

Efficacy of different insecticides against larval and pupal stages of citrus leaf miner *Phyllocnistis citrella* Stainton

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SUMMARY

Citrus is a globally cultivated fruit crop. In India amongst the fruit crops, citrus occupies third position with respect to area and production. The experiment was conducted with Randomized Block Design with three replications and eight treatments. The observations were undertaken just before and 3, 7 and 14 days after the treatment, respectively. Two seasons data on per cent larval and pupal reduction of *P. citrella* during 05 and 06 were pooled and subjected to statistical analysis of variance.

Key words :
Insecticides,
Larval, Leaf
miner,
*Phyllocnistis
citrella*

Citrus is a globally cultivated fruit crop, which includes orange, sweet orange, acid lime and other related species of citrus. In India amongst the fruit crops, citrus occupies third position with respect to area and production. Among the citrus group, Nagpur mandarin (*Citrus reticulata*) is the world fame glorious fruit crop.

Recent years export business and the industrialization of oranges are also being accelerated. Commercial value of these fruits encourages through plantation programme and international marketing through export have increased the orange cultivation in Vidarbha, in the state and even in the other parts of the country. In India more than 250 insect species are reported on citrus. In Maharashtra state, 14 species are reported of which 8 species are of significant importance (Anonymous, 1994). Among these serious pest the citrus leaf miner (*P. citrella*) is one of the important pest of citrus all over the country. For control of leaf miner, farmers are totally depend upon the chemical control measures and the existing insecticides are not effective against this pest. Therefore, the experiment was undertaken to test new chemicals along with indigenous products against larval and pupal stages of the leaf miner.

MATERIALS AND METHODS

Field experiment for the management of citrus leaf miner was undertaken on Nagpur mandarin orchard at All India Co-ordinated

Research Project on Tropical Fruits, Central Research Station, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.), during 2005 and 2006. The experiment was conducted with Randomized Block Design with three replications and eight treatments. The observations were undertaken just before and 3, 7 and 14 days after the treatment, respectively. Two seasons data on per cent larval and pupal reduction of *P. citrella* were pooled and subjected to statistical analysis of variance.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads:

Efficacy of some insecticides against the larva of citrus leaf miner :

The data on per cent larval reduction are presented in Table 1. The pooled data revealed that all the treatments were significantly superior over untreated control in reducing the larval population. A treatment with imidacloprid 0.005% was most effective showing 81.45% larval reduction. However, fenvalerate 0.005% and acephate 0.1125% were next in order of efficacy.

On seventh day after the treatment, imidacloprid 0.005% recorded higher per cent of larval reduction (89.04%) which was at par with fenvalerate 0.005% which recorded

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Table 1: Efficacy of some insecticides against the larvae of citrus leaf miner (hasta, 2005 and ambia 2006 bahar)

Tr. No.	Treatments	Conc. %	Per cent larval reduction on		
			3 DAT	7 DAT	14 DAT
T ₁	Fenvalerate	0.005	80.43 (63.84)	85.45 (67.65)	91.61 (73.43)
T ₂	Acephate	0.1125	77.39 (61.54)	81.13 (64.26)	87.70 (69.57)
T ₃	NSE	5.00	68.92 (56.15)	78.09 (62.14)	81.00 (64.21)
T ₄	Fish oil rosin soap	3.00	63.55 (52.90)	78.66 (62.53)	79.46 (63.06)
T ₅	Neem oil	1.00	44.60 (41.95)	64.69 (53.56)	72.29 (58.31)
T ₆	Imidacloprid	0.005	81.45 (64.63)	89.04 (70.75)	93.81 (75.70)
T ₇	Thiodicarb	0.075	75.14 (60.11)	84.19 (66.67)	87.58 (69.47)
T ₈	Control (water spray)	-	12.82 (20.91)	20.04 (26.48)	26.43 (30.87)
	F- test	-	Sig.	Sig.	Sig.
	S.E. ±	-	1.51	1.26	1.60
	C.D. (P=0.05)	-	4.24	3.59	4.49

(Figures in parentheses are arcsin means)

85.45% larval reduction. The treatment with thiodicarb 0.075%, acephate 0.1125%, fishoil rosin soap 3.00% and NSE 5.0% were next in order of efficacy. Similar results were reported when observations were recorded 14 DAT, where a treatment with imidacloprid 0.005% and fenvalerate 0.005% were found to be significantly superior over rest of the treatments and at par recorded 93.81% and 91.61% larval reduction, respectively. These results are in agriment with the results reported by Alrubeai *et al.* (1997), Salas *et al.* (1997) and Rao *et al.* (2002) who have reported pyrethroid to be the most effective in controlling citrus leaf miner. Yamamoto *et al.* (2000) concluded that imidacloprid was most effective in controlling the citrus leaf miner. Similar results were also been reported by Shivankar *et al.* (2002).

