https://doi.org/10.29321/MAJ.10.A02267

Madras Agric. J. 73 (5) : 274—277 May, 1986

EFFECT OF SLOW-RELEASE NITROGEN FERTILIZERS AND OF FOLIAR APPLICATION OF NEEM PRODUCTS ON RICE PESTS

P. MANIDURAI MANOHARAN DAVID

An on-farm trial was conducted at Manamadurai in Tamil Nadu with the objective of studying the influence of slow-release fertilizer nitrogen and the effect of sprays with simple extracts of neem products on the incidence of rice pests. Both neem cake-coated urea and coaltar-coated urea significantly reduced the incidence of whorl maggot and leaffolder but had no significant effect on the incidence of stem borer. Green leafhopper population was lower in neem cake-coated urea while gall midge incidence was less in coaltar-coated urea. Foliar application of neem seed extract at 2% and neem cake extract at 5% were ineffective in controlling major rice pests.

The advent of high-yielding rice varieties has increased not only the use of fertilizer nitrogen but also the pest problems (Balasubramanian *et al.*, 1983). However, judicious application of fertilizers (Haseman, 1946) and slow-release nitrogen formulations (Chellaih, 1984) help minimise pest incidence. Of late, the need for expoliting environmentally safe plant products in suppressing pest populations is also increasingly realized in the face of IPM programme (Sharma, 1985). Promising among them are neem products (Ketkar and Ketkar, 1985) In the present study slow-release nitrogenous fertilizers, namely, neem cake-coated urea and coaltar-coated urea and simple extracts of neem seed and cake were evaluated for their efficacy against some of the rice pests.

MATERIALS AND METHODS

An experiment in randomised block design with three replications and seven treatments was conducted in a farmer's holding at Manamadurai in Tamil Nadu in *rabi*, 1985. IR 20 was transplanted adopting 10 cm X 20 cm spacing. Basal dose of N at 100 kg/ha in the form of neem cake coated urea, coaltar-coated urea and plain urea was applied only once in the respective treatment plots, which measured 4 m X 5 m, before transplantation. Other treatments, including the untreated control, did not receive any nitrogen throughout the experimemt. P and K at 50 : 50 kg/ha were applied basally in all treatments, including the check. Urea and neem cake were mixed at 5:1 (W/W) ratio while sufficient quantity of coaltar was melted and diluted in kerosene before it wae coated on urea. Neem seed and cake extracts were sprayed thrice at 10-day intervals on 30, 40 and 50 days after transplanting (DAT) while phosphamidon was applied twice on 30 and 45 DAT. Foliar application was made with a hand-operated knapsack sprayer using 500 l of water per hectare

* Agricultural Research Station, TNAU, Paramakudr-623 707.

Table Effect of slow-release fertilizer nitrogen and neem products on the incidence of major pests and on the yield of rice

(Figures in parenthesis are means of transformed values)

Treatments	Green leafhopper		Whorl maggot		Leafroller		Gall midge		Stem borer		Grain yield kg/ha
	Mean No. of GLH/ hill	%reduction over control	%affected leaves	%reduction over control	%affected leaves	%reduction over control	%affected tillers	%reduction over control	%affected tillers	%increase over control	
Neem cake-coated urea	0.95 (1.13)	40.63	4.80 (12.13)	56.52	0.75 (3.84)	82.68	2.78 (8.74)	-3.73	4.03 (7.12)	17.15	3291
Coaltar-coated urea	1.26 (1.21)	21.25	3.85 (10.20)	65.13	1.04 (3.70)	75.98	1.41 (4.37)	47.39	5.34 (9.21)	55.23	3000
Urea	1.33 (1.32)	16.88	7.47 (14.85)	32.34	1.55 (4.39)	64.20	2.69 (6.58)	-0.37	3.80 (6.77)	10.47	3458
Neem seed extract 2%	1.22 (1.26)	23.75	8.53 (15.65)	22.74	8.67 (12.49)	-100.23	2.69 (6.72)	-0.37	4.16 (6.67)	20.93	2250
Neem cake extrct 5%	1.20 (1.27)	25.00	10.15 (17.99)	8.06	4.53 (8.41)	-4.62	2.47 (7.00)	7.84	5.26 (8.64)	52 91	2375
Phosphamidon 0.1%	1.20 (1.13)	25.00	7.77 (14.93)	29.62	3.08 (5.74)	28.7	1.11 (4.01)	58.58	3.10 (6.53)	-9.88	2583
Untreated check	1.60 (1.56)	—	11.04 (19.05)	—	4.33 (8.63)	—	2.68 (6.07)	—	3.44 (6.02)	—	2458
C. D. (P=0.05)	N.S.		5.54*		4.68**		N.S.		N.S.		633**

* Significant at 5 per cent level

** Significant at 1 per cent level

N.S. Not Significant

Observation on pests were recorded from five randomly selectee plants i each plot. Green leafhopper (GLH) was counted by tapping the hill and counting the total number of nymphs and adults that have fallen onto the water surface. For whorl maggot and leaffolder, total number of leaves and damaged leaves in each hill were recorded before expressing the damage in percentage. In the case of gall midge and stem borer, total number of tillers and silver shoots, dead hearts and white ears, as the case might be, were counted and percentage of damage arrived at. The data on GLH population were transformed into $\sqrt{X+0.5}$ values while angular transformation was adopted for whorl maggot leaffolder, gall midge and stem borer damage.

