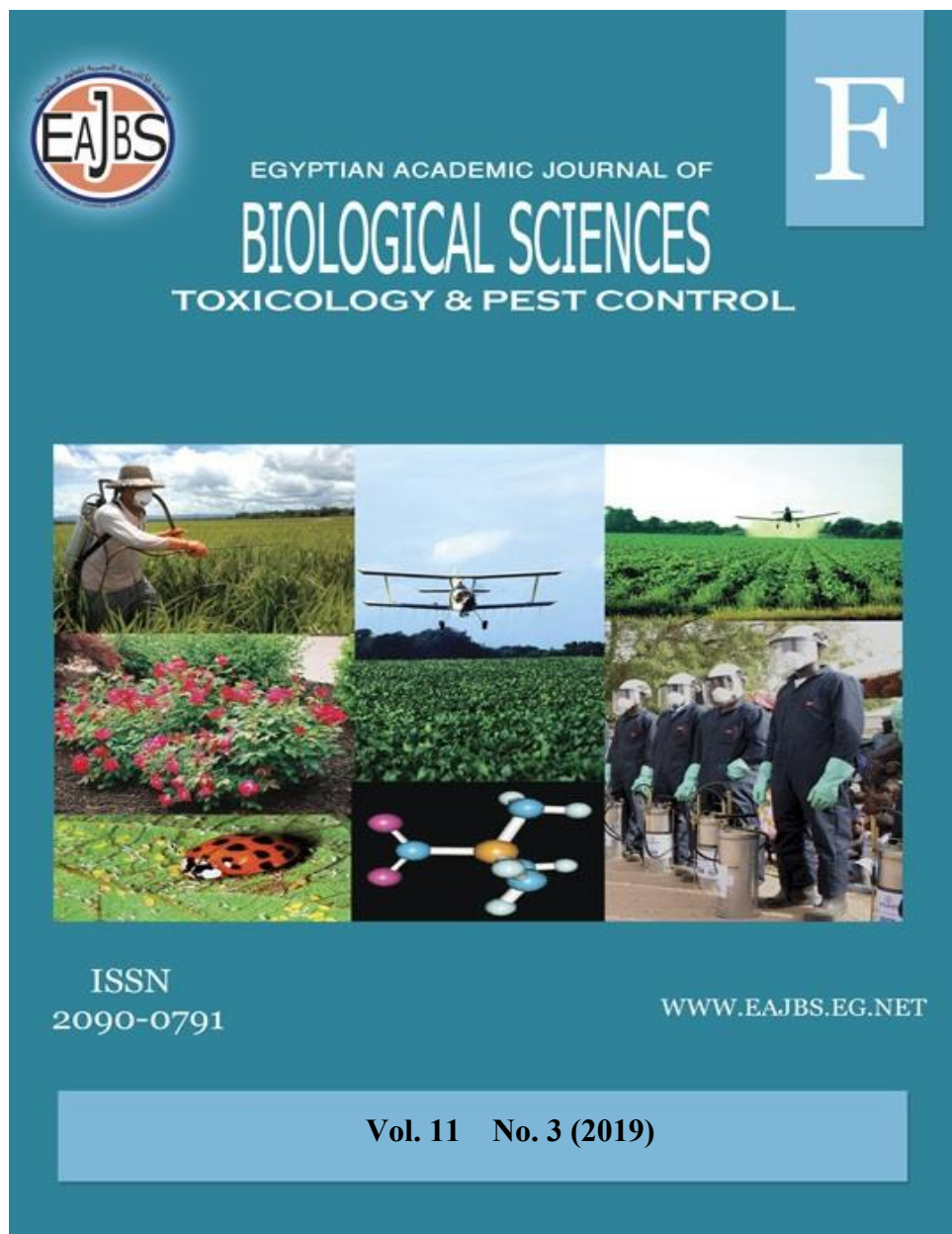


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Treatment Mulberry Trees with Some Insecticides and Its Effect on the Productivity of Silkworm, *Bombyx mori* L.

