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## ***Perina nuda* F. (Lepidoptera: Lymantriidae): An Important Leaf Eating Caterpillar of Fig Trees**

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Cheanban, S., Bumroongsook, S. and Tigvattananont, S. (2017). *Perina nuda* F. (Lepidoptera: Lymantriidae): an important leaf eating caterpillar of fig trees. International Journal of Agricultural Technology 13(4):485-492.

**Abstract** Some biological studies of *Perina nuda* Fabricius was conducted under the laboratory conditions (33° C; 65 %RH). This moth species undergoes complete metamorphosis with four stages in its life cycle: egg, larva, pupa and adult. Mating copulation occurred at night and a female laid eggs in group averaged 46 eggs/group. The number of egg laid by each female of Banyan tussock moth was 168-387 eggs. The egg incubation period lasted for 5.50 days. The caterpillar hatched after that. They went through the growth and development process with 7 larval instars and the developmental time for the 1st to the 7th larval instar was 2.28, 3.08, 3.02, 3.42, 3.67, 3.34, and .610 days, respectively. The larvae have urticating hair and used as a defensive weapon. The hairy setae was carried on through the pupa stage. Adult moths emerged after xxx -day long pupal stage. Life span was found difference between gender. The Banyan tussock moth female tended to live longer than the male insect (7.00 and 5.44 days, respectively). Their larvae are known as leaf eating caterpillars with broader host plants and feed on leaves of fig trees, shrub and lianas in the genus *Ficus*.

**Keywords:** Banyan tussock moth, host plants, fig tree, life history

### **Introduction**

Moraceae is known fig family or mulberry family. It is a medium to large perennial plant with a height of 10-20 meters. It has single leaves which grow alternately. In Thailand, there are more than 72 species of *Ficus*. There are reports of food crops of caterpillars. *Ficus carica* (*Mangifera indica*) and *Artocarpus heterophyllus* (*Ficus caribaeae*), *Ficus* sp, *F. benjamica*, *F. benghalensis*, Leaf retention (*F. retuas* L.) (Hill, 1994; Munisppan *et al.*, 2012). Fig var. Uthumporn (*F. racemasa*), *F. pumila* and *F. religiosa* in foreign countries. Found in China, Hong Kong, India, Sri Lanka (Butani, 1979; Hill, 1994).

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The butterfly is scientifically named *Perina nuda*, established in 1787 by Fabricius. Erebidis classified in family Erebidae, subfamily Lymantriinae and order Lepidoptera were originally classified as Lymantriidae. (Hill, 1994; Fibiger and Lafontaine, 2005). The larvae of the ficus transparent wing moth, are external feeders on the foliage of banyan and *Ficus* spp., resulting in tree defoliation. The transparent wing moth, is a serious pest of banyan (*Ficus* spp.) and is a major defoliator of forest and shade trees in Southeastern Asia (Su *et al.*, 1983). Nowadays, utilization of broad-spectrum chemical insecticides is the only practical method of controlling this caterpillar, but this method may have safety issues in the city, as well as it may cause the natural enemies to delay or suppress field colonization.

**Objectives:** The aim of this study is to investigate external morphology, life history of *Perina nuda* and its host plants.

## **Materials and methods**

*Perina nuda* were collected from fig trees in Bangkok metropolitan areas. *Perina nuda* larvae were placed in plastic boxes for further studies under the laboratory conditions. Both newly emerged male and female these eggs were collected daily and placed in a petridish singly. Color change of eggs was observed and recorded. When the egg hatched, the larva was fed with fig leaves till it turned to be a pupa. Body length and head capsule width of different larval instars were measured. Morphological features of these larvae were observed and recorded. As it turned to an adult, the length and width of wings was measured and photographed including frenulum and fantail character to separate male and female of this insect species.

## **Results**

### ***External morphology of Banyan tussock moths***

**Eggs:** small, maroon color and smooth surface (Fig. 1).

**Larvae:** eruciform larvae, gray head and dark brownish dorsum, thorax with 3 paired legs, prolegs on the 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> and the last abdominal segments, its body covered with 3 different types of setae: charaza, verricule (dense tuft of upright hairs) and verrucae (Fig 2).

