



---

---

## **Study on rearing performance of *Bombyx mori* and occurrence of difficulties during rearing in the climatic condition of Khultabad of Marathwada region of Maharashtra**

**T.D. PATHAN, R. M. KHAN\***

Department of Zoology, Kohinoor Arts, Commerce and Science College,  
Khultabad, Dist-Aurangabad.(MS)

\*Department of Botany, Kohinoor Arts, Commerce and Science  
College, Khultabad, Dist-Aurangabad.(MS).

Affiliated to Dr.BAMU.Aurangabad

[tdpathan@rediffmail.com](mailto:tdpathan@rediffmail.com), [rmkhan99@gmail.com](mailto:rmkhan99@gmail.com)

---

### **ABSTRACT**

Sericulture is a viable agro-based industry and suited to the socio-economically poor and rural India and it is considered as one of the best alternative sources of self-employment generation mainly to the rural poor farmers. Mulberry sericulture is concerned with culture of mulberry silkworm which feeds on mulberry leaves. The silkworms spin cocoons which are used for the manufacturing of different types of silk fabrics. However due to lack of knowledge many farmers most of the time suffer loss due to outbreak of disease during rearing. The present study was carried out at Khultabad of Aurangabad district of Marathwada region to know the performance of Mulberry silkworm, and occurrence of various difficulties during silkworm rearing in the climatic conditions of Khultabad of Marathwada region of Maharashtra. This study found the highest performance in quantitative characters and economic parameter during rearing month of August –September (rainy season) and October-November (Autumn), where as lowest in the month of February-March (early Summer). In the research area it is also found that scarcity of water in summer season acts as constrain in sericulture however due to scarcity of water during early summer (March onward and in late summer) mulberry plantation get badly affect and produce poor quality and diseased leaves, after eating such poor quality leaves, weaknesses develop in larvae which may directly affect on quantitative characters and cocoon yielding performance.

**Key Words:** Mulberry, Sericulture, Larvae and Cocoon.

---

### **INTRODUCTION**

Sericulture is a agro-based industry in which raw silk obtain by rearing of silkworm. Sericulture is suited to the economically poor people of rural India.

However due to lack of knowledge many farmers most of the time suffer loss due to outbreak of disease during rearing. This is due to fluctuations in the environmental and rearing conditions



badly affect the silk production. The current study was carried out at Khultabad of Aurangabad district of Marathwada region to know the difficulties in rearing and rearing performance of Mulberry silkworm *Bombyx mori*, in the climatic conditions of Khultabad of Marathwada region of Maharashtra.

#### **MATERIAL AND METHODS**

The plantation establishment and rearing was carried out as per the practices suggested by Dr. C. J. Hiwre, in his book *Sericulture a Cottage Industry* (2012). The silkworm *Bombyx mori* (FC1/FC2 double hybrid) eggs according to their availability were collected from the District Sericulture Office, Aurangabad Department of Sericulture, Government of Maharashtra. During rearing of silkworm, temperature and humidity maintained and recorded in the rearing room. Various parameters regarding silkworm rearing were recorded and also the difficulties which raised during rearing were recorded time to time. The collected data were compiled and analyzed. During rearing of different batches of silkworm *Bombyx mori* at different rearing seasons the incidences of diseases were recorded. During rearing dusting of disinfectants was carried out whenever required.

#### **RESULT AND DISCUSSION**

During rearing in early summer season that falls in February-March 2015 more fluctuation in temperature were recorded. The average minimum and maximum temperature ranges from 24 °C to 33°C throughout the rearing period.

Similarly in case of relative humidity also a broad range of fluctuation i. e. 60% - 75% was recorded in early summer season.

Performance of rearing silkworm *Bombyx mori* show slight variations. The average weight of mature larva found lowest in summer season where as it was found highest Rainy & Winter season respectively. The average cocoon weight found lowest in summer season and it was found highest in Rainy and winter season respectively. In the same manner average shell weight also found highest in rainy season. The rainy season has show best result for crop yielding with parameters cocoon weight larval weight and shell percentage with less incidence of diseases of silkworm.

In present study it also observed that throughout summer season in Khultabad there is always water scarcity problem. Mulberry plants required regular watering to develop healthy nutritious leaves. However due to shortage of water it become difficult to watering the mulberry plants which results in production of poor quality leaves and sometimes diseased leaves. Such poor quality leaves responsible for occurrence various diseases in the larvae & disease incidence is one of the major hindrances for sericulture activity in India. (S.K. Dutta *et al.* 2012).