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ABSTRACT

During the spring season of 2019, the effect of two insecticides (Cymbush®&Tracer®) on larvae of *Bombyx mori* L. were studied at Plant Protec. Dept. Fac. of Agric., Fayoum Univ. Insecticides were sprayed on mulberry trees by concentration 1ml/l . of Cymbush® and 0.1ml/l. of Tracer® .Mulberry leaves were harvested on to three times (after 3,6,9,12 days).Results show that, the 5th instar larval mortality percentages increased , where data ranged between 18.30% in Cymbush® and 10.21% in Tracer® compared to 9.93% in control. While cocooning percentages, cocoon shell ratio and silk productivity were decreased when comparing to control, where data ranged between 74.00% in Cymbush®, 89.08% in Tracer® , 12.00% in Cymbush®,19.07% in Tracer® and 1.021 cg/day in Cymbush®, 1.800 cg/day in Tracer® , respectively compared to 93.00%, 19.77% and 1.910 cg/day in control, respectively.

INTRODUCTION

The silkworm *Bombyx mori* L. is herbivorous and feeds exclusively on fresh mulberry leaves during the larval phase (Nagaraju and Goldsmith, 2002).The silk industry plays an important role in the economy, so research on silkworm and mulberry crop enhancement is of high importance. *B. mori* is highly susceptible to insecticides, and the application of insecticides near sericulture projects is not advisable because the silkworms can be harmed by chemicals on the leaves, either through consumption of contaminated leaves or through other contacts with the insecticides (Bora *et al.*, 2012). Mulberry is a major commercial crop and widely grown as food plant for silkworm *B. mori* (Naik *et al.*,2013). Mulberry, *Morus* spp. is infested by a number of insect pests and thrips among these *Pseudodendrothrips mori* is one of the major pests that cause huge damage to mulberry plants (Subramanian *et al.*, 2010). For the control of thrips organophosphate pesticides like dimethoate and dichlorvos are commonly used (Ali and Rahman ,1991).As a consequence of pesticide usage in the past couple of years, sericulture faces many common problems such as sensitivity of the silkworm, *B. mori*, too many pesticides, and the death of silkworm (Cui and Yuan, 2003). This is largely due to the application of pesticides in the control of pests in crop fields that are close to mulberry plantations and also to the direct control of mulberry pests (Etebari *et al.*, 2007). The present study was carried out to determine the effect of Cymbush® (pyrethroid insecticides) and Tracer®(Spinosad insecticides) on the productivity of silkworm, *B. mori*.

MATERIALS AND METHODS

The effect of two insecticides on the productivity of silkworm, *Bombyx mori* L. were studied during spring season of 2019 at Plant Protec. Dept. Fac. of Agric., El Fayoum Univ. Cymbush® (pyrethroid insecticides) and Tracer® (Spinosad insecticides) dissolved in distilled water to prepare different concentrations (1m/l.,0.1m/l. of Cymbush® and Tracer®, respectively). Egg box of silkworm, *B. mori* (Egyptian hybrid) was obtained from the Seric. Res. Dept., Plant Protec. Res. Inst, Agric. Res. Center. Dokki, Giza. Larvae of *B. mori* were reared on fresh mulberry leaves (*Morus alba* var. *indicia*) under laboratory conditions ($27\pm 2^{\circ}\text{C}$, $76\pm 5\%$ RH). At the beginning of the 5th instar, larvae were divided in to two groups (in addition to the control). Each group contained five replicates (each of twenty larvae). The previous experiment was repeated for four times.

Mulberry leaves harvested after 3,6,9,12 days post-treatment with insecticides. The larvae of control fed on mulberry leaves without any treatment. The parameters of *B. mori* (the 5th instar mortality percentages, cocooning percentages, cocoon shell ratio, and silk productivity) were recorded.

