

SHORT COMMUNICATION

Efficacy of Some Fipronil Insecticides in Controlling Sugarcane Termites

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Sugarcane (*Saccharum officinarum*) is one of the most important cash-cum industrial crop in Bangladesh. The Sugarcane crop, by virtue of its long duration, nature of canopy and microclimate condition in crop area is favourable for harbour wide range of insect pests. Among the sugarcane pests termites causes severe damage to sugarcane plants from planting to harvest and play a major role in reduction of cane yield. Termite is one of the major soil pests of sugarcane in Bangladesh (Alam *et al.*, 1964). Five species of termites viz. *Odontotermes parvidens* Holm and Holm, *Odontotermes lokanardi* Chatterjee et Thakur, *Odontotermes* sp., *Microtermes obesi* Holm and *Microtermes* sp. have been identified to be destructive to sugarcane in Bangladesh (Alam and Miah, 1997). *Odontotermes obesus* and *Microtermes* sp. are considered as serious pests of sugarcane in Bangladesh (Dean, 1979). Termite cause damage to eye buds of planted setts, young shoot on germination and infest lower internodes of growing canes (Khanna *et al.*, 1956 ; Rajani, 1964). These damages cause death of young plants and produce gap in cane rows with resultant poor yield (Karim *et al.* 1979). Termite infestation is observed both in setts (buds) and standing canes. Bud damage by termites may reach up to 60% (Singh and Kishan, 1946; Avasthy, 1967). Crop yield and sugar recovery reduced by 2.5 and 4.5% respectively (Agarwala, 1955). Substantial loss is caused due to their attack in to later stages. In the past chlorinated hydrocarbons (Heptachlor, Dieldrin, Chlordane, and BHC etc.) were extensively used against termites all over the world, which is very toxic and hazardous with long residual effects. These chemicals are now banned in Bangladesh and else where. Therefore, there is an urgent need to find out effective, as well as less hazardous insecticides to suppress termites. Fipronil insecticide is a pseudo-systemic with predominantly contact and stomach action. Fipronil applied as an in furrow soil spray at 50-200g ai ha⁻¹ provides excellent, long term control of termites and positive influence in root developing.

The experiment was set up at Akandabaria farm, Carew & co., Sugar Mills Ltd. Darsana, Chuadanga, Bangladesh during the cropping season 2009-2010. There were eight (8) treatments as showing in Table 1. The experiment was designed in Randomized Complete Block Design (RCBD) with four replications. Individual plot size was 6m x 6m. Block to block distance was 2m and plot to plot was 1m. Planting was done through conventional sett placement (end to end) in the trenches and in the month of December

2009 with the variety Isd 32 in termite prone farm, Akandabaria under Carew & co., Sugar Mills Ltd. Darsana, Chuadanga. All the test insecticides were applied after placement of setts in the trenches at plantation. Granular insecticides were applied by broadcasting and SC chemicals were applied in mixing with water by using sprayer over the setts and then covered with soils immediately. Prevalence of pest was common since land was selected only in termite prone farm and endemic throughout the season in sugarcane fields.

To study the efficacy of test insecticides, data on termite population was taken thrice. First data was taken in the month of February (3 months crop) when setts are attacked, second data were collected in March and finally in April. At each time 5 clumps per plot were uprooted randomly by digging with the help of spade. The uprooted setts/clump along with soils and counted the number of termites placing the setts/clump on a broad plastic sheet (1m^2). The termites were released in the respective plots after counting. The yield of canes per plot was recorded at harvest in December. The data were analysed statistically and compared by using LSD at 5% level for interpretation.

