

THE EFFECT OF SELECTION FOR HIGH VERSUS LOW
KERNEL DENSITY AND FLINT VERSUS DENT KERNEL TYPE
IN A SYNTHETIC CORN VARIETY

A Thesis

Submitted to the Faculty

of

Purdue University

by

Gustavo Anibal Vera

In Partial Fulfillment of the

Requirements for the Degree

of

Doctor of Philosophy

May 1973

ABSTRACT

Vera, Gustavo Anibal. PhD., Purdue University, May 1973. The effect of selection for high versus low kernel density and flint versus dent kernel type in a synthetic corn variety. Major Professor: Paul L. Crane.

One of the important aims in world-wide work on corn improvement has been yield increase. Several plant characters have been studied and their relationship to yield determined. The effect of selection for kernel type is a topic on which little work has been done. This work tries to determine the effect of kernel type and kernel type selection on yield and other characters.

An advanced generation from the cross Eto x CBC (Corn Belt Composite) was used, and two types of selection were performed: kernel density and visual selection. Four cycles of selection for high and low density were completed, and three cycles for visual flint and visual dent.

The different cycles of selection were tested in five locations in Indiana and six variables were analyzed: yield, percent moisture, stand, lodging, and plant and ear height.

In general, visual selection was more effective than density selection, because the means of the former tend to shift with more intensity in each direction of selection than the means of the density subpopulations. Yield was not

affected by the methods of selection, remaining about the same for both types of selection. Percent moisture tended to increase with selection in the visual dent subpopulation. Stand was different among the entries, due mainly to the age of the seed. The "Low Density" subpopulation showed more lodging than "High Density" subpopulation. "Low Density" tended to become taller with each cycle of selection. "Visual Dent" also tended to become taller than "Visual Flint" with each cycle of selection. For ear height, the "Visual Dent" subpopulations were taller than "Visual Flint", but the differences among entries were less than for plant height.

Since selection for "Visual Dent" resulted in higher moisture, taller plants and higher ears, it suggests that under the conditions of this work, an indirect selection for later maturity was made.

From the results presented it can be concluded that, although statistically significant differences among entries in characters as moisture, stand, and plant height existed, it is possible to select for dent or flint kernel types in a population heterozygous for these types, without appreciably affecting yield, percent moisture, percent stand, percent lodging, and plant and ear height. This is because the differences were small. However, precautions should be taken to avoid confounding immaturity with softness of kernel.