

1. Inbreeding depression in inter-variety populations of open-pollinated varieties of corn and interaction of non-allelic genes.

Experimental evidence on the importance of interactions among nonallelic genes is being sought in statistical genetic investigations with corn. Vetukhiv (Evolution 8:241-251, 1954) measured survival to adulthood as an index of viability of the larvae in geographical strains of three species of *Drosophila* and in the F_1 and F_2 populations from crosses among strains within the species. In crosses between strains within two of the species F_1 's were superior to both parent strains and the F_2 's were inferior, at least to the average for the parent strains. The results were interpreted as indicative of epistasis as an important aspect of genotypic variation at the inter-strain level, if not within strains. An experiment, similar to that conducted by Vetukhiv, was carried out with corn in 1955 using the Jarvis, Indian Chief and Weekley open-pollinated varieties and the F_1 and F_2 of the three possible crosses among them. If heterosis in these crosses, reported earlier (see American Naturalist, in press), is entirely due to allelic gene interaction (dominance) the F_2 should be intermediate in mean yield between the F_1 and the average for the two parent varieties in contrast to the type of results obtained by Vetukhiv and explainable on the basis of epistasis.

The parent varieties, F_1 and F_2 (inter-se mated F_1) of each population were grown in replicated plots at three locations and the results for yield are reported below.

Entry	Jarvis x Indian Chief (lbs/plant)	Jarvis x Weekley (lbs/plant)	Jarvis x Indian Chief (lbs/plant)
F_1	.40	.44	.50
F_2	.39	.40	.47
Parents	.36	.37	.42

These results do not support the hypothesis that epistatic effects are important in genetic variation of segregating populations of the cross of two open-pollinated varieties of corn.

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