Biological Forum – An International Journal **13(3): 492-496(2021)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

New Report on Pine Tent Caterpillar *Dendrolimus pini* L. (*Lasiocampidae*: *Lepidoptera*) from Eastern Ghats Forest region of Visakhapatnam, Andhra Pradesh, India

P. Seetharamu[1*], D. Sekhar[2], K. Babuji Naidu[3] and G. Ramarao[4]

[1]Senior Scientist (Entomology), ANGRAU, Regional Agricultural Research Station, Chintapalle, Visakhapatnam District-531 111, (Andhra Pradesh), India.
[2]Senior Scientist (Agronomy), Regional Agricultural Research Station, Chintapalle, Visakhapatnam District-531 111, (Andhra Pradesh), India.
[3]Teaching Associate (Entomology), Agricultural Polytechnic, Regional Agricultural Research Station, Chintapalle, Visakhapatnam District-531 111, (Andhra Pradesh), India.
[4]Associate Director of Research, ANGRAU, Regional Agricultural Research Station, Chintapalle, Visakhapatnam District-531 111, (Andhra Pradesh), India.

(Corresponding author: P. Seetharamu)*
(Received 31 May 2021, Accepted 14 August, 2021)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: A field survey was conducted for insect pests on various crops grown in and around the Chintaplle forest region and on farm at Regional Agricultural Research station, Chintapalle, Andhra Pradesh, India during *rabi*, 2020-2021. We have reported the pine tent caterpillar/pine lappet moth *Denrolimus pini* L. (*Lasiocampidae*: *Lepidoptera*) on apple and pine trees for the first time from Eastern Ghats forest region of Visakhapatnam district, Andhra Pradesh, India. The incidence of tent caterpillar was first noticed during the month of December, 2020 on pine trees in the region and apple, silver oak on farm. In this report attempts are made to describe about the first occurrence of pine tent cater pillar in the eastern ghats of Andhra Pradesh. We have collected and reared the caterpillar in the entomology laboratory and identified the caterpillar based on the larval chaetotaxy *i.e.*, mature caterpillars have soft, grey to brown hairs, thick bands of steel blue and black hairs on the thorax, and a black mark flanked by irregular white lines on the abdominal segments. The adults are robust, reddish brown forewings include grey-brown to brown forewings with a reddish-brown lateral band and an irregular dark-brown to black stripe along the edges; white circular spot is conspicuous at the base of the fore wings. All the descriptions and biology of the pine tent cater pillar was documented with neat photographs and the specimens were deposited in the laboratory at RARS, Chintapalle. This study will enlighten the information regarding the occurrence, distribution and damage of pine tent cater pillar and forms a baseline data for future studies could be conducted to obtain more details and documentation on Lasiocampidae insect pest diversity and effective tactics for the management of the insect pest in the eastern ghats region of Andhra Pradesh.

Keywords: *Lepidoptera, Lasiocampidae*, Larval Chaetotaxy, morphological description, biology, New record from Eastern ghats of Andhra Pradesh, India.

INTRODUCTION

In the order Lepidopetra diversified nocturnal and crepuscular habit moths are in the family Lasiocampidae. Lasiocampidae are small to large sized insects with wingspan ranges between 20–180 mm (Zolotuhin and Pinratana, 2005). The body is stout, remarkably hairy often provided with broad triangular or rounded forewings and almost circular small hind wings, lacking wing-coupling. Adults often sexually dimorphic being females are larger than males. The family *Lasiocampidae* consists of 1,952 species (224 genera) worldwide (Vannieukerken *et al*., 2011). Many insect species are reported to feed on pines (Hutacheram and Tubtem, 1995). The *Lasiocampidae* are commonly known as Lappet moths due to presence of decorative skin flaps on prolegs of their caterpillars (Jatishwor *et al.*, 2020). In Indian Himalayas and north east India (Sikkim and Arunachal Pradesh) recent studies conducted by Zoological survey of India reports the presence of 39 species of *Lasiocampidae* (Sanyal *et al.*, 2018; Husain, 2020). The pine-tree lappet moth (*Dendrolimus pini* L.) is periodically a serious defoliating insect pest in parts of continental Europe, where its caterpillars have been responsible for major

