Inoculum: Seed, host plants, and plant residues are sources of inoculum.

Transmission: The bacterium spreads by wind-driven and splashing rain, plant contact, and insects, such as aphids. The disease has a very low transmission rate; low levels of seed contamination do not result in field disease. Seed lots with fewer than 1,000 colony-forming units per gram do not cause field epidemics.

Infection: The bacterium invades through stomata and wounds.

Symptoms and signs: Early symptoms are characterized by translucent stripes that are easily seen under incident light. Initially, lesions are water-soaked (Fig. 1) and produce honeylike exudates under humid conditions. Leaf lesions may start at the apex and extend downward. This pattern is not typically observed in subtropical field conditions. Typical symptoms on leaves consist of elongated, light brown lesions, several centimeters long, that are initially distinct but later coalesce to form large, brownish streaks (Fig. 2). The upper portions of glumes are discolored but all parts may become dark (Fig. 3). Discolored awns darken with time. During wet weather, the bacterium invades stems, kernels, and leaves.

Survival: The pathogen survives on weeds and grasses because of its broad host range. It survives poorly in soil unless crop debris is present. Free-living bacteria cannot survive more than 14 days in air-dried soil and no more than 57 days when infected leaves are mixed into moistened soil. The bacterium does not survive well in tropical soils because plant stubble decays rapidly in warm, humid climates.

Disease Management

Clean seed and resistant cultivars should be used. If possible, overhead irrigation should be avoided.

References

Bradbury, J. F. 1986. Guide to Plant Pathogenic Bacteria. CAB International, Slough, U.K.

Wiese, M. V. 1987. Compendium of Wheat Diseases, 2nd ed. American Phytopathological Society, St. Paul, MN.

Figure 1. Early stage infection of wheat leaf with water-soaked lesions. (Courtesy S. Thomson)

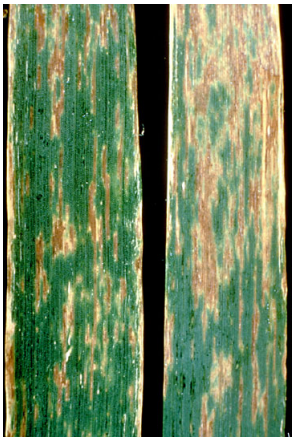

Figure 2. Late stage infection of wheat leaves with interveinal brown streaks and blotches. (Courtesy APS)

Figure 3. Wheat glume with brownish black streaks and blotches. (Courtesy APS)