

Cottonseed Treatment Evaluations in Arizona, 1992

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Abstract

*Field experiments were conducted at three locations in Arizona (Maricopa, Marana, Safford) to evaluate 9 cottonseed treatments on Upland cotton (*G. hirsutum* L.). Stand counts were taken to evaluate the effectiveness of each treatment. Statistical analysis showed no significant differences among the treatments used at the Maricopa location. Significant differences were found among the treatments used at the Marana and Safford locations.*

Introduction

With the planting of every cotton (*Gossypium* spp.) crop there is the potential for the infestation of seedling diseases. Seedling diseases often result in the loss of a satisfactory stand, which is further complicated by the possibility of replanting affected fields, delaying the start of the crop. The occurrence of such soil-borne diseases in a cotton field is often sporadic and varies considerably from season to season due primarily to weather conditions and the sequence of weather events in relation to the growth and development of the cotton plants. In many cases, cotton growers desire adequate protection against seedling diseases and a seed treatment which is applied to the seed prior to planting. In an effort to test a group of cottonseed treatments under field conditions, a project was carried out at three locations in Arizona in 1992 as a continuation of similar projects in 1989 and 1990 and 1991 (Silvertooth and Malcuit, 1990; Silvertooth and Malcuit, 1991; Silvertooth and Malcuit, 1992).

Methods

Three field experiments were conducted in 1992 (Table 1) to evaluate the relative effectiveness of a group of cottonseed treatments on Upland (*G. hirsutum* L.) cotton. The treatments shown in Table 2 were used on common lots of DPL 90 (Delta and Pine Land Co. Acala 90) in all experiments with the exception of Marana, in which only treatments 1 through 6 were used. The Safford and Maricopa experiments were dry-planted and watered up. The Marana experiment was planted into moisture and capped. All experiments were arranged as randomized complete block designs with four replications. Plots were four (40 inch) rows wide and 40 feet in length at Marana and Maricopa. Plots were 2 (40 inch rows) and 40 feet in length at Safford. Exactly 200 seeds were planted in each respective treatment row.

Stand counts were made on all plots by counting the number of emerged plants per 40 feet of row. Percent emergence was calculated on the basis of 200 planted seeds. For purposes of statistical analysis, appropriate transformations of percentage data were used for analysis of variance and mean separation procedures (Fishers LSD) according to guidelines put forth by Gomez and Gomez (1984).

Results

The conditions associated with each experimental location is outlined to some extent regarding the initial soil temperatures, heat units (HU, 86/55°F limits) accumulated at planting, and at five day increments after planting in Table 1. The final stand count measurements were taken within 21 days after planting and the HU accumulations at 20 days ranged from 183 to 276. General weather conditions were favorable through germination at Safford and Marana with 71 to 65 HU respectively, being accumulated five days after planting. Weather conditions at Maricopa were favorable at planting followed by cool temperatures along with intermittent rainfall totaling 2.05 inches of recorded precipitation accumulated over 12 days after planting.

The stand count results are shown in Tables 3 through 5 for all treatments. For each experiment, the basic descriptive statistics are also provided such as the least significant difference (LSD) at the 0.05 probability level, the observed significance level (OSL) or the probability of a greater F value, and the coefficient of variation (CV) expressed as a percent.

The Maricopa location experienced weather conditions that are often associated with the occurrence of seedling diseases and presents a situation where we would be most likely to observe responses to fungicidal seed treatments. Although no significant differences among treatments were found (Table 3) the untreated checks (6 and 7) placed close to the bottom in ranking of treatment means suggesting an undetectable response. Although weather conditions were such that disease pressure was unlikely, the Marana location showed significant differences among treatments with the untreated check lower than all other treatments. Significant differences were found at the Safford location however the ranking of treatments suggest that the experiment may have been confounded by unknown factors.

