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Research Department

1. Local evaluation of daylength sensitive exotic germplasm.

A much needed beginning has been made toward a systematized method of evaluating exotic germplasm for use in the Corn Belt. Fortunately, this has included considerations of yield and general agronomic excellence as well as the usual search for specific qualitative traits. Of especial interest to the practical temperate zone breeder are investigations which deal with material from short-day areas. It is very difficult to locally evaluate such introductions due, of course, to their tangled overgrowth under our field conditions. One must rely heavily, with some justification, upon native performance records. Since, however, the F_1 crosses of such germplasm with early Corn Belt material are generally adapted to the Central Corn Belt, one would be interested in comparing their relative performance in such crosses with (1) their behavior in the overgrowth condition, and (2) the contribution given by the exotics after incorporation. The data reported here are concerned only with the first comparison.

In 1959, five exotics (one variety, one double cross, and three single crosses), representing various degrees of maturity and overgrowth response, were crossed in common to a very early Corn Belt dent inbred, A509. Attempts at crossing to a second early inbred, A340, failed. The two heterogeneous exotic populations were each represented by a sample of 28 plants crossed individually to A509 and bulked in equal proportions for this study. Each sample of 28 plants constituted the earliest segregates out of populations of 200 plants (San Juan) and 400 plants (H309). To this extent, these samples were not fully representative of the populations. The exotics, exotic x inbred crosses, the early inbred tester, two adapted single crosses, and an adapted synthetic variety were grown at Grinnell in 1960 in a replicated study involving six replications. Subplots were single 19 plant rows. Considerable care was taken to border the weak inbred tester and the excessively vigorous exotic populations with material of comparable vigor and maturity. Individual plant data were taken for a number of quantitative traits.

Subplot size was not adequate for a variance study in several of the traits. The study suffered further in the absence of additional testcross series to other early testers. In consideration, too, that the F_1 rather than the F_2 generation had to be used for the three exotic single crosses, it seemed wise not to attempt a close interpretation of the data. The average performance in each population for each of seven traits is offered for the reader's own consideration.

	Mid ¹ / Silk	Plant Ht. (in.)	Ear Node Ht. (in.)	Ear Lgt. (in.)	Kernel Row Number	Dry Weight Shelled Seed per Plant (grams)	% Prolific- acy ² /
A509	22.0	54.0	12.4	4.48	15.6	47	0
WF9 x Oh43	22.9	102.7	31.2	7.77	19.3	254	6
M14 x 187-2	24.5	100.7	34.7	9.57	15.8	271	0
Minnesota Synthetic 2	25.4	100.4	36.1	8.37	16.8	223	12
A509 x(Mp305xMp307)	27.5	106.3	44.3	7.54	15.2	238	38
x(Nc218xNc222)	27.9	106.3	41.0	7.72	16.1	233	11
x San Juan	28.5	107.9	44.9	7.85	16.5	219	2
x H309	30.3	108.3	42.5	7.93	16.9	198	2
x(Mp414xMp428)	33.0	108.3	41.3	7.79	16.2	231	40
Mp305 x Mp307 ⁴ / ₄	39.8	123.1	63.9	7.98	12.8	301	91
Nc218 x Nc222 ⁵ / ₅	46.3	109.2	57.8	7.28	16.6	217	11
San Juan ⁶ / ₆	57.3	132.1	82.8	6.88	14.9	111	9
H309	65.1 ³ / ₃	140.6	94.0 ³ / ₃	--	--	--	--
Mp414 x Mp428 ⁸ / ₈	49.4	116.9	50.7	6.74	13.7	142	69

1/ Number of days after July 1

2/ Based on number of plants bearing second ear 50% or more the size of first ear

3/ A downward estimate as only the early portion (45%) of the population silked

4/ Mississippi white dent single cross

5/ North Carolina yellow dent single cross

6/ Mexican white dent variety, race Vandeno

7/ Mexican white dent double cross, race Celaya

8/ Mississippi yellow dent single cross.

E. E. Gerrish

2. Wild maize undone by domesticated forms?

A recent concept of wild maize, 6,000 BC, seems to be that of a branch of the Maydeae in a particularly precarious position due to (1) over specialization in the lateral, pistillate branches and, (2) confinement to a narrow ecological niche (low natural population). Is it in the realm of possibility that the wild forms were carried to extinction by the constant introgression of the more numerous, but even less fitted types developing under man's protection?

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