Environment & Ecology 27 (4B) : 2071—2073, 2009
 ISSN 0970-0420

Efficacy of Certain Insecticides Against Shoot Borer, *Chilo infuscatellus* Snellon in Sugarcane

HARI CHAND, ANIL KUMAR AND G. P. DWIVEDI

Division of Entomology, Sugarcane Research Institute Rajendra Agriculture University Bihar, Pusa 848125, Samastipur, India

Abstract

An experiment was conducted to determine the efficacy of six insecticides against shoot borer in respect of per cent germination, cumulative incidence per cent millable canes (000) and yield (MT) per hectare for three years during 2005-08 in sugarcane. All insecticides were applied at the time of planting and observations were recorded at 60, 90 and 120 days after planting. Among the treatments, phorate 10G was found to be statistically superior as given highest germination per cent, millable cane, yield (MT) per hectare and lowest cumulative incidence per cent, millable cane, yield (MT) per hectare and lowest cumulative incidence per cent were 43.53, 66970, 65.44 (MT) per hectare and 8.25, respectively. Carbofuran 3G was the next best treatment and it was statistically at par with endosulfan 35EC and chloropyrophos 20EC. However, rest treatments were statistically significant over control (untreated plots).
Key words : Shoot borer, Insecticides, Efficacy, Sugarcane.

Sugarcane an important agro-industrial crop in India plays a vital role in national economy. In Bihar it has considered as cash crop but cultivation is declined due to attacked by several insect pests at different stages of crop growth. *Chilo infuscatellus* Snellen is one of the serious pest of sugarcane in the state. The losses of 22–33% in yield, 12% in recovery, 2% in CCS, 27% in jaggery and 20% in gur. Keeping in view, the present study was undertaken to find out the efficacy of six insecticides against shoot borer on sugarcane under field condition for three years (2005-08) as infestation of this pest is increasing day-by-day.

Methods

To study the efficacy of six insecticides against shoot borer field experiments were conducted for three consecutive years (2005-06, 2006-07 and 2007-08) during autumn season at the New Area Research Farm of Sugarcane Research Institute, RAU. Pusa with BO-137 variety of sugarcane. The trial was laid out in randomized block design with recommended agronomical practices of RAU were followed in time in all the treatments. There were seven treatments including control (untreated) with three replications as follows : T_1 : Carbofuran 3G at 1.0 kg a.i./ha, T_2 : Phorate 10G at 2.0 kg a.i./ha, T_3 : Endosulfan 35 EC at 0.75 kg a.i./ha, T_4 : Chloropyrophos 20EC at 1.00 kg a.i./ha, T_5 : Monocrotophos 36SL at 0.6 kg a.i./ha, T_6 : Acephate 75 WP at 0.5 kg a.i./ha, T_7 : Control (untreated).

The plot size was of 10 × 5.4 m^2 and all insecticides were applied at the time of planting. The observation were recorded at 60, 90 and 120 days after planting on germination per cent and cumulative incidence per cent by plant showing dead hearts. The number (‘000) of millable canes and yield (MT) per hectare were also recorded at the time of harvesting of the crop. The data obtained were subjected to statistically analyzed.

Results and Discussion

The results showed differences among the treatments due to application of various insecticides in respect of cumulative germination, incidence percent, number of millable canes and yield (MT)per hectare (Tables 1 to 4).

The data revealed that the per cent germination was higher (42.53) in treatment with phorate 10G followed by carbofuran 3G (39.04) and with endosulfan 35EC (37.38). Remaining treatments (monocrotophos 36 SL and acephate 75 WP) were statistically at par

Table 1. Effect of insecticides on germination percentage.

Treatment	Germination per cent 2005-06	2006-07	2007-08	Cumulative germination (%)
T_1	38.85	36.97	41.30	39.04
T_2	45.45	43.15	42.00	43.53
T_3	38.30	36.98	36.87	37.38
T_4	38.07	37.36	34.83	36.75
T_5	35.53	32.40	34.83	34.25
T_6	32.28	31.57	33.60	32.48
T_7	30.15	28.00	31.48	29.88
SE	0.71	0.33	0.58	Y = 0.55 T = 0.84
CD (5%)	2.18	1.00	1.78	Y = NS T = 2.58
CV (%)	3.32	1.60	2.74	4.00

over control.

In cumulative incidence percent all the insecticidal treatments were significantly superior over control (Table 2) in keeping the infestation of shoot borer at low level. Among the insecticidal treatments, phorate 10G has given minimum incidence percent (8.25) followed by carbofuran 3G (9.07) and endosulfan 35EC (9.68), while maximum incidence was found in untreated plots.

