

## Research Article

# Evaluation of Biorational Component and Chemicals for the Management of Lemon Butterfly Larvae on Citrus

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### Abstract

The investigation was conducted with imposed of treatments; *Beauveriabassiana* (1x108 CFU/ ml), *Metarhiziumanisopliae* (1x108 CFU/ ml), NSE (5.0%), Neem oil (2.0%), Spinosad 45 SC (0.03%), Imidacloprid 17.8 SL (0.005%), Acetamiprid 20 SP (0.04%), Abamectin 1.8 EC (0.003%) and Control (water spray) on Nagpur Mandarin against nursery pests. Such treatments were arranged in statistical design RBD with three replications, under green shade net nursery. In overall, cumulative effect of four applications of all the treatments, Abamectin 1.8 EC (0.003%) recording lowest (6.10 per cent) leaves infestation of leaf miner and found at par with Spinosad 45 SC (7.18 per cent) leaves infestation. The next best effective treatments, Acetamiprid 20 SP (9.34 per cent) of leaves infestation and Imidacloprid 17.8 SL (10.31 per cent) leaves infestation were at par with each other and found significantly superior to the Neem oil 2%, NSE 5 %, *Beauveria-bassiana* 1x108 CFU/ml and *Metarhiziumanisopliae* 1x108 CFU/ml respectively and these treatment groups were at par with each other. Maximum per cent infestation of leaf minor was noticed in control is (25.14 per cent).

**Keywords:** Lemon Butterfly Larvae; Insecticide and Biorational Components

During 1999- 2001, an extensive survey was conducted in citrus (*Citrus* spp.) growing areas of Central India to record the incidence of citrus leaf miner (*Phyllocnistiscitrella*) and its natural enemies. In the year 2000-2001 citrus leaf miner infestation was 54.7, 52.1 and 43.4% in spring, monsoon and autumn seasons, respectively. Parasitism by eulophids (*Citrostichus phyllocnistoides* and *Cirrospilus quadristriatus* [*Cirrospilus ingenuus*]) was more in autumn (13.1%), followed by spring (8.5%) and monsoon (6.2%). Orchards of acid lime and Nagpur mandarin recorded more predators than nurseries of rough lemon, Rangpur lime and acid lime. Eulophid parasitism was negatively correlated with minimum temperature (-0.669) and wind velocity (-0.913). Similarly, predatory population was negatively correlated with minimum temperature (-0.680) and vapour pressure (-0.876). (Shivankar and Rao, 2003).

### Materials and Methods

The present investigation entitled, "Evaluation of biorational component and chemicals for the management of nursery pests on citrus" was carried out in the month of September-October 2014 at Centre of Excellence for Citrus (Indo- Israel Project), Bharat

Nagar, Horticulture Section, College of Agriculture, Nagpur with a view to evaluate their efficacy against citrus leaf miner under nursery on Nagpur mandarin grafts. The material used and methodology adopted during the course of present experiment are described below.

### Material

Material like insecticides, electronic balance, measuring cylinder, hand pump sprayer, containers, funnel, field lens, syringe (to take small quantity of liquid insecticide), luggage labels, price labels, thread, polythene bags, muslin cloth etc. were used during the course of experiment. Material and the facilities viz. citrus grafts, green shed net, labour etc. required for the investigation were provided by the, Professor of Entomology, Entomology section, Professor of Horticulture and I/c Centre of Excellence for Citrus, Horticulture Section, College of Agriculture, Nagpur, during the entire period of investigation.

The detail information regarding treatment used against citrus leaf miner in nursery on Nagpur mandarin is given in Table 1.

### Method of application of insecticides

#### Method of application

Spraying of the insecticides, were performed with the help

of hand pump sprayer and the plants were treated with sufficient care to cover whole of the plant surface, Due care was also under taken to avoid drifting of spray material from one treatment block to another. Spraying was conducted during morning hours.

Approximately one liter spray solution was prepared every time for spraying three blocks of each treatment.

### Time of application of treatment

When incidence of nursery pest on citrus noticed in citrus nursery, spraying was initiated. In all, four applications were undertaken at 10 days of interval in the month September-October 2014. Observations of nursery pest on citrus infestation were recorded before 24 hours and after 3 and 7 days of spraying of each application.

### Method of recording observation

Method adopted for recording observation of citrus nursery pests in the present investigation are as below,

1. Pre-treatment observations were taken at before 24 hours of treatment application.
2. Post- treatment observations were taken at of 3 and 7 days after treatment application.
3. Total 4 spraying were given at 10 days interval during the course of investigation.
4. Counted the nursery insect pests infestation on five randomly selected plants from each block.
5. Counted total leaves and damage leaves by citrus leaf miner on 5 randomly selected plants from each treatment block for recording of percent leaf miner infestation.
6. Counted live and dead larvae of citrus leaf miner on infested leaves at pretreatment and post treatment period on five randomly selected plants from each treatment block for recording percent mortality.

## Results and Discussion

Sr. No.	Treatments	Conc. (%)	Average larvae per plant
T <sub>1</sub>	Beauveria bassiana	1x10 <sup>8</sup>	0.92 (0.96)
T <sub>2</sub>	Metarhiziumanisopliae	1x10 <sup>8</sup>	0.95 (0.97)

T <sub>3</sub>	NSE	5.0	1.06 (1.02)
T <sub>4</sub>	Neem oil	2.0	1.12 (1.06)
T <sub>5</sub>	Spinosad 45 SC	0.03	0.67 (0.81)
T <sub>6</sub>	Imidacloprid 17.8 SL	0.005	0.58 (0.76)
T <sub>7</sub>	Acetamiprid 20 SP	0.04	0.78 (0.88)
T <sub>8</sub>	Abamectin 1.8 EC	0.003	0.72 (0.85)
T <sub>9</sub>	Control (water spray)		1.87 (1.36)
'F' Test			Sign.
SE (m)±			0.030
CD @ 5 %			0.091

(Figures in parentheses are corresponding values of Square root transformation)

**Table 1:** Overall cumulative effect of three sprayings on larval population of lemon butterfly.

The highest population was noticed in treatment Control (water spray) i.e. 1.87 larvae/plant.

Saradaet. al. (2013) Similarly, spraying with aqueous extract of neem seed kernal @ 0.5% twice at 8 days interval was effectively checked the pest population as it has strong antifeedant and repellent activity [52,53] and stated that azadirachtin (0.3%) as effective one against citrus butterfly among the various neem products. The biopesticides *Bacillus thuringiensis* Var. *Kurstaki* (BTK), @ 2g/L and Azadirachtin 0.5% and Nimbecidin 0.03% at 4.5ml/L are effective botanicals against butterfly larvae. Hence these findings are somewhat correlated with the result of present investigation and gave support to the data of biorational components. While the results of another treatment could not be compared due to want of literature.

## References

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