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EFFECT OF ORGANIC MANURES ON MULBERRY LEAF FIELD AND COCOON CHARACTERS OFSILKWORM, *BOMBYX MORI* L.

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Abstract

The study was conducted in the zoology department of Muslim Arts College, Thiruvithancode, Kanyakumari District, Tamil Nadu, to ascertain the impact of applying various organic manures (farmyard manure and vermicompost, both separately and in combination) to the soil in mulberry trees, as well as the effects on the characteristics of silkworm larvae and cocoons.When fed mulberry leaves made from a combination of different manures, fifth instar larval length (5.98 cm) and weight (3.16g) of Morus alba mulberry variety grown in pots were greatly increased. Treatment-fed silkworms (T) had noticeably larger cocoon weights (1.54g), shell weight(0.34g), and shell ratio (23.26%).

Keywords: Vermicompost, farmyard manure, Mulberry, *Bombyx mori*, silk characters.

1. Introduction

Mulberry (Morus sp.) is a plant that is seldom perennial. Environmental factors, integrated nutrient management, and soil health all affect the quantity and quality of mulberry leaves produced. Mulberry leaf productivity is known to respond effectively to the addition of organic manures and is strongly reliant on plant nutrients such as NPK [1]. In this sense, farmyard manure derived from cow dung is essential [2]. In mulberry, vermicompost and NPK have an impact on leaf yield, plant height, and leaf count [3]. In order to achieve high leaf production and, consequently, high cocoon yield, it is imperative to maintain biologically appropriate conditions and apply fertilisers and manure on a schedule [4].

A higher yield of nutrient-rich mulberry leaves was secured by the balanced use of fertilizers, either organic and inorganic or a combination of both, which improved the production of cocoon crops [5&6]. In addition to employing traditional farm-based products,

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there is an increasing demand for homemade materials including Jeevanrutha, panchagavya, amritpani, and biodigested liquid organic manures. These compounds have been shown to boost mulberry output and have an impact on B. mori larval growth and cocoon characteristics [7]. The paper lists potential organic inputs in this context, highlighting their value in mulberry farming as well as quality and cocoon yield for sustainable sericulture.

2. Materials and methods

The investigation was carried out on *Morus alba* L. plant and mulberry silkworm, *Bombyx mori* L.

2.1. Procurement and maintenance of *B.mori* larvae

The third instar larvae were purchased from the state Government Sericulturecenter, Konam, Nagercoil, Tamil Nadu. The caterpillars were fed with *M.alba*leaves and maintained in oven dried trays under ideal conditions of room temperature (25°C) and humidity (70-80%).

2.2. Experimental design

The *M.alba*cuttings were planted in 4 separate pots. After one month, the manures were applied in the following forms. Each treatment consists of 5 sets

T - Control

T - Vermicompost (50g)

T_2 - Farmyard manure (50g)

T3 - Vermicompost (25g) + Farmyard manure (25g)

The manures were applied at 15 days intervals. 70 days after pruning observations were made in the treated plants from 5 randomly selected plants. The growth parameters, such as, height of the plant (cm), number of branches/plant, number of leaves/plant, average leaf length (cm) and average leaf weight (g) were measured and recorded.

2.3.Treatment of *B.mori* larvae

The third-stage larvae were chosen at random and divided into 4 batches—1 for the experimental group and 2 for the control group—each containing 5 replicates and 50 silkworms. Throughout the larval stage, the B. mori larvae were fed the T1, T2, and T3 manures applied mulberry leaves. At the same time, new mulberry leaves were used to raise the control larvae (T).

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2.4 Observations recorded

In the fifth instar of each replication, the larvae's length (in centimetres) and weight (in grammes) were measured, and the mean was calculated. The periodicities of the larvae and pupae were noted individually and represented in hours. Larval survival was noted and reported separately, with percentages given. On the fourth day following spinning, the cocoons were collected, and their attributes were measured. Using an electronic balance, the weight of the cocoon, pupal, and shell was calculated and recorded in grammes. The shell ratio was computed as a percentage using the following formula.

$$\text{Shell ratio} = \frac{\text{shell weight}}{\text{cocoon weight}} \times 100$$

