



## EVALUATION OF NEW CORN BRANDS X POPULATION

The responses of modern and/or recently released corn brands when planted at low, medium, and high populations were evaluated at the Scott Learning Center. Evaluations included yield, ear height, ear weight, and ear “momentum”. These evaluations should be considered when selecting a planting population that will help maximize yield potential and profitability, while minimizing the risk of lodging and the costs associated with lodging and harvest loss.

### BACKGROUND

Traditionally, corn adapted for the southern United States has been tall with high ear placement. Additionally, corn fields in the south are at risk for weather-related damage such as hurricanes. Damage from insects common in the south such as southwestern corn borer (SWCB), sugarcane borer (SCB), and European corn borer (ECB), can weaken the stalk and increase the chance for lodging. Considering the variables just mentioned, optimal yield potential would often have to be sacrificed for standability.

Corn breeders select for germplasm that can produce respectable yield potential in stressful environments. This can often be observed when comparing modern and older germplasm in stressful situations, such as increasing populations. Modern corn tends to maintain ear size at higher populations, compared to older corn that are more likely to have nubbin ears or barren stalks under stress. Even with the advancements in breeding, differences are still present among the modern corn brands in terms of how they respond to higher populations relative to yield potential and standability. Demonstration plots were established at Scott Learning Center to evaluate these differences.

### PLOT ESTABLISHMENT

Ten corn brands were evaluated in plots that were 150 feet long by 4 rows wide, and replicated twice. All four rows of each plot, planted on 38-inch beds, were taken to yield. Nitrogen was applied at 240 pounds/acre. Agronomic practices were standard for the area. Populations were 31,000, 35,000, and 39,000 plants/acre (ppa). Stand loss was minimal, so harvest populations can be used synonymously with planting populations. Planting date was April 1, 2011 and harvest date was August 15, 2011.

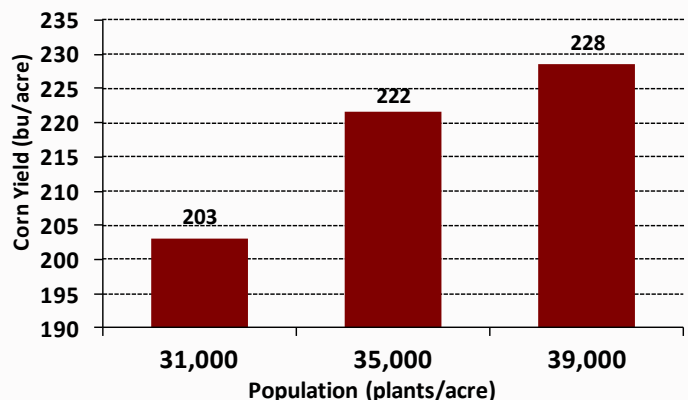
Yield (bu/acre) was taken for each plot and corrected to standard moisture. Plant characteristics were evaluated on 10 plants per plot. Characteristics evaluated include ear height (inches from the soil surface), ear weight (grams), and ear “momentum”. The characteristic of ear “momentum” is calculated by multiplying ear height by ear weight. While there are several factors that can contribute to lodging, ear “momentum” can be used as an indicator for lodging potential as it

relates to ear height and weight. A higher ear “momentum” would tend to indicate potential for more lodging.

### RESULTS AND CONCLUSIONS

#### Effect of Population on Yield.

Averaged across corn brands, higher populations resulted in higher yields (Figure 1). There was an 18 bushel/acre increase for 35,000 vs. 31,000 ppa. There was a 6 bushel/acre yield increase for 39,000 vs. 35,000 ppa.



**Figure 1. Yield response to higher populations averaged across 2 replications of 10 corn brands.**

#### Effect of Population on Yield by Brand.

Not all corn brands have the same yield response to different populations (Figure 2). For each increase in population, nine of the ten corn brands had a positive yield response, albeit to different degrees. DKC64-69 brand produced similar yields at all three populations.

