

EFFICACY OF FOUR INSECTICIDES AS SEED CANE TREATMENT FOR CONTROLLING OF SUGARCANE TERMITES

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ABSTRACT

As a significant higher infestation up to 70% have been reported from sugarcane in certain locations of newly planted rainfed

sugarcane plantations in Sri Lanka, experiments were conducted to evaluate the efficacy of three insecticides namely; Imidacloprid 200EC, Chlorpyrifos 20EC, and Phenylpyrazole (Fipronil) 3G in order to use in control programmes.

The efficacy of five different treatments and the control were compared on the variety SL 88-116 which was grown under the standard agronomic practices, under rain fed conditions. The analysis of data showed that Cruiser (Thiamethoxam 70%WS) 1216g/ha at the highest level of the rank of effectiveness while Fipronil (Phenylpyrazole 3G) was ranked as the second effective insecticide in the tested treatment. However, after comparing the cost, and convenience of application, Fipronil (Phenylpyrazole3G) 30kg/ha can be identified as the most suitable and cost effective treatment for controlling of termites in Sugarcane up to three months period under rain fed conditions.

INTRODUCTION

Sugarcane is scientifically known as *Saccharum officinarum* (L), is an important crop fulfilling 60% of the world sugar requirement and Modern Sugarcane cultivars are evolved through hybridization of sugarcane species. Yield of hybrid varieties is dependent on its genetic potential, environmental conditions and pest & disease damages (Sundara,1998). Crop damage by termites especially new low fiber hybrid varieties has been identified as a one of major problem in Sugarcane cultivating at rain fed conditions as they damage seed cane sets, young shoots, stubbles and the plants by eating up roots, buds and the pith of stalks and sometimes even inner tissues of stalk, ultimately killing the plant (Kumarasinghe.N.C, 1988). Their damage at different growth stages cause considerable reduction of plant density, quality of juice and sugar recovery, which in turn affect the sugar production (Kumarasinghe.N.C & Ranasinghe M.A.S.K. 1988). Of the above damages the effect of the termites to planting stage has been recorded at significantly higher levels up to 30-60 percent reduction of buds (Teotia, *et.al.*, 1963; Roonwal, 1981).



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Live wood termites have long been known to be pest of sugarcane grown under rainfed agriculture in Sri Lanka. Severe termite infestations up to 70% have been reported in late 1980s due to the establishment of new plantations in Sevanagala and Pelwatte, after clearing the shrubs and jungles. The damage by termites has been recorded from rainfed sugarcane plantations in all the sugarcane growing areas of the country (Kumarasinghe, 2003). There are six termite species of the family Termitidae attacking sugarcane in Sri Lanka. These species included *Odontotermes redimanni*, *Odontotermes ceylonicus*, *Odontotermes horni*, *Coptotermes ceylonicus*, *Heterotermes ceylonicus* and *Naustitermes ceylonicus* and they were recorded from all commercial sugarcane plantations in Sri Lanka (Fernando, 1977; Kumarasinghe, 2003). The termites damage has been at severe levels especially at the stage of planting, due to the destruction of newly planted seed cane by termites. Similar damage by termites to seed cane causing losses has been reported from other countries too such as Bangladesh (Karim, et.al., 1979). Therefore, due to the absence of other suitable methods including biological and agronomic control; the present study was planned to evaluate three locally available insecticides for the termites at the planting stage under rainfed conditions, in order to recommend for the termite control in rain fed plantations.