Disease appears on the lower surface of leaves as brown pustules, gradually spreads brown pin head structure through ventral surface. Feeding of diseased leaves results poor cocoon crop and causes reduction in the income of the rearers, so timely



## International Journal of Universal Print

ISSN: 2454-7263 ID: ACTRA 2018 062 Published Mar. 2018

Volume No. 04, Issue No.07, Copyright © Universal Print

Web: [www.universalprint.org](http://www.universalprint.org) , Email: [ijup@universalprint.org](mailto:ijup@universalprint.org)

Title Key: Study on rearing performance of *Bombyx* ...

management for control of disease is the prerequisite for harvesting healthy and nutritious leaves. Disease not only reduces leaf yield but also causes degradation in the quality (Quadri *et al.* 1999a & 1999b) and feeding of such diseased leaves prolongs larval period (Noamani *et al.* 1970 and Umesh Kumar *et al.*, 1993)

In the present study it was found that in summer season mulberry leaves which supplied to the larvae speedily lose moisture and softness due to high temperature and low humidity which directly affect on the feeding performance of the larvae which result in poor health of the larvae. Several studies reveals that the environmental factors, in particular temperature and humidity at the time of rearing and moisture content of mulberry leaves, affect growth of the silkworm (H. R. Rapusa *et.al.* 1975) & (V. K. Rahmathulla *et al.* 2003). According to several studies the success of the sericulture industry depends upon several environmental factors and environmental conditions such as biotic and abiotic factors are of particular importance (S. Ueda *et al.* 1975). Among the abiotic factors, temperature is one of the important factor which plays a major role on growth and productivity of silkworms (K. V. Benchamin *et al.* 1986)

In the same way one of the study shows that genetic traits of silkworms are qualitative in nature and that phenotypic expression is greatly influenced by environmental factors such as temperature, relative humidity & light (C. Ramesha *et al.* 2009). In present

study minimum mortality i.e 3.0% was recorded in August-September, while maximum mortality was 11.5% and it was recorded in February-March of 2015 due to high fluctuation in temperature and humidity in this month due to starting of summer in Marathwada region of Maharashtra.

In the present study it is clear that there were slightly variation in rearing performance in different rearing season in climatic condition of Khultabad. The highest performance in case of larval weight, economic parameter and fecundity were observed during rainy and Autumn season, where as it found lowest in the early Summer probably due to increased temperature and poor quality of leaves.

### CONCLUSION

In the present study it is clear that in research area rainy and winter season are best seasons for successful rearing however it should be avoid in early summer and summer season. In the research area, scarcity of water in summer season found constrain in sericulture however due to scarcity of water during early summer (March onward and in late summer) mulberry plantation get badly affect and produce poor quality and diseased leaves, after eating such poor quality leaves, weaknesses develop in larvae which may directly affect on quantitative characters and cocoon yielding performance. Also incidences of diseases in larvae occurs more in summer season than other seasons, so silkworm rearers of this area should avoid rearing in early summer till



end of summer. However the remaining seasons are suitable for rearing of silkworm. Silkworm rearers in this area should take Care about maintenance of

optimum temperature and humidity including proper ventilation and hygienic condition during rearing.

**Table 1. Temperature and relative humidity maintained and recorded during rearing of different batches of silkworm, *Bombyx mori* Double Hybrid variety Fc1/Fc2**

Sr.No	Month	Strains/Eco-races	Temperature (°C)		Humidity (%)	
			Minimum	Maximum	Minimum	Maximum
1.	DEC 2013-JAN 2014 (Winter Season)	Double Hybrid variety Fc1/Fc2	21 °C	25 °C	70%	80%
2.	FEB-MAR 2014 (Early Summer season)	Double Hybrid variety Fc1/Fc2	27 °C	33 °C	60%	78%
3.	AUG-SEP 2014 (Rainy Season)	Double Hybrid variety Fc1/Fc2	25 °C	27 °C	85%	87%
4.	OCT-NOV 2014 (Autumn Season)	Double Hybrid variety Fc1/Fc2	24 °C	29°C	75%	85%
5.	DEC 2014-JAN 2015 (Winter Season)	Double Hybrid variety Fc1/Fc2	19 °C	22 °C	65%	80%
6	FEB-MAR 2015 (Early Summer season)	Double Hybrid variety Fc1/Fc2	24 °C	33 °C	60%	75%

**Table 2. Rearing performance of mulberry silkworm *Bombyx mori* during DEC 2013-SEP 2014.**



## International Journal of Universal Print

ISSN: 2454-7263 ID: ACTRA 2018 062 Published Mar. 2018

Volume No. 04, Issue No.07, Copyright © Universal Print

Web: [www.universalprint.org](http://www.universalprint.org) , Email: [ijup@universalprint.org](mailto:ijup@universalprint.org)

Title Key: Study on rearing performance of *Bombyx* ...

