

# Biology of *Bombyx mori* L. at Talwandi Sabo, Punjab-Short Communication

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## ABSTRACT

The biology of the Mulberry silkworm was studied under laboratory conditions from January 2018 to April 2018 at Department of Entomology, Guru Kashi University, Talwandi Sabo. The results revealed that the female an average oviposition period was of 20.2±2.38 hour whereas; single female laid on an average 107.8±11.04 eggs. The average total larval period was of 23.7±0.95 days. The average pupal period was of 10.36±1.25 days. The average adult emergence period was of 54.92±5.62 days. The longevity of the female and male was also recorded. The results revealed that female lived for 5.64±0.48 days and male survived for 4.68±0.47 days. In future, this research will be helpful for starting the sericulture in non-traditional places.

**Key-words:** Longevity, Monophagous insect, Mulberry, Oviposition, Silk moth

## INTRODUCTION

In India, silk production percentage was 15% of total world production <sup>[1]</sup>. Generally, four kinds of silkworm are used for silk production. Those are Mulberry, Eri, Tasar and Muga. But in these Mulberry silkworms are producing 89.45% of silk <sup>[1]</sup>. Production of silk is major agro-based rural industry <sup>[2]</sup>. This *Bombyx mori* L. is a monophagous insect that feeds exclusively on mulberry leaves. In India, five states i.e. Karnataka, Jammu & Kashmir, Tamilnadu, Andhra Pradesh, and West Bengal are the traditional state for silk production <sup>[1,2]</sup>. But very less work was done in the field of sericulture at Punjab. Therefore present investigation was conducted on, to study the biology of *B. mori* under laboratory condition using mulberry leaves at Talwandi Sabo.

## MATERIALS AND METHODS

Silkworm immature (just after emergence) was collected from Regional Sericulture Research Station, Central Silk Board, Government of India, Sujampur during Dec 2017. The collected larva was brought to the Entomology Laboratory at Guru Kashi University, Talwandi Sabo. The leaves of mulberry were collected from the University campus and surrounding area at Talwandi Sabo. These collected leaves were cleaned with distilled water. After cleaning, leaves were chopped into small pieces and given to the newly emerged larvae as food the mulberry leaf food was daily provided to these larvae. The routine hygiene was also maintained at the laboratory. Further, oviposition period, each larvae duration, and total larval duration were recorded. The last larval stages of silkworm were kept in separate containers heaving dry woods for pupation. The total days for pupa formation were also recorded. The newly formed pupae were kept in insect cages for adult emergence. Further the total adult emergence period was recorded. The newly emerged male and female silk moths were separated and kept in separate containers for mating. After mating, the female silk moths started laying eggs. Further, the total number of eggs per female was recorded.

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The male and female silk moth longevity was also recorded. The entire recorded data was transferred on worksheet Microsoft excel 2013 for statistical analysis.

## RESULTS

The result revealed that the single silk moth female laid on an average  $107.8 \pm 11.04$  eggs. Total  $20.2 \pm 2.38$  hours were the average oviposition period of mulberry silk moth (Table 1). The average larval duration for first, second, third, fourth, and fifth larval instars were recorded as  $3.56 \pm 0.51$ ,  $3.60 \pm 0.5$ ,  $4.48 \pm 0.51$ ,  $5.56 \pm 0.51$ , and  $6.48 \pm 0.51$  days respectively. Total  $23.68 \pm 0.95$  days were recorded as average total larval period (Table 2).

Fully grown silk moth fifth in stars larva stopped feeding, became restless, sluggish and gradually raised their head and start spinning for forming cocoon. The average prepupal period was of  $2.6 \pm 0.5$  days. The average pupal period of mulberry silk moth was of  $10.36 \pm 1.25$  days (Table 2). Cocoon or pupa was oval shaped and full white in colored.

The adults were emerged after forming holes in the cocoons. The average adult emergence period was of  $54.92 \pm 5.62$  days. The longevity results revealed that female lived for  $5.64 \pm 0.48$  days and male survived for  $4.68 \pm 0.47$  days (Table 1).

