Planting Population Effect on yield potential in dryland and irrigated corn

Planting population is a critical crop planning decision which ultimately helps establish corn yield potential. Optimum corn planting populations may vary greatly depending on whether the field is in a rainfed or irrigated production system. Many producers may look to reduced plant populations as a saving on seeding costs; however, final yield may be reduced with low planting populations, particularly when nutrients and water are not yield-limiting factors.

Planting population recommendations vary in the Midsouth, from as low as 16,000 seeds/acre for less productive dryland acres to 38,000 seeds/acre on highly productive irrigated fields with a trend toward increasing populations in highly productive fields[1,2]. Typically seeding rates should exceed the desired planting population by 5 to 10%. Many corn products have recommended planting rates based on "earflex", which is the product's ability to compensate for fewer plants/acre where the ear has the potential to grow both in length and girth[1].

Study Guidelines

Demonstration trials were conducted in 2012 at the Monsanto Learning Center at Scott, MS to determine the effect of five planting populations: 25,000, 28,000, 31,000, 34,000 and 37,000 seeds/acre and irrigation on yield potential of corn products. Two corn products, DKC64-69 Brand (114-day relative maturity (RM)) and DKC66-96 Brand (116-day RM), both with Genuity® VT Triple PRO® traits, were planted on April 4, 2012. Half of the trial was furrow irrigated as needed and the other half was dryland. Standard agronomic practices for the area were implemented. The demonstration trial was harvested on August 16, 2012 for yield and adjusted to 15.5 percent moisture.

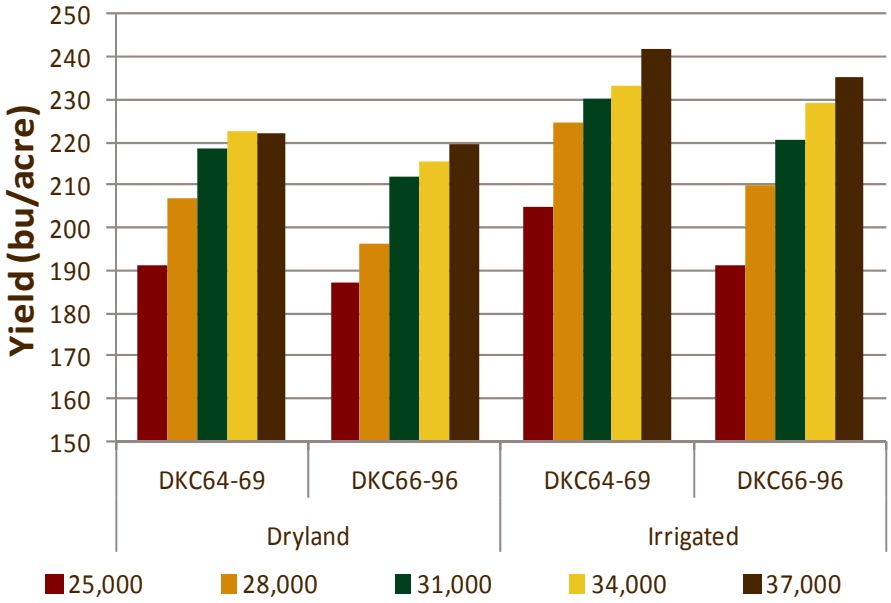

Figure 1. Planting population effect on yield potential for two corn products on irrigated and dryland acres.

Results

Yield results for the dryland demonstration show that DKC64-69 Brand had the highest yield when planted at 34,000 seeds/acre and DKC66-96 Brand had the highest yield at 37,000 seeds/acre. However, yield did not increase greatly with planting population beyond 31,000 seeds/acre on dryland. For the irrigated demonstration, both products had the highest yield when planted at 37,000 seeds/acre. These results suggest that higher yield potential may be realized in irrigated corn when planted at populations higher than 31,000 seeds/acre. It is important to note that it is not recommended to plant DKC64-69 Brand at populations over 34,000 seeds/acre to help manage the potential for late season lodging.

Conclusions

Under ideal environmental conditions, yield potential on dryland corn fields may increase at planting populations above 31,000 seeds/acre, but a grower assumes additional risk with the additional seed investment and gambles that rainfall will be adequate to utilize the planted populations to increase corn grain yield. Ear barrenness and ear tip kernel abortion may occur when high planting populations cause interplant competition in the presence of environmental stresses. When evaluating a corn

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product and planting population, monitoring barren stalks and ear tip kernel abortion can help in determining a suitable population[2].

It is important to note that yields presented for 2012 for dryland corn were above average for Scott, MS due to the timing of rainfall events (Figure 2). This demonstration will need to be repeated to obtain results more typical for dryland acres in the region.

This demonstration also illustrates how irrigation can help facilitate corn production at higher planting populations, contributing to both yield level and yield stability. Yield results from this trial suggest that planting populations for an irrigated field should be 31,000 seeds/acre or higher (depending on hybrid planted) to maximize yield potential. However, planting populations are a localized decision based on a detailed knowledge of the grower's local climate, product choice, yield history, yield goal, and tolerance for risk. In general, as risk is reduced either with the addition of irrigation and/or proper product selection, properly managed, higher surviving populations have the potential to generate higher yields.

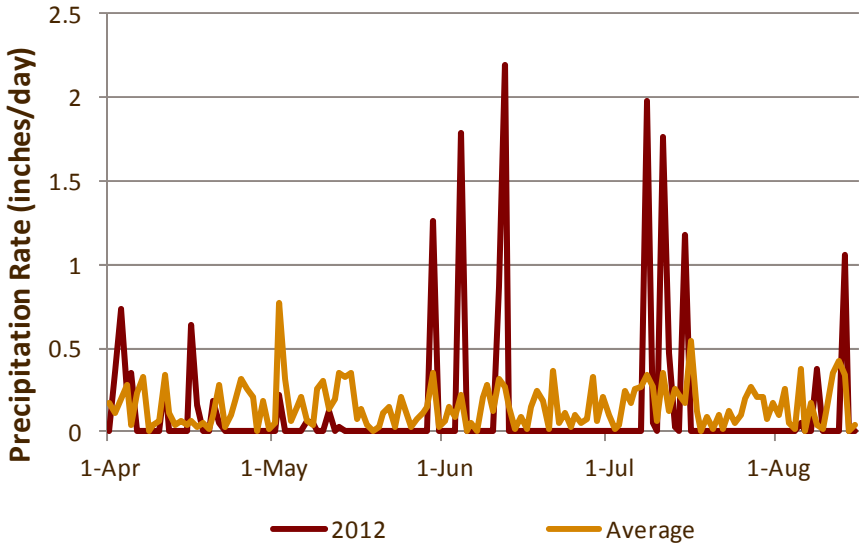

Figure 2. Rainfall in 2012 compared to 10-year average for Scott, MS.

The information discussed in this report is from a single site, non-replicated, one-year demonstration. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

Sources: [1]Espinoza, L. and J. Ross. Corn Production Handbook. University of Arkansas. MP437-250-6-08R

[2]Larson, E. J. Corn plant population. Mississippi State University Extension Service . IS1548.

[3]Thompson McClure, A. Planting corn for grain in Tennessee. University of Tennessee Extension. W077.

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