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Effect of mulberry genotypes on growth parameters of chawki silk worm (*Bombyx mori* L.)

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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. Twenty larvae were randomly selected in each replication of every treatment and weight in different instars. Silkworms nourished with leaves of MI-79 recorded higher larval weight in first, second and third instars (0.096, 0.388, 2.366 g/20 larvae) respectively. The first and second instar larval duration recorded minimum in the S-36 (3.73 days) and (2.96 days) followed by MI-79(3.96 days) and (3.06 days) respectively. However, the first instar larval duration found maximum in the larvae fed on S-13 (4.16 days) and second instar on ME-52(3.63 days). Third instar larval duration was minimum (3.93 days) and maximum (4.63 days) in ME-52 and C-20 respectively. First moulting found to be high in silkworms fed on C-20 (25.34 h) and minimum moulting duration found in MI-79(24.00 h) and the second moulting duration found high in the silkworms fed with MI-79. Among the studied genotypes MI-79 and S-36 found to be best suited for chawki silkworm rearing.

Keywords: Mulberry, silk worm, *Bombyx mori* L.

Introductions
"Natural Silk" a dry salivary secretion is produced when a fully grown silkworm larva spins its cocoon for pupation. It's known as the "Golden Fiber" or "Golden Queen" of textiles, and it's revered all over the world for its lustrous sheen. Its products are delightfully light, soft but sturdy, silky, and universally praised by leading fashion designers across the world for their elegance, color dyeing affinity, thermal tolerance, and water absorbency. Silk as a weavable fiber was first discovered by the Chinese emperor Xi Ling Shi in 2,640 B.C., and Chinese kept its culture and weaving secrets for 2,500 years. (Gangopadhyay, 2008) [4]. Sericulture is the science of rearing of silkworms and production of silk. Silk is the most elegant textile in the world with natural sheen, light weight, soft touch, glamour, and highly durable. The total raw silk production in the country during 2022-23 was 40,800 MT, which was 4.8% more than the production achieved during the previous year 2021-22. India is the second largest producer of silk in the world. Among the four varieties of silk produced in 2022-23, Mulberry accounted for 70.49% (28,760 MT), Tasar 9.43% (3,850 MT), Eri 19.36% (7,900 MT) and Muga 0.71% (290 MT) of the total raw silk production of 40,800 MT. (CSB 2023). Silkworm, *Bombyx mori* L. is a monophagous insect that feeds exclusively on mulberry leaves (*Morus* spp.) and the insect extracts all the nutrients from the leaf (Amanpreet *et al*., 2020) [1]. Since the nutritional status of leaf has a vital role in influencing the performance of different stages of silkworm Bahar *et al* 2010 [2], the selection of mulberry genotypes is an important aspect for better growth and development of silkworm and its economic parameters.

Materials and Methods
The experiment entitled "Effect of mulberry genotypes on growth parameters of silk worm (*Bombyx mori* L.)" was conducted in the Department of sericulture, University of Agricultural Sciences, in Completely Randomized Design The silkworms were reared on five mulberry genotypes *viz.*, MI-79, ME-52, S-36, S-13 and C-20 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 fresh mulberry leaves of above five varieties were obtained in required quantity from germplasm

maintained at Department of sericulture farm. 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 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 moulting 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 and to study other economical larval parameters. Equal weighed amount of food was supplied in each feeding to each replication every day. The weight of the larvae was recorded after every instar before and after moult.

Young age silkworm rearing parameters

Larval weight (g)

Twenty larvae were randomly selected in each replication of every treatment and weighed in different instars.

Larval duration (days)

The larval duration is direct importance to the rearer since he has to feed the worms carefully for harvesting of cocoons. The time required to complete the three instars reared on different mulberry genotypes were recorded and expressed in days.

Moulting duration (h)

It is the period recorded during the moulting time of silkworms. The time required to complete the moult by the worms reared on different mulberry genotypes were recorded and expressed in hours.

