parent with any desired sugary inbred as seed parent. This permits high quality seed with good germination rates. The farmer gets a crop ear with a sprinkling (25%) of extra sweet kernels, usually just the correct amount for the many people who find 100% shrunken-2 kernels too sweet for their taste preference.

The propagation of the double recessive su sh2 in the pollen parent may be facilitated by the use of an extra Tripsacum chromosome carrying the dominant allele of one or the other of the recessive. When present as an extra pair of alien chromosomes, the transmission to daughter gametes is the normal 50-50. But when reduced to a single extra alien chromosome in the farmer's crop, its transmission drops down to about 8%, leaving the recessive trait largely uncovered to the benefit of the quality connoisseur. At present this system would have to be restricted to the use of Tr7 carrying the Su locus. The Tripsacum chromosome marked by Sh2 has not been isolated.

A side advantage of bisweet hybrids, as with bicolor hybrids, is that they are a source of "grow-it-yourself" ears exhibiting F_2 ratios. With the segregation of both bi-sweet and bi-color factors on a single ear, independent assortment may be demonstrated for students.

Walton C. Galinat

Three systems for two-ranked ears in corn — Depauperate type: The eight-rowed Northern Flints, when grown under stress, frequently produce two-ranked ears with paired spikelets giving a four-rowed ear. The tendency toward this type of two-ranking is stronger in eight-rowed strains having an inherited reduction in the vascular system of the cob. When such a reduction in vascular system is combined with the mutant for single female spikelets, the styles may fail to elongate, as in the "silkless" mutant.

Elongation type: When condensation is relaxed sufficiently, ranking continues to drop until the two-ranked state is achieved. The two-ranked level of condensation was selected from among the F_2 segregants of a cross between a string cob sweet corn inbred (MW401) and an "interlocked" derivative of Coroico corn by eight-rowed Northern Flint corn. The two-ranked cobs of this selection are sometimes four-ranked at the base or in the lower half of the rachis. The degree of condensation upon which this is based is polygenically controlled between extremes like that of kernel row number.

Tripsacum-teosinte type: A dominant factor for two-ranked spikes, first discovered as one of the effects of a Tripsacum chromosome (Tr9) when present

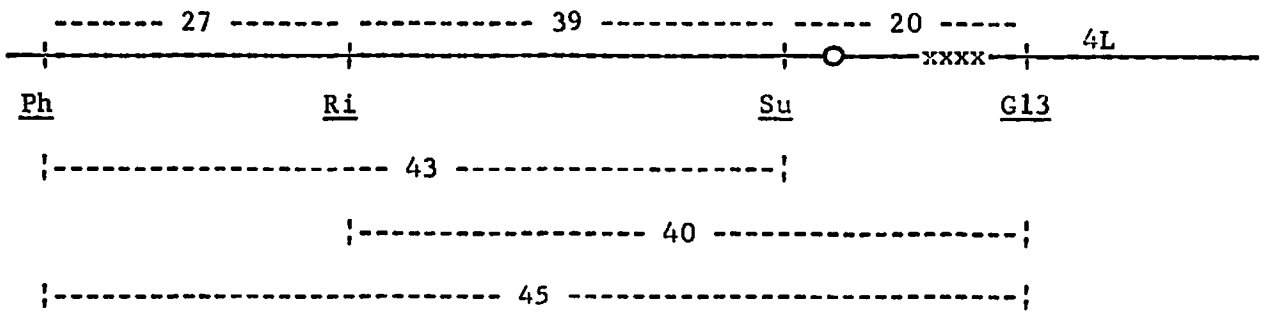
in an eight-rowed background, has been transferred to maize on a corn-Tripsacum interchange chromosome (M2-Tr9). In a row-number background higher than eight-rowed, the effect is only a reduction in row number. This dominant factor from Tripsacum is allelic to two-ranking from teosinte, as shown by a hybrid with a two-ranked teosinte derivative that failed to segregate the many-ranked condition through the F_3. At first the dominant factor was unstable regarding the point at which its phenotype was manifest. However, in due course a factor, possibly from teosinte, was selected which synchronized its expression with the onset of rachis formation. The nature of this synchronizing factor is unknown.

As one of the essential traits which distinguishes corn from teosinte, the inheritance of the two-ranked spike has special significance. The development of two-ranked, string cob sweet corn is possible and well underway.

Walton C. Galinat

Abscission layer development in the rachis of Zea: its nature, inheritance and linkage — Abscission occurs independently in two regions of the rachis, namely the rind and the pith, as seen in longitudinal sections of cobs from corn-teosinte derivatives. Our studies reveal that development of the abscission layer in these two regions is controlled by two different genes on chromosome 4 (Tables 1 and 2). These genes, hereby designated as Ph for pith abscission and Ri for rind abscission, are placed on the short arm as shown in Figure 1.

Figure 1. Placement on chromosome 4 of factors for abscission layer development in maize-teosinte derivatives.



xxxx = possible small inversion in the Su-G13 region