Utilizing Harvest Aids
IN GRAIN SORGHUM

Introduction

Applying a harvest aid to grain sorghum has become a very common practice in Louisiana. When properly applied, they permit faster and more efficient combining with no reduction in grain weight. Grain moisture content from across the field will be more uniform, which can result in fewer moisture discounts. It is relatively easy to determine the black layer stage of kernel development when harvest aids should be applied. A black layer forms at the seed attachment point at physiological maturity when maximum seed weight is reached. At the black layer stage, the vascular tissue or phloem tubes can no longer carry nutrients and water to grain, and the seed can no longer increase in dry weight.

Benefits of utilizing harvest aids

Grain sorghum producers may consider harvest aids to manage sorghum drydown and harvest because they:

- Provide for more efficient and faster threshing.
- Dryout the late-emerging nonproductive suckers or tillers that could delay harvest.
- Reduce differences in harvest maturity across a field due to uneven emergence dates.
- Kill grain sorghum, which is a perennial plant.
- Minimize tropical weather-related damage by promoting an earlier harvest and possible prevention of seed sprouting.
- Hasten harvest to meet a delivery or pricing deadline.
- Provide late-season weed control and reduce the presence of moist weedy material in the grain.

Determining physiological maturity

Physiological maturity in grain sorghum is reached when a black layer appears on the sorghum kernels. This layer is visible at the base of the kernel following individual detachment from their outer glume. Physiologically mature seed will contain approximately 30 percent moisture. Sorghum seed change color and accumulate hard starch in a similar manner to maturing corn kernels. If you observe a considerable amount of green seed rather than the red or brown color of mature seed, you will need to wait and give the field more time to fully mature.

Seed at the top of the head will mature prior to those located at the bottom of the head because sorghum pollinates first at the top of the head and progresses steadily downward to the base of the panicle (or flower cluster) in six to nine days. On average, sorghum hybrids reach black layer at 120 days after planting. Most sorghum hybrids reach 50 percent bloom about 75 days after planting, and another 45 days are required after pollination for the grain to reach physiological maturity.

In Figure 1, five kernels of sorghum have been removed from different locations on the seed-head. Kernels 1, 2, 3, 4 and 5 were located in descending order down the seedhead. The crop is considered mature when all the kernels appear like kernels 1, 2, and 3. Kernels 1 and 2 have a fully developed black layer, and kernel 3 has a black layer that has formed. Kernels 4 and 5 show almost no formation of a black layer. Hard starch forms initially at the seed crown and progressively moves toward the base where it develops a black layer similar to corn. Pinch a seed between your fingernails. If you easily penetrate soft dough at the base of the seed, it is not mature.

Figure 1. Sorghum kernels in various stages of maturity harvested from the same panicle from the most mature (1) to the least mature (5). The black layer is first visible in kernel 3 and becomes more distinguishable as the seed loses moisture. (Dan Fromme, LSU AgCenter)

Do not apply a harvest aid prematurely or before physiological maturity because you will sacrifice yield and reduce test weight by hastening seed fill. About 25 percent seed weight is added during the last 14 days prior to physiological maturity. Therefore, it is extremely important to scout the entire sorghum field and properly determine physiological maturity before applying a harvest aid.

Harvest aid products

Three products are labeled for use as harvest aids: sodium chlorate, glyphosate, and carfentrazone. Good spray coverage is essential for all three products.

- **Sodium chlorate:** Provides leaf desiccation but does not kill the plant and, as a result, regrowth may occur. Apply seven to 10 days prior to harvest. Rates are based on product formulation. If a 6 pounds per gallon sodium chlorate is used, apply 1 gallon of product per acre and adjust rates accordingly for different formulations. Use the lower rate when grain sorghum moisture is low and weather conditions are conducive to drying. Use the higher rate when conditions for desiccation are poor. This product may be applied by aircraft (4 to 10 gallons per acre) or ground (10 to 20 gallons per acre) equipment. It is essential that the foliage be thoroughly covered. This product should not be mixed with insecticides or other organic materials, unless specifically labeled, because a fire or explosion may result. Apply as a medium or coarse spray. Desiccation is favored on clear, calm, sunny days with high temperatures and high humidity. If rain is anticipated within 24 hours, application should be delayed. Desiccation may be slowed when daytime temperatures are below 60 degrees.
- **Glyphosate:** Apply up to 44 fluid ounces per acre after sorghum has reached 30 percent moisture or less. Use a spray volume of 10 to 20 gallons of water per acre for ground application, or 3 to 10 gallons of water for aerial application. As with other herbicides that result in plant death, avoid preharvest application to plants infected with charcoal rot as lodging may occur. Allow a minimum seven days between application and harvest of grain sorghum.

Figure 2. Infected plants die prematurely before all grain can be filled. Upon closer inspection, many sorghum heads will appear dull and lackluster and the spikelets may droop, giving the panicle a ragged appearance. Panicles will contain shriveled grain with the worst being found at the base of the sorghum head, which would have been the last grain to mature. (Tom Isakeit, Texas A&M University)

Figure 3. By the time sorghum begins to lodge, it may be too late to apply glyphosate. When sliced open, the lower 5 to 6 inches of the stalk will be soft, spongy, and/or disintegrated. Within there will be charcoal-colored specks, which are reproductive structures of the pathogen. As prematurely killed plants continue to lose moisture, the plants will fall rapidly under the weight of their own grain. (Tom Isakeit, Texas A&M University)

Also, glyphosate is a late-season weed control option. Rainfastness can vary based on glyphosate formulation; however, six hours is sufficient time for absorption by the leaves.

