

phenotypes is to distort the segregation ratios and to obscure the mode of inheritance. The unstable phenotype characterizes both the mutant and teosinte derived traits.

On outcrossing of the two-ranked Waltham Flint to a two-ranked derivative from a maize-teosinte hybrid, all ears (36) in the F_1 and F_2 were two-ranked, indicating allelism of the genes controlling this trait in the maize and teosinte parents.

Segregations from maize-teosinte hybrids usually indicate that the two-ranked trait is controlled by two independently inherited units. The origin of the two-ranked condition in the Waltham Flint may stem in part from the bringing together of the necessary recessives during the recent hybrid origin of this variety and in part from successive mutations. In any case, the recessive alleles for this trait in maize matched off in hybrid combination with the corresponding recessive alleles from teosinte.

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3. A possible role of condensation in a domestication of teosinte.

Teosinte is highly variable in the development of its lateral branches on which its female spikes are usually borne. In some plants these upper branches are elongate and terminated by a tassel with the female spikes dispersed singly in the axils of its leaves. At the other extreme, a telescoping of the branch aggregates its spikes in tight clusters close to the main culm and all are female. In collecting seed from thousands of teosinte plants on a recent expedition in Mexico, we found that the harvesting of bulk seed was much easier from plants with clustered spikes because of the greater concentration of spikes and resultant accumulation of fruit cases within their overlapping and, thereby, mutually protective husks. This suggests that an important, if not the first, step in a possible domestication of teosinte, if this occurred, could have been selection perhaps unconsciously applied for a condensation of spikes into tight clusters. At first condensation in teosinte would serve something of the same purpose as the rigid rachis character in the domestication of other cereals. Once cultivation

(planting and harvesting) began, the more condensed forms would automatically take over.

Selection for higher levels of condensation would go beyond the clustering of spikes and associated traits of reduced shattering of fruit cases and triangularization of their shape in the lower more condensed positions. It would tend to force the developing spikelets out of their vertically compressed cupules as well as promote a proliferation in ranking. Condensation of secondary branches onto the main axis may represent one system for the origin of yolking and whorling, as suggested by Anderson and Brown (1948). These authors did demonstrate that condensation is a factor in the development of higher orders of polystichy. The high degree of secondary branching apparent in the teosinte tassel might reflect a potential for polystichy through such branch condensation. Furthermore, maize that is considered to lack condensation in the tassel according to Anderson, such as the northern flints and Confite Morocho, still has more condensation in the female spike than teosinte, as shown in its hybrids with teosinte. Distortions in the transition between two states of phyllotaxy may result from primordial slippage. This slippage should be expected in the maize cob under the stress of compaction, combined with a reduced nodal network.

The carry-over in maize of the condensation that clusters the spikes in teosinte would result in the multi-husk enclosure of an ear terminating a telescoped branch.

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4. A possible inverse relation between degree of tassel branching and kernel row number in certain strains of corn.

In a small population (20 plants) of string cob sweet corn characterized by a high degree of tassel branching, an estimate of the proportion of the tassel that was included in the branching zone was made and recorded on the tassel bag at pollination time. Later at harvest time we were surprised to find that the most highly branched tassels were on plants tending to have ears with lower kernel-row numbers (see Table).