

Table 1. Average Yield of Varieties and Variety Crosses

	Jarvis	Indian Chief	Krugs	Reids Yellow Dent	Diente de Cabolla	Mayorbela
Jarvis510	.569	.480	.520	.528	.544
Indian Chief533	.549	.551	.617	.586
Krugs371	.453	--	.500
Reids Yellow Dent430	.535	.560
Diente de Cabolla364	.317
Mayorbela374

Table 2. Yield of Variety Crosses in Per Cent of Midparent

	Indian Chief	Krugs	Reids Yellow Dent	Diente de Cabolla	Mayorbela
Jarvis	109	109	111	121	123
Indian Chief		122	114	138	129
Krugs			113	---	134
Reids Yellow Dent				135	139
Diente de Cabolla					86

These results agree, in general, with expectations based on genetic diversity between varieties due to isolation and adaptation to different regions, and further indicate that the maximum yielding crosses may not result from intercrossing the highest yielding parental varieties.

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1. Inheritance of resistance to *Diplodea zeae*, *Gibberella zeae* and *Fusarium moniliforme*, stalk rots in corn.

In a preliminary survey, twelve different fungi were isolated (and identified) from diseased stalk tissues of 25 inbred lines of corn grown under normal field conditions at Fargo, North Dakota. No single organism was clearly defined as being predominantly responsible for the stalk rot observed.

In a subsequent detailed study, five inbred lines and their respective F_1 and F_2 progenies were stem-inoculated, after pollination was completed, with pure cultures of *Diplodea zeae* (Schw.) Lev., *Gibberella zeae* (Schw.) Petch and *Fusarium moniliforme* (Sheld.) Snyder and Hansen. The results obtained were as follows:

D. zeae rot symptoms suggested no dominance for resistance in the F_2 in two crosses and partial dominance in one cross.

G. zeae reaction indicated no dominance for resistance in three crosses.

F. moniliforme reaction indicated no dominance for resistance in three crosses.

Estimations of gene number conditioning reactions to these organisms revealed that only a few factor pairs may be involved. Heritability, in the broad sense, for resistance to the three stalk rot diseases studied was positive and relatively high for eleven out of fourteen estimations as shown in the table below.

HERITABILITY OF REACTION TO THREE STALK-ROT DISEASES OF CORN

Disease Organism	Cross	Estimates of Heritability	
		A	B
<u>Diplodia zeae</u>	ND-5 x W-22		-137.2
	ND-36 x Oh51-A	47.25	43.93
	ND-230 x Oh51-A	18.83	62.92
<u>Gibberella zeae</u>	ND-5 x W-22		10.12
	ND-36 x Oh51-A	77.85	55.70
	ND-230 x Oh51-A	-25.07	92.38
<u>Fusarium moniliforme</u>	ND-5 x W-22		71.33
	ND-36 x Oh51-A	32.65	21.09
	ND-230 x Oh51-A	-36.33	29.50

$$(A) \quad H = \frac{V_{F_2} - V_{F_1}}{V_{F_2}} \times 100$$

$$(B) \quad H = \frac{V_{F_2} - V_P}{V_{F_2}} \times 100$$

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