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1. A congruous background for the tr and pd genes.

The mutant genes in maize for a two-ranked spike (tr) and for single female spikelets (pd) are usually unstable in expression, especially in the heterozygous condition and in a genetic background of typical modern maize. A sporadic proliferation to many ranks and to paired spikelets appears to be promoted by the extensive vascularization of a thick modern cob. When the tr and pd genes are transferred to a background of the string cob (Sg) trait in combination with the teosinte chromosome 4 complex, the axis is vascularized more like that of teosinte and these mutant genes acquire a stable phenotype and are fully fertile in the homozygous compound (tr tr, pd pd).

Both the tr and pd reduce vascular development in the cob. The additive effects of such reductions in the compound tr tr, pd pd may result in either female sterility through lack of style development or the expression of one of the genes may exclude that of the other with the phenotype fluctuating back and forth on a single cob. But when teosinte chromosome 4 is introduced a harmonious balance is reached which allows fertile expression of the double mutant combination. This teosinte segment, discovered and extracted by Mangelsdorf, increases vascular development in the rind of the cob and this is tied into the spikelet supply trace by fusion in the glume cushion.

Walton C. Galinat

2. On the individual breeder's gene pool.

With the hazards of genetic erosion now common knowledge, the corn breeders, both commercial and public and almost without exception, have started their own isolated gene pools of variation into which they introduce all available exotic stocks of maize. The idea of their own