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INFLUENCE OF NITROGEN LEVELS AND PLANT POPULATIONS ON THE INCIDENCE OF RICE STEM BORER *Scirpophaga incertulas Walker*

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ABSTRACT

The influence of green manure, nitrogen levels and plant population with insecticide treatment on the incidence of rice stem borer (**Scirpophaga incertulas** Wlk.) in kharif and rabi seasons revealed that combination of green manure and plant population had no influence on the incidence of dead heart, but 150 and 200 kg N/ha applied plots recorded significantly higher dead hearts. White ear incidence was significantly higher at high nitrogen levels and at the population level 80 hills/m^2 which was on par with 100 hills/m2 as compared to 66 hills/m^2.

KEY WORDS: RICE STEM BORER, GREEN MANURE, NITROGEN LEVELS, PLANT POPULATION.

The damage by yellow stem borer, *Scirpophaga incertulas* (Walker), the predominant one in India, ranged from 3 to 95 per cent (Ghosh *et al.*, 1960) In recent years it was found that high nitrogen levels (up to 200 kg N/ha) and high population (100 hills/sq.metre) have resulted in high yields upto 8 tons/ha in rice (TNAU, 1987). Experiments conducted to study the effect of application of green manure, high plant population levels and high level of

able 1. Effect of organic manure, plant population and nitrogen levels on the stem borer incidence and yield of rice (Kharif, 1987-88) - IR 50.

Treatment	Dead Heart (%) N levels kg/ha					White Ears (%) N levels kg/ha					Grain yield (t/ha) N levels kg/ha.				
	0	100	150	200	Mean	0	100	150	200	Mean	0	100	150	200	Mean
green manure															
66 hills/m^2	3.1	3.1	4.1	6.3	4.2	2.6	3.9	5.0	6.4	4.5	3.1	6.2	7.0	7.6	6.0
	(10.14)	(9.98)	(11.68)	(14.54)	(11.59)	(9.28)	(11.39)	(12.92)	(14.65)	(12.06)					
80 "	3.0	3.1	4.1	7.1	4.3	3.1	4.2	6.1	8.9	5.6	4.1	6.4	6.4	7.5	6.1
	(9.98)	(10.14)	(11.68)	(15.45)	(11.81)	(10.14)	(11.83)	(14.30)	(17.36)	(13.41)					
100 "	4.0	4.1	5.2	6.5	4.9	3.0	3.8	6.3	9.1	5.5	3.8	6.4	6.4	6.6	5.8
	(11.54)	(11.68)	(13.18)	(14.77)	(12.79)	(9.98)	(11.24)	(14.54)	(17.56)	(13.33)					
Green manure															
66 hills/m^2	3.4	3.1	4.5	6.8	4.4	2.8	4.0	5.2	6.0	4.5	6.0	7.0	7.7	8.0	7.2
	(10.63)	(10.14)	(12.25)	(15.12)	(12.04)	(9.63)	(11.54)	(13.18)	(14.18)	(12.21)					
80 "	3.4	3.8	5.2	8.06	5.1	3.0	4.5	6.3	9.2	5.7	5.6	7.5	7.5	7.5	7.0
	(10.63)	(11.24)	(13.18)	(16.64)	(12.92)	(9.98)	(12.25)	(14.54)	(17.66)	(13.61)					
100 "	4.2	5.0	5.1	9.4	5.9	3.1	5.0	6.0	8.9	5.8	5.0	6.8	7.2	7.9	6.7
	(11.83)	(12.92)	(13.05)	(18.85)	(14.16)	(10.14)	(12.92)	(14.30)	(17.36)	(13.68)					
Mean	3.5	3.7	4.7	7.3		2.9	4.2	5.8	8.1		4.6	6.7	7.0	7.5	
	(10.79)	(11.02)	(12.50)	915.90)		(9.86)	911.86)	913.96)	916.46)						

(Figures in parentheses are transformed values) *For brevity, the incidence is converted to single decimal.

	CD (P = 0.05)	CD (P = 0.05)	CD (P = 0.05)
Green manure	2.04	1.09	0.4
Plant population	1.92	0.90	N.S
N levels	0.88	0.85	0.3
Interaction	4.17	2.04	N.S

Table 2. Effect of organic manure, plant population and nitrogen levels on the stem borer incidence and yield of rice (Rabi, 1987-88) - IR 60.

Treatment	Dead Heart (%) N levels kg/ha					White Ears (%) N levels kg/ha					Grain yield (t/ha) N levels (kg/ha)				
	0	100	150	200	Mean	0	100	150	200	Mean	0	100	150	200	Mean
No green manure															
66 hills/m^2	5.2*	5.2	6.4	10.2	6.7	4.9	5.1	5.9	10.2	6.5	2.4	4.2	6.0	5.8	4.6
	(13.18)	(13.18)	(14.65)	(18.63)	(14.91)	(12.67)	(13.09)	(14.02)	(18.65)	(14.60)					
80 "	6.1	6.0	8.1	11.2	7.9	6.7	10.9	12.7	12.2	10.6	3.0	6.6	6.1	6.0	5.4
	(14.19)	(14(18)	(16.54)	(19.55)	(16.12)	(14.80)	(19.20)	(20.90)	(20.68)	(18.90)					
100 "	5.3	6.4	8.6	12.1	8.1	10.2	10.3	12.2	12.8	11.3	3.6	6.0	5.9	6.0	5.4
	(13.18)	(14.65)	(17.05)	(20.36)	(16.31)	(18.49)	(18.65)	(20.45)	(20.67)	(19.56)					
Green manure															
66 hills/m^2	4.1	3.6	4.2	6.1	4.5	4.2	3.2	5.7	7.2	5.1	4.9	6.0	5.4	6.7	5.8
	(11.54)	(10.94)	(11.83)	(14.18)	(12.12)	(11.78)	(10.20)	(13.60)	(15.50)	(12.77)					
80 "	5.2	4.8	5.2	9.5	6.2	6.3	9.9	10.5	13.0	9.9	4.6	5.8	5.9	6.2	5.6
	(13.18)	(12.66)	(13.18)	(17.95)	(14.24)	(14.50)	(18.20)	(18.28)	(21.10)	(18.02)					
100 "	5.5	5.1	6.1	10.1	6.7	9.5	10.6	10.9	12.2	10.8	3.9	5.9	5.7	5.5	5.3
	(13.56)	(13.05)	(14.30)	(18.53)	(14.86)	(17.93)	(18.90)	(19.20)	(20.76)	(19.19)					
Mean	5.2	5.2	6.4	9.9		6.6	9.2	10.3	14.2		3.8	5.8	5.8	6.0	
	(13.14)	(13.11)	(14.59)	(18.20)		(14.50)	(16.80)	(18.10)	(22.10)						

