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Evaluation of Insecticides against Mirid Bug, *Poppiocapsidea* (= *Creontiades*) *biseratense* (Distant) on Bt Cotton

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ABSTRACT

For evaluation of different insecticides and botanicals against mirid bug, a field experiment was laid out in a randomized block design (RBD) at Main Agricultural Research Station, Raichur during 2011-12 *Kharif* season with 11 treatments including an untreated control with three replications. The efficacy of different synthetic and neem based insecticide with and without salt against mirid bug, (*Poppiocapsidea biseratense)* recorded a day before, one, three, seven and 10 days after each spraying. Results revealed that Among the different insecticides evaluated for their efficacy against *P. biseratense,* fipronil 5 SC+1 percent salt at 50 g a.i. /ha, acephate 75 SP +1 per cent salt at 750 g a.i. /ha, profenophos 50 EC +1 per cent salt at 1000 g a.i. /ha, were found to be superior over other chemicals in reducing the mirid bug population and recorded higher seed cotton yield. Insecticides *viz.*, fipronil 5 SC, acephate 75 SP, profenophos 50 EC were *on par* with each other. Whereas, neemguard at 51 g a i. / ha and thiodicarb 75 SP at 750 g a.i. /ha were less effective against mirid bug.

Key words *Bt cotton, Mirid bug, Poppiocapsidea biseratense, Kharif , salt and seed cotton yield*

The introduction of transgenic *Bt* cotton for commercial cultivation since 2002 has given solution to the bollworm complex to the large extent and become boon to the cotton growing farmers. But at the same time they were susceptible to most of the sucking pests. Reduction of number of sprays, use of more specific insecticides led to secondary pests gaining more importance on Bt cotton *viz*. aphids (Anon., 2002), leafhoppers (Hedge *et al.,* 2004), thrips (Sun Chang Gui *et al*., 2002), whiteflies (Anon., 2003), spider mites (Deng Shudong *et al*., 2003), mirid bugs (Patil *et al*., 2006) and mealy bugs (Anon., 2007). Among the sucking insect pest groups, the family Miridae (a family of insects which feed on the plant tissue juices) is one, consisting large and diverse plant, leaf and grass bugs. These are also known as Capsid bugs, belonging to the order Hemiptera. Most of the Mirid species are plant feeders as they pierce plant tissues and feed on the sap content due to which there will be morphological and biochemical changes of the plant and cause reduction in yield.

MATERIALS AND METHODS

For evaluation of different insecticides against mirid bug, a field experiment was laid out in a randomized block design (RBD) at Main Agricultural Research Station, Raichur during 2011-12 season with 11 treatments including an untreated control with three replications. *Bt* cotton hybrid MRC 7351 was raised in plot size of 26 sq m with 90 x 60 cm spacing. The treatments were imposed when mirid bug population was at peak incidence. Before imposing the treatments, pre-treatment observations were taken a day before application on five randomly selected plants in each plot on ten squares per plant. Post treatment observations were recorded on one, three, seven and ten days after application on ten squares per plant per plot per replication.

A day before spraying of insecticides the mirid bug population was uniform in all the treatments after first spray. During 2011-12 (Table1) the efficacy of different synthetic and neem based insecticide with and without salt against mirid bug recorded a day before, one, three, seven and 10 days after each spraying revealed that, one day after spraying, significantly lower population (0.82 bugs/10 squares/ plant) was recorded in fipronil 5 SC + 1 per cent salt treatment. Three days after spraying, significantly lowest population was recorded in fipronil 5 SC treatment (0.87 bugs/10 squares/plant). Whereas, treatments *viz*., profenophos 50 EC + 1 per cent salt and acephate 70 SP + 1 per cent salt recorded 0.95 and 0.98 bugs/10 squares/ plant respectively and were on par with acephate 75 SP, profenophos 50 EC treatments.

