

Effects of Talstar and Rugby on White Grubs and Yield of Sugarcane

M. M. Biswas, M. Abdullah, M. N. A. Siddiquee, M. A. Rahman and M. A. Alam
Bangladesh Sugarcane Research Institute,
Ishurdi-6620, Pabna.

ABSTRACT

An experiment was conducted with different dose rates of Rugby 10G and Talstar 2WP to evaluate their effectiveness against white grubs of sugarcane. The experiment was set up at 3 locations viz. i) RSRS, Thakurgaon, ii) Mohan farm, Thakurgaon Sugar Mills Ltd. and iii) Sultanpur farm, Setabgonj Sugar Mills Ltd, Dinajpur during the cropping season 2004-2005. Pooled data (1st) showed that all the treatments except Talstar 2WP at 100gm ai ha⁻¹ applied in March and in March + April, Rugby 10G at 1.0 and 2.0 kg ai ha⁻¹ applied in March resulted desired level of white grub control while (2nd data) Talstar 150 & 200 gm ai ha⁻¹ and Rugby 1.5 & 2.0 kg ai ha⁻¹ applied in March + April and lone application of Rugby 1.0kg aiha⁻¹ in March showed satisfactory control of grubs. Yield data showed that all the treatments produced increased cane yield over control plots. Talstar and Rugby at higher doses (2.0 kg ai ha⁻¹) applied in March + April showed 52.99 and 54.27% increased yield over control respectively.

Key words : Effects, white grubs, rugby, talstar, yield, sugarcane

INTRODUCTION

White grubs are serious pests of sugarcane. Among soil pests white grubs play considerable role in damaging canes. Seventeen species of white grubs have so far been recorded in Bangladesh causing damage every year (Anon., 1981; 1984). Among these, *Brahmina* sp., *Holotrichia* sp., *Anomala* sp. and *Adoretus versutus* are most damaging. Different species of white grubs attack sugarcane at the same time (February to May) and cause severe damage resulting in loss of yield. Due to white grubs 20-100% infestation occurs in the field and loss due to white grubs was reported to be 23.07 to 38.17 t ha⁻¹ (Miah *et al.*, 1983). Patil and Hapase (1981) reported yield loss might be as high as 80-100% by white grubs. Its attack is mainly confined to the non- flooded sandy/ sandy loam soils of northern cane growing areas particularly of Panchgarh, Thakurgaon and Setabgong Sugar Mills (AEZ-1), Rangpur Sugar Mills (AEZ-3) and Rajshahi sugar Mills (AEZ-11). To combat the white grub situation, the growers under these sugar Mills use insecticides which are mostly from Organocarbamate group and is costly. The objective of this study was to find out a substitute of Organocarbamate as well as cheaper insecticides for the control of White grubs. Hence, the experiment was undertaken with Rugby 10G (Organophosphate) and Talstar 2WP (Synthetic pyrethroid) that are less toxic compared to organochlorine insecticides.

MATERIALS AND METHODS

The experiment was set up at three locations viz. Mohan farm, Thakurgaon Sugar Mills (TSM), Thakurgaon; Regional Sugarcane Research Station (RSRS), Thakurgaon and Sultanpur farm, Setabgonj Sugar Mills (STSM), Dinajpur during the cropping season 2004-2005. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications. There were 14 treatments including one control. The treatment Curaterr 5G (March & April) was considered as standard. The plot size was 6m x 6m. Block to block distance was 1.5m and plot to plot distance was 1m. The variety Isd 31 was used as planting material and planting was done through conventional sett placement (end to end) in the trenches in November, 2004. The test insecticides were granular and WP in formulation. The application schedule of insecticides was such that in some of the treatments it was applied only in March and in some treatments it was applied in March & April. Insecticide application at each time was followed by irrigation for granular formulation. Before irrigation, soil ridges surrounding individual plots were made to protect the flow of water from one plot to another. The fertilizer application, weeding, mulching and earthing up were done as normal cultural practices. For application of Rugby 10G and Curaterr 5G (standard) furrows were made on both sides of cane rows and then insecticides were applied at the base of the plants and in the space between furrows and mixed with soils followed by irrigation. Talstar 2WP was mixed with water and applied at the base of plants and covered with soils.

