

1993 Cottonseed Treatment Evaluations

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Abstract

Cottonseed was treated with several fungicide treatments in an effort to protect the seed and seedling from disease. Seed germination and vigor was evaluated in three Arizona locations; Maricopa, Marana, and Safford. Stand counts were taken on two separate dates after emergence and percent emergence was calculated. Among the three locations only one, Marana, showed significant differences among treatments. The highest percent emergence being seeds treated with Nu-Flow ND at a rate of 7.5 fl oz/cwt. The untreated control placed last in the ranking at this location.

Introduction

One of the most important factors involved in producing a high yielding crop of cotton is being able to establish a uniform and vigorous stand early in the season. There are many factors that may affect the accomplishment of this goal. Weather is one of the most influential factors in seedling development. Cool temperatures can slow down the germination and growth of a cotton seedling resulting in 'skippy' stands and poor seedling vigor. Another factor is that of seedling diseases and soilborne fungi that can slow down growth and development of a seedling, and in a worst case scenario, lead to the death of the seedling. In an effort to curb the effects of seedling diseases on emergence and vigor, cottonseeds treated with a variety of fungicides, and at different rates, were evaluated from the standpoint of seedling emergence and viability. This project is an extension of similar work conducted in Arizona in recent years (Silvertooth and Malcuit, 1990; Silvertooth and Malcuit, 1991; Silvertooth and Malcuit, 1992; Silvertooth and Malcuit, 1993).

Materials and Methods

Separate experiments were conducted at the University of Arizona Marana, Maricopa, and Safford Agricultural Centers in 1993. At each location plots were four 40" rows in width by 40 ft in length. The six treatments + check plot were replicated four times in a randomized complete block design. Exactly 200 seeds were planted in each row in each of the plots. Table 1 displays the treatments one through six, the materials used, and at what rates they were used, with treatment seven being the check (untreated seed). The same treatment scheme was imposed at each of the three locations. Stand counts were then taken in each of the plots at all three locations two times after seedling germination (approximately 300 and 600 HUAP). Percent emergence was then calculated on the basis of 200 seeds planted per row. The data was then subjected to an analysis of variance and the means were compared and separated using a Fisher's LSD at the $\alpha=0.05$ level according to the guidelines put forth by Gomez and Gomez (1984).

Results and Discussion

Table 2 shows the some of the general weather conditions at planting and heat unit accumulations for 5, 10, 15, and 20 days after planting. Weather conditions were favorable throughout the entire time the experiment was conducted (planting date through last sample date). Rainfall was minimal to none with Maricopa, Marana and Safford receiving 0.83, 0.20, and 0 inches of rainfall respectively. Heat unit (HU 86/55 °F thresholds) accumulations were recorded by local AZMET weather stations at each location.

Tables 3-5 show the average percent emergence for each treatment and the accompanying statistical information. Both sample dates for each location are included along with corresponding HUAP (Heat Units Accumulated after Planting) data. According to the statistical analysis performed none of the treatments were significantly different at either Maricopa or Safford on both dates of sampling. At Marana there were some interesting results. The average percent emergence was significantly different with an OSL (Observed Significance Level) of 0.001 for both sample dates indicating a high level of significance. In both of the dates of sampling the rankings were very similar with treatment one at the top and treatment seven (check) at the bottom, indicating positive responses to the treatments. Treatment five, which ranked second, was not significantly different from treatment one.

Weather conditions at each location were similar in terms of HUAP values. However, it is interesting to note a lower level of HUAP for the first 5 days following planting (41 HUAP). Cooler conditions immediately following planting are often regarded as contributing to a higher incidence of seedling disease. Soil temperatures at planting were not necessarily cool, but were actually quite favorable.

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References

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Table 1. Treatments used in the 1993 Seed Treatment evaluations experiments in Arizona

<u>Treatment</u>	<u>Formulation</u>	<u>Rates</u> --fluid oz./cwt--
1	Nu-Flow ND	7.50
2	Nu-Flow M	1.25
3	Nu-Flow M	2.50
4	Nu-Flow M + Apron TL	1.25 2.0
5	Nu-Flow M + Apron TL	2.50 2.0
6	Nu-Flow AD	5.75
7	Control Untreated	

Table 2. Weather conditions and general HU accumulation trends for 1993 seed treatment experiment locations.

<u>Location</u>	<u>Planting Date</u>	<u>Soil Temp °F***</u>	<u>Accumulated HU (86/55°F HU)</u>				
			<u>Planting*</u>	<u>5d**</u>	<u>10d</u>	<u>15d</u>	<u>20d</u>
Maricopa	18 March	68.5	297	74	94	137	191
Marana	2 April	67.8	379	41	100	148	225
Safford	7 April	62.6	357	53	96	168	244

*Heat units accumulated since January 1 at planting.

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

***Soil temperature at seed placement depth on the day of planting.

Table 3. Percent Emergence Means for Cottonseed Treatments, Maricopa AZ, 1993

Sample Date 6 April 1993 (HUAP 200)*

<u>Treatment</u>	<u>Mean Emergence per row (%)</u>
7	38 a**
1	38 a
6	35 a
4	34 a
5	34 a
2	33 a
3	32 a
LSD _{0.05}	NS
OSL§	0.301
C.V.(%)†	11.6

Sample Date 22 April 1993 (HUAP 401)*

<u>Treatment</u>	<u>Mean Emergence per row (%)</u>
7	45 a**
1	44 a
6	42 a
4	42 a
2	42 a
5	41 a
3	41 a
LSD _{0.05}	NS
OSL§	0.217
C.V.(%)†	5.7

* Heat units accumulated after planting.

**Means followed by the same letter are not significantly different according to a pairwise comparisons using a Fisher's LSD.

§ Observed significance level.

† Coefficient of variation.

Table 4. Percent Emergence Means for Cottonseed Treatments, Marana AZ, 1993

Sample Date 24 April 1993 (HUAP 255)*

<u>Treatment</u>	<u>Mean Emergence per row (%)</u>
1	63 a**
5	62 a
3	53 b
4	49 bc
2	43 c
6	28 d
7	25 d
LSD _{0.05}	6.85
OSL§	0.0001
C.V.(%)†	10.0

Sample Date 22 May 1993 (HUAP 792)*

<u>Treatment</u>	<u>Mean Emergence per row (%)</u>
1	56 a**
5	53 a
4	44 b
3	44 b
2	38 c
6	24 d
7	22 d
LSD _{0.05}	5.37
OSL§	0.0001
C.V.(%)†	9.04

* Heat units accumulated after planting.

**Means followed by the same letter are not significantly different according to a pairwise comparisons using a Fisher's LSD.

§ Observed significance level.

† Coefficient of variation.

Table 5. Percent Emergence Means for Cottonseed Treatments, Safford AZ, 1993

Sample Date 30 April 1993 (HUAP 296)*

<u>Treatment</u>	<u>Mean Emergence per row (%)</u>
7	51 a**
2	48 a
6	45 a
4	44 a
1	43 a
3	39 a
5	36 a
LSD _{0.05}	NS
OSL§	0.283
C.V.(%)†	19.7

Sample Date 24 May 1993 (HUAP 729)*

<u>Treatment</u>	<u>Mean Emergence per row (%)</u>
4	38 a**
2	37 a
7	33 a
6	29 a
3	29 a
5	23 a
1	20 a
LSD _{0.05}	NS
OSL§	0.156
C.V.(%)†	33.0

* Heat units accumulated after planting.

**Means followed by the same letter are not significantly different according to a pairwise comparisons using a Fisher's LSD.

§ Observed significance level.

† Coefficient of variation.