**Biospectra : Vol. 10(2), Sept., 2015, pp. 17-20**

*An International Biannual Refereed Journal of Life Sciences*

*Animal Science*

ISSN : 0973-7057

# Silk production and growth of *Antheraea assamensis* fed on leaves of *Persea bombycina* and *Listea monopetala* in different seasons

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*Received : 17th May, 2015; Revised : 10th July, 2015*

**Abstract :** *Antheraea assamensis* Helfer, a multivoltine muga silk moth has two primary food host plant 'Som', *Persea bombycina* and 'Soalu', *Listea monopetala* were reared during rainy, autumn and winter season. ERR%, Cocoon wt., Pupa wt., Shell wt. of *A. mylitta* during different rearing period rainy, autumn and winter seasons were studied. Superior quality crop production is found from 'Som' fed moth compared to moth that were fed on 'Soalu'. Considering the cocoon shell production in different seasons, 'Som' fed crop produced heavier and tough cocoon than the moth that were fed on 'Soalu'. Significant difference $p<0.05$ is found in the production of cocoon shell, cocoon weight when both the experimental food plants are taken into consideration. In both the cases shell production is found more during winter season.

**Keywords : rearing, Som, Soalu**

## INTRODUCTION

*Antheraea assamensis* is a semidomesticated Indian muga silk moth. This muga silk moth, *Antheraea assamensis* is endemic to North East India. The climatic condition of north eastern region of India is optimum for the growth of Lepidopteran species and are found distributing up to 1370AMSL, Das et al (2000). Sub-Himalayan region of north eastern India inhabit many sericigenous insects species. This silk moth is polyphagous in nature and feed on wide range of host plants, Choudhury (1970). 'Som', *Persea bombycina* and; 'Soalu', *Listea monopetala* are the primary host plant of *Antheraea assamensis*. 'Soalu', *Listea monopetala* is semi-deciduous in nature and 'Som', *Persea bombycina* is evergreen in nature. *Antheraea assamensis* is multivoltine and it completes five to six life cycles in a year.

## MATERIALS AND METHODS

Young Moths were collected from the field. Collected moths were allowed to copulate for 6-8 hours in coupling Jars. After copulation is over, female moths were transferred individually on straw made sticks. The female moths were tied by a cotton thread to these sticks. These disease free layings (dfl) sticks were disinfected by dipping in 3% formalin for 10 minutes. Sticks are then washed with plain water and dried in shade. These dfls are kept in small paper packets. The dfls were incubated at 24±2? and 70-80% relative humidity. Egg packets were placed on a plastic tray covered with perforated black colour cotton cloth so that proper and uniform hatching may take place. A few tender twigs of 'Som', *Persea bombycina* and 'Soalu', *Listea monoptela* were placed on the hatched larva inside the paper packets. Hatched larvae crawl over the leaves of 'Som' and 'Soalu'. Twigs of 'Som' and 'Soalu' on which larvae get crawled are shifted directly on the foliage of 'Som' and 'Soalu' plants respectively.

Rearing fields having 'Som' and 'Soalu' plants were disinfected before the transfer of larrva by spraying 5% bleaching powder solution of rearing field. Then after rearing field is dusted with slacked lime and bleaching powder mixture in the ratio of 9:1. Rearing of larvae was carried on properly pruned 'Som' and 'Soalu' plants. Rearing was carried on in winter, autumn and rainy seasons. Rearing

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plants were fully covered to protect the larvae from predators. To transfer the larvae to new bush having quality leaves or from one place to another part of the plant triangular bamboo made trolly called 'Chaloni' was used. To avoid infection hand touching of larvae was avoided as far as feasible. Rearing performance and salient features of different life stages of *Antheraea assamensis* on 'Som' and 'Soalu' were recorded and analyzed. Influence of crop plant on cocoon crop performance was evaluated by Effective Rate of Rearing (ERR%), cocoon weight, pupa weight and shell weight. These parameters were evaluated for both food plants during different rearing season by standard Laboratory techniques. The data were statistically analyzed following Student's 't' test.

