Effects of Twin Row Configuration on Corn Yield

Background

Corn seeding rates have been increasing steadily by 300 to 425 plants/acre per year, over the past 25 years. This increase has been made possible due to genetic improvements in plant stress tolerance and agronomic practices. Population increases have been directly correlated to corn yield increases on a per year basis. Since row spacing interacts with population to determine interplant competition, potential yield performance can be maximized when optimum plant population is matched with the best row spacing configuration.

This trial was based on the knowledge that corn planted in twin rows, positioned eight inches apart on 30" centers (Figure 1), can potentially provide higher yields than the standard 30" single row. In 2009, Monsanto trials in 20 locations across the U.S. showed that twin row spacing outyielded the standard 30" single row 80% of the time[2]. Corn that is planted in twin rows has more equidistant plant spacing. Therefore, it has potentially greater access to water and nutrients, improved light interception, and enhanced ability to cope with stressful conditions. However, within the twin row system, it is not known if seed placement (Figure 2) can further increase yield potential and what will be the response of different corn products at different plant populations.

Study Guidelines

Three corn products, Genuity® SmartStax® RIB Complete® corn blend (112 RM), Genuity® VT Double PRO® RIB Complete® corn blend (111 RM), and Genuity® VT Triple PRO® RIB Complete® corn blend (112 RM), were planted on 5/1/2013. Treatments included synchronized and unsynchronized seed placement configurations in twin rows with 30K, 35K, 40K, and 45K seeds/acre plant populations.

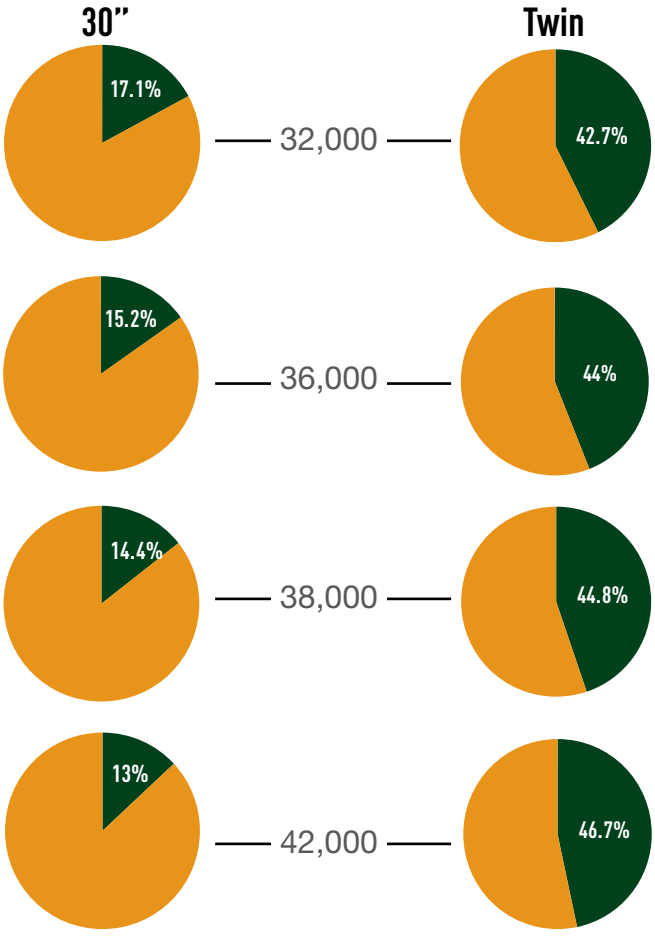

Figure 1. Interplant spacing between standard 30" rows and twin rows with 30" centers and the percent of an acre that is utilized in twin rows versus 30-inch rows. The green part on the pie chart represents the rooting area available in each system.

