



## BIONOMICS OF *CRYPTOPHLEBIA OMBRODELTA* LOWER A MAJOR PEST OF TAMARIND

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### ABSTRACT

The moth *Cryptophlebia ombrodelta* (Lower) is a destructive pest on tamarind, *Tamarindus indica*. Its biology and morphometrics are presented herein with rearing done in the laboratory. The mature larva measures about 1.7 to 2.14 cm (2.12 cm), with pinkish body. The moth is grey, with female laying pale yellowish to white, flat and rounded eggs near the peduncle joint of pod (fruit) or on the pod surface. The eggs hatch 6 to 9 days. The affected pods can be recognized by the entrance hole packed with excreta. It causes about 42% loss to tamarind fruits and completes 3 to 4 generations/ year.

**Key words:** *Cryptophlebia ombrodelta*, Lepidoptera, Tortricidae, tamarind, pest, loss, biology, lifestages, morphometrics, eggs, larva, pupa, adult

The eucosmid (olethreutid) moth *Cryptophlebia ombrodelta* Lower was described from Sydney by Oswald B Lower in 1898 under the name *Arotrophora ombrodelta* Lower (Tindale, 1955). The synonyms of *C. ombrodelta* are: *Arotrophora ombrodelta* (Lower); *C. carpophaga* (Walshingham, 1900); *Pogonozada* (Hampson 1905); and *Thaumatotibia* (Zacher 1915). Twenty two species of this genus are known so far, of which *C. illepida* (Butler), *C. ombrodelta* (Lower) and *C. peltastica* are considered to be major pests (Bradley, 1953). *Cryptophlebia ombrodelta* is reported from India, Sri Lanka, Nepal, Indonesia, China, Taiwan, Vietnam, Thailand, western Malaysia, New Guinea, Philippines, Japan, Guam, Australia and Hawaii. It is considered a pest of legumes. It has been reported to be an important pest of macadamia, litchi, and longan fruit in Asia, Australia and Hawaii (Jones, 1995). The pest is commonly known as tortrix moth, litchi fruit moth, macadamia nut borer and tamarind fruit borer. This study provides some details of its biology and morphometrics.

### MATERIALS AND METHODS

Biology of *C. ombrodelta* was studied in the laboratory (21-32°C, 68-80%RH) in Shaheed Gundadhoor College of Agriculture and Research Station, Jagdalpur (Bastar). Mature pupae were collected from infested fruits of tamarind and reared in plastic cages of size 26 x 15 x 7.5 cm. Emerged adults were allowed to lay eggs in the rearing cage. The open end of the rearing cage were covered with fine cloth and tightened with rubber bands. Egg hatchability was studied in petridishes. The

larval, pupal and adult durations were also recorded with rearing done under petridishes. Observations from egg to adult stages were recorded at 24 hr interval.

### RESULTS AND DISCUSSION

The adults of *C. ombrodelta* mate in shady and cool places during day time, and lays eggs singly. These egg are pale yellowish white, flat and rounded, with irregular lines on their chorion. After 3-4 days, these have their chorion beautifully sculptured with pinkish red spots, and finally become blackish, and measure 1 mm in dia. These are laid in small groups of about 15 eggs on surface of the pod. Newly emerged larva is about 0.4-0.6 cm long, with average of 0.6 cm. It is creamy-white, with black head, and enters into the fruit from pedicel joint and rarely from middle of the fruit. Larvae feed up to 3-5 cm length of fruit to attain its maturity. Mature larva measure about 1.7-2.14 cm long (2.12 cm) and are pinkish, with head dark reddish and partly retractable in the prothorax. The antennae are small and 3-jointed. Thorax bears 3-jointed legs and the prolegs are borne by the 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> and 10<sup>th</sup> abdominal segments. Pupa is obtect, adecticous type and dark reddish, covered within the silken cocoon. It measures about 0.8-1.1 cm long (0.96 cm), 0.25-0.35 cm broad. About 10 segments are distinct from above. The eyes are small and dark black, antennae and legs are fused ventrally. Anus lies ventrally on the 10<sup>th</sup> segment. Three to four generations are completed till maturity of the fruit, and it is more fertile from July to September, with eggs laid singly or in group of 1-3 near the peduncle joint of fruit.



