

Sorghum Ergot

New Disease Threat to the Sorghum Industry

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What is it?

Sorghum ergot is a disease caused by a fungus (*Claviceps africana*) that infects the ovaries of sorghum flowers and often converts them into a white, fungal mass (sphacelia). The most obvious external symptom of infection is the abundant exudation from infected flowers of an amber-colored, sticky fluid, or "honeydew," which often drips onto the leaves and soil. Spores of the fungus are contained within the honeydew, and when these germinate they produce secondary spores on the surface of the honeydew, giving it a white-scum to powdery appearance. Wind rapidly spreads these secondary spores over long distances. The fungus also can be spread by seed contaminated with sphacelia or honeydew. Under certain conditions, *Claviceps africana* produces very durable, compact fungal structures called sclerotia.

Where is it?

Sorghum ergot has existed in Africa for many decades. It appeared in Brazil in 1995, and since then it has quickly spread throughout sorghum production areas in the Americas. It was first detected in the United States in Texas in 1997. During the 1997 season, sorghum ergot spread from the Lower Rio Grande Valley to the High Plains of Texas, and into Kansas, Nebraska, New Mexico and Georgia.

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Newly formed honeydew dripping from an infected panicle.

How Are Different Types of Sorghum Affected?

Sorghum ergot infects only unfertilized ovaries. Once fertilized, an ovary becomes resistant to infection. The mechanism of this resistance is uncertain, but the resistance is highly effective. Any condition that prevents or delays fertilization increases the risk of ergot. Sorghum plants with inherent male sterility or with pollination difficulties caused by cool temperatures are most severely affected by ergot.

Because of their high self fertility, grain sorghum hybrids should sus-

tain very little damage from ergot, except where cool temperatures can predispose the flower to infection. Cool temperatures (average daily minimum below 55 degrees F) occurring 3 to 4 weeks before flowering inhibit pollen development, while cool temperatures occurring at flowering to 5 days thereafter can delay fertilization by slowing pollen tube growth. Therefore, grain sorghum maturing during the cooler temperatures of autumn is at greater risk of ergot than sorghum maturing during summer months.

Male-sterile sorghum (female "A" line) used in hybrid seed production is at significant risk because of a delay in pollination, since the female flower receives pollen from a different plant. Poor pollination caused by cool temperatures increases chances of ergot infection in normally resistant commercial grain sorghum hybrids. High humidity and moist conditions also favor ergot infection. Forage sorghums vary in their levels of fertility. Some forage sorghums, especially sterile hybrids, are very susceptible to ergot because they often produce little or no pollen and tillering provides a succession of sorghum flowers that can be conducive to the rapid and prolonged buildup of inoculum. Johnsongrass is a host of the sorghum ergot pathogen and likely serves as an overwintering source of ergot inoculum in south Texas.



White secondary sporulation of the ergot fungus on the surface of honeydew.

How is it a Threat to Texas?

Each flower infected with ergot represents a direct loss of one seed. Additional losses occur because the stickiness of infected panicles interferes with the harvest of healthy seed and favors the growth of saprophytic fungi, which can affect seed quality. A high incidence of ergot in sorghum forages also can result in abundant amounts of honeydew that can interfere with harvest by "gumming" the equipment.

Seed production fields are very susceptible to this disease. Texas produces approximately 90 percent of the hybrid sorghum seed planted in the United States and 45 percent of the world supply. To protect this seed supply, seed production fields may need to be treated with a fungicide and additional pollinator rows may need to be planted. These measures will add to the cost of hybrid seed production.

Evidence to date suggests that *C. africana*, the sorghum ergot fungus in the United States, has little or no toxicity to livestock, especially at the low quantities that might be consumed if good disease management practices are employed. However, the presence of ergot on grain sorghum may result in regulatory restrictions on grain shipment to other nations.

What to Do?

The following practices can minimize the development of ergot and limit its impact:

1. Time planting to avoid low evening temperatures (below 55 degrees F) during the period 3 to 4 weeks prior to flowering and from flowering to 5 days thereafter. The former induces pollen sterility and the latter slows pollen tube growth. Both subject the flower ovary to the risk of infection.
2. When planting in ergot-free areas, use seed treatment fungicides such as captan, thiram or Maxim®. Where the disease is already present, or if the seed has been stored for 3 or more months prior to planting, seed treatments are of much less importance than other practices for ergot management.



White secondary sporulation on honeydew that dripped onto leaves.

3. After harvest, disk the fields to prevent sorghum ratoon and sorghum volunteer development. The ergot fungus can maintain itself on sorghum ratoon and volunteer plants not killed by winter freezes.
4. Manage Johnsongrass within and around the borders of the field.
5. Harvest forage sorghums prior to heading.
6. In hybrid sorghum seed production, use an approved fungicide according to the label. Also use the most effective pollen management practices. It is not necessary to use fungicides for grain sorghum production.

More information on sorghum ergot can be found on the internet at:

(<http://www.cgiar.org/icrisat>)
 (<http://www.ars.grin.gov/ars/SoAtlantic/Maryaguez/sorghumnews.html>)
 (<http://www.agr.state.tx.us/comm/pr112.htm>)
 (<http://cygnus.tamu.edu>)
 (<http://primera.tamu.edu/pubs/ERGOT.HTM>)

Produced by AgriLife Communications, The Texas A&M University System