CRDC127

Biological Control 2000/ 2001
Analysis for "Small Scale Plot Trials".

Table of Contents

Trial 1 "Comparison of Biocontrol Agents."
Aim: To compare the effectiveness of different biocontrol products in an Fov infected field.

Trial 2 "Variety Trial."
Aim: To compare the effect of biocontrol agent "SPF01+Benzoic Acid" on different varieties of cotton. Along with monitoring the performance of theses varieties under Fov infected conditions.

Trial 3 "Inoculum Dose response."
Aim: To compare the effect of applying different concentrations of inoculum (SPF01) on Fov infected plants

Trial 4 "Comparison of Inocula"
Aim: To compare the effectiveness of biocontrol agent SPF01 produced at "ACRI laboratories" and by "Seed and Grain Biotechnology."

Trial 5 "SPF01 and Benzoic Acid"
Aim: To compare the effect of applying bacteria (SPF01) and organic acid (Benzioc acid) both individually and together, as an effective biocontrol agent against Fov.

Data Collected and analysed
Seed Cotton Yield, Disease incidence, Dry weights, Lint yield.

General Comments
There were some discrepancies in lint yield due to different amounts of trash in the samples, as there was no facilities to pre-clean the samples prior to ginning.

Results from trial 5 indicate that the application of benzoic acid alone was the best treatment for yield.
There is some speculation about the results for trial 5, due to the trends shown in data retrieved from past seasons.
The results from trial 1 and 3 indicate a definite need to repeat trial 5.

Trial 1

Comparison of Biocontrol Agents

Seed Data
Planting Date: 23-24/10/00
Variety Sicot 189
Treatment QASSP
Rate 13 plants/meter

Plot/ trial Data
Plot Area: 4 row plots x 16 meters (64 sq mtr)
Reps Replicated six times
Design Completely randomised block design
Pre plant preparation: Standard, (No Temik)

Treatments
1 = Control (standard planting)
2 = SPF01(*Bacillus spp.)* and Hydroxy Benzoic Acid (HBA)
3 = Kodiak and Hydroxy Benzoic Acid (HBA)
4 = Trichoderma on millet seed
5 = BNR 1751 on millet seed
6 = BNR 1707 on millet seed
7 = BNR 1739 on millet seed

Injection/ delivery/ Introduction
Kodiak came in a fine powder form and was weighed out, mixed with water and injected at the recommended rate. It was delivered at the time of planting, in to the seed furrow, through an **Inoculum Injection Applicator** (IIA), which was fitted to standard planting machinery. The IIA enabled a relatively even spread of the inoculum though out the seed furrow.

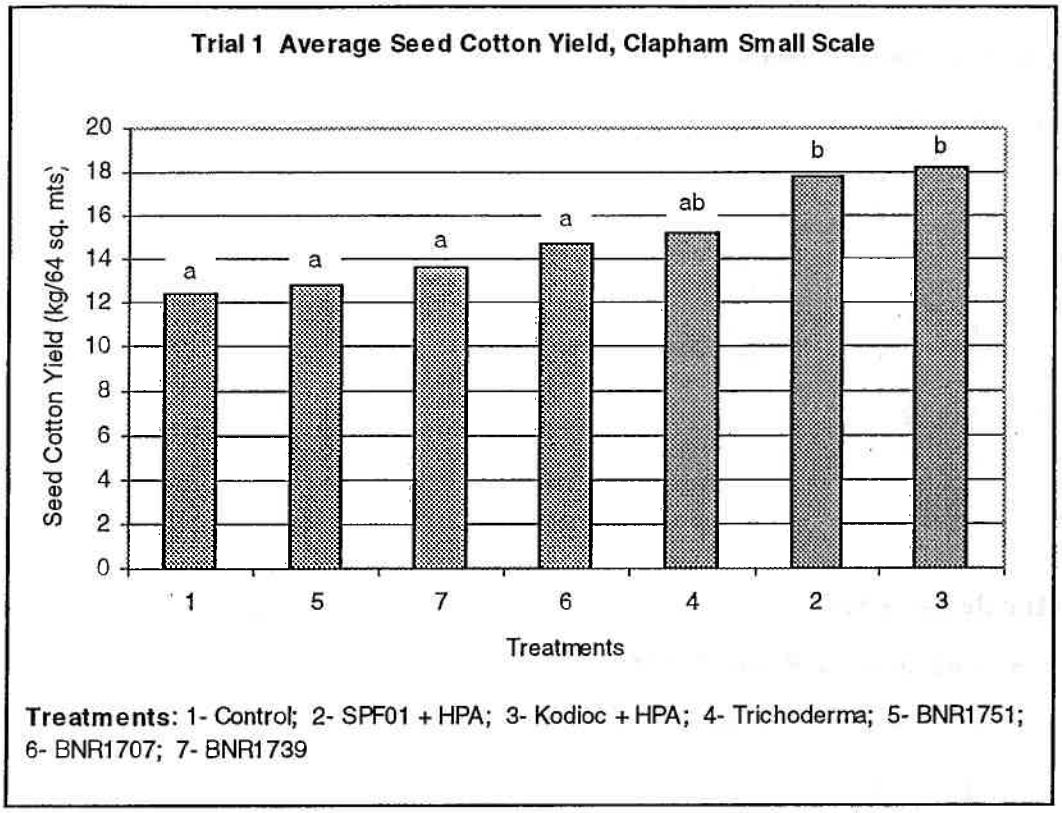
Hydroxy Benzoic Acid (HBA) came in a crystallised power and was weighed out, mixed with water and injected at the recommended rate via the IIA. The IIA is designed to inject/deliver up to four liquidised substances at the same time in the same furrow, without contamination between liquids until the point of entry into the furrow. It was also applied as a foliar application at the following stages:

