

Use of Granular Insecticides in Controlling Sugarcane Rootstock borer, *Emmalocera depressella* Swinhoe

M.M.Biswas, M.A.Alam, R.Kundu,
M.Abdullah and A.Mannan
Sugarcane Research & Training Institute,
Ishurdi, Pabna, Bangladesh.

Received on 8.1.94

ABSTRACT

Several insecticides namely Padan 10G, Miral 3G and Furadan 5G were used at 3.0 and 4.0 kg ai ha⁻¹ doses to prove their effectiveness against Rootstock borer (RSB). The experiment was carried out at two locations Carew & Co. Ltd. and Rangpur Sugar Mills (RSM) Farms following RCB design with four replications. Insecticides were applied once in July in furrows near rootzone. Results obtained on different parameters like percentage reduction of pest incidence, presence of live larvae in 100 canes and percentage rootstock injury (cm) in infested canes showed no significant effect of Chemicals on the pest. Rootstock borer infestation in the treated plots ranged from 58.6–87.1 and 74.5–85.1% at Carew & Co and RSM farm respectively. The injury caused by RSB in 100 canes measured in cm ranged from 421.1–636.0 and 292.9–360.5 cm at Carew & Co. and RSM farm respectively.

INTRODUCTION

In recent years Rootstock borer has assumed the serious turn in attacking the canes throughout the country. In Bangladesh, canes grown in sandy/sandy loam soils are mostly vulnerable to this pest. It causes considerable damage to the crop in early as well as grown up canes. Initial infestation shows visible symptoms of "dead heart" or drying of 3rd/4th leaf in attacked canes. Large scale infestation in the early stages create gapiness in the field. In later months, (July on ward) due to continuous feeding within the rootstock, the whole stock becomes destroyed showing external symptoms of yellowing of outer leaves. Heavily infested canes easily lodged down affecting cane yield and recovery. Miah *et. al.* (1986) observed 68.0% infestation at the early stages and recorded reduced cane yield by 8.6%.

Information regarding chemical control of rootstock borer is lacking in Bangladesh except the work done by Miah *et. al.* (1986). They conducted experiments with Dieldrin 20 EC and Furadan 5G. In India soil application of gamma HCH was recommended for the control of root borer to be applied in furrows at the time of planting (Agarwala and Prasad, 1955; Gupta and Avasthy, 1954). However, Khan and Joshi (1969) found HCH ineffective in Rajasthan against root borer. Sikchi *et. al.*

(1987) reported effective control of root borer with soil application of granular formulations of Quinalphos, Carbofuran and Phorate.

Very little information regarding the chemical control of rootstock borer exists in Bangladesh and its extent of damage demands top priority for its control measures. The present study was undertaken to find out suitable control measures of rootstock borer (RSB).

MATERIALS AND METHODS

The experiment was set up in two locations such as Shahebgonj farm under Rangpur Sugar Mills (RSM) and Akandabaria farm under Carew & Co. Ltd. during the cropping season 1989-90. The experiment was laid out in randomized complete block design (RCB) with four replications. The plot size was 10m x 10m. Block to block distance was 2m and plot to plot distance was 1m. The variety Isd 16 was used as planting material and planting was done through conventional sett placement in the trenches. Three chemicals such as Furadan 5G (carbofuran), Miral 3G (Isazophos) and Padan 10G (Cartap) were used against the target pest, rootstock borer. The treatments were as follows :

- T₀ Untreated (Check),
- T₁ Furadan 5G @ 3.0 kg ai ha⁻¹ applied in July,
- T₂ Furadan 5G @ 4.0 kg ai ha⁻¹ applied in July,
- T₃ Miral 3G @ 3.0 kg ai ha⁻¹ applied in July,
- T₄ Miral 3G @ 4.0 kg ai ha⁻¹ applied in July,
- T₅ Padan 10G @ 3.0 kg ai ha⁻¹ applied in July,
- T₆ Padan 10G @ 4.0 kg ai ha⁻¹ applied in July,
- T₇ Mechanical control in June (Uprooting of infested plants for destruction with larvae, if present).

The chemicals were applied by broadcasting the granules in the furrows as per schedule in the root zone, then covered with soils and irrigated. Mechanical control of RSB infested plants (uprooting the plants for destruction along with larvae) was included to observe its performance over the untreated as well as chemical treatments.

Data were collected twice, first after one month of chemical application, and at harvest. The following parameters such as, percentage RSB infestation, presence of live larvae and injury caused in rootstocks were considered for comparison and interpretation. Each time, two rows of canes (20 sq. m area) per plot were uprooted for the purpose. The fertilizer application, weeding, earthing up, etc. were done as normal cultural practices.

RESULTS AND DISCUSSION

From the Table 1 it is observed that, the tested chemicals at different dose rates and mechanical control treatments showed no reduced RSB infestation at required level compared to the untreated (check) in both experimental sites (Akandabaria and Shahebgonj farms). The percentage RSB infestation at Shahebgonj farm was found higher compared to that of Akandabaria farm having lower population of RSB live larvae. The percentage RSB infestation after one month of insecticide application was statistically identical in all treatments in both locations. The infestation ranges from 35.1 to 46.4 and 60.0 to 72.0% in Akandabaria and Shahebgonj farm respectively.

Table 1. Effects of different treatments on percentage infestation and larval population from 20 sq. m area, one month after chemical application, 1989-90.

