Research Paper :

Field efficacy of rynaxypyr (coragen) 20 SC against fruit and shoot borer, *Earias vitella* (Fab.) in okra

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SUMMARY

A field experiment was conducted to evaluate the efficacy of rynaxypyr (coragen) 20 SC against okra fruit and shoot borer, *Earias vitella* (Fab.) during 2009-2010 at Main Agricultural Research Station, University of Agricultural Sciences, Raichur, Karnataka. The experiment was laid out in RBD with three replications. Among the newer insecticide molecules evaluated, rynaxypyr 20 SC @ 30 g a.i. /ha and rynaxypyr 20 SC @ 20 g a.i. /ha were superior in recording less larval populations, lower fruit damage (7.80 and 10.51 %) and higher fruit yield (11.60 and 10.89 t/ha), followed by spinosad @ 56 g.a.i/ha, emamectin benzoate @15 g.a.i/ha and flubendiamide @ 45 g.a.i/ha.

Key words : Rynaxypyr (coragen), Fruit borer, Okra, *Earias vitella*

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Okra [*Abelmoschus esculentus* (L.) Moench.] is an important vegetable crop providing a good source of income to farmers. In India, okra is grown extensively all over the country in an area of 4.32 lakh hectares with a production of 45.2 lakh tones of fruits with a productivity of (Anonymous, 2009). In Karnataka it is cultivated on an area of 8,100 hectares with a production of 73.1 thousand tones (Anonymous, 2009). The spotted bollworm of okra fruit and shoot borer, *E. vitella* is a widely distributed insect pest. It is estimated to cause about 69 per cent losses in marketable yield of okra due to attack of fruit borer (Rawat and Sahu, 1973). Shah *et al.* (2001) observed fruit damage to the extent of 91.6 per cent due to attack of fruit borers.

Among the different insect pests, fruit borers take upper hand by causing direct damage to tender fruits. Though many non-chemical control strategies are advocated under the IPM umbrella, still farmers rely on chemical insecticides. Repeated use of same chemical may lead to development of resistance in insects. To over come these problems a new insecticide rynaxypyr, belonging to anthranilic diamide group was evaluated. It has larvicidal activity. The insecticide is selective in action against wide range of lepidopteran insect pests. Hence, preliminary investigations have been made to evaluate the efficacy against fruit and shoot borer.

MATERIALS AND METHODS

Field experiment was conducted at Main Agricultural Research Station, University of Agricultural Sciences, Raichur- 584102, Karnataka, with an okra variety, Arka Anamika during 2009-2010 cropping season. The field trial was laid out in a Randomized Block Design with three replications with a plot size of 5.0 x 5.0 mtr and a spacing of 60 x 30 cms. The seeds were sown after seed treatment with imidacloprid 70 WS @ 10 g per kg seeds against early sucking insect pests. Except for plant protection schedule, all the agronomic practices followed were similar as recommended in package of practices. There were eight treatments, *viz.,* two different dosages of rynaxypyr 20 SC (20 and 30 g a.i/ha) and compared with spinosad (Tracer) 45 SC, indoxacarb (Avaunt) 14.5 SC, flubendiamide (Fame) 48 SC, emamectin benzoate (Proclaim) 5 SG, quinalphos (Ekalux) 25 EC and untreated control. The first insecticidal application was initiated at 50 days after sowing when the larval population of fruit borer reached at below economic injury level (EIL) and repeated second spray at 20 days after first spray. In both the insecticidal sprays pre-spray count of fruit borer larvae per plant was also taken. Five plants were selected at random and tagged in each plot for taking the larval count. Pre-treatment population of *Earias* was recorded 24 hours before the spray. Post treatment population was recorded at 3, 7 and 10 days after spraying. The data taken at each imposition were collected, subjected for statistical analysis by following the Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Observations made a day before spray on the larval population indicated that all the treatments including untreated check population were ranging from 0.73 to 1.10 larvae per plant which were statistically non-significant indicating uniform distribution of larvae. A day before second spray the population of larvae ranged from 0.40 to 0.53 larvae per plant which were statistically non-significant indicating uniform distribution of larval population of larvae (Table 1).

