



Research Paper

**RELATIVE VARIATIONS IN THE REELING PERFORMANCES OF
MUTANT STRAINS OF *Antheraea mylitta* D. (SATURNIIDAE:
LEPIDOPTERA)**

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Abstract

The present communication accounts for the relative variations in respect of reeling performances of three mutant strains viz; Daba-blue, Daba-yellow and Daba-almond evolved from the Daba ecotype of *A. mylitta* D during the Seed Crop Season (July- August) and Commercial Crop Season (September-October). Results obtained are indicative of the fact that the three mutant strains of *A. mylitta* D. differ among themselves in respect of their reeling performances. The reeling performances of Daba-blue have been found evidently better than the Daba-yellow and Daba-almond. Commercial crop Season has registered its supremacy over Seed crop season in respect of reeling performances among the 3 mutant strains of *A. mylitta* D. The results obtained appear to be the outcome of relative variations in the genetic architecture and physio-genetic makeup among the three mutant strains of *A. mylitta* D.

Key words: Ecotype, Reeling, Tenacity, Strains.

INTRODUCTION

Antheraea mylitta D. belonging to family Saturniidae of order Lepidoptera is the principal indigenous tasar silk producing insect existing in the tropical tasar silk producing states namely Jharkhand, Orissa, Madhya Pradesh, Maharashtra and Bihar in India. The tasar larvae are usually reared in the forest areas mainly on the foliages of *Terminalia arjuna*, *Terminalia tomentosa* and *Shorea robusta*, the primary tasar host plant. The tasar producing insects are wild, polyphagous and bivoltine/multivoltine in nature. *Antheraea mylitta* D. exists in the forms of several ecotypes and three distinct mutant strains with three different larvae body colours such as blue, yellow and almond as compared to normal green. It is important to mention that the evolution of three

different strains of Daba ecotype of *A. mylitta* D.viz; Daba-blue, Daba-yellow and Daba-almond is spectacular development in the field of tasar culture.

Jolly *et al.* (1969) observed that the mutant strains of tropical silkworm in spite of having the same chromosomal number differ among themselves in their behavioural manifestations. Further Jolly *et al.* (1985) presented details of species variations in the genus *Antheraea* producing vanaya silks. Fristrom (1965) found variation in morphological characters of mutant strains of *Drosophila melanogaster*. Krishnaswamy *et al.* (1973) developed desired methods of silkworm culture under different conditions. Sharma *et al.* (1990) reported significant variations in quantitative and qualitative characters among different ecotypes of *Antheraea mylitta* D. The significant impact of environmental conditions on the biological manifestations of tropical tasar silkworm, *A. mylitta* D. has been worked by Sharma *et al.* (2013). Genetic variability among the ecoraces of tropical tasar silkworm have been reported by Renuka *et al.* (2016).

MATERIALS AND METHODS

Healthy cocoon of 3 different mutant strains of *Antheraea mylitta* along with control were selected for the evaluation of their reeling performances during the seed crop and the commercial crop season. A lot consisting of 100 cocoons divided into 5 replications (20X5) was considered separately for the mutant strains and the control. The under given specific reeling techniques as suggested by Chowdhary *et al.* (1972) were followed in respect of reeling analysis of experimental and control lots. The reeling analysis was carried out for both the seed crop and commercial crop cocoons of experimental lot.

The cocoon of experimental lots as well as the control lot was first boiled in freshwater for 2 minutes followed by 60 minute steaming having a 15 lbs/sv inch pressure in the pressure cooker. After Steaming, the cocoons were left in the cooker until the pressure was gradually released. The cocoons were further taken out and loosely wrapped with a porous cloth. The cocoon bundle was then soaked in about 0.2% biopril-50 Solution for 20 hours at a temperature of 40°C and afterwards at room temperature. The soaked cocoons were semidried after spreading them on the bed before deflossing and thereafter they were processed for the reeling on reeling machine.

The data in respect of the length of the tasar yarn, production of raw silk, reelability percentage, size of the raw silk, tenacity of the fibre and elongation percentage were recorded for each type of mutant strains and control. The data were

further analysed, compared in respect of different reeling characters and presented in the tables.

RESULTS AND DISCUSSION

The relative reeling performances of three mutant strains of *Antheraea mylitta* in respect of filament length, size of fibre, elongation percentage of fibre, reelability percentage of silk yarn, rate of production of silk fibre and tenacity of tasar silk yarn have been evaluated during the seed crop and commercial crop seasons and the results obtained have been recorded in table 1 and 2.

