

**IMPROVING ABSOLUTE SILK YIELD OF SILKWORM , *BOMBYX MORI* L.
BY USING ROYAL JELLY**

Nagat, H. Soliman* & Rasha, A. Salim**

*** Plant Protection Department, Faculty of Agriculture, El Fayoum
University, Egypt.**

**** Plant Protection Institute, Agriculture Research Center, Egypt.**

ABSTRACT

Effect of royal jelly on absolute silk yield of silkworm, *Bombyx mori* L. was studied during spring season of 2017. Royal jelly was diluted with distilled water to prepare three concentrations (1, 3, and 6 mg/ml.). The obtained results showed that, the concentration 6 mg/ml. of royal jelly occupied the first category to improve larval weight, pupal weight, effective rate of rearing, cocoon shell weight and absolute silk yield when compared to control.

INTRODUCTION

Silk production is dependent on the larval nutrition (**Legay, 1958**). The *Bombyx mori* L. is essentially monophagous and survives solely on mulberry leaves which play an important role in the nutrition of the silkworms, and in turn cocoon and silk production (**Nagaraju, 2002**). The nutritional status of mulberry leaves can be improved by enriching them with extra nutrients to increase larval growth and improve cocoon characteristics (**Sengupta et al., 1992**). Royal jelly is obtained from *Apis mellifera* colonies. It contains protein, carbohydrates, beneficial lipids, B complex vitamins including high amount of fatty acids, which are involved in growth, regulation and immunity (**Vitek, 1995**). The rapid growth and development as well as increasing number of eggs can be obtained by addition of royal jelly to the normal mulberry leaves (**Saikatsu et al., 1989**). The present study aimed to evaluate the effect of royal jelly on absolute silk yield of silkworm, *B. mori*.

MATERIALS AND METHODS

During spring season of 2017 at Plant Protection Dept. Fac. of Agric., El Fayoum Univ. To study the effect of royal jelly on absolute silk yield of *B. mori*, egg box (Egyptian hybrid) was obtained from the Seric. Res. Dept., Plant Protec. Res. Inst, Agric. Res. Center, Dokki, Giza. Royal jelly was diluted with distilled water to prepare different concentrations. Larvae of *B. mori* were reared on fresh mulberry leaves (*Morus alba* var. *indicia*) grown in the farm of faculty of Agriculture at Fayoum (at Dar El Ramd region) under laboratory conditions (27±2°C, 65±5% RH). At the beginning of the 5th instar, larvae were divided into four groups (in addition to the control). Each group contained five replicates (each of twenty larvae).

Larvae of *B. mori* were fed daily during the 5th instar on treated mulberry leaves with concentrations (1, 3, and 6 mg/ml. according to preliminary studies which ranged between 0.5 to 9 mg/ml) of royal jelly after drying on ambient air temperature for one minute. While the control was fed on mulberry leaves sprayed with distilled water. Tested parameters (5th instar larval weights, pupal weights, effective rate of rearing, cocoon shell weights and absolute silk yield) were recorded. Data was analyzed by ANOVA through statistical package for social science (SPSS) according to **Berkowitz and Allaway, 1998** to find out the significance between treated and control. Means were separated by (L.S.D at 0.05%).

RESULTS AND DISCUSSION

Larval weights:

According to data in **Table (I)** statistical analysis proved that there were insignificant differences between means of larval weights, where the means ranged between 2.000 g for 1mg/ml and 2.046 g for 6 mg/ml of royal jelly.

Pupal weights:

The means of the pupal weights ranged between 0.685 g/pupa for control and 0.708 g/pupa for 6 mg/ml of royal jelly According to data in **Table (I)**, statistical analysis proved that there were significant differences between means of pupal weights.

The obtained results are in general agreement with the findings of **Nguku et al.,2007 & Gad, Abir, 2013** whom found that, increasing in both larval and pupal weights when using mulberry leaves treated with royal jelly .

Effective rate of rearing:

According to data in **Table (2)** the effective rate of rearing occupied the 1st category (82.00%) when larvae treated with 6 mg/ml of royal jelly, statistical analysis proved that there were insignificant differences between means of effective rate of rearing.

TABLE (I):Effect of feeding *Bombyx mori* L. larvae on mulberry leaves treated with different concentrations of royal jelly on some biological parameters.