Three days after first spray, the larval population ranged from 0.07 to 1.77 larvae per plant. Significantly lowest population was recorded in the treatment rynaxypyr @ 30 g.a.i/ha which was superior over rest of the treatments. While the treatments like rynaxypyr 20%SC @20 g. a. i/ha, emamectin benzoate @15 g. a. i/ ha, spinosad @ 56 g.a.i/ha and flubendiamide @45 g.a.i/ ha recorded 0.10, 0.13, 0.17 and 0.17 larvae per plant, respectively. Lower dose of rynaxypyr @ 20 g.a.i/ha was at par with emamectin benzoate @ 15 g.a.i/ha, spinosad and flubendiamide. The highest population (1.77 larvae per plant) was recorded in untreated check. Three days after second spray, no larvae were recorded in the treatments rynaxypyr @ 30 g. a. i/ha, emamectin benzoate @ 15 g.a.i/ha and flubendiamide @ 45 g.a.i/ha, While indoxacarb @ 75 g.a.i/ha and quinalphos recorded 0.15 and 0.20 larvae per plant, respectively. Whereas, untreated check had the highest population (0.60 larvae per plant) (Table 1).

Seven days after first spray, the population ranged from 0.03 to 1.93 larvae per plant with significantly lowest population observed in rynaxypyr @ 30 g. a. i/ha. While the larval population in treatments rynaxypyr @ 20 g. a. i/ha, emamectin benzoate @ 15 g.a.i/ha were at par with each other. No larval population was observed after second spray in both the treatments of rynaxypyr, emamectin benzoate @ 15 g.a.i/ha and flubendiamide @ 45 g.a.i/ha and spinosad @ 56 g.a.i/ha these were on par with each other. (Table 1).

On ten days after first spray, in all treatments the trend of larval population ranged from 0.10 to 1.83 larvae

Table 1: Efficacy of rynaxypyr 20 SC on larval population of *Earias vittella* on okra in 2009-2010

Sr. No.	Treatments	Dosage (g. a. i /ha)	Larvae per plant*							
			First spray				Second spray			
			1DBS	3DAS	7DAS	10 DAS	1DBS	3DAS	7DAS	10 DAS
1.	Rynaxypyr 20 SC	20	0.90	0.10	0.13	0.13	0.42	0.10	0.00	0.00
			(1.18)	(0.77)^{de}	(0.79)^{de}	(0.79)^{ef}	(0.95)	(0.77)^{d}	(0.70)^{d}	(0.70)^{e}
2.	Rynaxypyr 20 SC	30	0.87	0.07	0.03	0.10	0.50	0.00	0.00	0.00
			(1.17)	(0.75)^{e}	(0.72)^{e}	(0.74)^{f}	(1.00)	(0.70)^{e}	(0.70)^{d}	(0.70)^{e}
3.	Spinosad 45 SC	56	1.10	0.17	0.23	0.27	0.53	0.07	0.03	0.02
			(1.26)	(0.81)^{d}	(0.85)^{d}	(0.87)^{d}	(1.01)	(0.75)^{d}	(0.72)^{d}	(0.72)^{d}
4.	Indoxacarb 14.5 SC	75	0.93	0.33	0.37	0.43	0.40	0.15	0.10	0.08
			(1.19)	(0.91)^{c}	(0.93)^{c}	(0.96)^{c}	(0.94)	(0.80)^{c}	(0.77)^{e}	(0.76)^{c}
5.	Emamectin benzoate	15	1.07	0.13	0.13	0.13	0.40	0.00	0.00	0.00
	5 SG		(1.25)	(0.79)^{de}	(0.79)^{de}	(0.79)^{ef}	(0.94)	(0.77)^{e}	(0.70)^{d}	(0.70)^{e}
6.	Flubendiamide 48 SC	45	0.93	0.17	0.20	0.23	0.45	0.00	0.00	0.00
			(1.19)	(0.81)^{d}	(0.83)^{d}	(0.85)^{de}	(0.95)	(0.77)^{e}	(0.70)^{d}	(0.70)^{e}
7.	Quinalphos 25 EC	500	0.73	0.47	0.50	0.63	0.42	0.20	0.15	0.10
			(1.10)	(0.98)^{b}	(1.00)^{b}	(1.06)^{b}	(0.95)	(0.83)^{b}	(0.80)^{b}	(0.77)^{b}
8.	Control	--	1.10	1.77	1.93	1.83	0.42	0.60	0.88	0.75
			(1.26)	(1.50)^{a}	(1.55)^{a}	(1.52)^{a}	(0.95)	(1.04)^{a}	(1.17)^{a}	(1.11)^{a}
	S.E ±		0.12	0.04	0.02	0.04	0.08	0.02	0.01	0.02
	C.D. (P=0.05)		NS	0.12	0.06	0.12	NS	0.06	0.03	0.06

