

Goggi, A. S., L. Pollak, J. Golden, M. DeVries, G. McAndrews, and K. Montgomery. 2007. Impact of early seed quality selection on maize inbreds and hybrids. **Maydica** 52:223-233.

### **Abstract**

Seed composition, genetic background, and environment influence seed quality. Plant breeders selecting for improved seed composition seldom select their inbreds for improved seed quality traits. The standard germination test evaluates seed viability, but it often overestimates field performance. Therefore, seed vigor tests are used to predict seed germination under stressful environments. There is little information on the possible genetic improvement of seed selected for both, improved seed composition and vigor. The objectives of this study were 1) to evaluate the seed quality attributes of a group of maize (*Zea mays* L.) inbreds selected for high protein content; 2) to assess whether early selection improves the seed quality and decreases the phenotypic variability of seed vigor in a group of inbreds; and 3) to calculate the breeding parameters of general (GCA) and specific combining ability (SCA). During summer 2002 and 2003, related sets of inbred lines were grown in replicated nurseries near Clinton, IL, and Ames, IA. Seed from each inbred was produced by self pollination. Some of the inbred lines grown in 2002 and all grown in 2003 were high-protein white lines that also had been selected for germination cold tolerance and high post-accelerated aging field emergence. In 2002, the mean percentage of standard germination test, saturated cold test, accelerated aging test, soak test, and fast green test for the group of selected high-protein white inbreds were significantly ( $P \leq 0.05$ ) higher than the corresponding average values of the yellow inbred checks. There was genetic variability for seed quality in these sets of high protein white inbreds even after a very intense selection process for improved seed quality traits. GCA effects for seed quality were more important than the SCA effects, indicating that the additive effect of the inbreds was more important than the dominant effect to the final seed quality of the hybrids. Selecting inbreds for high seed quality early in the breeding program is beneficial and important for improving germination and field performance.

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