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BIOEFFICACY OF NEWER INSECTICIDEDS AGAINST SHOOT BORER, *CHILO INFUSCATELLUS* SNELLEN UNDER SUGARCANE AGRO ECOSYSTEM IN BIHAR

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ABSTRACT
The experiment was conducted two consecutive years 2014-15 and 2015-16 to know the bio efficacy of seven insecticides excluding control. During 2014-15 the treatment Chlorantraniliprole 18.5 SC@375ml/ha was superior when it was applied at 30 DAP and 6 0DAP as recorded maximum germination (32.89 %), least cumulative % incidence of shoot borer (3.18%) and highest yield (90.33t/ha) followed by Chlorantraniliprole 0.4G and Flubendiamide 480 SC, % germination,% incidence and yield being 32.52%, 3.72%,88.83 t/ha and 29.93%, 4.11% and 88.16t/ha , respectively. However, remaining treatments were significant over control and the trends were same in both years.

INTRODUCTION

Sugarcane is long duration crop right from planting to till harvesting, there is liable to be attack by a number of insect pests, out of these borers *i*.e. root, shoot, top, stalk and plessey borer are caused heavy losses to the quality as well as quantity of the crop. Amongst the borers, shoot borer, *Chilo infuscatellus* Snellen is a major pest of Bihar and occurring in early stage of crop growth period from March to June. Due to heavy infestation of this pest the Bihar State Planning Board of India declared north Bihar to be an epidemic area for *C. infuscatellus* (Kumar *et al*.,1987). The Larvae enter the plant laterally by holes in the stalk and bore downward as well as upward killing growing point there by cutting of the central leaf spindle with dries up forming dead heart that can be pulled out easily and emits an offensive odour. Borer infestation during germination phase kill the mother shoots resulting in the dry up of entire clump creates gaps in the field. It has been computed that the shoot borer destroyed 26-65 per cent mother shoot and 6.4, 27.1 and 75 per cent primary, secondary and tertiary tillers, respectively (Krishnamurthy Rao 1954).Avasthy and Tiwari (1986) reported that shoot borer cause economic losses from 22-23 per cent in yield and 12 per cent in sugarcane recovery. Gupta and Sharma (2007) also reported that the attack of this borer cause great economic losses. The yield loss may estimate to be 22-33 (Patil and Hapse 1981).Keeping in view there is a number of insecticides recommended for farmers of Bihar, due to repeatedly use of insecticides are not doing well. Therefore, effort has been made under all India coordinated project on sugarcane to find out the effective newer insecticides for the first time in Bihar agro ecosystem for management of shoot borer.

MATERIALS AND METHODS

The field experiment was conducted two consecutive years under all India coordinated project on sugarcane during 2014-15 and 2015-2016 at Pusa Farm, Sugarcane Research Institute, RAU, Pusa.The experiment was laid out in randomized black designin gross plot size 6 $\times$5.4 m with spacing between row to row 0.9m.There were eight treatments including control i.e.Fipronil0.3G @ 25 kg/ha at the time of planting and 60 day after planting (DAP),Chlorantranilprole 0.4G @ 22.5 kg/ha at the time of planting and 60 DAP, Chlorantranilprole 18.5 SC @375ml/ha at 30 and 60 DAP, Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP, Flubendiamide 480 SC @ 250 ml/ha at 30 and 60 DAP, Phorate10G @ 15 kg/ha at time of planting and 60 DAP, Carbofuran 3G @ 33 kg/ha at time of planting and 60 DAP and untreated control with three replications. Sugarcane variety *i*.e. BO 154 was planted with recommended agronomical package and practices for sugarcane production in Bihar excluding plant protection measure other than treatment. The observation of shoot borer was recorded by counting number of infested plant (based on dead heart produced) as well as the total number of shoot/plant in each plot at 60, 90 and 120 day after planting. The per cent incidence of shoot borer was calculated by using given formula.

$$\text{Percent incidence} = \frac{\text{Number of death hearts}}{\text{Total no.of shoot}} \times 100$$

The finally cumulative per cent infestation was worked out by taking progressive total of infested shoot in proportion of total shoot formed. Besides germination and yield were also worked out and statically analysis

RESULTS AND DISCUSSION

Impact on germination

The data (Table 1) revealed that the treatment Chlorantranilprole 18.5 SC had highest germination (32.89%) followed by Chlorantranilprole 0.4G (32.52%) and Flubendiamide 480 SC (29.93%) as compared to untreated control (28.21%). In case of Fipronil 0.3G (29.87%) was at par with Flubendiamide 480 SC. During next year (2015-16) experimentation more loss same trends were observed. Gajesingh *et al* (2009) reported that the treatment Rynaxypyr 20SC@100g a.i. /ha was found to be best as had highest germination of 35.9%.

