A wide variation was observed in majority of the physico-chemical characters among the orange varieties (Table 2). The maximum fruit weight (191.55g), length (6.75cm), diameter (6.75cm) of the fruit, juice percentage (42.95%) and rind thickness (6.75mm) were recorded in Jaffa sweet orange, while maximum percentage of rind (31.77%) and rag (41.83%) were observed in Valencia and Hamlin respectively. Seed number per fruit was minimum in Jaffa (2.60) followed by Hamlin (3.20) and Valencia late (6.55). Kodur Sathgudi recorded maximum acidity (0.98%) whereas maximum brix/acid ratio was observed in Blood Red Malta (18.25) followed by Hamlin (14.97) and Valencia Late (13.20).

Jagtap *et al.* (2000) reported that the sweet orange cultivars namely Blood Red Malta, Blood Red Mutation, Hamlin, Jaffa, Kodur Sathgudi, Nucellar Mosambi, Valencia, Valencia Late adapted well under agro-climatic conditions of Western Maharashtra. From an overall analysis of the performance of sweet orange varieties under study, it can be concluded that all the varieties of sweet orange performed well in Andhra Pradesh except Blood Red Malta.

References

Castle, W.S. (1983). Growth, yield and cold hardiness of seven year old bear lemon trees on twenty seven root stocks. *Proc. Florida State. Hort Sci.* **96**: 23-25.

Jagtap, D.D., Pujari, C.V., Raijadhav, S.B. and Tiwari U.S. (2000). Pre-bearing performance of sweet orange cultivars. *Hi-tech citrus management Proc. of International Symposium on Citriculture,* 132-135.

(Received: September 2002; Revised: April 2003)

Madras Agric. J. 90 (7-9) : 562-564 July-September 2003

Research Notes

Efficacy of fish oil rosin soap, neem oil and insecticides against onion thrips *Thrips tabaci* Lindeman

D. VENKATESH AND P.M.M. DAVID

Dept. of Agrl. Entom., Agrl. College & Res. Instt., Tamil Nadu Agrl. Univ., Killikulam-628 258, Tamil Nadu

Thrips, *Thrips tabaci* Lindeman, is the most destructive pest of onions. Several insecticides have earlier been tested for the control of this pest. We tested the efficacy of fish oil rosin soap (FORS) and neem oil in comparison with insecticides and the results of field experiments are presented in this article. Two field experiments were conducted during November 1996 and February 1997 at Agricultural College and Research Institute, Killikulam. Six treatments, including the untreated check, were compared in a randomized block design with four replications. Plots were three metres long and two metres wide in which ridges were formed 45 cm apart. The insecticide treatments were imposed 60 days after planting when the pest population was at its peak. Second spray was given seven days later. Thrips population, both nymphs and adults, and the damage caused by them were assessed before the first round of spray and three days after each round from 10 plants selected at random. The population density was assessed in number per 10 plants and the per cent decrease in population after treatment was corrected by using Henderson and Tilton (1955) formula.

The extent of damage was assessed after the second spray in two ways from 10 random leaf samples drawn from each plot. The lacerated silvery patches were measured from a 2.5 cm long leaf bit cut from the middle sector of sample leaves. These tubular sample bits were cut open longitudinally before examination under a transparent grap sheet The extent of laceration was measured in square centimeters. Since high variability was observed in the width of cut ends of the leaf bit samples, this value was

Table 1. Effect of fish oil rosin soap, neem oil and insecticides on *Thrips tabaci*

Treatments	Mean per cent reduction in population		Mean area of laceration (cm^2)	Mean length of dry tips (cm)	Mean bulb yield (kg)
	Nymphs	Adults			
Neem oil %	62.06 (53.57)b	67.63 (55.92)c	0.23b	3.85b	2.550b
Fish oil rosin soap 2.5%	62.29 (56.17)b	82.42 (60.60)bc	0.39b	4.35b	2.225bc
Neem oil 1% + Fish oil rosin soap 2.5%	71.02 (57.96)b	82.87 (61.60)b	0.35b	4.18b	2.400b
Endosulfan 0.07%	92.98 (74.41)a	93.87 (77.12)a	0.12a	1.75a	3.725a
Dimethoate 0.3%	91.28 (73.4)a	98.43 (80.670a	0.09a	1.73a	4.275a
Untreated check	-	-	0.85c	7.43c	1.713c

Figurs in parenthesis are angular transformed values. Means followed by the same letter are not significantly different by DMRT

converted into laceration per square centimeter. Secondly, the tip drying was measured with scale in centimeter from the apex of each of the 10 leaves per plot. Yield data were recorded at harvest. The pooled data from the two seasons were subjected to analysis of variance.

FORS, neem oil and insecticides were significantly effective against both nymphs and adults of *T. tabaci* (Table 1). In both seasons, dimethoate 0.03% and endosulfan 0.07% were equally superior to FORS 2.5% and neem oil 1% in reducing the populations of nymphs as well as of adults. Mohan and Kumar (1980) also found dimethoate to be effective against onion thrips. Endosulfan is also a proven chemical (Gawande *et al.* 1984). Though FORS and neem oil were inferior to the insecticides, FORS proved superior to neem oil in controlling thrips populations. FORS, either alone or in mixture with neem oil, was on par in effectiveness. FORS was a main constituent of a product, Black leaf 40 prepared and tested by the Rahman and Batra (1945) who recorded about 82 per cent mortality in onion thrips. Natarajan *et al.* (1991) found that FORS was even superior to endosulfan in controlling *T.tabaci* on cotton. However, Chandramohan and Nanjan (1993) observed neem oil as an effective control agent for onion thrips next to dimethoate.

The area lacerated by thrips on leaves and the extent of tip drying were significantly less in plots where dimethoate and endosulfan were sprayed. The yield on onion was also more from the plots treated with dimethoate, followed by endosulfan. Chandramohan and Nanjan (1993) recorded identical yields from plots where dimethoate and neem oil were applied.

References

Chandramohan, N. and Nanjan, K. (1993). Field evaluation of insecticides against onion thrips, *Thrips tabaci* Lind., on garlic. *Madras Agric. J.* 80: 53-54.

Gawande, R.B., Sontakke, B.K. and Borle, M.N. (1984). Insecticides against onion thrips, *Thrips tabaci* Lind. *Indian J. Ent.* 46: 284-286.

Henderson, C.F. and Tilton, E.N. (1945). Tests with acaricides against the brown wheat mite. *J. Econ. Entomol.* 48: 157-161.

Mohan, N.J. and Kumar, N.R.K. (1980). Chemical control of onion thrips. *Pesticides*, 14: 28-29.

Natarajan, K., Sundaramurthy, V.T. and Chidambaram, P. (1991). Usefulness of fish oil rosin soap in the management of whitefly and other sap feeding insects in cotton. *Entomon.* **16**: 229-232.

Rahman, K.A. and Batra, A.L. (1945). The onio thrips, *Thrips tabaci* Lind (Thripidae Terebrantia: Thysanoptera). *Indian J. Agric Sci.* **14**: 26-26.

(Received: October 2000; Revised: September 2002

Madras Agric. J. 90 (7-9) : 564-566 July-September 2003

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