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.

3) Significant and positive correlations were found between mid-parent and F_1 means (.7526, .4214 and .5711).

4) Significant and positive correlations were found between inbred means and "general inbred means" in two groups (.8665 and .6551) and nonsignificant but positive in a third group (.5274). "General inbred mean" is mean performance of an inbred in F_1 crosses.

5) Predicted double cross performance was correlated with actual performance. Three prediction methods were used: Jenkins' methods B and C and inbred method E. Method C gave the highest correlations and inbred method E, in general, gave the poorest.

6) Components of variance were estimated from F_1 data in diallel cross analysis. General combining ability was found to be approximately twice the size of specific combining ability in two groups and equal in size in a third group. Additive variance (assuming no epistasis) was found to exceed dominance variance by 1.60, 4.68 and 5.38 times in three groups, respectively. Partial dominance was indicated in two groups and over dominance in a third group. The diallel procedure was used as developed by Matzinger and Kempthorne (Genetics 41: 822-833. 1956). The inbred lines in each group were not random lines from a random mating population, an assumption required by the analysis. It seemed worthwhile, however, to complete the analysis and to interpret the estimates with caution.

7) Constant parent regression analysis as proposed by Hull gave results indicating partial dominance.

8) Heritabilities estimated from F_2 and backcross data ranged up to 66.8 percent; however, only 60 percent of the estimates were positive. Mean heritability was approximately 21 percent when the negative estimates were assumed to be zero.

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1. Temperature mutant.

A new allele of the st gene has been found, which manifests its mutant effect only in the endosperm. This allele, designated st^e,

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[1]Operated by Union Carbide Corporation for the United States Atomic Energy Commission.