



RESEARCH NOTE

Report on the occurrence and biology of *Thalassodes pilaria* Guenée (Lepidoptera: Geometridae) on litchi (*Litchi chinensis* Sonn.) in Bihar, India

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Litchi or lychee (*Litchi chinensis* Sonnen) is one of the most important subtropical fruit trees of the family Sapindaceae. The translucent, flavoured aril or edible flesh of the litchi is popular as a table fruit in India, while in China and Japan it is preferred in dried or canned state. India is the second largest producer of litchi in the world after China with an area and production of 82,000 ha and 555,000 tonnes, respectively during 2012-13 (DAC, 2013). Pests are one of the major constraints affecting production and quality of litchi. In recent years, a change in pest dynamics has been observed in litchi (Kumar *et al.*, 2011). The occurrence of a green looper, identified as *Thalassodes pilaria* (Lepidoptera: Geometridae) was recorded on litchi trees in Bihar state during scouting surveys of farmer fields. The moths are commonly called Big emerald. The population of the pest was monitored in a fixed plot at National Research Centre for Litchi (NRCL) Experimental Farm during 2012. The mean number of insects (count) per 100 leaves was recorded.

Rearing of the pest was done in laboratory on litchi leaves at a temperature of $28 \pm 1^\circ\text{C}$, relative humidity $70 \pm 5\%$ and photoperiod 12:12 h L:D conditions. The young larvae (1st and 2nd instars) were collected from field and reared in the laboratory in Petri dishes (18 cm diam.). The pupae were transferred to insect rearing jar (8.5 cm \times 8.5 cm \times 15 cm) for emergence of adults. A filter paper disc with a cotton swab dipped in honey was kept in each rearing jar. Morphometric measurements of different stages were taken and biology was studied. Insect morphology was studied with the help of a stereo-binocular microscope. The data on looper counts were subjected to analysis of variance (ANOVA) after square root transformation. The least significant differences (LSD) between means at 5% significance level ($P = 0.05$) and the standard error (SE) of means were computed. The diagnostic symptoms of damage and characteristics of the pest as well as summaries of studies conducted to assess the occurrence of pests in litchi are described.

The larvae of *T. pilaria* fed on tender foliage and resembled a green stick similar to the midrib of leaves or thin shoots that served as a camouflage for the pest (Fig. 1). Studies on the biology of the pest revealed that larvae were green resembling to colour of young leaves which gradually changed to darker green as the leaves became older. The dimensions of fully grown larvae (last instar) were approximately 2 mm wide and 3.6-4.3 cm (mean 3.86 ± 0.109) long. The width of head capsules in last instar larvae were 1.4-1.6 mm (mean 1.52 ± 0.055). The pupae were 1.4-1.7 cm (mean 1.54 ± 0.047) long and the adults with fully spread wings were 2.7-3.0 cm (mean 2.83 ± 0.047) wide. The developmental period from larva to adult was completed in 18-23 days (mean 20.11 ± 0.962), out of which the larval period was 9-13 days (mean 10.89 ± 0.981), the pupal period was 6-7 days (mean 6.67 ± 0.272) and adult period was 2-3 days (mean 2.56 ± 0.192). The adults, however, failed to mate in the laboratory (temp. $28 \pm 1^\circ\text{C}$, RH $70 \pm 5\%$, and 12:12 h L:D). The newly formed pupa was greyish brown in colour. The adult moth had sea-green colour wings which were semitransparent having fine white lines (Fig. 2). Fore wing was broad, triangular and leading edge was yellowish brown, crossed by two distinct white lines and a number of faint transverse marks which was also white. The distinct fine white lines continued up to terminal edge of hind wings, converging to form a 'W' $\frac{3}{4}$ way along length. The hind wings had an angular margin. Underside of the moth was greenish white. Legs and antennae were yellowish brown. The first half of antennae was feathery while second half was threadlike.

The period of occurrence of this pest was from July to December. The peak infestation was observed from 15th September to 15th October that coincided with the occurrence of another geometrid pest of litchi, *Perixera illepidaria* Guenée. During September and October 2012,



Fig. 1. Larva of *T. pilaria* feeding on young leaves of litchi.

