



*Research Paper*

**RELATIVE IMPACT OF PHOTOPERIODIC CONDITIONS ON THE REELING PERFORMANCES OF TASAR COCOONS OF *Antheraea mylitta* D.**

Deepti Kumari<sup>1</sup>, S.N.P. Yadav Deen<sup>2</sup> and Sarfaraz Ali<sup>3</sup>

<sup>1&2</sup>University Department of Zoology, M.U., Bodh-Gaya,

<sup>3</sup>P.G.Department of Biotechnology, M.U.Bodh Gaya,  
India.

**Abstract**

The paper reveals the relative effects of four different photoperiodic conditions viz; 0hr., 8hr., 16hr. and 24hr. on the reeling performances of tasar cocoons of indigenous tropical tasar silkworm, *Antheraea mylitta* D. The results obtained are indicative of the fact that tasar cocoons of *Antheraea mylitta* D. essentially require a long day photoperiod of 16 hours for its desired reeling manifestations in respect of length and size of fibre as well as tenacity, elongation, reelability and productivity of tasar silk yarn on account of maintenance of optimum light condition to tasar cocoons for desired reeling processes.

**INTRODUCTION**

Tasar silk yarn produced by the tasar cocoons of *Antheraea mylitta* D. is of great commercial importance on account of its usefulness and vast export potential. However, the quality of tasar yarn in a process of reeling depends on several factors in which exposure of tasar cocoons to light condition for desired reeling manifestation is one of the important factor as far as the quality of tasar yarn is concerned. As a matter of fact nature has provided us various resources for obtaining beautiful fibres in textile world in which some are plant products, while others are from animal resources. Tasar cocoons produced by different species of *Antheraea* belonging to family saturniidae of order Lepidoptera are the examples of animal resources producing "**Golden Fibre**" known as tasar silk yarn.

The extraction of silk fibre from is unique deposition of long continuous fibre of high tensile strength and nearly of uniform thickness. This process of unwinding the silk fibre from a number of cocoons and combining them in one thread of consistency to make it practically useful is known as reeling (Ghosh, et al., 1980), Jolly (1967) in course of furnishing a report on wild sericigenous in India mentioned that the cocoon shell of tasar silkworm mainly contains fibroin and sericine on account of salivary secretion of tasar larvae forming cocoons where the fibroin is pasted with gummy sericin. In course of reeling techniques are applied to dilute the sericin content in order to take out the tasar fibre without breakage of silk thread. Further Jolly (1970) mentioned that the prolonged exposure of tasar cocoons to sun or desired

photoperiodic conditions are supposed to denature the sericin and help in smooth reeling practises to a greater extent. Barah, et al. (1988) revealed the relative impact of different seasons on the quality of eri cocoons of *Antheraea assama* with a note that seasonal changes influence the quality of eri cocoons. Beck (1980) reported significant role of photoperiodic conditions on the bionomics of insects. Choudhary (2008) also mentioned the significant role of weather on cocoon shell of muga silkworm. The impact of photoperiodism in relation to development of insect is well explained by Danilevskii (1965). Renuka, et al. (2016) reported genetic variabilities in eco-races of tropical tasar silkworm. Anumeha (2011) reported evident impact of photoperiodic conditions on the behavioural manifestations of *Antheraea mylitta* D. Sharma, et al. (2013) mentioned profound impact of environmental factors on the quality of tasar cocoons and tasar yarn with seasonal changes. In view of said fact the present investigation has been designed to examine the relative effect of four different photoperiodic treatments (0hr., 8hr., 16hr. and 24hr.) on the reeling performances of *Antheraea mylitta* D. an indigenous tasar silkworm.

#### MATERIALS AND METHODS :

Healthy tasar cocoons of *Antheraea mylitta* D. were collected from seed supply station at Chaibasha (Jharkhand) and carefully brought at Bodh-Gaya and thereafter kept under sericulture research laboratory in P.G. Department of Zoology, Magadh University, Bodh-Gaya for a week for proper acclimatization. Further the tasar cocoons of uniform size and weight were assorted. A lot of 500 tasar cocoons divided in to five replications (100×5) were kept separately at four different photoperiodic exposures of 0hr., 8hr., 16hr. and 24hr. along with control under laboratory conditions for a week and thereafter a relative analysis of said tasar cocoons in respect of their reeling performances were carried out and presented in table 1. Following formulae were used in course of determination of reeling parameters.

$$\text{Length of cocoon filament} = \frac{\text{Length of cocoon filament (m)} \times \text{Av. reeling cocoon number}}{\text{Total reeled cocoon number}}$$

$$\text{Denier (D)} = \frac{\text{Weight in gm. silk filament}}{\text{Length of silk filament in meter}} \times 9000$$

$$\text{Reelability (\%)} = \frac{\text{Number of reeled cocoons}}{\text{Number of ends feeding}} \times 100$$

#### RESULTS AND DISCUSSION :

Results in relation to relative impact of four different photoperiodic treatments (0hr., 8hr., 16hr. and 24hr.) on the tasar cocoons of *Antheraea mylitta* D. in respect of reeling performances such as length, size of fibre, tenacity, elongation, reelability as well as production of tasar silk yarn have been evaluated and presented in the table 1.

Table : 1

S.N	Reeling Parameters	Photoperiodic treatment				Control	C.D. at 0.5% level for treatments
		0hr.	8hr.	16hr.	24hr.		
1	Av.length of tasar yarn (mtr.)	135.0	151.0	293.0	215.0	258.0	**
2	Av.size of tasar yarn (D)	10D	12D	22D	14D	18D	**
3	Av.production of tasar yarn per hr.(gm.)	10.0	10.9	18.3	11.3	14.2	N.S.
4	Av.reliability of fibre (%)	28.3	30.9	42.6	32.5	38.7	**
5	Av.tenacity of fibre (g/d)	0.90	1.0	2.80	1.10	1.80	*
6.	Av.elongation of fibre (%)	13.0	14.0	24.0	16.0	19.0	*

Results obtained indicate that the reeling parameters in respect of average length of fibre, size of tasar yarn, production of tasar yarn per hour, reelability of fibre, tenacity and elongation of fibre at **0hr.** (135.0 mtr., 10D, 10.0 gm., 28.3%, 0.90 (g/d) and 13.0%); **8hr.** (151.0 mtr., 12D, 10.9gm., 30.9%, 1.0 (g/d) and 14.0%); **16hr.** (293.0 mtr., 22D, 18.3gm., 42.6%, 2.8 (g/d) and 24.0%) and at **24hr.** (215.0mtr., 14D, 11.3gm., 32.5%, 1.10 (g/d) and 16.0%) photoperiodic treatments respectively present evident variations in respect of reeling manifestations of tasar cocoons of *Antheraea mylitta* D. as compared to control (258.0 mtr., 15D, 14.2gm., 38.7%, 1.80 (g/d) and 19.0%). Table further reveals that the reeling performances of tasar cocoons at a long day photoperiodic treatment of 16 hr. is evidently better than the control as well as three other photoperiodic treatments of 0hr., 8hr., and 24hr. Showing the effectiveness of 16hr. photoperiodic treatment of tasar cocoons in relation to better and desired reeling manifestations.

It appears that the 16hr. photoperiodic treatment of tasar cocoons for days together provide conducive condition for denaturation of sericin from tasar silk fibre on account of proper dryness of tasar cocoons making the process of unwinding of tasar silk fibre from shell of cocoons very smooth and perfect. The results so obtained are very much at par with the earlier investigations carried out by Jolly (1970), Beck (1980) and Anumeha (2011)

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