Table 1 accounts for the relative reeling performances of Am-blue, Am-yellow, Am-almond mutant strains of *Antheraea mylitta* along with its control during the seed crop season. Table indicates that the length of fibre (6528, 6438 and 6280 mtr.), size of tasar silk fibre (2D, 1.8D and 1.5D), elongation percentage of silk yarn (36.%, 34% and 30%), reelability of the fibre (68.20%, 67.10% and 65.32%), rate of production of tasar yarn per hour (48.21, 45.58, and 44.12gms) and tenacity of silk fibre (3.0, 2.70 and 2.50g/d) of Am-blue, Am-yellow and Am-almond mutant strains of *Antheraea mylitta* are evidently different to each other but the mutant strains of *Antheraea mylitta* have relatively better reeling performances than the control in respect of length of fibre (6110mtr.), size of fibre (1.1D), elongation percentages of fibre (28.0%), reliability of fibre (62.95), rate of production of yarn (42.28gm.) per hour and tenacity of fibre (2.30g/d) thus showing better reeling performances as compared to control. Further among the three mutant strains of *Antheraea mylitta*, the relative reeling performances of Am-blue as compared to Am-yellow and Am-almond have been found better significant.

Table 2 reveals the relative reeling performances of three mutant strains of *Antheraea mylitta* of reeling parameters of tasar cocoons. Table indicates that the length of fibre (6625, 6539 and 6310 mtr.), size of fibre (2.8D, 1.9D and 1.3D), elongation percentage of fibre (38.0, 36.0 and 34.0), reelability of tasar yarn (70.35%, 68.21% and 66.98%), production rate of fibre per hour (50.32, 47.39 and 45.95gms.) and tenacity of fibre (4.0, 3.0 and 2.90 g/d) of Am-blue, Am-yellow and Am-almond mutant strains of *Antheraea mylitta* are relatively better than the seed crop season, which accounts for the significant impacts of different seasons on the reeling performances of mutant

strains of *Antheraea mylitta*. The reeling performances of Am-blue as compared to Am-yellow and Am-almond are evidently better showing differences in the reeling behavior of three mutant strains.

However, all the three mutant strains of *Antheraea mylitta* in spite of differences in their reeling performances have shown better results than the control in which the length of fibre (6190 mtr.), size of yarn (1.2D), elongation of fibre (31.0%), reliability of fibre (63.80%), rate of production of fibre per hour (43.52gms.) and tenacity of fibre (2.39g/d) are evidently lesser than the mutant strains.

Table 1: Table showing relative reeling performances of three mutant strains of *Antheraea mylitta* during seed crop season

Sl. No.	Parameters of rearing	Am-Blue	Am-yellow	Am-almond	Control	C.D. at 0.5% level for Characters
1	Length of fibre (mtr.)	6528	6438	6280	6110	**
2	Size of fibre (D)	2D	1.6D	1.5D	1.1D	*
3	Elongation of fibre (%)	36.0	34.0	30.0	28.0	**
4	Reelability of fibre (%)	68.20	67.10	65.32	62.95	**
5	Production of fibre per hour (gm)	48.21	45.58	44.12	42.28	**
6	Tenacity of silk fibre (g/d)	3.0	2.70	2.50	2.30	*

* = Significant

** = Highly Significant

Table 2: Table showing relative reeling performances of 3 mutant strains of *Antheraea mylitta* during Commercial crop season

Sl. No.	Parameters of rearing	Am-Blue	Am-yellow	Am-almond	Control	C.D. at 0.5% level for Characters
1	Length of fibre (mtr.)	6625	6539	6310	6190	**
2	Size of fibre (D)	2.8D	1.9D	1.3D	1.2D	*
3	Elongation of fibre (%)	38.0	36.0	34.0	31.0	**
4	Reelability of fibre (%)	70.35	68.21	66.98	63.80	**
5	Production of fibre per hour (gm)	50.32	47.39	45.94	43.52	**
6	Tenacity of silk fibre (g/d)	4.0	3.0	2.90	2.39	*

* = Significant

** = Highly Significant

The comparative analysis in respect of reeling performances of mutant strains along with control during both the seasons of rearing reveals the given facts:

- All the three mutant strains of *Antheraea mylitta* have different reeling performances in respect of quality of tasar cocoons in which the performances of Am-blue mutant strains of *Antheraea mylitta*.
- All the three mutant strains of *Antheraea mylitta* have registered their supremacy over control in respect of reeling performances during both the seasons.

The results obtained appear to be the outcome of genetic variabilities among the three mutant strains of *A. mylitta* D. on account of relative differences in their physio-genetic makeup. It further appears that the Am-blue mutant

strain as compared to Am-yellow and thereafter Am-almond is more robust in its genetic architecture as such it has shown relatively better performances in various rearing parameters. Results obtained are indicative of the fact all the three mutant strains of *A. mylitta* D. in spite of relative differences have registered their supremacy over the control (Daba-green) on account of desired beneficial mutation in relation to their rearing performances. Thus the evolution of three distinct mutant strains of tropical tasar silkworm is in the larger interest of tasar culture. The said results are very much unconformities of earlier investigations carried out by Jolly *et al.* (1969), Ahsan *et al.* (1975).

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