METHODOLOGY

In the present experiment, effectiveness of four insecticides; Thiamethoxam, Imidacloprid 200EC, Chlorpyrifos 20EC, and Phenylpyrazole (Fipronil) 3G) were tested for termite control in rain fed plantations under the standard agronomic practices. Thiamethoxam was used in two forms (Cruiser W/S & Actara W/G) and each form of Thiamethoxam was prepared in three levels of concentrations. The above six concentrations of Thiamethoxam and other three insecticides: Imidacloprid 200EC, Chlorpyrifos 20EC, and Phenylpyrazole (Fipronil 3G) were tested with untreated control plots arranged in randomized complete block design with three replications at Udawalawa (Southern border of the Sabaragamuwa Province), Sri Lanka. The plot size was maintained at 6m x 5 rows with 1.37m row spacing while 1.5m distance was maintained between plots. SL 88 -116 which is a low fiber variety prone to termite attacks was used as the experimental plant. The experimental plants were grown under the standard agronomic practices, under rain fed conditions. The insecticide treatments given to the seed cane at the time of planting are given in Table 1.

Table 1. Treatments of insecticides and methods of application

Treatment	Insecticide	Concentration	Method of Application
CL1	Thiamethoxam 70% WS(Cruiser)	608g/ha (0.5g/l)	Seed cane was immersed twice in chemical solution for 15 min. having 15 min. interval
CL2	Thiamethoxam 70% WS(Cruiser)	1216g/ha (1.0g/l)	
CL3	Thiamethoxam 70% WS(Cruiser)	2432g/ha (2.0g/l)	
A11	Tiamethoxam 25% WG (Actara)	200g/ha	Soil drench
A12	Tiamethoxam 25% WG (Actara)	400g/ha	Soil drench
A13	Tiamethoxam 25% WG (Actara)	800g/ha	Soil drench
PIIE	Phenylpyrazole 3% G (Prince)	30kg/ha (30g/plot)	Granules mixed with 250g of dried sand & Apply to furrows
IMI	Imidacloprid 200EC (Kohonor)	250ml/ha (3ml/3l)	Soil drench
CLOR	Chlorpyrifos 20EC	1000ml/ha(10ml/10l)	Soil drench
CON	Control	No treatment	

The observations on plants damaged by termites were recorded in 30, 60, 90, 120, 150 and 180 days after planting. The visual observations on termite damage to the buds of planted seed cane were recorded in 60 days after planting by uprooting the seed cane sets which were failed to germinate. The effects of all tested treatments based on the percent termite damage against the control were compared. The comparison of treatment with each other at monthly basis was carried out by using procpobit procedure of SAS software.

RESULTS AND DISCUSSION

The experimental results show a significant effect up to three months period for all treatments except Chlorpyrifos, Imidacloprid and Thiamethoxam 70% WS (608g/ha concentration) in controlling of termites when compared with the control. Also Thiamethoxam 70% WS (1216g/ha concentration) has given highest level of significance when compared with all treatments although it was not significantly different from Phenylpyrazole (Fipronil). After three months, gradual decreasing of effect of treatments was indicated by gradually increasing of cumulative damage percentage and there was no any significant deference among treatments.

