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## RESEARCH ARTICLE

### MANAGEMENT OF YELLOW STEM BORER USING BOTANICALS AND NEWER MOLECULES OF INSECTICIDES

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#### ABSTRACT

Treatments evaluated for the management of YSB, Fipronil 40 WG @ 1 g/l registered its superiority over botanics. All insecticides are found on par in the order of their efficacy viz, Fipronil 0.3 G @ 0.075kg a.i./ha, Car tap hydrochloride 50 SP @ 300 g a.i./ha, Cartap hydrochloride 4 G @ 750 g a.i./ha, Carbofuran 3 G @ 1kg a.i./ha and Chlorpyriphos 20 EC @ 2.5ml/l. Among the botanicals evaluated neem oil commercial formulation @ 5ml/l was found superior followed by NSKE @5%, Jatropha Nut Seed Kernal extract @5%, *Vitexnegundo* Leaf extract @ 5%, *Gnidiaglauca* Leaf extracts @ 5%, *Acoruscalamus* rhizome/powder extract @ 5% and Eupatorium leaf extract @ 5%.

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## INTRODUCTION

Rice (*Oryza sativa* L.) is one of the major staple food for more than half of the world population and being grown worldwide. Among several insects that feed on rice, the extent of damage caused by stem borer varied from 80 to 97 per cent (Sharma et al., 1996). It is a major constraint responsible for low production of rice yields in all most all the rice ecosystems, causing 3.95 per cent yield loss in India (Senapati and Panda, 1999). Among the various methods used by the farmers to protect the rice crop from this pest, the chemical control remains the only way of quick method for suppression of infestation. This study will analyse the botanicals and new molecules of insecticides against yellow stem borer.

## MATERIALS AND METHODS

Field experiment was carried out during *kharif* 2013-14 at ARS, Sirsi to evaluate the efficacy of botanicals and newer molecules of insecticides for the management of rice yellow stem borer undertrained rice ecosystem. Trial consisted of fourteen treatments including untreated control which replicated thrice. Nursery bed was raised using susceptible rice variety Jaya and 21 days old seedlings were transplanted in blocks of 5 x 3 meter. Seedlings were transplanted keeping spacing of 20 x 10 cm between rows and plants and each block containing 8 rows, in each row 20 seedlings were maintained uniformly.

All treatments were imposed twice at 30 and 60 days after transplanting. Observations were recorded on total numbers of tiller and infested tillers (dead heart/white ear head) at one day before and 7, 14, 21 days after the imposition of treatment in 10 randomly selected hills from each plot. The crop was harvested by leaving two border rows around the plot at maturity and plot-wise grain yield was recorded. The data of YSB incidence as per cent dead hearts (DH) and white ear heads (WEH) was transformed by using arc sine transformation.

## RESULTS AND DISCUSSION

The result of the experiment conducted on the management of YSB indicated that the percent dead heart (DH) incidence caused by the yellow stem borer among the different treatments ranged from 1.60 to 5.80 per cent as against 9.25 per cent in untreated check at 7 DAS. All the treatments were significantly superior to control except Eupatorium leaf extract evaluated @ 5% compared to untreated check. Among the insecticides evaluated, Fipronil 40WG @ 1g/l was found to be superior with respect to reduction of yellow stem borer infestation by recording 1.60 per cent dead heart. Fipronil 40WG @ 1g/l found on par with Fipronil 0.3G @ 0.075kg a.i./ha (1.78% DH), Cartap hydrochloride 50 SP @ 300 g a.i./ha (1.92% DH), Cartap hydrochloride 4G @750 g a.i./ha (2.33% DH), Carbofuran 3G @1kg a.i./ha (2.57% DH) and Chlorpyriphos 20 EC @ 2.5ml/l (2.81% DH). Trends remain same even after 14 and 21 DAS by maintaining their efficacy in the management of YSB.

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**Table 1. Efficacy of botanicals and newer insecticides against paddy YSB *S. incertulas* (30DAT)**

