1995 Seed 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 two Arizona locations; Maricopa and Marana. Stand counts were taken on two separate dates after emergence at both Maricopa and Marana and percent emergence was calculated. Significant differences in percent emergence due to treatment were observed in both sample dates at Marana. Results at Maricopa were not statistically significant but similar trends to those at Marana were observed with treatment number 6 (no treatment) having the lowest percent emergence and treatment number 2 (combination of Nu-Flow ND and Apron TL) having the highest emergence.

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 poor seedling vigor and 'skippy' stands. 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; Norton and Silvertooth, 1994; Norton and Silvertooth, 1995).

Materials and Methods

Separate experiments were conducted at the University of Arizona Marana, and Maricopa, Agricultural Experiment Stations in 1995. An identical study was planted at the Safford Agricultutral Center and was completely lost due to adverse weather conditions following planting. Plots were planted on 21 March at Maricopa and 6 April at Marana with 410 and 469 HU/1 Jan.(86/55°F thresholds) respectivley. Plots were four, 40 inch rows in width and 40 ft. in length at each location. The six treatments 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 six treatments, including the materials used, and the rates at which they were used. The same treatment scheme was imposed at both locations. Stand counts were taken at both Maricopa and Marana on two separate dates after planting by counting the number of emerged plants in each row of each plot. Percent emergence was then calculated on the basis of 200 seeds planted per row. The resulting data was subjected to an analysis of variance and treatment means were compared using a Fisher's LSD at the α=0.05 level according to the guidelines put forth by Gomez and Gomez (1984).

Results and Discussion

The spring of 1995 was extremely cool which provided ideal conditions for this type of experiment. Figures 1 and 2 show the general air and soil temperatures one week ahead of planting and for about a month following planting at Maricopa nd Marana respectively. At both locations a sharp drop in daily high temperature was observed with a corresponding decrease in soil temperatures which occured within days of planting. At Maricopa, soil temperatures were at approximately 70°F at planting. Within the next 4-5 days soil temperatures had dropped to around 55°F. A similar scenario occured at Marana. Soil temperatures at planting were at approximately 68°F. Within 2 days temperatures had dropped to 60°F and within ten days had dropped to around 55°F. Soil temperatures below 55°F are commonly recognized as being severely detrimental to cottonseed germination, vigot, and emergence. This was evident at all three 1995 locations.

Differences among treatment means at Marana for both sample dates were highly significant with observed significance levels of 0.0001 and 0.0003 for sample dates one and two respectively. Percent emergence in treatment 2 was significantly higher than all other treatments except treatment 1 (Table 2). It is interesting to note that the highest rate of emergence was about 70% at Maricopa on 18 April which dropped to 61% for the same treatment on 12 May. This was common in many cases in 1995. Although differences among treatment means were not significant at Maricopa, constant trends in treatment rankings were observed that were similar to those at Marana. Treatment 6 (check) had the lowest emergence at both locations for all sample dates and treatment 2 had the highest emergence (Table 3).

Treatments of Nu-Flow ND and Apron TL (in combination) performed very well in both locations in 1995.

Acknowledgement

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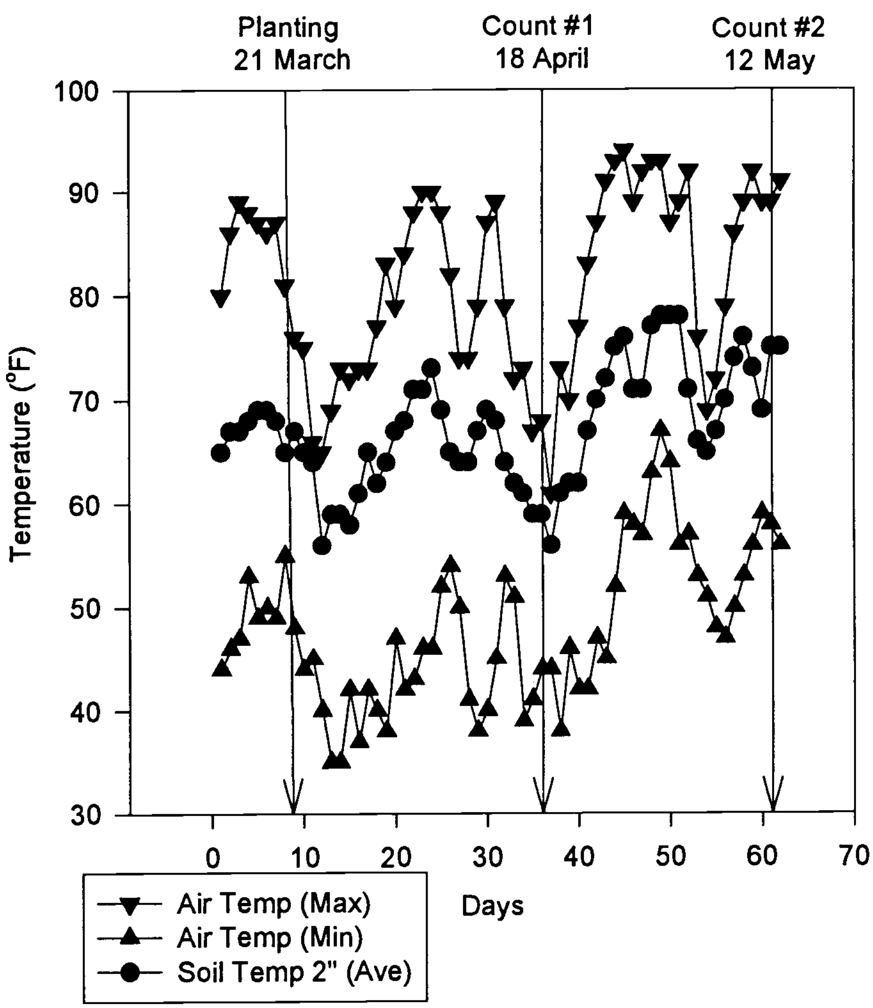

Figure 1. General air and soil temperatures during seed treatment evaluation, Maricopa, 1995.