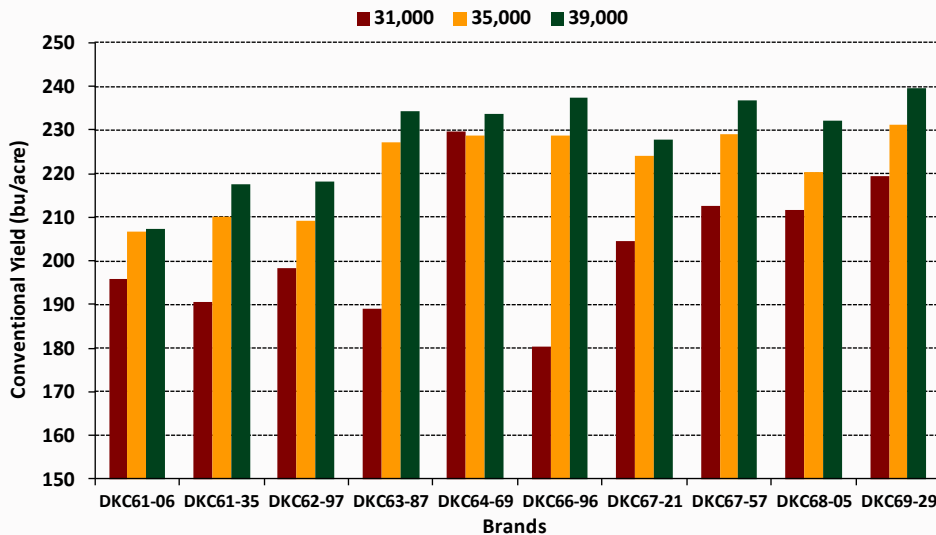
#### Effect of Population and Corn Brand on Ear Height, Ear Weight, and Ear “Momentum”.

Ear heights were influenced more by corn brand than population (Figures 3 and 4). The average effect of population on the ear

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height of a corn brand was 2.4 inches (5.9% of the average ear height). However, the average difference in ear heights across corn brands at each of the populations was 10.9 inches (26.7% of the average ear height). The degree to which the ear height of a corn brand changed due to population, varied by corn brand.

Ear weights were influenced more by corn brand than population; however, the effect of population on ear weight was greater than the effect of population on ear height (Figures 3 and 4). The average effect of population on the ear weight of a corn brand was 25.4 grams (10.6% of the average ear weight). However, the average difference in ear weights across corn brands at each of the populations was 86.8 grams (36.3% of the average ear weight). The degree to which the ear weight of a corn brand changed due to population varied by corn brand.

The measure of ear “momentum” is a means to gauge two aspects of the susceptibility of a corn brand for stalk lodging, by multiplying

ear height and ear weight. The lowest population had the highest ear “momentum”, due to having larger ears on average with similar ear height. The higher risk of lodging that is associated with a higher ear “momentum”, is often offset by reduced competition for moisture and nutrients that can be seen at lower populations, and/or a corn brand’s ability to cannibalize, and/or a corn brand’s rind strength.

### COMMENTS AND EXAMPLES

Corn brands differ in their response to higher populations in terms of their potential for increased yields, and also increased risk for lodging. It is important to understand how corn brands respond to different populations prior to deciding what planting population to use. Here are some examples of different responses seen in this trial:

- 1) DKC64-69 brand did not show a positive yield response to higher populations, and should not require the extra investment in seed. This enables

plantings with optimal yield potential at lower planting rates, which can help preserve stalk strength, as well as help minimize lodging risk and maintain high yields for the grower at minimum investment.

- 2) DKC66-96 brand provided a large yield response to higher populations, and has lower ear heights, weights, and ear “momentum” that help reduce the risk of lodging, which makes it feasible to attempt planting the higher populations that can reward with more yield without greatly increasing the risk of lodging associated harvest losses.
- 3) DKC67-21 had a positive yield response to higher populations; however, lodging risk associated the high ear placement and ear weight of the corn brand need to be seriously considered prior to increasing populations.

### SUMMARY

When selecting corn brands and their respective planting populations, consider the following factors:

- What is the general yield potential for the corn brand in the environment that it will be placed?
- Is the corn brand likely to have a large enough yield increase at higher populations to cover the increased cost of seed?
- Is the risk for increased lodging at higher populations (as it relates to ear height and weight) worth the benefit of the potential increase in yields at higher populations?

