With these data the correlation coefficients between number of B's and average pollen grain size and its variance were computed. The r values obtained were 0.2505 and -0.2884, respectively, showing no statistical significance. These results mean that there is no apparent influence of the presence of B's on the pollen grain size and there is no change in the variability of the pollen grain size.

The fact that B chromosomes do not have any apparent influence on pollen grain size suggests that plants with B chromosomes have cell sizes similar to those of plants without B's, at least within a certain range of B numbers. If this is true, an explanation is needed for the mechanism by which B's affect male flowering and plant size. One possible explanation is that the presence of B's affects the timing of the cell division cycle, and/or the speed of cell growth is changed by changing the cell metabolic processes. This idea is supported by the findings of Ayonoadu and Rees (1968) who have presented data showing that the duration of the complete mitotic cycle in root tip meristems of rye increases in the presence of B chromosomes.

References.

Jones, R. N. and H. Rees. 1968. The influence of B-chromosomes upon the nuclear phenotype in rye. Chromosoma 24:158-176.

Ayonoadu, U. W. and H. Rees. 1968. The regulation of mitosis by B-chromosomes in rye. Exp. Cell Res. 52:284-290.

T. Angel Kato Y.

3. Frequencies of maize by teosinte crosses in a simulation of a natural association.

A study was carried on to learn about the frequency with which different maize and teosinte races would hybridize in nature.

Several maize races (table 1) and Chalco (T_1) and Guerrero (T_2) teosintes were planted in Tepalcingo Experimental Station in Morelos State in Mexico. At flowering time, 5 pollinations were made on Jala race shoots using a mixture of equal volumes of pollen of Jala race and T_1. Another 5 pollinations were made on Cuba 12 shoots using a mixture of pollen of Cuba 12 and T_1 and so on until 5 pollinations were made on

Table 1

Estimated percentages of maize-teosinte crosses that may happen in nature if different races were associated.

Maize Race	Observed % of Crosses with Chalco Teosinte	Maize Race	Observed % of Crosses with Guerrero Teosinte
Jala	31.8	Camelia Vicuña	42.4
Cuba 12	8.8	Arrocillo Amarillo	40.4
Guatemala 127	6.9	Tuxpeño	22.4
Arrocillo Amarillo	4.9	Guatemala 55 H	12.3
Cuba 54	3.8	Jala	9.1
Vandeño	3.4	Tabloncillo	5.9
Bolita	3.3	Cuba 54	4.2
Nal-Tel Guat.	2.9	Tehua	3.8
Cónico	2.8	Zapalote Grande	3.8
Tabloncillo	2.4	Olotillo	2.4
Honduras 19	2.2	Flint Guarani	1.6
Guatemala 806	1.8	Chapalote	0
Cónico Norteño	1.5	Reventador	0
Cuba 63	1.2	Vandeño	0
Chapalote	0	Harinoso de ocho	0
Reventador	0	Maíz Dulce	0
Harinoso de ocho	0	Cónico Norteño	0
Maíz Dulce	0	Bolita	0
Guerrero 250	0	Cónico	0
Celaya	0	Guerrero 200	0
Jalisco 78	0	Caingang	0
Palomero Toluqueño	0	Comiteco	0
Serrano	0	Pepitilla	0
Guatemala 114	0	Comun Segregaciones	0
Guatemala 145	0	Puya Segregaciones	0
Nal-Tel de 8	0	Entrelocado duro	0
Quicheño precoz	0		
Cuba 31	0		
Costa Rica 30	0		
Canario de 8	0		
Martinica 2	0		

Martinica 2 with a mixture of pollen of Martinica 2 and T_1. Mixing equal pollen volumes from maize and teosinte would simulate a hypothetical situation in which such populations would grow together and would coincide in their flowering periods. The same procedure was used in the case of T_2 to pollinate the maize races; however, due to the lack of knowledge of the date of flowering of some of the races involved, it was not possible to get all possible maize-teosinte combinations. No attempt was made to use teosinte populations as females.

The pollinations of each particular maize-teosinte successful combination (3 or more pollinations) were harvested together and a 100 seed composite was prepared by mixing equal numbers of seeds from the 3-5 ears harvested. The 100 seed composites of the successful maize-teosinte combinations were then planted in a 4 row plot each. After flowering time counts were made in each plot of the total number of plants and the number of maize-teosinte crosses to get the percentage of crossing.

If no selective fertilization occurred, one would expect to get about 50% maize-teosinte crosses in all cases. However, 58% of the maize races pollinated with a maize plus Guerrero teosinte mixture showed a definite selection in favor of maize pollen (0% crosses with teosinte). Thirty-five of the maize races permitted some crosses with Guerrero-teosinte to occur, but there was a strong selection in favor of maize pollen. Two races of maize, Camelia Vicuña and Arrocillo Amarillo (7%), showed no evidence of any mechanism preventing teosinte pollen from fertilizing maize ovules, even with competition from maize pollen. As can be seen in Table 1, a similar situation was observed in the group of maize races pollinated with maize plus Chalco-teosinte mixtures.

The races of maize Celaya, Maíz Dulce, Bolita, Vandeño, Palomero, Toluqueño, Jala, Cónico Norteño, Zapalote Grande, Zapalote Chico, Nal-Tel, Arrocillo Amarillo, Harinoso de Ocho, Dzit Bacal and the collection Martinica 2 were used as females in crosses with pure pollen of teosinte and in all cases a good seed set was obtained. Thus, in most cases, competition with maize pollen seems to be the reason for the lack or reduced number of maize-teosinte crosses.

A similar study on individual F_2 plants from crosses of Camelia Vicuña and Arrocillo Amarillo with maizes that showed no crosses with teosinte may increase our understanding of the genetic mechanism (if any) involved in the selective fertilization observed in maize-teosinte associations. Likewise, we could more readily understand the way by which teosinte and maize populations can grow together, being compatible in crosses and still maintaining their identities even when their flowering periods overlap.

Mario Castro Gil

4. Some reasons for depressed yield in dwarf corns.

Productivity in corn has frequently been reduced when dwarfing genes have been introduced into varieties or hybrids.

Leaves of brachytic-2 corn plants and other dwarf types emerge from the nodes in a single vertical plane, internodes are really short, leaf width is frequently increased and as a result the tassel is proportionately very big. It appeared to us that one of the main reasons for depressed yield in most dwarf corn types could be increased intra-plant competition for light. Since dwarfing genes could be of extreme importance in corn breeding programs, a study was set up to determine the effect on yield of varying light penetration by changing the canopy arrangement. A homozygous brachytic-2 open pollinated variety (having 75% of Puebla Group 1, 12.5% of Tuxpeño and 12.5% of Cónico Norteño) was grown in Roque, Guanajuato, Mexico in 1969 and subjected to 4 treatments:

a) Normal planting (control).

b) Leaves above ear positioned upright from flowering time on (UL).*

c) Midribs of leaves oriented East to West (EW).**

d) Midribs of leaves oriented East to West and leaves above ear positioned upright from flowering time on (UL + EW).

The plant density was 60,000 plants/ha. A two replicate randomized complete block design was used. The plot size was 6 rows 6 m long.

Grain yields are presented in Table 1 for the 4 treatments.

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*Leaves were positioned upright with transparent plastic bands holding them from the stalk.

**Seedlings were oriented East to West 10 days after emergence in very wet soil.