Trial 1 ***HBA Foliar Application Information***

Date	*Age (days)* (from planting)	*Conc* (g/L)	*Rate* (L/Ha)	*method*
6/11/2000	14	4	135	spray rig
23/11/2000	31	4	117	spray rig
13/12/2000	52	8	135	spray rig
19/12/2000	58	8	130	spray rig
10/01/2001	79	8	170	spray rig
21/01/2001	90	8	135	spray rig
9/02/2001	109	8	150	nap sack
15/02/2001	115	8	175	nap sack
2/03/2001	130	8	154	nap sack

The timing of the foliar applications were for once every three weeks or when plants were under environmental stress

Table of results



Seed Cotton Yield

******* Table of Ranked Means *******

Treat	rep.	Mean
1	6	12.41 a (Control)
5	6	12.85 a (BNR 1751)
7	6	13.60 a (BNR 1739)
6	6	14.66 a (BNR 1707)
4	6	15.16 ab (Trichoderma)
2	6	17.82 b (BCA)
3	6	18.21 b (Kodiak)

NB: Means with same subscript are not significantly different at the 5% level
++ LSD = 3.147

Trial 2

Variety Trial

Seed Data
Planting Date: 23-24/10/00
Variety Treatments 1-12
Rate 13 plants/meter

Plot/ trial Data
Plot Area: 4 row plots x 20 meters (80 sq mtr)
Reps Replicated four times
Design Completely randomised block design
Pre plant preparation: Standard, (No Temik)

Treatments
1 = Sicot 189 + BioControl Agent: SPF01 + HBA (BCA)
2 = Sicot 189
3 = Sicot 189i + BCA
4 = Sicot 189i
5 = Sicala V2 +BCA
6 = Sicala V2
7 = Delta Pearl + BCA
8 = Delta Pearl
9 = Nu Pearl + BCA
10 = Nu Pearl
11 = Emerald + BCA
12 = Emerald

Injection/ Delivery/ Introduction
The varieties were planted with standard planting machinery. Each planting unit was thoroughly cleaned between varieties.
The Bio-Control Agent (BCA) was applied at the recommended rate. There may have been some spread of the BCA between plots, however, minimal (< 0.5ml/mtr).

Those plots treated with the BCA received HBA foliar applications at the following stages:

