

<u>Pedigree</u>	<u>Leaf Observations</u>
(C 103 x Pa C 103g) selfed once	100% similar to Pa C 103g
(Pa C 103g x C 103) selfed once	100% similar to Pa C 103g
(C 103 x Pa C 103g)C 103	100% similar to Pa C 103g
C 103 (C 103 x Pa C 103g)	100% similar to Pa C 103g
(C 103 x Pa C 103g)Pa C 103g	100% similar to Pa C 103g
Pa C 103g (C 103 x Pa C 103g)	100% similar to Pa C 103g

It has been suggested for numerous reasons that the leaf color and striping of C 103 in this area is possibly due to low magnesium nutrition. Due to the location of this observation area on a subsoil area with better magnesium supply, it is suggested that the results are not conclusive.

2. Preliminary tests to detect non-allelic gene interaction (Epistasis) in four-way and eight-way hybrids.

Using the method L. F. Bauman described at the 1956 Annual Meeting of the American Society of Agronomy in which the deviation of a single-cross X tester from the average of the two inbreds X tester is a measure of the amount of epistasis present in the single-cross, appropriate crosses were made with material of current commercial interest in this state.

Two tester inbreds (A 158 and W 153R) were used with the single-crosses (Pa 54 x Pa 11), (Pa 32 x Pa 33), (Ind Wf 9 x Oh 51A), (Ill A x W 22), and (Oh 43 x Oh 45); the four-way hybrids Pa 444 (Pa 54 x Pa 11) (Pa 32 x Pa 33), Pa 602 (Ind Wf 9 x Oh 51A) (Ill A x W 22), and Oh W 64 (Ind Wf 9 x Oh 51A) (Oh 43 x Oh 45); and the eight-way hybrids (Pa 444 x Pa 602) and (Pa 444 x Oh W 64). Testing was at three locations representing extremes in soil and ecology within the appropriate maturity range in this state. The 1957 testing year was extremely dry on two of the three locations.

Tester parent was found to exhibit a profound effect on the measurement of epistatic deviations. Major location effects both as to extent and direction of the epistatic deviation were found in some cases; in others the epistatic deviations were remarkably uniform in size and direction from location to location. Every four-way and eight-way hybrid showed significant epistatic deviation for one or more characters with one or both testers. The characters and hybrids in combined total exhibited significant epistatic deviations in 25% of the four-way hybrid cases and 69% of the eight-way hybrid cases. Disregarding direction, the extent of the average epistatic deviation was uniformly greater with fewer lines involved, with the exception of ear length. (See table 1 on following page.)

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Table 1. Summary of epistatic deviations at Centre Hall, Mifflensburg, and Towanda during the 1957 season in Pennsylvania.

	Yield	% H ₂ O	Plant Height	Ear Node Height	Ear Height Ratio	Ear Length	Ear Diameter	Ear Length-Diameter Ratio
<u>Tester Parent A 158</u>								
Pa 444	-.8	+.8	-1.0	+.6	+2.2*	-.10	+.02	-.12
Pa 602	+6.5*	-.3	-1.1	-2.8*	-2.0*	-.02	+.02	-.02
Oh W 64	.0	+.6	+1.2	+2.0*	+1.4	-.07	-.02	+.01
Pa 444 x Pa 602	+1.7	-.2	+.8	+.2	-.1	+.08	-.01	+.06
Pa 444 x Oh W 64	-1.4	-.9*	-.7	-2.6*	-3.1*	-.30*	-.02	-.16*
<u>Tester Parent M 153R</u>								
Pa 444	-4.6	+.5	+.2	+.2	+1.1	-.02	-.02	+.02
Pa 602	+1.2	-.4	+1.4	+.1	+1.0	+.03	-.03*	+.08
Oh W 64	-2.4	+.3	+.2	.0	+.2	+.06	+.02	+.04
Pa 444 x Pa 602	+1.8	+1.2*	-3.7*	-2.0*	-2.2*	+.08	+.03*	-.02
Pa 444 x Oh W 64	-1.3	-1.1*	.0	+.3	-.3	-.26*	-.03*	-.08
<u>Error Factors</u>								
L.S.D. (.05)	4.9	.9	2.4	1.9	2.0	.22	.03	.13
H.S.D. (.05)	8.9	1.6	4.5	3.4	3.7	.40	.06	.24
<u>Average Weighted Deviations disregarding signs</u>								
Four-Way Hybrids	2.61	1.05	1.58	1.62	2.80	.105	.042	.108
Eight-Way Hybrids	1.55	.85	1.30	1.28	1.42	.180	.022	.085
Difference in Favor of Four-Way's	1.06	.20	.28	.34	1.38	.075	.020	.023