ASSESSING THE EFFECTS OF PLANTING DATE, SEEDING RATE AND FUNGICIDE ON COTTON STAND AND YIELD

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Abstract

Studies were conducted during 1999 and 2000 to assess the effects of seeding rate and fungicides on cotton stand and yield. Cotton was seeded at 1, 3, or 6 seed per foot. Fungicide treatments included black seed (not treated with a fungicide), commercial seed treatment, or commercially treated seed with an in-furrow application of Terraclor Super X EC (2 qt/A). The commercial fungicide seed treatment and the seed treatment plus an in-furrow fungicide spray significantly increased stand over black seed 19% and 23%, respectively. However, yield was not improved with the addition of the fungicide treatments and the greatest effect on yield stability was achieved by manipulating seeding rate. The seeding rate of 3 seed/ft never produced stands equal or greater than 2 plants/ft, suggesting more work may be required to accurately define the interaction of seeding rate, fungicide treatment, and optimum yield. The consistent results of 6 non-treated seed/ft, implies black seed may be a good at-plant option.

Introduction

Tests were conducted in 1999 and 2000 to evaluate the effects of seeding rate and fungicide treatments on conventional cotton at the Louisiana State University Agricultural Center Northeast Research Station (St. Joseph and Winnsboro location) (Burris et al. 1998 and 1999). Fungicide treatments that included non-treated (black seed), commerical fungicide seed treatment, (metalaxy, thiram, carboxin, and PCNB), and Terraclor Super-X EC were compared using seeding rates of 1, 3, or 6 seed/row ft. The approximate cost of the fungicides on the commerical treated cotton seed, was $2.15, $5.30, and $10.60/A for one, three and six seed/row ft respectively, based on 5100 seed per pound. The estimated cost for the in-furrow spray treatment was $14.00/A. Therefore, fungicide expense can be a significant part of the costs associated with at-plant treatments. When the cost of an in-furrow insecticide is combined, total costs often exceed $20.00 per planted acre.

Methods

Seeding rate / fungicide combinations were replicated four or six times and arranged in a randomized complete block design. Experimental plots were four rows spaced 40 inches by 45 feet in length. In-furrow spray was applied using a John Deere 7100 cone planter equipped with one (25001 flat fan) nozzle per row. Cotton seed (Stoneville 474) was planted at 1, 3, and 6 seed/ft. Temik 15G (3.5lb/A) was applied in-furrow in each test. Fungicide treatments were (1) non-treated, (2) commercial seed treatment (metalaxy, thiram, carboxin, and PCNB), and (3) TSX 2.5E (2qt/A) applied in combination with the seed treatment. Plant density and yield were recorded from the center two rows. Data were subjected to statistical analysis using Pesticide Research Manger or SAS.

Summary

Data Averaged Across Fungicides (Table 1-5)

Percent emergence for seeding rates of 3 and 6 seed/ft was significantly less compared to 1 seed/ft. Increased competition at higher rates may have resulted in this effect. Seeding rate of 3 seed/ft produced significantly better stand compared to 1 seed/ft. Planting cotton at a rate of 6 seed/ft significantly increased stand compared to 1 and 3 seed/ft. Seeding rates of 3 and 6 seed/ft significantly increased seedcotton yield compared to 1 seed/ft. These results are acceptable based on recommendations by the Louisiana Cooperative Extension Service (Barnett et al. 2000.)

Data Averaged Across Seed Rates (Table 1-5)

Percent emergence was significantly higher for the seed treatment and in-furrow spray treatment compared to the non-treated. The mean emergence values for the seed treatment (62%) and TSX (65%) were not significantly different. Plant stand was significantly higher for the seed treatment and in-furrow spray treatment compared to the non-treated. There were no significant differences in plant stand between the seed treatment and the in-furrow spray treatment. Seedcotton yield was not significantly increased by the fungicide treatments.

Reference

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Table 1. The effect of fungicide treatment and seeding rate on plant density and seedcotton yield. Planted April 12, 1999, St. Joseph, LA.

Treatment	Seeding rate (seed/ft)	Plant density (plants/ft)[1]	Seedcotton Yield (lb/acre)[1]
Non-treated	1	0.39 e	2262 b
Non-treated	3	1.09 d	2730 a
Non-treated	6	2.43 b	3045 a
Seed treatment	1	0.43 e	2158 b
Seed treatment	3	1.47 c	2688 a
Seed treatment	6	2.81 a	2980 a
TSX 2.5E-(IFS)[2]	1	0.45 e	2282 b
TSX 2.5E-(IFS)[2]	3	1.40 c	2722 a
TSX 2.5E-(IFS)[2]	6	2.67 a	2677 a

[1]Means in a column followed by the same letter are not statistically different.

[2]IFS=In-furrow spray applied at 64 fl oz/A.

