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Corn planting decisions: What's changed and what's the same?

Mark Licht
Iowa State University, lichtma@iastate.edu

Emily Wright
Iowa State University, ewright5@iastate.edu

Mitch Baum
Iowa State University, mebaum@iastate.edu

Nick Upah
Iowa State University, nickupah@iastate.edu

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Mark Licht, assistant professor, Agronomy and Extension cropping systems specialist, Iowa State University; Emily Wright, research associate, Agronomy, Iowa State University; Mitch Baum, graduate student, Agronomy, Iowa State University; Nick Upah, graduate student, Agronomy, Iowa State University

Corn planting is arguably the most important field operation. Wide sweeping decisions from hybrid selection, row spacing, and seeding rates to planter adjustments, seed depth, and field conditions all come together the day planting occurs. It is a perfect storm where all these decisions align to achieve ideal stand establishment and set the stage for high yield potential.

It's been stated many times that ideal planting conditions are when soil moisture is conducive for planting without compaction and soil temperatures are 50°F and rising. We have consistently heard that seed depth placement should be 1.75 to 2 inches deep and that planter maintenance and adjustments should be made to not only achieve desired planting depth but also ideal plant-to-plant spacing. Hybrid selection, planter row spacing, and seeding rate are decisions made ahead of time. These are decisions that come at great cost. Seed costs account for approximately 20% of the cost of production and machinery is a large investment realized over several years. Choosing hybrids that match cropping system practices, weather conditions, and soil environments is extremely important.

The old

Row spacing and plant population have been the focus of many studies throughout the years in an effort to identify ways to increase maize yields and minimize production costs. Many studies have shown that there was yield increase going to 30-inch rows from 40-, 38-, or 36-inch rows. Research looking at row spacing less than 30-inches have had varying results. In some cases row spacing has had no effect on yield, whereas others have seen anywhere from a 2 to 7% increase in yield by narrowing row spacing from the more common 30-inch rows.

Since 2000, plant densities in Iowa have increased approximately 300 plants per acre per year. However, genetics and environment have an influential role to play. For many years, seed companies have targeted hybrids for placement in certain field environments and seeding densities. University recommendations often place target corn seeding rates at 34,000 to 37,000 seeds per acre.

Research over the years has indicated that a corn-planting window of April 11 to May 18 is ideal to achieve 95% yield potential. Ideal planting dates and windows vary greatly from year to year and geographic area of the state. Planting date alone does not determine yield potential; genetics and environmental factors have significant influence. Soil conditions at and following planting combined with planter adjustments influence time to emergence, early root development, and plant stand establishment that carry forward through the growing season. Hybrid maturity combined with heat unit are factors that can affect the length of the grain filling period and ultimately yield potential.

The new

Since 2009, there have been ten site-years of research conducted in northwest Iowa looking at the interaction of row spacing and seeding rate. In an analysis of the ten site-years, 50% of the trials resulted in 20-inch row spacing yielding significantly greater than 30-inch row spacing (Figure 1). In the other site-years, yields were not significantly different. Overall, there was not a penalty to the 20-inch row spacing.

There were no row spacing by seeding rate interactions across the 10 site-years, therefore, it would not be recommended to change seeding rates when switching to a 20-inch row spacing.

Corn planting date and hybrid maturity selection are often considered to be linked, especially when late planting is forced because of spring weather conditions. A trial conducted at seven sites from 2014 through 2016 looked at yield impact from late planting as well as hybrid maturity selection. The critical date of planting before yield penalties were realized was May 8, May 12, and May 6 at the northern, central, and southern locations (Figure 2). This early to mid-May critical planting date represents a slight narrowing of the planting date window from previous recommendations. Longer season hybrids had greater yield potential when planted before the critical planting date. Hybrid maturity selection became less important when planting dates were delayed past mid-May. For late May and June planting dates short season hybrids were significantly higher yielding only 10% of the time and nominally higher 33% of the time. It should be noted that in northern Iowa, 44% of the time none of the hybrids reached physiological maturity when planted in late June. This is ultimately the risk of late planting: that adapted hybrids may not reach maturity before a fall killing frost.

Summary

As a result of recent research, there is evidence that 20-inch corn row spacing does not result in lower yield potential compared to 30-inch row spacing. This is significant because it could open an opportunity for overall greater profitability when considering the entire cropping sequence. While 20-inch row spacing may be inconsistently increase corn yields, there would certainly be a yield benefit in soybean production years

Timely planting and use of full season hybrid maturities is extremely critical to attaining high yield potential. This does not mean hybrid maturity selection should be shortened when planting after mid-May. Well-adapted hybrid maturities should be retained until planting gets delayed into late June. For late June planting dates shortening hybrid maturity or switching crop selection should be considered to avoid the risk of not achieving physiological maturity prior to fall frost.