DAS- Days after pray DBS- Days before spray NS- Non-significant *Mean of five plants

Figures in parentheses are $\sqrt{x+0.5}$ transformed values

Means followed by the same letter(s) in a column are not significantly different by DMRT (P=0.05)

Table 2 : Efficacy of rynaxypyr 20 SC on per cent fruit damage and yield in okra

Sr. No.	Treatments	Dosage (g. a. i/ha)	Fruit damage (%)*	Yield (t/ha)**
1.	Rynaxypyr 20 SC	20	10.51 (18.91)[e]	10.89[ab]
2.	Rynaxypyr 20 SC	30	7.80 (16.20)[f]	11.60[a]
3.	Spinosad 45 SC	56	19.35 (26.10)[d]	9.70[de]
4.	Indoxacarb 14.5 SC	75	22.81 (28.50)[c]	8.85[e]
5.	Emamectin benzoate 5 SG	15	18.70 (25.59)[d]	10.19[c]
6.	Flubendiamide 48 SC	45	19.03 (25.86)[d]	9.9[cd]
7.	Quinalphos 25EC	500	27.71 (31.76)[b]	7.13[f]
8.	Control	--	35.44 (36.53)[a]	4.83[g]
	S. E. ±		1.14	0.45
	C. D. (P=0.05)		3.47	1.35

**Sum of seven pickings
* Figures in parentheses are arcsine-transformed values
Means followed by the same letter(s) in a column are not significantly different by DMRT (P=0.05)

per plant and the lowest population was observed in rynaxypyr @ 30 g.a.i/ha (0.10 larvae per plant) which maintained its superiority even after ten days of spraying. Similarly, ten days after second spray larval population ranged from 0.00 to 0.75 larvae per plant indicating decreased incidence of spotted bollworm. Larval population was nil in both the dosages of rynaxypyr and emamectin benzoate 5%SG @15 g.a.i/ha, flubendiamide @ 45 g. a. i/ha. Whereas, untreated check recorded highest population (0.75 larvae per plant) (Table 1).

Significantly low per cent fruit damage was observed in the treatment rynaxypyr @ 30 g.a.i/ha (7.80%) followed by its lower dosage (20 g.a.i/ha) which recorded 10.51 per cent fruit damage. Highest per cent fruit damage was in untreated check. Higher fruit yield was recorded in rynaxypyr @ 30 g.a.i/ha (11.60 t ha^{-1}) followed by its lower dosage treatment (10.89 t ha^{-1}) and differed significantly over emamectin benzoate @ 15 g. a. i/ha, flubendiamide @ 45 g.a.i/ha and spinosad @ 56 g.a.i/ha (10.19, 9.91 and 9.70 t ha^{-1}) treatments which differed with each other and untreated check recorded the lowest yield (4.83 t ha^{-1}) (Table 2).

The results obtained with the use of rynaxypyr were in accordance with earlier reports of Bheemanna *et al.* (2008) where rynaxypyr at 40g a.i/ha was used against bollworm complex of cotton and recorded minimum boll damage of 3.94 per cent and highest good opened bolls (36.76/plant). However, the use of higher dosage *i.e.* 40 g. a.i/ha may be because of change in the crop and also the more number of lepidopteran pest, change in the crop and also the season. These results were also in accordance with Hosamani *et al.* (2008); Rajavel *et al.* (2009) and Singh *et al.* (2009).

The overall results revealed that rynaxypyr 20 SC is the new potential insecticide, effective against okra fruit and shoot borer apart from spinosad 45 SC, flubendiamide 48 SC, emamectin benzoate 5 SG.

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