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Research Notes

Farmers participatory assessment of neem based insecticide in controlling the ear head bug (*Leptocorisa acuta*) in rice

K. PONNUSAMY

Central Institute of Brackishwater Aquaculture, (Indian council ofAgrl. Research) 75, Sathome High Road, R.A.Puram, Chennai - 600 028, Tamil Nadu.

Rice is the most important and extensively grown staple food crop in India. However, rice production has not kept pace with the population increase as the productivity remaining very low. Rice production is affected by number of bio-physical and socio-economic constraints among which the incidence of pests and diseases were found to be one of the major factors in limiting the rice production.

Effective crop protection is an integral component of efforts to increase and sustain rice yields. Considering the ill effects of indiscriminate use of chemical pesticides, integrated pest management is considered to be effective in controlling the pests. The use of biopesticides and biocontrol agents in integrated pest management is ecofriendly and cost effective. Neem products have been found to control a wide range of insect pests and plant disease organisms. Neem products repel insects, act as antifeedants, inhibit reproduction and cause other interruption (Schmutterer, 1990). Neem based insecticides were commonly available in the market and their use is increasing.

The rice crop is affected by pests like stem borer, leaf folder, brown plant hopper, green leaf hopper and ear head bug. The ear head bug is one of the important pests of rice generally appearing before the flowering stage and continuing upto milky stage and cause considerable reduction in the grain yield. I this context, present investigation was carrie out to assess the effect of neem based insecticid in controlling the rice ear head bug. The stud was conducted at Kattur village, near Chenna during August 2000 - January 2001 (Samb season) under the World Bank funded researc project entitled "Institution Village Linkage Programme for Technology Assessment and Refinement in Coastal Agro-ecosystem of Tiruvallur district of Tamil Nadu" under National Agricultural Technology Project. During Participatory Rural Appraisal (PRA) exercises conducted at the village, it was revealed that indiscriminate use of insecticides and non-application of pesticides for control of ear head bug were found to be the farmer's practice. Farmer's belief was that rains can easily washout the insects and hence there is no need for insecticide application even beyond Economic Threshold Level (ETL).

Field investigations were carried out in 20 farmers' field to assess the effect of neem based bio-insecticide containing azadirachtin (0.03%) in controlling the ear head bug population on rice variety white ponni. The size of treatment plot is 1000 sq.m. The weather is moderately warm with rainy period between October to December. The soil of the village is moderately

Table 1. Effect of neem oil on ear head bug control

Particulars	Ear head nymphal population reduction		Grain yield (t/ha)	Returns Rs./ha	Cost of treatment	Cost benefit ratio
	Flowering stage (%)	Milky stage (%)				
Untreated field	25	15.2	3.56	18,374	-	2.55
Treated field	69	63.1	3.98	20,441	495*	2.74

*Cost of treatment includes cost of neem oil and spraying charges.

rained clay loam with a pH of 7.4. The oil is low in available nitrogen, medium in hosphorus and high in potassium.

The neem based insecticide containing zadirachtin (0.03%) was sprayed at the rate f 500 ml/ha twice once at flowering stage nd second at 15 days later. A control plot vith no insecticide spray was maintained. Other ractices like irrigation, manuring and weeding vere followed as per the farmer's practice. he following formula was adopted to work ut the cost benefit ratio.

$$\text{Cost Benefit Ratio} = \frac{\text{Treatment yield} \times \text{Value of paddy (Rs/kg)}}{\text{Basic cost of cultivation} + \text{Cost of protection}}$$

The two sample t-test was applied to find out the significant difference between two groups of farmers.

The biometric observations, incidence of ear head bug were recorded at regular intervals. The grain yield was recorded. The rice fields reated with neem based insecticide (Azadirachtin 0.03%) recorded reduced incidence of ear head bug population by 24.2% over the control. Ear head bug population remained low in the plots treated with neem products (Durairaj and Venugopal, 1993; Raguraman and Rajasekaran, 1996). The nymphal population of ear head bug was assessed at two stages namely flowering and milky stages. The population ranged between 7-12 nos./sq.m.

There was concomitant increase in the yield of grain in the plots treated with neem based insecticide than the control. The plots treated with neem based insecticide recorded average grain yield of 3980 kg ha^{-1} while the control recorded average grain yield of 3560 kg ha-1. The neem based insectide treated plots recorded 11.79% increased grain yield over the control. The results are in line with the findings of Kaul and Sharma (1999) and Singh and Singh (1999). Further grain yield obtained by two groups of farmers were subjected to two sample t-test and the results (t38df calculated value 10.058) revealed that two groups of farmers significantly differ from each other. From this, it could be inferred that the application of neem oil as bio-insecticide has given good results as compared to control.

High cost benefit ratio was obtained from the treatemnt plot (2.74) compared to control plot (2.55). Based on the above results it may be concluded that application of neem based insecticide (Azadirachtin 0.03%) @ 500 ml/ ha twice once at flowering stage and second at 15 days later reduced the incidence of ear head bug and increased the grain yield of ric and thus offering a harmonious approach to pest management. The farmers perceived that application of neem based insecticide is easy, safe and adoptable with observable results which facilitate fellow farmers for adoption of this eco-friendly farm technology. Farmer participatory wholesome IPM technology development, validation and transfer suited to the local needs will definitely improve the farm profitability and health security of the people at large.

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Research Notes

Performance evaluation of porous pipe irrigation in heavy soils

P. SUSEELA, M.V. RANGASWAMY AND S. SENTHILVEL

Dept. of Soil and Water Conservation Engg., College of Agrl. Engg., Tamil Nadu Agrl. Univ., Coimbatore - 641 0(

An efficient irrigation system should provide maximum productivity per unit area with unit quantity of water. Subsurface irrigation is an efficient method of irrigation, in which water, nutrients and soil additives can be applied to the root zone that encourages deeper and more extensive root development resulting healthier and more productive plants (Murugaboopathy *et al.* 1991). Since water is applied below the soil surface, development of hardpan, sealing of soil strata, compaction of soil etc. can be avoided. The moist environment below the soil surface is conducive for the activities of earthworms and microbial life (Sohrabi and Gazori, 1997).

Porous pipe subsurface irrigation can be defined as "application of water below the soil surface at the root zone of the plants through tiny openings provided on the wall of the pipe at a rate that allows the soil to absorb the water at its natural rate" (Yoder *et al.* 1995). Porous pipe is made from recycled rubber and polyethylene. It allows both air and water to pass through pores provided in the wall at low pressure. Porous pipe is designed to operate at low poressure, which allows for smaller and less expensive pumping systems & smaller energy demands (Mohammad, 1998). Moreover maintenance of porous pipe is minim Even though porous pipe subsurface irrigatio has so many advantages, very little informatio available on the discharge availabiity and operatin characteristics of the porous pipes in differe soils. In this study, an attempt is made t study the hydraulic performance of porous pip in heavy soil.

The experiment was conducted at th College of Agricultural Engineering, Tamil Nad Agricultural University, Coimbatore during 200(2001. The soil at the experimental site wa sandy clay loam for the top 20 cm dep and sandy clay for deeper layers.

The discharge line of the experiment setup consists of a 3.75 cm diameter PV pipe and 1.6 cm diameter porous pipe (outsic diameter = 2.2 cm; inside diameter = 1.6 cm A screen filter was provided in the delive line for filtration. Ball valve and pressure gaug connected to the main line was used to s the operating pressure by controlling the flo The porous pipe laterals of 10m lengths we connected to the main line by using start ar washer connectors. In each line separate ta were provided to allow the water to flow on