Impact on incidence

The data of cumulative per cent incidence of shoot borer infestation under field condition are given in table 1 of both cropping season 2014-15 and 2015-16 and the result revealed that all the insecticides treatment recorded significantly lower % as compared to control. The cumulative per cent incidence recorded in different insecticide treatment during 1st year of experimentation which was varied from 3.18 to 7.68 % against 12.55% in untreated control. Among the insecticides treatment ,Chlorantranilprole 18.5 SC @375ml/ha at 30 and 60 DAP proved to be most effective and significantly superior as recorded lowest incidence 3.18% followed by Chlorantranilprole 0.4G @ 22.5 kg/ha at the time of planting and 60 DAP (3.72%), and Flubendiamide 480 SC @ 250 ml/ha at 30 and 60 DAP (4.1%). The treatment with Fipronil 0.3G @ 25 kg/ha at the time of planting and 60 DAP was found to be next in order of effectiveness (4.75%) followed by Carbofuran 3G @ 33 kg/ha at the time of planting and 60 DAP (5.30%), Phorate10 G @ 15 kg/ha at the time of planting and 60 DAP (6.80%) and Spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP (7.68%).The data during next year of cropping season (2015-16) revealed that the per cent incidence of different treatment varied from 5.28 to 9.36% as compared to control 18.66%.The trend of different treatments were same as cropping season of 2014-15. Present findings were partially agreement with Nilesh Bhawar *et al.* (2015) reported that the granular insecticides lasenta 80 WG @ 250 g a.i./ha proved to be most effective against *C. infuscatellus* where 5.12 and 3.17 per cent dead hearts were recorded at first application and second application ,respectively and the next best treatment in order of their effectiveness were ferterra 0.4 G @ 30 g a.i./ha, fipronil 0.3G @ 7.5 g a.i./ha, cartap hydrochloride 4 G @ 750 g a.i./ha, chlorpyriphos 10 G @ 1 kg a.i./ha, carbofuran 10 G @ 750 g a.i./ha and phorate 10G@ 750 g a.i./ha. Gadhiya*et al*.(2014) reported that Chlorantraniliprole, Spinosad and Emamectin benzoate were more effective and statically at par with each other in protecting the groundnut crop from the infestation of *Helicoverpa armigera* and *Spodoptera litura*.T. A. Nikam *et al*.(2015) reported that Spinosad was found to be the most toxic, followed by Emamectin benzoate, Chlorantriniliprole, Flubendiamide and Lufenuron against 3rd and 4th instars larvae of *Plutellax ylostella*.S. K. Pandey(2014) Chlorantraniliprole @ 0.04% was most effective as it exhibited least dead hearts of 2.85% with the decrease of 83.43% in the incidence over control followed by Chlorpyriphos.

Impact on yield

The data recorded on cane yield and increased in yield over untreated control (UTC) are presented in table 1. During 2014-15, the data indicated that the application of Chlorantranilprole 18.5 SC recorded highest yield 90.39t/ha and 19.09% increased yield over UTC followed by Chlorantranilprole 0.4G which was recorded 88.83t/ha and 17.53% increased yield over UTC. The other treatment, Flubendiamide 480 SC recorded 88.16t/ha and 16.80% increase over UTC, Fipronil 0.3G recorded 86.80t/ha and increased 15.5% over UTC.the next best treatment was Carbofuran 3G which was recorded 84.56t/ha and 13.26% yield increase over UTC followed by Phorate10 G (84.23t/ha) with 12.93% increase over UTC. Spinosad 45 SC also recorded 83.39t/ha with 12.09% yield over UTC. While, during 2015-16Chlorantranilprole 18.5 SC recorded highest yield 85.8t/ha and 17.70% increased yield over UTC followed by Chlorantranilprole 0.4G which was recorded 88.83t/ha and 17.53% increased yield over UTC.

