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# Performance of different Mulberry Genotypes on growth rate of Chawki Mulberry Silkworm, *Bombyx mori* (Lepidoptera: Bombycidae)

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**Abstract**
The first, second and third instar silkworm *Bombyx mori* were reared on MI-79, ME-52, S-36, S-13 and C-20. The larvae fed on MI-79 recorded higher growth rate (0.68), (0.78) and (0.82) at first, second and third instar respectively followed by S-36 and least growth rate found in C-20(0.57) and (0.64) at first and second instar respectively. Significantly minimum growth rate was recorded when silkworms were reared on ME-52 (0.76) at third instar. The variation of growth rate among mulberry accessions might be due to difference in biochemical constituents present in the mulberry varieties.

**Keywords:** Mulberry genotypes, chawki, silkworm, rearing performance

## Introduction

Silkworm *(Bombyx mori L.)* is essentially monophagous insect feeds solely on mulberry leaves *(Morus spp.)*. Leaf quality is an important parameter used for evaluation of varieties aimed at selection of superior varieties for rearing performance. Mulberry varieties regarded as one of important factors that effect on number of laid eggs, fecundity, hatchability, larval period and weight in silkworms. This variation will lead to various physiological state and cocoon production. Maximum larval growth and uniform cocoon production determined by mulberry leaves varieties (Naidu *et al*., 2008) [6]. It also been observed that the growth and development of silkworms and quality of silk cocoon produced are directly influenced by the variety and quality of leaves fed to the worms. Morphological characters of leaves contribute to acceptability by silkworms (Bari *et al* 1988) [1]. Chakarborthy *et al* 2012 studied genotypes and observed variation in leaf yield in different genotypes Therefore, selection of mulberry genotypes is an important criterion for better growth and development of silkworm for proper nourishment to obtain better fecundity and higher cocoon productivity (Das and Krishnaswamy 1969) [4]. Therefore, the objective of this study was to evaluate the performance of different Mulberry Genotypes on growth rate of Chawki Mulberry Silkworm, *Bombyx mori* (Lepidoptera: Bombycidae).

## Materials and Methods

The genotypes used in the experiment were maintained at Department of Sericulture, UAS, GKVK, Bengaluru-65 as semi-tree. These genotypes were planted during 2006 in red loamy soil. The genotypes were maintained with all the normal cultural practices like irrigation, weeding, fertilizer application measures as per the package of practices for rainfed mulberry (Dandin and Giridhar, 2010) [3]. Pruning was done at four feet height from the ground level. Before the commencement of silkworm rearing, the rearing room and appliances were thoroughly disinfected thoroughly as per the standard procedure (Dandin and Giridhar 2010) [3]. The rearing room was kept air tight for 24 hours. After 24 hours the room was kept open and used for rearing. The rearing experiment was conducted during the month of February-March in 2014. To study the nutritional efficiency of mulberry silkworm, *Bombyx mori* L on five mulberry genotypes *viz.*, MI-79, ME-52, S-36, S-13 and C-20 the silkworms were reared on each genotype under laboratory condition from first to third instar following the rearing technique with three replications each consisting twenty larvae for each genotype were maintained in each instar.

The newly hatched larvae were selected randomly and transferred separately with the help of feather to the rearing tray of each replication of each genotype under study. The initial weight of the larvae of each replicate was recorded before providing of food to observe the growth rate. The first, second and third instars were fed with tender leaves. The larvae were fed at a frequency of two times, medium age leaves were fed to the third instar silkworm per day except during mounting periods. The quantity of food was increased with the advancement of larval age to full fill their nutritional requirements. Separate batches of 100 larvae for each genotype under identical conditions were also maintained to replace the dead/unhealthy larvae, if any during observation period. Equal weighed amount of food was supplied in each feeding to each replication every day. After every instar of feeding the leftover food and feaces were collected and weighed. The weight of the larvae was recorded after every instar before and after moult. The difference between the weight before and after feeding gave the fresh weight gain of the larva during feeding period.

**Estimation of Growth rate (GR)**

Growth rate explains how much of fresh matter increased in the body of the larvae, per day per gram of body weight.

Where,

$$GR = \frac{G}{TA}$$

G = increase in the weight of larva during feeding period (g)
T = Duration of feeding period
A = Mean larval weight during feeding period (g)

Initial larval body weight (g)-Final larval body weight (g)

Weight gain of larvae (g) = ___________________________

**Results and Discussion**

Growth rate (GR) explains how much of dry matter increases in the larvae per gram of body weight per day. It directly influences the speed of development, which depends on the quality of host and physiology of silkworm, etc.

**Table 1:** Growth rate of Chawki silkworm PM × CSR2 as influenced by mulberry genotypes

| SL. No. | Genotype | 1st instar | 2nd instar | 3rd instar |
|---|---|---|---|---|
| 1 | ME-52 | 0.59 | 0.70 | 0.76 |
| 2 | MI-79 | 0.68 | 0.78 | 0.82 |
| 3 | S-36 | 0.64 | 0.76 | 0.80 |
| 4 | S-13 | 0.61 | 0.74 | 0.78 |
| 5 | C-20 | 0.57 | 0.64 | 0.78 |
| F-test | | * | * | * |
| CD at 5% | | 0.58 | 0.73 | 0.73 |
| S.E.M ± | | 0.18 | 0.23 | 0.23 |

The larvae fed on MI-79 recorded higher growth rate (0.68), (0.78) and (0.82) at first, second and third instar respectively followed by S-36 and least growth rate found in C-20(0.57) and (0.64) at first and second instar respectively. Significantly minimum Growth rate was recorded when silkworms were reared on ME-52 (0.76) at third instar. The variation of growth rate among mulberry accessions might be due to difference in biochemical constituents present in them. Similar differences were noticed by Dutta *et al.* (1996) [5], who reported that the larvae reared on Jatimani had higher growth rate compared to silkworms reared on K-2 mulberry variety. Prabhakara *et al.* (2000) [7] reported that the larvae reared on S-14 leaves resulted in maximum growth rate compared to M-5. Ramachandra *et al*. 2008 opined that the growth rate in *B. mori* depends on the nutritional content of the mulberry leaves.

**Summary**

Silkworm *(Bombyx mori L.)* is essentially monophagous insect feeds solely on mulberry leaves *(Morus spp.)*. Leaf quality is an important parameter used for evaluation of varieties aimed at selection of superior varieties for rearing performance. The larvae fed on MI-79 recorded higher growth rate (0.68), (0.78) and (0.82) at first, second and third instar respectively followed by S-36 and least growth rate found in C-20(0.57) and (0.64) at first and second instar respectively. Significantly minimum growth rate was recorded when silkworms were reared on ME-52 (0.76) at third instar. The variation of growth rate among mulberry accessions might be due to difference in biochemical constituents present in the mulberry varieties.

**Conclusion**

The study highlights the significant impact of different mulberry genotypes on the growth rate of the silkworm, *Bombyx mori* L. Among the tested varieties, MI-79 demonstrated the highest growth rates across all instars, indicating its superior nutritional quality for silkworm rearing. In contrast, the C-20 genotype exhibited the lowest growth rates, suggesting its lesser suitability for silkworm nourishment. The observed variations in growth rates can be attributed to the biochemical composition of the mulberry leaves, which directly influences the silkworm's development and overall productivity. Therefore, selecting appropriate mulberry genotypes is crucial for enhancing silkworm growth and optimizing cocoon production in sericulture practices.

**Conflict of interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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