EFFICIENCY OF GERMINATION AND VIGOUR TESTS IN PREDICTING FIELD PERFORMANCE OF DIFFERENT GENOTYPES OF MAIZE *(Zea mays L.)*

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ABSTRACT

Eighteen varieties of maize *(Zea mays* L.) were used to evaluate the efficacy of germination and vigour tests in predicting maize emergence under field conditions as well as to investigate whether differential response to the tests exist among the maize varieties. The study was designed to establish which among the tests could be used to reliably predict field emergence of maize.

The four tests used were the standard germination, accelerated ageing, tetrazolium staining and conductivity. Each test was evaluated with 4 replicates of 25 seeds per variety. The tests were conducted in the Seed Science Laboratory of the Department of Plant Science. In addition, the maize varieties were evaluated in a 4-replicate field trial, laid out as randomised complete-block design at the Teaching and Research Farm of the University during the 2004 late season.

The results showed that eleven out of eighteen varieties evaluated had standard germination above 80%. The viability of seed as determined by tetrazolium staining was also above 80% for seventeen varieties. Germination for accelerated ageing test varied between 5% and 72% while conductivity test results ranged from 48.4 µs/cm/g to 146.6 µs/cm/g. Field emergence varied from 62% to 90%. There was variation in the results of relative ranking of each vigour test as well as the grand rank summation. Field emergence of varieties 18 (TZEEY — SR BC$_5$) and 7 (TZE WPop X 1368 STR CI) could be reliably predicted by these vigour tests but predictions for varieties 9 (SIN 9432) and 12 (TZEE — SR Damascus) would be unreliable. Results of the relative ranking of the varieties within each test and the significant variety x test interactions observed in the study suggested that evaluation of seed vigour involving several maize varieties should be done under several seed quality tests in order to minimize the chances of taking wrong

decisions. Furthermore the significant positive correlation coefficients of field emergence with tetrazolium (r = 0.62, P < 0.01) as well as accelerated ageing (r = 0.48, p < 0.05) indicated that these two tests could be used to predict maize emergence and seedling vigour in the field.

The performance of the maize varieties in the field trial showed few significant con-elation coefficients between the laboratory tests and mature plant traits. Tetrazolium test had significant negative correlation with grain yield (r = -0.49, p < 0.05). For the standard germination test, there were significant negative correlations with days to 50% tasseling, pollen shed and Bilking (r = -0.64 to 0.62, p < 0.01) while accelerated ageing had significant correlation with days to 50% tasseling and pollen shed. Therefore, seedlots with high germination in the laboratory had a tendency to flower early.

In conclusion, tetrazolium and accelerated ageing tests reliably predicted field emergence and flowering dates of the 18 maize varieties evaluated.