

## ORIGINAL PAPER

# Effect of fortification of Mulberry leaves with homeopathic drug *Nux Vomica* on *Bombyx Mori*. L.

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**Silk worm (*Bombyx mori* L.) larvae were fed on Mulberry leaves treated with *Nux vomica* mother tincture. The impact on larval, cocoon, shell and pupal weight, silk ratio, average filament length and denier, and number of breakages during reeling were investigated. The results were positive in all parameters under study except cocoon weight, pupal weight, and the average denier of the filament. *Homeopathy* (2006) 95, 148–150.**

**Keywords:** mulberry leaves; *Bombyx mori*; homeopathic drug; *Nux vomica*; larval and post-cocoon characters

## Introduction

The silk worm (*Bombyx mori* L.) is a beneficial insect reared for the valuable commodity silk. The silk industry plays an important role in the Indian rural economy, so research on silkworm and mulberry crop enhancement is of high importance.

The insect is monophagous feeding only on mulberry leaves, and the foliage quality of mulberry has a profound effect on the quality of silk. The nutritive value of mulberry leaves depends on various agro-climatic factors and any deficiency of nutrients in leaves affects silk synthesis by the silkworm. Nutritional management directly influences the quality and quantity of silk production.<sup>1,2</sup>

In recent years, attempts have been made to fortify the leaves with nutrients, including spraying with antibiotics, juvenile hormones, juvenile-hormone mimicking extracts of plants, etc to improve the quality and quantity of silk. The supplementation and fortification of mulberry leaves is a recent technique in sericulture research. Murgan *et al*<sup>2</sup> and Murugap-pan<sup>3</sup> studied the effects of fortification of mulberry

leaves with jaggery (a crude extract of sugar cane juice). No attempts have been made to use homeopathic medicines to improve sericulture. I investigated the effect of *Nux vomica* on biological parameters of the silk worm. The homeopathic drug picture is described by Tyler.<sup>4</sup> The importance of homeopathic medicines and their effective sustainable use other than human has been explained by Naveen.<sup>5</sup>

## Material and methods

The silk worm eggs were disease-free layings (DFLs) obtained from the State Sericulture Department, Aurangabad, Maharashtra, India. The strain of *B. mori* L. was CSR2 × CSR4. The eggs were incubated and hatched, and brushings of newly hatched larvae were taken (brushing means the newly hatched larvae were collected by a feather and reared up to cocoon stage). Rearing was conducted in September 2004 at the Department of Zoology, Dr Babasaheb Ambedkar Marathwada University, Aurangabad, under laboratory conditions: temperature range 25–28 °C relative humidity range 80–100%. Medication was given to the larvae of Vth age from 23–28 September 2004.

The Programme of rearing was as follows:

Eggs procured: 04.09.2004.

Larvae hatched and brushing taken: 07.09.2004.

First moult: 10.09.2004.

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Table 1 Results (mean values)

Parameter	Control	Nux vomica	Difference Nux v - control (%)
Larval weight (g)	3.00	3.82**	27.33
Cocoon weight (g)	1.871	1.848	-1.23
Shell weight (g)	0.372	0.401*	7.8
Pupal weight (g)	1.499	1.446	-3.5
Silk ratio (%)	19.882	21.820*	9.75
Filament length (m)	757.12	827.43**	9.28
Filament weight (g)	0.201	0.251**	24.9
Denier	2.38	2.73**	14.70
Breakages (n)	2	2	—

\* $P < 0.05$ ;\*\* $P < 0.01$ ; t-test.

Second moult: 12-13. 09.2004.

Third moult: 16-17.09.2004.

Fourth moult: 21-22.09.2004.

Fifth instar: 28.09.2004 mature larvae randomly selected for weighing.

Cocoon harvested: 03.10.2004, random sample taken for analysis.

The experiments were conducted on randomly selected freshly 4th moult larvae (ie 5th instar/age larvae). For the control and experimental, 50 larvae were randomly selected with three replicates. The total number of larvae in each group was thus  $50 \times 3 = 150$ . Both groups were exposed to the same environmental conditions.

The mother tincture of *Nux vomica* was manufactured by Lord's Homeopathic Laboratory Pvt Ltd, New Delhi 110028 (batch no. MT 247). The test solution was prepared as 1:4 v/v, drug in distilled water (10 ml of drug with 40 ml of distilled water). Both the groups received 40 g of mature chopped mulberry leaves for each feed, 4 times per day. The control group was feed on mulberry leaves treated with 2 ml of distilled water; the experimental group was given feed mixed with 2 ml of the test solution. All the rearing operations were carried out according to Krishnaswamy<sup>6</sup> and Hiware.<sup>7</sup> Safety measures were taken to avoid toxicity of Strychnine and Brucine in the operatives.

Evaluation was based on mature larval weight, cocoon weight, shell weight, pupal weight, silk ratio, average filament length, average weight of filament, average denier of filament and number of breakages during reeling and it was carried out on randomly selected samples. The values were compared between experimental and control groups in terms of percent change.

## Results and discussion

The results are presented in Table 1. There was a trend favoring *Nux vomica* treatment in all values measured except the cocoon, pupal weights, and the denier of the filament in the experimental group compared to the control group. Larval weight was increased by 27.33% ( $P < 0.001$ ), shell weight 7.795%

(ns), silk ratio 9.747% (ns), average filament length 9.28% ( $P < 0.001$ ), average weight of filament 24.87% ( $P < 0.001$ ). The number of breakages during reeling was similar in both the groups. The cocoon, pupal weight and size of filament (Denier) showed the negative trend from *Nux vomica* treatment values 1.229% (ns), 3.535% (ns) and 14.705% ( $P < 0.001$ ), respectively. The finding of increased larval weight was in line with the findings of Kumarraj *et al*<sup>8</sup> and Verma and Atwal<sup>9</sup> who used other methods of supplementation. Filament size increased by 14.75% and length by 9.3%; this result is similar to the findings of Kalpana *et al*.<sup>10</sup> The number of breakages per filament during reeling in both the groups was only two and there was no significant difference between treatments.

From this study it appears that treatment with *Nux vomica* improves biological parameters of *B. mori* L. It had no apparent deleterious effects on the silkworm: mortality during rearing was not significant. *Nux vomica* may act on the digestive physiology of the worms. *Nux vomica* tincture is highly toxic, but only small volumes are required. Risk to operators can be avoided by simple measures. Further work is required to determine the optimum dose and regime, but it appears that this may be an effective and cheap method of improving silk yield, which can be applied at the level of individual farms.

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