## RESULT

Analysis of result of both the tables show that cocoon production, pupa weight, shell weight are found high in winter season in case of both the food plants 'Som' and 'Soalu' on which experimental moth was reared. In case of both the experimental food crop ERR% was found highest during winter season and lowest during rainy season. Table 1 show rearing of A. *assamensis* on *'Som' Persea bombycina* during Rainy, Autumn and Winter seasons. Similarly, table 2 show rearing of A. *assamensis* on *'Soalu' Listea monopetala* during Rainy, Autumn and Winter seasons.

**TABLE - 1**
**Rearing of *Antheraea assamensis* on 'Som' during Rainy, Autumn and Winter seasons (Mean ± standard deviation)**

| Rearing season | ERR % | Cocoon weight(in g) | Pupa weight(in g) | Shell weight(in g) |
|---|---|---|---|---|
| Rainy season | 33.02 ± 0.22 (29.1 – 35.2) | 9.92 ± 0.20 (7.8 – 10.2) | 8.80 ± 0.21 (6.8 – 9.9) | 1.12 ± 0.02 (0.99 - 1.4) |
| Autumn season | 24.31 ± 0.9 (21.2 - 27.1) | 11.73 ± 0.25 (9.2 - 12.6) | 10.30 ± 0.05 (8.6 - 12.3) | 1.43 ± 0.02 (1.1 - 1.9) |
| Winter season | 45.11 ± 1.62 (41.2 - 48.8) | 13.25 ± 0.15 (11.1 - 15.3) | 11.31 ± 0.12 (9.6 - 12.1) | 1.94 ± 0.03 (1.4 - 2.5) |

**TABLE - 2**
**Rearing of *Antheraea assamensis* on 'Soalu' during Rainy, Autumn and Winter seasons (Mean ± standard deviation)**

| Rearing season | ERR % | Cocoon weight(in g) | Pupa weight(in g) | Shell weight(in g) |
|---|---|---|---|---|
| Rainy season | 14.4 ± 1.46 (12.10 – 15.6) | 11.30 ± 0.33 (9.70 – 12.8) | 9.90 ± 0.29 (8.2 – 10.6) | 1.40 ± 0.01 (1.1 - 1.8) |
| Autumn season | 23.01 ± 1.00 (22.6 - 24.0) | 11.42 ± 0.28 (10.5 - 12.6) | 10.21 ± 0.17 (9.4 - 11.1) | 1.21 ± 0.11 (1.1 - 1.4) |
| Winter season | 41.99 ± 0.48 (39.66 - 42.1) | 12.99 ± 0.48 (11.2 - 14.1) | 11.42 ± 0.45 (10.1 - 12.2) | 1.57 ± 0.03 (1.1 - 1.9) |

**TABLE - 3**

**Cocoon shell (raw silk in g) production based on Effective Rate of Rearing (ERR X Shell wt.) of A. *assamensis* in 'Som' and 'Soalu' food plants in different seasons.**

| Rearing season | Som | Soalu |
|---|---|---|
| Rainy season | 41.42 ± 1.38 (39.1 - 43.4) | 38.30 ± 1.84 (36.2 - 40.4) |
| Autumn season | 38.18 ± 1.91 (35.2 - 41.0) | 27.10 ± 1.65 (26.2 - 28.9) |
| Winter season | 88.14 ± 2.34 (84.2 - 96.2) | 68.42 ± 2.1 (62.2 - 73.2) |

Cocoon shell production is found significant $p < 0.01$ in both the host plant during winter season compared to production during rainy season. When cocoon shell production during autumn season is compared to winter season it is found significant the level of $p < 0.05$. P Value is found insignificant when cocoon shell production during rainy season is compared to autumn season. A. *assamensis* larvae that are feed on 'Som' show higher ERR% value than those feed on 'Soalu' in all the three rearing seasons. Superior quality crop production is found from 'Som' fed moth compared to moth that were fed on 'Soalu'. Considering the cocoon shell production in different seasons, 'Som' fed crop produced heavier and tough cocoon than the moth that were fed on 'Soalu'.

Significant difference $p<0.05$ is found in the production of cocoon shell, cocoon weight when both the experimental food plants are taken into consideration. In both the cases shell production is found more during winter season.

