



Ministry of Agriculture, Livestock and Irrigation
Department of Agriculture (DOA)



**Effect of Different Feeding Frequencies on the
Yield and Quality of Silkworm Cocoon
(*Bombyx mori. L.*)**



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INTRODUCTION



- ❖ Sericulture has been practiced in many developed and developing countries in the world for a long time.
- ❖ Sericulture started in Myanmar since 7th century and modern sericulture was established in 1952.
- ❖ In Myanmar, silkworm rearing has been seemingly practiced from the ancient time in a rural area and mulberry plants are grown in **Kachin State, Kayah State, Chin State, Shan State, and Mandalay Region** covering with **1231 ha in 2021-22 fiscal year** (DOA, 2022).

- ❖ About 92.20% of the silk produced in the world is obtained from mulberry silkworm reared solely on mulberry leaves (*Morus* spp.).
- ❖ Mulberry leaves mainly constitute **proteins, carbohydrates, vitamins, phagostimulants, sterols, and minerals** which can easily be eaten by the silkworms (Koul, 1989).
- ❖ Growth and development of silkworm is vary depending on quality and quantity of mulberry leaf, which in turn indicated by commercial characteristics of cocoon crop (Ramesha et al., 2010).



- ❖ Food intake and silk production in silkworms are very closely related to nutritional factors.
- ❖ An optimum feeding frequency satisfies the appetite of the worms for their uniform and healthy growth.
- ❖ Insufficient feeding in the fifth larval instar causes production of small sized cocoon with owing to sequential disease (Kawaguchi et al., 1996).
- ❖ The success of sericulture industry depends on the **performance of silkworm, mulberry varieties and feeding frequency.**
- ❖ Therefore, it is worth to find out the suitable mulberry leaves feeding frequency to produce high yield and good quality cocoon for improving sericulture industry in Myanmar.

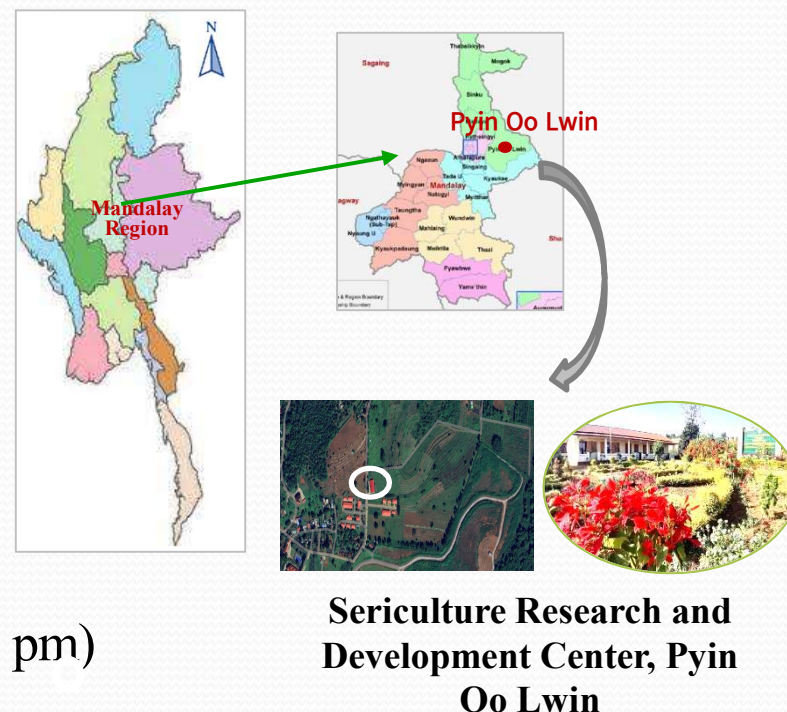


OBJECTIVES

- 1) To verify the suitable frequency of feed required for high yield and good quality cocoon production
- 2) To recommend the suitable feeding frequency of mulberry leaves to silkworm rearers and government sericulture farms in mulberry growing areas in Myanmar

MATERIALS AND METHODS

- Experimental site - Pyin Oo Lwin Sericulture Research and Development Center
- Duration - 2022-2023 Winter Season
- Experimental - Complete Randomized design Design (CRD) with 4 replications
- Treatments - 1) Single feeding (6 am)
2) Two feedings (6 am, 10 am)
3) Three feedings (6 am, 10 am, 2 pm)
4) Four feedings (6 am, 10 am, 2 pm, 5 pm)
- Tested silkworm strain - N_{24} Kachin $\times$ IN_{06}



(Each experimental unit included 500 larvae per replication at 4th instar.)

