Indian Journal of Applied Entomology **23**(1) : 63-65 (2009)

ORGANIC CONTROL OF SHOOT BORER IN ORCHID (*DENDROBIUM NOBILE*) THROUGH BOTANICAL PESTICIDES

NAROTTAM KUMAR MEENA

National Research Centre for Orchids, Pakyong – 737 106, Sikkim, India

ABSTRACT

Bio efficacy of some botanical products of *Azadirachta indica, Allium sativum, Seima walchii, Artimesia, Nicotiana tobacum* and *Datura stramonium* against the shoot borer (*Peridaedala* sp.) of *Dendrobium nobilae* was evaluated under polyhouse conditions. The minimum shoot borer infestation was recorded for Achook (NSKE) 1500 ppm and Neem oil 0.03% (~ 4% and ~ 5% respectively), after 7 days of treatment. Maximum per cent infestation of shoot borer was recorded by *Seima walchii* leaf extract 10% (~ 12% at 7th days after treatment).

Keywords: Shoot borer (*Peridaedala* sp.), *Dendrobium nobile* Bio efficacy, Botanical pesticides

Orchids are fascinating with beautiful flowers and exhibit a wide range of diversity in form, size, colour and texture beyond human imagination. It constitutes an order of royalty in the world of ornamental plants, and hence is of immense horticultural importance (Kaushik, 1983). Orchids are severely infested by the shoot borer (*Peridaedala* sp.), mite (*Tetranychus aurticae*), two species of aphids (*Macrosiphum* sp and *Toxoptera aurantii*), five species of scales (*Pinnaspis buxi, Coccus hesperidum, Lecanium* sp., *Chrysomphalus aonidum* and *Diaspis boisduvali*), mealybug (*Pseudococcus maritimus*), thrips (*Dichromothrips nakahari* Mound), black weevil, grasshopper, snails and slugs. Among these, the shoot borer (*Peridaedala* sp.) is a newly reported serious pest of orchids Nagrare, 2005 besides *Dendrobium nobile*. It causes significant damage to 16 species of *Dendrobium* and 24 species of orchids under 14 genera were also found susceptible to the shoot borer (Nagrare, 2005). Eggs are laid on young shoots and the newly emerged larvae feed on succulent shoots. Later, they bore downward making tunnels and feeding inside the stem leaving excreta at the opening point. Full grown larvae pupate inside the tunnel and the adult emerges through the entry hole. Plant growth is arrested, dead shoot or yellow shoots produced which deteriorate the quality of flowers. To minimize the cost of control measures, insecticidal pollution, pest resistance to insecticides and resurgence, a few botanical insecticides were evaluated for their bio efficacy against the shoot borer.

MATERIALS AND METHODS

Experiment was carried out at the institute's farm, National Research Centre for Orchids (ICAR), Pakyong (27°20"N × 88°40"E), East Sikkim, in the potted plants of orchids, species *Dendrobium nobile* under polyhouse conditions during the year 2007 and 2008. The experiment was laid out as completely randomized design (CRD) with eight treatments including control and each treatment was replicated thrice. Three years old potted plants having 10-15 shoots per pot were evaluated for organic control of shoot borer (*Peridaedala* sp.) with two applications aqueous leaf extracts (10%) of *Seima walchii, Artimesia* and *Datura stramonium* collected from the forest were prepared. Dry tobacco leaves soaked in water over night was used to prepare aqueous extract 10% while garlic was directly ground in mixture thoroughly, filtered and a 5% solution was prepared. Spraying was done by using pre-calibrated hand sprayer (Ganesh). First spray was done when shoot borer infestation built-up sufficiently and the second spray was applied 15 days after first treatment. The observations were recorded by usual count of damaged shoots on randomly selected and tagged five potted plants one day before and 2, 4 and 7 days after treatments. For interpretation, the data on shoot borer infestation from fifteen pots were collected and per cent infestation of damaged shoots was worked out. The data were converted to arc sine transformation and subjected to analysis of variance to determine the treatment effects.