## DISCUSSION

Cocoon crop production is higher during winter in case of most of silk producing moth on all variety of host food plants. This might be due to low temperature (20°C-23°C), relative humidity(60%-70%), and low rainfall (19mm) facilitates increased spinning of cocoon. Yokovama (1962) reported that Bombyx mori produce superior quality cocoon at optimum temperature (22°C-23°C) and humidity (60%-70%). Optimum environment helps in the production of good quality cocoon and helps in the maximum productivity ( Krishnaswami *et. al.,* 1973). Relatively drier atmosphere (RH 60%-70%) during spinning period yield good quality and better cocoon in B. mori. Sengupta (1986) remarked that larger ERR% of A. mylitta in winter season is due to climatic limitations.

**TABLE - 4**

**Ecological parameters (Mean ± standard deviation) during rearing period of *Antheraea assamensis***

| Rearing season | Temp(°C) | Relative humidity | Rainfall (in mm) |
|---|---|---|---|
| Rainy (July - Aug) | 32.35 ± 0.66 | 82.02 ± 1.3 | 234.82 ± 7.34 |
| Autumn(Sept. – Oct.) | 26.33 ± 0.42 | 77.31 ± 1.50 | 91.93 ± 4.10 |
| Winter (Nov. – Dec.) | 18.11 – 0.22 | 67.21 ± 1.33 | 19.28 ± 2.05 |

Poor quality of cocoon during rainy season might be due to high temperature (31°C), Humidity (83%), and rainfall (231 mm). Ullal and Narsimhamma (1987) reported that high temperature results in poor quality cocoon in *Bombyx mori*. Tanka (1964) reported that rainy season is unsuitable for rearing of *Bombyx mori* due to high Relative Humidity and fluctuating environmental temperature. Sarkar (1980) has reported that sudden variation in temperature is harmful to rearing *Philosomia ricini* larvae. Krishnaswami et al (1973) reported that temperature exceeding 20-26°C and humidity exceeding 60%-70% affect cocoon quality in *Bombyx mori*. Jolly et al (1974) reported that heavy rainfall

disrupts spinning of A. *mylitta* and results in production of inferior quality cocoons.

During autumn lower ERR% and poor silk content in cocoon in compare to rainy period might be due to longer stormy weather duration (9-10 hours) that causes high rate of larval mortality. Krishnaswami et al (1973) reported poor silk content of autumn cocoon crop in A. *mylitta*. Sengupta (1986) has reported better quality cocoon production by A. *mylitta* in autumn.

Thus it is may be concluded that Food plant 'Som' is relatively more suited for A. *assamensis* in terms of cocoon shell production as well as getting better quality silk than 'Soalu' food plant.

## REFERENCES

1. **Choudhary, S.N. , 1970.** Muga Silk Industry, Directorate of Sericulture, Govt. Of Assam.
2. **Das, P.K., Sahu, A.K. & Babulal 2000.** Management of Muga silkworm and germplasm. In proceeding of workshop on Management of Sericulture Germplasm for posterity, held at Central Sericulture Research Centre, Hosure, p. 133-139.
3. **Jolly, M.S., S.K. Sen & M.K. Ahsan, 1974.** Tasar Culture, 1st Ed. Central silk Board, Bombay, pp. 266
4. **Krishnaswami, S., M.N. Narsimhanna, S.K. Suryanarayan & S. Kumararaj, 1973,** Sericulture Manual 2, FAO Agricultural Services Bulletin, Rome, pp. 131.
5. **Sarkar, D.C., 1980.** Ericulture in India, 1st Ed. Central Silk Board, Bombay, pp. 51
6. **Sengupta, K. 1986.** Tasar Silk Production in India. In: Lecture on Sericulture (Ed. G. Boraiah), Surambha Publishers, Bangalore.
7. **Ullal, S.R. & M.N. Narsimhanna, 1987.** Hanbook of Practical Sericulture, 3rd Ed. Central Silk Board, Bangalore, pp. 166.
8. **Yokoyama, T., 1962.** Synthesised Science of Sericulture, Central Silk Board, Bombay, pp. 378.

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