

tained this year, however, confirm the earlier conclusions with respect to the number of genes. An ear, known to be homozygous for one Bh factor and apparently segregating for five or six others, produced progenies segregating in ratios of 243:781, 81:175, 27:37, 9:7, and 3:1. The actual numbers were respectively for blotched and nonblotched seeds: 198:667, 203:418, 142:207, 141:103, 182:54. The results indicate that there must be at least six factors in the system. The effort to identify testers for all of these will continue.

P. C. Mangelsdorf

12. Vestigial glume modifiers.

Having finally obtained homozygous Vg Vg inbred strains in a background approaching that of sweet corn inbred P39, it became apparent that two and possibly three modifying genes are essential to insure good pollen production under adverse environmental conditions. Previously we reported that the effect of a certain weak tunicate allele in restoring tassel glumes to Vg plants bearing "glumeless" ears was sufficient to permit normal pollen production. But such restored Vg tassel glumes are flattened rather than boat-shaped and consequently they do not enclose the young anthers tightly enough to prevent shriveling of the dehiscence pore under conditions of heat and drought. However, if the young anthers are colored a cherry red by a certain R-allele, then there is sufficient additional protection provided by light obstruction within the walls of the anther to permit normal pollen production. At the actual time of pollen shedding, this red color fades out to a pale shade in contrast to the purple-anthered character which remains permanently dark.

All three of these genes (Vg, tu^W, R^r) are dominant to normal and this facilitates back-crossing them into a quality-acceptable inbred (P39) of sweet corn. The final selection of the homozygous condition of these dominants following inbreeding may be accomplished in F₂ by the following techniques. Since one of the effects of tu^W is to cause the semi-liguleless expression of the Vg gene to become recessive in our stocks, selection of the "liguleless" plants in segregating stocks identifies the Vg Vg plants. Classification as Vg Vg on a basis of ligulelessness may be accomplished in either the seedling or mature plant. The R^rR^r plants in segregations may be identified by progeny tests of seedlings grown in sand flats. The tu^W gene is incompletely dominant so that the homozygotes may be recognized by comparison of tassel glumes for a given Vg condition determined as mentioned previously.

The possibility of a third important modifying gene for Vg exists. In some stocks which have the necessary tu^W and R-allele modifiers, the filaments of Vg Vg anthers are slow to elongate and when they do lengthen they are less than one-half normal length. Sometimes these Vg Vg

anthers remain within the glumes and never do disperse their pollen. This filament trouble is peculiar to the homozygote although it can be eliminated by selection in as much as we have one line without such filament difficulties.

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1. High-oil and high-protein hybrids.

Two new corn hybrids, Ill. 6021 (R75 x R76) (R84 x K4) and Ill. 6052 (R78 x 38-11) (R84 x K4), have been developed in the Agronomy Department of the University of Illinois. Foundation single-cross seed of these two hybrids is available to seedsmen interested in producing seed in 1959. Sufficient double-cross seed for farm use will be available for the 1960 growing season. These new hybrids yield about 30 percent more oil and 10 percent more protein than present commercial hybrids. In addition, they are similar to standard hybrids in grain yield, standability, and other agronomic traits. Nationwide use of adapted high-oil hybrids would produce almost as much oil as is now received from butterfat, soybeans, cotton, and flax. These new high-oil hybrids should benefit both the starch industry and the livestock feeders.

R. W. Jugenheimer

2. Inbred lines and sister-line crosses.

Sister-line crosses are combinations between sister strains of the same inbred line. Some sister-line crosses have considerably greater yield, vigor, and standability than the original inbred line and may be practical for the commercial use of single-cross hybrids. Data on a group of inbred lines and sister-line crosses are reported in Illinois Agricultural Experiment Station Bulletin 636. Some growers are interested in producing Hy x Oh7 because of its high yield and to yield well under high plant populations. Hy2 yielded 35 bushels acre; whereas, a related sister-line cross R158 x CI.42A yielded 12 bushels per acre. This latter hybrid might be used as a seed parent. In addition it is resistant to leaf blight and is higher in protein content. Oh7 yielded 51 bushels an acre whereas, Oh7 x Oh7A, a sister line cross, yielded 85 bushels an acre. This cross might be used as the pollen parent for the commercial production of a modified version of Hy x Oh7. Many of the other sister-line crosses appear to be pr