Treatments	Grubs				Adults			
	Experiment I		Experiment II		Experiment I		Experiment II	
	Mean	% reduction	Mean	% reduction	Mean	% reduction	Mean	% reduction
Fluvalinate @ 50 "	7.1^{bcd} (2.74)	38.3	4.5^{cd} (2.14)	68.3	3.6^{d} (1.91)	65.4	4.1^{d} (2.06)	65.4
Fluvalinate @ 70 "	5.9^{de} (2.54)	48.7	4.2^{cd} (2.05)	70.4	3.2^{d} (1.83)	69.2	3.2^{e} (1.88)	72.9
Fenvalerate @ 110 "	5.8^{cde} (2.68)	40.9	4.6^{cd} (2.18)	67.6	2.8^{de} (1.75)	73.1	3.4^{e} (1.88)	71.2
Cypermethrin @ 55 "	5.7^{e} (2.46)	50.4	4.1^{b} (2.03)	71.1	2.3^{e} (1.57)	77.9	2.4^{f} (1.61)	79.7
Monocrotophos @ 0.4kg "	6.8^{cde} (2.66)	40.9	4.4^{cd} (2.14)	79.0	5.4^{bc} (2.39)	48.1	5.4^{c} (2.38)	54.2
Quinalphos @ 0.313kg "	8.2^{b} (2.93)	28.6	5.7^{bcd} (2.36)	59.0	6.5^{b} (2.61)	37.5	6.3^{b} (2.60)	46.6
Carbaryl 1.0 kg a.i/ha "	7.8^{bc} (2.85)	32.2	3.9^{d} (2.00)	72.5	4.7^{c} (2.22)	54.8	4.5^{d} (2.18)	61.9
Control	11.5^{a} (3.33)	-	14.2^{a} (3.79)	-	10.4^{a} (3.30)	-	11.8^{a} (3.50)	-
C.D. (P = 0.05)	0.214		0.314		0.223		0.170	

Figures in parentheses are transformed values means with same alphabets do not differ significantly.

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Madras Agric. J.78, (1-4): 10-14 Jan.-Apr. 1991
https://doi.org/10.29321/MAJ.10.A01813

INFLUENCE OF VARIETIES, SPACINGS AND PEST MANAGEMENT ON THE INCIDENCE OF THREE MAJOR PESTS OF RICE

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ABSTRACT

In a study on the influence of varieties, spacings and pest management, spraying with monocrotophos 36 WSC at 500 ml/ha. recorded significantly lower infestation of pests and an increase of 10% grain yield. Insect resistant cultures IET 6315 and ACM 8 recorded significantly lower incidence of gall midge and stem borer as compared to IR 20. Spacings had no influence on the incidence of the pests and yield. IR 20 at a spacing of 20 x 15 cm, sprayed at ETL recorded the lowest incidence of leaf folder.

IET 6315 and ACM 8 recorded significantly lower damage in 20 x 15 cm spacing. The results suggest that gall midge incidence in the moderately resistant varieties can be reduced by adopting a wider spacing and on susceptible varieties with insecticides.

KEY WORDS : Rice, Pest management.

Cultural management of insects *viz.*, the use of cropping techniques that reduce pest population has advantages over insecticides and host-plant resistance in that they do not require costly inputs and have less likelihood of enhancing biotype selection. Besides, these techniques fit very well in the integrated pest management systems. The plant spacing is an important cultural factor which influences the insect incidence (Kiritani, 1979). The influence of varieties, nitrogen and spacings on the infestation of rice leaf folder was studied by Rajendran (1985). The increased application of nitrogen had been reported to increase the incidence of leaf flolder (Chandramohan and Jayaraj, 1977), stem borer (Hirano, 1964) and gall midge (Narayanan *et al.*,1973). In the present study, the influence of plant spacing on three varieties under protected and unprotected conditions was assessed with respect to the incidence of three pests *viz.*, leaf folder (*Cnaphalocrocis medinalis Guenee.*), gall midge (*Orseolia oryzae* Wood-mason) and stem borer *(Scirpophaga incertulas wlk.)*