Sr.No	Parameters	Dec 2013-Jan 2014(Winter)	Feb-Mar 2014 ( Early Summer)	Aug-Sep 2014 (Rainy)	
1.	Larval weight (g)	4.150 ±0.055	3.980 ±0.045	4.355± 0.030	
2.	Larval duration(days.hrs)	25	25.6	24	
3.	Cocoon weight (g)	2.086 ±0.055	1.80 ±0.046	2.090 ±0.037	
4.	Shell weight (g)	0.505 ±0.015	0.430 ±0.012	0.533 ±0.011	
5.	Shell ratio (%)	24.20	22.87	25.50	
6.	Pupa weight (g)	1.581 ±0.043	1.450 ±0.037	1.557 ±0.032	
7.	Pupal period (days.hrs)	11	11	13	
8.	Larval Mortality (%)	7%	8%	5%	
9.	Moth weight (g)	♂	0.408 ±0.024	0.380 ±0.030	0.520 ±0.015
		♀	1.201 ±0.028	0.940 ±0.022	1.320 ±0.026
10	No. egg laying	595 ±7	570 ± 13	615 ±12	
11.	Life cycle duration (days.hrs)	45	48	49	

**Table 3. Rearing performance of mulberry silkworm *Bombyx mori* during Oct. 14- Mar. 15.**

Sr.No	Parameters	Sep -Oct 2014 (Late Rainy)	Oct-Nov 2014 (Autumn)	Dec 2014- Jan 2015 (Winter)	Feb-Mar 2015 (Early Summer)



1.	Larval weight (g)	4.069 ± 0.060	4.300±0.030	4.106 ±0.050	3.969 ±0.055	
2.	Larval duration(days.hrs)	25	24	24.6	26.5	
3.	Cocoon weight (g)	1.568 ± 0.059	2.070 ±0.040	1.706 ±0.045	1.595 ±0.050	
4.	Shell weight (g)	0.380 ±0.014	0.520 ±0.015	0.381 ±0.012	0.387 ±0.016	
5.	Shell ratio (%)	24.23	25.12	22.33	24.26	
6.	Pupa weight (g)	1.188 ±0.050	1.550 ±0.025	1.325 ±0.065	1.300 ±0.047	
7.	Pupal period (days.hrs)	12	11	11	11	
8.	Larval Mortality (%)	5	7	8	15.5	
9.	Moth weight (g)	♂	0.510 ±0.021	0.500 ±0.040	0.382 ± 0.045	0.363 ±0.025
		♀	1.050 ±0.045	1.290 ±0.035	1.105 ±0.020	0.835 ±0.030
10	No. egg laying	565 ±10	580 ±15	570 ±9	510 ±11	
11.	Life cycle duration (days.hrs)	45	46	46	48	

## REFERENCES

- 1) C.J. Hiware (2012): Agro Cottege Industry sericulture, Daya Publishing House ,new Delhi,pp.35-93.
- 2) C. Ramesha, S. V. Seshagiri, and C. G. P. Rao, "Evaluation and identification of superior polyvoltine crossbreeds of mulberry silkworm, *Bombyx mori* L.," *Journal of Entomology*, vol. 6, no. 4, pp. 179–188, 2009.



- 3) H. R. Rapusa and B. P. T. Gabriel, "Suitable temperature and humidity and larval density in the rearing of *Bombyx mori* L.," *Philippine Department of Agriculture*, vol. 60, pp. 130–138, 1975.
- 4) K. V. Benchamin and M. S. Jolly, "Principles of silkworm rearing," in *Proceedings of Seminar on Problems and Prospects of Sericulture*, S.Mahalingam, Ed., pp. 63–106, Vellore, India, 1986.
- 5) Noamani, M.K.R., Mukherjee, P.K. and Krishnaswami, S. Studies on the effect of feeding multivoltine silkworm (*Bombyx mori*. L.) larvae with mildew effected leaves. *Indian J. Sericulture*, **9**: 4 – 52). 1970.
- 6) Qadri, S.M.H., Gangwar, S. K., Pratheesh Kumar, P.M., Elangavon, C., Maji, M. D and Saratchadra, B. Crop loss assessment due to leaf spot disease of mulberry *Indian J. Sericulture*, **38** (1) :35-39 (1999a).
- 7) Qadri, S.M.H., Pratheesh Kumar, P.M., Gangwar, S. K., Elangavon, C., Das, N. K., Maji, M.D and Saratchadra, B. Crop loss assessment due to powdery mildew in mulberry, *Bull. Sericulture. Res.* **9**: 31-35. (1999b).
- 8) S. K. Dutta, M.K.Ghosh, A.Borah, B.B.Bindroo, "Development of Disease Forecasting Model for Leaf rust of Mulberry (*Morus alba* L.) of Dimapur of North East India". *Nat Sci*; **10** (8):66-69. 2012
- 9) S.Ueda, R. Kimura, and K. Suzuki, "Studies on the growth of the silkworm *Bombyx mori*. IV mutual relationship between the growth in the fifth instar larvae and productivity of silk substance and eggs," *Bulletin of the Sericultural Experiment Station*, vol. 26, no. 3, pp. 233–247, 1975.
- 10) Umesh Kumar, N.N., Sharma, D.D. and Shree, M.P., Effect of feeding fungus infected leaves on commercial characters of silkworm (*Bombyx mori*. L.) *Indian J. Sericulture*, **32** (1):107-109. 1993.
- 11) V. K. Rahmathulla, T. Raj, M. T. Himanthraj, G. S. Vindya, and R. G. G. Devi, "Effect of feeding different maturity leaves and intermixing of leaves on commercial characters of bivoltine hybrid silkworm (*Bombyx mori*)?" *International Journal of Industrial Entomology*, vol. 6, no. 1, pp. 15–19, 2003.