**Pupa:** yellowish gray color covered with orange hairy setae (Fig 3.).

**Description of males:** very small proboscis, bipectinate antenna (Fig. 4), body length 10-14 mm (Fig. 5), transparent forewing, one large brown frenulum at the anterior of the hindwing (Fig. 6).



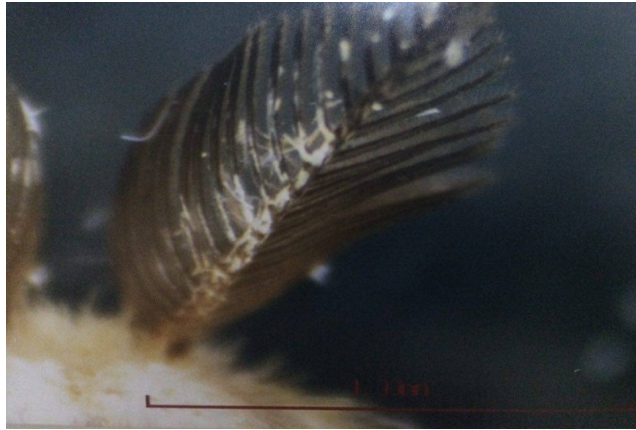
**Figure 1.** Eggs of Banyan tussock moth



**Figure 2.** Urticating spine on the larval surface



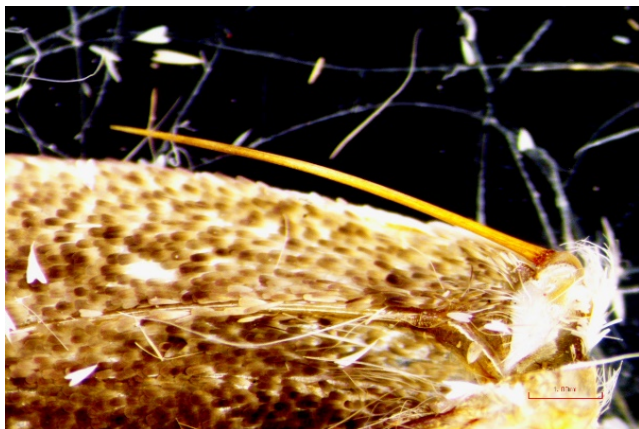
**Figure 3.** A hairy pupa of Banyan tussock moth



**Figure 4.** A bipectinate ante



**Figure 5.** The male adult of Banyan tussock moth

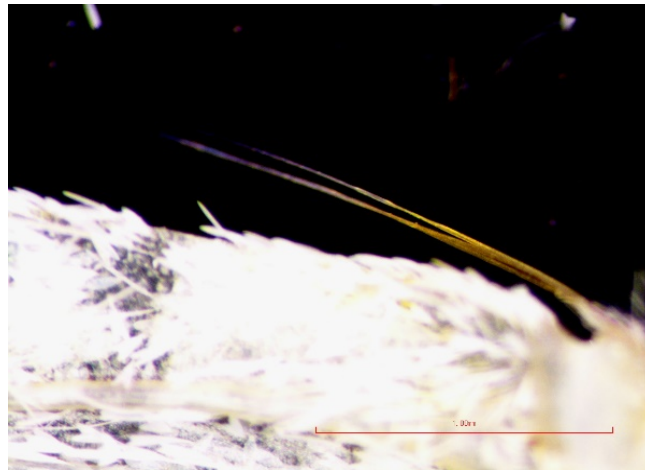


**Figure 6.** A frenulum of the male

**Description of females:** pale yellow head and labial palp, bipectinate antenna, body length 11.0-12.50 mm, abdomen covered with white hairs (Fig. 7), 2-3 smaller frenulums on the hindwing (Fig 8.).



**Figure 7.** The female adult of Banyan tussock moth



**Figure 8.** Frenulums of the female

### ***Growth and development of Perina nuda***

The detail of developmental time for the caterpillar including body length and head capsule width was described in Table 1 and 2. An adult female laid eggs in a group on its host plants. Egg incubation was 5.5 days. The larva infested and caused damage to fig trees (Fig.9) and others in Moraceae family (Table 3 and Fig. 10). The total larval period was 24.90 days before pupation. The pupal stage lasted 4.85 days for the male adult and 4.55 days for the female

moth. After molting, the female moth tended to survive longer than the male (7.00 and 5.44 days, respectively).