Table 1 : Bio efficacy of newer insecticides for the control of sugarcane shoot borer.

Treat ment No.	Treatment details	Cropping season 2014-15 Germi nation (%)	Cumu lative % incidence of SB	Yield (t/ha)	Yield increased over control (t/ha)	Cropping season 2015-16 Germi nation (%)	Cumu lative % incidence of SB	Yield (t/ha)	Yield increased over control (t/ha)
T_1-	Fipronil 0.3G@ 25kg/ha	29.87	4.75	86.80	15.5	31.1	7.54	82.2	14.10
T_2-	Chlorantraniliprole 0.4G @ 22.5 kg/ha	32.52	3.72	88.83	17.53	32.2	6.05	84.5	16.40
T_3-	Chlorantraniliprole 18.5 SC @ 375ml/ha	32.89	3.18	90.33	19.09	33.7	5.28	85.8	17.70
T_4-	Spinosad 45 SC@ 90ml/ha	28.73	7.68	83.33	12.09	29.5	9.36	77.8	9.70
T_5-	Flubendiamide 48 SC @250ml/ha	29.93	4.11	88.16	16.86	30.9	6.78	83.3	15.20
T_6-	Phorate 10 G @15kg/ha	29.14	6.80	84.23	12.93	29.1	8.40	78.7	10.60
T_7-	Carbofuran 3 G @ 33 kg/ha	29.25	5.30	84.56	13.26	30.6	7.93	80.4	12.30
T_8-	Untreated Control	28.21	12.55	71.30	-	29.4	18.66	68.1	-
	SEm ±	1.82	0.40	3.24	-	1.26	0.37	2.74	-
	CD at 5%	NS	1.23	9.84	-	NS	1.27	6.86	-
	CV %	10.55	11.76	6.63	-	10.35	10.65	7.63	-

REFERENCES

Avasthy, P. N. and Tiwari, N. K. 1986. The shoot borer ,*Chilo infuscatellus* (Snellen).In sugarcane Entomology in India, ICAR. *SBI, Coimbatore Publication*. pp. 68-82.

Bhawar, N. and Mohite, P. and Patel, S. 2015. Seasonal incidence and bioefficacy of granular insecticides against sugarcane early shoot borer *Chilo infuscatellus* (Snellen) in Western Maharastra. *I. J. I. R. R.* **12(2):** 1538-1541.

Gadhiya, H. A., Borad, P. K. and Bhut, J. B. 2014. Effectivness of synthetic insecticides against *Helicoverpa armigera* (Hubner) Hardwick and *Spodoptera litura* (Fabricius) infesting groundnut. *The Bioscan*. **9(1):** 23-26.

Gupta, M. K. and Sharma, A. K. 2007. Plessey borer,*Chilo tumidicodtalis* damage in sugarcane. *Ann. Pl. Protec. Sci*. **15:** 12-14.

Krishnamurthy Rao, B. H. 1954. Apparent and actual yield of sugarcane and the part played by stem borer**.** *Proc. A. Conv.Sug.Technol. Assoc. India***. 23:** 25-27.

Kumar, K., Gupta, S. C., Mishra, G. P., Dwivedi, G. P. and Sharma N. N. 1987. Sugarcane pests in Bihar: Retrospect and prospect- A Review. **8:** 59-66.

Nikam,T. A., Chandele, A. G. and Nikita, S. A. 2015. Relative Toxicity of some newer insecticides to Diamondback Moth, *Plutella xylostella* Linnaeus.*The Ecoscan*. **(8):** 105-108.

Pandey, S. K. 2014. Comparative efficacy of some insecticides on early shoot borer (*Chilo infuscatellus*Snellen) incidence in sugarcane under subtropical India. *Vegetos*. **27(1):** 146-148.

Patel, A. S. and Hapase, D. G. 1981. Research on sugarcane borer in Maharastra.*Proceeding National Symposium* on *Stalk Borer*, Karnal pp.165-175.

Singh, G., Prasad, C. S., Sirohi, A., Kumar, A. and Ali, N. 2009. Field Evaluation of Rynaxypyr 20 SC against Insect Pests of Sugarcane**.** *Ann. Pl. Protec. Sci*. **17(1):** 50-52.