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Biology of Lamerin Race of Silkworm, *Bombyx mori* L.

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ABSTRACT

Lamerin race of the silkworm, *Bombyx mori* L was collected from its aboriginal inhabitant (North-eastern India) and observations were made on various developmental stages. The race is hibernated (bivoltine) and survived with a microsporidian infection. It spins orange yellow colour flossy cocoons of irregular shape and with thick filament. The mean adult life span for females and males were 12 days and 10 days respectively.

Key words: Aboriginal, hibernation, Lamerin, microsporidian, silkworm.

INTRODUCTION

Manipur is a small state in the north east of India along the Indo-Myanmar boarder. It has all around climatic and topographical features supporting a rich and unique form of flora and fauna. However under the prevailing law and order situations, poor communication facilities particularly in highly regions are inaccessible and left untouched. Mulberry silkworm rearing and reeling is confined to villages such as Khurkhul, Leimaran, Pheiyeng and Thongiao. Lamerin (Lepidoptera-Bombycidae) is a local silkworm race confined to some traditional sericulture villages like Leimaram produces orange yellow silk (Bhat, 2006). This race has recently attracted the attention of researchers because it survives with microsporodiosis for past several generations (Vijayalakshmi, 2000; Bhat & Natraju, 2005). The race has always been popular object for study probably for its host parasite interaction but surprisingly little is known about the race (Bhat & Natraju, 2007). There was no systematic investigation so far and the present study was carried out to investigate the biology of the Lamerin race of the silkworm *Bombyx mori* L.

MATERIALS AND METHODS

The Lamerin race was collected during May 2003 (Consignment no. 31533611) from the Regional Tasar Research Station (RTRS) incubated at 25 ± 1 °C and 80 ± 5% RH, followed the standard procedure (Datta, 1992) for normal embryonic development. The hatching, larval weight, larval duration, larval markings, pH of larval homogenate, haemolymph, excreta and gut juice were also observed and recorded by pH paper (Merck, Lang-4, 8m). Fecundity was assessed and recorded.

RESULTS AND DISCUSSION

The results on the biology and different developmental stages of Lamerin race was observed and presented in Fig. 1 and Fig. 2. Eggs were round shaped with a length and width ranged 1.2 and 1.00mm respectively. The micropyle was placed in slight depression at the extremity of the horizontal axis of the eggs as usual in other mulberry silkworm races. Freshly laid eggs were whitish in colour (Fig. 1a) and became brown after hibernation (Fig. 1b). The hatching percentages of eggs were recorded as 75 - 80% and the freshly hatched larvae were dark brown in colour and weighed 0.39mg and measured 2.8, 0.36mm in length and width respectively. The newly hatched larvae fed on the chlorophyll and lower epidermis of fresh mulberry leaves whereas, the upper epidermis and vine network remained intact. The race passed through five ages and four moults, as the larvae grow the skin colour started changing to white. Young age larvae were more tolerant to high temperature (27±1) and humidity (85±5) but as the larvae proceeded to the advanced stage low temperature (23±1) and humidity (65±5) was maintained. The 5th age larvae were plain without any larval markings, cylindrical, creamy white in colour (Figure 1c), measured 49.33, 5.67mm in length and width respectively. The larvae were with good appetite and the average larval duration ranged 24-26 days. The pH of larval homogenate, haemolymph, gut juice and excreta was recorded and presented in Fig. 2. The haemolymph colour was creamy yellow. The larval growth during 5th age (weight and size) showed geometric increase and the average mature larval weight, silk gland weight were recorded 2.30 and 0.33g respectively. The change from the larva to prepupa became evident by cessation of feeding and wrinkled skin of the larvae. The transformation of prepupa into pupa occurred within three days they were cream in colour and cast off skin before pupation. After two days of pupation the colour changed to dirty brown with black dot on the head region. The body of the pupa was contracted, distended (Fig. 1d). The hypodermis secreted a fresh layer beneath the old cuticle and the eyes were prominent. According to the measurements average body length of pupa was 20.90mm, 19.60mm and width were 6.20mm, 5.20mm in female and male respectively. Lamerin race spins orange yellow, small, irregular shaped cocoons (Fig. 1e). The cocoons had more floss measure 39 and 17mm in length and width respectively. The average single cocoon weight and shell weight were 1.20g and 0.14g respectively. Under natural conditions the moth emergence took place on 12th days of spinning from one end of cocoons by slitting them. The moths were active, medium sized with white creamy scales which covered whole body and wings (Fig. 1f). The average body length was 19.80mm and 17.40mm and width was 8.70mm and 5.10mm in female and male adults respectively. The average body weight of female and male moths was 456 and 252mg respectively. The male moth flight was here and there in search of female counter parts for copulation however, female moths were stagnant. The flight duration was very short and moderately high. The average adult life span was 12 and 10 days in females and males respectively.

