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1. <u>Estimates of genetic variance components in two open-pollinated varieties and populations derived from the cross between them.</u>

Estimates of the genetic variance components based on two years data have been obtained for the F_2 generation of the cross of the Jarvis and Indian Chief open-pollinated varieties of corn. These estimates and those made earlier on the parent varieties and F_1 of the variety cross are given below.

<u>Estimates of Genetic Variances 1956-1957</u>

Population	Male	Female	Mean Yield lbs./plot
<u>Intra-variety</u>			
Jarvis	.00101	.00093	
Indian Chief	.00057	.00082	.520
<u>Inter-variety</u>			
Jarvis x Indian Chief	.00036	.00078	
Indian Chief x Jarvis	.00038	.00052	.587
<u>Advanced Generation Variety Cross</u>			
(Jarvis x Indian Chief) F_2			
1956	.0021	.0013	
1957	.0014	.0016	.540

Although the variance estimates for the different populations were obtained in different years, it is not likely that the differences in the genetic variances of the three kinds of populations are due to environmental differences. The genetic variance of the F_1 cross between the varieties is less than the intra-variety estimates, which is compatible with the partial to complete dominance hypothesis for the explanation of gene action conditioning the expression of yield.

The estimate of the genetic variance of the (Jarvis x Indian Chief) F_2 is considerably greater than any of the other estimates. In fact, the estimates of the male component for this population is the highest estimate obtained to date from populations involving these varieties. This suggests that a 20% increase in yield is possible by selecting and intercrossing the superior 5% of the (Jarvis x Indian Chief) F_2

progenies. The relatively high genetic variance and mean yield of this population provides indications that such material may have potential value that has not been exploited in the breeding programs.

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1. Brown spot resistance in corn.

Individual inbred, F_1, F_2, B_1 and B_2, corn plants were inoculated with brown spot (Physoderma maydis Miyabe) and rated for disease symptoms in three environments (i.e., one location in 1956 and two locations in 1957). Double cross plants were also grown and rated.

Three groups were studied. Group 06 consisted of six inbreds and all possible sub-populations (15 F_1, F_2, B_1 and B_2 combinations). Group 08 consisted of eight inbreds (six common to group 06) and all possible sub-populations (28 F_1, F_2, B_1 and B_2 combinations). Group 11 consisted of eleven inbreds (six common to group 08 and four common to both 06 and 08) and all possible F_1's.

The following mean number of plants were observed for each combination in each indicated sub-population in each group:

Group	Inbreds	F_1	F_2	B_1	B_2
Group 06	83	92	166	87	88
Group 08	61	64	123	62	62
Group 11	80	87	–	–	–

For example in group 06, 83 plants were rated of each of the six inbreds, and 92 F_1 plants were rated of each of the 15 possible F_1's.

The following conclusions were drawn:

1) F_1 plants were found to be approximately 13 percent more susceptible than inbred plants when compared on the same rating scale.

2) In 98 comparisons of F_1's with inbred parents, ten were more resistant than either inbred parent and 43 were more susceptible.