MATERIALS AND METHODS

A field experiment was conducted in factorial randomised block design at the Agricultural College and Research Institute, Madurai during 1986 *Kharif* seasons. The treatments consisted of three rice entries *viz.*, ACM 8, IET 6315 and IR 20, two spacings *viz.*, 20 X 10 cm and 20 X 15 cm and two levels of pest management *viz.*, spraying monocrotophos 36 WSC 500 ml/ha at economic threshold level (ETL) and untreated control. ACM 8 and IET 6315 are gall midge resistant medium duration varieties. The variety IR 20 of medium duration and susceptible to leaf folder, gall midge and stem borer. The treatments were replicated thrice and the plot size was 10 m^2. Twentyfive days old seedlings were transplanted. The incidence of leaf folder, gall midge and stem borer attained ETL between 35 and 40 days after transplanting (DAT) and one round of spraying with monocrotophos 36 WSC at 500 ml/ha was given at 40 DAT. The incidence of the pests was recorded 15 days after spraying *viz.*, at 55 DAT. The damage by leaf folder was estimated on leaf basis by counting the total and affected leaves in 20 plants per plot selected at random. The incidence of gall midge and stem borer were estimated on tiller basis by counting the total and affected tillers in 20 plants selected at random. The damage was expressed in percentage and the data were appropriately transformed and statistically analysed. At harvest the yield data were recorded.

RESULTS AND DISCUSSION

The incidence of leaf folder, gall midge and stem bore observed at 55 DAT are furnished in Tables.

Leaf folder : The differences in the incidence among the three varieties as well as spacings were not significant but their interaction effects were significant. LET 6315, 20 X 15 cm spacing had the lowest incidence. The varieties ACM 8 and IR 20 with spacing 20 X 10 cm recorded the lowest incidence and they were on par. Rajendran (1985) reported that two spacings *viz.* 20 X 10 cm and 20 X 15 cm had not exerted significant influence on the leaf folder infestation on

IR 20, CO 43 and IET 5741. Irrespective of varieties and spacings, the sprayed plots recorded significantly lower incidence than the unsprayed plots, and the sprayed plots of IR 20 recorded significantly lowest damage when compared with the other two varietles. Three factor interactions were also significant with IR 20 at 20 X 15 cm spacing and sprayed at ETL recorded the lowest incidence which was on par with IR 20, ACM 8 and IET 6315 at 20 X 10 cm spacing sprayed at ETL.

Gall midge : The differences in the incidence among the three varieties as well as pest management levels were significant, whereas the differences among the spacing levels were not significant. The varieties IET 6315 and ACM 8 recorded significantly lower damage as compared to IR 20. The sprayed plots recorded significantly lesser damage than the untreated ones. In the case of interaction effect of varieties and treatments the resistant varieties *viz.,* IET 6315 and ACM 8 recorded significantly lower incidence in the spacing of 20 X 15 cm when compared with the spacing of 20 X 10 cm. However, in the case of susceptible IR 20 the spacing 20 X 10 cm recorded significantly lower incidence than 20 X 15 cm spacing. Three factor interactions were also significant showing that the two resistant varieties at a spacing of 20 X 15 cm, whether sprayed or unsprayed had lower incidence which were on par. In the case of susceptible IR 20, sprayed plots at a spacing of 20 X 10 cm, recorded lower incidence when compared with 20 X 15 cm spacing. The results show that the gall midge moderately resistant varieties can be reduced by adopting a wider spacing but on susceptible varieties with Insecticides even if they are planted in closer spacings.

