The Response Of Corn Products To Increasing Populations

Introduction

Generally, corn yield potential will increase with increasing populations.[1,2] However, the optimum plant population density can vary depending on product genetics.[3,4,5] As a hedge against weather related lodging risk and to account for the plant structure and ear placement of most older, southern adapted products, many Southern producers have traditionally planted corn at lower than optimal plant populations. This is because lodging can occur with increased plant populations and can be magnified when insect or weather damage is introduced.[6]

A trial was conducted at the Monsanto Learning Center at Scott, MS to evaluate the response of DEKALB® brand corn products to planting populations that represent low, medium, and high densities. The objectives of the trial were to determine: the optimal population for a given corn product and the characteristics (ear height, ear weight, momentum, yield by population) of the corn products compared to the older corn products. This trial has been conducted in previous years, including 2012.

The trial was planted on April 18, 2013 utilizing 9 corn brands, 3 populations (31,000, 34,000, 37,000), and 2 row configurations (Table 1). The plots were also irrigated as needed.

Table 1. Treatments used in the trial

Corn Brands	Population	Row Configuration
DKC61-78	31,000	Single
DKC61-88	34,000	Twin
DKC62-08	37,000	
DKC64-69		
DKC66-40		
DKC66-87		
DKC66-97		
DKC67-57		
DKC67-88		

The measurements taken from each replicated plot included:

- Height to ear shank from ground, 10 ears per plot
- Weight per ear in grams, 10 ears per plot
- Momentum calculated as height in inches X weight in grams
- Yield in bushels per acre from the 4 row X 150 ft plot adjusted to 15.5% moisture

Results and Conclusions

Average ear height varied by corn brand, but generally did not vary by population for each corn brand (Figure 1). Therefore, average ear height across populations is presented. Average ear weight was generally consistent across brands, but varied by population. Momentum is a measurement of the combined force from ear weight (grams) and ear placement (inches from the ear shank to the ground), where higher placed heavier ears have the potential to contribute to lodging characteristics for a given corn product. Average momentum values varied by both corn brand and population of each corn brand (Figure 2). DKC61-78 brand had similar average momentum values at all populations. DKC61-78 also had the lowest momentum values, which indicates it had some of the lower lodging potential at all tested populations. DKC67-88 brand had the highest average momentum value; therefore, had the highest potential of lodging. In some cases, average momentum values were higher at lower populations, which is due to bigger ears. This indicates there is not more risk associated with planting at higher populations for some corn brands. Average yields varied by both corn brand and population of each corn brand (Figure 3). In general, average yields increased at the two higher populations (34,000 and 37,000 seeds/acre). DKC67-88 brand had a higher momentum than other products (Figure 4). DKC61-78 brand and DKC66-97 brand had lower momentum than other products.

Summary

In past years growers have planted low populations for the sake of standability. The elimination of stalk feeding pests by YieldGard® products and the Genuity® family of traits along with the change in plant structure is helping to manage harvest lodging risk. Corn brands are now different in their structure which allows increasing populations without greatly increasing risk. This is mostly measured in the momentum calculation. As populations increase, generally the ear moves a bit higher and is smaller on average. These characteristics can allow growers to increase yield potential without greatly increasing harvest related lodging risk.

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Sources and Legals

[1] Thomason, W. 2005. Corn plant populations and yield goals. Virginia Tech Cooperative Extension. Crop and Soil Environmental News, March 2005. Available online: www.ext.vt.edu/;

[2] Williams, W.A., et al. 1968. Canopy architecture at various population densities and the growth and grain yield of corn. Crop Sci. 8:303-308;

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[4] Cox, W.J. 1996. Whole-plant physiological and yield responses of maize to plant density. Agron. J. 88:489-496;

[5] Widdicombe, W.D. and Thelen, K.D. 2002. Row width and plant density effects on corn grain production in the northern Corn Belt. Agron. J. 94:1020-1023;

[6] Sorensen, R.B. et al. 2006. Row pattern, plant density, and nitrogen rate effects on corn yield in the Southeastern US. Plant Management Network;

Standability evaluations of DEKALB® brand corn Ppoducts. Scott Learning Center Demonstration Report 2012.

The information discussed in this report is from a single site, non-replicated 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.