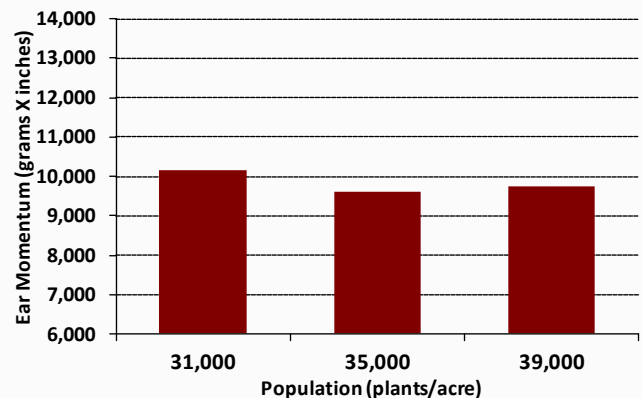
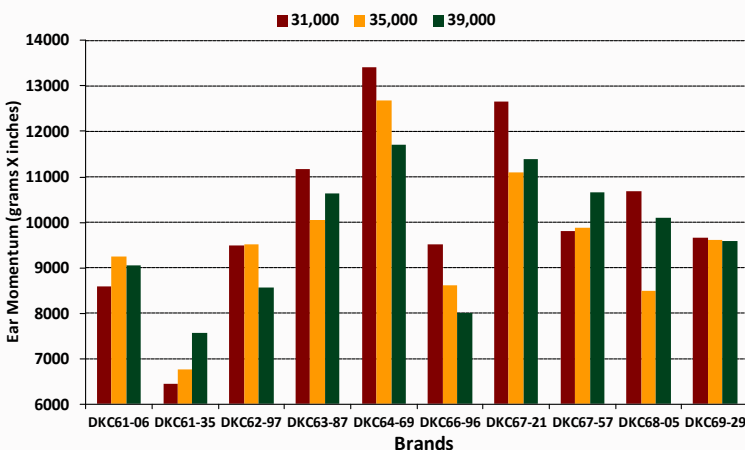
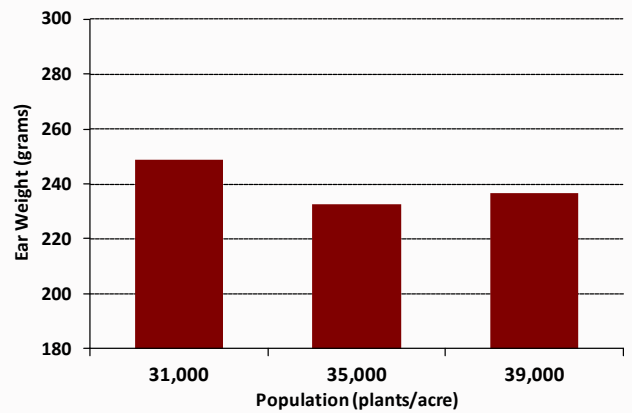
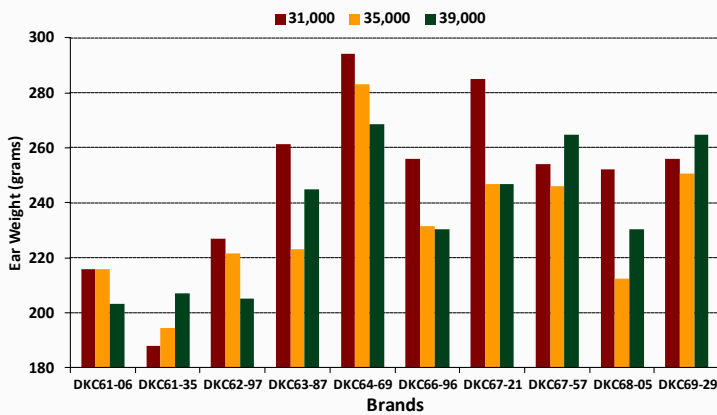
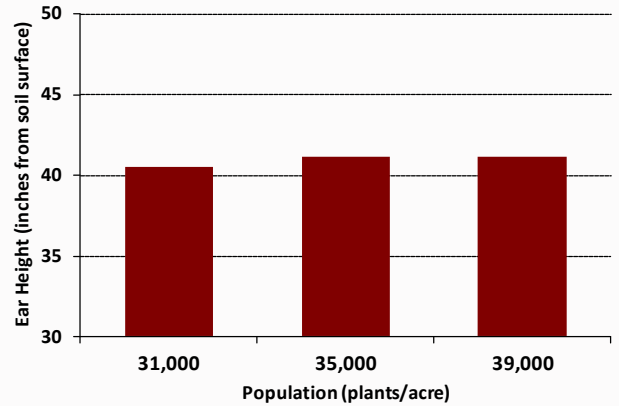
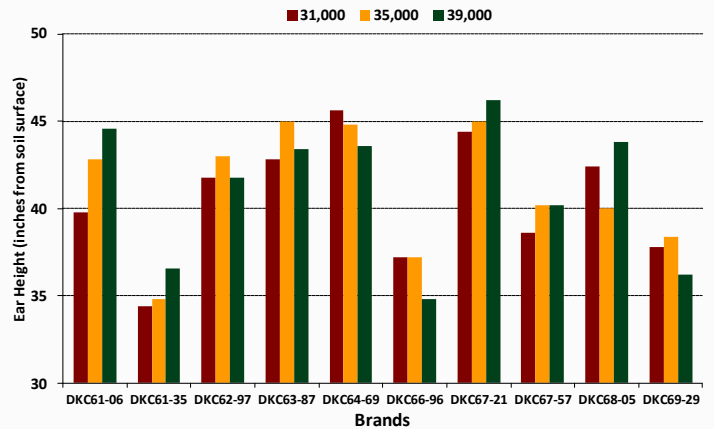
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# 2011 LEARNING CENTER

at Scott, Mississippi  
DEMONSTRATION REPORT



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**Figure 3. Differences in corn brand characteristics at various populations.**

**Figure 4. Effect of population on ear height, ear weight and ear "momentum" averaged across 10 corn brands.**

The information discussed in this report is from a single site, two-replication, 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.

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