For counting the population of white grubs, data were taken from 5 randomly selected clumps per plot. An area of 60 cm x 60 cm was dug up from a depth of 40 cm with spade. Population of Larvae and adult (if any) was counted in roots and in soils of these pits. Data were taken twice, 30 days after each application. The yield of canes per plot was recorded at harvest in December, 2005.

RESULTS AND DISCUSSION

All the treatments irrespective of doses rate and time of application reduced white grub population significantly over control plots at three test locations which were statistically identical (Table 1). Considering the efficacy level it was observed that treatment like Talstar 2WP at 100gm ai ha⁻¹ (March + April) at RSRS farm did not reach the desired efficacy level. At Mohan farm though all the treatments showed significant reduction of white grubs among which Talstar 2WP at 150gm ai ha⁻¹ (March), Talstar 2WP at 100gm ai ha⁻¹ (March + April), Talstar 2WP at 150gm ai ha⁻¹ (March + April), Rugby 10G at 1.0 and 2.0 kg ai ha⁻¹ (March + April) produced desired level (80% and above) of efficacy in reducing the target pest. At Sultanpur farm Talstar 2WP at 100gm ai ha⁻¹ (March), Talstar 2WP at 100gm ai ha⁻¹ (March + April), and Rugby 10G at 1.0 kg ai ha⁻¹ (March) could not reach the optimum level of efficacy. The data on pooled percent efficacy showed that all the treatments except Talstar 2WP at 100gm ai ha⁻¹ applied in March and in March + April, Rugby 10G at 1.0 and 2.0 kg ai ha⁻¹ applied in March resulted desired level of white grub control.

Table 1. Efficacy of Talstar and Rugby in controlling White grubs of sugarcane in Thakurgaon region, 2004-2005.

Treatments (Chemicals)	Number of WG/5 Clumps/plot (1st data) (Mean of 3 replications)			Pooled efficacy (%)
	RSRS, Thakurgaon	Mohan farm, TSM	Sultanpur farm, STSM	
Talstar 2WP @ 100gm ai ha ⁻¹ in March	1.33b (87.12)	4.00b (65.69)	2.33bc (68.21)	73.67
Talstar 2WP @ 150gm ai ha ⁻¹ in March	1.00b (90.31)	1.33b (88.52)	1.00bcd (86.35)	88.39
Talstar 2WP @ 200gm ai ha ⁻¹ in March	1.66 b (83.93)	4.00b (65.69)	0.66cd (90.99)	80.20
Talstar 2WP @ 100gm ai ha ⁻¹ in March + April	4.00b (61.27)	1.00 b (91.42)	2.33bc (68.21)	73.63
Talstar 2WP @ 150gm ai ha ⁻¹ in March + April	1.33 b (87.12)	2.00 b (82.84)	1.33 bcd (81.85)	83.93
Talstar 2WP @ 200gm ai ha ⁻¹ in March + April	1.33 b (87.12)	3.00 b (74.27)	0.33 d (95.49)	85.62
Rugby 10G @ 1.0 kg ai ha ⁻¹ in March	0.00 b (100.00)	4.33 b (62.86)	2.66 b (63.70)	75.52
Rugby 10G @ 1.5 kg ai ha ⁻¹ in March	0.33 b (96.80)	3.00b (74.27)	1.00bcd (86.35)	85.80
Rugby 10G @ 2.0 kg ai ha ⁻¹ in March	1.66 b (83.93)	4.66b (60.03)	0.33d (95.49)	71.89
Rugby 10G @ 1.0 kg ai ha ⁻¹ in March + April	1.33 b (87.12)	1.66b (85.76)	1.33 bcd (81.85)	84.91
Rugby 10G @ 1.5 kg ai ha ⁻¹ in March + April	0.66 b (93.61)	4.00 b (65.69)	1.00 bcd (86.35)	81.88
Rugby 10G @ 2.0 kg ai ha ⁻¹ in March + April	1.00 b (90.31)	1.33b (88.59)	0.00d (100.00)	92.96
Curaterr 5G @ 2.0 kg ai ha ⁻¹ in March + April	1.33 b (87.12)	2.00b (82.84)	1.00 bcd (86.35)	85.43
Control	10.33a (-)	11.66a (-)	7.33a (-)	-
LSD (5.0%)	1.209	4.674	1.966	