Lamerin is a tetramoulter pure mulberry silkworm race with five larval ages. The race hibernates with inferior economic traits and irregular shaped cocoons. The single female moth laid 350-395 eggs. The females revealed longer adult longetivity than males

which is in conformity with the observations made by Doddaswamy and Subramanya, (2007) who stated that the adult life span in females was more than that of their male counter parts in both the types of voltinistic races (bivoltine and multivoltine). It was assumed from the present investigation that the females consumed more diet during feeding stage and was long lasting in the non feeding stage. Further, Murakami and Shimada (1988) also reported that the males are more active than females in Bombyx mori and hence energy consumption and metabolic rate could be the main factor for sex-wise difference in adult life spans.

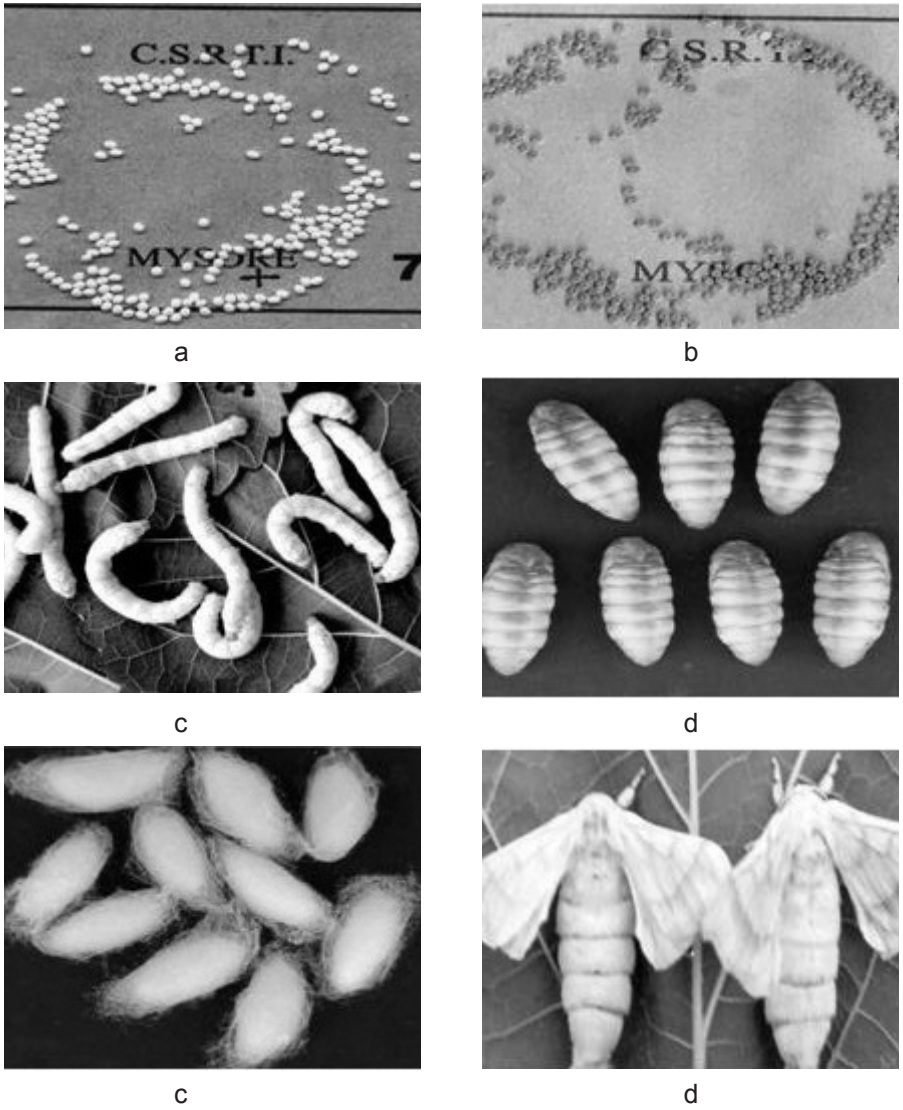

Figure 1: Different developmental stages of Lamerin race of silkworm.

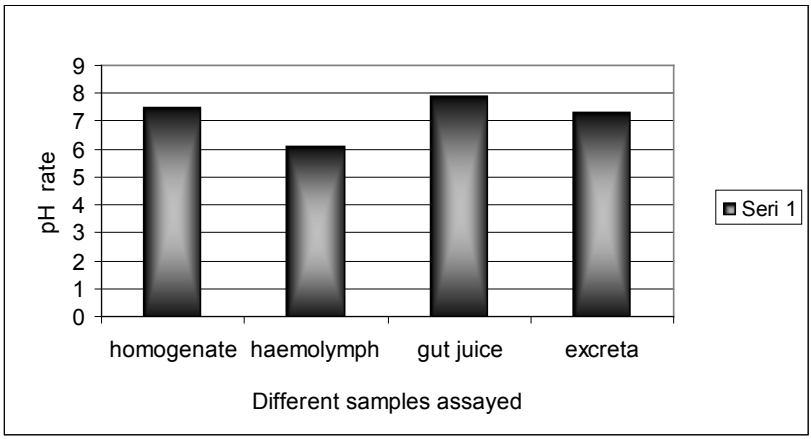

Figure 2: Study on the pH of Lamerin race of the silkworm.

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