Phytotoxicity

The phytotoxicity due to these plant extracts was recorded in terms of burning symptoms such as lesions on flower buds, flowers, leaves, dryness of plants etc. as suggested by Kavadia and Gupta (1986).

RESULTS AND DISCUSSION

The data presented in the Tables-1 and 2 show that all the treatments were highly significant at 5% level of

Table 1: Efficacy of botanicals against shoot borer, *Peridaedala* sp. on orchid (*Dendrobium nobile*) in 2007

Treatments	Dosages/ Conc.	Per cent shoot damage by shoot borer						Mean
		First Treatment			Second Treatment			
		2 DAT	4 DAT	7 DAT	2 DAT	4 DAT	7 DAT	
Neem oil	5 ml/lit.	10.20* (18.62)**	8.22 (16.66)	8.20 (16.63)	9.35 (17.80)	7.49 (15.88)	7.33 (15.70)	8.47 (16.88)
Garlic extract	5%	13.25 (21.34)	12.35 (20.57)	13.4 (21.47)	13.15 (21.26)	10.58 (18.98)	9.18 (17.63)	11.99 (20.21)
Chilaune leaves (*Seima walchii*)	10%	17.00 (24.01)	15.20 (22.68)	16.45 (23.67)	17.00 (24.60)	14.50 (22.65)	13.00 (20.84)	15.53 (23.07)
Dhatura leaf extract	10%	14.10 (22.05)	13.10 (21.21)	14.15 (22.09)	13.19 (21.29)	11.00 (19.36)	10.20 (18.62)	12.62 (20.77)
Achook (NSKE) 1500 ppm	5 ml/lit.	9.30 (17.62)	7.24 (15.60)	7.32 (15.69)	8.45 (16.89)	6.50 (14.76)	6.28 (14.50)	7.52 (15.84)
Tita pat extract (Artimissia)	10%	16.26 (23.78)	15.00 (22.78)	17.00 (24.34)	16.15 (23.69)	14.08 (22.03)	12.60 (20.73)	15.18 (22.89)
Tobacco extract	5%	13.00 (21.11)	11.92 (20.16)	12.89 (21.01)	12.30 (20.53)	9.68 (18.12)	9.45 (17.88)	11.54 (19.80)
Control (untreated)	–	21.89 (27.86)	24.56 (29.69)	27.61 (31.65)	23.08 (28.63)	21.80 (27.76)	18.91 (25.77)	22.98 (28.56)
Mean		14.38 (22.05)	13.45 (21.17)	14.63 (22.07)	14.08 (21.89)	11.95 (19.94)	10.87 (18.46)	
Sem ±		0.39	0.56	0.45	0.45	0.47	0.87	
CD (P=0.05%)		1.18	1.68	1.34	1.34	1.41	2.60	

*Mean of three replicates; DAT – Days after treatment ** Figures in parentheses are arc sine transformed values

Table 2: Efficacy of botanicals against shoot borer, *Peridaedala* sp. on orchid (*Dendrobium nobile*) in 2008

Treatments	Dosages/ Conc.	Per cent shoot damage by shoot borer						Mean
		First Treatment			Second Treatment			
		2 DAT	4 DAT	7 DAT	2 DAT	4 DAT	7 DAT	
Neem oil	5 ml/lit.	8.78* (17.23)**	6.65 (14.94)	6.20 (14.40)	7.00 (15.32)	5.10 (13.05)	5.00 (12.88)	6.46 (14.64)
Garlic extract	5%	11.63 (19.94)	10.05 (18.48)	9.62 (18.06)	11.00 (19.36)	9.92 (18.35)	9.30 (17.68)	10.20 (18.64)
Chilaune leaves (*Seima walchii*)	10%	15.97 (23.53)	13.60 (21.90)	13.65 (21.96)	14.00 (22.11)	12.55 (20.89)	12.30 (20.82)	13.68 (21.87)
Dhatura leaf extract	10%	13.13 (21.19)	11.55 (19.86)	11.10 (19.45)	12.30 (20.53)	10.97 (19.33)	10.06 (18.48)	11.52 (19.81)
Achook (NSKE) 1500 ppm	5 ml/lit.	7.85 (16.27)	5.80 (13.92)	5.92 (14.06)	6.20 (14.40)	4.40 (12.09)	4.31 (11.96)	5.75 (13.78)
Tita pat extract (Artimissia)	10%	14.55 (22.35)	12.40 (20.61)	12.58 (20.77)	13.10 (21.16)	12.25 (20.44)	12.25 (20.48)	12.86 (20.97)
Tobacco extract	5%	11.35 (19.68)	9.15 (17.60)	8.86 (17.31)	10.00 (18.42)	8.02 (16.30)	7.55 (15.94)	9.16 (17.54)
Control (untreated)	–	19.05 (25.84)	22.46 (28.25)	25.30 (30.12)	20.63 (27.01)	18.55 (25.51)	17.00 (24.34)	20.50 (26.85)
Mean		12.79 (20.75)	11.46 (19.44)	11.65 (19.52)	11.78 (19.79)	10.22 (18.24)	9.72 (17.82)	
Sem ±		0.40	0.52	0.42	0.54	0.43	0.53	
CD (P=0.05%)		1.21	1.54	1.26	1.61	1.30	1.59	