**Table 1:** Total Adult emergence period, Adult longevity, Fecundity and Oviposition period of *B. mori*

No. of Observation	Total Adult Emergence Period (days)	Adult Longevity (Days)		Fecundity (No. of Eggs)	Oviposition Period (hrs)
		Male	Female		
1	62	4	5	121	21
2	63	5	6	97	17
3	47	5	5	104	18
4	49	5	5	114	24
5	50	5	6	101	23
6	52	5	5	117	17
7	63	4	6	120	22
8	63	4	5	111	20
9	51	5	5	94	17
10	52	5	6	119	19
11	61	4	5	106	23
12	58	4	5	120	21
13	53	5	6	110	18
14	49	5	6	96	21
15	62	4	6	88	17

16	60	5	6	114	24
17	52	5	6	89	19
18	51	5	6	93	22
19	49	5	6	122	23
20	61	4	6	109	20
21	54	4	6	114	21
22	50	5	6	91	17
23	48	5	5	116	19
24	60	5	6	115	19
25	53	5	6	114	23
Mean±SD	54.92±5.62	4.68±0.47	5.64±0.48	107.8±11.04	20.2±2.38

**Table 2:** Duration of larval instars, Total larval period, Prepupal period and Pupal period in *B. mori*

No. of Observation	Duration of larval instars of <i>B. mori</i> (days)					Total Larval Period (days)	Pre pupal Period (days)	Pupal Period (days)
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>			
1	3	4	5	5	7	24	3	9
2	4	4	4	6	7	25	2	9
3	4	3	4	5	6	22	3	10
4	3	3	5	5	7	23	3	9
5	3	4	4	6	6	23	3	9
6	3	4	4	5	7	23	3	10
7	4	3	5	6	7	25	2	12
8	4	4	5	6	6	25	2	10
9	4	4	4	6	6	24	3	11
10	3	4	5	5	6	23	3	9
11	4	3	5	6	7	25	2	12

12	4	4	4	6	6	24	3	10
13	3	3	5	5	7	23	2	9
14	4	3	4	5	6	22	2	9
15	4	4	5	6	6	25	2	11
16	3	3	5	6	6	23	3	12
17	3	4	4	6	6	23	3	10
18	3	4	4	5	7	23	3	9
19	4	3	5	5	7	24	2	12
20	4	3	4	6	6	23	3	11
21	3	4	5	6	6	24	3	12
22	4	3	4	6	7	24	2	9
23	4	4	4	5	6	23	3	12
24	3	4	5	6	7	25	3	12
25	4	4	4	5	7	24	2	11
Mean±SD	3.56±0.51	3.6±0.50	4.48±0.51	5.56±0.51	6.48±0.51	23.68±0.95	2.6±0.50	10.36±1.25

## DISCUSSION

Observations in this study showed that single female laid on an average  $107.8 \pm 11.04$  eggs, contrary to Patel *et al.* [3], who reported  $269 \pm 30.23$  eggs per female silk moth as average fecundity rate. The average oviposition period in the present study was of  $20.2 \pm 2.38$  hours, whereas Silayach and Khokhar [4] reported 14.97 hours as an average oviposition period of mulberry silkmoth.

The average total larval period was of  $23.68 \pm 0.95$  days. The result obtained by this study confirm with earlier study done by Tikun *et al.* [2], who also reported the total larva duration of silk moth as of  $23.77 \pm 0.744$  days. Meshram [5] worked on *B. mori* at Chhattisgarh recorded  $26.23 \pm 1.18$  days for the total larval duration. Kaleem *et al.* [6] when worked with new strain of mulberry silk moth revealed that total larval period was of  $24.44 \pm 1.51$  days. Whereas, Alvarez [7] recorded total larval period of 33.0 days in mulberry silk moth.

In the present study, the average prepupal period and pupal period was of  $2.6 \pm 0.5$  and  $10.36 \pm 1.25$  days. This finding had similar to Tikun *et al.* [2] who recorded  $2.29 \pm 0.46$  and

$10.20 \pm 0.92$  days for average pre-pupal, and total pupal period, respectively. The longevity results revealed that female lived for  $5.64 \pm 0.48$  days and male survived for  $4.68 \pm 0.47$  days. Similar kind of study conducted by Doddaswami and Subramanva [8] was also revealed that the female lived longer than male and the average longevity of male and female was of  $5.60 \pm 0.70$  &  $6.23 \pm 0.43$  days respectively.

## CONCLUSIONS

Mulberry silkworm female laid on an average  $107.80 \pm 11.04$  eggs in its life span. The oviposition period was  $20.20 \pm 2.38$  days and total larval period was of  $23.68 \pm 0.94$  days. Total pupal periods were  $10.36 \pm 1.25$  days. The adult emerged from pupa in  $54.92 \pm 5.62$  days. The female silk moth lived longer than male silk moth.

Therefore, in future these types of studies will motivate farmers to adopt sericulture for their economic development and will be helpful for starting the sericulture in non-traditional places.

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**Research design**- Dr. Anita Singh

**Supervision**- Dr. Anita Singh

**Material**- Dr. Jora Singh Brar, Dr. Anita Singh

**Data collection**-Harpreet Singh

**Data analysis and interpretation**-Harpreet Singh

**Literature search**-Harpreet Singh

**Writing article**-Harpreet Singh

**Critical review**-Dr. Anita Singh

**Article editing**-Harpreet Singh

**Final approval**- Dr. Anita Singh

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