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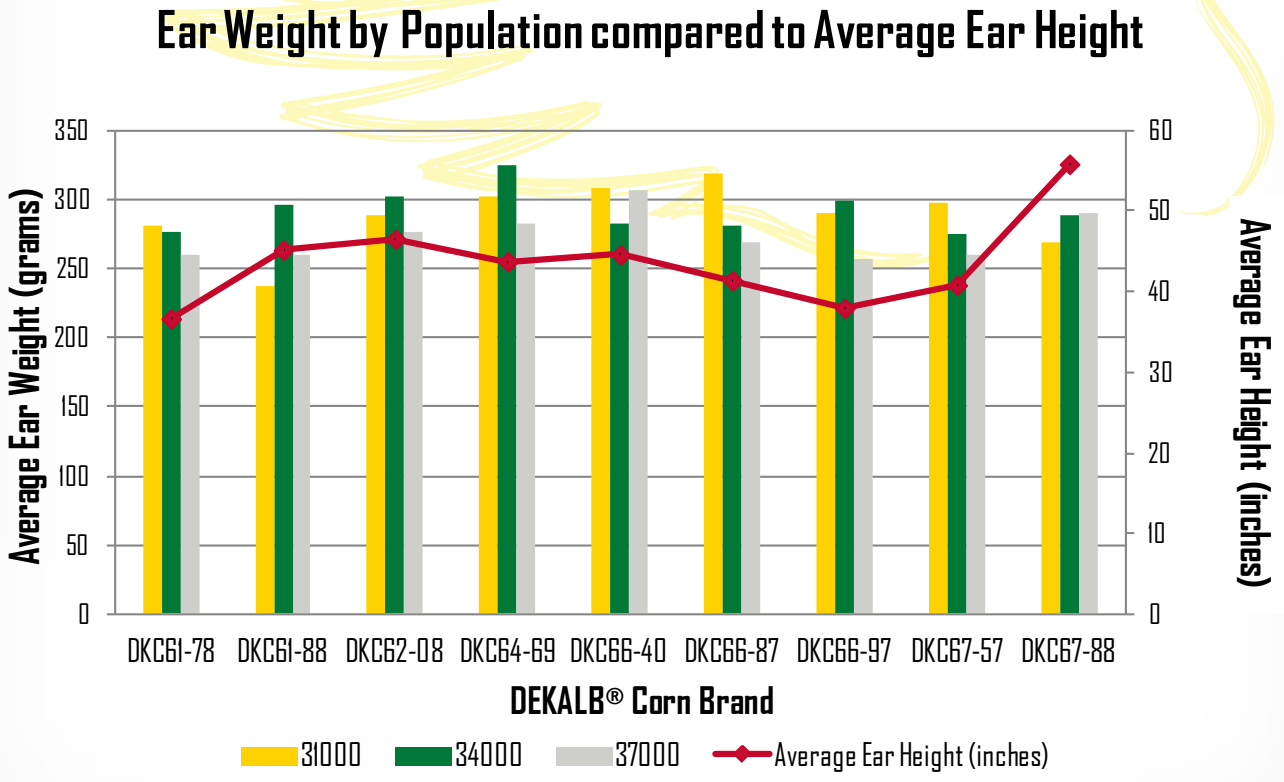

Figure 1. Average ear weight (grams) by population compared to average ear height (inches).

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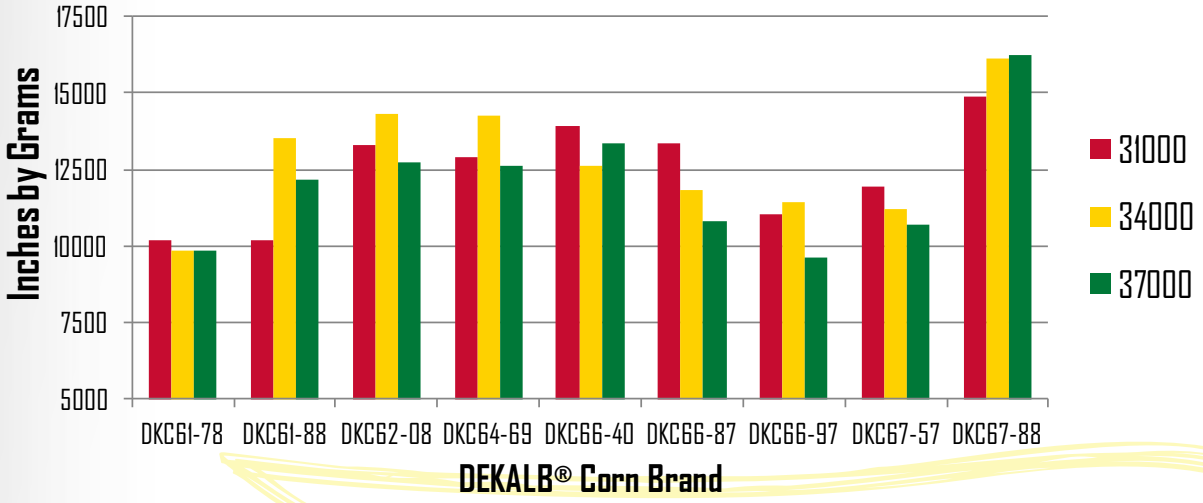

Figure 2. Average momentum (inches x grams) by population.

