

**Short Communication**

**EFFICACY OF SELECTED INSECTICIDES FOR CONTROL OF  
YELLOW-STEM BORER IN RICE IN SRI LANKA**

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**INTRODUCTION**

Yellow-stem borer (YSB), *Scirpophaga incertulas* (Lepidoptera: Pyralidae) is one of the major pests of rice especially in the Northern Province of Sri Lanka where the damage observed in both *Maha* (Major) and *Yala* (Minor) seasons (Nugaliyadde *et al.*, 1997; Nugaliyadde *et al.*, 2000; Pushpakumari *et al.*, 2010). YSB damage in some areas in this region is very high (20%) necessitating farmers to rely on insecticides for its control (Personal communication, Provincial Director of Agriculture, Northern Province). Since, two insecticides namely Carbofuran 3G, Chlorpyrifos 400 g/l and 200 g/l EC used extensively for the control of YSB in Sri Lanka have been withdrawn from the market, a need has arisen to re-evaluate the efficacy of the remaining recommended insecticides and new nominations against this difficult to control pest (DOA, 2012).

**MATERIALS AND METHODS**

A replicated field trial was conducted at the Rice Research Station, Murunkan to determine the efficacy of Carbosulfan 200 g/l SC (Mode of Action -MoA 1A), two formulations of Diazinon 5G (MoA 1B), two formulations of Fipronil 0.3G (MoA 2B), and Virtako 40WG against YSB (IRAC 2015). Virtako 40WG is a mixed formulation containing thiamthoxam (MoA 4A) and Chlorantraniliprole (MoA 28). Samples of the above insecticides, except Virtako 40WG, were received through the Office of the Registrar of Pesticides for re-testing purposes. The Virtako 40WG sample was purchased from the pesticide dealer at Murunkan.

The test insecticides were applied at recommended doses to plants of plots measuring 3 m x 8 m at 3-weeks after planting and at the panicle initiating stage at the recommended doses. Test insecticides (except carbosulfan 200 g/l SC) were mixed with urea for field application. The treatments were replicated 3 times in a Randomized Complete Block Design. At maximum tiller stage, the tiller density (number of tillers/m<sup>2</sup>) and the number of dead hearts (no/m<sup>2</sup>) were estimated separately for treated and untreated plots using five sub-plots measuring 1 m<sup>2</sup> each. Similarly, at hard dough stage, the white head density (no/m<sup>2</sup>) was also estimated. The data were analyzed using Statistical Analysis System (SAS) package.

## RESULTS AND DISCUSSION

The field trial plots recorded very low dead heart counts and hence recorded data were not statistically analyzed. However, at soft-dough stage the white head counts in the untreated plots exceeded 5.3% of the panicles (Table 1).

**Table 1: White heads (no/m<sup>2</sup>) and grain yield (t/ha) of plots treated with the indicated insecticide (n= 5)\***

Insecticide	Dose FP/ha (ai g/ha)	No tiller/m <sup>2</sup> *	No. white heads/m <sup>2</sup> *	RYSB damage (%)*	Yield (t/ha)**
Diazinon 5G	22 kg (1100)	375	67 b	15	3.55 b
Diazinon 5G	22 kg (1100)	341	57 b	14	3.55 b
Carbosulfan 200 g/L SC	1,200 ml (240)	363	48 b	11	3.63 b
Fipronil 0.3G	12 kg (36)	383	28 bc	07	5.10 a
Fipronil 0.3G	12 kg (36)	358	19 bc	05	4.90 a
Virtako 40WG	125 g (50)	357	04 c	01	4.53 a
Virtako 40WG	150 g (60)	370	02 c	0.5	5.03 a
Untreated control		372	98 a	26	2.05 c
LSD		NS	7.5		1.3

Note: \* Values to the nearest whole number; Values in column with the same letter are not significantly different at 5% level.

All treated plots, had significantly low percentage of white heads as compared to the untreated control. Based on these observations the Carbosulfan 200 g/l SC, the two formulations each of Diazinon 5G and Fipronil 0.3G, and Virtako 40WG found to be effective for the control of YSB. The EIQ values of the tested insecticides indicate their impacts on the farmer, consumer and the ecosystem are comparatively lower than those obtained for carbofuran and chlorpyrifos (Table 1). Based on the above observations, it is proposed to revise the insecticide recommendation for YSB control as indicated in Table 2.

**Table 2: Proposed recommendations for yellow stem borer control in rice.**

<b>Recommended Insecticide</b>	<b>MoA</b>	<b>Dose/ ha</b>	<b>Insecticides not available in the market</b>	<b>MoA</b>
Carbosulfan 200g/l SC	1A	1,200 ml	Chlorpyrifos 200 g/l EC	1B
Diazinon 5%GR	1B	22 kg	Chlorpyrifos 400 g/l EC	1B
Fipronil 0.3%GR	2B	12 kg	Carbofuran 3 GR	1A
Virtako 40 WG <sup>5</sup>	4 A+28	125- 150 g		
<i>Not tested in the study</i>				
Phenthoate 500g/l	1B	1,600 ml		
ECQuinalfos 250g/L EC	1B	960 ml		

## CONCLUSIONS

Tested insecticides, namely Carbosulfan 200 g/l SC, Diazinon 5% GR, Fipronil 0.3% GR and Virtako 40 WG are effective in controlling yellow stem borer in rice. These four insecticides represent five Mode of Action Groups namely, 1A, 1B, 2B, 4A and 28 and hence can be used prudently to prevent resistance development in YSB to these insecticides.

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