Concentrations of royal jelly (mg/ml)	Parameters		
	Mean of weight (g) ±SE		Effective rate of rearing (%) ±SE
	5 th larval instar	Pupal stage	
1	2.000±0.0076	0.699±0.0098ab	80.00±0.5669
3	2.020±0.0099	0.699±0.0090ab	78.00±0.5450
6	2.046±0.0063	0.708±0.0100a	82.00±0.8971
Control	2.000±0.0090	0.685±0.0090b	78.00±0.8000
F test	--	*	--
LSD at 0.05%	--	0.020	--

IMPROVING ABSOLUTE SILK YIELD OF SILKWORM, BOMBYX..... 26

Cocoon shell weights:

According to data in **Table (2)** the means of cocoon shell weights ranged from 0.169g to 0.178g for 1mg/ml and 6mg/ml of royal jelly respectively, statistical analysis proved that there were significant differences between means of cocoon shell weights. Improving in cocoon shell weights by using mulberry leaves treated with royal jelly take the same trend with **Nguku et al.,2007 & Gad, Abir, 2013.**

Absolute silk yield:

Data in **Table (2)** showed that, the highest absolute silk yield (14.59) was obtained at 6 mg/ml of royal jelly. Statistically, it found that there were no significant differences among means of absolute silk yield.

TABLE (2):Effect of feeding *Bombyx mori* L. larvae on mulberry leaves treated with different concentrations of royal jelly on some economical parameters.

Concentrations of royal jelly (mg/ml)	Parameters	
	Cocoon shell weights (g).	Absolute silk yield.
1	0.169±0.0122b	13.52±0.5779
3	0.173±0.0090ab	13.49±0.3770
6	0.178±0.0988a	14.59±0.8000
Control	0.170±0.0880ab	13.26±0.5500
F test	*	--
LSD at 0.05%	0.009	--

REFERENCES

- Berkowitz D. and Allaway A. (1998).** Statistical package for social sciences (SPSS), Version 7.5 for Windows NT/Windows 95:130-132.
- Gad, Abir, A. (2013).** Biological and physiological effects of some honey bee products and its mixtures as nutritional additives on two strains of the mulberry silkworm *Bombyx mori*. Alex. J. Agric. Res., 58(1): 47-52.
- Legay, J. M. (1958).** Recent advances in silkworm nutrition . Ann. Revi. of Entomol., 3:75-86.
- Nagaraju, J. (2002).** Application of genetic principles in improving silk production. Current Science, 83 (4).
- Nguku, E. K.; Muli, E. M. and Raina, S. K. (2007).** Larvae, cocoon and post-cocoon characteristics of *Bombyx mori* L. (Lepidoptera: Bombycidae) fed on mulberry leaves fortified with kenyan royal jelly. J. Appl. Sci. Environ., 11(4) 85 – 89.
- Saikatsu, S.; Ikeno, K.; Hanada, Y. and Ikeno, T. (1989).** Physiologically active substances in the oral excreta produced by honey bee-effects of royal jelly on silkworm. Ohu Daigaku Shigakushi, 16(3): 113 –116.

Nagat, H. Soliman & Rasha, A. Salim***

27

Sengupta, K. ; Singh, B. D. and Mustafi, J. C. (1992). Role of vitamins in silkworm nutrition. *Indian J. of Seric.* 11(1): 11-19.

Vitek, J. (1995). Effect of royal jelly on serum lipids in experimental animals and humans with atherosclerosis. *Experientia*, 5 (9): 27-35

تحسين محصول الحرير الخام لدودة الحرير التوتية باستخدام غذاء الملكات

نجاهة حامد سليمان & رشا عادل سالم
قسم وقاية النبات - كلية الزراعة - جامعة الفيوم - مصر
معهد بحوث وقاية النبات - مركز البحوث الزراعية - مصر

الملخص

خلال فصل الربيع لعام ٢٠١٧ تم دراسة تأثير غذاء الملكات على محصول الحرير . حيث تم تخفيف غذاء الملكات في الماء لتحضير التركيزات المختلفة (١ ، ٣ ، ٦ مجم/مليتر). اظهرت النتائج ان أفضل تركيز هو ٦ مجم/مليتر حيث ادى الى تحسين وزن اليرقة والعذراء وكفاءة التربية ووزن قشرة الشرنقة ومحصول الحرير مقارنة بالكنترول.