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References

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Table 1. Seed treatment experimental University of Arizona Agricultural Center locations and conditions in Arizona, 1992.

| <u>Location</u> | <u>Planting Date</u> | <u>Soil Temp.</u> [§] -°F- | <u>Accumulated HU</u> | | | | |
|-----------------|----------------------|--|--------------------------|---------------|-------------|-------------|-------------|
| | | | <u>Planting</u> * | <u>5 d</u> ** | <u>10 d</u> | <u>15 d</u> | <u>20 d</u> |
| | | | ----- (86/55°F HU) ----- | | | | |
| Maricopa | 3/20/92 | 65 | 271 | 34 | 58 | 110 | 183 |
| Marana | 4/08/92 | 70 | 369 | 71 | 139 | 200 | 294 |
| Safford | 4/07/92 | 68 | 315 | 65 | 133 | 190 | 276 |

[§]Soil temperature at the depth of seed placement, at the time of planting.

* HU accumulated since Jan. 1 at planting.

**HU accumulated 5, 10, 15 and 20 days after planting.

Table 2. Treatments used in the 1992 seed treatment evaluation experiments in Arizona. *

| <u>Treatment</u> | <u>Formulation</u> | <u>Rates</u> |
|------------------|--|-------------------------|
| | | -----fluid oz./CWT----- |
| 1 | Nu-Flow ND | 7.5 |
| 2 | Nu-Flow ND + Apron TL | 7.5 2.0 |
| 3 | WECO 62864 Apron TL | 3.0 2.0 |
| 4 | WECO 62864 Apron TL Nusan 30 EC | 3.0 2.0 2.25 |
| 5 | WECO 62864 Nusan 30 EC | 3.0 2.25 |
| 6 | Untreated Check | ---- |
| 7 | Untreated Check | ---- |
| 8 | Vitavax PCNB Apron FL | 6.0 0.75 |
| 9 | Vitavax PCNB Anchor FL | 6.0 0.75 |
| 10 | Vitavax PCNB Apron FL Baytan 30 FL | 6.0 0.75 1.0 |
| 11 | Nuflow ND Apron TL | 7.5 2.0 |

* All materials applied in a slurry at a rate of 800 cc/CWT on a common lot of DPL-Acala 90.

Table 3. Percent emergence means for cottonseed treatments, Maricopa, 1992.

| <u>Treatment</u> | <u>Mean Emergence per Row</u> |
|------------------|-------------------------------|
| | ----- % ----- |
| 9 | 62 |
| 5 | 57 |
| 10 | 56 |
| 11 | 55 |
| 3 | 54 |
| 8 | 53 |
| 1 | 53 |
| 7 | 51 |
| 4 | 49 |
| 2 | 48 |
| 6 | 46 |
| LSD 0.05 | NS |
| OSL [§] | 0.17 |
| CV(%) | 13.6 |

[§]OSL, observed significance level (probability of a greater F value).

Table 4. Percent emergence means for cottonseed treatments, Marana, 1992.

| <u>Treatment</u> | <u>Mean Emergence per Row</u> |
|------------------|-------------------------------|
| | ----- % ----- |
| 1 | 78 A* |
| 4 | 76 A |
| 5 | 75 A |
| 2 | 75 A |
| 3 | 69 B |
| 6 | 63 C |
| LSD 0.05 | 4.4 |
| OSL [§] | 0.0001 |
| CV(%) | 4.0 |

*Means followed by the same letter within the column are not significantly different ($P \leq 0.05$) according to pairwise comparisons using a Fisher's LSD.

[§]OSL, observed significance level (probability of a greater F value).

Table 5. Percent emergence means for cottonseed treatments, Safford, 1992.

| <u>Treatment</u> | <u>Mean Emergence per Row</u> |
|------------------|-------------------------------|
| | ----- % ----- |
| 7 | 55 A * |
| 11 | 53 AB |
| 8 | 52 AB |
| 10 | 49 ABC |
| 9 | 47 ABCD |
| 4 | 45 BCD |
| 1 | 41 CD |
| 3 | 41 CD |
| 2 | 40 CD |
| 6 | 39 D |
| 5 | 39 D |
| LSD 0.05 | 9.2 |
| OSL [§] | 0.003 |
| CV(%) | 14 |

*Means followed by the same letter within the column are not significantly different ($P \leq 0.05$) according to pairwise comparisons using a Fisher's LSD.

[§]OSL, observed significance level (probability of a greater F value).