3. Results

Table 1 shows the effect of different manures on growth parameters of *M.alba*. The maximum plant height (31.5±1.25 cm), number of branches/ plant (12.4±0.26), number of leaves/plant (199.8±17.26), leaf length (16.42+0.56 cm) and leaf weight (3.02+0.14g) were recorded in the T_3 treated groups when compared to control. Table 2 shows the effect of different manures on growth of *B.mori* larvae (5th instar). In the T3 treated groups, maximum larval length (5.98±0.42 cm) and weight (3.16±0.28g), was recorded. The larval and pupal duration were decreased and survivability ratio increased (99.5+1.26%). The cocoon parameters of silkworm, fed with organic manures (vermicompost+farmyard manure) treated groups showed maximum cocoon weight (1.54+0.12 g) pupal weight (1.20±0.11 g), shell weight (0.34±0.07g) and shell ratio (23.26±1.90%). Total eggs laid by a single moth was increased (547.6+29.91) and hatchability percentage (98.26±1.4%) also increased at T3 treated groups over control and other treated groups.

4. Discussion

The effect of organic manures, such as, Vermicompost, farmyard manure and vermicompostfarmyard manure on the yield of *M. alba* and on *B.mori* had been investigated.

The application of organic manures (a blend of farmyard manure and vermicompost) greatly enhanced plant growth and output in the current study, supporting the conclusions of Ram et al. [8]. They found that the growth attribute characteristics and leaf yield were significantly impacted by the application of mixed cake and farmyard manure along with the

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recommended quantity of NPK. According to Dahiya and Singh [9], the use of farmyard manure may have improved mulberry growth and quality characteristics by providing more plant nutrients, improving the physical environment, and enhancing soil biological processes. Kochot et al. [10] state that the application of fertilisers and organic manures together improved the physical condition of the soil, which in turn encouraged root growth and increased nutrient uptake via stimulating microbial growth.

The application of various organic manure sources may have affected the uptake of nutrients, which in turn raised leaf quality, which aided in silkworm growth and development and consequently produced higher larval and cocoon characters. This could account for the increased larval and cocoon characters. Chakraborty and Chakraborty [11] report that when developing worms were fed mulberry leaves grown by applying organic manures and other biofertile fertilisers, the worms showed excellent results in larval growth and cocoon characteristics. The influence of liquid organic manures on silkworm larval and cocoon features was investigated by Chandrashekhar et al. [12]. The leaf quality of three distinct liquid organic manures was evaluated by feeding them to silkworms while being fed with the recommended dosage of fertiliser (control). The silkworm's larval and cocoon characteristics were noted to have significantly increased.

Developmental periods were significantly reduced and survivability increased due to the different manures supplementation to the mulberry. Krishnappa [13] and Khan and Saha [14] reported that amino acidsupplementation reduced the larval duration and increased the survivability rate.

Conclusion

According to the current study, applying organic manures in combination has a positive impact on mulberry leaf output, which could eventually result in the production of compact, high-quality cocoons for sale.

Table 1 Effect of different manures on growth parameters of *M. alba*

Treatment (%)	Plant height (cm)	No of branches per plant	No of leaves per plant	Leaf length (cm)	Leaf weight (g)

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T	25.3±0.56	9.2±0.01	124.6±10.45	11.14±0.54	2.45±0.12
T_1	27.2±1.54 (7.51)	9.8±0.14 (6.52)	135.4±12.56 (8.67)	1.53±0.81 (21.45)	2.89±0.24 (17.96)
T_2	29.9±2.51 (18.18)	11.6±0.42 (26.09)	172.2±11.47 (38.20)	14.18±0.67 (27.29)	2.96±0.18 (20.82)
T_3	31.5±1.25 (24.51)	12.4±0.26 (34.78)	199.8±17.26 (60.35)	16.42±0.56 (47.40)	3.02±0.14 (23.27)

Note: per cent deviation over control values in parentheses

Table 2 Effect of different manures in growth of *B.mori* larvae (5thinstar)

Treatment (%)	Larval length (cm)	Larval weight (g)	Larval duration (hrs)	Pupal duration (hrs)	Survivability ratio (%)
T	5.47±0.51	2.34±0.14	182.6±2.17	251.2±2.32	95.2±1.12
T_1	5.52±0.16 (0.31)	2.68±0.26 (14.53)	179.4±2.46 (17.52)	248.4±2.23 (-11.15)	97.6±1.06 (2.52)
T_2	5.73±0.14 (4.75)	2.87±0.17 (22.65)	165.2±2.32 (-9.64)	232.6±4.60 (-25.12)	98.4±1.46 (3.36)
T_3	5.98±0.42 (9.32)	3.16±0.28 (35.04)	151.4±2.54 (-17.09)	216.2±4.12 (-13.93)	99.5±1.26 (4.52)

