

Genotype Unknown (Origin in parenthesis):

Hairy sheath (Mexican composites)	71-1035 x CM (segreg)
Hoya arrugada, rugose leaf (Chalqueno)	71-971# (segreg)
Low ear position (Oh 43)	71-966# (segreg)
Normal internode elongation above ear	71-873 P x CM (segreg)
Square stalk (Roque 47 Y#, R/F Mexico)	71-1000S (segreg)
Zebra leaf	71-955# (segreg)

James L. Brewbaker

ILLINOIS FOUNDATION SEEDS, INC.
Champaign, Illinois

1. ACR genotype of Illini Xtra-Sweet and Early Xtra-Sweet hybrids.

Most corn varieties are of the genotype of $\underline{A_1A_2cr}$, with some varieties $\underline{A_1A_2Cr}$.

In 1970 an F_1 cross of $\underline{a_1A_2CRy_1}$ x $\underline{A_1A_2CRy_1}$ was planted to produce ears which would express the phenotypic ratio of 3 purple to 1 white. This cross was planted adjacent to the Illini Xtra-Sweet variety expecting the timing and the wind would favor a minimum of contamination. Both the silking and the wind were such that pollination of some $\underline{A_1a_1y_1y_1}$ silks with Illini Xtra-Sweet pollen occurred.

It was anticipated there would be an excess of purple kernels in the cases of cross pollination. The sibbed ears were expected to express a 3 purple to 1 white seed color ratio. At harvest it was promptly noted many ears appeared to have both white and yellow seeds, as well as, the purple kernels. Some ears on the $\underline{A_1a_1}$ rows immediately adjacent to the Illini Xtra-Sweet had only yellow and purple kernels, which appeared to be segregating on a 1:1 basis.

Dr. Earl Patterson, University of Illinois, called it to our attention that $\underline{a_1}$ and $\underline{sh_2}$ are closely linked on chromosome 3. In the conversion of stocks from $\underline{su_1}$ to $\underline{sh_2}$, $\underline{a_1sh_2}$ stocks must have been used in the conversion program with the $\underline{a_1sh_2}$ linkage not being broken.

Subsequently in 1971, $\underline{A_1a_1y_1y_1}$ stocks were crossed, by hand pollination, by both Illini Xtra-Sweet and Early Xtra-Sweet. At harvest it

was noted that in both cases the ears were segregating in a 1 purple to 1 yellow seed ratio. This identified the fact that Xtra-Sweet varieties are both of the $\underline{a_1 a_1 sh_2 sh_2}$ genotype.

In 1971 ears which would give a seed ratio of 1 purple dent: 1 yellow dent: 1 purple shrunken: 1 yellow shrunken were being produced by planting a stock of $\underline{A_1 A_2 CcRSh_2 sh_2 y_1 y_1}$ in an isolation plot, detasseling this hybrid, and allowing it to pollinate with pollen from the Xtra-Sweet parents. The resulting crossed ears expressed no segregation for color, all the kernels being purple. This would indicate that both Illini Xtra-Sweet and Early Xtra-Sweet are of a dominant CC genotype.

Clarion B. Henderson

2. Seedlings segregating on a 9:3:3:1 phenotypic ratio.

It is relatively easy to have maize ears which express phenotypic ratios of 3:1 and 9:3:3:1. It is also easy to have seedlings which express a 3:1 ratio. To our knowledge there is little or no seed available which, when planted, will produce seedlings expressing a 9:3:3:1 ratio.

In working with both $\underline{lw_1}$ (lemon-white albino-chromosome 1) and $\underline{d_1}$ (dwarf₁-chromosome 3) the idea occurred to us to combine these two mutants in such a way to produce seedlings which would exhibit 9:3:3:1 ratio, when planted.

The first attempt to produce this material was made by crossing heterozygous dwarf-1 by $\underline{Lw_1 Lw_1}$ (or $\underline{Lw_1 lw_1}$) stocks. At the same time these $\underline{Lw_1 Lw_1}$ (or $\underline{Lw_1 lw_1}$) plants were selfed by progeny number. The $\underline{D_1 d_1}$ plants crossed by $\underline{Lw_1 Lw_1}$ were discarded. Only the $\underline{D_1 d_1}$ plants crossed by $\underline{Lw_1 lw_1}$ were harvested. The cross of $\underline{D_1 d_1} \times \underline{Lw_1 lw_1}$ was then planted and each plant selfed. At the harvest of these selfs all ears not expressing a segregation for lemon-white were discarded (approximately 50% of the selfed plants). The remaining ears were individually germinated to ascertain those segregating for both $\underline{d_1}$ and $\underline{lw_1}$, not for just $\underline{lw_1}$ alone.

The second procedure selected was the crossing of $\underline{Lw_1 Lw_1}$ (or $\underline{Lw_1 lw_1}$) stocks by homozygous dwarf-1 plants. To more aptly make this cross the dwarf-1 plants were carefully treated with gibberellic acid.