4. Associations of quantitative characters with the gene determining variegated pericarp.

As a part of a survey study made for the purpose of locating genes affecting quantitative characters, individual plants of a maize genetic stock homozygous for variegated pericarp (V/V)[1] were crossed with individual plants of two inbred lines, rec. L289 and N6, each of which produce colorless pericarp (W/W). The F_2 progenies were grown in replicated randomized blocks to test for associations of quantitative differences with F_2 genotypes. Individual plant measurements were made for the 10 quantitative characters shown in Table 3. Genotypic classification of F_2 plants was made on the basis of phenotypic ratios for variegated pericarp in the progenies of open-pollinated F_2 plants.

Analyses of variance of the 10 quantitative characters were made on means for genotypes within plots in the F_2 generation. In the case of six quantitative characters, days to silking, days to shedding pollen, plant height, ear height, ear weight and ear length, the analyses indicated that genotypes reacted differently in the F_2(V/V x rec. L289) cross than in the F_2(V/V x N6) cross. Where this interaction was found, separate analyses were made within the F_2(V/V x rec. L289) cross and the F_2(V/V x N6) cross. Wherever the analyses indicated a difference between genotypes, the least significant differences between genotype means were calculated and are presented in Table 3 with their respective means.

Although it may appear that an incomplete dominance type of gene action is involved in the case of days to silking, days to shedding pollen, plant height, and ear height, the differences observed may be due to interaction of different types of gene action. Similarly, it may appear that an overdominance type of gene action is involved in the case of leaf width, stalk diameter and possibly ear weight. However, the observed differences might be explained by dominance of linked genes in the repulsion phase, or by interaction of different types of gene action.

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[1]The P alleles, P^{vv} and P^{wr}, are represented as V and W respectively.

Table 3. Mean values.for 10 quantitative characters in the F2 genotypes of crosses betwoen a maize genetic stock homozygous for variegated pericarp (V/V) and two inbred lines, a recovered L289 (W/W) and N6(W/W), respectively.

Quantitative character	Inbred used in cross with V/V	F2 genotype			L.S.D.	
		W/W	V/W	V/V	5%	1%
Days to silking	rec. L289	67.2	67.3	67.0		
	N6	70.5	69.0	68.1	0.86	1.23
	Mean[1]	69.7	68.6	67.8		

Days to shedding pollen	rec. L289	66.4	66.5	66.3		
	N6	70.4	69.1	68.8	0.68	0.90
	Mean	69.4	68.4	68.2		
Plant height (in.)	rec. L289	87.6	87.5	80.8		
	N6	79.1	73.7	69.5	2.83	3.75
	Mean	81.2	77.1	72.3		
Ear height (in.)	rec. L289	27.8	27.8	26.7		
	N6	27.1	25.8	23.8	1.18	1.56
	Mean	27.3	26.3	24.5		
Leaf width (mm.)	rec. L289	103.8	109.7	105.5		
	N6	88.1	91.2	89.1		
	Mean	92.0	95.8	93.2	2.15	2.84
Stalk diameter (1/32 in.)	rec. L289	32.2	32.6	32.2		
	N6	30.5	31.0	30.3		
	Mean	30.9	31.4	30.7	0.62	0.82
Ear weight (gm.)	rec. L289	156.9	166.6	146.1		
	N6	195.4	210.6	203.2		
	Mean	185.8	199.6	188.9		
Ear length (cm.)	rec. L289	19.19	19.38	19.11		
	N6	17.56	17.65	17.07		
	Mean	17.97	18.08	17.58		
Ear diameter (cm.)	rec. L289	4.16	4.11	3.99		
	N6	3.98	4.01	4.01		
	Mean	4.03	4.03	4.00		
Number of kernel rows	rec. L289	13.1	12.9	12.8		
	N6	12.9	12.6	12.7		
	Mean.	12.9	12.7	12.8		

[1]Weighted mean of the rec. L289 and N6 crosses.