B.Sc 1st Semester(Zoology SEC)
Salbari College, Baksa(BTR)
Life Cycle of Muga Silkworm

By : J K Nath (Asstt. Professor)

Introduction:

Muga silk is an exclusive prerogative of India. It is mostly produced in the Brahmaputra valley of Assam in the north eastern region. The shimmering golden-yellow silk is referred to in literature from as long ago as 1662 B.C. Even today it occupies a very important place in the life and culture of the Assamese people regardless of community and caste. During the last few decades, however, there has been a substantial decline in the muga industry, particularly due to indiscriminate felling of food plants and frequent natural calamities, such as flood and drought. The muga silkworm is cultivated only in Assam, possible because its characteristic ecological requirements are found only in its natural abode. Eastern Goalpara and the south-western part of the Kamrup districts in lower Assam are the major seed cocoon areas, and there the trade is largely in the hands of tribal communities (Kacharis, Rabhas and Garo). Commerical rearing, on the other hand, is practiced mainly by Ahoms in sibsagar and Lakhimpur and to a lesser extent in Nowgong, Darrang and other districts. The nature grown cocoons are utilized for see, and over 80% of the commercial cocoons produced in the plains are transported by the traders to Sualkuchi village, where muga reeling and weaving are done on a large scale, almost as a monopoly.

Life cycle and Morphology Muga silkworm:

Heterogeneity and sexual dimorphism with regard to colour pattern are less pronounced in *A. assamensis* than in *A. mylitta* because of its limited geographical distribution. Being a member of Antheraea, most of its broad morphological characteristics are comparable to those of the other members of this genus.

Life Cycle of Muga Silkworm :

The life cycle of muga silkworm has four stages i.e. **egg, larva, pupa encased in cocoon and adult** moth. The life cycle of this silk moth runs for 65-70 days in spring and autumn, 105-115 days in winter and only 52 to 55 days in summer, depending on the climatic conditions. Each generation passes through four life stages, all of them looking different and the non feeding adult stage very different from the feeding larval stage. The life stages are **1.Egg, 2.The larval stage, 3. Pupal stage 4. The adult moth.**

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Eggs :

The eggs are oval , dorsoventrally flattened and bilaterally symmetrical. It is about 2.4-2.7 mm in length, 2.5 mm in diameter and 0.00073 mg in weight. The eggs are brownish grey in colour at the time of oviposition and they appear light green or creamy. The duration of egg stage is 7 days in summer and 16 days in winter.

Larva :

The eggs are hatched into larva of about 2 mm long. They grow rapidly, eat voraciously and end up about 30 mm long after 4-5 weeks. The larvae soon after hatching eat a portion of the eggs and disperse in search of food. The larvae passes through 5 instars.

1st instar larva :

A newly hatched larva is 0.7-1.2 cm in length. The colour of the body is black with distinct yellow lines at inter segmental region. The body tubercles are black in colour and are provided with setae. The larvae prefers to feed on tender leaves of the host plant. After feeding for 3-4 days in summer and 6-8 days in winter, the larva enters the first moult and transforms itself into the second instar larva.

2nd instar larva :

The second instar larva is light yellow in colour and about 1.4 -1.8 cm in length. This stage lasts for 3-4 days in summer and 7-10 days in winter , thereafter the second instar larva enters into the third instar larva.

3rd instar larva :

The 3rd instar larva is green in colour and about 1.8-2.5 cm in length. This stage lasts for 5-7 days in summer and 10-13 days in winter. The tubercle colour is violet.

4th instar larva :

The fourth instar larva is dorsally dark green and ventrally light green in colour, about 2.5-3.5 cm in length and approximately 2.00-3.5 g in weight. The head is triangular in shape and small black eyespots on the lateral side of the head are prominent. The lateral line is distinct yellow in colour. The tubercles are red in colour . This stage lasts for 7-10 days in summer and 12-15 days in winter.

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5th instar larvae :

The fifth instar larva is approximately 4-5.5 cm in length. The dorsal surface of the body is light green and ventral surface is deep green in colour. Eye spots are prominent. The body tubercles are brick red in colour with setae. The lower portion of the lateral line is yellow in colour and the upper portion in chocolate in colour. Three pairs of thoracic and four pairs of abdominal legs are well developed. Spiracles are black in colour. This stage lasts for 10-12 days in summer and 16-19 days in winter.

1 - Eggs of muga silkworm *Antheraea assamensis* (Helfer) (Lepidoptera: Saturniidae), 2 - *A. assamensis* -First Instar, 3 - Second Instar, 4 - Third Instar, 5 - Fourth Instar, 6 - Fifth Instar, 7 - First Instar feeding on egg shell

Pupa :

On maturity, the larva spins the cocoon with silk filaments around its body, after selecting a suitable site for pupation.The pupa is copper brown, measures about 3.2 x 1.8 cm and weighs about 5.7 g. The pupal stage lasts for around 14 days in summer and 40 days in winter.

