Table 1
Percent Lignin Content of Cobs and Rachis Segments of Various Maize Lines and Maize Relatives

	Percent		Percent
Tripsacums		Maize Inbreds	
floridanum	54	WF9	68
dactyloides (2n)	48	I11A	68
Teosintes		L317	64
Amercameca	72	C103	63
Chalco	64	0h07	60
Honduras	32	W22	58
Maize-teosinte Hybrid		38-11	56
A158 x Florida teosinte	79	0h51A	56
Maize Varieties		0h40B	55
Parker's Flint	58	0h45	54
Wilbur's Flint	56	0s420	49
Gourdseed	53	I11Hy	42

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1. A high frequency of hybrids between certain genetic stocks of maize and Illinois Tripsacums.

An effort was made in 1963 to cross certain heterozygous translocation stocks with plants of T. dactyloides (2N + 4N), collected from different locations in Illinois. Although not all the data have been summarized, nor has the hybrid nature of all progeny been confirmed cytologically, the results merit reporting and further detailed analysis. No special crossing techniques were used other than the "shortened silk" technique of Mangelsdorf and Reeves. Embryo culture was not used to obtain any of the hybrids. However, the pericarp was removed and the "poorly developed" seeds were germinated about 30 to 40 days after pollination. The following table summarizes the data for crosses with certain maize stocks.

The data illustrate the high number of hybrids produced by certain pollinations and, also, the fact that certain female parents give a larger number of hybrids than others. One pollination (15) produced 22 hybrids (3.27%) with a diploid Tripsacum from Harvel, Illinois. The authors are not aware of any reports in the literature indicating that this many hybrids have been produced from one pollination. In the classical work reported by Mangelsdorf and Reeves only 29 hybrids were obtained when 185,000 silks on 382 ears were pollinated with Tripsacum pollen (.01%). Several factors, such as sterility of the female parent,

Pollination	Pedigree	Total number of ovules	Number of hybrids	Percent hybrids
1.	T1-6c(+/T) x Acc 685 (Horse Shoe Lake) 4N*	1144	11	.96
2.	T1-6c(+/T) x Acc 685 (Horse Shoe Lake) 4N	912	12	1.31
3.	T1-6c(+/T) x Acc 685 (Horse Shoe Lake) 4N	608	13	2.13
4.	T1-6c(+/T) x Acc 684 (Horse Shoe Lake) 4N	660	0	--
5.	T1-6c(+/T) x Acc 687 (Horse Shoe Lake) 4N	688	18	2.61
6.	T1-6c(+/T) x Acc 687 (Horse Shoe Lake) 4N	936	4	.49
7.	T1-6c(+/T) x Acc 676 (Horse Shoe Lake) 3N	1120	0	--
	Total	6050	71	1.17
8.	T6-9(+/T) x Acc 687 (Horse Shoe Lake) 4N	864	2	.23
9.	T6-9(+/T) x Acc 687 (Horse Shoe Lake) 4N	714	2	.28
10.	T6-9(+/T) x Acc 685 (Horse Shoe Lake) 4N	742	9	1.21
11.	T6-9(+/T) x Acc 685 (Horse Shoe Lake) 4N	828	0	--
12.	T6-9(+/T) x Acc 684 (Horse Shoe Lake) 4N	882	0	--
13.	T6-9(+/T) x Acc 372-2 (Emerson) 2N**	532	0	--
	Total	4562	13	.28
14.	T4-10b(+/T) x Acc 694 (Freeman Spur) 4N	792	2	.25
15.	T4-10b(+/T) x Acc 662 (Harvel) 2N	672	22	3.27
	Total	1464	24	1.63
16.	T5-9(+/T) x Acc 694 (Freeman Spur)	756	8	1.05

* Refers to designation, location, and ploidy level of Tripsacum parent.

**Refers to a clone obtained from R. A. Emerson's garden at Ithaca, New York.

(See article 1 for explanation of table.)

	Phenotypes		X^2	P
	Resistant	Susceptible		
1. (Oh43 x Guatemala 125) BC2 ⊗ (Ht/ht) ⊗	88	24	0.847	0.30-0.50
2. (Oh43 x Guatemala 125) BC2 ⊗ (Ht/ht) ⊗	78	32	0.891	0.30-0.50
3. (Oh43 x Guatemala 125) BC3 (Ht/ht) x (ht/ht)	59	47	1.358	0.20-0.30
4. (WF9 x Guatemala 125) BC3 (Ht/ht) x (ht/ht)	37	34	0.127	0.70-0.80
5. (B14 x Guatemala 125) BC3 (Ht/ht) x (ht/ht)	59	47	1.358	0.20-0.30

(See article 2 for explanation of table.)

Tripsacum plant used and others, could account for the high frequency of hybrids. A more detailed study employing a number of different Tripsacum plants and certain maize stocks is being planned in an attempt to answer several questions posed by the results.

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2. Monogenic resistance to Helminthosporium turcicum extracted from teosinte.

In the 1962 Florida winter nursery plants of Guatemala teosinte were found to be highly resistant to northern leaf blight under natural epiphytotic conditions existing that year. The resistant plants were crossed to the susceptible inbred Oh43. Seedlings of the F_1 hybrid were tested in the greenhouse. All plants showed the typical phenotype for resistant lesions similar to the dominant (Ht) gene reported by Hooker in the 1963 M.N.L. In subsequent generations the material was backcrossed to the susceptible inbred for two generations and resistant progeny selected for backcrossing in each generation. A number of backcross generations were used to make the material more adapted to corn-belt conditions.

During the summer of 1963 backcross-two resistant plants (Ht/ht) were selfed and also backcrossed again to the susceptible recessive parent (Oh43, ht/ht). The backcross plants were also test crossed onto the susceptible inbreds B14 and WF9. The selfed and testcross seedlings were tested in the greenhouse. The limited data, presented in the following table, indicate a single dominant gene will explain the resistance observed. The phenotype of the resistant plants is similar to that found in GE 440 and 'Ladyfinger' popcorn by Hooker. Further tests are necessary to determine if this gene is allelic to the Ht alleles found in these two stocks. Should the gene be nonallelic to the Ht gene of Hooker, it may be possible to incorporate a greater degree of resistance to northern leaf blight than each gene separately.

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3. A possible cause for unreduced female eggs in corn-Tripsacum hybrids.

The occurrence of unreduced megasporocytes in the F_1 hybrid between corn x T. dactyloides has been reported by Mangelsdorf and Reeves (Texas Bull. 574). Galinat (M.N.L. 1961) found similar results for corn x T. floridanum hybrids. Several mechanisms could account for the unreduced eggs in these hybrids. One of these could be the failure of cell wall formation in either mitotic or meiotic divisions. Failure of cell wall formation during mitosis should give rise to somatic sectors of tissue carrying the doubled number of chromosomes. This should result in fertile eggs which are either "clustered" on the pistillate inflorescence or occur in a certain pattern.

In backcrossing corn x T. dactyloides hybrids (female parent) with the corn parent, "normal seeds" resulted from 61% of the pollinations.