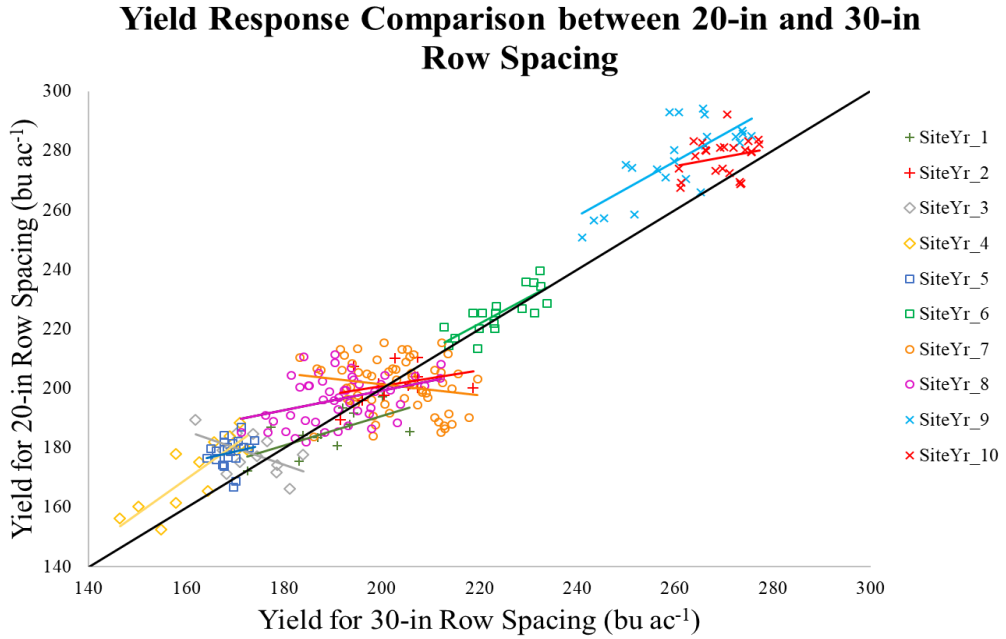

Figure 1. Corn yield response for 20-inch and 30-inch row spacing at ten site-years in northwest Iowa from 2009 through 2016. The solid line is the 1:1 yield line.

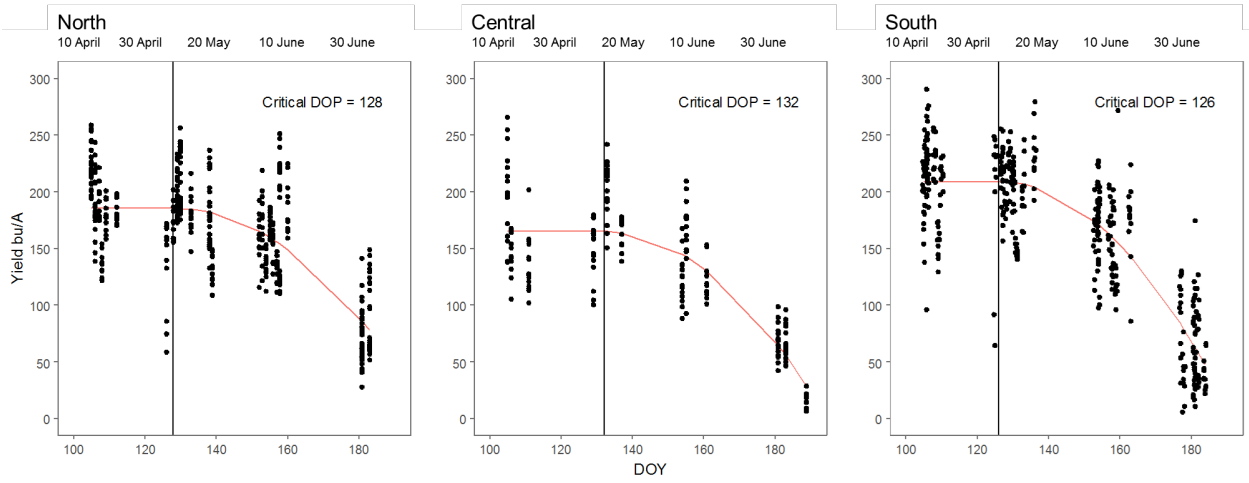

Figure 2. Critical planting dates for northern, central, and southern Iowa across 21 site-years using four planting dates and three hybrid maturities, except in central Iowa were four hybrid maturities were used.

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