Noppong Chulchoho 2006: Comparison of S_2 Progeny and Testcross Performance in Suwan 5 Maize Variety. Master of Science (Agriculture), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Associate Professor Amnuay Yothasiri, Ph.D. 74 pages.
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The experiments were carried out to: (1) compare the S_2 line *per se* (S_2) and S_2 testcross (TC) methods for evaluating the S_2 lines, (2) study correlation between the two methods, (3) study response to selection of each method and (4) study their inbred and hybrid development. In this study, the Suwan 5(S)C3 (ABC0) maize variety was divided into two subpopulations, Suwan 5(S)C3(F) (AC0) (flint) and Suwan 3(S)C3(SF) (BC0) (semi-flint). The evaluation methods of the S_2 and S_2 testcrossed with inbred testers Ki 45 in AC0 and Ki 46 in BC0) were undertaken. One hundred progenies from each method in each subpopulation were evaluated in the 2000 early rainy season at the National Corn and Sorghum Research Center, Nakhon Ratchasima province. Ten highest yielding entries selected from each subpopulation were grouped by using their S_4 lines to form 4 synthetics of Cycle 1. The 4 synthetics and 3 original populations were topcrossed with the Ki 45 and Ki 46 inbreds to obtain 14 population topcrosses. Twenty-one population crosses of the 7 populations, the 7 populations *per se* and the 14 population topcrosses were evaluated. Ten S_6 lines from the highest yielding selections of each method of the AC0 and BC0 were testcrossed with the Ki 45 and Ki 46 inbreds, repectively. Twenty hybrids of the 2 subpopulations and 4 hybrid checks were evaluated. The S_7 lines from the highest yielding selections of both methods of each subpopulation and 4 inbred checks were also compared. A total of 3 trials were evaluated in the 2001 late rainy season at the National Corn and Sorghum Research Center. The results of genetic variability among progenies evaluated over both subpopulations showed that the S_2 was 1.84 times greater than the TC method for all of 14 agronomic characters measured and 4.35 times for grain yield. Correlation coefficient (r) between the 2 methods for grain yield was 0.069. In conclusion, the S_2 method was more efficient in evaluating S_2 lines than the TC method for improving yields of populations *per se* and populations topcrossed with inbreds. However, the TC method was more efficient in improving yields of population crosses. Both methods were not different in selecting inbreds and hybrids for high yield.

Student's signature

Thesis Advisor's signature

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