

News Column
Stacy Campbell

Cottonwood Extension District, Hays

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Sorghum management considerations: Planting practices

Some of the main planting practices affecting yields in sorghum are: row spacing, row arrangement, seeding rate/plant population, planting date, and hybrid maturity.

Sorghum plants can compensate and adjust to diverse environmental conditions through modifications in the number of tillers, head size, and final seed weight. For sorghum, the final number of seeds per head is the plant component that varies the most; and thus has more room for adjustment than the other plant components (seed weight and number of tillers).

Seeding rate / plant populations

Sorghum population recommendations range from a desired stand of 23,000 to more than 100,000 plants per acre depending on annual rainfall Table 1:

Table 1. Grain sorghum recommended seeding rate, plant population and row spacing at different average annual rainfall. Source: <https://www.bookstore.ksre.ksu.edu/pubs/MF3046.pdf>

Avg. Annual Rainfall (inches)	Seeding rate (x 1,000 seeds/acre)*	Recommended Plant Population (x 1,000 plants/acre)	Within-row Seed Spacing (65% emergence)		
			10-inch rows	20-inch rows	30-inch rows
< 20	30-35	23-27	18-21	9-10	6-7
20 to 26	35-64	25-45	10-18	5-9	3-6
26 to 32	50-80	35-55	8-13	4-6	3-4
> 32	70-125	50-90	5-9	2-4	2-3
Irrigated	110-150	80-110	4-5	2-3	1-2

*** Assuming 65% field emergence.**

Because of sorghum's ability to respond to the environment, final stands can vary at least 25 percent from the values listed above, depending on expected growing conditions, without significantly affecting yields. Lower seeding rates minimize risk of crop failure in dry environments. Sorghum can compensate for good growing conditions by adding tillers and adjusting head size, but yields can be

reduced in a dry year if populations are too high. For a high-yielding environment (>150 bu/acre), under narrow rows, high plant populations can be a critical factor for improving sorghum yields.

Higher seeding rates also should be used when planting late. Increase rates by 15-20 percent if planting in late-June or later. Late planting will restrict the time that sorghum plants will have in the season for producing productive tillers, thus decreasing the plants' ability to compensate for inadequate stands.

Recent research in Kansas has confirmed these long-term recommendations. In these studies, sorghum yields were maximized at 25,000 plants per acre (optimum between 20,000 to 30,000 plants per acre) in western Kansas at 17 inches annual precipitation; 40,000 in central Kansas at 30 inches annual precipitation; and 50,000 in eastern Kansas at 32 inches annual precipitation. Studies in Missouri, with substantially more than 32 inches of annual precipitation, maximized yield with about 60,000 plants per acre. For western Kansas, final stands of about 20,000 to 30,000 plants per acre can attain yields of 60 to 80 bushels per acre or more. For central and eastern Kansas, final stands of 50,000 to 70,000 plants per acre can maximize yields, with the final objective of having 1 to 1.5 heads per plant.

Having more than the recommended number of plants per acre results in fewer fertile and productive tillers and thinner stems, which will reduce yield in the drier environments and increase susceptibility to drought. On the other extreme, thin stands can compensate for better-than-expected growing conditions somewhat by producing more and/or larger heads. However, under high-yielding environments, a higher final plant population will be needed to increase yields as much as possible (Table 1).

Planting date

A summary of research data performed in the last several years has confirmed that the optimum planting date for maximizing yields will be around early June (Figure 1). Still, the decision related to the optimum planting date should be timed so plants have the best possible chance of avoiding hot, dry weather at the flowering stage, but can still have sufficient time to mature before the first frost.

Planting date has some effect on seeding rates. Sorghum will tiller more readily in cool temperatures and less readily under warm conditions. As a result, later plantings in warmer weather should be on the high side of the recommended range of seeding rates for each environment since there will be less tillering. The potential for greater tillering with earlier planting dates makes sorghum yields generally more stable when planted in May and early June compared to late June or July plantings.

Planting depth

Seed placement is also a critical factor when planting sorghum. Optimum seed placement for sorghum is about 1-2 inches deep. Shallower or deeper planting depths can affect the time between planting and emergence, affecting early-season plant uniformity. We recently conducted a planting depth study, using late planting (about mid-June) under uniform soil temperatures and three seed placements – shallow, 0.5 inch; optimum, 1.5 inches; and deep, 3 inches. Optimum and deep placement resulted in similar shoot growth while shallower placement resulted in delayed development with fewer number of leaves and less total shoot mass.

Next week--row spacing and hybrid selection will be discussed. Information provided by Ignacio Ciampitti, Crop Production and Cropping Systems Specialist.