

## 2. Brachytic-2 dwarf hybrids.

Hybrids of brachytic single crosses and normal single crosses have been obtained. The brachytic gene causes a shortening of stalk internodes, especially those below the ear. Other parts of the plant are usually not reduced. In the past three years, many hybrid combinations have been measured for ear and plant height, grain yield, and in some cases for culm diameter and silage yield.

A preliminary analysis of the performance is summarized in the accompanying table (No. 1). The means representing normal, semi, and full dwarf hybrids show an obvious trend. The brachytic-2 gene has partial dominance which is enhanced in specific genetic backgrounds. In addition, there is evidence that reciprocal semi-dwarfs respond differently. The degree of expression of the brachytic gene in identical nuclear backgrounds is not always equal in dwarf and normal cytoplasms.

Table 1 Dwarf-Normal comparative means by years:

	<u>1960</u>			<u>1961</u>				<u>1962</u>			
	Grain yield bu/A	Plant height inches	Culm dia- meter inches	Grain yield bu/A	Plant height inches	Ear height inches	Culm dia- meter inches	Grain yield bu/A	Silage yield lbs DM/A	Plant height inches	Ear height inches
Normal	90.2	88.0	0.98	100.9	94.6	37.6	0.81	90.3	8726.4	84.7	31.9
Semi-dwarf	86.0	81.6	1.05	101.1	92.5	35.1	0.82	86.4	8870.0	80.3	28.7
Dwarf	-	-	-	97.2	90.1	34.0	0.83	61.3	5749.9	57.1	13.6

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## 3. Chromosome knobs.

Dr. Albert Longley in a report to the Rockefeller Foundation Mexican Program ("Chromosome Knobs of Maize from the Latin Americas" by Albert Longley and Angel Kato Y. 1961) described the origin of large masses of heterochromatic material in several diverse collections of the race Nal-Tel. Plants used in Longley's studies were sacrificed. Seed samples (5 kernels) of collections reported to show unusual heterochromatic accumulations were planted in the greenhouse in winter 1962 and microspore mother cells were collected for chromosome observations.

These eleven collections were sampled: Guatemala 207, Guatemala 269, Guerrero 174, Panama 5P, Panama 12P, Panama 39P, Costa Rica 45, Nicaragua 3432, Nicaragua 3406, Costa Rica 400, and Guatemala 835. A total of 27 plants were characterized successfully for chromosome morphology. One plant in each of three collections (Guatemala 269, Panama 5P, and Panama 39P) showed a heterochromatic block similar to that terminating abnormal chromosome 10L terminating 9S. The abnormal 10 condition was seen in four other plants.

Due to poor plant growth and lack of adaptation to Ithaca conditions, it was not possible to obtain selfed lines. Crosses were made to other plants, however, and stocks carrying the unusual chromosome 9 have been obtained.

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#### 4. Tojap and teosinte cytoplasm.

Mazoti (1950) has reported that the expression of the iojap gene is greatly reduced or entirely lacking in homozygous ij ij plants which contain teosinte cytoplasm. Several years ago Mazoti (kindly) gave us seed of two of his iojap stocks. One was a standard gl gl ij ij line with maize cytoplasm, and the other a stock derived from the first line by backcrossing it as male parent for 8 generations to teosinte cytoplasm. The second line with teosinte cytoplasm was thus also presumably gl gl ij ij. The two lines, however, clearly differed in the degree of chlorophyll variegation. The strain with teosinte cytoplasm has shown few striped plants in the four seasons it has been grown, and the few striped plants that did appear usually contained only one or a few short white stripes. The stock carrying maize cytoplasm has given all variegated plants which typically have a moderate number of relatively narrow stripes. That the stock with teosinte cytoplasm is homozygous ij ij has been confirmed by crossing it as male parent to standard ij ij and + ij female parents with maize cytoplasm. We have continued the backcrossing for three more generations with no change in the expression of the iojap phenotypes in the two lines.

The strain with teosinte cytoplasm was also crossed as female parent with two of our standard iojap stocks (obtained originally from the Coop. and maintained by selfing). The  $F_1$  families, all ij ij in teosinte cytoplasm, were vigorous. At maturity both progenies contained more striped plants than were present in the ij ij teosinte cytoplasm female parent. Each family also had solid green plants (4 green, 15 striped in one family, 8 green, 12 striped in the second family).