

OBSERVATIONS ON THE LIFE CYCLE OF *LYMANTRIA DETERSA* WALKER, 1865 (LEPIDOPTERA: EREBIDAE) AND RECORD OF *TERMINALIA BELLIRICA* AS ITS NEW LARVAL HOST PLANT

PRIYA GUPTA¹ & RAJU KASAMBE^{2*}

¹Room No. 3, Baba Salvi Chawl, Bandongari, Near Pushpa Park Bus Stop, Malad (East), Mumbai, Maharashtra. PIN – 400097.

²Bombay Natural History Society, Dr. Sálím Ali Chowk, Shaheed Bhagat Singh Road, Opposite Lion Gate, Mumbai. PIN- 400001. Maharashtra.

*Corresponding author: r.kasambe@bnhs.org

Reviewer : Peter Smetacek

INTRODUCTION

The study area is called the Bombay Natural History Society (BNHS) Nature Reserve is a forested area spread over 33 acres and is nestled between Dadasaheb Phalke Chitra Nagari (aka Film City) and Sanjay Gandhi National Park in Mumbai City of Maharashtra, India. The Reserve also has a small butterfly garden spread over an area of around one quarter of an acre.

The authors studied the lepidoptera and plant interactions in the BNHS Nature Reserve during a period of six months (September 2022 to February 2023). Field observation as well as rearing of larvae was done to know the larval host plants of butterflies and moths.

This paper describes findings about the Detersa Tussock Moth *Lymantria detersa* Walker, 1865 (Lepidoptera: Erebidae). It is found in Southern India (Ahmednagar,

Bombay, Belgaum, Nagrishpur, Poona, S. Coorg) (Gupta 1992).

MATERIALS AND METHOD

Eggs or larvae of lepidopterans were collected by authors for rearing. Those were reared and data maintained. The larvae were fed with the staple diet of leaves of the plant on which the larvae were found. The rearing jars were cleaned of the frass every day. The jars were loosely closed to allow aeration but to prevent parasitoids or ants from entering it. A tissue paper was kept inside the jar to absorb the excess moisture from frass of the larvae. Observations about the life cycle in wild were also noted.

OBSERVATIONS

The authors found a group of well camouflaged larvae huddled together on the bark of Baheda tree (*Terminalia bellirica*) trunk inside the Conservation Education Centre (CEC) building in BNHS Nature Reserve, Mumbai. The

larvae were of two sizes, smaller and larger in the same group. They had a unique feeding pattern. When they were small, they were seen feeding on only one side of the leaf and then they would turn to other side just leaving the midvein and secondary venations. The larvae were seen feeding during the night and were never seen feeding during the day time. A similar observation was reported from Coimbatore, India (Pillai *et al.* 1999). Pillai *et al.* (1999) reported that larvae feed at night and hide during the day in loosely spun silken mats to which cut tree needles are appressed to provide further protection.

Many larvae were collected and kept in rearing jars – one in each jar. The larvae were fed with the staple diet of the Baheda *T. bellirica* leaves. The rearing jars were cleaned of the frass every day. Later, the larvae pupated by making cocoons of loose silk threads and pupated inside the rearing jar. The pupae also showed sexual dimorphism, and were also of two sizes. The smaller pupa hatched after 10 days of pupal diapause and a brown moth eclosed. The moth was released after photographing. It had comb-like bipectinate antennae. We identified the moth as a male Detersa Tussock Moth *Lymantria detersa* Walker, 1865 (Lepidoptera: Erebidae) from following features: brown bipectinate antennae, thorax brown, legs cream coloured, forewing brown; basal area black with spot on anal vein, subterminal band brown consisting of wide crescent-shaped spots between veins from costa to posterior margin; fringe light brown with black spots between veins; hindwing colour

being dirty white (Pogue & Schaefer, 2007; Vaylure, 2018).

