Sorghum Downy Mildew

KEY POINTS

- Most often occurs in the Upper Gulf Coast of Texas, but has been found in other sorghum growing regions.
- Outbreaks of sorghum downy mildew (SDM) in Texas have been associated with metalaxyl-resistant strains of the fungus and the use of susceptible grain sorghum products.¹
- Managing this disease and maximizing yield potential requires a three-pronged approach of crop rotation, grain sorghum product selection, and seed treatments.

Life Cycle and Symptomology

Sorghum downy mildew (SDM) is caused by the fungus *Peronosclerospora sorghi* and survives in soil and plant debris. Systemically infected seedlings are pale yellow or have light-colored striping or mottling on the leaves. Infected plants can be stunted and may die prematurely. The fungus may produce a fuzzy, white growth on the underside of leaves (Figure 1). In general, systemically infected plants do not produce grain. As infected plants continue to grow, new leaves emerge that have white parallel stripes of varying width, alternating with green tissue.¹ The white-striped areas eventually turn brown and disintegrate, which results in a shredded appearance that may look like hail injury. Oospores are produced in the diseased tissue; these are the fungal structures responsible for overwintering.

The fuzzy white growth is evidence of the production of sporangia. Sporangia are spores produced during cool, wet or humid weather. These spores are blown or splashed onto leaves of nearby plants and cause localized lesions. These lesions are brown and slightly rectangular-shaped (Figure 2). This phase of SDM infection does not produce oosporoes and is not responsible for loss of yield potential.²

Plants infected systemically with SDM may be scattered in the field or found in clumps (Figure 3). Generally, yield loss does not occur until 20 to 30% or more of the plants in a field are infected.³ Below this point some yield compensation occurs in non-infected plants due to the thinning of the overall plant population. There can be greater yield loss from areas of the field where numerous infected plants are found together.

Figure 1. Systemically infected plant with striped leaves and downy growth on underside of leaves.

Figure 2. Localized lesions caused by SDM.

Figure 3. Systematically infected plant with downy mildew.
Management

Outbreaks of SDM have often been linked to sorghum monoculture. Planting in monoculture allows for the gradual buildup of oospores in the soil. The presence of inoculum can lead to a severe disease outbreak under the right environmental conditions. If SDM occurs in a field, that field should be left out of sorghum for at least two years. Johnsongrass is susceptible to SDM and therefore needs to be controlled to maximize the effectiveness of a rotation program. SDM can also infect corn; however, little to no oospores are produced. Consider planting a grain sorghum product resistant to the pathotype in the field.

If SDM occurs in a field, the strain or pathotype of the fungus should be identified. Pathotypes 3 and 6 occur in the Upper Gulf Coast with pathotype 3 being more common. Identifying the pathotype of the fungus is important for making grain sorghum product decisions for the future.

The increased occurrence of SDM has been associated with metalaxyl-resistance in both pathotypes 3 and 6 of *P. sorghi*. Unfortunately, there are no effective seed treatment fungicides to take the place of metalaxyl. In fields where SDM has not been identified, seed treatments containing metalaxyl should be used as a preventative measure. Fields with metalaxyl-resistant strains of SDM should still be planted with treated seed as they may also contain a strain of the pathogen that is not resistant to metalaxyl, but may have the ability to overcome host resistance.

Summary

Scout fields early for evidence of SDM when plants are seedlings, 3 to 4 weeks after planting. Later in the season, diseased and stunted plants may be hidden by healthy plants and easily overlooked. If SDM is identified, consider your management options going forward and arrange for pathotype testing to help with grain sorghum selection in the future.

While SDM is an important factor to consider when selecting sorghum hybrids, keep in mind that disease incidence can be sporadic and is dependent to a great degree on environmental conditions.

Sources:


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