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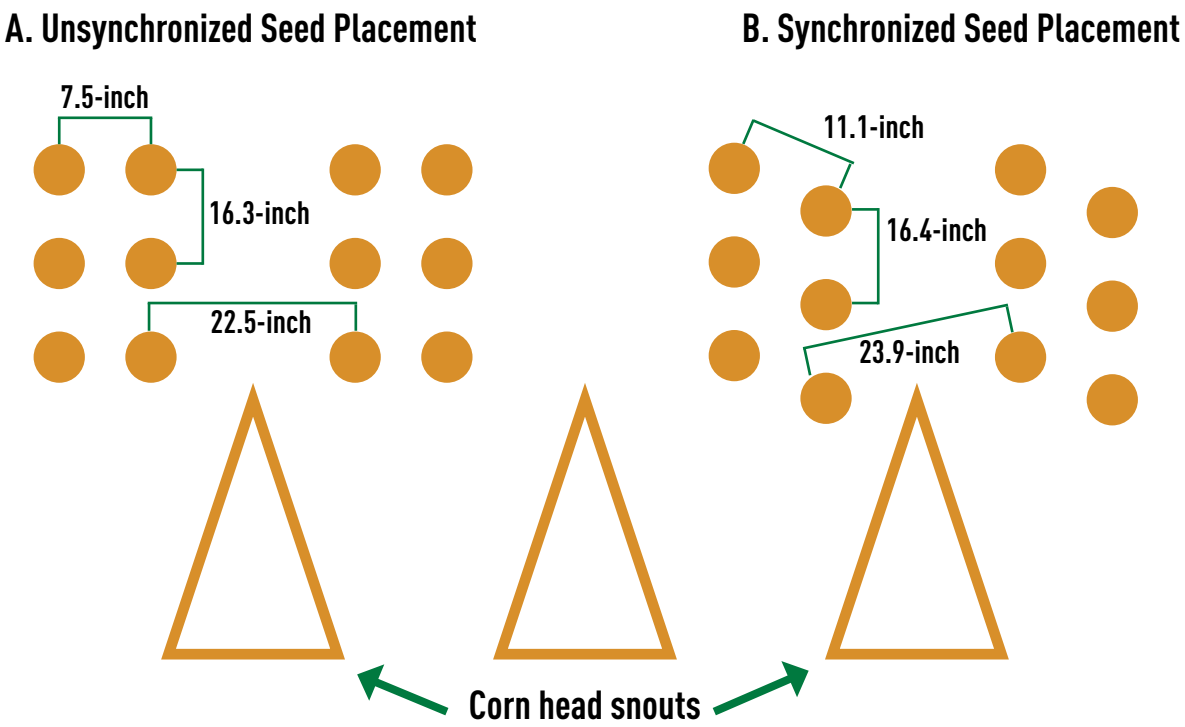

Figure 2. Unsynchronized (A) and synchronized (B) twin row corn plant (orange circles) arrangement distances for 25K* seeds/acre plant population. (*K = 1000).

Plot size was 20' x 100' (0.045914 acres) planted in a continuous corn field. Conventional tillage consisted of chisel plowing in the fall followed by a soil finisher in the spring. Weeds were managed with PRE application of Harness® Xtra 5.6L herbicide at 2 qts/acre on 5/2/2013 and POST application of Roundup PowerMAX® herbicide at 22 fl oz/acre + AMS at 17 lb/100 gal on 6/19/2013. Plots were harvest on 9/27/2013 and yield was adjusted to 15% moisture content.

Results and Observations

Unsynchronized seed placement at 30K and 45K seeds/acre provided higher yields than the synchronized treatment (Figure 3). Unsynchronized seed placement provided lower and similar yields at 35K seeds/acre and 40K seeds/acre, respectively, compared to the synchronized seed placement.

The yield response of corn products to seed placement was highly inconsistent and provided no specific trend across all populations.

In 2012, a similar trial conducted at the same location showed that synchronized seed placement produced a yield advantage of 8 bu/acre over the unsynchronized placement at low (30K seeds/acre) and medium (35K seeds/acre) plant populations. The unsynchronized seed placement configuration produced a 3 bu/acre advantage over the synchronized placement at high (40-45K seeds/acre) plant population.

Compiled data from 2012 and 2013 indicated that synchronized seed placement slightly outyielded (≈ 3.4 bu/acre) the unsynchronized placement at both low and medium populations (Figure 4). Such yield response is highly inconsistent across years, products, and probably other factors and should be cautiously adapted for management decisions.

