SOME GENETIC AND MORPHOLOGIC CHARACTERS AFFECTING THE POPPING EXPANSION OF POPCORN

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There are few crops which vary more in quality than popcorn. Some of these causes can be remedied by better methods of storage and care in getting the crop from the producer to the consumer. Others can be remedied only by improvement in variety or type.

Popping expansion, or popping volume, measured as units of volume of popped corn obtained from an original unit of shelled corn, is used as the primary criterion of quality. The importance of this measure to the operators of commercial establishments is obvious since their product is sold on the basis of volume rather than weight. A high expansion is also associated with palatability because the lighter and fluffier kernels are usually the more tender.

Considerable progress has been made in the improvement of a few varieties by seed selection. Much greater improvement is now possible, however, by using the modern method of hybridization of inbred lines which has been so successful with field corn. Except for evidence obtained from studies to improve popping expansion by mass selection, little is known of the inheritance of popping quality. It is reasonable to assume that expansion of popcorn is conditioned by certain properties of the endosperm and pericarp and hence the mode of inheritance may be very complex. Any information on the relation between the popping expansion of inbred lines and their hybrids and on the relation of kernel characters and popping expansion should be of value in outlining and conducting a well-planned breeding program for this crop.

MATERIALS AND METHODS

Twenty-nine inbreds classified from previous work as high or low in popping expansion were selected from the varieties Yellow Pearl and Japanese Hulless. The high expansion inbreds ranged from 25.4 to 31.1 volumes and the low expansion inbreds from 15.0 to 23.4 volumes. The name Yellow Pearl, also applied to a distinct variety, is used as a type name in this study for all yellow varieties having pearl type kernels.

In order to determine the relation between popping expansion of inbred lines and their F1 crosses, 202 crosses were made in 1940 between high and low popping lines within and between the two groups of varieties as shown in Table 1.

Each of the three groups with standards for comparisons were arranged in a randomized block design with five replications. The test plot size was 2 x 5 hills, thinned to three plants per hill. The inbred material was space-planted in five replicated 30-foot rows, approximately 10 inches between plants.

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