

Efficacy of Cruiser 70WS and Cruiser BLE in Controlling Termites and Seed Borne Pathogens When Applied with Sett Treating Fungicides

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ABSTRACT

An experiment was conducted with some fungicides and insecticides namely Cruiser 70WS and Cruiser BLE with sett treating chemicals viz. Bavistin 50 WP and Tilt 250EC to find out their effectiveness against termites and seed borne pathogen and their effects on the growth and yield parameter of sugarcane. The experiment was conducted at Sreepur, Gazipur, Bangladesh in a farmer's plot during cropping season 2003-04. All the test insecticides and fungicides were applied singly or combinedly. Cruiser BLE @ 4.00 g/litre water, Cruiser BLE @ 5.00 g/litre water and Cruiser 70WS 1g/L water reduced cent percent population of termites compared to check plots of sugarcane. Also Cruiser 70WS and Bavistin and Tilt resulted cent percent termite reduction when used combinedly. All treatments also promoted the growth and yield parameters of sugarcane on germination, tillering, millable cane production and yield. Germination, tiller, millable cane and yield increased over control were 14.60-36.42%, 27.98-36.79%, 10.33-58.81% and 20.19-81.80%, respectively.

Key Words: *Saccharum officinarum*, Termite, Seed borne pathogen, Fungicides

INTRODUCTION

Sugarcane (*Saccharum officinarum*) is one of the most important crops grown as cash crop in Bangladesh. It is the major source of sugar in our country. Termite is a destructive sugarcane pest among the different pest of sugarcane which losses germination, tillering, millable canes and finally yield of cane. Five species of termite have been also identified destructive to sugarcane in Bangladesh (Alam and Miah, 1997). Termite lives in the soil and damage sugarcane by excavating through the cane setts, leading to the death of buds and young shoots (Koto *et al.*, 2000). Termite may attack any part of sett, but in the hard-rinded varieties, they prefer to attack the ends, buds and root bands (Choudhary *et al.*, 1986 and Mill, 1992). The attack of termite (Termitidae: Isoptera) can be seen on almost all field crops, vegetables and fruit trees also, not only in a specific region but through out this regions. As many as 13 species of termites are reported to cause damage to sugarcane in India. The species which cause most frequently damage are *Odontotermes obesus* and *Microtermes obesi* and they are major species in various sugarcane growing parts of country (Chhotani, 1967). Singh and Kishan (1946), Teotia *et al.* (1963) and Roonwal (1981) reported 30-60% destruction of buds due to termites, while Avasty (1967) reported it to be 40%, which results in an yield loss of 33 percent.

Seed borne diseases are the major causes for decreasing germination and ultimately cane yield. Among the fungal diseases red rot, wilt and pineapple are most important which causes considerable yield loss in Bangladesh. The yield loss of sugarcane is about 0.2-100% by red rot, 2-30% by wilt and 0.5-15% by pineapple disease (Talukder *et al.*, 2005). Rahman *et al.* (1999) cited that among the three fungicides Bavistin (0.15%) was more effective and controlled 92.47% of the disease followed by Benlate and Tilt. They treated the inoculated two bud setts with Bavistin @ 0.1, 0.15, and 0.20%; Benlate and Tilt 0.20, 0.25 and 0.30% for 30 minutes. Anzalone (1970) reported that the control of red rot in seed pieces with Benomyl (100 or 200 ppm), when treated under air pressure of 10 lbs psi for 15 minutes. Chad *et al.* (1974) reported that Benomyl (0.25%) and Vitavax (0.05%) increased germination over the control by 50% and

reduced the red rot incidence in the variety Co 312 by 1 hour treatment of setts. Several researchers have worked with their own problems in treating seeds for pest management and disease control separately. Therefore, the experiment was conducted to find out the effect of insecticides and fungicide in controlling termite population and sett borne disease of sugarcane.