Figs. 1-6. *Cryptophlebia ombrodelta* 1. Newly laid egg, 2. First instar larva, 3. Mature larva, 4. Pupa, 5. Female moth, 6. Male moth

The eggs hatch in 6 - 9 days, with embryo when fully developed within the chorion making a hole and thrusts its body slowly through this opening. Newly emerged tiny larva bites a small hole into the fruit and begins to feed. The larva as it grows continues to make tunnels within the fruit. In general, one larva is seen in a single fruit but 1-3 larvae may be present. The larval instars are from five to six, occupying 18- 23 days, with fully fed larva pupating in the larval tunnel under a silken cocoon covered with its excreta. Pupal period lasts for 12-16 days, with moth emerging by rupturing the pupal coat of silken covering, and flying away (Fig. 1-6). It is distributed in India, Sri Lanka, Nepal, Indonesia, China, Taiwan, Vietnam, Thailand, West Malaysia, New Guinea, Philippines, Japan, Guam, Caroline Is., Australia and Hawaii (Robinson et al. 1994). In India, it is distributed all over the tamarind growing area of Chhattisgarh such as Bastar, Dantewada, Narayanpur, Bijapur, Kondagaon, Dhamtari and some parts of Rajnandgaon, Sarguja and Raigarh. It can cause severe damage up to 42%, with a single larva damaging about 3-5 cm length of fruit prior to pupation. Larvae are polyphagous and have been observed feeding on plants in several families. Recorded food plants are *Tamarindus indica*, *Parkinsonia aculeata*, *Cassia fistula*, *Cassia occidentalis*, *Senna occidentalis*, *Cassia alata*, *Cassia sophera*, *Cassia bicapsularis*, *Nephelium litchi*, *Acacia* sp, *Aegle marmelos*, *Sesbania aculeata*, *Sesbania grandiflora*, *Feronia*, *Adenanthera pavonia*, *Filicium decipiens*, *Bauhinia hirsuta*, *Bauhinia purpurea*, *Bauhinia malabarica*, *Parkia*, *Prosopis juliflora*, *Coccoloba uvifera*, *Phaseolus lunatus*, *Poinciana pulcherrima* and *Pithecellobium dulce*, citrus, coconut.

Singh (2014) reported that the damage of borer started at the green fruit stage and went up almost till the maturity stage in bael and tamarind. The females lay eggs on the fruits surface and larvae bore into the fruit. Inside the fruit, the larvae feed on the pulp and seed and remained in until adult emergence. Pupation occurred in the fruit near the rind and the adult emerged through an already made borehole leaving behind the

puparium attached to exit hole on the fruit surface. Adults are brown to reddish brown with a dark-brown pretornal spot that was more pronounced in females. Late instar larvae were approximately 13-20 mm long. The abdomen is yellowish white, turning reddish in the final instar. The head and prothoracic shield were black or dark brown in the early instars, turning pale or yellowish brown in the final instar. These observations corroborate with the present findings. Sinclair (1974) reported that the *C. ombrodelta* was reared satisfactorily on an artificial medium. The use of head capsule widths to identify larval instars was complicated by the variable number of instars (five to six).

#### ACKNOWLEDGEMENTS

The authors thank Dr S S Shaw, Dr S C Mukharjee and Dr A K Gupta for their guidance. S G College of Agriculture and Research Station, Jagdalpur is acknowledged for assistance.

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(Manuscript Received: October, 2021; Revised: March, 2022;

Accepted: March, 2022; Online Published: April, 2022)

Online First in [www.entosocindia.org](http://www.entosocindia.org) and [indianentomology.org](http://indianentomology.org) Ref. No. e21232