The data on number of millable canes indicated that the highest number of millable canes (66,970/ha) were obtained treatment with phorate 10G. The next best treatment was carbofuran 3G and endosulfan 35 EC and these were statistically at par with chloropyrophos 20EC, monocrotophos and acephate.

Phorate 10G recorded the highest yield (65.44 MT/ha) followed by carbofuran 3G (64.09 MT) and endosulfan 35 EC (57.91 MT/ha). The similar trend was observed in other treatments as noticed in germination, incidence and yield scale of evaluation. However, all the treatment were significantly superior than the control (33.14 MT/ha).

Table 2. Effect of insecticides on incidence percentage.

Treatment	Incidence percent 2006-06	2006-07	2007-08	Cumulative germination (%)
T_1	9.51	8.81	8.90	9.07
T_2	8.68	7.50	8.57	8.25
T_3	9.40	9.60	10.03	9.68
T_4	10.18	10.61	11.05	10.61
T_5	12.22	11.20	11.95	11.79
T_6	12.42	13.43	13.33	13.06
T_7	13.86	14.02	14.32	14.07
SE	0.44	0.29	0.39	Y = 0.23 T = 0.35
CD (%)	1.36	0.88	1.19	Y = NS T = 0.98
CV (%)	7.04	4.61	6.02	5.49

Table 3. Effect of insecticides on number (‘000) of millable canes/ha.

Treatment	Number of millable cane (‘000) per hectare 2005-06	2006-07	2007-08	Cumulative no. of canes (1000)/ha
T_1	64.23	66.51	66.89	65.88
T_2	65.31	67.38	68.23	66.97
T_3	61.33	61.23	59.13	60.56
T_4	59.31	60.06	57.26	58.88
T_5	55.65	58.82	54.19	56.22
T_6	55.92	55.97	52.93	54.94
T_7	39.59	40.78	38.24	39.54
SE	1.40	0.42	1.64	Y = 0.76 T = 1.16
CD (5%)	4.30	1.29	5.06	Y = NS T = 3.31
CV (%)	4.22	1.24	5.02	3.51

Jhansi and Rao (1) reported that cumulative incidence per cent of dead hearts were less in endosulfan 35 EC (25.17%) followed by savidol 4G (25.42%), cartap 4G (25.80%), monocrotophos (26.38%), carbaryl (27.35%) and quinalphos (28.23%) compared to the control plot incidence which above 30%. Saroj and Dharam (2) recorded that amrutguard applied at 3.75 l/ha as spray over the seed setts in furrows and imidachoprid at 187.5 ml/ha also as spray over setts in furrows at 250 ml/ha protected the crop from termite and early shoot borer as effectively as

Table 4. Effect of insecticides on yield (MT/ha).

Treatment	Yield (MT) per hectare 2005-06	2006-07	2007-08	Cumulative yield (MT/ha)
T_1	57.82	66.87	57.57	64.09
T_2	64.56	66.03	65.72	65.44
T_3	56.28	56.60	60.84	57.91
T_4	58.24	55.00	56.94	56.93
T_5	53.88	52.57	54.20	53.55
T_6	52.47	55.17	51.10	52.91
T_7				
SE	0.69	1.17	1.96	Y = 0.91 T = 1.39
CD (5%)	2.12	3.61	6.03	Y = NS T = 3.96
CV (%)	2.22	3.68	6.07	4.40

chloropyrophos (dumet 20EC) at 6.25 l/ha. Galande and Bhoi (3) also reported that three spray of carbosulfan 25 EC and endosulfan 35 EC (0.05%) given the minimum infestation of early shoot borer and higher number of millable canes, cane yield and benefit : cost ratio. These results are similar to the present study. Thus it may be concluded that phorate 10G or carbofuran 3G may be applied at the time of planting for reducing the infestation of shoot borer on sugarcane.

References

1. Jhansi K., R. Rao and B. Chandra. 1995. Chemical control of shoot borer, *Chilo infuscatellus Snellen. Bhartiya Sugar* 22 : 21—22.
2. Saroj J. and D. Singh. 2005. Bioefficacy of imidacloprid and amrutguard against termite and shoot borer in sugarcane crop. *Indian J. Ent.* 67: 359—365.
3. Galande S. M. and P. G. Bhoi. 2005. Efficacy of certain insecticides against shoot borer, *Chilo infuscatellus* Snellen on sugarcane. *Indian J. Sugarcane Tech.,* 20 : 66—68.