Stem Borer : The difference in the incidence among the three varietles, the two management levels and their interaction effects were significant while the differences among the spacings were not significant. ACM 8 and IET 6315 recorded significantly lower damage as compared to IR 20. The sprayed plots recorded significantly lesser damage than the untreated ones. On ACM 8 and IET 6315, irrespective of the spacing both sprayed and unsprayed plots recorded significantly lower incidence than IR 20. In the case of IR 20 sprayed plots recorded significantly lower damage than the unsprayed ones. The interactions between varieties and spacings as well as pest management levels and spacings were not significant showing that the spacing had no influence on stem borer incidence. However, the three factor interactions were significant showing that the varieties ACM 8 and IET 6315, whether sprayed or not, whether planted in closer or wider spacings recorded lower incidence when compared with IR 20. In the case of IR 20 whether planted in closer or wider spacing, the sprayed plots recorded significantly lower incidence than the unsprayed plots. The results showed that the incidence of stem borer can be reduced either by using moderately resistant varieties or by insecticides suceptibel varieties.

Yield : Of the varieties, IR 20 recorded 5462 Kg/ha followed by ACM 8 with 5366 kg/ha which were on par. Irrespective of the varieties and spacings, sprayed plots recorded significantly higher yield than the unsprayed plots. Planting spacings and interaction of the different factors had no effect on yield. Rajendran (1985) also reported significant difference in yield only in the case varieties whereas the two spacings *viz.* 20 X 10 and 20 X 15 cm and two levels of nitrogen *viz.*

120 kg/ha and 180 kg/ha had not shown significant difference in the yield.

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Table : Influence of varieties, spacings and pest management on infestation by leaf folder, gall midge and stem borer (Mean of three peplications - 55 DAT)

Treatments (1)	S_1		S_2		V x T		V x S		V
	T_1 (2)	T_2 (3)	T_1 (4)	T_2 (5)	T_1 (6)	T_2 (7)	S_1 (8)	S_2 (9)	(10)
	Leaf folder (% leaves affected)								
V_1	11.65^{ab} (19.89)	28.57^{d} (32.32)	14.94^{d} (22.70)	31.23^{d} (33.89)	13.30^{b} (21.30)	29.90^{c} (33.11)	20.11^{ab} (26.11)	23.09^{b} (28.30)	21.60^{a} (27.20)
V_2	13.18^{ab} (21.27)	31.85^{d} (34.33)	13.51^{b} (21.50)	27.13^{c} (28.03)	13.35^{b} (21.39)	29.49^{c} (31.18)	22.52^{c} (27.80)	20.32^{a} (24.77)	21.42^{a} (26.29)
V_3	11.34^{ab} (19.65)	30.77^{d} (33.70)	10.12^{a} (18.28)	37.36^{e} (37.68)	10.73^{a} (18.97)	34.07^{d} (35.69)	21.06^{ab} (26.68)	23.74^{b} (27.98)	22.40^{a} (27.33)
T x S	12.05^{a} (20.27)	30.40^{a} (33.45)	12.85^{a} (20.83)	31.90^{a} (33.20)					
T					12.46^{a} (20.55)	31.15^{b} (33.33)			
S							21.23^{a} (26.86)	23.38^{a} (27.02)	
	Gall midge (% tillers affected)								
V_1	8.75^{d} (2.94)	7.56^{bcd} (2.74)	5.74^{a} (2.39)	5.76^{a} (2.36)	7.25^{b} (2.61)	6.66^{ab} (2.55)	8.16^{b} (2.84)	5.75^{a} (2.38)	6.95^{a} (2.61)
V_2	8.31^{cd} (2.80)	6.41^{abc} (2.49)	6.29^{ab} (2.47)	5.14^{a} (2.26)	7.30^{b} (2.64)	5.78^{a} (2.38)	7.36^{b} (2.65)	5.72^{a} (2.37)	6.54^{a} (2.51)
V_3	9.21^{d} (3.03)	15.49^{f} (3.91)	12.27^{e} (3.50)	17.94^{f} (4.23)	10.74^{c} (3.26)	16.72^{d} (4.07)	12.35^{c} (3.47)	15.11^{d} (3.87)	13.73^{b} (3.67)
T x S	8.75^{a} (2.92)	9.82^{a} (3.05)	8.09^{a} (2.79)	9.61^{a} (2.95)					
T					8.43^{a} (2.85)	9.72^{b} (3.00)			
S							9.29^{a} (2.99)	8.66^{a} (2.87)	
	Stem borer (% tillers affected)								
V_1	7.24^{a} (2.68)	8.06^{abc} (2.82)	8.30^{abc} (2.88)	8.07^{abc} (2.83)	7.77^{a} (2.78)	8.06^{a} (2.83)	7.65^{a} (2.75)	8.18^{a} (2.85)	7.92^{a} (2.80)