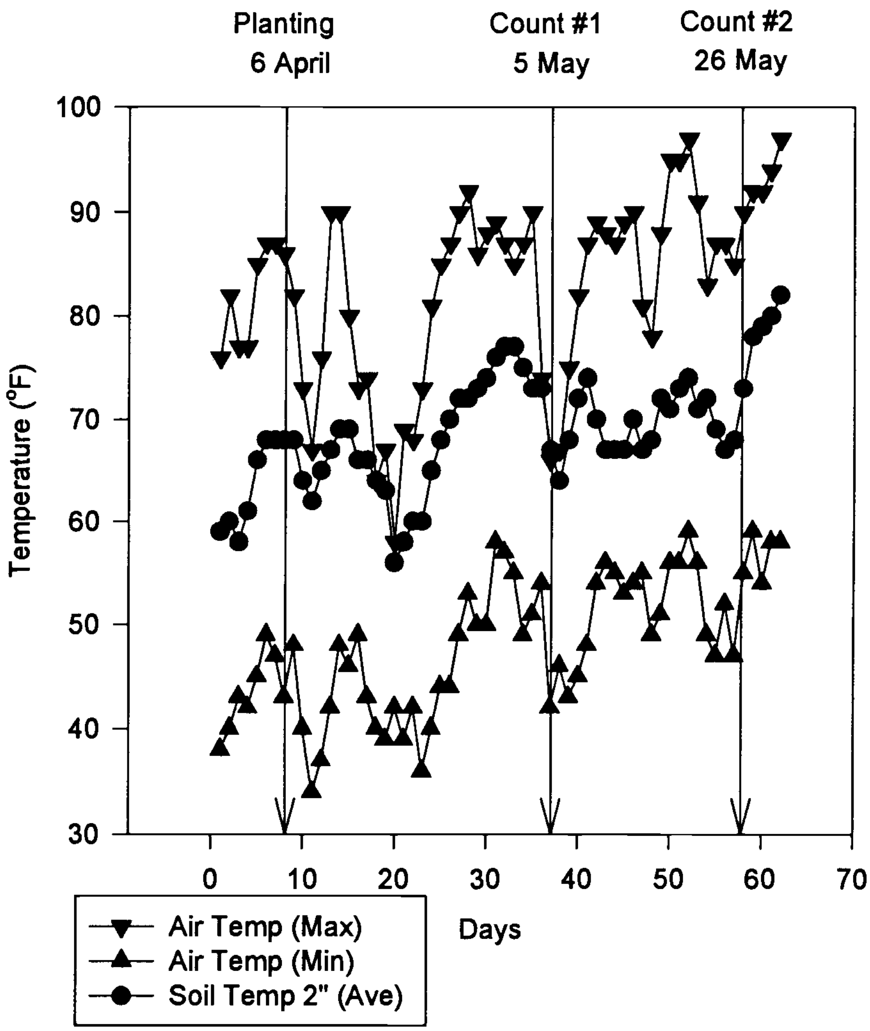

Figure 2. General air and soil temperatures during seed treatment evaluations, Maricopa, 1995.

Table 1. Treatment compositions for seed treatment experiments conducted at Maricopa and Marana, 1995.

Treatment #	Treatment	Rate fluid ounces/cwt.
1	Nu-Flow ND	7.5
2	Nu-Flow ND	7.5
	Apron TL	2.0
3	Nu--Flow M	2.5
	Nusan 30 EC	2.5
4	Nu-Flow M	2.5
	Nusan 30 EC	2.5
	Apron TL	2.0
5	Baytan 30 FL	0.5
	Apron FL	0.75
	Thiram 42S	2.0
6	Untreated Check	----

Table 2. Percent emergence data for seed treatment study at Marana, 1995.

Date 5 May	Treatment	Percent Emergence	
	2	55.13 a*	
	1	52.88 ab	
	3	49.56 b	
	4	48.97 bc	
	5	43.81 cd	
	6	38.56 d	
	LSD†		5.56
	OSL‡		0.0001
	C.V (%)§		7.66
Date 26 May	**Treatment**	**Percent Emergence**	
	2	52.31 a*	
	1	49.44 ab	
	3	46.63 bc	
	4	46.38 bc	
	5	41.13 cd	
	6	36.63 d	
	$LSD_{0.05}$†		5.63
	OSL‡		0.0003
	C.V. (%)§		8.22

*Means followed by the same letter are significantly different according to a Fisher's LSD
†Least Significant Difference
‡Observed Significance Level
§Coefficient of Variation

Table 3. Percent emergence data for seed treatment study at Maricopa, 1995.

Date 18 April	Treatment	Percent Emergence
	2	70.19 a*
	1	67.31 a
	5	66.13 a
	3	65.33 a
	4	65.22 a
	6	52.78 b
	LSD†	NS
	OSL‡	0.0545
	C.V (%)§	11.12

Date 12 May	Treatment	Percent Emergence
	2	60.74 a
	5	59.63 ab
	1	58.63 ab
	3	58.18 ab
	4	54.25 ab
	6	46.44 b
	$LSD_{0.05}$†	NS
	OSL‡	0.3274
	C.V. (%)§	16.85

*Means followed by the same letter are significantly different according to a Fisher's LSD

†Least Significant Difference

‡Observed Significance Level

§Coefficient of Variation