

SEVERAL TESTS EVALUATED TO DETERMINE THEIR EFFECTIVENESS IN PREDICTING VIABILITY OF COTTONSEED PLANTED IN SOIL UNDER ADVERSE CONDITIONS

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Seed of 24 different varieties used in Agricultural Extension cotton variety tests for 1967 was used in this experiment. The objective was to find an effective method of predicting the performance of cottonseed planted in soil under adverse growing conditions.

The field test planting for this experiment was established March 15, at Tucson. The temperature of the soil at the two-inch planting depth in the field was carefully monitored. While the general trend during the experiment was up, there was much fluctuation in the minimum, maximum and 8 A.M. temperatures.

Cottonseed placed in preirrigated soil at a two-inch depth without pre-soaking and without supplemental moisture produced the largest number of emerged seedlings, averaging 69.8 percent for the 24 varieties. The results obtained in the field check plots served as the basis for comparison of the relative effectiveness of each of the several tests used for predicting field emergence.

Official germination test data for each lot of cottonseed were provided by Harley Reeder, Registered Seed Analyst and owner and operator of the Agricultural Seed Laboratories, Phoenix. The correlation between official germination percentages and actual seedling emergence in the field was 0.41.

Soil from the field test plots was placed in benches in three different plastic greenhouses for the second experiment. The concentration of CO<sub>2</sub> in the atmosphere was kept at a constant and different level in each greenhouse. Concentration levels of CO<sub>2</sub> were 300, 1200 and 2400 ppm. It was observed that the 1200 and 2400 ppm<sup>2</sup>CO<sub>2</sub> concentrations inhibited slightly the speed of cottonseed germination and seedling emergence. However, after seedlings were emerged, growth was enhanced by supplemental applications of CO<sub>2</sub> to the atmosphere. The stimulation of growth observation was verified by plant dry weight determinations at the conclusion of the experiment. The correlation between the actual emergence of seedlings for each variety in the field and the percent of emergence of seedlings in the 1200 ppm CO<sub>2</sub> environment was 0.79.

The correlation between field emergence and the development of radicles was determined in the third experiment. Three different germinator temperatures were used, 15.5, 18.2, and 21.1C. The correlation between emergence of seedlings in the field and development of radicles 5mm long or longer in 12 days in the 21.1C germinator was 0.64.

In the fourth and final phase of this experiment the probable germination percent for each of the 24 varieties of cotton was estimated using the tetrazolium chloride test. The correlation between actual seedling emergence in the field and that estimated using tetrazolium chloride was 0.72.

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The results obtained indicate that further cottonseed germination and related studies should be made. It seems likely that new laboratory or greenhouse tests to predict performance of seed under adverse conditions could be developed.

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USING SALINE WATER FOR THE  
GERMINATION IRRIGATION -- MOVEMENT OF SALTS

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Two experiments were conducted at the Safford Experiment Station to ascertain the effect of watering up cotton with preshaped beds when using saline irrigation water. The purpose of the study was to observe the movement of soluble salts in beds with different crown widths.

Materials and Methods

Soil samples were taken from 12 different sites within the profile of the beds. A soil probe was used to obtain the sample from a horizontal plane. Samples at 0.0, 1.5, 3.0, and 4.5 inches deep were taken at various "positions" -- 3 inches from the north edge of the bed, the middle of the bed, and 3 inches from the south edge of the bed.

In one experiment the crown widths of the beds were 9, 12, and 16 inches. Cottonseed of the variety 1517 V were planted 3 inches from the south edge and in the middle of each different width.

In the other experiment a wide-narrow row spacing was used; the spacing was 30 inches and 50 inches alternately in comparison with a 40-inch row spacing. In this instance the position of the soil samples taken was 3, 6, and 9 inches from the north edge of the bed; the depth of the samples was the same as previously stated. The seed was placed 3 inches from the outer edge of the bed.

The soil samples were taken from the preshaped beds just prior to the germination irrigation (1 May 67). The germination irrigation was applied using the well at the Safford Experiment Station as the water source. The salt concentration of the well water was 2500 ppm total soluble salts (TSS) and 60 percent of the exchangeable cations was sodium.

Soil samples were again taken just prior to the next irrigation (15 June 67) using the sampling procedure previously stated. The samples were extracted and analyzed for TSS.

Results and Conclusions

Differences in salt accumulation were not detected with respect to crown width or wide-narrow row spacing. However, a difference was observed in