Except the treatment ascend 3GR all the test insecticides showed satisfactory performance in suppressing sugarcane termites in the experiment (Table-1) applied. In the first data (February) significant difference was observed and the data showed that all the treated plots reduced termite population giving the efficacy up to 100% except ascend 3GR that gave the effectiveness of 55.39%. The effectiveness of ranged from 55.39% to 100.00%. In the second data (4 months crop) statistically no significant difference was observed among the test insecticides and standard though ascend 50 SC and refree 50 SC treated plots showed the higher efficacy (79.47% and 100.00%). Table 1 also shows results on the basis of the data recorded in the month of May (5 months crop). All the insecticides treated plots showed significant difference in reducing termite population over control. The effectiveness ranged from 85.73-98.42. Some reports (Anon.; 1996a, 1996b) indicated that regent (fipronil group) has been tested against several insect pests of corn, rice, cotton, potato and citrus including foliar and soil pests globally with varying doses from 25-300g a.i ha⁻¹. But for controlling sugarcane stem borer and termite this doses of regent varied from 50-200 g a.i ha⁻¹ which produced satisfactory results that supported the present findings. Alam *et al.* (2001) reported that regent 3 GR and regent 50SC @ 100 g a.i ha⁻¹ significantly reduced sugarcane termites. Alam *et al.* (2004) also recommended some chlorpyrifos chemicals @ 2.0-2.5 Kg a.i ha⁻¹ against sugarcane termites. Madan and Singh (1998) found that, chlorpyrifos 20EC @ 1.25 Kg a.i.ha⁻¹ satisfactorily controlled sugarcane termites among the tested organophosphate insecticides including sevidol 4G and quinalphos 5G which is also in agreement with the present findings.

Table 1: Efficacy of some new insecticides against Sugarcane Termites and yield, Carew and Co., Darsana, Chuadanga, Bangladesh (2009-2010)

Treatments (Insecticides)	Number of Termites (mean)			Mean popula- -tion	Percent Effective- ness over control	Yield (t ha ⁻¹)	Yield increase (+) or decrease (-) over control
	1 st time data	2 nd time data	3 rd time data				
Ascend 3GR @ 50 g ai ha ⁻¹ at planting	92.00ab (55.39)	76.50 (43.37)	6.25b (98.36)	58.25	75.70	53.05a	23.57
Ascend 50 SC @ 50 ml ai ha ⁻¹ at planting	0.00b (100.00)	27.25 (79.47)	30.50b (91.98)	19.25	91.97	53.48a	24.57
Cipfrin 3GR @ 50 g ai ha ⁻¹ at planting	0.00b (100.00)	115.75 (12.81)	11.25b (97.04)	42.33	82.34	51.80a	20.66
Refree 50 SC @ 50 ml ai ha ⁻¹ at planting	0.00b (100.00)	0.00 (100.00)	54.25b (85.73)	18.08	92.45	53.21a	23.95
Refree 3GR @ 50 g ai ha ⁻¹ at planting	0.00b (100.00)	118.75 (10.55)	12.25b (96.78)	43.67	81.78	54.13a	26.08
Ruler 3 GR @50 g ai ha ⁻¹ at planting	0.00b (100.00)	120.75 (9.03)	20.00b (94.74)	46.92	80.43	52.62a	22.57
Regent 3GR @ 50 g ai ha ⁻¹ at planting (standard)	0.00b (100.00)	13.25 (90.02)	6.00b (98.42)	6.42	97.32	54.78a	27.60
Control (Untreated)	206.25a (-)	132.75 (-)	380.25a (-)	239.75	-	42.93b	-
Lsd (5%)	179.5	NS	123.3	-	-	5.730	-

*Figures followed by the same letter (s) are not significantly different at 5% level as per LSD

Figures in parenthesis are percent effectiveness over control

It revealed from Table 1 that all test insecticides showed statistically significant cane yield over control. The yield increase over control in different treatments varied. The yield of sugarcane ranged from 51.80 to 55.13 t ha⁻¹ among insecticide treated plots where as the control plots (untreated) had 42.93 t ha⁻¹. The increased cane yield over control in insecticide treated plots ranged from 20.66 to 28.42 %. refree 3 GR @ 50 gm ai ha⁻¹ had the highest yield 55.13 t ha⁻¹ showing 28.42% yield increase over control followed by regent 3GR, ascend 50SC, refree 50 SC and ascend 3GR which gave 54.78 t ha⁻¹, 53.48 t ha⁻¹, 53.21 t ha⁻¹ and 53.05 t ha⁻¹ showing 27.60%, 24.57%, 23.95% and 23.57% yield increase over control respectively. Cipfrin had the lowest yield among insecticide treated plots which produced 51.80 t ha⁻¹. Alam *et al.* (2008) reported that fipronil insecticide like agronil 3GR, bonanza 3GR, econil 3GR and envoy 50SC gave 09.23 to 52.27 percent yield increase over control when applied against termite. The present findings have similarities with the above reported results. The results suggested that except the treatment ascend 3GR all the test insecticides were found effective in suppressing termite population (mean efficacy) beyond 80% and might be recommended for the control of termites since fulfil the requirement of government (PTAC)

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