Results and Discussion

Larval weight (g/20 larvae)

Mulberry silkworms fed with leaves of selected mulberry genotypes exhibited marked difference in larval weight (g/20 larvae). Worms nourished with leaves of MI-79 recorded higher larval weight in first, second and third instars (0.096, 0.388, 2.366 g/20 larvae respectively). However, C-20 recorded lower larval weight of 0.080 g/20 larvae in first instar, 0.360 g/20 larvae in second instar and 2.033 g/20 larvae in third instar (Tabe1). This may be due to these genotypes found rich in moisture content and nutrient status. These findings were on par with Sujathamma *et al*. (2001) [5] who reported that the nutritive quality leaves of Tr-10 and S-13varieties found superior, as larvae fed on these two varieties have shown higher values of larval weight.

Table 1: Larval weight of chawki silkworm PM × CSR2 as influenced by mulberry genotypes

Sl. No.	Genotype	1st instar	2nd instar	3rd instar
1	ME-52	0.080	0.364	2.166
2	MI-79	0.096	0.388	2.366
3	S-36	0.084	0.379	2.233
4	S-13	0.082	0.370	2.166
5	C-20	0.080	0.360	2.033
F-test	*	*	*	*
CD at 5%		0.076	0.011	0.241
S.Em ±		0.024	0.035	0.761

Larval duration (days)

The first and second instar larval duration recorded minimum in the S-36(3.73 days) and (2.96 days) followed by MI-79 (3.96 days) and (3.06 days) respectively. However, the first instar larval duration found maximum in the larvae fed withS-13 (4.16 days) and second instar on ME-52 (3.63 days). Third instar larval duration was minimum (3.93 days) and maximum (4.63 days) in ME-52 and C-20 respectively (Table 2). The present results are comparable with the findings of Tayade *et al.* (1988) [6], who observed significant differences in larval weight when the silkworm larvae fed on mulberry varieties *viz.*, Kanva-2, Kosen, LM-1, LM-2, Mysore local, S-30, S-36, S-41 and S-54.

Table 2: Larval duration of chawki silkworm PM × CSR2 as influenced by mulberry genotypes

Sl. No.	Genotype	1st instar	2nd instar	3rd instar
1	ME-52	4.06	3.63	3.93
2	MI-79	3.96	3.06	4.23
3	S-36	3.73	2.96	4.06
4	S-13	4.16	3.63	4.56
5	C-20	4.13	3.36	4.63
F-test	*	*	*	*
CD at 5%		0.64	0.72	1.12
S.Em ±		0.20	0.22	0.35

Moulting duration (hours)

First moulting found to be high in silkworms fed on C-20 (25.34 h) and minimum moulting duration found in MI-79 and the second moulting duration found high in the silkworms fed with MI-79. None of the findings were found with regard the effect of different mulberry genotypes on silkworm moulting duration.

Table 3: Moulting duration of chawki silkworm PM × CSR2 as influenced by mulberry genotypes

Sl. No.	Genotype	1st moult	2nd moult
1	ME-52	21.80	22.76
2	MI-79	24.00	24.50
3	S-36	23.65	23.20
4	S-13	21.30	20.90
5	C-20	25.34	22.70
F-test	*	*	*
CD at 5%		4.14	6.33
S.Em ±		1.31	2.01

Summary

Twenty larvae were randomly selected in each replication of every treatment and weight in different instars. Silkworms nourished with leaves of MI-79 recorded higher larval weight in first, second and third instars (0.096, 0.388, 2.366 g/20 larvae respectively). However, C-20 recorded lower larval weight of 0.080 g/20 larvae in first instar, 0.360 g/20 larvae in second instar and 2.033 g/20 larvae in third instar. The first and second instar larval duration recorded minimum in the S-36 (3.73 days) and (2.96 days) followed by MI-79 (3.96 days) and (3.06 days) respectively. However, the first instar larval duration found maximum in the larvae fed on S-13 (4.16 days) and second instar on ME-52(3.63 days). Third instar larval duration was minimum (3.93 days) and maximum (4.63 days) in ME-52 and C-20 respectively. First moulting found to be high in silkworms fed on C-20 (25.34 h) and minimum moulting duration

found in MI-79 and the second moulting duration found high in the silkworms fed with MI-79. Among the studied genotypes MI-79 and S-36 found to be best suited for chawki silkworm rearing.

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