RESULTS AND DISCUSSION

Seven days after treatment, significantly lowest population observed in fipronil 5SC treatment (0.91 bugs/ 10 squares/plant). While the bug population in treatments acephate 75 SP+1 per cent salt, profenophos 50 EC +1 per cent salt, were 1.02 and 0.99 bugs/ 10 squares/plant respectively and were *on par* with acephate 75 SP and profenophos 50 EC treatments. Ten days after spraying in all the treatments, population increased and it ranged from 1.00 to 4.64 bug/10 squares/plant with lowest bug population in fipronil 5 SC treatment and highest in untreated check. Similar trend was observed in after second spray

Table 1. Bio-efficacy of different insecticides against mirid bug, *Poppiocapsidea biseratense* (after first spray)

Sl. No.	Treatments	Dosage (g.a.i/ha)	Population of bugs/10 square/plant*				
			1 DBS	1 DAS	3 DAS	7 DAS	10 DAS
1	Fipronil 5 SC +1% salt	50	4.00 (2.12)	0.82 (1.15)	0.89 (1.18)	0.90 (1.19)	1.02 (1.23)
2	Profenophos 50 EC + 1% salt	1000	3.94 (2.11)	0.91 (1.19)	0.95 (1.20)	0.99 (1.22)	1.10 (1.26)
3	Acephate 75 SP + 1% salt	750	4.01 (2.12)	0.94 (1.20)	0.98 (1.22)	1.02 (1.23)	1.13 (1.28)
4	Thiodicarb 75 WP + 1% salt	750	3.98 (2.12)	3.54 (2.01)	3.57 (2.02)	3.71 (2.05)	3.86 (2.09)
5	Neemguard (1500 ppm) + 1% salt	51	4.00 (2.12)	2.75 (1.80)	2.73 (1.80)	2.77 (1.81)	2.91 (1.85)
6	Fipronil 5SC	50	4.00 (2.12)	0.84 (1.16)	0.87 (1.17)	0.91 (1.19)	1.00 (1.22)
7	Profenophos 50 EC	1000	3.97 (2.11)	0.95 (1.20)	0.99 (1.22)	1.04 (1.24)	1.14 (1.28)
8	Acephate 75 SP	750	4.00 (2.12)	0.97 (1.21)	1 .00 (1.22)	1.06 (1.25)	1.16 (1.29)
9	Thiodicarb 75 WP	750	4.02 (2.13)	3.61 (2.03)	3.69 (2.05)	3.77 (2.07)	3.90 (2.10)
10	Neemguard (1500 ppm)	51	3.99 (2.12)	2.80 (1.82)	2.84 (1.83)	2.90 (1.84)	3.01 (1.87)
11	Control	…..	4.01 (2.12)	4.18 (2.16)	4.22 (2.17)	4.30 (2.19)	4.64 (2.27)
	S.Em±		0.05	0.01	0.02	0.01	0.02
	CD @ 5%		NS	0.03	0.05	0.04	0.06

DBS – Day before spray **DAS** – Day after spray **NS** – Non significant

*Mean of three replications

Figure in the parenthesis are (“x+0.5) transformed values

Table 2. Bio-efficacy of different insecticides against mirid bug, *Poppiocapsidea biseratense* (after second spray)