damage to Scots pine forests as well as Russia and parts of Asia and it has also been reported in North Africa (Malyshev, 1997; Roger *et al.,* 2017; EPPO, 2020). The pine lappet moth *Kunugia latipens* Walker (*Lepidoptera*: *Lasiocampidae*) the arboreal defoliator and it has been reported as a ma jor insect pest of pins in the Meghalaya region (Thakur and Pathak, 1983. Recently, an outbreak of lappet moths were observed in the mid-altitude hills of Meghalaya during May–June 2011 (Firake *et al*., 2012). The caterpillars are causing serious damage on tropical pine trees and also attack other species of coniferous trees such as firs (*Abies* species), Himalayan cedars (*Cedrus* spp.), Junifer, eucalyptus and mango (Moore, 2011, Jatishwor *et al*., 2020). The pine tent caterpillar, *Dendrolimus pini* L. *Lasiocamipdae*: *Lepidoptera* was reported for the first time on pine, apple, silver oak trees in the forest area of eastern ghats of Andhra Pradesh, India and the biology of the species are described in this report.

MATERIALS AND METHODS

Study area: The Eastern Ghats are a long chain of broken hills and elevated plateaus, running about 1750 km with an average width of about 100 km between Mahanadi and Vaigai rivers along the Indian East coast through Orissa, Andhra Pradesh and Tamilnadu. Eastern Ghats of northern Andhra Pradesh lies between 16°15'–19°12′N & 80°50′–84°47′E and runs through Srikakulam, Vizianagaram and Visakhapatnam. The study area is under High Altitude Tribal Zone of Andhra Pradesh consists of 26 tribal mandals of Srikakulam, Vizianagaram and Visakhapatnam districts in the Eastern ghats forest region. Out of which 11 mandals are in Visakhapatnam district occupies 55.12 per cent geographical area is under forest of Eastern Ghats. The chintapalle forest range consists of the 3 mandals (Chinthapalli, Koyyuru and Gudem Kotta Veedhi) with wide diversity of forest herbs, shrubs and tree species. The Regional Agricultural Research Station, Chintapalle geographical location is 17° 13′ North latitude, 84° 33′ East longitude and 1200 mts above the mean sea level on Narsipatnam - Bhadrachalam road. Geographically this location forest covers Odisha and Chatishgarh states of India. The forest area receives 1150 - 1300 mm rainfall annually both from south-west and north-east monsoon. The temperatures range from Min. 4°C-17°C to Maximum 20°C-38 °C with a relative humidity varying from 40 – 85%. There are several peaks between 1300 to 1670 m. Sambarikonda near Gudem village is 1670 m, Kappalakonda is 1589 m and Sapprla, Dharakonda is 1365 m above MSL in altitude. The eastern ghats forest of Visakhapatnam consists of diversified plant flora and abundant forest trees like teak, pine, rain trees, bauhinia trees, bamboo, sissoo, silver oak etc. and wide range of medicinal plants and other flora.

During the insect pest survey of field crops the tent caterpillar was noticed on pine trees in the lothugedda, Chinnagedda, Gudem forest areas of chintapalle forest range. Tthe caterpillar feeding on needles of the pine trees on 1st December, 2020 and the same caterpillar was noticed on apple, silver oak at RARS farm on 15th December, 2020. The caterpillars were collected and reared in entomology laboratory of Regional agricultural research station chintapalle and studied the detail biology of pine tent caterpillar (*Dendrolimus pini* L.) which is belongs to family *Lasiocampidae* of the order *Lepidoptera*. The species identification was confirmed with the available information and reports from other countries where the species is a native of Scottland, Europe and parts of Asian countries. The morphometrics i.e. larval chaetotaxy, adult descriptions and biology information was documented. The specimens were deposited in the laboratory at RARS, Chintapalle.

