

Combinations	: Percentage: : Infection :	Total : Plants :	Number of Crosses
All lines resistant	22 ± 3.2	444	4
3 lines resistant	34 ± 2.9	365	5
2 lines resistant	42 ± 2.6	716	6
1 line resistant	57 ± 3.2	495	4
All lines susceptible	54 ± 3.7	280	3

The results strongly indicate a positive correlation between the degree of damage and the dose of susceptible inbreds involved in the hybrid. For every additional susceptible line, there was a corresponding increase in susceptibility of the double cross. If a highly resistant hybrid were to be produced, therefore, it is necessary to use only parental lines that are resistant to the disease.

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3. Inheritance of the reaction of corn to downy mildew disease.

Immediately after the screening of inbred lines for their reaction to downy mildew, crosses between resistant and susceptible lines, their F_2 , and their backcrosses to both parents were produced. The reaction of these crosses together with that of the parents was tested in a replicated plot in 1962 wet season under epiphytotic of the disease. The results are presented below.

Entries	: Percentage : : Infection <u>1/</u> :	Total Plants Examined <u>2/</u>
Resistant parent (R)	33.7 ± 4.0	735
Susceptible parent (S)	84.3 ± 2.4	628
R x S	46.8 ± 2.2	1167
(R x S) Selfed (F_2)	41.5 ± 2.7	991
(R x S) R	24.3 ± 2.2	1024
(R x S) S	62.5 ± 2.8	924

1/ and 2/ - Each figure represents the average and total, respectively, of 44 plots representing 11 crosses each of which was replicated 4 times.

Disease epiphytotics in this test was more severe than that in the screening phase. An average infection of 50% was obtained compared to only 37% in the latter. This is probably the reason why the resistant lines which had infection counts of less than 10% in the screening nursery had a much higher infection in this test. Nevertheless, the susceptible inbreds had a much higher infection count than the resistant lines, thus maintaining a good distinction between the two classes.

Only two phenotypes were obtained in this experiment, the resistant and the susceptible classes. Probably this is inadequate to identify qualitative characters that are controlled by two or more factor pairs. The original plan was to count infected plants at two stages of growth so that more classes could be obtained, but strong winds and heavy rainfall destroyed the plants before the second reading. Nevertheless some interesting information can be obtained from the present results.

The most striking feature of the data is its pronounced trend towards the resistant parent. The F_1 and F_2 are much nearer the resistant than the susceptible parent. In the backcrosses, the resistant phenotype is much more easily recovered than the susceptible phenotype. This behavior can mean any one or both of the following:

- (1) that resistance is partially dominant over susceptibility, and
- (2) that the superiority of the crosses in terms of vigor and growth rate caused the "skewed behavior".

If the former is true then it is a very good indication that only a few factor pairs control the reaction of corn plants to the disease. If the latter is present, which is very likely as shown by the "over recovery" of resistance even only at the first backcross, not much information can be obtained from the present data. It will be necessary in subsequent inheritance studies to use also single crosses between resistant inbreds and between susceptible inbreds as resistant and susceptible parents, respectively.

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4. The frequency of restorer factors for A, B, S and T sterility inducing plasmatypes in inbred lines of corn in the Philippines.

The survey of pollen restorers for A, B, and S plasmatype was started when the T-cytoplasm was suspected to carry factors that induce susceptibility to some leaf diseases (see item No. 1). Crosses of all standard and promising lines to A158A, A158B, and A158S obtained from the Connecticut Experiment Station were made in the 1961-62 wet season and tested for pollen fertility and reaction to leaf diseases in the 1962 wet season. The percentages of fertile tassels in the F_1 are presented in table 1.