(Figures in parentheses are transformed values) *For brevity the incidence is converted to single decimal

	CD (P = 0.05)	CD (P = 0.05)	CD (P = 0.05)
Green manure	2.88	1.47	0.3
Plant population	3.55	0.58	N.S
N levels	1.92	0.74	0.6
Interaction	4.69	0.80	N.S

nitrogen on the incidence of rice stem borer are reported.

MATERIALS AND METHODS

Two field experiments were conducted in split plot design during kharif and rabi 1987-88 with the varieties IR 50 and IR 60 respectively. Organic manure and plant population levels were allotted to the main plots and nitrogen levels to the sub-plots. Three replications were maintained. The treatment details are presented in Tables 1 and 2. Sunnhemp *(Crotolaria juncea)* as organic manure was cut and incorporated at 12.5 t/ha in the field at the time of last puddling and allowed to decompose for a week. Nitrogen was applied in the form of neem cake coated urea 25% as basal, 25% as neem cake blended urea at tillering, 25% at panicle initiation and last 25% at heading as prilled urea. Potassium in the form of muriate of potash (50 kg K_2O/ha) and phosphorus in the form of super phosphate (50 kg P_2O_5/ha) were applied basally at the last puddling and incorporated. One round of monocrotophos 0.036% was applied at tillering phase in kharif and two rounds of monocrotophos 0.036% were applied, one at tillering and another at panicle initiation stage in rabi season.

Observations on the dead heart (DH) were made at 10 days interval starting from 30 DAT. From each subplot 10 clumps were diagonally selected and the percentage of DHs was calculated from total tillers to infested ones. Pre-harvest observation on white ears (WE) was recorded in similar manner from total productive tillers to damaged ones. The plotwise grain yield was recorded leaving the border two rows from all the sides and expressed as ton/ha. The data on DH and WE percentage were analysed statistically after transforming them to arcsin values.

RESULTS AND DISCUSSION

Effect of organic manuring

The incidence of WE alone was significantly more in plots without green manure at 66 hills/m^2 population level in rabi season. The yield was significantly higher in green manure applied plots in both seasons (Tables 1 and 2).

Effect of plant population

The DH incidence was not significantly different at all the three levels, whereas WE incidence was significantly different between 66 hills/m^2 in both the seasons, but incidence in 80 hills/m^2 was on par with 100 hills/m^2. Although the difference in grain yield due to plant population levels was not significant, there was a slight reduction in yield at very high plant population levels. Rao and Raju (1987) also reported that yield components particularly grains/panicle were decreased in closer spacing.

Effect of N levels

DH incidence was similar in 100 kg N/ha and no fertilizer, while it was significantly different at 150 and 200 kg N/ha. Varying doses of N showed a marked difference in WE infestation. The influence of chemical fertilizers on the higher incidence of stem borer have been already reported by MichealRaj and Morachan (1973) and Saroja and Raju (1981). As reported by Israel and Vedamoorthy (1962), the higher N levels resulted in exudation of droplets containing nitrogen through the leaf tips, which attracted the moths leading to increase in WE. Highest yield was obtained at 200 kg N/ha though the stem borer incidence was high as observed by Panda *et al.* (1986) due to more vegatative growth and tiller production.

Interaction

In all the population levels, increased N levels increased the DH incidence; however 150 and 200 kg N/ha were on par. Though there was steady increase in DH incidence due to higher plant population in all the N levels, the variation was narrow and not signifcant. However, it could be recorded that combination of higher plant population coupled with N resulted in increased DH and yield was also reduced. This might be due to the conductive microclimate prevailed as well as migration of the stem borer larvae for feeding in the early stage of the crop. A similar trend was noticed with WE incidence in both the seasons. But increased plant population in combination with N levels significantly increased the incidence particularly during rabi due to cloudy weather and intermittant rainfall.

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BIO-EFFICACY OF NEEM OIL AND DELTAMETHRIN AGAINST SPOTTED BOLL WORM *Earias vittella* (Fab.) (*Noctuidae : Lepidoptera*) ON COTTON (MCU 5)

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ABSTRACT

A study was carried out to test the bio-efficacy of neem oil at 0.10 to 0.50 per cent concentrations alone and in combination with the pyrethroid deltamethrin (0.09%) on cotton CMCN 5) under field condition during winter 1986-1987. Deltamethrin (0.09%) was the most effiective treatment in minimising shoot, square, bolls, kapas and loculi infestation due to E. vittella. The next best treatments were neem oil at 0.5% alone and combinations of neem oil 0.30, 0.40 and 0.50% with deltamethrin 0.09%. Deltamethrin 0.09% spray recorded the maximum yield. Deltamethrin in combination with neem oil recorded higher yield than neem oil alone. Yield loss was

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