Sorghum As The Queen Of Residues For Conservation Tillage

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Next to small grains, sorghum provides the most soil protection of any row crop grown in South Texas. Conservation tillage methods are discussed with respect to maximizing water-use and conservation in this subtropical production climate. When hybrid selection, weed control and tillage practices have been maximized, date-of-planting is the most important decision a producer can make in sorghum profitability. Yet, planting date is often the most neglected aspect of establishing the stand. In a three-year planting-date-study using up to eleven planting dates, sorghum was assessed for seed yields, seed size, panicle exertion, days-to-black-layer, and wateruse efficiency when received at various sorghum growth stages. Heat units and crop-weather patterns are discussed.

Pioneer 84G62 was selected for the planting date study, and was planted-to-moisture, in weekly intervals on 38-inch row beds. Using conventional production practices, all planting dates were managed equally.

In 2002, adequate planting moisture was available January through April, and no rainfall was received until July. The entire crop for all planting dates was produced without the benefit of rainfall or irrigation. Seed yields ranged from 1566 lbs/ac for a 31 January planting date, to 3999 lbs/ac for the 20 February planting date. Subsequent yields decreased linearly with later planting dates, to a low of 1613 lbs/ac for the 28 March planting date. After the 20 February peak planting date, seed yields decreased at 68 lbs/day-of-delay in planting date with no additional rainfall. Seed numbers also increased linearly from 4000 to 6200 seed/100 grams during the same days of delay ending 28 March.

In 2004, adequate rainfall and planting moisture was received through eleven weekly planting dates ranging from 23 February to 6 May. These planting dates provided seed yields that decreased in a linear fashion. Sorghum yields decreased from 5822 lbs/ac on 23 February to 3227 lbs/ac on 6 May, losing 36 pounds of sorghum for every planting day-of-delay after 23 February. Decreases in seed yield were attributed to higher late-season nighttime temperatures. Seed numbers increased linearly from 3338 seed/100g on 23 Feb, to 1518 seed/100g on 6 May.

In 2003, the sorghum growing season began dry such as was experienced in 2002; however, 3.5 inches of rainfall was received from 5 June to 15 June, which significantly affected some of the later planting date. Grain yields were decreasing at 291 lbs/ac, weekly. When rainfall was received 2-week post flowering, a 743 lbs/ac yield increase resulted. However, 1 week post flowering and flowering provided 2211 lbs/ac and 2900 lbs/ac, respectively. Rain received at one week pre-flowering, resulted in 1930 lb/ac.

Every inch of needed rainfall, when received in significant amounts at these growth stages would be valued as follows:

Sorghum Growth Stage		Value of One- Inch Rainfall
2 weeks post flowering	-	212 lbs/ac
1 week post flowering	-	632 lbs/ac
at flowering initiation	-	829 lbs/ac
1 week pre-flowering	-	552 lbs/ac

Rainfall received at the bloom stage is of the greatest benefit to sorghum when it is needing rain. Sorghum is at its peak water demand at the boot and bloom growth stages, where as much as 2.7 inches is being used on a weekly basis. The water regime of sorghum establishes panicle exertion within the first 45 days of plant growth. Seed numbers were observed to increase, while individual seed weights decreased with delays in planting dates. Larger plants (biomass) and higher yields were achieved with prime planting dates.

Increases in plant residues provide greater protection of the soil, and the conserved water also contributes to increased seed production.