



FIRST RECORD OF *TRILOCHA VARIANS* (FAMILY: BOMBYCIDAE) A PEST OF *FICUS BENJAMINA* (L.) AND IT'S BIOLOGY IN TALWANDI SABO, DIST BATHINDA, PUNJAB

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ABSTRACT

The occurrence of *Trilochoa varians* (Bombycidae: Lepidoptera) larvae damaging the leaves of *Ficus benjamina* is reported for the first time from Talwandi sabo, district Bathinda, Punjab. The biology of *Trilochoa varians* was studied on *Ficus benjamina* (L.) under the laboratory conditions. The results on different biological parameters showed that the fecundity of female ranged from 164 to 275 which increased its survival rate. It has five larval stages. The last instar changed its colour to dark reddish. The longevity of females was higher (10.3 ± 0.53 days) than the males (5.5 ± 0.37 days). The information contained in this paper will lead to proper management practices during peak reproductive period of *T. varians* to avoid pest outbreak.

KEY WORD: *Trilochoa varians*, *Ficus benjamina*, biological studies.

INTRODUCTION

Ficus benjamina is a decorative ornamental plant of family Moraceae commonly it is known as weeping fig which is native to tropical and sub-tropical countries like India and Southeast Asia (Zolotuhin & Witt, 2009). *F. benjamina* has been reported effective in removing gaseous formaldehyde from indoors (Kim *et al.*, 2008). It also has several medicinal properties. Its roots, leaves, fruits and latex are frequently used for the treatment of various illnesses (Sirisha *et al.*, 2010). It was reported to having anti-tumor and anti-fungal properties (Mousa *et al.*, 1994; Lansky *et al.*, 2008). *F. benjamina* is vulnerable to pests including mealybugs and whiteflies (Walton and Pringle, 2004; Avery *et al.*, 2011). During the present studies *F. benjamina* was found infested with severe infestation of *T. varians*. Apart from *F. benjamina* it also feeds on other species like *F. religiosa*, *F. infectoria*, *F. elastica* and *F. benghalensis* (Kedar *et al.*, 2014). The young larvae feed on leaves, twigs and tender shoots. As a result of feeding the leaves appear transparent. However the late instars cause complete defoliate of the plants. The review of literature revealed that this was the first report of *T. varians* feeding on *F. benjamina* in this region (Talwandi Sabo, Dist. Bathinda Punjab). Earlier *T. varians* infesting several species of ficus has been reported in Haryana, Karnataka and Tamil Nadu (Kedar *et al.*, 2014; Udayagiri, 1988; Rajavel & Shanthi, 2007). The present studies recount the biology of *T. varians* under laboratory condition, which will prove useful to formulating proper control measures against this pest.

MATERIALS & METHODS

Talwandi Sabo is a Tehsil head quarter in Malwa region of Punjab, having an area around 3287263 Km². It is located

at latitude 29°59'0" N and longitude 75°5'0" East. Its Climate is Semi arid with wide variations of summer and winter temperatures. In current year (2014-15) the maximum summer temperature reached 49°C and the winter temperature was recorded as low as 2°C. The weather generally remains dry but it was very humid from mid May to end of August. The rainfall concentrated in July to September. Talwandi sabo occupies large area under agriculture. The place also has rich flora of ornamental plants like roses, marigold; trees like amla, sahtoot and pines. GKU Campus is surrounded by *Ficus benjamina* for decoration. The study was conducted from August, 2014 to August, 2015 at Talwandi Sabo (Punjab) the leaves of *F. benjamina* were found to be infested by leaf eating larvae. The larvae were reared under laboratory conditions which emerged. The adult moths were identified by using taxonomic keys and were confirmed with Navsari Agriculture University. Further studies on the different life stages of the pest were carried out by utilizing the laboratory reared adults by using natural host plants.

The biology of *T. varians* was studied on ficus twigs at room temperature (24.3-31.2°C, 48.9-71.7% R.H.) in the laboratory. Harboring larval stages of the moth were collected from the fields and were reared in laboratory. The newly emerge adults males and females were isolated and were provided honey swabs. After mating observation revealed that the females laid eggs inside the boxes. These eggs were used for mass multiplication. Ten replications were used for this experiment. The observations were made daily to record the moulting of larvae, duration of different stages. Longevity of adult moths (males and females) was also recorded.

RESULTS & DISCUSSION

T. varians larvae caused 80 to 90% of defoliation in *F. benjamina*. Heavy infestation was observed from May to December. The trail results indicated that the adult female of *T. varians* deposited 215 ± 33.85 eggs in rows on under surface of the leaves. The eggs were yellow and round flat in shape. Similar results were reported by Daimon *et al.* (2012) on colour and shape of eggs. The eggs hatched in 3-8 days (5.8 ± 0.48). The egg colour changed from yellow to black prior to hatching. There were five larval stages and the duration of 1st, 2nd, 3rd, 4th and 5th instars was 2.63 ± 0.13 , 3.36 ± 0.16 , 3.18 ± 0.13 , 4.45 ± 0.17 and 7.09 ± 0.26 days, respectively. The males were short lived as compared to the females. The mean adult longevity of males was 5.5 ± 0.37 days and that of the females was 10.3 ± 0.53 days. The neonate larvae were brown in colour. However, after 24 hours the larva coloured to greyish white till the fourth instar. The fifth instar larvae were dull brown with grayish bands. A short and fleshy horn was present on eighth abdominal segment. The last instar larvae resembled young branches of *Ficus* spp., making them difficult to locate. Early instars had longer horn than

the final instar. Almost similar description has been given by other workers (Daimon *et al.*, 2012).

