



Managing Grain Sorghum for Maximum Profitability in the Texas High Plains

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Grain sorghum remains one of the most risk free crops that can be grown in the Texas High Plains. Other crops may produce more profits in any given year, but from a risk management standpoint grain sorghum will almost always produce a crop at a lower cost per acre than most other crops. Several cultural and management practices can enhance the potential of producing a successful grain sorghum crop.

Water management is the primary yield detriment for dryland or limited irrigated sorghum on clay loam soils in the Texas High Plains. It is critical that as much water as possible be stored in the soil profile prior to or soon after sorghum planting. A clay loam soil will hold approximately 2 inches of available plant water per foot. With a typical 4-foot soil profile up to 8 inches of water could be available to the crop. A sandy soil will only hold 0.75 to 1 inch of available water per foot, making it a less desirable soil on which to produce sorghum unless the profile can be replenished through timely rainfall or irrigation. It takes approximately 6 inches of water to get a sorghum plant to the point where grain can be produced. If this amount can be stored in the soil prior to planting, the risk associated with growing sorghum successfully is greatly reduced. For every inch of additional water

applied through irrigation or rainfall during the growing season, yield will increase 350 to 450 pounds per acre. Study after study has shown that reducing tillage will help maintain crop residues on the surface which results in more water stored in the soil. Each tillage operation will cause approximately one half inch of water loss through evaporation. The actual amount of loss will be dependent on the depth and type of tillage, soil type, and amount of moisture stored at the time of tillage.

Poor weed control will reduce stored soil water. Weeds must be controlled during the fallow period prior to planting sorghum. A severe infestation of weeds can use as much as 3 inches of water in a single month. Weed control is also important during the growing season. Because of the lack of good, safe, post emergence herbicides that are labeled for sorghum, an application of a pre-emergence herbicide is strongly recommended. Broadleaf weeds such as pigweed can usually be controlled with an inexpensive treatment of atrazine at the time of planting. If annual grasses are a problem then more expensive products containing the active ingredients of Dual®, Lasso®, Frontier®, or Harness® will need to be used. Several premixes containing these herbi-

cides combined with atrazine are available. Under dryland conditions, applying the herbicide in a band and cultivating the middles may be an option in order to keep down cost. If possible, avoid the use of 2,4-D or high rates of Banvel®. Even though injury from these herbicides may appear light, yield reductions can and do occur, especially if the herbicides are applied to sorghum past ten inches in height. Peak® plus 0.75 lb. of atrazine is a good alternative for broadleaf weed control if a post-emergence herbicide application is needed. For the irrigated farmer, a post-emergence application of Buctril® + atrazine + 2 oz. Banvel® can be a very effective treatment. Rhizome Johnsongrass in sorghum will greatly reduce yield. Competition from Johnsongrass can be significantly reduced by letting the Johnsongrass emerge prior to planting, and then treating with Roundup® prior to sorghum planting. Since Roundup® has no soil activity, grain sorghum can be safely planted immediately after herbicide application. Research has shown that sorghum yield can be more than doubled by treating Johnsongrass in this manner.

The planting date for dryland or limited irrigated sorghum is dependent on soil moisture and the amount of irrigation capacity that is

available. If a full profile of water (wet to 6 feet) is present, a medium-late sorghum can be planted in mid-May. If something less than a full profile of water is present, choose a medium maturity hybrid with good drought tolerance. If need be, wait until at least 3 feet of moisture is present before planting. A good sorghum crop can be planted as late as July. The later you plant, the shorter the maturity of the hybrid will need to be. A good yielding sorghum will require moisture in September. If water is lacking, the plant will translocate water and nutrients from the stalk, which can lead to lodging. For this reason, plant a hybrid with good stalk strength.

Plant density should also be adjusted to soil moisture conditions. A seed drop of 32,000 seed per acre has been shown to provide the best results under a wide range of conditions. This is a high enough density to not limit yield, while under extreme dry conditions the sorghum will be less likely to burn up compared to a higher population. If the variety chosen to plant has a high tillering capacity, seeding rate may be dropped 30 percent. If less than three feet of moisture is present by early July consider lowering the plant density to 20,000 seed per acre and planting a short maturity drought tolerant hybrid.

A strategy that has proved successful for dryland sorghum planted in early July is to plant a very short maturity hybrid on 15 inch centers at a seeding rate of 64,000 seed per acre. This should only be done if 4 to 5 feet of soil moisture is present. The higher seeding rate is necessary because of the lack of tillering that will occur at this late planting date.

Dryland and limited irrigated sorghum seldom has greenbug infestations high enough to warrant insecticide application in the Texas High Plains. For this reason, seed

treated with Gaucho® is usually not necessary. Texas A&M research consistently shows in dryland and limited irrigated systems that Gaucho® treated sorghum seed will not pay for itself in the Texas High Plains. This however, is not necessarily true for other parts of the State where soil insect or early season pests are more of a problem. Gaucho® treated seed is more justified under full irrigation conditions.

If only limited irrigation is available, the highest return will usually occur if sorghum is irrigated at heading or milk stage depending on the severity of moisture stress prior to irrigation. For high yield levels, it is important that the sorghum not stress during the mid-vegetative stage. About 30 to 35 days after emergence the potential size of the head and number of seed is being determined. If adequate soil moisture (4 ft.) is present at planting, and any significant rain events occur 2 to 4 weeks after planting, the sorghum is not placed under much stress during this time. If this is the case, the first irrigation can be delayed until boot or heading. Irrigation at the grain milk stage will also improve yield, and is particularly important if sorghum was watered early but not watered at heading.

Maximum sorghum yield can usually be achieved with an irrigation capacity of 3.5 to 4.5 gpm per acre. The actual amount needed will depend on the irrigation system and the field location in the Texas High Plains. Irrigation systems equipped with LEPA or nozzles set low in the canopy will require less irrigation capacity than nozzles placed several feet above the crop canopy or furrow irrigation. Water

demand is also generally higher as you move south in the Texas High Plains. Critical irrigation times are during boot, heading, flowering and grain filling stages of plant growth. If little rainfall has occurred shortly after planting, then an irrigation 30 to 35 days after emergence will be necessary to insure the potential for good head size and grain number. For maximum yield under irrigation a seeding rate of 80,000 seed per acre is adequate for most conditions. A medium-late to late maturity hybrid should be planted before June 1. If planting is delayed, then a medium-early to medium maturity hybrid may be better. If so, seeding rate should be increased to 110,000 seed per acre.

In summary, under dryland or limited irrigation, choose your planting date, hybrid, and seeding rate based on stored soil water and irrigation capacity. Under low soil moisture conditions, delay planting and choose a shorter season hybrid and consider planting at a lower seeding rate. If conditions turn favorable after planting, sorghum has the ability to tiller and compensate for low seeding rates. Always choose a hybrid with good standability. Weeds must be controlled prior to planting and a pre-emergence herbicide application is recommended. Do not spend extra for insecticide treated sorghum seed unless you have a history of soil insect or early season pest problems. Under full irrigation where maximum yield is desired, plant early, use a high seeding rate, and keep in mind the critical growth stages of sorghum in irrigation timing for maximum production.

For additional information see our web site at:
<http://taessoilcrop.tamu.edu>

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