Treatments (1)	S_1		S_2		V x T		V x S		V
	T_1 (2)	T_2 (3)	T_1 (4)	T_2 (5)	T_1 (6)	T_2 (7)	S_1 (8)	S_2 (9)	(10)
	Leaf folder (% leaves affected)								
V_2	8.24^{abc} (2.87)	7.48^{ab} (2.73)	8.89^{abc} (2.98)	8.23^{abc} (2.85)	8.56^{ab} (2.93)	7.85^{a} (2.79)	7.86^{a} (2.80)	8.56^{a} (2.91)	8.21^{a} (2.86)
V_3	9.61^{cd} (3.09)	13.47^{a} (3.66)	9.38^{bc} (3.02)	11.49^{de} (3.39)	9.49^{b} (3.06)	12.48^{c} (3.52)	11.54^{a} (3.37)	10.44^{a} (3.21)	10.99^{b} (3.29)
T x S	8.36^{a} (2.88)	9.67^{a} (3.07)	8.86^{a} (2.96)	9.26^{a} (3.02)					
T					8.61^{a} (2.92)	9.46^{b} (3.05)			
S							9.02^{a} (2.97)	9.06^{a} (2.99)	
	Grain yield (Kg/ha.)								
V_1	5400^{a}	5167^{a}	5750^{a}	5150^{a}	5575^{a}	5158^{a}	5283^{a}	5450^{a}	5366^{a}
V_2	4850^{a}	4367^{a}	5217^{a}	4667^{a}	5033^{a}	4517^{a}	4609a	4942^{a}	4775^{b}
V_3	5667^{a}	5200^{a}	5817^{a}	5167^{a}	5742^{a}	5183^{a}	5434^{a}	5492^{a}	5462^{a}
T x S	5305^{a}	4911^{a}	5594^{a}	4994^{a},					
T					5450^{a}	4953^{a}			
S							5109^{a}	5295^{a}	

Figures in parentheses are transformed values ;

S_1-20 x 10 cm ; S_2-20 x 15 cm ; V_1-ACM 8 ; V_2-IET 6315 ; V_3-IR 20 ; T_1-Sprayed ; T_2-unsprayed

Means followed by the same letters in a column are not significantly different by least significant test criterion (P = 0.05)

Madras Agric. J.78, (1-4): 14-16 Jan.–Apr. 1991

EFFECT OF PLANT DERIVATIVES ON FEEDING AND MORTALITY OF GRAPEVINE FLEA BEETLE *Scelodonta strigicollis* L. (EUMOLPIDAE : COLEOPTERA)

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ABSTRACT

A laboratory experiment was conducted to study the effect of water extracts of neem seed and neem cake *(Azadirachta indica* A. Juss), pungam seed *(Pongamia glabra* Vent), pinnai seed *(Calophyllum inophyllum Linn.)* and illupai seed *(Basia latifolia)* Boxb. at 1 and 2 per cent concentrations on the feeding activity and mortality of grape flea beetle, *Scelodonta strigicollis L.* Two per cent neem seed extract was found to be the best in deterring the feeding activity which recorded the lowest area of feeding (16.7 mm^2) followed by 2 per cent pungam seed extract (20.3 mm^2). The highest mortality (67.2%) was recorded in pungam seed extract 2 per cent followed by neem seed extract 2 per cent (58.8%).