

GROWTH AND DEVELOPMENT OF SILK WORM (*BOMBYX MORI* L.) ON MULBERRY LEAVES

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ABSTRACT

The studies on Growth and development of *Bombyx mori* L. on Mulberry leaves viz. V-1, S-1635 and M-5, for head capsule width, body length, body width and body weight, larval weight, Single cocoon weight, shell percentage, Yield and Cocoon filament length was undertaken during 2009-2010. The larval growth of silkworm was completely by passing through five instars each, when fed on leaves of mulberry varieties viz., V-1, S-1635 and M-5, the larval duration silkworm varied from 25.02- 25.26 days on V-1, S-1635, while it range from 27.04 days for M-5 mulberry variety. The larval head capsule width of silkworm was found superior to 0.61 mm on S-1635 followed by V-1 having 0.62 mm. V-1 mulberry variety fed then body length x breadth of observed was 5.65 x 1.93 to 39.0 x 9.6 mm. The body weight of silkworm *B.mori* L. was found to be 43.45 to 873.7 mg for I to V instars when fed on V-1 Mulberry variety. Progression factors of head capsule width, body length, body width and body weight of silkworm on, V-1 was observed to be 1.54 to 2.23 respectively. Variety V-1 was observed significantly superior among tested varieties in larval weight (50.17), Single cocoon weight (0.39 g), shell percentage (19.93 %), Yield (18.70 kg) and Cocoon filament length (810.00 m).

INTRODUCTION

Sericulture is an agro-based rural industry having tremendous employment potential and foreign exchange earnings. About 4 million people are engaged directly or indirectly in sericulture's activity in India (Chowdhary, 1984). We are at second position in silk production by producing 17550 MT of silk in the world and India is only the country having distinc-

tion in the world for all four type of silkworm in silk production viz., mulberry silkworm (*Bombyx mori* L.), Tasar silkworm (*Antheraea mylitta*), Eri silkworm (*Philosamia ricini*) and Muga silkworm (*Antheraea assamensis*). About 95 percent production is from mulberry silkworm (Anonymous, 1983). Raw silk is used in many ways in the manufacture of woven and knitted garments, parachuted components, fishing lines, elastic webs, bottling silk cloth used in milling and

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chemical industry. Insulation coils of telephone and wireless receivers, types for racing cars, etc. There are about 100 trade names used in India for describing the different kinds of silken goods. Mulberry plant is the most preferable by mulberry silkworm, mulberry (*Morus alba*) plant is native of Indo-China particularly from lower slopes of Himalayas. Its leaves from basic food material for mulberry silkworm leaves can also be used as fodder for cattle which increase milk production in cattle by 10 percent (Anonymous, 1991). The component of leaf varies according to the variety of good cocoon producing mainly depend on factors like silkworm variety quality of mulberry leaf and management. To increase cocoon production and to reduce labour cost, it is advisable to choose silkworm strains and mulberry variety which is suitable for particular set of a condition hence, the investigations were made to evaluate superior variety by further evolution.

MATERIAL AND METHODS

The experiment was conducted in a Completely Randomised Design (CRD) with three treatments and five replications each treatment consisted of 100 silkworms at Department of Entomology, College of Agriculture, Latur (Maharashtra). Before starting the experiment the rearing room temperature was checked daily two times and also the rearing room temperature was maintained at 24 to 28°C. All the rearing equipment was also disinfected with the help of 2% formalin solution and 0.3% Bleaching powder. Disease free laying (df'l's) of three parental lines viz., V-1, S-1635, M-5 of multivoltine silkworm germplasm were procured from the Central Sericulture Germplasm Resources Centre, Hosur, Tamil Nadu and which was used as experimental material. The df'l's of parental races were properly black boxed at pin head stage and incubated at 25°C and 70% relative humidity for 48 hrs. Before hatching, during this period care was taken to protect the eggs from predators. Before hatching the eggs were exposed to sun light in morning hours for few minutes to promote the uniform hatching of larvae from eggs. The fresh mulberry leaves of variety S-1635 was obtained from already established mulberry garden.

The improved technology of silkworm rearing was followed as suggested by Krishnaswami (1978). The newly hatched larvae were fed with fresh mulberry leaves of S-1635 variety. Hundred worms of each race treated as one treatment and were kept in 36.6" x 36.6"

size wooden tray. The leaves were chopped into small pieces of 0.5 x 1.5 cm sq. And sprinkled over the newly hatched worms for their feeding and after brushing, feeding was given four times a day at 6.00 hrs, 10.00 hrs, 16.00 hrs and 21.00 hrs the rearing trays reshuffled daily within a treatment and were cleaned daily.