Note: per cent deviation over control values in parentheses

Table 3 Effect of different manures on cocoon parameters of silkworm, *B.mori*

Treatment (%)	Cocoon weight (g)	Pupal weight (g)	Shell weight (g)	Shell ratio (%)
T	1.24±0.14	1.01±0.10	0.23±0.05	19.20±1.49
T_1	1.33±0.10 (7.25)	1.12±0.13 (10.89)	0.27±0.04 (17.39)	19.68±2.49 (2.50)
T_2	1.47±0.10 (18.54)	1.16±0.08 (14.85)	0.31±0.04 (4.78)	21.73±1.81 (13.17)
T_3	1.54±0.12 (24.19)	1.20±0.11 (18.81)	034±0.07 (47.85)	23.26±1.90 (21.14)

Note: per cent deviation over control values in parentheses

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References

1. Jaiswal, K, Goel, R, Singh, S, Kumar, P & Gupta, S 2005,'Influence of different organic manures on few traits of mulberry and cocoons under Lucknow condition. Progress of Research in organic sericulture and seri by product utilization',seri scientific publishers, Bangalore, pp. 127-130.
2. Chakraborty, B & Chakraborty, SK 2016,'Influence of Bioand organic nutrients on economic traits of mulberry silkworm, *Bombyx mori* L.',International Journal of Innovative Research in Science, Engineering and Technology, vol. 5, no.12, pp. 21204-21209.
3. Murarkar, SR Tayade, AS,Bodhade, SN &Ulemale, RB 1998,'Effect of vermicompost on mulberry leaf yield', Journal of Soils and Crops, vol. 8, no.1, pp. 85- 87.
4. Zheng, TZ, Tan, YF Huang, GX, Fan, H& Ma, B1988, ' Mulberry cultivation. FAO Agricultural services, Bulletin, vol. 73, no.1.
5. Nasreen, A, Cheema, GH &Ashfag, M 1999,'Rearing of Silkworm, *Bombyx mori* L on alternative food plants,'Pakistan Journal of Biological, Sciences, vol. 2, no.8, pp.43-45.
6. Sannappa, B, Doreswamy, C, Ramakrishna, N, Govindan, R & Jagadish, KS 2005, ' Influence of sources of organic manures applied to mulberry on rearing performance of silkworm (PMxCSR)', Progress of research in organic sericulture and Seri byproduct utilization, pp. 131-136.
7. Chandrashekhar, S, Hemavathi, SV & Kumar, AM 2022,'Effect of liquid organic manures on larval and cocoon traits of silkworm (*Bombyx mori* L.)', International Journal of Plant and Soil Science, vol. 34, no.24, pp.276-282.
8. Ram, BL Maji, C, Trivedi, K & Singh, RP 2018,'Integrated effect of mixed cake and farm-yard manure on mulberry sericulture in acid soils of Kalimpong hills', Current Journal of Applied Science and Technology, vol. 26, no.6, pp.1-11.
9. Dahiya, SS & Singh, R 1979, 'Effect of farmyard manure and CaCo3 on the dry matter yield nutrient. Uptake by oats (*Avena sativa)* plant and soil, vol. 56, pp.391.
10. Kochot, A, Reddy, D & Prasad, RM 2001,'Long term soil fertility management through integrated plant nutrition supply: Indian Institute of Soil Science, Bhopal, India, pp. 335.
11. Chakraborty, B & Chakraborty, SK 2016,'Influence of Bioand organic nutrients on economic traits of mulberry silkworm, *Bombyx mori* L.',International Journal of Innovative Research in Science, Engineering and Technology, vol. 5, no.12, pp. 21204-21209.
12. Chandrashekhar, S, Hemavathi, SV & Kumar, AM 2022,'Effect ofliquid organic manures on larval and cocoon traits of silkworm (*Bombyx mori* L.)', International Journal of Plant and Soil Science, vol. 34, no.24, pp. 276-282.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

13. Krishnappa, JB 1987,'Influence of amino acids supplementation on growth and development of mulberry silkworm, *Bombyx mori* L.: L.P.G Degree Thesis, University of Agricultural Science, Bangalore, India.
14. Khan, MD& Saha, BN 1995, 'Growth and development of the mulberry silkworm, *Bombyx mori* L. on feed supplemented with alanine and glutamine',Sericologia, pp, 35: 657-663.