

**ASSOCIATION OF COTTON STANDS WITH
GERMINATION IN STRESS AND
NON-STRESS TESTS**

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Abstract

Obtaining a vigorous stand of cotton becomes increasingly difficult as planting environment becomes more harsh and as seed vigor declines. Seed vigor is often defined by high germination in a standard cool test. However, germination results from cool tests can vary greatly due to minor variations in temperature among incubators. This study compares measurements of cottonseed germination to determine which provided the highest associations with field stands in the 1997 Arkansas Variety Test. The field test included six replications of 48 genotypes (seed supplied by various seed companies) and was planted at a rate of 5 seed/row foot at six locations spanning ca. 200 miles from southeast to northeast Arkansas. After final stands were established, live plants in 20 row feet of each plot were counted. Germination percentages of seed from the same seed lots were determined by the cool test using standards described in AOSA Seed Vigor Testing Handbook. Additional seed from the same lots were immersed in hot (65°C) water for 5- (no stress), 30- (moderate stress), and 45- (high stress) min, then germination percentages after 48 hours at 30°C were determined. In addition, a count of all germinated seed (no radicle length restriction) was made in the cool test and a cool-warm vigor index was calculated by adding the standard cool test germination and germination after 5-min hot water treatment. Stands of genotypes were relatively poor at each location, varying from lows of 0.2 to 2.0 plants/row foot to highs of 2.9 to 4.1 plants/row foot. Average germination percentage was lowest from the standard cool test, followed by germination after 45-min, 30-min, and 5-min hot water treatments, and was highest for total germination in the cool test. Standard cool test germination was negatively correlated with stand at each location. Also, the cool-warm vigor index and germination after 45-min hot water treatment were poorly correlated with stands. The highest correlations were attained with total germination in the cool test, germination after 30-min and germination after 5-min hot water treatments. The radicle length requirement for counting seed as germinated in the standard cool test does not appear to be valid. Germination of seed after 5- and 30-min hot water treatments in relation to the seed quality curve (proposed by Bird and Reyes in 1958) provides a rapid and accurate assessment of seed vigor.