Silkworm Rearing

For young silkworms (first to third instars)

- Young larvae (from first to third instars) were fed with tender, succulent and nutritious leaves known to favor growth and development of silkworms.



For grown silkworms (fourth and fifth instars)

- Mature and coarse leaves were fed to grown silkworms (from fourth to fifth instars) till mounting



- Cocoons were collected after 7th day of mounting and assessed for commercial parameters by Sonwalkar (1991) methods.

Data Collection

Growth and quality parameters

- Style of feeding
- Larval weight (g), Larval duration (days)
- Total weight of cocoons (lb.), Number of cocoons per pound
- Average silk percentage (fresh)

After reeling test, the following parameters were collected.

- Average length of silk yarn per cocoon (m)
- Average non-breaking length of silk yarn per cocoon (m)
- Estimated dry reelable percent (%)

Statistical analysis

- Statistix 8
- Least Significant Difference (LSD) test at 5% level

RESULTS AND DISCUSSION

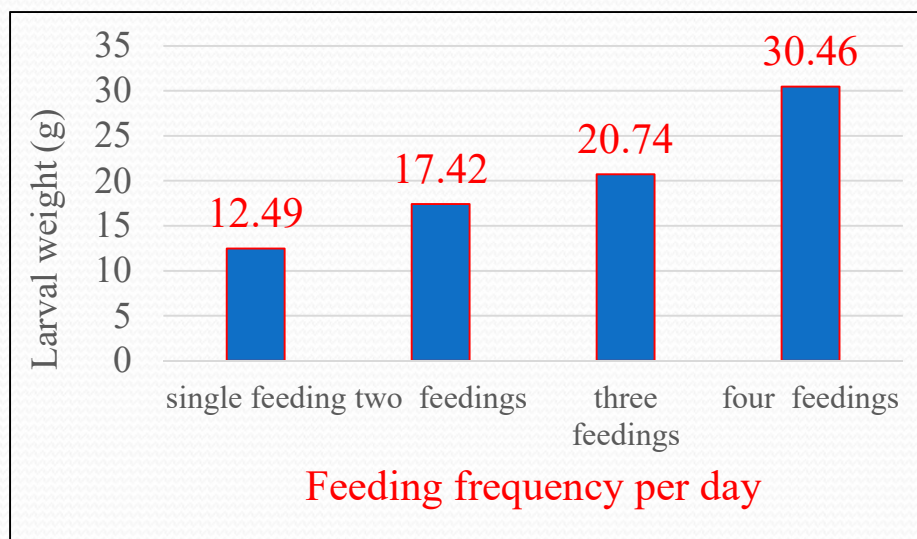


Fig.1 Performance of silkworm hybrid (N_{24} Kachin $\times$ In_{06}) for 5th instar larval weight (g)

If the feeding frequency of silkworm is minimized, the larvae show retarded growth and development, yielding both lower quality and quantity of cocoon production. However, if the feeding frequency is increased, it leads to robust growth and development and ultimately better production of quality and quantity of cocoons (Roy Choudhury et al., 1993).

