

News Column

Stacy Campbell

Cottonwood Extension District, Hays

May 31, 2018

### Sorghum management considerations: Planting practices

In last week's article seeding rate/plant populations, planting date and planting depth were discussed. This week's article is a continuation of sorghum management considerations when planting. If you missed last week's article you can find it on our web site at [www.cottonwood.ksu.edu](http://www.cottonwood.ksu.edu)

### Row spacing

The other factor that can influence yield is row spacing. The last three columns in Table 1 show that plant spacing within the row becomes greater as row spacing decreases. This greater intra-row plant spacing reduces plant-plant competition early in the growing season when head number and head size are being determined.

**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.**

A response to narrow row spacing is expected under superior growing environments, when water is a non-limiting factor. Narrow rows increase early light interception, provide faster canopy closure, reduce evaporation losses, can improve suppression of late-emerging weeds (a major issue in sorghum), and maximize yields.

The influence of row spacing on sorghum yield has not been entirely consistent in K-State tests. In a summary of experiments conducted in Kansas, the comparison between wide (30-inch) vs. narrow (15-inch) row spacing shows a close relationship, with an overall yield benefit of 4 bushels per acre with narrow rows. In addition, narrow rows out yielded wide rows in 71 percent of all observations evaluated.

A more consistent response to narrow rows was documented when yields were above 70 bushels per acre, with a greater chance of having higher yields when using narrow rows. In summary, the potential for a positive yield response to narrow rows is greatest in high-yielding environments, but the response is not always consistent. Under low-yielding environments, conventional (30-inch) wide row spacing is the best alternative.

*Should populations be adjusted with narrow rows?* Research results indicate that the population producing the greatest yield doesn't change with different row spacing, but the magnitude of response to population potentially can be greater with narrower row spacing in high-yielding environments.

Planting date seems to have an interaction with row spacing. Over three years at the North Central Experiment Field, there was essentially no difference in yield between 15- and 30-inch rows for late-May plantings, but there was a 10-bushel yield advantage for 15-inch rows for late June plantings. A similar response was observed at Manhattan in 2009 when no difference in row spacing was observed for the May planting, but 10-inch rows had an 11-bushel/acre yield advantage over 30-inch rows with the June planting. The opposite response was seen at Hutchinson in 2009 where narrow rows had a 6 bushel/acre yield advantage with a May planting date, but wide rows had a 6 bushel/acre yield advantage with a June planting date. In all cases, yields were less with the June planting, but the June plantings at Belleville and Manhattan averaged more than 115 bushels/acre, while yields at Hutchinson were less than 92 bushels/acre.

### **Hybrid selection**

The selection of sorghum hybrids should be based not only on maturity, but also on other traits such as resistance to pests, stalk strength, head exertion, seeding vigor, and overall performance. The selection of a sorghum hybrid based on its maturity should be strictly related to the planting date, expected duration of the growing season, and the probability the hybrid will mature before the first freeze event. Shorter-season hybrids might be a better fit for late planting dates (mid-June to July depending on the regions); while a longer-season hybrid is recommended when planting time is early and the duration of the growing season is maximized.

For the summary of planting date information in Figure 1, hybrid maturity showed a very complex pattern across the diverse locations. Overall, longer-season hybrids showed a better yield at the mid-May planting time, but yields were less than 100 bushels per acre. For medium- and short-season hybrids, the early June planting date produced yields of more than 100 bushels per acre. The goal is to plant a hybrid maturity at each particular site/environment (weather and soil type) so the plants can bloom in favorable conditions, and have adequate grain fill duration before the first fall freeze occurs.

### **On-farm research experience: 2014-2016 seasons**

During the last three growing seasons, on-farm research studies were established in collaboration with farmers and Sandra Wick, Post Rock District Extension Agent.

A summary of sorghum plant population response to all years of on-farm research revealed an optimal response to plant population at around 30 to 45 thousand seeds per acre (Figure 4). This shows how essential it is to continue the on-farm research efforts for properly identifying optimal plant population and providing a better guidance to key stakeholders in Kansas.

The recommendations provided in Table 1 can serve as a guideline for sorghum seeding rates, but more on-farm studies with a local and regional focus are needed in order to fine-tune and better understand sorghum yield responses to seeding rates.

### **Summary**

- Determine your desired population based on average rainfall and expected growing conditions. There is no need to go overboard.
- Make sure you plant enough seed for your desired plant population. About 65-70 percent field germination is a good general rule to use.
- Think about using narrower row spacing to close the canopy sooner and potentially capture greater yields in yield environments of 70 bushels per acre or more.
- Planting data and hybrid selection are tied together and are related to the conditions experienced by sorghum plants during the late summer. Think about this before deciding your planting time and selecting a hybrid.

Information provided by Ignacio Ciampitti, Crop Production and Cropping Systems Specialist