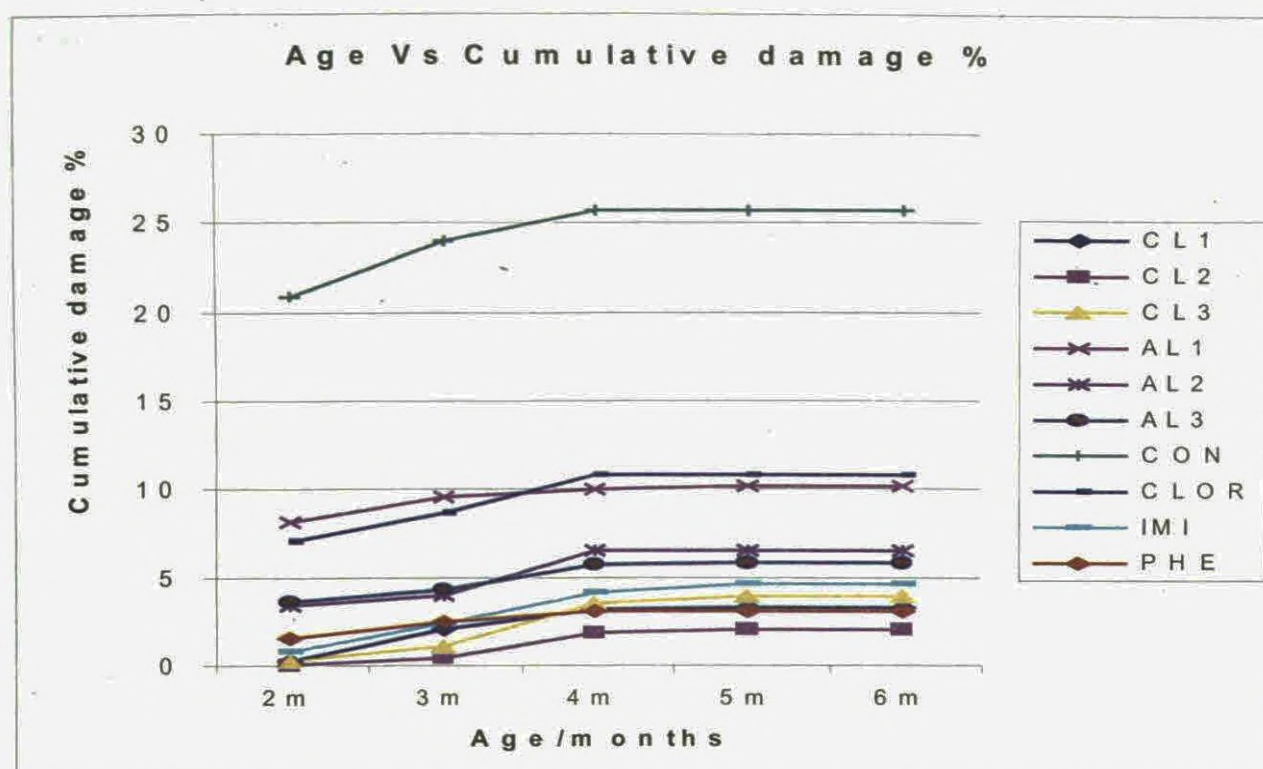


Figure 1. Cumulative % damage by termites to sugarcane seed setts since planting

It was observed after six months of the comparison of cumulative damage that a significant difference was not existed and cumulative termite damage percentage was below 5% in all the three insecticides; Thiamethoxam 70 WS, Imidacloprid 200EC and Phenylpyrazole 3G (Fig 1). Therefore best treatment was selected by considering rank of significance and rank of cumulative damaged percentage as indicated in Table 2.

Table 2. Rank of effectiveness of treatments

Treatment	Total no of occasions in significance	Rank of significance	Cumulative damage %	Rank of cumulative damage %	Average effectiveness	Rank of average effectiveness
CI1	5	1	3.22	3	2	3
CI2	5	1	2.04	1	1	1
CI3	4	2	3.89	4	3	4
PHE	5	1	3.00	2	1.5	2
IMI	4	2	4.51	5	3.5	5

The rank of effectiveness showed that the highest average effectiveness was showed by Thiamethoxam 70% WS (Cruiser 1216g/ha 1.0g/l) while the treatments Thiamethoxam 70% WS (Cruiser 608g/ha (0.5g/l), Thiamethoxam 70% WS (Cruiser 1216g/ha or 1.0g/l) and Phenylpyrazole 3% G (Prince 30kg/ha) showed the same rank of significance.

CONCLUSION

According to the above results it can be concluded that Cruiser (Thiamethoxam 70% WS) 1216g/ha was the highly effective treatment and Fipronil (Phenylpyrazole 3G) ranked as the second effective insecticide with regard to the control of termites.

Similar observations of high efficacy of Cruiser 70WS has been recorded on sugarcane termites in planted sett stage in Bangladesh too (Islam, 2001). However, cost of insecticide and convenience of application is play more vital role in sugarcane farming systems, therefore by comparing the cost, and convenience of application, Fipronil (Phenylpyrazole3G) 30kg/ha can be identified as the most suitable and cost effective treatment for controlling of termites in Sugarcane up to three months period in rain fed conditions.

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