

2. Inbreeding depression in autotetraploid maize.

The rate at which autotetraploids approach homozygosity during inbreeding is slower than in diploids. In diploids, loss in vigor during selfing parallels loss in heterozygosity. If, in autotetraploids, one assumes that:

- (1) homozygosity, per se, is responsible for reduction in vigor,
- (2) all three heterozygotes are equal in vigor (AAAa = AAaa = Aaaa),
- (3) only chromatid segregation occurs,
- (4) the ultimate amount of vigor loss is 73% (based on Jones' diploid single cross data),
- (5) all plants are euploid,

then it turns out that the reduction in vigor from the S_0 to the S_1 amounts to approximately 7%. If one considers chromosomal segregation only, the value amounts to approximately 3%.

In 1959, 40 S_0 and S_1 families were compared in a replicated split-plot trial. The S_1 was found to be considerably less vigorous, as measured by yield of grain, than we had expected. The S_1 , on the average, yielded 70% as much as the S_0 , a value comparable to that encountered in diploid material. However, in 1960, 25 S_0 - S_1 comparisons were made, and the S_1 mean yield was 82% of the S_0 .

A significant family x generation was found in the 1960 data. Six of the 25 families showed less than 10% loss in vigor after a generation of selfing.

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3. Tetraploid genetic stocks now available.

We now have marker stocks of the following types available and will share them with those interested in them:

sugary 1
white endosperm
waxy
golden 1
chocolate pericarp
liguleless 1
ACRPr (probably homozygous)
brown midrib 1

A number of combinations of these, and other mutants, are made up. New stocks are also being worked up.