

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  $\underline{a_1a_1sh_2sh_2}$  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  $\underline{A_1A_2CcRSh_2sh_2y_1y_1}$  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  $\underline{d_1}$  (dwarf<sub>1</sub>-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  $\underline{Lw_1Lw_1}$  (or  $\underline{Lw_1lw_1}$ ) stocks. At the same time these  $\underline{Lw_1Lw_1}$  (or  $\underline{Lw_1lw_1}$ ) plants were selfed by progeny number. The  $\underline{D_1d_1}$  plants crossed by  $\underline{Lw_1Lw_1}$  were discarded. Only the  $\underline{D_1d_1}$  plants crossed by  $\underline{Lw_1lw_1}$  were harvested. The cross of  $\underline{D_1d_1} \times \underline{Lw_1lw_1}$  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  $\underline{Lw_1Lw_1}$  (or  $\underline{Lw_1lw_1}$ ) stocks by homozygous dwarf-1 plants. To more aptly make this cross the dwarf-1 plants were carefully treated with gibberellic acid.

Untreated dwarf-1 plants grow to a height of about 8 to 12 inches. With our gibberellic acid treatment, the dwarf-1 plants grow to a height of approximately 3 feet.

At harvest all the crossed ears are saved and separately shelled. Some seed from each ear was then planted and selfed to determine whether the  $\underline{Lw}_1\underline{Lw}_1$  or  $\underline{Lw}_1\underline{lw}_1$  genotype was crossed by  $\underline{d}_1$  plants. Progenies producing ears segregating for lemon-white were saved and the remnant seed used to produce additional seed segregating for both  $\underline{lw}_1$  and  $\underline{d}_1$ .

In developing this second procedure it was apparent that approximately half the crossed ears segregated for both  $\underline{lw}_1$  and  $\underline{d}_1$ . Of the selected progenies producing the  $\underline{lw}_1$  phenotype, these rows contained plants of which  $\frac{1}{2}$  were found to be segregating for both  $\underline{lw}_1$  and  $\underline{d}_1$ . All the progenies and all the selfs produced seed segregating for dwarf-1 expression.

The phenotypes produced by this second procedure would be for a 9 tall green:3 tall albino:3 dwarf green:1 dwarf albino ratio, or for a 3 tall green:1 dwarf green ratio.

Clarion B. Henderson

### 3. Studies and classification of cytoplasm variations.

Because of the seriousness of both Helminthosporium maydis race T Southern Leaf Blight and Yellow Leaf Blight and their attack on corn varieties in the T cytoplasm background, a study was initiated with cytoplasm that did not show susceptibility to these two diseases.

When this relationship of disease susceptibility and cytoplasm background became apparent, Dr. M. S. Zuber, University of Wisconsin, recalled some previous work of Dr. Jack Beckett, while Dr. Beckett was with the University of Illinois. Dr. Beckett had accumulated and studied various sources of corn which gave some expression of sterility in the different backgrounds. With the transfer of Dr. Beckett from the University of Illinois, to the University of Missouri, studies of this project were discontinued. Dr. Zuber, in recognizing the potential availability and use of this material, accumulated these stocks and made them available to research workers. Dr. A. L. Hooker, University of Illinois, and