



## Influence of nutrition composition of diverse two mulberry cultivars on silkworm *Bombyx mori* L. (Lepidoptera: Bombycidae)

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### Abstract

Two mulberry varieties under study. The two cultivars were; *Morus alba* Linn. Var. *Canava* -2 (M1) and *Morus alba* Linn. Var. *Morittiana* (M2). Investigation was conducted to assess the bast of different two mulberry cultivars in terms of leaf moisture and nutritional analysis. The results reported that the variety *Canava*-2 is better than the variety *Morittiana* for silkworm (*B. mori* L.) rearing. Investigation showed that there is great significantly diversity among the mulberry cultivars in terms of their nutritional components.

Resultes recorded also fourth larval duration, fifth larval duration, total larval duration; larvae weight; cocoon weight; cocoon shell weight; silk ratio and cocooning percentatge.

**Keywords:** silkworm, *bombyx mori* l, *Morus alba*, mulberry varieties

### Introduction

Silkworms consider important economic insects to many countries such as China, India and Thailand (Kumari, N. and S.P.Roy, 2011) [15]. Mulberries leaf are the main source of feeding for silkworms (*B. mori* L.). Mulberry's trees is grown under different climatic conditions; interest in the agricultural processes of trees positively affects the quality's and quantity's of cocoons produced (Vanitha, C. and K.C. Narayanaswamy, 2019) [27]. The quality of mulberry tree have a strong relationship with growth silkworm larvae and quality silk production (Vidyasagar and Kotresha.,2003) [28]. Mulberry leaves are rich in protein and amino acids.

This was identified from the nutritional components of mulberry trees by analyzing their biochemical components, and they differ in different cultivars, which in turn affect growth and cocoon production (Subhan *et al.*, 2013) [22]. It was also found that the nutritional effect of leaves statu plays a vitality role in the growth quality's of mulberry silkworms and silk production. (Adeduntant 2013 and Andarari *et.al* 2017) [1].

Dandin *et al.*,2003 and Biasiolo *et al.*,2004) [7, 8] they found that improving productivity characteristic in mulberry tree play a vital role in the sericulture industry. The present experiment aimed two different of mulberry for the geowth and economic characters of mulberry silkworm *B. mori* L.

### Materials and methods

#### 1. Preparing of silkworm, (*B. mori* L.)

Stock culture of silkworm, *Bombyx mori* L. were acquired from Sericulture Research Department, Plant Protection Research Institute, Agriculture Research Center, Giza, Egypt.

#### 2. Silkworm rearing technique

Larvae reared on spring season in the Laboratory of Plant Protection Research Institute Mansoura. under laboratory condition at (at  $25 \pm 2^\circ$  C and 75-80% humidity till cocoon spinning according to. (Krishnaswami 1978) [13]. The larvae feed on fresh and clean mulberry leaves connected every morning four times daily from two different mulberry varietie (M1 and M2). Chicken egg carton plates were used as mountages for cocoon cocoon spinning (Zannoonn and Omera,1994).

#### 3. Mulberry Spp

Leaf of mulberries used in the research were coll from trees grown at the, Plant Protection Research Institute of Mansoura.

**Table 1:** Different mulberry tree varieties

Treatment	Description
M1	<i>Morus alba</i> Linn. Var. <i>Canava</i> -2
M2	<i>Morus alba</i> Linn. Var. <i>Morittiana</i>

#### Mulberry leaves biochemical analysis

The samples were taken from the middle parts of the tree branches used in the experiment as collecting samples with three replicates. biochemical analysis to estimate (Total proteins) by method of Lowry *et al.*,1951 [17]. (Total carbohydrate) was determined by method of Hedga and Hofreiter,1962., and (miosutre, lipid, and fiber) were estimated using AOAC protocol 1995 [4, 10].

#### Economic traits of silkworm

Fourth larval duration, fifth larval duration; Total larval duration, the weight of larvae, cocoon, cocoon shell, cocoon shell ratio and cocooning percentage were recorded.

Larval weight, cocoon weight and cocoon shell weight were recorded with the Electronic Balance (Hussain *et al.*,2011) [11]

Silk ratio% was calculated according Tanaka (1994) [26]

\* Silk ratio% = cocoon shell weight (g) /cocoon weight (g)

statistical analysis were applied to collected data by usin SAS program.(.)