Treatments		Akandabaria Farm (Carew & Co.)		Shahebgonj Farm (RSM)	
Chemicals	Dose (kg ai ha ⁻¹)	RSB infestation (%)	RSB larvae in 100 canes	RSB infestation (%)	RSB larvae in 100 canes
Check	—	43.6	24.8	68.3	2.8
Furadan 5G	3.0	45.8	38.5	72.0	5.3
Furadan 5G	4.0	35.2	30.3	63.9	3.8
Miral 3G	3.0	46.4	34.5	70.1	4.3
Miral 3G	4.0	42.0	30.0	65.0	5.0
Padan 10G	3.0	35.1	29.5	60.7	4.5
Padan 10G	4.0	36.1	20.8	63.2	2.5
Mechanical control	—	39.4	31.5	60.1	4.0
LSD (5%)		NS	NS	NS	NS

Data recorded at harvest have been presented in the Table 2 also shows the similar type of insecticidal effects on percentage RSB infestation having no significant difference among the treatments over untreated plots in Akandabaria as well as Shahebgonj farms. The control plots in both locations recorded above 75% infestation. At harvest, treated plots showed 58.6–87.1% and 74.5 to 85.1% infestation at Akandabaria and Shahebgonj farm respectively.

The population of live larvae in Shahebgonj farm is lower compared to that of Akandabaria farm and all the treatments were statistically similar compared to untreated plots in both experimental sites. It is to mention that, though lower larval

population was recorded at Shahebgonj farm but it showed similar infestation as was observed in Akandabaria farm.

Table 2. Effects of different treatments on percentage infestation, larval population and injury in canes from 20 sq. m area at harvest, 1989-90.

Treatments		Akandabaria Farm (Carew & Co.)			Shahebgonj Farm (RSM)		
Chemicals	Dose (kg ai ha ⁻¹)	RSB infestation (%)	RSB Larvae in 100 canes	Injury in 100 canes (cm)	RSB infestation (%)	RSB larvae in 100 canes	Injury in 100 cane (cm)
Check	—	79.0	27.3	542.4	76.2	7.2	342.7
Furadan 5G	3.0	58.6	34.4	517.7	85.1	9.9	329.8
Furadan 5G	4.0	76.5	27.5	510.5	79.7	5.2	340.2
Miral 3G	3.0	87.1	44.2	636.0	76.5	6.2	306.5
Miral 3G	4.0	82.9	36.0	550.9	81.5	8.5	317.2
Padan 10G	3.0	78.5	40.3	511.1	82.4	6.2	360.5
Padan 10G	4.0	75.0	27.4	421.1	77.7	4.0	319.2
Mechanical control	—	79.4	29.6	528.1	74.5	8.7	292.9
L S D (5%)	NS	NS	NS	NS	NS	NS	NS

During harvest, the uprooted rootstocks were dissected to quantify the extent of injury caused by the borer due to its continuous feeding within the rootstock. Table 2 also furnished that various chemicals with various doses showed almost similar injury (cm) indicating no statistical difference among them. The experiment conducted at two different locations showed similar response. Injury with different rates of insecticides used ranges from 481.1 to 635.0 cm and 292.9 to 360.5 cm in Akandabaria and Shahebgonj farm respectively. These results agree with the report of Miah *et al.* (1986) who found no significant effects of Furadan against RSB control in sugarcane.

Kundu (1988) observed positive effects of Miral in controlling RSB population (Unpublished). However, results obtained reveals that the chemical had no positive effects either in reducing pest population or level of infestation.

The pesticides were applied in the month of July, a peak population density period of root stock borer apprehending an effective control for the pest. The present work with high doze rates like 3.0 and 4.0 kg ai ha⁻¹ of insecticides did not produce satisfactory results in reducing the pest population, hence its infestation. In future, research should include newer chemicals. Critical time and frequency of insecticide application should also be determined through survey and monitoring of eggs.

ACKNOWLEDGEMENTS

The authors wish to thank the management of RSM and Carew & Co. for all sorts of co-operations during this experiment. Sincere thanks are extended to Mrs. Monowara Begum, Asstt. Cane Entomologist and Mr. Nurul Islam, Scientific Asstt. for help in collecting data. Thanks are also extended to Mr. A. Ghafur, Associate Statistician (Gr-1) for statistical analysis and Mr. Fazlul Karim and Mr. Ferdous Alam for typing the manuscript.

REFERENCES

- Agarwala, S. B. D. and Prasad, S. N. 1955. The problem of sugarcane borers and experiments on their chemical control. Part-I. *Indian J. Ent.*, **17** : 307-314.
- Gupta, S. D. and Avasthy, P. N. 1954. Some recommendation for the control of sugarcane pests in India. *Indian Sug.*, **4** : 387-405.
- Khan, R. M. and Joshi, H. C. 1969. Abnormal larval population of sugarcane root borer, *Emmalocera depressella* Swinhoe (Pyralidae : Lepidoptera) in insecticide treated plots. *Indian J. Ento.*, **31** : 177-179.
- Kundu, R. 1988. (Unpublished). Screening of insecticides against rootstock borer.
- Miah, M. A. H.; Kundu, R.; Mannan, A.; and Abdullah, M. 1986. Assessment of cane damage caused by rootstock borer, *Emmalocera depressella* Swinhoe and effects of pesticides on the pest. *Bangladesh J. Sugarcane*, **8** : 1-4.
- Sikchi, B. R.; Patel, A. S. and Hapase, D. G. 1987. Preliminary observations on the chemical control of *Emmalocera depressella* Swinhoe in Sugarcane. Proc. 37th Conf. Sug. Technol. Assoc., **1**: 321-324.