*Mean of three replicates; DAT – Days after treatment ** Figures in parentheses are arc sine transformed values

significance over untreated control indicating that all were effective. Achook (NSKE) 1500 ppm (5ml/lit.) was significantly superior over other treatments except Neem Oil (5ml/lit) which was statistically at par. The average damaged shoot was minimum for Achook (NSKE) 1500 ppm (4.31%) followed by Neem Oil (5.00%) at 7 days after treatment in 2008 during second spray. Shoot borer infestation continuously increased in untreated potted plants of orchid. The pest, *Peridaedala* sp. was first reported in 2005 (Nagrare, 2005) hence no work was reported for the control of shoot borer through botanicals especially in orchids. Earlier, Ambekar *et al.* (2000) observed that Achook and Nimbecidine (0.03% EC) could be effective in controlling the shoot borer in okra. Gowri *et al.* (2002) reported that Nimbecidine (1.0%) was effective against the shoot and fruit borer in okra crop. Sardana and Kumar (1989) reported that plant oils especially Neem Oil (2%) was effective against *Earias vittella* on okra and recommended its use in an integrated control scheme. The maximum damaged shoots of 12.30 per cent was recorded in case of *Seima walchii* leaf extract (10%) followed by *Artimissia* leaf extract (10%) (12.25%) at the end of 7th day after treatment.

Phytotoxicity: Foliar application of the botanical products on the flowers and vegetative parts of orchids had no phytotoxic symptoms. The quality of the flower (shape, size and colour) was also not deteriorated.

ACKNOWLEDGEMENT

I am grateful to the Director, National Research Centre forOrchids for providing necessary facilities and co-operation during the course of investigation.

REFERENCES

Ambekar, J.S., Panwar, A.S. and Sakhare, M.V. (2000). Bioefficacy of certain *Neem* products against okra fruit borer. *Journal of Maharashtra Agricultural University,* **25** :42-45.

Gowri, S., Rao, G.R. and Nagalingam, B. (2002). Evaluation of certain new *Neem* formulations against okra fruit borer, *Earias vittella* (Fab.) and their effect on yield. *Journal of Entomological Research,* **26**: 245-247.

Kaushik, P. (1983). *Ecological and Anatomical Marvals of the Himalayan Orchids.* Today and Tommorrow's Printers Publishers, New Delhi, India.

Kavadia, V.S. and Gupta, H.C.L. (1986). Generation of data on bio-efficacy, residue and half-life of pesticide formulations. Final Technical Report submitted to Sukhadia Univ., Deptt. of Entomology, Rajasthan College of Agriculture, Udaipur (Raj.).

Nagrare, V.S. (2005). New record of shoot borer *Peridaedala* sp. (Lepidoptera: Tortricidae) and its host range of orchids. *Entomon*, **30**: 359-360.

Sardana, H.R. and Kumar, N.K.K. (1989). Effectiveness of plant oils against leaf hooper and shoot and fruit borer on okra. *Indian Journal of Entomology*, **51**: 167-171.