Each race was computed by taking average number of eggs laid by single female moth of each race. The disease mortality during rearing was recorded by formula,

$$\text{Disease \%} = \frac{\text{No. of disease larvae}}{\text{Total No. of larvae}} \times 100$$

RESULTS AND DISCUSSION

Data presented in Table 1 revealed that the larval duration of silkworm was recorded in the range of 20.61 days to 19.19 days. Significantly positive larval duration of 19.19 days recorded by V-1 race. The race S-1635 (19.66), M-5 (20.61) was found at par with each other, whereas the highest larval duration was observed in the M-5 (20.61). Krishnaswami (1978) reported that the larval duration was longer in race M-5 (24.17).

The larval weight was varied in the range of 50.12 g to 33.70 g. The performance of V-1 (50.12 g) for larval weight was observed significantly superior over the rest of races followed by S-1635 (40.54 g). The lowest larval weight was recorded in M-5 (33.70 g). Koundinya and Suma (2000) reported that the larval weight highest in V-1 and S-1635.

The Single cocoon weight was recorded in the range of 1.96 g to 1.66 g. The highest single cocoon weight was recorded in the race V-1 (1.96 g) over rest of the races tested. The races V-1 (1.96 g), S-1635 (1.86 g), M-5 (1.66 g) were found at par to each other. Whereas, the longest single cocoon weight was recorded V-1. Rayer (2006) and Chakravorty (2004) reported the highest single cocoon weight.

The Single shell weight was recorded in the range of 0.38 g to 0.30 g. The highest single shell weight was recorded in the race V-1 (0.38 g) over rest of the races tested. The races V-1 (0.38 g), S-1635 (0.38 g), M-5 (0.30 g) were found at par to each other. Where, the longest single shell weight was recorded V-1. Rayer (2006) and Chakravorty (2004) reported the highest single shell weight.

The cocoon shell percentage varies between 19.93 to 17.84%. The highest cocoon shell percentage was recorded by the V-1 (19.93%), which was significantly

Table 1. Performance of silkworm races for different economic characters.

Name of the races	Larval Duration (Days)	Weight of 10 mature Larvae (g)	Weight of Single Cocoon (g)	Single shell Weight (g)	Percentage of Cocoon -shell (%)	Cocoon yield/ 10,000 (Kg)	Disease Percentage (%)	Length of Cocoon filament (m)
V-1	19.19	50.12	1.96	0.38	19.93	18.66	1.2	794
S-635	19.66	40.54	1.86	0.36	19.81	18.55	1.4	766
M-5	20.61	33.7	1.66	0.30	17.84	16.59	1.6	632
SE(m) +	0.1283	0.090	0.018	0.004	0.062	0.063	0.825	7.659
C.D. @ 5%	0.0816	0.279	0.057	0.009	0.193	0.194	2.544	23.60

superior over the rest races tested followed by M-5 (19.84 %), S-1635 (19.81 %). The lowest cocoon shell percentage was observed in S-1635 (19.81 %). Rayer (2006) and Chakravorty (2004) reported the cocoon shell percentage.

Cocoon yield per 10,000 larvae brushed varied in the range of 18.66 kg to 16.59 kg. Maximum yield was observed in the race V-1 (18.66 kg) and minimum in the M-5 (16.59 kg). V-1 and S-1635 is at par to each other. Chakravorty (2004) and Rayer (2007) reported the cocoon yield.

The significantly lowest disease mortality was recorded by V-1 (1.2 %). The races V-1 (1.2 %), S-1635 (1.4 %) and M-5 (1.6 %) was found at par with each other and superior one. The significantly highest disease mortality was observed by M-5 (1.6 %). The disease resistance is the major characteristics while studying the performance of races of silkworm. Patil (2004) and Rayer (2007) were observed the disease mortality in silkworm.

The cocoon filament length of silkworm was recorded in the range of 794 m to 632 m. Longest filament length was recorded in larvae fed on V-1 (794 m) and lowest filament length was recorded in larvae

fed on M-5 (632 m) Rayer (2007) and Gawade (2006) were observed the highest cocoon filament length.

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