MATERIALS AND METHODS

The experiment was conducted in a farmer's field at Sreepur, Gazipur during 2003-04 cropping season following RCBD and replicated three times. It was conducted to identify the efficacy of individual and combined application of insecticides and sett treating chemicals against termite and seed borne pathogens control in sugarcane field. The variety Misrimala was planted in 60 m² plot. Two budded sett was prepared and dipped in selected insecticides and fungicides separately and in combination with sett treating fungicides. Selected insecticides and sett treating fungicides were applied only at planting time. Recommended doses of fertilizers were applied. Intercultural operation like weeding, earthing up, mulching, and irrigation were done as usual. Data on germination, termite population, presence of seed borne pathogen were recorded at 45 and 75 DAP. Growth and yield parameter i.e. tillers, millable cane and yield of sugarcane were recorded.

The following treatments are included in the experiment:-

- T₀ – Untreated control
- T₁ - Cruiser BLE @ 4.0 g/litre water
- T₂ - Cruiser BLE @ 5.0 g/ litre L water
- T₃ - Cruiser 70 WS @ 1.0 g/ litre water
- T₄ – Bavistin 50WP @ 1.0 g/ litre water
- T₅ – Bavistin 50 WP @ 1.0g + Cruiser 70 WS @ 1.0 g/ litre water
- T₆ - Tilt 250 EC @ 2.0 ml/ litre water
- T₇ - Tilt 250 EC @ 2.0 ml/ litre water + Cruiser 70WS @ 1.0 g/ litre water

RESULTS AND DISCUSSION

Results presented in the Table 1 revealed that at 45 days after planting (DAP) the highest (58.51%) germination was counted in Cruiser 70 WS @ 1.0 g/litre water which increased 36.42 percent germination over control and differ significantly with Tilt 50 WP @ 2.0 ml/litre water and untreated control plots. At 150 DAP 100 percent termite population were reduced in Cruiser 70 WS when applied alone, Bavistin 50 WP @ 1.0 g + Cruiser 70 WS @ 1.0 g/litre water and Tilt 250 EC 2.0 ml + Cruiser 70 WS @ 1.0 g/litre water respectively. On the other hand, Cruiser BLE (combined formation of fungicide and insecticide) @ 4.0 g/litre water and 5.0 g/litre water reduced 100 percent termite population in sugarcane field. Termite infestation occurred severely when Bavistin 50 WP and Tilt 250 EC applied alone. Results presented in the Table 2 revealed that at tillering stage the highest tiller increased by 36.79 percent over control when Cruiser 70 WS @ 1.0 g/litre water was applied. Almost all treatment combinations produced higher tiller over control except Tilt 250 EC @ 2.0 ml/litre water. However, significantly lower tillers were produced in Tilt 50 WP @ 2.0 ml/litre water and untreated control plots. In case of millable cane production, higher number of millable cane ($79.72 \times 10^3 \text{ ha}^{-1}$) were produced in Bavistin 50WP + Cruiser 70 WS @ 1.0 g/litre water and differ significantly with Tilt 50 WP @ 2.0 ml/litre water and untreated control plots. The production of millable cane increased over control is 47.99%. The same trend observed in cane yield. The cane yield was lower 42.64 TCH in untreated plots where the highest was 77.52 TCH in treatment Bavistin 50 WP @ 1.0 g/litre water. Cane yields were increased significantly in all treated plots over control except in Tilt 250 EC @ 2.0 ml/litre water treated plots. This might be the cause of higher termite infestation and lower germination. Presence of fungi in ungerminated setts was taken in September. Results presented in Table 1 indicate that

pathogens like *Colletotrichum* sp. was found in all treatments. *Acremonium* sp. and *Fusarium* sp. were found in untreated control, Cruiser 70 WS @ 1.0 g/litre water, Cruiser BLE @ 4g/litre water and Cruiser BLE @ 5g/litre water treatments. When Tilt 250 EC @ 2ml/litre water + Cruiser 70 WS @ 1.0 g/litre water applied, only *Acremonium* sp. and *Fusarium* sp. was found.