Table 2. The effect of fungicide treatment and seeding rate on plant density and seedcotton yield. Planted April 30, 1999, St. Joseph, LA.

Treatment	Seeding rate (seed/ft)	Plant density (plants/ft)[1]	Seedcotton Yield (lb/acre)[1]
Non-treated	1	0.57 d	2091 c
Non-treated	3	1.63 c	2982 a
Non-treated	6	3.05 b	3078 a
Seed treatment	1	0.61 d	2244 bc
Seed treatment	3	1.89 c	2721 ab
Seed treatment	6	3.65 a	2964 a
TSX 2.5E-(IFS)[2]	1	0.65 d	2111 c
TSX 2.5E-(IFS)[2]	3	1.96 c	2842 a
TSX 2.5E-(IFS)[2]	6	3.87 a	2868 a

[1]Means in a column followed by the same letter are not statistically different.

[2]IFS=In-furrow spray applied at 64 fl oz/A.

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Table 3. The effect of fungicide treatment and seeding rate on plant density and seedcotton yield. Planted April 18, 2000, St. Joseph, LA.

Treatment	Seeding rate (seed/ft)	Plant density (plants/ft)[1]	Seedcotton yield (lb/acre)[1]
Non-treated	1	0.49 f	1349 a
Non-treated	3	1.16 d	1543 a
Non-treated	6	1.87 bc	1395 a
Seed treatment	1	0.84 e	1388 a
Seed treatment	3	1.77 c	1497 a
Seed treatment	6	3.42 a	1497 a
TSX 2.5E-(IFS)[2]	1	0.83 e	1320 a
TSX 2.5E-(IFS)[2]	3	2.05 b	1509 a
TSX 2.5E-(IFS)[2]	6	3.54 a	1461 a

[1]Means in a column followed by the same letter are not statistically different.
[2]IFS=In-furrow spray applied at 64 fl oz/A.

Table 4. The effect of fungicide treatment and seeding rate on plant density and seedcotton yield. Planted May 8, 2000, St. Joseph, LA.

Treatment	Seeding rate (seed/ft)	Plant density (plants/ft)[1]	Seedcotton Yield (lb/acre)[1]
Non-treated	1	0.66 f	1412 b
Non-treated	3	1.72 d	1898 ab
Non-treated	6	3.13 b	2022 a
Seed treatment	1	0.91 ef	1424 ab
Seed treatment	3	1.94 cd	1516 ab
Seed treatment	6	3.32 ab	1719 ab
TSX 2.5E-(IFS)[2]	1	1.05 e	1596 ab
TSX 2.5E-(IFS)[2]	3	2.12 c	1850 ab
TSX 2.5E-(IFS)[2]	6	3.58 a	1850 ab

[1]Means in a column followed by the same letter are not statistically different.
[2]IFS=In-furrow spray applied at 64 fl oz/A.

Table 5. The effect of fungicide treatment and seeding rate on plant density and cotton lint yield. Planted May 11, 2000, Winnsboro, LA.

Treatment	Seeding rate (seed/ft)	Plant density (plants/ft)[1]	lint (lb/acre)[1]
Non-treated	1	0.83 d	331 cd
Non-treated	3	1.83 c	449 a-d
Non-treated	6	2.80 b	509 ab
Seed treatment	1	0.82 d	291 d
Seed treatment	3	1.82 c	331 cd
Seed treatment	6	3.44 a	522 a
TSX 2.5E-(IFS)[2]	1	0.78 d	353 bcd
TSX 2.5E-(IFS)[2]	3	2.25 bc	487 abc
TSX 2.5E-(IFS)[2]	6	3.41 a	451 a-d

[1]Means in a column followed by the same letter are not statistically different.
[2]IFS=In-furrow spray applied at 64 fl oz/A.

Table 6. An analysis of treatments averaged across seed rates (effect of fungicides).

Treatment	Plant emergence (percent)	Plant density (plants/ft)[1]	Seedcotton yield (lb/acre)[1]
Non-treated	50.8 b	1.6 b	1806 a
Seed treatment	62.3 a	1.9 a	1729 a
TSX 2.5E-(IFS)[2]	65.8 a	2.0 a	1759 a

[1]Means in a column followed by the same letter are not statistically different.
[2]IFS=In-furrow spray applied at 64 fl oz/A.

Table 7. An analysis of treatments averaged across fungicide treatments (effect of seed rate).

Treatment	Plant emergence (percent)	Plant density (plants/ft)[1]	Seedcotton yield (lb/acre)[1]
Six seed/ft.	52.2 b	3.1 a	1936 a
Three seed/ft.	58.0 b	1.7 b	1851 a
One seed/ft.	68.7 a	0.6 c	1508 b

[1]Means in a column followed by the same letter are not statistically different.
[2]IFS=In-furrow spray applied at 64 fl oz/A.