**Table 1.** Duration (days) of different developmental stages of *P. nuda* under laboratory conditions

Developmental stage	Mean±S.D.	range
Egg	5.50±0.10	5.21-5.36
Larva		
1 <sup>st</sup> instar	2.28±0.10	2.13-2.42
2 <sup>nd</sup> instar	3.08±0.08	2.92-3.21
3 <sup>rd</sup> instar	3.02±0.27	2.38-3.46
4 <sup>th</sup> instar	3.42±0.37	2.79-3.83
5 <sup>th</sup> instar	3.67±0.44	2.96-4.25
6 <sup>th</sup> instar	3.34±0.35	3.08-4.00
7 <sup>th</sup> instar	6.10±1.71	4.50-9.83
Total larval period	24.90±1.40	22.17-29.21
Male pupa	4.85±0.40	4.50-6.00
Female pupa	4.55±0.46	3.50-5.63
Male	5.44±2.20	4.00-7.00
Female	7.00±2.85	5.00-10.00

**Table 2.** Head capsule width and body lengths (mm) of banyan tussock larvae

Larval instars	Head capsule width		Body length	
	mean±SD	range	mean±SD	range
1	0.43±0.01	0.40-0.45	3.13±0.66	2.00-4.00
2	0.69±0.03	0.60-0.71	4.63±0.72	3.00-6.00
3	0.94±0.02	0.90-1.00	6.38±1.02	4.50-7.50
4	1.43±0.03	1.40-1.50	9.85±1.73	6.50-12.00
5	2.07±0.06	1.90-2.20	12.50±2.28	9.50-17.00
6	2.6±0.09	2.50-2.90	17.73±2.70	14.00-25.00
7	3.57±0.08	3.45-3.70	26.03±3.79	16.00-30.00

**Table 3.** Host plants of *Perina nuda*

Common name	Scientific name	Family
Weeping fig tree	<i>Ficus benjamina</i> L.	Moraceae
Cuetain fig tree	<i>Ficus retusa</i> L.	
Sacred fig tree	<i>Ficus religiosa</i> L.	
Mock bohdi tree	<i>Ficus rumphii</i> Blum	
Banyan tree	<i>Ficus benghalensis</i> L.	
Cluster fig tree	<i>Ficus racemosa</i> L.	
Sacred fig eater	<i>Ficus</i> sp.	
Council tree	<i>Ficus altissima</i> Blume	



**Figure 9.** The insect infestation of Banyan tussock moth



**Figure 10.** The host plants of *Perina nuda*

## Discussion

Hill (2008) stated that *P. nuda* was a larva defoliator. There are more than 72 species of *Ficus* species in Thailand. They were host plants of caterpillars such as *Ficus carica* (*Mangifera indica*) and *Artocarpus heterophyllus* (*F. caribaeae*), *Ficus*, *F. benjamica*, *F. benghalensis*, Leaf retention (*F. retuas* L.) (Hill, 1994; Munisppan *et al.*, 2012). Uhumporn (*F. racemasa*), *F. pumila* and *F. religiosa* in foreign countries. They were found in China, Hong Kong, India, Sri Lanka (Butani, 1979; Hill, 1994). *Ficus* have many insect pest, including insects in the family as follows. Hyspid are *Asota caricae*, *A. plaginota* and *Aganai ficus*, Danaid are *Euploea godarti*, *E. modesta*, Pyralid are *Margaronia ityssalis*, *M. negatalis*, Bombycid, are *Trilocha varians*. Erebid, are *Perina nuda*, Zagaenid are the *Phauna flammans*

*P. nuda* destroy the leaves and the severe outbreak of the caterpillars will cause the leaves to dry and heavy defoliation, resulting in the death of the fig trees. NBAIR (2013) reported in India the Banyan tussock moth was commonly collected from several species of *Ficus* and others such as mango and jackfruit.

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(Received: 31 May 2017, accepted: 30 June 2017)