Table 2
Kernel position effect on linoleic acid of individual ears of R196 and Tx39-16 inbreds

Kernel position	Ear 1	2	3	4	5
			R196 - Linoleic - 1965		
Base	67.58	66.99	68.51	67.97	66.69
Middle	68.51	66.80	67.96	68.52	66.49
Tip	67.73	67.08	67.98	70.05	67.48
			Tx39-16 - Linoleic - 1965		
Base	45.26	45.32	45.11	45.50	47.36
Middle	47.58	47.29	47.02	47.62	47.44
Tip	48.30	47.54	49.38	49.00	47.78
			Tx39-16 - Linoleic - 1966		
Base	48.16	45.94	46.48		
Middle	48.88	46.51	48.02		
Tip	50.63	49.47	50.43		

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1. Cryptic genes for tripsacoid characteristics in Latin-American maize varieties.

One of the most common effects of the experimental introgression of teosinte or Tripsacum into maize is the induration of the tissues of the rachis and lower glumes. These characteristics are found in many Latin-American varieties and can be transferred to U.S. inbred strains by repeated backcrossing accompanied by selection. We have assumed that they are the product of previous introgression of teosinte or Tripsacum in these varieties but have never had direct proof of this.

The experiments reported here are concerned with an attempt to determine whether chromosomes extracted from modern Latin-American varieties, which affect induration of the tissues of the rachis and lower glumes, also carry genes for other characteristics such as distichous spikes and solitary pistillate spikelets which were derived from teosinte or Tripsacum introgression but whose effects are ordinarily concealed because they

Table 1

Characteristics of F_1 hybrids of Guerrero teosinte with inbred A158 (Control) and strains of A158 modified by substituting chromosomes from teosinte and from Latin-American varieties

Pistillate parents of crosses	Length cm.	Per cent staminate	Grades tripsacoid influence			
			Rank	Pairing	Fragility	Total
A158 (control)	18.4	47	2.2	0.6	0.6	3.4
Florida teosinte chromosome 3	18.4	52	4.0	2.2	1.2	7.4
Florida teosinte chromosome 1, 3, 9	21.6	56	2.2	1.4	0.2	3.8
Florida teosinte chromosome 4+	20.4	64	4.0	2.6	3.0	9.6
Durango teosinte chromosome 1, 7, 9	18.8	68	3.0	2.4	3.2	8.6
Nobogame teosinte chromosome 4A	12.0	37	2.8	1.8	3.6	8.2
Nobogame teosinte chromosome 4B	3.8	68	2.4	2.8	3.8	9.0
Averages, teosinte derivatives	15.8	58	3.1	2.2	2.5	7.8
Mexico 1077	19.2	59	1.6	1.2	2.0	4.8
Honduras 1639	28.2	72	4.0	3.0	2.0	9.0
Nicaragua 501	19.8	67	2.2	3.6	2.0	7.8
Cuba 394	18.6	54	2.8	2.4	2.0	7.2
Averages, middle American varieties	21.4	63	2.7	2.6	2.0	7.2
Brazil 1691	13.4	83	4.0	3.0	3.0	10.0
Paraguay 333	18.4	67	4.0	2.6	2.4	9.0
Argentina 1807C	22.0	64	3.0	3.0	2.0	8.0
Bolivia 1157	18.8	49	2.6	2.0	3.0	7.6
Averages, South American varieties	18.2	66	3.4	2.7	2.6	8.6
Mexico 1077 X Venezuela 1536	16.0	42	2.0	1.8	2.2	6.0
Honduras 1639 X Nicaragua 501	26.6	72	4.0	3.2	2.4	9.6
Nicaragua 501 X Brazil 1691	17.2	58	3.6	3.0	3.8	10.4
Bolivia 1157 X Argentina 1807C	22.4	68	4.0	3.2	2.4	9.6
Averages, derivatives of two varieties	18.0	60	3.4	2.8	2.7	8.9

cannot be phenotypically expressed in genotypes which consist predominantly of maize germplasm.

The experiments involve crossing the inbred A158 and its various chromosome-substitution derivatives with a teosinte from Guerrero, Mexico, on the assumption that cryptic genes of this nature might express themselves in F_1 hybrids of maize and teosinte although unable to do so in a genetic background which is predominantly maize. Earlier observations on maize-teosinte hybrids had suggested that this may be true.

The lateral inflorescences of the F_1 hybrids were scored for prominence of a terminal staminate spike, distichous vs polystichous spikes, solitary vs paired spiklets, fragile vs solid rachis. The data on the first mentioned characteristics are based on actual measurements; the remaining three, which are arbitrary grades, were combined in a final total "tripsacoid" grade. The results are shown in Table 1.

The data show that (1) every hybrid involving a modified strain of A158 is more tripsacoid in one or more characteristics than the control; (2) substitution chromosomes from Latin-American varieties are on the whole about as strong in their effects as the chromosomes introduced into A158 directly from teosinte; (3) the substitution chromosomes from varieties of the South American countries, Bolivia, Argentina, Brazil, and Paraguay, where the introgression presumably came from Tripsacum, since teosinte is unknown in South America, are as strong in their tripsacoid effects as those from Middle America where the introgression may have come from either teosinte or Tripsacum; (4) the strongest average effect occurred in the hybrids involving strains which had been modified by substituting chromosomes from two different Latin-American varieties.

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