RESULTS AND DISCUSSION

The data on pest incidence and on grain yield are given in the Table.

GREEN LEAFHOPPER

Slow-release nitrogenous fertilizers and foliar application of neem products did not have any significant effect on GLH population. However, the population was lower in neem cake-coatad urea plots than in plain urea and untreated control plots. Saxena (1986) observed relatively low GLH populations in IR 42 treated with 1:4 mixture of custard apple and neem seed oils in combination with neem cake+urea.

WHORL MAGGOT

Among the three forms of urea, the damage by whorl maggot was minimum (0.85%) in coaltar-coated urea plots and maximum (7.4%) in plain urea plots and there were no significant difference among them. However, the damage in coaltar-coated urea plots and neem cake-coated urea plots was significantly much lower than in the control plots by 65.13% and 56.52% respectively. Sprays of neem seed extract at 2% and neem cake extract at 5% were found ineffective against whorl maggot as they reduced the damage over the control only by 22.74% and 8.06% respectively and were on par with the check. Phosphamidon accounted for only 29.62% reduction in damage which might be due to its delayed spraying on 30 DAT.

LEAFROLLER

Neem cake-coated urea and coaltar-coated urea had significant influence on the incidence of leafroller and were the only treatments superior to the check in reducing the damage over the control by 82.68% and 75.98% respectively. However, they were statistically on par with plain urea (64.20%) and phosphamidon (28.87%). Foliar applications of extracts of neem products were not at all effective against leafroller as they registered increased damage over the check.

GALL MIDGE

The results indicate that none of the treatments was significantly sup-

erior to the check suggesting that they did not haue any influence on the incidence of gall midge. Phosphamidon, however, registered the highest reduction over the check in gall midge damage (58 58%) followed by coaltar-coated urea (47.39%).

STEM BORER

Since there were statistically no variations among different treatments and since the level of damage was much more than the control plot in all plots applied with nitrogen fertilizers and sprayed with neem products excepting for phosphamidon, it may be concluded that neither slow-release fertilizer nitrogen nor spraying with neem products had any significant effect on the occurrence of stem baorer. However, Alagersamy *et al*, (1985) observed low incidence of stem borer in plots applied with neem cake-coated urea at 20%.

GRAIN YIELD

Nitrogen-applied plots registered increased grain yield over the check. However, only plain urea and neem cake-coated urea were significantly superior to the check in increasing the grain yield. Both neem seed extract and neem cake extract were on par with the control.

The above results thus indicate that both neem cake coated urea and coaltar-coated urea were significantly effective in minimising the incidence of whorl maggot and leafroller but had no influence on the incidence of stem borer. GLH population was lower in neem cake-coated urea while gall midge incidence was lower in coaltar coated urea. Foliar application of simple extracts of neem seed extract and neem cake extract had no effect on major rice pests.

REFERENCES

ALAGARSAMY, G., M. VELUSAMY, S. RAJA GOPALAN and S. PALANISAMY. 1985. Effect of slow-release N fertilizers on stem borer (SB) and sheath rot (ShR) incidence and on rice grain yield *Intl. Rice Res. Newl.*, *10* : (4) : 19.

BALASUBRAMANIAN, P., SP. PALANIAPPAN and M. GOPALAN, 1983. Effect of carbofuran and nitrogen on leaffolder incidence *Intl Rice Res. Newsl.*, *8* (5) : 13-14.

CHELLIAH, S. 1984. Pest management in rice In.: *State Level Training on Rice Production Technology Minikit Programme, Feb.* 14-17. TNAU, Coimbatore. pp. 29-31.

HASEMAN, L. 1946. Influence of soil minerals on insects. *J. econ. Ent.*, *36* : 8-11.

KETKAR, C. M. and M. S. KETKAR, 1985. Potential role of neem in plant protection In : *Proc. natn. Seminar behav. physiol. Appr. Mgmt. Crop Pests*, TNAU Coimbatore. (ed. A. REGUPATHY and S. JAYARAJ). 11. 7-14.

SAXENA, R. C. 1986. Effect of custard apple oil, neem and neem cake on green leaf hopper (GLH) population and on tungro infection. *Intl. Rice Res. Newsl.*, *11* (2) : 25.

SHARMA, R. N. 1985. A crictical unalysis of the scope of plant products in crop protection. In : *Proc. natn. Seminar behav. Physiol. Appr. Mgmt. Crop Pests*, TNAU, Coimbatore [ed. A. REGUPATHY and S. JYAARAJ). pp. 1-6.