Efficacy of some insecticides against the pupa of citrus leaf miner :

The pooled data on pupal reduction are presented in Table 2. The treatment with 0.005% imidacloprid was found to be most effective in reducing the pupal population (74.49%). However, it was at par with fenvalerate 0.005% (71.60%). The treatment with acephate 0.1125% was significantly superior over rest of the remaining treatments, when observations were recorded after 3

Table 2 : Efficacy of some insecticides and indigenious products against the pupa of citrus leaf miner of hasta, 2005 and ambia 2006

Tr. No.	Treatments	Conc. %	Per cent pupal reduction on		
			3 DAT	7 DAT	14 DAT
T ₁	Fenvalerate	0.005	71.60 (57.83)	79.73 (63.29)	88.41 (70.18)
T ₂	Acephate	0.1125	68.40 (55.83)	76.65 (61.12)	85.13 (67.46)
T ₃	NSE	5.00	60.15 (50.80)	69.37 (56.43)	77.90 (62.26)
T ₄	Fish oil rosin soap	3.00	54.23 (47.43)	65.46 (54.05)	67.55 (55.28)
T ₅	Neem oil	1.00	46.38 (42.92)	64.51 (53.46)	70.72 (57.06)
T ₆	Imidacloprid	0.005	74.49 (59.70)	83.65 (66.22)	90.66 (72.32)
T ₇	Thiodicarb	0.075	61.06 (51.39)	75.73 (60.65)	85.91 (68.04)
T ₈	Control (water spray)	-	24.49 (29.56)	31.74 (34.27)	31.74 (34.27)
	F- test	-	Sig.	Sig.	Sig.
	S.E. ±	-	1.29	1.34	1.36
	C.D. (P=0.05)	-	3.62	3.76	3.83

(Figures in parentheses are arcsin means)

DAT. Similar trends of results were observed when observations were recorded after 7 DAT and 14 DAT. The treatments with imidacloprid and fenvalerate 0.005% were significantly superior over rest of the treatments in reducing the pupal count 83.65% and 79.73%, respectively on 7 DAT and 90.66% and 88.41%, respectively on 14 DAT. The treatment with thiodicarb 0.075% and acephate 0.1125% were next in order of efficacy. The other treatments in descending order were NSE 5%, neem oil 1% and fishoil rosin soap 3.00%. These results were in agreement with the findings of Kendappa *et al.* (2005) who reported that acephate 0.15%, imidacloprid 0.004% and fenvalerate 0.02% were effective against pupal stage of serpentine leaf miner. However, results obtained by thiodicarb 0.075% can not be compared with findings of other workers for the want of literature.

Results of pooled analysis indicated that imidacloprid 0.005% followed by fenvalerate 0.005% was most effective in minimizing the larval and pupal populations of citrus leaf miner. NSE 5%, fishoil rosin soap 3.00% and neem oil 1% were effective to same extent in minimizing larval and pupal populations of citrus leaf miner.

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REFERENCES

Alrubeai, H., Al Jboory, I., Hafied, A., Hassan, B. and Jabbo, N. (1997). Efficacy of some plant extracts and chemical insecticides on *Phyllocnistis citrella*. *Arab and Near East Plant Prot. Newsletter*, **25**:28.

Anonymous (1994). Entomological Reports. All India Fruit Improvement Project (Citrus), Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.).

Kendappa, G.N., Shankar, G., Mallikarjunappa, S. and Mithyantha, M.S. (2005). Evaluation of certain insecticides against serpentine leaf miner, *Liriomyza trifoli* (Burgess) (Agromyzidae: Diptera) on French bean (*Phaseolus vulgaris* L). *Pestol.*, **29** (3): 36 - 38.

Rao, A.R., Reddy, K.R., Gopal, G.S. and Madhavi, M. (2002). Evaluation of insecticides against citrus leaf miner (*Phyllocnistis citrella* Stainton) on acidlime. *Indian J. Citriculture*, **1**(1) :79 – 82.

Salas, H., Figueroa, D. and Willink, E. (1997). First trial on chemical control of the citrus leaf miner in (*Phyllocnistis citrella* Stainton) Tucuman. *Advance Agroindustrial*, **17** (69) :22 – 24.

Shivankar, V.J., Sham Singh, Rao, C.N. and Dhengle, V.N. (2002). Field appraisal of imidacloprid against citrus leaf miner *Phyllocnistis citrella* Stainton. *Indian J. Citriculture*. **1**(2) :167 –170.

Yamamoto, P.T., Roberto, S.R. and Pria, W.D. (2000). Systemic insecticides applied on citrus tree trunk to control *Oncometopia facialis*, *Phyllocnistis citrella* and *Toxoptera citricida*. *Scientia Agricola.*, **57** (3): 415–420.