The pupation took place in boat-shaped whitish yellow silken cocoons. They were typically spun on the leaves. Similar observations were made by Rajavel & Shanthi, (2007). The head, thorax and abdomen of adults were dark reddish brown. The forewings were pale reddish brown having curved waved lines. The hind wings were grayish with reddish brown outer margins. Jia & Jinxin (1997) reported that the egg, larva, pupa and adult stage lasts for 4-8 days, 11-15 days, 3-17 days and 5-16 days, respectively. Each female lays 155-251 eggs. During the studies ichneumonid wasps were found parasitizing the pupae of *T. varians* and large number of the wasp emerged from these parasitized pupae. Hai-Ying *et al.* (2009) reported three species of *Trichogramma* as potential egg parasitoids of *Ocinara varians*. Udayagiri, (1988) also reported some egg and pupal parasitoids of *T. varians*. The present studies indicated the potential threat by *T. varians* to *F. benjamina*. The results indicate the need for carrying out in-depth study on this larva.

TABLE 1: Biological parameters of *Trilocha varians* on *Ficus benjamina* (L.) under laboratory conditions

Biological Parameters	Mean \pm SD*	Range (days)
Incubation period (days)	5.8 ± 1.549	3-8
First instar (days)	2.6 ± 0.421	2-3
Second instar (days)	3.4 ± 0.527	3-4
Third instar (days)	3.2 ± 0.421	3-4
Fourth instar (days)	4.5 ± 0.527	4-5
Fifth instar (days)	7.1 ± 0.823	5-8
Pupal period (days)	13.7 ± 2.983	10-17
Longevity		
Female (days)	10.3 ± 1.702	6-12
Male (days)	5.5 ± 1.178	4-7
Fecundity (no. of eggs/female)	215.4 ± 33.85	164-275

*Value of mean of 15 replicates \pm SE

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REFERENCES

- Avery, P.B., Mannion, C.M., Powell, C.A., McKenzie, C.L. and Osborne, L.S. (2011) Natural Enemies Managing the Invasion of the Fig Whitefly, *Singhiella simplex* (Hemiptera: Aleyrodidae), Infesting a *Ficus benjamina* Hedge. Florida Entomologist 94:696-698.
- Daimon, T., Yago, M., Hsu, Y.F., Fujii, T., Nakajima, Y. and Kokusho, R. (2012) Molecular phylogeny, laboratory rearing, and karyotype of the bombycid moth, *Trilocha varians*. Journal of Insect Science 12:49.
- Hai-Ying, O., Lin, R., Mei, L., Yi-Jing, C., Yu-Rong, H. and Ming- Yi, T. (2006) Parasitizing capacity of several trichogrammatid species on *Ocinara varians*. Chinese Bulletin of Entomology 43:669-672.
- Jia, L. and Jinxin, L. (1997) Studies on the bionomics of *Ocinara varians* Walker. Entomological Journal of East China 40:31-34.
- Kim, K.J., Kil, M.J., Song, J.S., Yoo, E.H., Son, K. and Kays, S.J. (2008) Efficiency of Volatile Formaldehyde Removal by Indoor Plants: Contribution of Aerial Plant Parts versus the Root Zone. Journal of The American Society for Horticultural Science 133: 521-526.
- Kedar, S. C., Kumaranag, K. M. and Saini, R. K. (2014) First report of *Trilocha* (= *Ocinara*) *variens* and its natural enemies on *Ficus* spp. from Haryana, India. International Journal of Entomology and Zoology Studies 2: 268-270.
- Lansky, E.P., Helena, M.P., Alison, D.P. and Robert, A.N. (2008) *Ficus* spp. (fig): Ethnobotany and potential as anti cancer and anti inflammatory agents, Journal of Ethnopharmacology, 119: 195-213.

Mousa, O., Vuorela, P., Kiviranta, I., Abdel Wahab, S., Hiltunen, R. and Vuorela, H. (1994) Bioactivity of certain Egyptian Ficus species. Journal of Ethnopharmacology 41: 71-76.

Rajavel, D.S. and Shanthi, M. (2007) Note on the first occurrence of *Trilocho* (= *Ocinara*) *varians* walker (Bombycidae: Lepidoptera) as a pest of pipal tree (*Ficus religiosa*) in Madurai, Tamil Nadu. Indian Forester 133:1706- 1708.

Sirisha, N., Sreenivasulu, M., Sangeeta, K. and Chetty, C. M. (2010) Antioxidant Properties of Ficus Species – A

Review. International Journal of PharmTech Research 2: 2174-2182.

Udayagiri, S. (1988) Life history and new records of natural enemies of *Trilocho varians* (Walker) (Lepidoptera: Bombycidae). Annals of Entomology 6:1-6.

Walton, V. M. and Pringle, K. L. (2004) Vine mealybug, *Planococcus ficus* (Signoret) (Hemiptera: Pseudococcidae), a Key Pest in South African vineyards A Review. South African Society for Enology and Viticulture 25: 54-62.

Zolotuhin, V.V. and Witt, T.J. (2009) The Bombycidae of Vietnam. Entomofauna 16:231-272.