BIPM components for the management of borer complex in sugarcane

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ABSTRACT

Developing Biointensive Integrated Pest Management (BIPM) package involving bio agents and safer insecticides facilitate to achieve sustainable yield and quality and monitory benefits to farmers and sugar mills and brings out green environment. In order to find out the effect of various BIPM components to sugarcane borer complex an investigation was undertaken at Sugarcane Research Station, Melalathur during 2010-2011. The treatments imposed were: T1-carbofuran 3G @ 1 kg a i ha^{-1} at basal and 105 DAP (days after planting), T2-rynaxypyr 20 SC @ 75 g $aiha^{-1}$ (sett treatment) + soil drenching at105 DAP @ 75 g a i ha^{-1}, T3-intercropping of blackgram+ mechanical removal of top borer infested shoots and egg masses of internode and top borers, T4- neemcake @ 125 kg ha^{-1} at basal and 105 DAP, T5-release of *T.chilonis* @ 2.5 cc ha^{-1} $release^{-1}$ starting from 30 to180 DAP at 15 days interval (11 releases), T6-combination of T_4 + T_5, T7- intercropping of blackgram + Detrashing at 150, 180 and 210 DAP+ T_6 and T8-untreated check. Observations on the incidence of shoot borer were recorded on 30, 45, 60 and 90th days after planting and percentage of shoot borer incidence was recorded and pooled incidence were worked out. The internode borer incidence was recorded at the time of harvest based on number of canes affected with respect to total number of canes in a randomly selected row in each plot and percentage incidence of internode borer was worked out. The yield parameters like cane yield, sugar yield and per cent CCS recorded at the time of harvest. Results clearly showed that rynaxypyr 20 SC @ 75 g ai ha^{-1} recorded lowest percent damage of early shoot borer followed by T_7. The incidence of internode borer was the lowest in T_2 which recorded highest cane yield of 102.50 tonnes/ha followed by T_7.

Key words: Borers, cane yield, neem cake, rynaxypyr, sugarcane, *Trichogramma chilonis*

INTRODUCTION

In India wide diversity of crops is being cultivated among them, food crops occupy a major portion of the land area, while sugarcane (*Saccharum officinarum* L.) and fibre crops occupy relatively lesser acreage. In spite of low acreage under sugarcane, it commands greater significance due to its remarkable contribution to national economy. In order to increase national income, the sustainable production of such crops is imperative. One of the major constraints in maintaining sustainability is losses due to insect pests, as sugarcane is known to be attacked by as many as 212 insect pests and 76 non insect pests in India right from germination to harvest. Among them, borers are the major destructive pests which cause 8 to 10 percent cane yield losses at farmer's level and 10 to 15 percent sugar recovery losses in sugar industries. Statistically the borers cause losses of 25.5 million tonnes at national level. Developing Biointensive Integrated Pest Management (BIPM) package involving bio agents and safer insecticides facilitate to achieve sustainable yield and quality and monitory benefits to farmers and sugar mills and brings out green environment. In order to find out the effect of various BIPM components to sugarcane borer complex an investigation was undertaken at Sugarcane Research Station, Melalathur during 2010-2011.

MATERIALS AND METHODS

The field-testing of insecticides was undertaken at Sugarcane Research Station, Melalathur during 2010-2011 to find out the effect of various BIPM components against sugarcane borer complex. The variety Co 86032 was planted in a randomized block design during March 2010 with 8 treatments replicated thrice. The size of each block was 10x8m. The treatments imposed were T1-carbofuran 3G @ 1 kg a i ha^{-1} at basal and 105 DAP (days after planting), T2-rynaxypyr 20 SC @ 75 g $aiha^{-1}$ (sett treatment) + soil drenching at 105 DAP @ 75 $gaiha^{-1}$, T3-intercropping of blackgram+ mechanical removal of top borer infested shoots and egg masses of internode and top borers, T4- neemcake @ 125 kg ha^{-1} at basal and 105 DAP, T5- release of *Trichogramma chilonis* @ 2.5 cc ha^{-1} $release^{-1}$ starting from 30 to180 DAP at 15 days interval (11 releases), T6-combination of T4 + T5, T7-

intercropping of blackgram + detrashing at 150, 180 and 210 DAP+ T6 and T8-untreated check. Observations on the incidence of shoot borer were recorded on 30, 45, 60 and 90th days after planting and percentage of shoot borer incidence was recorded and pooled incidence were worked out.