* Figures accompanied by same letters do not differ significantly at 5.0% level as per LSD test

** Figures in parentheses are percent effectiveness over control.

Data collected (RSRS farm, Thakurgaon) after second application of insecticides indicates positive response in reducing white grub population over control plots. But from those some treatments like Talstar 2WP at 100gm ai ha⁻¹ (March), Talstar 2WP at 150gm ai ha⁻¹ (March + April), Rugby 10G at 1.0, 1.5 and 2.0 kg ai ha⁻¹ (March) and Rugby 10G at 2.0 kg ai ha⁻¹ (March + April) showed highly satisfactory control of white grubs (Table 2). All the treatments at Sultanpur farm, STSM showed desired level of efficacy (over 80%) except Talstar 2WP at 150gm ai ha⁻¹ (March), Talstar 2WP at 150gm ai ha⁻¹ (March + April), Rugby 10G @ 2.0 kg ai ha⁻¹ (March) and Rugby 10G @ 1.0 kg ai ha⁻¹ (March + April) in controlling white grubs. Data on pooled percent efficacy (Table 2) showed that the test insecticides Talstar and Rugby applied in March + April with higher doses (1.5 and 2.0 kg ai ha⁻¹) produced satisfactory result on white grub population and the result was at par with the standard (Curaterr 5G at 2.0kg ai ha⁻¹). Miah *et al.* (1986) reported that among different chemicals Furadan (Carbofuran) and Ekalux (quinalfos) at 2.00 kg ai ha⁻¹ effectively controlled white grubs. Abdullah *et al.* (1998) reported that Rugby 10G @ 2.0 kg a.i ha⁻¹ reduced white grub population (over 80 percent) compared to untreated plots which have similarities with the present study. Alam *et al.* (2001) reported that Rugby 10G @ 2.0 kg a.i ha⁻¹ and Talstar 2WP @ 0.2 kg a.i ha⁻¹ gave 85.75% and 79.57 efficacy respectively in controlling soil pest like termite which have similarities with the present study. Alam *et al.* (2006) also reported that Talstar 2WP applied @ 200 gm ai ha⁻¹ in March and May, Rugby 10G applied @ 2.0 kg ai ha⁻¹ in March and May effectively controlled (over 80%) rootstock borer. All these reports support the efficacy of test insecticides in controlling white grubs of sugarcane.

Data collected at harvest showed that cane yield varied from 56.70 to 78.81 t ha⁻¹ among the treated plots at 3 locations while untreated plots produced 45.76-49.57 t ha⁻¹ (Table 3). All the treatments produced increased cane yield that varied from 27.55-59.82% over control plots. Talstar and Rugby at higher doses (2.0 kg ai ha⁻¹) applied in March + April showed 52.99 and 54.27% yield increase over control plots respectively.

From the present findings, upon satisfactory reduction of whitegrubs Talstar 2WP @ 150gm ai ha⁻¹ and Rugby 10G @ 2.0kg ai ha⁻¹ applied in March + April might be recommended for application against the target pest in the pest prone areas by the cane growers. However, further investigation may be carried out to have conclusive results.

Table 2. Efficacy of Talstar and Rugby in controlling White grubs of sugarcane in Thakurgaon region, 2004-2005.

