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Observation on *Trilocha varians* (Lepidoptera: Bombycidae)

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Biological studies of the silkworm larvae in the laboratory revealed that after mating, females laid eggs in consecutive rows, sometimes observed 2-6 layers. These eggs were often found attached to the side of plastic rearing cup or its lid 2-15 eggs/group. Innature, the female usually lay eggs on the dorsal part of the fig leaves, 3-24 eggs/group. The female can lay eggs between 160-270 eggs, whereas the unmated adults can lay 15-183 eggs /insect. These unfertilized eggs would not developed into larvae. Egg incubation period was 3.33-3.62 days. The developmental time for larval instar 1- 5 was 1.97 ± 0.09, 2.00 ± 0.06, 2.03 ± 0.05, 2.12 ± 0.04 and 2.62 ± 0.34 days, respectively. The fully grown of the fifth instar will build cocoon up the apex of the fig leaf. The prepupa stage was 1 day. The pupa is developed within the pupal case for 4.00-5.75 days (average 4.85 ± 0.50 days for male pupa and 4.99 ± 0.50 for female pupa. Adults as they emerged from the coccon, both sexes does not eat due to not well established mouth parts. Mated male moths tend to live slightly longer and vise versa for the mated female(mated male and female:5.96 ± 0.93 and 7.20 ± 1.25 days, respectively and for unmated male and female 5.58 ± 1.00 and 8.28 ± 1.72 days, respectively. The moth would hide among the leaf base of host plants during the day and active at night.

Keywords: *fig* tree, life history, *Trilocha varians*

Introduction

Ficus is classified in Moraceae 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*. *Trilocha varians* is caterpillars usually eat and caused the leaves of the Moraceae family mainly the leaves of the *Ficus* (Zolotuhin and Witt, 2009) silkworms destroy the leaves. The severe outbreak of both caterpillars will cause the leaves to dry and falling off and results in the death of the banyan trees.

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Trilocha varians (Walker) is classified in the order Lepidoptera and Family Bombycidae. These butterflies are closely related to the silk worms (domesticated silkworm moth, *Bombyx mori*) which is categoried in the same order and family. However, the larvae of both insect species have different diets. *Bombyx mori*'s larvae have narrow host plants and they oonsumed only mulberry and *Morus alba*. While the fig caterpillars eat many plants in the family Moraceae, especially the plants in the genus *Ficus* (plants). *Trilocha varians* is considered economic pest of ornamental plants such as *Ficus annulata*, *F. microcarpa*, *F. altissima* and *F. benjamina* This caterpillar will eat the leaf surface of the fig trees and heavy destruction will result in leaf dryness and defoliation. In addition, the same phenomena is found on the fig trees along the roadside, Few research on this moth species is limited especially comparision between domesticated silkworms and *Trilocha varians*.

Materials and methods

Biological characteristics studies of T. varians

The developmental time of egg, larva, pupa and adult of fig silkworm moth(FSM) was observed and recorded(N=30) include mating copulation period of males and females. These larvae were reared in the petri dish with young fig leaves which they were changed every day. Both males and females were placed in an adults rearing cage for mating behavior and egg collection.

Results and Discussion

Biological studies of silkworm larvae under laboratory condition

Biology of FSM was carried out in the entomological laboratory, King Mongkut's Institute of Technology Ladkrabang. Both male and female adults do not feed since their proboscis are absent (Fig. 1 and 2). Adult emergence was from7 pm to 11 pm. It took about 24 hours after they were paired. Mating occurred at night (7 pm till midnight) and lasted for 15-20 hours (Fig 3-4) The female lay group of egg during the night right after mating copulation. Eggs are laid in layers, between 2 and 6 layers attached to a plastic container or lid 2-15 eggs (Fig 5). In nature, the female usually lays eggs in group on the leaf dorsal of the banyan trees from 3 to 24 eggs. During the female's lifespan, it can lay eggs from 160 to 270 eggs while the unfertilized female can lay 15-183 infertile eggs/insect. The egg incubation period is 3.33-3.62 days. The newly hatched 1st instar will break through its egg shell in the morning from 8.00 am to midday (Fig 6). It does not eat the egg shell. There are 5 laval instars The first four larval

instar will consume their exuviae but not the fifth larva instar. The developmental time for instar1-5 is1.97 ± 0.09, 2.00 ± 0.06, 2.03 ± 0.05, 2.12 ±0.04and 2.62 ± 0.34 days, respectively.(Table 1). At the end of the last larva stage, it will transform into a pupa. It will spend 8-12 hours to build up its cocoon on the fig leaf apex. A boat-shaped cocoon, 2 layers, is made of white or yellow papery silk and attach onto the leaf surface. The insect will first woven papery silk onto the leaf surface and then construct the head and terminal end of the cocoon served as a protective shield, then spin the fiber silk to cover its body as a second layer which is very thick and durable. There is a pit for adult exit. Cocoon color is white, yellow or brown. The color of cocoon does not tell the difference between sex of FSM. The prepupa stage is about 1 day old. The pupal stage is 4.88 ± 0.50 days for males and 4.99 ± 0.50 days for females(Table 1). Adult males live for 5.96 ± 0.93 days and 7.20 ± 1.25 days for females. Both sexes do not feed due to no proboscis. In the nature, the adults remain hidden among the bushes of the banyan trees during daytime. However, the results indicated that there are variation in number of larval instar of FSM, this insect species can have 4-6 larval instar under the condition of 29-31 ^{o}C and 65%RH. In general, they do have 5 larval instars. FSM has been reported as an important pest fig plants (Daimon *et al*., 2012;) *Trilocha varians* devastated Ficus. It fed on leaves, and leaves white patches from feeding by early instar and more portions of leaves eaten up by late larvae(Navasero *et al*., 2013; Navasero *et al*., 20140