Cocoon :

The cocoon is a protective shell made up of a continuous filament spun by mature silk worm prior tu pupation. It is single shelled, light brown, oblong, closed, reelable and slightly flossy with a weak peduncle. It measures about 5.2 x 2.4 cm in size and weighs about 6.3 g. The cocoon is generally golden brown in colour.

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Moth :

The moth emerges from the cocoon . The male and female moths exhibit distinct sexual dimorphism. The male moths are brown to dark brown , while the female moths are yellowish light brown. Male is smaller than the female. The approximate body length of the males is 3.0 cm and of the females 3.5 cm. In male moth, the tips of the forewings have sharp curve, while in female there is no such curve. The male moth flies actively and copulates with the stationary fenale. The moth is a non feeding stage and dies within 7-12 days after its emergence.

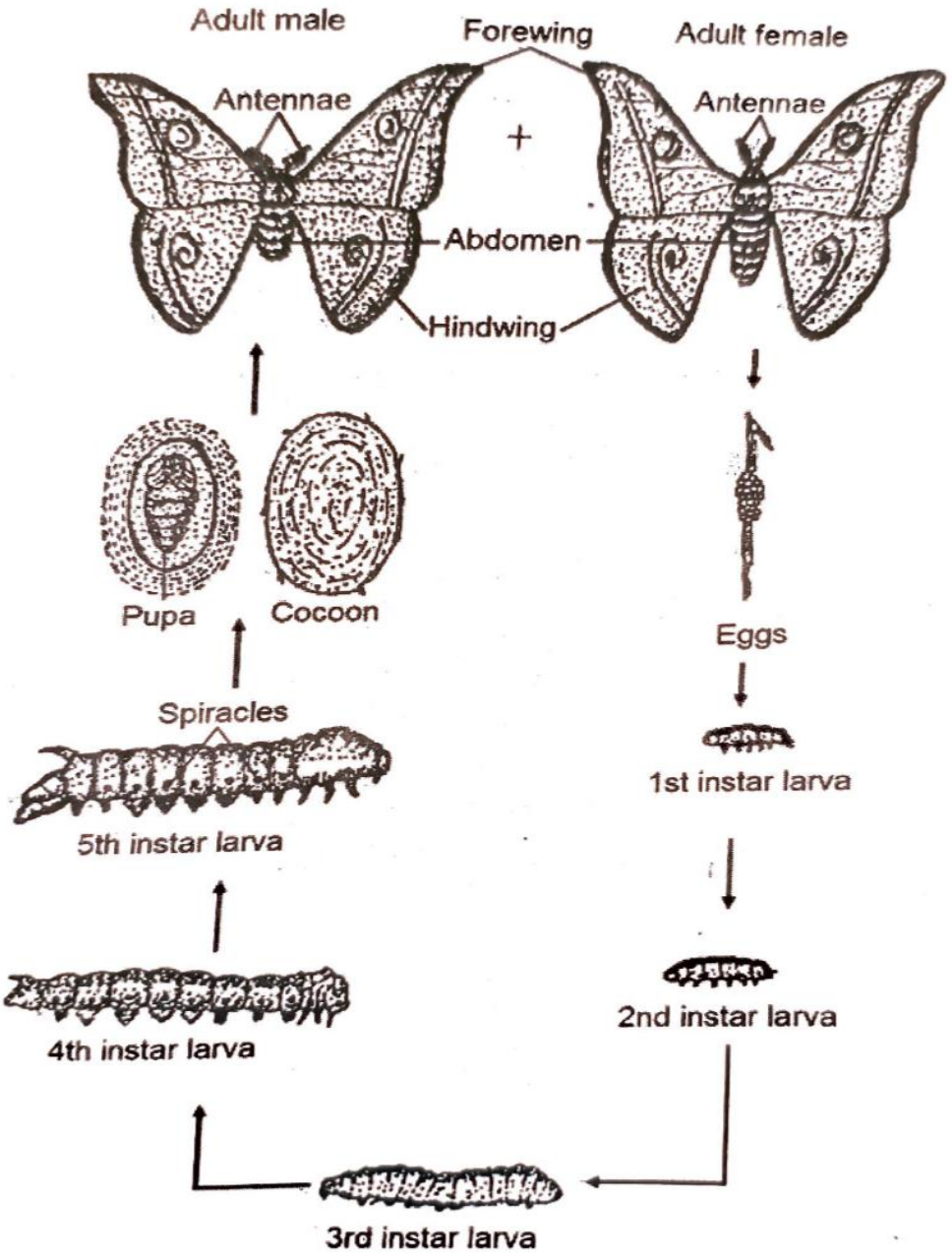

Fig 3.3. The life cycle of Muga silkworm (*Antheraea assama*)

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16 - keeping silkworm in dried leaves of host plant for spinning cocoons, 17 - collection of cocoons, 18 - Male moth, 19 - Female moth

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