Grain Sorghum Foliar and Stalk Diseases

- Many types of fungi, and some bacteria and viruses, can cause foliar and stalk diseases of grain sorghum.
- Diseases can be difficult to control after they develop, and the most economical and effective disease control procedures are preventative.
- Plant high-quality disease tolerant or resistant seed if available, utilize crop rotation along with good agronomic practices, and use fungicides when appropriate for the management of diseases.

Foliar Diseases

Foliar diseases in sorghum caused by fungi include leaf blights, leaf spots, anthracnose, sooty stripe, and rusts. Leaf blights can also be caused by bacteria. These diseases are most likely to occur under moist environments and extended periods of high humidity. In most years, disease development occurs from the whorl through maturity growth stages. Since foliar diseases generally appear at later growth stages, they are rarely a problem if sorghum is to be harvested for silage. Yield loss can occur if there is damage to the upper leaves of plants when the grain is filling.

Management:

- Planting disease tolerant or resistant products can be the most effective strategy.
- Crop rotation or plowing of infested crop residue if not rotating to a non-susceptible crop.
- Control of weeds that may serve as a source of inoculum, such as johnsongrass and other grassy weed species.
- Foliar applications of fungicides.

Sorghum downy mildew, caused by the fungus *Peronosclerospora sorghi*, can be a problem in many southern states, especially in coastal regions. Streaks may develop on leaves of infected plants, and a cotton-like fungal growth becomes visible on the underside of infected leaves (Figure 1). Control is through the use of resistant products, and rotation with wheat, soybean, or a forage crop.

Crazy top, a mildew caused by the fungus *Scleropithora macrospora*, causes young sorghum plant leaves to become mottled, resembling a viral infection. As the sorghum plant grows and the disease progresses, leaves become twisted and the plant develops malformations. Infected plants will not produce grain. Development of the disease is favored by high soil moisture levels and flooding. The best control option is to provide adequate field drainage.

Gray leaf spot, caused by the fungus *Cercospora sorghi*, usually does not occur until later in the growing season (Figure 2). The disease favors cool, humid weather and overcast days. Although all grain sorghum varieties are susceptible to the disease, some will tolerate the disease better than others.

Zonate leaf spot, caused by the soilborne fungus *Gloeocercospora sorghi*, can occur in warm and high rainfall conditions. The fungus is dispersed by rain and water splashing spores from the soil onto lower plant leaves. Symptoms of the disease are very large circular lesions with alternating straw-colored and purple rings. The disease usually does not cause economic damage, and dissipates with dry weather conditions. Control of the disease is primarily through residue management by crop rotation, and control of susceptible weed hosts, such as johnsongrass and other grassy weeds. Some grain sorghum products also have tolerance to the disease.

Leaf blights can also be caused by bacteria. Bacterial stripe, caused by *Pseudomonas andropogoni*, is the most common bacterial disease of sorghum, characterized by long narrow stripes that can vary from red to black. Stripe can be most prevalent from mid-season on, especially during warm and humid weather. Bacterial streak, caused by *Xanthomonas holicola*, appears as watersoaked tissue between veins that later turns brown with red margins. Bacterial spot, caused by *Pseudomonas syringae*, appears as watersoaked spot lesions on leaves. Bacterial blights are generally not serious, and can be managed by using clean seed, crop rotation, burying infested crop residue, and good weed control measures.
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Maize dwarf mosaic virus (MDMV) is a viral disease that can infect sorghum (Figure 3). The disease can form a mosaic of fine, yellow-green and dark green streaks that are most apparent on the younger leaves in the whorl. JOHNsongrass and other grass species serve as the source of the virus. Aphids feeding on infected plants act as vectors transmitting the virus to sorghum. The ability of MDMV to cause damage to sorghum is dependent on the presence of an overwintering virus host (mainly johnsongrass), aphid populations, and the susceptibility of the product. Affected plants can become stunted and suffer significant yield losses. Using tolerant products and controlling johnsongrass in and around the field are the best practices to manage the disease.

Stalk Diseases

Charcoal rot, caused by the fungus *Macrophomina phaseolina*, can cause stalk rot in grain sorghum. The disease is generally worse when sorghum plants have been under drought stress, which can weaken the plant’s defenses against the disease. Therefore, charcoal rot can be a major sorghum disease when grown in arid regions and in dryland production. The disease can be a problem anytime grain sorghum is stressed after bloom and into the fill period. The disease can be especially damaging when warm, moist growing conditions are followed by hot, dry conditions during grain fill. Plants are infected at the soil line as the grain begins to mature. Soft pith tissue quickly disintegrates, leaving only the string-like vascular bundles. Extremely small black fungal bodies, resembling charcoal dust, cover the vascular bundles resulting in the pith appearing shredded and dark gray. Affected areas of the stalk can become very weak, causing the plant to lodge. Under optimal conditions for the disease, severe damage in a field can occur in a few days. If water stress conditions are alleviated, such as by irrigation, the disease process can be reduced or stopped entirely.

Fusarium stalk rot, like charcoal rot, generally develops on mature to nearly mature plants that have been subjected to some form of stress. Infection, resulting from the fungus *Fusarium moniliforme*, occurs at the base of the plant, producing discoloration in the stalk. However, the black fungal bodies are not present in the pith as they are with charcoal rot.

Management of charcoal rot and fusarium stalk rot are similar:

- Plant sorghum products with good stalk strength and drought tolerance.
- Maintain good soil fertility, avoiding high levels of nitrogen and low levels of potassium.
- Avoid high plant populations, especially under dryland production.
- If practical, irrigate during dry periods after heading to help reduce drought stress.
- Where practical, rotate with cotton or another non-susceptible crop for at least two years before planting a susceptible crop (grain sorghum, corn, soybean).

**Anthracnose**, caused by *Colletotrichum graminicola*, can be a disease problem, especially in the eastern, southeastern, and southwestern grain sorghum producing areas. The disease can be a serious problem where sorghum has been grown continuously. Anthracnose can attack both foliage and stalks. Disease symptoms usually become visible about the time of boot formation, with lesions appearing on lower leaves. Stalk infection will develop from spores produced on leaves, and will spread throughout a field by splashing rain and wind. Wet and humid weather encourages rapid development of the disease. Stalk rot of infected plants can be identified by the appearance of red to purple tissue on the stalk surface and in the pith just below the seed head (Figure 4). Because the destruction of stalk tissue can limit movement of nutrients to the developing grain, anthracnose infection can be an important factor in final determination of grain yield. The disease develops rapidly after flowering as the grain matures. Sorghum products can be selected having resistance to anthracnose leaf and stalk infection. Fungicides can also be applied to grain sorghum foliage for protection against the disease.

Sources:

* Websites verified 4/13/15.

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology, Development, & Agronomy by Monsanto.

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