

Relative effects of constant temperatures at Egg surface level on the quatitative and qualatative characters of *Antheraea mylitta* D

Arvind Kumar

Department of Zoology, Magadh University, Bodh-Gaya

Email : dhanodevianm@gmail.com

Manuscript received online 06 July 2019, accepted on 17 August 2020

Abstract : Eggs of *Antheraea mylitta* requires suitable incubation at initial stage for better manifestations. The constant temperature of 30°C and ascending temperatures of 10°C-20°C-30°C & 20°C-30°C-35°C appear to be the best incubation temperatures as compared to variable, descending and chilling temperature in the process of post development. The results obtained becomes very clear when one takes note of the fact that the constant temperature and ascending temperatures create conducive embryonic condition at egg stage subsequently accelerating the process of development by acting as stimulating factor of developmental process.

(Keywords : Tasar, silk, *Antheraea mylitta*)

Introduction

Silk is the most beautiful gift of the nature produced by the sericigenous insects under domesticated and wild conditions¹⁻⁵. India has the unique distinction of being the only country in the world which produces all the four popular varieties of natural silk namely mulberry (*Bombyx-mori*), tasar (Species of *Antheraea*), eri (*Philosamia ricini*) and muga (*Antehraea assamensis*) in the larger interest of our economy as well as for export prospects.⁶⁻⁸ Silk is actually the natural fibre that spells splendour, lusture and elegance and it has been an inseparable part of Indian culture and tradition, over thousand of years.⁹⁻¹²

Experimental

A lot of 500 eggs of first day oviposition

divided into ten replication (5×10) was packed in incubation. The incubation boxes were throughly sterilized before the use. The boxes in equal number with equal number of eggs were kept in three different incubators at constant temperatures of 25°C, 30°C and 35°C till hatching. After hatching the freshly hatched larvae were brushed on the foliages of *Terminalia arjuna* (Arjun host plant) during the seed crop and commercial crop season. Data in respect of percentage of hatching, percentage of E.R.R. cocoon wieght, shell wieght, shell ratio and filament length of tasar yarn was collected carefully and recorded in the tables. The rearing of the tasar larvae was carried out under out door condition till cocoon formation stage. After formation of cocoons the harvesting was carried out and harvested cocoons were analysed for their economic charactors in the researved laboratory as per the method.

Results and Discussion

The fertilized eggs of mother moths of tasar silkworm namely *Antheraea mylitta* D. were collected and after through washing with dilute formalin solution as disinfectant were dried and soaked with cotton and the lots of eggs divided into replications were incubated at the sets of temperature shown below during the seed crop and commercial crop season.

- (a) Constant temperatures of 25°C, 30°C and 35°C.

Table - 1
Relative effects of 25°C constant temperature at egg surface level on the quantitative and qualitative characters of *Antheraea mylitta* during seed crop season.

S.No.		Replication (No. of Eggs)	Hatching %	E.R.R. %	Cocoon Wt. (gm)	Shell Wt. (gm)	Shell ratio (%)	Filament length (mtr)
Experimental Lot	1.	20 × 5	65.0	30.0	11.00	1.10	10.30	700
	2.	20 × 5	63.0	32.0	11.10	1.12	10.28	680
	3.	20 × 5	62.0	31.0	11.00	1.14	10.34	675
	4.	20 × 5	64.0	33.0	11.08	1.15	10.29	682
	5.	20 × 5	66.0	34.0	11.10	1.10	10.30	678
	Av.	20 × 5	65.0	32.0	11.06	1.12	10.30	683
Control		20 × 5	64.0	28.0	11.00	1.10	10.21	680
C.D. at 0.5% level for characters			N.S.	* *	N.S.	N.S.	*	N.S.

E.R.R. = Effective Rate of Rearing * * = Highly significant * = Significant N.S. = Not Significant

- (b) Variable temperatures of 30°C-25°C-35°C & 25°C - 10°C - 30°C
- (c) Ascending temperatures of 10°C-20°C - 30°C & 20°C - 30°C - 35°C
- (d) Descending temperatures of 35°C-30°C- 25°C & 30°C - 20°C - 10°C
- (e) Chilling temperatures of 10°C
- Under given results have been obtained :**
- (i) The initial treatment of incubation at egg surface level influence the biological performances of tasar silkworm.
- (ii) Constant temperature of 30°C is effective egg surface incubation treatment in respect of hatching as well as quantitative and qualitative characters of tasar as compared to 25°C and 35°C.
- (iii) The variable temperature of 30°C-25°C- 35°C & 25°C-10°C-35°C have adverse result in respect of fertility, productivity and quality of tasar yarn as compared to control.
- (iv) The effects of ascending temperature viz; 10°C-20°C - 30°C & 20°C-30°C-35°C at egg surface level has emerged as the best treatment in respect of better fertility, E.R.R.%, cocoon weight, shell weight, shell ratio and filament length of tasar yarn.
- (v) The impact of descending temperature viz; 35°C-30°C - 25°C & 30°C-20°C-10°C at egg surface level is poor in respect of hatching, productivity and quality of cocoons and has been found inferior than the control.
- (vi) The treatment of eggs at chilling temperature of 10°C has been found to badly affect the fertility and productivity to a greater extent and has emerged as