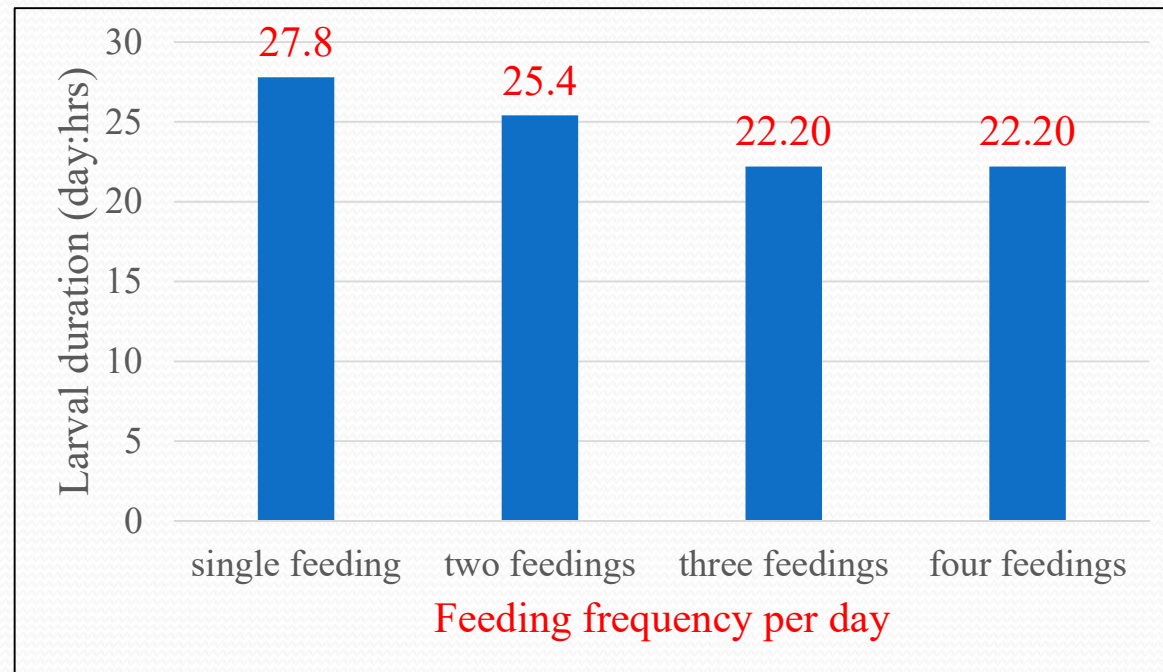


Fig.2 Performance of total larval duration for silkworm hybrid

(N₂₄ Kachin × In₀₆)

Production of good cocoon is the uniformity in larval growth and development with minimum intake of food and labor (Babu, 2014 and Srinath, 2014).

Table 1. Quality Parameters of Cocoon Produced from Four Mulberry Leaves Feeding Frequency in Winter Season

Mulberry feeding frequency per day	Quality Parameters of Cocoon		
	Total cocoon weight (lb)	Number of cocoons per pound	Average silk percentage (%)
Single feeding (6 am)	0.800 c	446 a	14.27
Two feedings (6 am, 10 am)	1.150 b	311 b	15.10
Three feedings (6 am, 10 am, 2 pm)	1.625 a	272 c	15.30
Four feedings (6 am, 10 am, 2 pm, 5 pm)	1.800 a	258 d	16.81
LSD_{0.05}	0.2082	1.1547	-
Pr>F	0.0001	0.0001	0.2699
CV %	10.06	0.51	11.30

In a column, means followed by the same letter are not significantly different at 5% LSD.

Silkworm rearing performance differed significantly on cocoon production by frequency of feeding mulberry leaves and nutritive effects of leaf position play a major role in the quality of silkworm growth and silk production (Adeduntan, 2013 and 2015).



Fig.3 Performance of cocoon for silkworm hybrid (N_{24} Kachin $\times$ In_{06})

The quality and quantity of food plant can play an important role in growth and development of silkworm, and it leads to the increase in body size and dry weight of cellular mass in each instar in the rearing bed (Ahmed et al., 2015a).

Table 2. Quality Parameters of silk yarn per cocoon of mulberry feeding frequency in winter season (2022)

Mulberry feeding frequency per day	Quality Parameters of silk yarn per cocoon		
	Total filament length (m)	Average non-breaking filament length (m)	Estimated reelable percent (%)
Single feeding (6 am)	298.71 d	186.14 c	44.02
Two feedings (6 am, 10 am)	351.86 c	228.35 bc	43.71
Three feedings (6 am, 10 am, 2 pm)	458.00 b	245.08 b	44.08
Four feedings (6 am, 10 am, 2 pm, 5 pm)	529.74 a	306.03 a	47.10
LSD_{0.05}	49.265	50.672	-
Pr>F	0.0001	0.0020	0.5424
CV %	7.81	13.62	8.20

In a column, means followed by the same letter are not significantly different at 5% LSD.

CONCLUSION AND RECOMMENDATION

- **Three and four feeding frequencies** can produce the good quality and high yield of cocoon among the tested frequency.
- Feeding is the most important factor in silkworm rearing, as it has a direct impact on growth and development of silkworms.
- Recommend the optimum feeding frequency of mulberry leaves to **government silkworm farms and private silkworm rearers** in Myanmar.

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THANK