### Results and discussion

#### Mulberry leaves biochemical analysis

Analyses nutritional of different two mulberry varieties are summarized in Table (2). Results showed that the maximum biochemical value of moisture (78.52%), carbohydrate (18.28%) total proteins (24.75%), lipids (4.05%), and fiber (8.82%). in *Canava*-2 mulberry variety wheras minimum value recorded in *Morittiana*.

**Table 2:** Biochemical composition of *M. alba* Var. *Canava-2* and *Morittiana* mulberry leaves.

Biochemical analysis	Mulberry	Variety
	<i>Canava-2</i>	<i>Morittiana</i>
Moisture%	78.52±2.50	2.40±74.05
Carbohydrate%	18.28±0.39	16.75 ± 0.52
Protein%	24.75±0.23	20.08±0.22
Lipids %	4.05 ±0.48	3.62 ±0.48
Fiber%	8.82 ±0.21	8.58 ± 0.33

**Silkworm biological characters**

Data in Table (3) cleared the significantly difference were noticed for larval weight (g); fourth, fifth and total larval duration (day).

A variety of M1 (*Canava -2*) was the best for all characters compared with a variety.M2 (*Morittiana*).

**Table 3:** influence of two different mulberry varieties for biological characteristic of silkworm.

Characters Varieties	Fourth larval duration (day)	Fifth larval duration (day)	Total duration(day)	Larval weight (g)
M1	4.830	8.10	33.172	2.55
M2	5.09	8.197	34.40	2.30
F	70.163**	992.088**	825.525**	20.135**
LSD5%	0.055	0.051	0.150	0.53

(\*) significant at 0.0 5, (\*\*) high significant at 0.01.

Results are compact with researchers (Shifa *et al.* 2018 and Ghada 2020) [9, 25] who investigated the effect of diverse species of mulberry tree (*Morus. Spp.*) on silkworm larvae (*Bombyx mori L.*). Observed that significantly lowest larval duration when larvae of silkworm fed on *Morus alba* Var. *Canava-2*. Impact of diverse mulberry types on all characteristics of silkworms studied by (Subhan *et al.* 2013 [22]; Pakhal *et al.* 2014; Manjulan and Vijaya Kumari 2015; K. Mahmoud 2017) [18]; Ramamoorthy *et al.* (2018) [21]; and Masoud *et al.* (2020) [19] who showed that nutritional composition mulberry leaf is important to the health of (*B. mori L.*) larvae and highly significant in all biological characters.

**Silkworm economic characters**

Effect of two mulberry varieties (M1 and M2) on economic characters were recorded in table 4. The variety M1 (*Canava-2*)

showed highly significant differences on cocoon weight, cocoon shell weight, silkratio% and cocooning percentage comparing by variety M2 (*Morittiana*).

The current study agreement with (Bari *et al.* 1985, Ashfaq *et al.* 2001, Bhojne 2014, Kumar *et al.* 2 014; Lalfalpuii *et al.* 2014; Vanitha and Narayanaswamy 2019 and Masoud *et al.* 2020) [3, 5, 19, 27] who noticed that different *M. alba* variety are rich in nutritional composition It has a high significant positive effect on the efficiency of producing all cocoon characters.

Can be said that the characteristics of silkworms (*B. mori L.*) differ according to feeding on the leaves of different mulberry trees, each type of mulberry tree have nutritional components effect on silkworm (Samami *et al.* 2019) [23]

**Table 4:** Influence of two different mulberry varieties for economic characteristic of silkworm.

Characters Mulberry Varieties	Cocoon weight (g)	Cocoon shell weight (g)	Silk ratio %	Cocooning %
M1	1.50	0.30	19.97	99.70
M2	1.420	0.277	19.40	99.52
F	37.20**	2.650*	1.530*	4.011*
LSD5%	0.56	0.011	0.051	1.020

(\*) significant at 0.05, (\*\*) high significant at 0.01

**Conclusion**

Search indicated that silkworm larvae (*Bombyx mori L.*) fed on two difference mulberry cultivars (*Canava-2* and *Morittiana*) showed significant differences in the duration of the fourth and fifth larval instars, the total larval duration, the weight of the larvae and all the cocoon's variables.

It is clear from the present study that the nutritional composition of mulberry varieties showed significant differences in silkworm *Bombyx mori L.* *Canava-2* variety was the best in terms of nutritional components that in turn affect silk yield when compared with variety *Morittiana*.

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