Sl. No.	Treatments	Dosage (g.a.i/ha)	Population of bugs/10 square/plant*				
			1 DBS	1 DAS	3 DAS	7 DAS	10 DAS
1	Fipronil 5 SC +1% salt	50	4.39 (2.21)	0.91 (1.19)	0.96 (1.21)	1.02 (1.23)	1 .00 (1.22)
2	Profenophos 50 EC + 1% salt	1000	4.41 (2.22)	0.96 (1.21)	1.03 (1.24)	1.10 (1.26)	1.08 (1.26)
3	Acephate 75 SP + 1% salt	750	4.47 (2.23)	1.01 (1.23)	1.08 (1.26)	1.15 (1.28)	1.13 (1.28)
4	Thiodicarb 75 WP + 1% salt	750	4.50 (2.24)	3.78 (2.07)	3.83 (2.08)	3.94 (2.11)	3.95 (2.11)
5	Neemguard (1500 ppm) + 1% salt	51	4.51 (2.24)	3.10 (1.90)	3.14 (1.91)	3.21 (1.93)	3.24 (1.93)
6	Fipronil 5SC	50	4.47 (2.23)	0.94 (1.20)	0.96 (1.21)	1.04 (1.24)	1.10 (1.26)
7	Profenophos 50 EC	1000	4.48 (2.23)	0.99 (1.22)	1.03 (1.24)	1.09 (1.26)	1.13 (1.28)
8	Acephate 75 SP	750	4.49 (2.23)	1.05 (1.24)	1.12 (1.27)	1.21 (1.31)	1.25 (1.32)
9	Thiodicarb 75 WP	750	4.50 (2.24)	3.84 (2.08)	3.95 (2.11)	3.97 (2.11)	4.01 (2.12)
10	Neemguard (1500 ppm)	51	4.32 (2.20)	3.18 (1.92)	3.24 (1.93)	3.34 (1.96)	3.52 (2.00)
11	Control	…..	4.53 (2.24)	4.68 (2.28)	4.71 (2.28)	4.78 (2.30)	4.84 (2.31)
	S.Em±		0.05	0.02	0.02	0.03	0.03
	CD @ 5%		NS	0.05	0.60	0.07	0.07

DBS – Day before spray **DAS** – Day after spray **NS** – Non significant

*Mean of three replications

Figure in the parenthesis are (“x+0.5) transformed values

Table 3. Bio-efficacy of different insecticides on yield parameters and seed cotton yield

Sl. No.	Treatments	Dosage (g.a.i/ha)	GOB/Plant	BOB/Plant	Seed cotton yield (q/ha)
1.	Fipronil 5 SC +1% salt	50	39.32	2.18	32.26
2.	Profenophos 50 EC + 1% salt	1000	34.01	2.24	30.20
3.	Acephate 75 SP + 1% salt	750	35.93	2.37	31.87
4.	Thiodicarb 75 WP + 1% salt	750	33.08	2.47	29.23
5.	Neemguard (1500 ppm) + 1% salt	51	33.30	2.60	29.15
6.	Fipronil 5 SC	50	39.27	2.20	32.17
7.	Profenophos 50 EC	1000	34.12	2.26	30.42
8.	Acephate 75 SP	750	35.24	2.39	31.67
9.	Thiodicarb 75 WP	750	33.63	2.50	29.82
10.	Neemguard (1500 ppm)	51	33.33	2.63	29.23
11.	Control	-	32.75	3.27	28.01
	S.Em±		0.62	0.08	0.56
	CD @ 5%		1.81	0.25	1.64

GOB – Good opened bolls **BOB** – Bad opened bolls

(Table 2). The results obtained with the use of fipronil 5 SC was in close agreement with the findings of Bheemanna, *et al.*, 2010, who reported that fipronil 5 SC @ 25g ai/ha was recorded lowest mirid population (0.52/15 square) with highest yield (34.31q/ha) which was *on par* with fipronil 5SC 25g ai/ha + salt. Further Moazzem Khan, *et al.,* 2004 reported that research on cotton and pulse crops had shown the addition of table salt to some insecticides will increase their efficacy allowing lower rates to be used effectively.

Significantly highest numbers of good opened bolls (GOB) were recorded in fipronil 5 SC + 1 per cent salt treatment (39.32 GOB/plant) which was *on par* with treatment fipronil 5 SC (39.27 GOB/plant) (Table 3). While the treatments acephate 75 SP + 1 per cent salt (35.93 GOB/plant), and profenophos 50 EC + 1 per cent salt (34.01 GOB/plant), were also on par with acephate 75 SP (35.24 GOB/plant) and profenophos 50 EC (34.12 GOB/plant) treatments. Further, thiodicarb 75 WP + 1 per cent salt (33.08 GOB/plant)), neemguard (1500 ppm) + 1 per cent salt (33.33 GOB/plant), thiodicarb 75 WP (33.63 GOB/plant) and neemguard (1500ppm) (33.33 GOB/plant) treatments were also on par with each other. Lowest number of GOB recorded in control (32.75 GOB/plant) treatment.

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