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1. Differentiation of evolved varieties and primitive races of maize of Himalayan and Latin American distribution.

It has been known for a long time that Assam and various other Eastern Himalayan states including Sikkim have a wide range of maize varieties many of which possess primitive characteristics (Stonor and Anderson, 1949). Two of these primitive varieties SP 1 (MNL 38: 69) and SP 2, two primitive Mexican races, Chapalote and Nal-Tel (Yucatan 7), one primitive Colombian race, Pollo Segregaciones and two highly evolved commercial types, Kanpur type 41 from India and Mexican June, have been compared for a number of their economic characters. Observations recorded in the course of a yield trial conducted at Delhi during 1969 in the form of a Randomized Block Design are presented in Table 1.

It will be seen that the primitive types are, in general, later in maturity than the evolved types. The Himalayan primitives are extremely late in maturity, silking about a month later than the evolved types. They are also much shorter in height, lower in yield, having smaller ears in their length and diameter, with fewer kernel rows and lower kernel weight compared to the evolved types. The American primitives, on the other hand, do not differ so markedly from the evolved commercial types.

Observations were also recorded on the pollen size (Table 2) of various primitive and evolved varieties. A total of 75 pollen grains from several plants were measured for each variety. It is observed that the Himalayan primitive varieties, especially SP 1, have a very low pollen diameter compared to the other maize varieties. An increase in pollen size during evolution has been clearly demonstrated by Galinat (1961).

The characters described above as well as the emergence of ears from the upper joints of the stalks, reduced internode length, and the occurrence of male and female flowers in the same inflorescence in the case of the Himalayan primitive varieties show that these varieties are closer to the progenitor corn plant reconstructed by Mangelsdorf (1958)

Table 1

Observed means for various primitive and evolved varieties for various quantitative characters

Variety	Days to 75% silking ± S.E.	Plant height (cms) ± S.E.	Grain yield per plant (gms) ± S.E.	Ear length (cms) ± S.E.
Himalayan primitives				
SP 1	85.50 ± 1.34	105.86 ± 5.44	8.25 ± 5.21	7.30 ± 0.53
SP 2	93.50 ± 1.34	93.10 ± 5.44	7.50 ± 5.21	5.67 ± 0.53
American primitives				
Pollo Segregaciones	81.75 ± 1.34	211.35 ± 5.44	21.36 ± 5.21	10.95 ± 0.53
Chapalote	78.50 ± 1.34	181.35 ± 5.44	27.90 ± 5.21	12.17 ± 0.53
Nal-Tel (Yucatan 7)	64.75 ± 1.34	169.00 ± 5.44	27.92 ± 5.21	10.21 ± 0.53
Evolved varieties				
KT 41	52.50 ± 1.34	148.55 ± 5.44	40.55 ± 5.21	13.50 ± 0.53
Mexican June	68.00 ± 1.34	180.90 ± 5.44	50.66 ± 5.21	11.63 ± 0.53

Variety	Ear diameter (cms) ± S.E.	Kernel rows ± S.E.	1000 grain weight (gms) ± S.E.	Seed density ± S.E.
Himalayan primitives				
SP 1	1.64 ± 0.09	8.86 ± 0.32	90.38 ± 9.77	1.22 ± 0.07
SP 2	1.77 ± 0.09	8.63 ± 0.32	72.84 ± 9.77	1.18 ± 0.07
American primitives				
Pollo Segregaciones	2.39 ± 0.09	10.92 ± 0.32	157.69 ± 9.77	1.17 ± 0.07
Chapalote	2.57 ± 0.09	11.02 ± 0.32	133.03 ± 9.77	1.16 ± 0.07
Nal-Tel (Yucatan 7)	2.71 ± 0.09	10.77 ± 0.32	134.77 ± 9.77	1.16 ± 0.07
Evolved varieties				
KT 41	3.00 ± 0.09	10.92 ± 0.32	155.88 ± 9.77	1.20 ± 0.07
Mexican June	3.73 ± 0.09	13.50 ± 0.32	174.25 ± 9.77	1.16 ± 0.07

Table 2

Mean pollen size of various primitive and evolved varieties

Variety	Mean pollen diameter (μ) $\pm$ S.E.
SP 1	66.09 $\pm$ 1.23
SP 2	78.88 $\pm$ 1.23
Palomero Toluqueno	85.31 $\pm$ 1.23
KT 41	85.05 $\pm$ 1.23
Mexican June	83.48 $\pm$ 1.23

than such American races as Chapalote, Nal-Tel and Palomero Toluqueno, which are believed to be direct descendants of the wild corn.

References

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2. Cytoplasmic differentiation between evolved and primitive types of maize.

A number of primitive varieties of maize of Himalayan and Latin American distribution were crossed reciprocally with two commercial varieties of maize, KT 41 (an Indian variety) and Mexican June. Observations on hybrid plants from these crosses have shown significant differences between the reciprocal crosses for a number of characters including maturity index, plant height and yield components such as ear length, number of kernel rows and 1000 grain weight (Table 1).