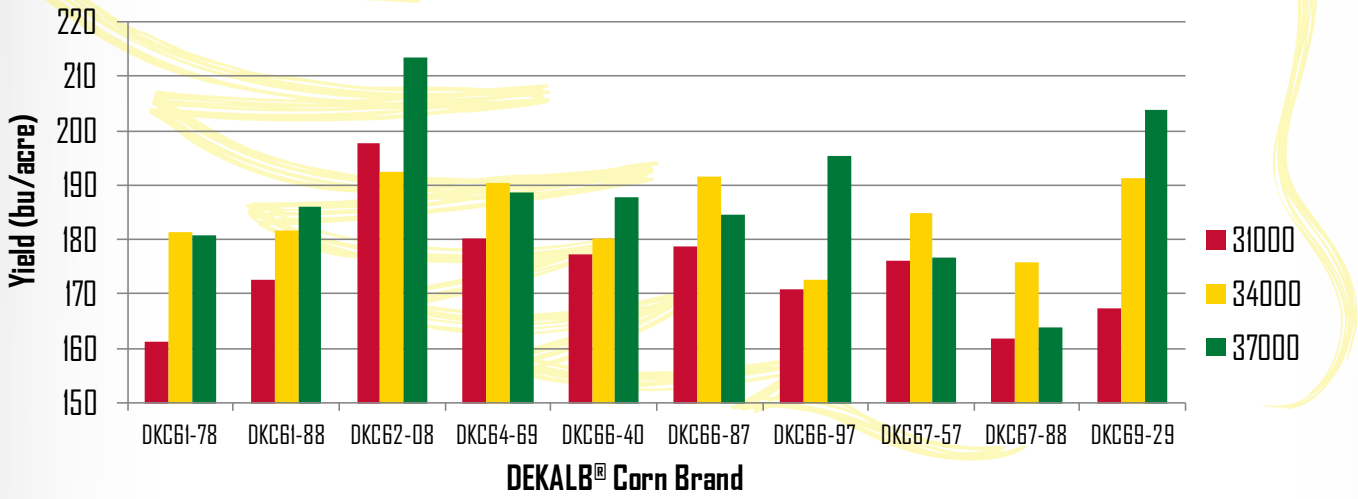

Figure 3. Average yield (bu/acre) by population.

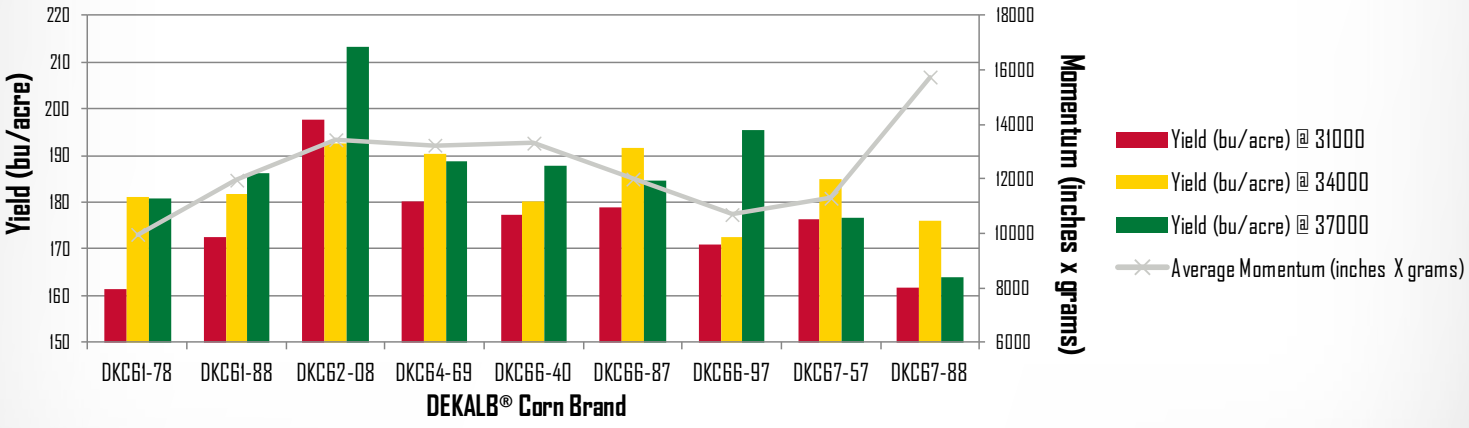

Figure 4. Average yield (bu/acre) by population compared to momentum.