Fig 1 Adult male of *Trilocha varains*

Fig 2 Adult female of *Trilocha varains*

Fig 3 Mating pair (dorsal view) of the fig silkworm moth

Fig 4 Mating pair (venter) of the fig silkworm moth

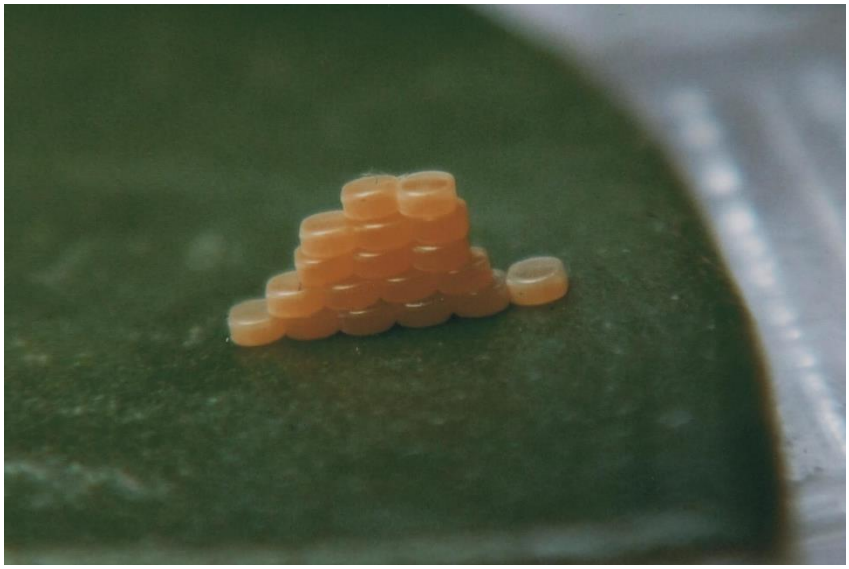

Fig 5 An egg group of *T. varians*

Fig 6 Egg shells of *T. varians* and traces of leaf damage due to the newly hatched larva

Table 1. Developmental time and fecundity of FSM

Stage	n	Mean ± SD	Range
Egg	30	3.47 ± 0.07	3.33 – 3.62
Larva			
1st instar	30	1.97 ± 0.09	1.83 – 2.17
2nd instar	30	2.00 ± 0.06	1.88 – 2.08
3rd instar	30	2.03 ± 0.05	1.92 – 2.17
4th instar	30	2.12 ± 0.04	2.08 – 2.21
5th instar	30	2.62 ± 0.34	2.17 – 3.04
Total larval period	30	10.74 ± 0.58	
Pupa (+ prepupa)			
Male pupa	30	4.88 ± 0.50	4.00 – 5.75
Female pupa	30	4.99 ± 0.50	4.00 – 6.00
Adult logerities			
Male	25	5.96 ± 0.93	5 – 8
Female	25	7.20 ± 1.25	5 – 10

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References

Daimon, T., M. Yago, Y.F., Hau, T. Fujii, Y. Nakajima, R. Kokuaho, H. Abe, S. Katauma and T. Shimada. (2012). Molecular phylogeny, laboratory rearing and karyotype of the bombycid moth *Triloha varians*. Journal of Insect Science 12:49. Available on: www. Insect science org/12:49

Navasero, MV, MM Navasero., MC de Roxas and, SM Calumpang. (2013). Occurrence of the Moraceae feeding bombycid, *Trilocha varians* (Walker) (Lepidoptera:Bombycidae) as pest of jackfruit and some ornamental species of Ficus in the. J. ISSAA19(2):41-48.

Navasero MV, MM Navasero and MC de Roxas. (2013). Note on the occurrence of the Moraceaefeeding bombycid mothe, Trilocha varians (Walker) (Bombycidae, Lepidoptera) as pest of jackfruit and some ornamental species of Ficus in the Philippines. In Abstracts of Papers Presented at the Annual Scientific Conference of the Philippine Association of Entomologists, Inc., held during the 44th Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines, Inc., March 5-8, 2013. Hotel Centro, Puerto Princesa City, Palawan. p. 95.

Zolotuhin, V.V. and T.J. Witt. (2009). The Bombycidae of Vietnam. Entomofauna 16: 231-272.

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