Treatments (Chemicals)	Number of WG/5 Clumps/plot (2nd data) (Mean of 3 replications)			Pooled efficacy (%)
	RSRS, Thakurgaon	Mohan farm, TSM	Sultanpur farm, STSM	
Talstar 2WP @ 100gmai ha ⁻¹ in March	1.33b (86.23)	6.66b (57.47)	1.00b (84.20)	75.96
Talstar 2WP @ 150gm ai ha ⁻¹ in March	2.00b (79.29)	3.00b (80.84)	1.60b (74.72)	78.28
Talstar 2WP @ 200gm ai ha ⁻¹ in March	2.66 b (72.46)	5.33 b (65.95)	1.00b (84.20)	74.20
Talstar 2WP @ 100gm ai ha ⁻¹ in March + April	2.66 b (72.46)	3.66 b (76.62)	1.00b (84.20)	77.76
Talstar 2WP @ 150gm ai ha ⁻¹ in March + April	1.66 b (82.81)	2.00 b (87.22)	1.33 b (78.98)	83.00
Talstar 2WP @ 200gm ai ha ⁻¹ in March + April	2.33 b (75.87)	3.66 b (76.62)	0.33 b (94.78)	82.42
Rugby 10G @ 1.0 kg ai ha ⁻¹ in March	0.66 b (93.16)	5.66 b (63.85)	0.66 b (89.57)	89.19
Rugby 10G @ 1.5 kg ai ha ⁻¹ in March	1.66 b (82.81)	4.66 b (70.24)	1.00b (84.20)	79.08
Rugby 10G @ 2.0 kg ai ha ⁻¹ in March	1.33 b (86.23)	5.00 b (68.07)	1.66 b (73.77)	76.02
Rugby 10G @ 1.0 kg ai ha ⁻¹ in March + April	2.33 b (75.87)	3.33 b (78.73)	1.66 b (73.77)	76.13
Rugby 10G @ 1.5 kg ai ha ⁻¹ in March + April	2.00 b (79.29)	4.66 b (70.24)	0.33 b (94.78)	81.43
Rugby 10G @ 2.0 kg ai ha ⁻¹ in March + April	0.66 b (93.16)	3.66 b (76.62)	0.66 b (89.57)	86.45
Curaterr 5G @ 2.0 kg ai ha ⁻¹ in March + April	1.66 b (82.81)	2.66 b (83.01)	0.66 b (89.57)	85.13
Control	9.66a (-)	15.66a (-)	6.66a (-)	-
LSD (5.0%)	2.299	5.349	1.847	

* Figures accompanied by same letters do not differ significantly at 5.0% level as per LSD test

** Figures in parentheses are percent effectiveness over control.

Table 3. Yield of sugarcane from different treatments applied with Talstar and Rugby in controlling White grubs in Thakurgaon region, 2004- 2005.

Treatments (Chemicals)	Yield (MTH)			Average yield of 3 Locations
	RSRS, Thakurgaon	Mohan farm, TSM	Sultanpur farm, STSM	
Talstar 2WP @ 100gmai ha ⁻¹ in March	60.70d	65.78c	56.70f	61.06
Talstar 2WP @ 150gm ai ha ⁻¹ in March	61.53d	67.17c	60.19ef	62.96
Talstar 2WP @ 200gmai ha ⁻¹ in March	66.63cd	71.36abc	63.39de	67.12
Talstar 2WP @ 100gm ai ha ⁻¹ in March + April	69.23bc	68.93bc	65.75bcd	67.97
Talstar 2WP @ 150gmai ha ⁻¹ in March + April	73.00ab	77.33a	69.40abc	73.24
Talstar 2WP @ 200gm ai ha ⁻¹ in March + April	76.96a	78.81a	73.77a	76.51
Rugby 10G @ 1.0 kg ai ha ⁻¹ in March	63.63cd	57.91c	56.76f	59.43
Rugby 10G @ 1.5 kg ai ha ⁻¹ in March	73.96ab	78.32a	65.93bcd	72.73
Rugby 10G @ 2.0 kg ai ha ⁻¹ in March	73.16ab	76.30ab	69.00abc	72.82
Rugby 10G @ 1.0 kg ai ha ⁻¹ in March + April	61.53d	65.77c	57.25f	61.51
Rugby 10G @ 1.5 kg ai ha ⁻¹ in March + April	75.33ab	77.63a	68.61bc	73.85
Rugby 10G @ 2.0 kg ai ha ⁻¹ in March + April	74.60ab	74.29a	64.76cde	71.21
Curaterr 5G @ 2.0 kg ai ha ⁻¹ in March + April	77.16a	75.26ab	69.95ab	74.12
Control	48.30e	49.57d	45.76g	
LSD (5.0%)	6.120	7.741	4.928	

* Figures accompanied by same letters do not differ significantly at 5.0% level as per LSD test.

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