Key Messages

- In 2013, yield response to seed placement was highly inconsistent and provided no specific trend across all populations.
- Yield difference at all populations was not high enough to warrant preference of one configuration over the other. Similar results reported by Nelson and Smoot[1] that a non-significant yield difference was observed between the two twin row seed placement configurations.

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- Yield for both seed placement configurations was lower at 40K and 45K seeds/acre, compared to 30K and 35K populations, which indicates that at high population severe interplant competition can present potential yield limitations irrespective of the twin row configuration.
- Two-year results indicate that yield response to seed placement, if any, varies from year to year, thus there is no advantage to synchronized seed placement in twin rows.

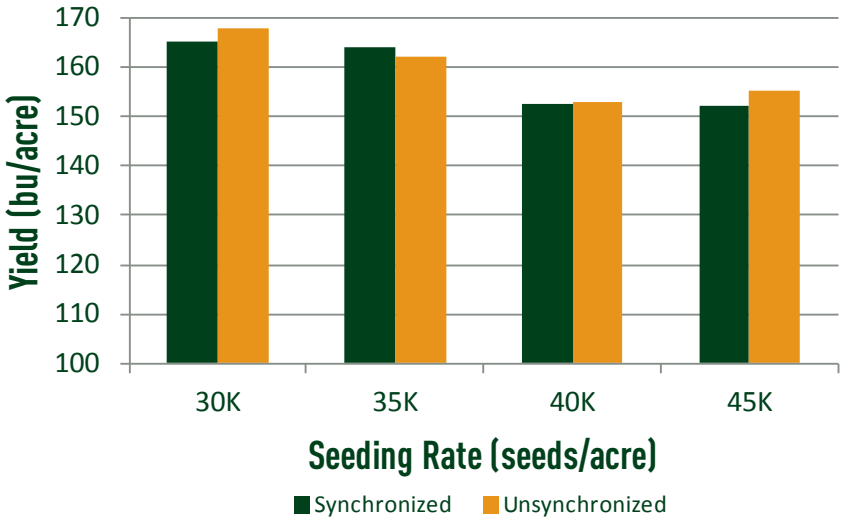

Figure 3. Effects of seed placement in twin rows and plant population on average yield of three corn products in 2013.

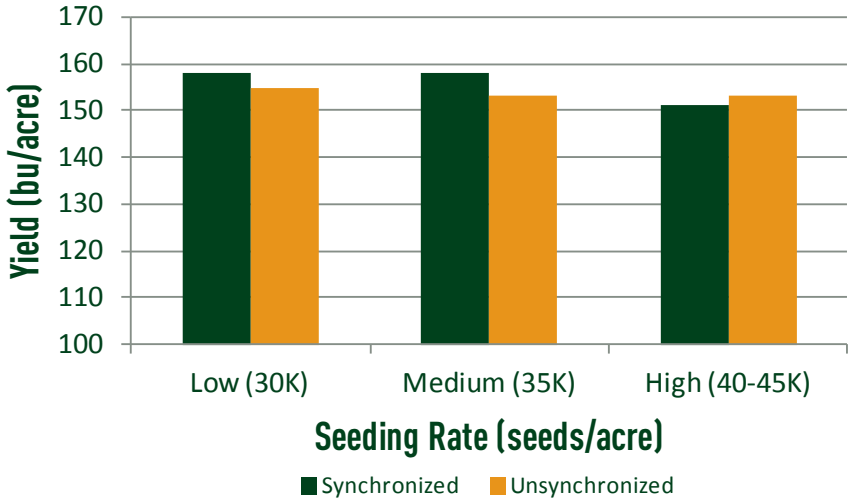

Figure 4. Effects of seed placement in twin rows and plant population on two-year yield average of three corn products.

Sources and Legals

[1] Nelson, K. A., and R. L. Smoot. 2009. Twin- and single-row corn production in northeast Mis. Crop Management, University of Missouri. [2] Evaluation of Twin Rows in Corn. 2009. National Research Summary. Monsanto Company. Importance of proper spacing for plants in twin row configuration. 2012. Monmouth Learning Center 2012, Demonstration Report. Monsanto Company. Populations and variable rate seeding for corn. 2013. agKnowledge Spotlight for DEKALB® Brand. Monsanto Company.

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