Table -2

Relative effects of 25°C constant temperature at egg surface level on the quantitative and qualitative characters of *Antheraea mylitta* during commercial crop season.

S.No.		Replication (No. of Eggs)	Hatching %	E.R.R. %	Cocoon Wt. (gm)	Shell Wt. (gm)	Shell ratio (%)	Filament length (mtr)
Experimental Lot	1.	20 × 5	67.0	34.0	11.89	1.20	10.40	725
	2.	20 × 5	66.0	32.0	11.79	1.21	11.00	732
	3.	20 × 5	68.0	32.0	11.83	1.23	10.68	730
	4.	20 × 5	67.0	33.0	11.84	1.20	10.58	731
	5.	20 × 5	67.0	32.0	11.84	1.26	10.54	729
	Av.	20 × 5	67.0	33.0	11.84	1.22	11.64	729.6
Control		20 × 5	65.0	29.0	11.32	1.18	10.38	710
C.D. at 0.5% level for characters			*	* *	*	N.S.	*	*

E.R.R. = Effective Rate of Rearing ** = Highly significant * = Significant N.S. = Not Significant

unviable treatment in view of characters of tasar.

It is thus very clear that eggs of *Antheraea mylitta* requires suitable incubation at initial stage for better manifestations. The constant temperature of 30°C and ascending temperatures of 10°C - 20°C - 30°C & 20°C - 30°C - 35°C appear to be the best incubation temperatures as compared to variable, descending and chilling temperature in the process of post development. The results obtained becomes very clear when one takes note of the fact that the constant temperature and ascending temperatures create conducive embryonic condition at egg stage subsequently accelerating the process of development by acting as stimulating factor of developmental process. The desired stimulating factor of development so

created by optimum incubation temperature actually supposed to enhance the rate of desired metabolic manifestation as a result it has subsequent effect on the fertility, productivity and quality of tasar yarn as compared to others undesired temperature of incubation. The results so obtained are very much in confirmities with the earlier work carried out by different investigators in the field of sericulture.

Conclusion :

It is thus concluded that the tasar silkworms require initial incubation temperatures of 30°C and also ascending temperatures at egg level for desired fertility, productivity, quality of cocoons and tasar silk yarn.

References

1. A. Bindu Prasuna and S.D.S. Murthy: *Bio. Scan* **3**(2) : 117 (2008).
2. M.M. Ahsan, : Annual Report C.T.R.S. pp. 51 - 52. (1977)
3. S.C. Agrawal, M.S. Jolly and N.D. Banerjee, Annual Report C.T.R.S. Ranchi Project **3** : 69 (1997).
4. S.C. Agrawal, M.S. Jolly, and A.K. Sinha : *Ind. Silk. Vol.* (6), 13 : 15. (1976)
5. Chowdhary, V.N. Muga, culture, Directorate of sericulture and weaving Govt. of Assam, Gauhati 5. pp. 53 - 57 (1974)
6. Chowdhary, S.N. Eri, culture, Directorate of sericulture and weaving Govt. of Assam, Gauhati 5. pp. 42 (1974)
7. P.S. Chen and A. Khun, *Nature* 11 (b) : 305 - 314 (1956).
8. H. David, Akey, H.P. and Robert, H.J.: *Ann. Ent. Soc. Amer.* **73** (3) : 411 (1978)
9. J. Dutrieu, *Soc. Biol.* **253** : 3071 (1961)
10. T. Fukada and Y. Higuchi, *Biol. Chem.* **27**, 99 (1963)
11. M.I.A. Fathah, Y.S. Salem, and M.I. Abdul *Entomol.* **84**, 311 - 315 (1977) .
12. S. Fraenkel and Blewett *Ann. Rep. C.T.R.S., Ranchi Proj.* **2** : 64 - 68 (1946)

Abstracted / Indexed in : Chemical Abstract U.S.A.

JC-1401/2K20 (ISSN:0973-239X), INDIA

Journal Chemtracks Vol. 22 (1&2), 305-308, January to December 2020