GENERAL NOTE

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OVIPOSITION TIME TABLE OF INDIAN TASAR SILKMOTH *ANTHERAEA MYLITTA* (SATURNIIDAE)

Additional key words: oviposition, fecundity, nocturnal, copulation.

The Indian Tasar silk worm *Antheraea mylitta* (Drury) is usually reared under semi-domesticated conditions on its primary host plant *Terminalia tomentosa* W. & A. on a large scale by a section of a tribal population in tropical parts of India. This insect (trivoltine at low altitude—300 m) is reared during rainy (July–August), autumn (September–October) and winter (November–December) seasons for silk harvest. From the harvested cocoons some healthy cocoons are sorted out for emergence, mating and oviposition of moths for production of eggs. The harvested cocoons, which yield raw silk, are the only means of income for the tribal rearers and so this species is of great commercial importance. Nevertheless there is no information available on oviposition time of *A. mylitta* although similar studies are available for other sericigenous species such as *Bombyx mori* Linn. (Tanaka 1964) and *Samia ricini* (Hutton) (Sarker 1980). This study provides a time-table of oviposition of *A. mylitta.*

During each breeding season, at least 200 healthy cocoons were collected at random from the harvested cocoon lot of a trained rearer of the Association for Development of Sericulture, Baripada, in the district of Mayurbhanj of Orissa State. All cocoons were preserved in a grainage house for emergence. After about one week of preservation of July–August and September–October harvested cocoons, and after six months of preservation (due to diapause) of winter harvested cocoons, the moths emerged from cocoons during midnight hours and started copulation. Twenty coupled healthy pairs that emerged and copulated on the same night were selected at random from the experimental lot. Each mating pair was transferred to a cardboard breeding box (30 cm × 20 cm × 10 cm) for natural decoupling and oviposition. The breeding boxes were numbered from 1 to 20 and were monitored around the clock for the entire oviposition period. The rate (number of eggs laid) and time of oviposition was recorded for different hours and days. The observations were repeated every year from 1994 to 1998 in all three breeding seasons. The mean value of 20 observations taken during each of three seasons in a year was considered as a single replicate and thus the mean ± standard deviation of five replicates for 5 years was taken for tabular presentation. The data were statistically analyzed using ANOVA and *t*-test (Sokal & Rohlf 1969).

All mating pairs started decoupling in the afternoon following copulation (i.e. after 15 to 16 hours of copulation). The male moths were then removed from the breeding box. The oviposition rate peaked between 17.00 and 19.00 hours (Table 1). Then it decreased gradually and was almost negligible after 20.00 hours on all days. Probability values of the '*t*' test demonstrate a statistically significant difference ($p < 0.01$) between the number of eggs laid in different hours during each day of oviposition (shown in the vertical column of table 1) and between the number of eggs laid in different days during different hours of oviposition (shown in the horizontal column of table 1) considered in the study except between different days in 06.00 to 17.00 hours. The data were also analyzed as a two-way ANOVA. There is significant ($p < 0.01$) variation among different hours of oviposition as well as among different days of oviposition.

The total duration of oviposition was five days. The highest (113.4 ± 5.8) number of eggs was laid on first day of oviposition. On the following four days , the number of eggs laid diminished drastically (Table 1). The mean fecundity was 194.7 ± 7.4. The rate of egg laying significantly differed in different hours and days. Every day the first hour of evening (17.00–18.00 hours) showed significantly ($p < 0.01$) higher number of eggs laid. A low rate of oviposition was observed at night after 20.00H and during the day before 17.00H. At all times the eggs ware laid in clusters. Most oviposition in a day occurred between 17.00 and 20.00H. This indicates how oviposition happens early in the night.

The mated female moths of *A. mylitta*, after decoupling, commenced egg laying with the approach of first hour of evening (17.00H) and continued until 21.00H. The peak hours of eggs laying were the early evening hours (17.00 to 19.00 hours). During the daytime very little oviposition was recorded. This indicates that darkness may have a stimulating effect on oviposition behavior. Similar trends were also observed in some other species of moths. The female moths of *Samia ricini* laid maximum eggs during the night, although some eggs were laid during day time (Sarker 1980). The stimulating effect of darkness on egg laying of

TABLE 1. Time table of number of eggs laid during different hours and days by *A. mylitta* (Drury) (Mean ± Standard Deviation).

Hours	Day: 1st	2nd	3rd	4th	5th	Total eggs laid	1*
01.00 to 06.00	Laying not started	2.5 ± 0.7	—	—	—	2.5 ± 0.7	—
06.00 to 17.00	Laying not started	1.2 ± 0.1	1.4 ± 0.2	—	—	2.6 ± 0.8	NS
17.00 to 18.00	60.1 ± 3.8	20.3 ± 2.1	13.5 ± 2.3	9.6 ± 2.1	6.3 ± 1.2	109.8 ± 6.4	p < 0.01
18.00 to 19.00	41.2 ± 3.1	7.8 ± 1.7	4.7 ± 1.3	2.3 ± 0.6	1.2 ± 0.4	57.2 ± 4.7	p < 0.01
19.00 to 20.00	6.7 ± 1.3	4.6 ± 1.1	2.8 ± 0.3	1.3 ± 0.2	—	15.4 ± 2.1	p < 0.01
20.00 to 21.00	4.3 ± 1.2	1.8 ± 0.9	—	—	—	6.1 ± 1.6	p < 0.01
21.00 to 24.00	1.1 ± 0.6	—	—	—	—	1.1 ± 0.6	—
Total	113.4 ± 5.8	38.2 ± 4.1	22.4 ± 2.6	13.2 ± 1.7	7.5 ± 1.2	194.7 ± 7.4	
t	p < 0.01	p < 0.01	p < 0.01	p < 0.01	p < 0.01	p < 0.01	

NS = Not Significant.
*t** = test of significance between the number of eggs laid in different days during different hours of oviposition.

Bombyx mori which oviposits at 21.00H has been confirmed (Tanaka 1964). *Plodia interpunctella* Hubner showed maximum oviposition at dusk, and darkness was necessary to stimulate egg laying whereas light inhibited it (Lum & Flaherty 1969, 1970). After mating, commencement of oviposition occurred on the first night in *P. interpunctella* (Richard & Thomson 1932). In the present investigation nocturnal oviposition behavior of *Antheraea mylitta* was observed. Similar behavior was reported in *B. mori* (Tanaka 1964). *A. mylitta* oviposited the majority of eggs during the first four days after mating; oviposition continued for five days. In case the of *S. ricini*, oviposition continues for 2–3 days (Sarker 1980). *Callosamia promethea* (Drury) oviposited most of the eggs during first three days after mating (Miller et al 1983). *A. mylitta* moths laid the maximum number of eggs on the first day and the least number on the last day.

Since maximum number of eggs of *A. mylitta* were obtained during the evening, evening hours were found to be most favorable for oviposition. But night hours favored *Corcyra cephalonica* Stainton for maximum oviposition (Chakravorty & Das 1983). The gradual decline observed in rate of egg laying with increase of age of *A. mylitta* moths is probably due to depletion of eggs in the oviduct towards the last part of adult life. A similar trend was reported in *S. ricini* (Sarkar 1980) and *C. cephalonica* (Chakravorty & Das 1983).

The preparation of the present time table of oviposition of *A. mylitta* may be useful for handling the Tasar grainage (egg production) operation in the most convenient way in Tasar farmer's work.

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