

Frequency Distribution of Maize Yield Before and After Reciprocal Recurrent Selection¹

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Abstract

Reciprocal recurrent selection in populations of *Zea mays* L. will be of great value if the increase in mean performance is accompanied by a corresponding increase in performance of hybrids found in the upper tail of the genotypic distribution. We examined the frequency distributions for yields of two populations of single-cross hybrids. A population of 192 intercultivar single crosses among inbreds was derived from two cultivars, 'Jarvis Golden Prolific' and 'Indian Chief', after six cycles of reciprocal recurrent selection. This population of single crosses was compared with a control population of 185 single crosses among unselected inbreds from the original cultivars. Frequency distribution of average single-cross yields over replications and locations showed no significant deviations from normal distributions. A small but statistically significant estimate of skewness was found for average yields of single crosses from the selected cultivar. Mean yields of single crosses from the selected cultivars averaged 12.5% greater than those from the unselected cultivars. Variances among the selected single crosses were smaller than among the unselected single crosses, but the differences were small and not statistically significant. Reciprocal recurrent selection apparently had little effect on the distribution of single-cross yields other than an increase in mean performance. This implied that the shape of the distribution had not changed but that the distribution had been shifted to the right, with an increased probability of outstanding hybrids in the upper tail. The best 10 single crosses from the selected population averaged 8.6% more yield than the 10 best single crosses from the original population. Five single crosses from the selected population exceeded the yield of the best single cross from the control population.

Key Words: Skewness • Kurtosis • Normal distribution • Single crosses

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