

found to be controlled by two incompletely dominant genes, as indicated by F_2 ratios of 1:14:1. In some cases the phenotypic effects of these genes are measured best in terms of rachis diameters (cob minus glumes) and in other cases rachis internode length is the more important criterion. In the F_2 segregation from self pollinating a hybrid between a string cob inbred and the sweet corn inbred Ia 5125, the distribution of rachis diameters was trimodal with a good fit to the 1:14:1 ratio. The fit was less distinct for rachis diameters with G29 and not at all apparent with Wilburs Flint. The reverse was true regarding rachis internode length. Only Wilburs Flint yielded a trimodal distribution for rachis internode length fitting a 1:14:1 ratio. The segregation involving Wilburs Flint was homozygous for the eight-rowed condition.

Crosses with the collection of A-B translocation testers yielded a few extreme string-type specimens in hybrids with TB4S and TB9S which indicates that the two major genes involved may be located on the short arms of these two chromosomes. Other studies indicate that teosinte also has loci affecting rachis internode length on these chromosomes.

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3. Non-cupulate pistillate rachises in maize.

The F_2 segregation of Iowa 5125 x string cob yielded a few pistillate rachises which were like the staminate rachises in being barren of cupules. This condition, apparently not previously observed in maize, may result from a recombination of parental factors for small cupules.

The small cupules of the string cob inbred stem from their vestigial nature in their "pure-maize" source. Confite Morocho.

The small cupules of 5125 may also be associated with pure maize germ-plasm or, at least, from a low-level of teosinte introgression. Because 5125 is fasciated and because teosinte introgression is known to reduce or eliminate fasciation (Galinat, MNL 37:35-36. 1963), this inbred is presumed to have a low-level of such introgression. While cupules appear to be rudimentary in maize, they do have a function in the formation of the cupulate fruit case of maize's close relatives, teosinte and *Tripsacum*. The well-developed cupules of modern "tripsacoid" maize appears to stem from the introgression by these relatives.

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4. Recessiveness of hairy sheath in *Tripsacum* species hybrids.

The gene for hairy sheath (Hs) on the short arm of corn chromosome 7 acts as a dominant (Tavcar, 1932). Yet when either of two species of *Tripsacum* with hairy sheaths, *T. maizar*, *T. pilosum*, are hybridized with species having glabrous sheaths, *T. dactyloides*, *T. floridanum*, *T. zopilotense*, and a glabrous form of *T. australe*, the F_1 hybrid is glabrous. The results of this study of the inheritance of hairy sheath in chiefly diploid species of *Tripsacum* may be useful in determining the parentage of various tetraploid species believed to have had an allopolyploid origin.