- **Carfentrazone:** The product label emphasizes use as a weed desiccant rather than for crop drydown. It provides excellent control of morning glory. Apply at 1 to 2 ounces per acre and use a minimum of 10 gallons of finished product per acre for ground application and 5 gallons per acre for aerial application. The time required between application and rainfast is one hour, and there is a preharvest interval of 3 days. Tank-mixing sodium chlorate with carfentrazone offers desiccation of grass weeds.

This information is provided as a guide only. Always consult the product label or manufacturer for complete information.

Crop lodging

Healthy sorghum plants usually do not lodge after a harvest aid is applied and are capable of standing for up to three weeks after treatment. After 30 days, lodging can be significant. It is a good idea to apply harvest aids to only the fields that can be harvested within 14 days of application.

Charcoal rot can cause premature lodging; therefore, it is a good idea to inspect fields before an application is made. Infected plants die prematurely before grain fill is completed (Figure 2). Visual inspection of plants before applying a harvest aid requires splitting the stalk lengthwise. Infected stalks will be soft, spongy, or disintegrated at the crown with charcoal-colored specks, which are fungal reproductive structures. If the stalk is unhealthy, plants will generally fall regardless of treatment. Figures 3 and 4 provide the visual symptomology when charcoal rot is present.

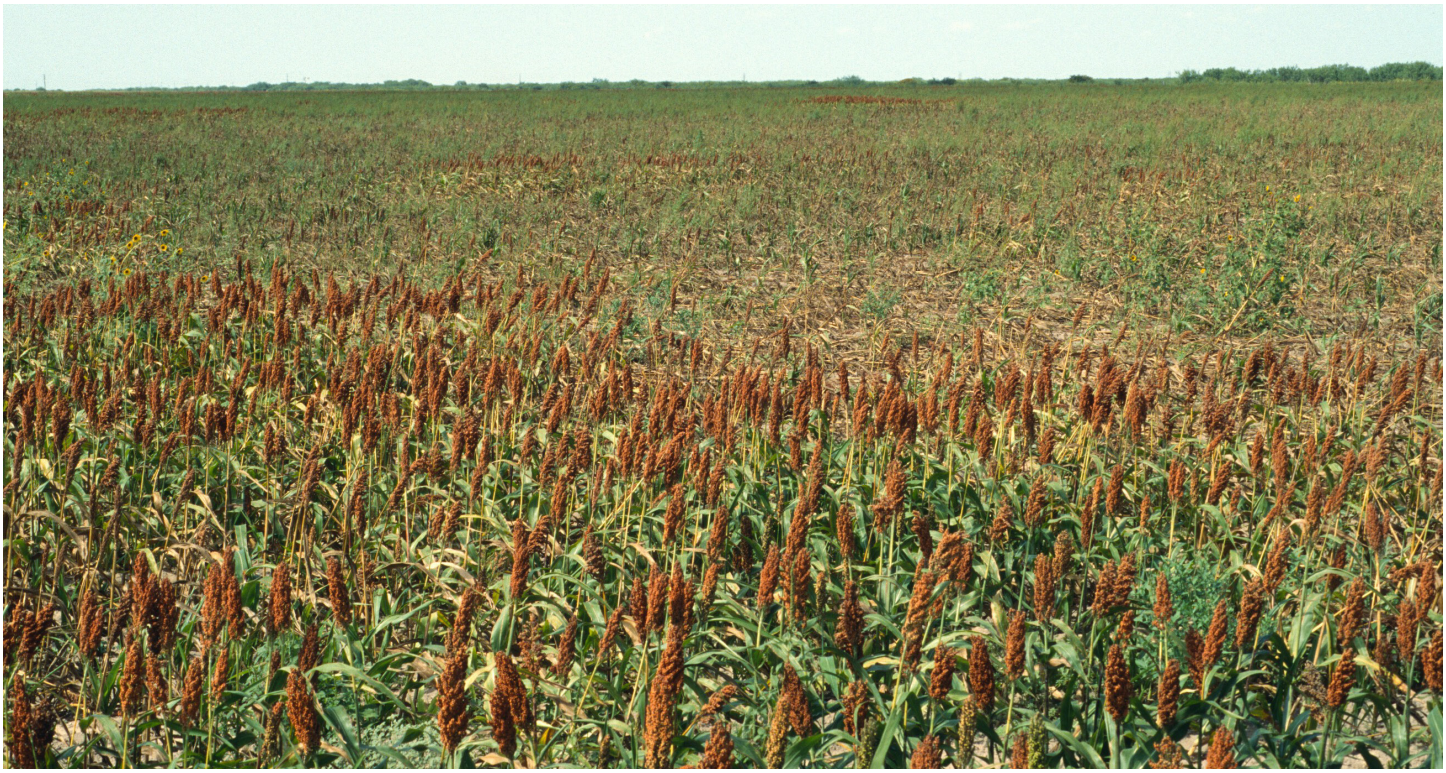

Figure 4. Harvest aid applications may accelerate the fall of infected plants with charcoal rot. To avoid excessive lodging, harvest in a timely manner. (Tom Isakeit, Texas A&M University)

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