After a few days, a nearly wingless creature (brachypterous) with bulging abdomen eclosed from the bigger-sized pupa at around 11am. It did not move a bit, possibly due to its heavy abdomen and remained at the same place. It was photographed and identified as Tussock moth (*Lymantria* spp.) which showed the similarity with *Lymantria* sp. found in Sri Lanka. Later we realized that the creature was a mouthless, nearly wingless female of the Detersa Tussock Moth *Lymantria detersa*.. The male and female adults were sexually dimorphic, the female having highly atrophied wings (Strand, 1923) (as good as wingless) and hence were flightless. The female even lacked the feeding parts or the mouth. The female's abdomen looked like a bulging bag full of eggs.

The flightless female was released on the trunk bark of a *T. bellirica* tree. The female released a white liquid (presumably pheromones); after a few minutes, a male arrived and located her. The male flew after mating with the female in the mid-afternoon. The female was seen laying many eggs on the same day and covering those with a dense mat of fine golden hair for the next few days, after which she fell and died (see images). Thus, the female did not even move from the place where the larva had pupated.

The batch of eggs hatched after few days and tiny larvae emerged. Due to their cryptic colouration and habit of huddling together, it was difficult to locate them on the tree trunk. Throughout the day the

group of larvae remained motionless and huddled together forming a shape which resembled the tree bark!

Length of female pupa was bigger and measured 3.3 cm—3.8 cm (average 3.6 cm, n=3). The length of male pupa was 1.4 cm—1.75cm (average 1.55 cm, n=14). The pupal diapause was found to be different for the two sexes. The adult males eclosed from pupae after 8—12 days (average 10.11 days, n=9), whereas the females eclosed after 6 days (n=1). The pupa had tufts of hair loosely spread all over the surface.

In another set of observations four female pupae were collected from the concrete walls of the building, out of which only two adult females eclosed and laid eggs. The third was found dead after eclosion and release. The fourth died by infestation with parasitoids. Hence, the pupal diapause for these individuals was not considered.

In the wild, the larvae were seen hanging with silk threads from the *T. bellirica* tree in early mornings, suggesting they climbed up to feed on leaves in the night. It was seen on many occasions that both male and female larvae had pupated on the concrete walls of the building inside a loose mesh of silk threads.

DISCUSSION

The two reported larval host plants for *Lymantria detersa* are: *Acacia nilotica* (L.) Willd. ex Delile, (Fabaceae) (Strand, 1923); *Casuarina equisetifolia* L. (Casuarinaceae) (Pillai *et al.* 1999; Robinson *et al.* 2010). *Terminalia bellirica*

(Family Combretaceae) has not been reported as a larval host plant for *Lymantria detersa*.

Also, it was speculated that, as with other flightless moth females (e.g., North American Gypsy Moth *Lymantria dispar dispar* (Linnaeus, 1758) and species in the related genus *Orgyia* Ochsenheimer, 1810), fecundity is largely influenced by flightlessness (Pogue & Schaefer, 2007). The *L. detersa* females looked like swollen bags full of eggs. In a literature search, photographic records of the brachypterous or flightless females of *L. detersa* could not be found and thus these could be possibly the first photographic records of the species females.

CONCLUSION

The regular observations of many larvae feeding on the leaves of *Terminalia bellirica* in the wild, as well as rearing on the staple diet of these leaves up to eclosion of adult moths proves its regular use as a larval host plant. The paper also presents possibly the photographic records of the brachypterous females of *L. detersa*.

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Fig 1: Cocoon showing eggs ©Priya Gupta



Fig 2: First instar © Priya Gupta



Fig 3: Larvae in tree trunk © Raju Kasambe



Fig 4: Larvae in tree trunk © Raju Kasambe



Fig 5: Female pupa with loose silk cocoon © Raju Kasambe



Fig 6: Freshly eclosed female laying egg and covering with hair © Raju Kasambe



Fig 7: Male pupa © Priya Gupta



Fig 8: Freshly eclosed male © Priya Gupta



Fig 9: Mating showing sexual dimorphism © Priya Gupta



Fig 10: Mating showing sexual dimorphism © Priya Gupta



Fig 11: Female larvae and parasitoids © Raju Kasambe