The internode borer incidence was recorded at the time of harvest based on number of canes affected with respect to total number of canes in a randomly selected row in each plot and percentage incidence of internode borer was worked out. Further, healthy and internode borer affected canes were recorded from 10 randomly selected canes in each plot for internode borer incidence and intensity were recorded

The yield parameters like cane yield, commercial cane sugar (%) were recorded and cane population and sugar yield were worked out. The experiments were subjected to statistical scrutiny following the method of Panse and Sukhatme (1985).

RESULTS AND DISCUSSION

Rynaxypyr 20 SC @ 75 g a i ha^{-1} recorded the lowest incidence of early shoot borer (15.43%) followed by combination of Neemcake, *T.chilonis* and intercropping as well as detrashing. (22.18%) (T7). Of the eight treatments, rynaxypyr (coragen) 20 SC @ 75 g a.i. ha^{-1} seem to offer as good a control and was found to be significantly superior to Carbofuran 3G@ 1 kg a.i. ha^{-1}. (Table.1) The plots receiving rynaxypyr 20 SC recorded minimum population build up of internode borer thereby proving the most effective of all treatments (16.5%) than T7 (29.0%).The percentage intensity as well as infestation index *viz*., 3.84 and 0.63, respectively for rynaxypyr 20 SC @ 75 g ai ha^{-1} recorded the highest cane yield of 102.50 tonnes/ha followed by T7 (93.75 tonnes/ha). The commercial cane sugar (CCS %) did not vary significantly among the treatments. (Table 2)

Rao *et al*. (2010) reported that cumulative incidence of early shoot borer varied from 26.57% in neemazole 0.5% to 41.77% in untreated control. The intensity of internode borer varied from 1.50% in *Ageratum conyzoides* 1.0% to 4.23% in neem cake application @ 2t/ha. The cane yield varied from 72.58 t/ha in the plot where neem cake was applied @ 2t/ha to 92.58t/ha in neemazole 0.5% applied plot. Among all the treatments followed, neemazole 0.5% was proved to be effective in reducing the incidence of early shoot borer and internode borer and also registered more cane yield among botanical pesticides.

The present findings are in agreement with the observations of Singh *et al*. (2009) reported that rynaxypyr 20SC @ 100g a.i./ha was found to be the best with minimum 0.12% infestation by early shoot borer and gave maximum yield of 77.13 MT/ha. Jaipal *et al*. (2010) recorded similar observations and reported that the mean incidence of shoot borer was lowered by about 60 per cent due to Rynaxypyr 20 SC treatments given as root drench and registered significantly increased cane yield over the untreated control as well as the standard recommended insecticide carbofuran. Thus, the

Table 1. Early shoot borer incidence in different treatments

Treatments	Early Shoot borer incidence (%)				
	30 DAT	45 DAT	60 DAT	90 DAT	Pooled
T1	0.69	5.36	3.53	13.61	23.19
T2	0.35	4.00	0.94	10.14	15.43
T3	1.37	7.11	3.89	24.31	36.67
T4	4.43	10.53	4.24	18.91	38.12
T5	1.46	12.37	6.00	18.73	38.56
T6	4.77	9.56	3.13	13.79	31.25
T7	1.74	11.61	1.88	6.96	22.18
T8	4.17	9.85	2.95	22.01	38.98
SE(M) ±	0.11	0.06	0.10	0.28	0.22
CD(p=0.05)	**0.33**	**0.18**	**0.31**	**0.86**	**0.68**

Mean of three observations; DAT – Days after treatment

Table 2. Internode borer incidence and yield parameters

Treatments	% of INB incidence	% intensity	Infestation Index	ESC 000'ha	CCS%	Cane yield (t/ha)	Sugar yield (t/ha)
T1	30.36	11.08	3.36	117.25	12.97	88.33	11.46
T2	16.50	3.84	0.63	115.00	13.05	102.50	13.38
T3	38.00	12.00	4.56	108.66	12.92	80.83	10.44
T4	48.50	9.20	4.46	119.33	13.03	81.67	10.64
T5	38.78	10.69	4.14	107.83	12.95	83.75	10.85
T6	34.33	10.33	3.55	112.16	13.00	87.50	11.38
T7	29.00	8.21	2.38	108.58	13.03	93.75	12.22
T8	58.33	16.09	9.38	104.41	12.67	70.33	8.91
SE(M) ±	0.20	0.27	0.03	0.06	0.00	0.09	0.03
CD(p=0.05)	0.59	0.82	0.08	0.15	NS	0.26	0.09

Mean of three observations; ESC- Economic shoot count; CCS- Commercial Cane sugar

insecticide Rynaxypyr could be selectively used in the management of sugarcane borers to get higher yield.

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