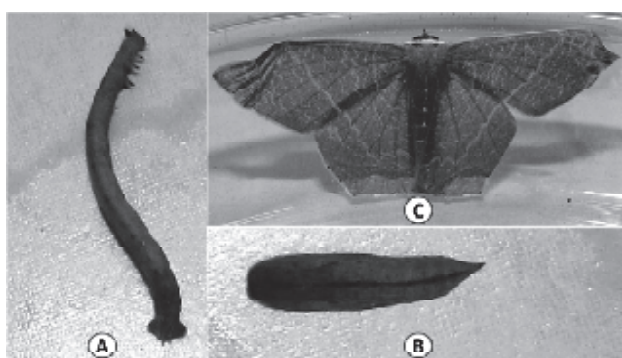


Fig. 2. The developmental stages of *T. pilaria*: A. Larva, B. Pupa and C. Adult

the mean temperatures were 25.3-32.2 °C and 21.1-31.6 °C, and the mean relative humidities were 70.6-89.7% and 56.4-84.8%, respectively. The photoperiod conditions at experimental farm of NRCL on 15th September, and 15th October was 12.18:11.42 h L:D and 11.33:12.27 h L:D, respectively. The data on larval count at 15 days interval during 2012 are given in Fig. 3. A statistically significant difference in mean larval counts per 100 leaflets (SEm 0.34 ± 0.12 , $P = 0.05$) at different interval during the period of occurrence was observed. It was evident from the data that the mean number of looper larvae per 100 leaflets significantly varied from 1.66 to 13.56. The highest mean count (13.56/100 leaflets) was on 15th October in the litchi orchard block at NRCL Farm. The population increased after 15th July and and decreased significantly after 30th November.

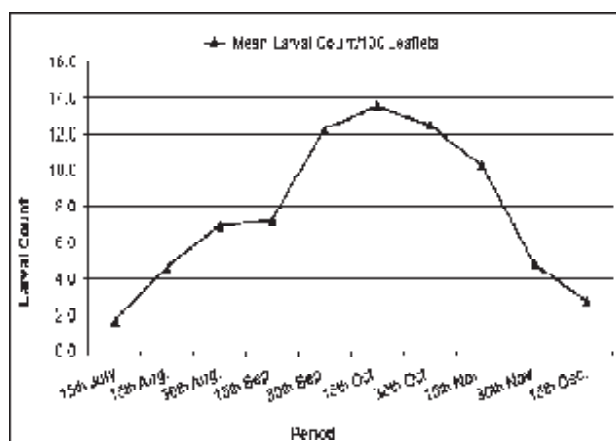


Fig. 3. Temporal distribution of *T. pilaria* in litchi at Muzaffarpur

The species, *T. pilaria* was first described by Guenée (1857). The adult moths of this species are members of the group called ‘Emeralds’. This species occurs across the south Pacific basin, including Fiji, Society Islands, Tahiti, Queensland in Australia (Anonymous, 2011), Indonesia (Sulawesi), Vanuatu, and Rarotonga on Cook Islands (Anonymous, 2007). This is a polyphagous pest feeding on several host tree species and is known to damage litchi in New Caledonia (Anonymous, 2007). Hung *et al.* (2006) had recorded a related species, *Thalassodes immisaria* Walker feeding on litchi (*L. chinensis*) and longan (*Dimocarpus longans*) in Taiwan. So far, this species has not been reported from India as a pest of litchi. Though, the incidence of this pest currently is not at an alarming level, with the change of the cropping pattern vis-à-vis climate change, there is a chance that the pest status of this species in litchi ecosystem may also change and hence warrants a regular monitoring.

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REFERENCES

Anonymous, 2007. Cook Islands Biodiversity and Natural Heritage – Biodiversity Database. <http://cookislands.bishopmuseum.org/species.asp?id=7825> (accessed 19 December 2013).

Occurrence of looper on litchi

- Anonymous, 2011. *Thalassodes pilaria* Guenée. <http://lepidoptera.butterflyhouse.com.au/geom/pilaria.html> (accessed 19 December 2013).
- DAC, 2013. State of Indian Agriculture, 2012-13, Govt of India, Ministry of Agriculture, Department of Agriculture & Cooperation, New Delhi, India Offset Press, New Delhi.
- Guenée, A. M. 1857. *Thalassodes pilaria*. *Histoire naturelle des insectes, Spécies général des Lépidoptères*, **9**: 361.
- Hung, C. C., Hwang, J.S. and Wang, H.Y. 2006. Survey of lepidopterous pests of litchi and longan in Taiwan. *Formosan Entomologist*, **26** (1): 27-44.
- Kumar, V., Kumar, A. and Vishal Nath, 2011. Emerging pests and diseases of litchi (*Litchi chinensis* Sonn.). *Pest Management in Horticultural Ecosystems*, **17**: 11-13.

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