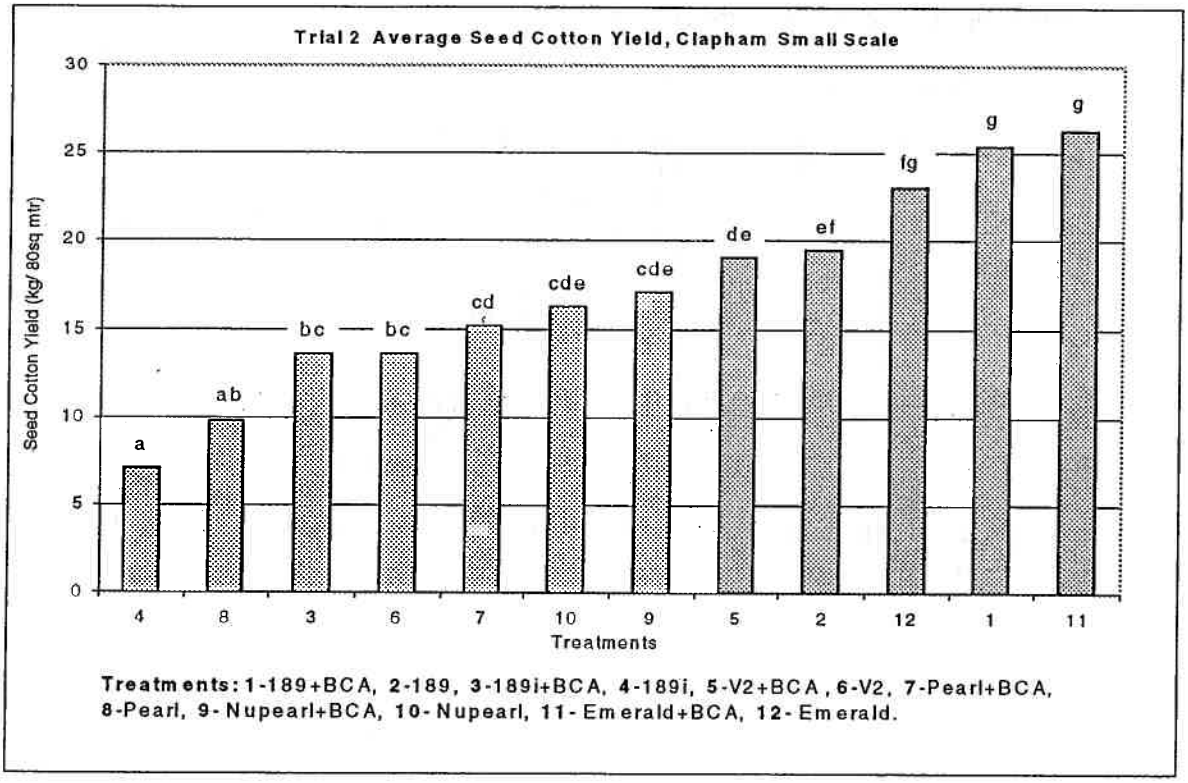
Trial 2 ***HBA Foliar Application Information***

Date	*Age (days)* (from planting)	*Conc* (g/L)	*Rate* (L/Ha)	*method*
6/11/2000	14	4	135	spray rig
23/11/2000	31	4	117	spray rig
13/12/2000	52	8	135	spray rig
19/12/2000	58	8	130	spray rig
8/01/2001	77	8	140	spray rig
10/01/2001	79	8	170	spray rig
21/01/2001	90	8	135	spray rig
9/02/2001	109	8	150	nap sack
15/02/2001	115	8	175	nap sack
2/03/2001	130	8	154	nap sack

The timing of the foliar applications were for once every three weeks or when plants were under environmental stress

Trial 2 Clapham Small Scale Plot Trials

Table of Results



Seed Cotton Yield

******* Table of Ranked Means *******

Treat	rep.	Mean		
4	4	7.07	a	189i
8	4	9.81	ab	Pearl
3	4	13.58	bc	189i + BCA
6	4	13.61	bc	V2
7	4	15.17	cd	Pearl + BCA
10	4	16.21	cde	NuPearl
9	4	17.04	cde	NuPearl + BCA
5	4	19.00	de	V2 + BCA
2	4	19.52	ef	189
12	4	23.06	fg	Emerald
1	4	25.42	g	189 + BCA
11	4	26.28	g	Emerald + BCA

5

5 1/2

6

NB: Means with same subscript are not significantly different at the 5% level

++ LSD = 3.990

Disease Incidence %3+4

******* Table of Ranked Means *******

Treat	rep.	Mean	
1	4	14.66 a	189+BCA
9	4	15.06 a	Nu Pearl+BCA
11	4	15.11 a	Emerald+BCA
3	4	21.23 ab	189i+BCA
2	4	23.06 ab	189
10	4	23.83 ab	Nu Pearl
7	4	25.57 ab	Pearl+BCA
5	4	26.18 ab	V2+BCA
12	4	26.61 ab	Emerald
6	4	28.28 b	V2
4	4	32.45 bc	189i
8	4	42.93 c	Pearl

NB: Means with same subscript are not significantly different at the 5% level

++ LSD = 12.78

Trial 3 ***HBA Foliar Application Information***

Date	*Age (days)* (from planting)	*Conc* (g/L)	*Rate* (L/Ha)	*method*
6/11/2000	14	4	135	spray rig
20/11/2000	28	4	125	spray rig
23/11/2000	31	4	112	spray rig
13/12/2000	52	8	135	spray rig
19/12/2000	58	8	130	spray rig
8/01/2001	77	8	140	spray rig
10/01/2001	79	8	170	spray rig
21/01/2001	90	8	135	spray rig
15/02/2001	115	8	175	nap sack
2/03/2001	130	8	154	nap sack

The timing of the foliar applications were for once every three weeks or when plants were under environmental stress

Comments on the results

Seed Cotton Yield

The results indicate, on average, an ascending yield increase with an ascending dilution factor. All treatments yielded significantly greater than the control. Whereas the most dilute treatment yielded significantly heavier than the standard concentration.

Dry Weights

Trial 3 indicated a significantly greater difference for all BCA treatments.

Disease Incidence

Trial 3 shows no significant differences between treatments.