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Seeding Rates in Grain Sorghum
UC Davis Small Grains and Alfalfa Field Day

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Background:

- California sorghum acreage appears to be on the rise. Growers may be substituting sorghum for corn as a lower-input alternative.
- UC has increased research efforts in recent years in order to provide information for California growers because information from the Midwest may not be relevant to California conditions.
- Sorghum seed size varies considerably across varieties, so the number of seeds/lb also varies considerably across varieties. For this reason, when determining seeding rates, growers should first determine their desired plant population.
- The purpose of this trial was to better understand optimal seeding rates for California grain sorghum.

Methods:

- Planted May 20, 2016 using cone planter, with seed approximately 2" deep, on 30" row spacing.
- White sorghum variety grown for grain, 16,000 seeds/lb and 85% germination.
- Five seeding rate treatments (5, 6, 9, 12, 15 lbs/acre) replicated in 4 blocks.
- Aside from planting and harvesting, the plot was managed the same as the rest of the field. Weed management was an important consideration for the grower.
- Harvested on November 14, 2016.

Results:

Table 1. Plant establishment characteristics of the 2016 UCCE Delta sorghum seeding rate trial.

Seeding Rate (lbs/acre)	Estimated Plant Population (plants/acre)	Stand Count 1-June (plants/acre)	Stand Count 16-June (plants/acre)
5	80,000	82,756 e	79,489 e
6	96,000	106,712 d	96,258 d
9	144,000	149,396 c	130,667 c
12	192,000	196,436 b	161,156 b
15	240,000	248,267 a	190,338 a
Treatment P value		<0.0001	<0.0001
Standard Error		4432	3748

Table 2. Plant maturity characteristics of the 2016 UCCE sorghum seeding rate trial in the Delta.

Seeding Rate (lbs/acre)	Days to Flowering (# of days)	Plant Height (inches)	Panicle Length (inches)	Panicle Exsertion (inches)	Moisture (%)
5	71	53.1 b	11.8 a	6.2 c	18.2
6	71	52.3 b	11.0 abc	6.7 c	18.0
9	71	54.7 a	11.1 ab	7.4 bc	17.2
12	71	53.4 ab	10.6 bc	8.1 ab	17.8
15	71	53.7 ab	10.3 c	9.1 a	18.1
Treatment P value	0.9014	0.0003	<0.0001	<0.0001	0.0589
Standard Error	0.4	0.8	0.3	0.4	0.22

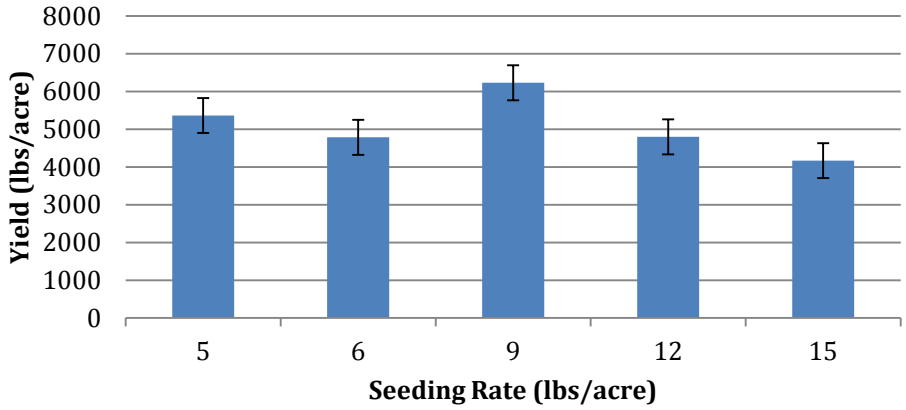

Figure 1. Yield at 13 percent moisture of the 2016 UCCE sorghum seeding rate trial in the Delta. There were no statistical differences among treatments (P = 0.1278), but with the exception of the 9 lbs/acre treatment, there was a trend for lower seeding rates to have higher yields.

Conclusions:

- California has unique growing conditions compared to other sorghum growing regions in the U.S.
- Trial results were somewhat inconclusive in the first year, but the 9 lb/acre treatment may have been favored by better moisture conditions based on the experimental design. The experimental design will be corrected in the 2017 trial.
- There may be a trend for lower rates (5 or 6 lbs/acre) to yield better than higher rates (12 or 15 lbs/acre). Plant competition may be contributing to this result.
- For the variety in this trial, the lower seeding rates corresponded with approximately 80,000-96,000 plants/acre, based on the seeds/lb and percent germination.
- If we see similar yield trends in 2017, then growers could have higher productivity with lower seed costs. The full report is available from: http://ucanr.edu/sites/deltacrops/. It includes a worksheet for calculating seeding rate based on the number of seeds/lb and percent germination.