Therefore, overviewing the results, it can be concluded that termite population can control effectively with Cruiser 70 WS alone and with combined application of tested fungicides like Bavistin 50WP and Tilt 250 EC with their tested doses.

Table 1. Germination, reduction of termite population and presence of sett borne pathogens by combined application of individual insecticides and along with sett treating fungicides during cropping season, 2003-2004.

Treatments	Germination at 45 DAP (%)		Termites population at 150 DAP		Fungal pathogens recorded in ungerminated setts
	Mean	increase over control	Mean (No)	reduction over control (%)	
T ₀ – Untreated control	42.89 b	-	135.00	-	<i>Colletotrichum</i> sp., <i>Acremonium</i> sp., <i>Fusarium</i> sp.
T ₁ - Cruiser BLE @ 4.0 g/litre water	53.56 a	24.88	0.00	100.00	<i>Colletotrichum</i> sp., <i>Acremonium</i> sp., <i>Fusarium</i> sp.
T ₂ - Cruiser BLE @ 5.0 g/litre water	52.66 a	22.78	0.00	100.00	<i>Colletotrichum</i> sp., <i>Acremonium</i> sp., <i>Fusarium</i> sp.
T ₃ - Cruiser 70 WS @ 1.0 g/litre water	58.51 a	36.42	0.00	100.00	<i>Colletotrichum</i> sp., <i>Acremonium</i> sp., <i>Fusarium</i> sp.
T ₄ – Bavistin 50WP @ 1.0 g/litre water	48.89 a	13.99	61.67	54.32	<i>Colletotrichum</i> sp.
T ₅ – Bavistin 50 WP @ 1.0g + Cruiser 70 WS @ 1.0 g/litre water	54.45 a	26.95	0.00	100.00	<i>Colletotrichum</i> sp.
T ₆ - Tilt 250 EC @ 2.0 ml/litre water	36.63 b	(-) 14.60	141.67	(-) 4.94	<i>Colletotrichum</i> sp.
T ₇ - Tilt 250 EC @ 2.0 ml/litre water +Cruiser 70WS @ 1.0 g/litre water	48.00 a	11.91	0.00	100.00	<i>Colletotrichum</i> sp., <i>Acremonium</i> sp.
LSD (at 5%)	13.13	-	-	-	
CV (%)	15.3	-	-	-	

Table 2. Different growth and cane yield characters by combined application of fungicide and insecticides during cropping season, 2003-2004.

Treatments	Tiller production		Millable cane production		Yield of cane	
	Mean (x 10 ³ ha ⁻¹)	increase over control (%)	Mean (x 10 ³ ha ⁻¹)	increase over control (%)	Mean (TCH)	increase over control (%)
T ₀ – Untreated control	128.66 b	-	53.87 b	-	42.64 b	-
T ₁ - Cruiser BLE @ 4.0 g/litre water	160.66 a	24.87	79.44 a	47.47	66.59 a	56.17
T ₂ - Cruiser BLE @ 5.0 g/litre water	158.00 a	22.80	79.16 a	46.95	70.34 a	64.96
T ₃ - Cruiser 70 WS @ 1.0 g/litre water	176.00 a	36.79	77.22 a	43.35	73.23 a	71.74
T ₄ – Bavistin 50WP @ 1.0 g/litre water	146.66 a	13.99	74.16 a	37.66	73.57 a	72.53
T ₅ – Bavistin 50 WP @ 1.0g + Cruiser 70 WS @ 1.0 g/litre water	164.00 a	27.47	79.72 a	47.99	70.98 a	66.46
T ₆ - Tilt 250 EC @ 2.0 ml/litre water	92.66 b	(-) 27.98	59.44 b	10.33	51.25 b	20.19
T ₇ - Tilt 250 EC @ 2.0 ml/litre water + Cruiser 70WS @ 1.0 g/litre water	144.00 a	11.92	69.72 a	29.42	67.58 a	58.49
LSD (at 5%)	40.07	-	22.04	-	20.63	-
CV (%)	15.70	-	17.90	-	18.60	-

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