Treatments	Dose	Mean per cent dead heart (DH)			
		DBS	7DAS	14DAS	21DAS
Eupatorium leaf extract	5%	6.45 (14.68)	5.80 (13.78)	6.01 (14.05)	9.17 (17.33)
Neem oil commercial formulation	5ml/l	5.44 (13.31)	4.09 (11.34)	4.31 (11.84)	7.02 (15.26)
<i>Gnidia glauca</i> Leaf extracts	5%	6.15 (14.25)	5.02 (12.92)	5.41 (13.35)	8.42 (16.85)
<i>Vitex negundo</i> Leaf extract	5%	5.50 (13.21)	4.85 (12.54)	5.27 (13.19)	8.01 (16.42)
NSKE	5%	5.95 (14.01)	4.49 (12.18)	4.70 (12.35)	7.32 (15.57)
Jatropha Nut Seed Kernal extract	5%	5.85 (13.91)	4.66 (12.33)	5.07 (12.79)	7.69 (16.06)
<i>Acorus calamus</i> rhizome/powder extract	5%	5.98 (14.14)	5.42 (13.31)	5.65 (13.68)	8.75 (17.12)
Cartap hydrochloride 4G	750g a.i./ ha	5.17 (13.07)	2.33 (8.75)	2.43 (8.92)	4.24 (11.83)
Fipronil 40 WG	1g/l	5.92 (13.92)	1.60 (7.26)	1.80 (7.65)	3.53 (10.77)
Chlorpyrifos 20 EC	2.5ml/l	6.12 (14.11)	2.81 (9.18)	2.95 (9.77)	4.83 (12.68)
Cartap hydrochloride 50 SP	300g a.i./ha	6.00 (14.09)	1.92 (7.95)	2.10 (8.31)	3.80 (11.23)
Fipronil 0.3G	0.075kg a.i./ ha	6.96 (15.25)	1.78 (7.66)	2.15 (8.41)	4.06 (11.61)
Carbofuran 3G	1kg a.i./ ha	5.79 (13.71)	2.57 (9.19)	2.80 (9.54)	4.58 (12.10)
Untreated check		6.52 (14.72)	9.25 (17.64) <sup>a</sup>	12.20 (20.43)	15.80 (23.41)
SEm±		NS	1.22	1.09	1.13
CD(0.05)		NS	3.55	3.16	3.30
Cv(%)		NS	18.97	16.07	13.21

**Table 2. Efficacy of botanicals and newer insecticides against paddy YSB *S. incertulas* (60DAT)**

Treatments	Dose	Mean per cent White ear head (WEH)		
		7DAS	14DAS	21DAS
Eupatorium leaf extract	5%	4.51 (12.15)	5.97 (14.11)	6.96 (15.26)
Neem oil commercial formulation	5ml/l	3.21 (10.20)	4.35 (11.97)	5.22 (13.04)
<i>Gnidia glauca</i> leaf extracts	5%	4.17 (11.70)	5.23 (13.16)	6.36 (14.56)
<i>Vitex negundo</i> leaf extract	5%	3.94 (11.41)	4.95 (12.83)	6.07 (14.20)
NSKE	5%	3.56 (10.76)	4.53 (12.23)	5.49 (13.51)
Jatropha Nut Seed Kernal extract	5%	3.75 (11.16)	4.82 (12.63)	5.72 (13.57)
<i>Acorus calamus</i> rhizome extract	5%	4.24 (11.87)	5.45 (13.48)	6.62 (14.77)
Cartap hydrochloride 4G	750g a.i./ha	1.62 (7.17)	2.36 (8.82)	4.10 (11.51)
Fipronil 40 WG	1g/l	0.82 (5.07)	1.60 (7.09)	3.32 (10.50)
Chlorpyrifos 20 EC	2.5ml/l	2.33 (8.78)	3.06 (10.04)	4.57 (12.31)
Cartap hydrochloride 50 SP	300g a.i./ha	1.10 (5.89)	1.80 (7.66)	3.57 (10.87)
Fipronil 0.3G	1kg a.i./ ha	1.38 (6.65)	2.19 (8.49)	3.81 (11.18)
Carbofuran 3G	1kg a.i./ ha	2.07 (8.13)	2.71 (9.46)	4.39 (12.05)
Untreated check		6.11 (14.29)	7.83 (16.19)	15.39 (23.08)
SEm±		0.87	0.74	0.99
CD(0.05)		2.52	2.14	2.86
CV (%)		15.53	11.27	12.55

Present findings are in conformity to the findings of Prasad *et al.* (2005) who have reported, cartap 4 G @ 0.6 kg a.i./ ha followed by chlorpyrifos 10 g @1.25 kg a.i./ha, fipronil 0.4 G @ 0.075 kg a.i./ha and chlorpyrifos 10 G @ 0.75 kg a.i./ha were found most effective with average yellow stem borer infestation of 2.9, 3.4, 3.4 and 3.4%, respectively, in comparison to 8.1% dead heart in untreated control.

### Conclusion

Treatments evaluated for the management of YSB, Fipronil 40 WG @ 1 g/l registered its superiority over botanicals and all the insecticides and botanical treatment were found on par with each other in suppressing the yellow stem borer damage. However, all the insecticides were found superior over botanicals and untreated check.

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### Conflict of Interest

No Conflict of Interest

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