
As a part of an adaptation program initiated in 1975 in an effort to broaden the U.S. germplasm base by utilizing elite exotic germplasm, this investigation was undertaken to evaluate agronomically the second cycle lines derived from intercrosses of simi-random first cycle temperate-adapted lines of 100% tropical origin. Other objectives were to compare genetic effects across testers and across environments and to examine genetic correlations among agronomically important traits in this unique germplasm. The material involved in this study represented progeny derived form intercrossing unrelated lines of the first cycle of selection, followed by four generations of selfing, started from the corresponding F2 populations. The inbred lines were crossed onto two single-cross testers: (B73Ht x Mo17Ht) and KU2301 (A Suwan single-cross from Thailand). The experimental hybrids were evaluated in North Carolina and Brazil during 1987 and 1988.

The mean yields of the experimental hybrids were higher when the inbreds were crossed with the (B73Ht x Mo17Ht) tester than when crossed with the tropical tester in North Carolina, but yields in Brazil using the KU2301 tester were higher than were the same testcrosss means in North Carolina.
The additive genetic variation for yield, selection index (100 x yield in bu/A + % erect plants - 5 x % grain moisture), and ear and plant height were substantial in the material under study. Estimates of among family correlations between traits were calculated for all possible pairs of the twelve characters studied. Based upon the estimates, the association of yield with any trait was usually fairly low, with the exception of the selection index.

The relative stability of the rank of the genetic effects across testers and across environments was measured by Pearson product moment correlations in combination with Spearman’s rank order correlations. In the upper range of the mean yield of the lines, there were twelve lines that were much better than others in consistency in yield and selection index across locations and across testers. About twenty-three other lines had high rank for either yield or selection index but inconsistent results between these two characters.

Most of the (B73Ht x Mo17Ht) testcrosses were agronomically competitive with commercial U.S. hybrids. The experimental hybrids had plant heights and grain moisture within the range of commercial materials grown in the southeastern corn region; they flowered on the average about 3 to 4 days later than the (B73Ht x Mo17Ht) tester. The testcrosses with the KU2301 tester were largely equal in maturity or earlier than the KU2301 tester.
The pedigrees of the upper range of inbreds represented at least five and probably six different tropical hybrids reflecting potential for being included in breeding programs as tropical germplasm sources.