RESULTS AND DISCUSSION

The pine tent caterpillar, *Dendrolimus pini* L. *Lasiocamipdae*: *Lepidoptera* was reported for the first time on pine, apple, silver oak trees in the forest area of eastern ghats of Andhra Pradesh, India. The caterpillars are more destructive and feeds on the needles of pine trees and other host plants like apple, silver oak, Jamun etc,. The brief descriptions of the tent caterpillar are presented
hereunder

A. Description of the Pine tent caterpillar (Dendrolimus pini L. *lasiocamipdae: Lepidoptera):*

Larva: The caterpillar is stout and elongated with huge setae on the body. The Fully grown caterpillars measures up to 7.6cm in length. The identification features mainly based the larval chaetotaxy. Matured caterpillars have soft, grey to brown hairs, thick bands of steel blue and black hairs on the thorax, and a black mark flanked by irregular white lines on the abdominal segments. The fully grown larval body dorsal region consists of white and brown diamond shaped markings are present which are looks like bark on trunk of the pine trees. The fully grown caterpillar move down the trees to over-winter in the leaf litter and soil close to the base of the trees. The final instar larvae enters into pupation on 31-12-2020. The total larval period is 4 weeks (Figs. 1-4).

Fig. 1. Pine tent caterpillar. **Fig. 2.** (Dorsal and ventral views).

Fig. 3. Final instar larva. **Fig. 4.** Spinning of cocoon.

Pupa : The final instar larvae was ready for pupation; prior to that it spins a loose transparent yellowish cocoon for pupation. The pupa is dark reddish brown in colour and measured about 5.7cm in length and the total pupal period is 4 weeks the information pertains to various lepidopteron families (Eribidae and Noctuidae) pupal period is in conformity with the findings of Sondhi and Sondhi, (2016); Husain, (2020); Shah *et al.*, (2021) (Fig. 5-6).

Fig. 5. Casted skin and Pupa. **Fig. 6.** Pupal mesurment.

Adults: The adult highly phototrophic; large and robust. The forewings are reddish brown include grey-brown to brown with a reddish-brown lateral band and an irregular dark-brown to black stripe along the edges. White circular spot is conspicuous at the base of the fore wings. Hind wings are red brown to grey-brown with a length of 5.5cm width 1.9cm and hind wings length is 2.9cm. White bands on the abdomen. Males are usually darker than females. The adults are emerged from the pupa on 1-2-2020 (Fig. 7-10). The present report morphological descriptions of the larva, pupa and adult characters of *Dendrolimus pini* L. are in conformity with the findings of Smetacek, (2008), Forestry commission, (2019); Ahara and Cotrell, (2013), Roger *et al.*, (2017), Sondhi and Sondhi, (2016).

Fig. 7. Adult pine lappet moth.

Fig. 8. Forewing length measurement.

Fig. 9. Width of forewing.

Fig. 10. Length of Hind wing.

CONCLUSIONS

As a part of the insect pest survey programme the pine tent caterpillar was noticed on pine, apple, silver oak and Jamun and reported for the first time from India in the eastern ghats of Visakhapatnaam district of Andhra Pradesh, India. There is a scope of this insect pest may switch over to other forest trees and may cause damage to the forest trees. Keeping in view of the occurrence of the insect pest on pine, silver oak and apple in this region future research will be focused on collection, identification, host range and detailed biology of the insect pest and their natural enemies and also focused on eco friendly management tactics to contain the insect pest in forest ecosystem.

Acknowledgements. The first author is highly thankful to Acharya N G Ranga Agricultural university Lam, Guntur, Andhra Pradesh and Associate Director of Research, Regional Agricultural Research Station, Chintapalle for providing the facilities to carry out the present study.

Conflict of Interest. Nil.

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How to cite this article: Seetharamu, P., Sekhar[2], D. K., Naidu, B. and Ramarao, G. (2021). New Report on Pine Tent Caterpillar *Dendrolimus pini* L. (*Lasiocampidae*: *Lepidoptera*) from Eastern Ghats Forest region of Visakhapatnam, Andhra Pradesh, India. *Biological Forum – An International Journal*, *13*(3): 492-496.