

On-farm Corn Population Trials

RFR-A1301

In 2013, ISU FARM had various experiments examining corn planting populations and the effect on corn yield. Yield results at the end of the season may be impacted by early season planting decisions. For this reason, it is important to have information on the best early season practices to aid decision-making before the season begins.

Methods

Farmers continue to increase corn planting populations in hopes of increasing yields. But as seed prices rise, it is important for farmers to find a population that maximizes both yield and profit. The following trials evaluated the effect of differing planting populations on grain yield. Three planting population trials with five treatments each were conducted in 2013 in Boone, Dallas, and Story counties (Table 1). Treatments consisted of plots with 25,000, 30,000, 35,000, 40,000, and 45,000 seeds/acre. Three trials were conducted in Cass, Montgomery, and Washington counties that investigated three planting populations with seeding rates ranging from about 30,000 to 45,000 seeds/acre. Two trials also were conducted in Adams and Buena Vista counties that had two planting populations from about 30,000 to 45,000 seeds/acre. Spring and fall stand counts were made in most of the trials. Treatments in all trials were replicated three or more times.

Results

There was a significant effect of corn planting population on corn yield in only Trial 5, where the planting population of 25,000 seeds/acre yielded significantly less than the planting population of 35,000 seeds/acre (Table 2). There also was a trend for a lower yield with the highest seeding rate of 45,000 seeds/acre in Trials 7 and 8 ($P \leq 0.08$). With the stressful year, it is likely the corn did not respond as much to the higher planting population because of the lower yield potential in 2013. The dry conditions present in the summer also would have increased the potential for lower yields with the highest seeding population of 45,000 seeds/acre. In all of the trials, 35,000 seeds/acre was in the top-yielding tier of treatments and was not significantly lower yielding than any other treatment. According to ISU Extension Corn Specialist Roger Elmore's research, the optimal planting rate for yield falls in the range of 34,500 to 37,000 seeds/acre and the optimal planting rate for profit falls between 30,000 and 35,000 seeds/acre. Thus, the results of the trials presented align with Elmore's recommendations on planting population.

Table 1. Hybrid, row spacing, planting date, previous crop, and tillage practices from corn population trials in eight counties.

| Exp. No. | Trial | County | Hybrid | Row spacing (in.) | Planting date | Previous crop | Tillage |
|----------|-------|-------------|-----------------------------|-------------------|---------------|---------------|------------------------|
| 130203 | 1 | Buena Vista | DK 5262 RRNA | 36 | 6/18/13 | Soybean | Spring field cultivate |
| 130609 | 2 | Adams | DK 66-96 Pro 3 | 15 | 6/20/13 | Soybean | No-till |
| 130610 | 3 | Cass | Eply E 1403 VT 2p RIB | 30 | 5/15/13 | Soybean | Conventional |
| 130704 | 4 | Washington | DKC 61-16 | 30 | 5/14/13 | Soybean | No-till |
| 130505 | 5 | Dallas | Pioneer 993HR | 30 | 5/14/13 | Corn | Conventional |
| 130506 | 6 | Boone | Pioneer 1161 | 30 | 5/18/13 | Corn | Conventional |
| 130507 | 7 | Story | Pioneer 9910XR VT3 | 30 | 6/13/13 | Corn | Conventional |
| 130607 | 8 | Montgomery | DK 6297 | 15 | 6/4/13 | Corn | Tilled |

Table 2. Spring stand, fall stand, and yield from corn planting population trials.

| Exp. No. | Trial | Treatments | Spring stand (plants/A)* | Fall stand (plants/A)* | Yield (bu/A)* | P-Value |
|----------|-------|------------|--------------------------|------------------------|---------------|---------|
| 130203 | 1 | 29,700 | 29,500 a | 29,000 a | 144.9 a | 0.73 |
| | | 34,300 | 33,600 b | 33,100 b | 146.2 a | |
| 130609 | 2 | 35,000 | 33,875 a | -- | 157.6 a | 0.50 |
| | | 45,000 | 42,050 b | -- | 162.4 a | |
| 130610 | 3 | 30,000 | 27,625 c | -- | 173.5 a | 0.32 |
| | | 35,000 | 32,375 b | -- | 169.7 a | |
| | | 40,000 | 37,625 a | -- | 168.6 a | |
| 130704 | 4 | 31,000 | 29,375 b | 29,125 b | 211.0 a | 0.23 |
| | | 34,000 | 32,875 ab | 32,750 ab | 217.8 a | |
| | | 37,000 | 35,625 a | 35,000 a | 219.1 a | |
| 130505 | 5 | 25,000 | 23,050 e | 22,500 e | 164.4 b | 0.02 |
| | | 30,000 | 27,800 d | 27,000 d | 170.0 ab | |
| | | 35,000 | 32,400 c | 30,800 c | 171.9 a | |
| | | 40,000 | 36,800 b | 33,800 b | 170.4 ab | |
| | | 45,000 | 41,200 a | 39,200 a | 167.1 ab | |
| 130506 | 6 | 25,000 | 17,400 c | 17,800 b | 147.8 a | 0.65 |
| | | 30,000 | 20,800 bc | 20,300 b | 151.3 a | |
| | | 35,000 | 25,100 bc | 25,000 ab | 157.6 a | |
| | | 40,000 | 27,300 ab | 25,300 ab | 146.5 a | |
| | | 45,000 | 33,400 a | 30,800 a | 166.4 a | |
| 130507 | 7 | 25,000 | 24,300 e | 24,300 e | 176.8 a | 0.08 |
| | | 30,000 | 29,900 d | 29,500 d | 177.8 a | |
| | | 35,000 | 34,600 c | 33,500 c | 170.3 a | |
| | | 40,000 | 40,800 b | 39,500 b | 170.2 a | |
| | | 45,000 | 45,700 a | 44,800 a | 166.2 a | |
| 130607 | 8 | 37,000 | -- | -- | 253.7 a | 0.06 |
| | | 40,000 | -- | -- | 256.8 a | |
| | | 45,000 | -- | -- | 230.3 a | |

*Values denoted with the same letter within a trial are not statistically different at the significance level 0.05.