Statistical analysis

Data were analyzed by ANOVA through statistical package for social science (SPSS) to find out the significance between treated and control (Berkowitz and Allaway 1998). Means were separated by (L.S.D at 0.05%).

RESULTS AND DISCUSSION

Data in table (1) show that 5th instar mortality percentages of *B. mori* fed on mulberry leaves sprayed with insecticides were 16.54 and 18.30% in Cymbush®&Tracer®, respectively in the first group compared to 10.54% in control. In second group mortality percentages were 14.60 and 16.82% in Cymbush®&Tracer®, respectively compared to 10.07% in control. Mortality percentages in third group were 11.06 and 13.88% in Cymbush®&Tracer®, respectively compared to 9.98% in control. In fourth group mortality percentages were 10.21 and 11.00% in Cymbush®&Tracer®, respectively compared to 9.93% in control. The obtained results are in general agreement with the findings of Luo *et al.*, 2011 when using imidacloprid on second-instar, third-instar, fourth-instar, and fifth-instar *B. mori* larvae. Yu *et al.*, 2012 found highly toxic in stomach of *B. mori* larvae when feeding on toxic mulberry leaves treated with butene-fipronil.

Table 1. Effect of mulberry leaves treated with insecticides on 5th instar mortality percentages (%) of the silkworm, *Bombyx mori* L

Treatments	Times of harvested			
	After 3 days(first group)	After 6 days(second group)	After 9 days(third group)	After 12 days(fourth group)
Cymbush®	16.54±0.8900	14.60±0.9000	11.06±0.3440	10.21±0.4334
Tracer®	18.30±0.2300	16.82±0.8700	13.88±0.4655	11.00±0.5660
control	10.54±0.9008	10.07±0.7554	9.98±0.4500	9.93±0.2213
F value	**	**	*
LSD at 0.05%	3.880	2.167	2.330

According to data in Table (2) cocooning percentages of *B. mori* were 80.77 and 74.00% in Cymbush®&Tracer®, respectively in the first group compared to 94.03% in control. In second group cocooning percentages were 83.01 and 75.32% in Cymbush®&Tracer®, respectively compared to 95.80% in control. Cocooning percentages in third group were 86.12 and 80.09%, respectively compared to 94.13% in control. In fourth group cocooning percentages were 89.08 and 87.11% in Cymbush®&Tracer®, respectively compared to 93.00% in control. The previous data are in general agreement with the findings of Nasr, 2011 who found decreasing in cocoon production when using mulberry leaves treated with chlorpyrifos, chlorfluazuron, and oxymatrine on larvae of *B. mori*.

Table 2. Effect of mulberry leaves treated with insecticides on cocooning percentages (%) of silkworm, *Bombyx mori* L

Treatments	Times of harvested			
	After 3 days(first group)	After 6 days(second group)	After 9 days(third group)	After 12 days(fourth group)
Cymbush®	80.77±1.7800	83.01±1.7809	86.12±1.6756	89.08±1.0028
Tracer®	74.00±1.5645	75.32±1.6566	80.09±1.8990	87.11±1.5997
control	94.03±1.3409	95.80±1.7800	94.13±1.4530	93.00±1.9091
F value	**	**	**	*
LSD at 0.05%	4.5409	3.8990	4.0231	4.990

Data in Table (3) indicate that the means of cocoon shell ratio of *B. mori* were 14.23 and 12.00% in Cymbush®&Tracer®, respectively in first group compared to 18.21% in control. In second group cocooning percentages were 16.00 and 13.67% in Cymbush®&Tracer®, respectively compared to 18.00% in control. Cocooning percentages in third group were 17.10 and 15.11% in Cymbush®&Tracer®, respectively compared to 19.08% in control. In fourth group cocooning percentages were 19.07 and 17.50% in Cymbush®&Tracer®, respectively compared to 19.77% in control. The obtained results are in general agreement with the findings of Nasr, 2011 who found decreasing in cocoon production when using mulberry leaves treated with chlorpyrifos, chlorfluazuron, and oxymatrine on larvae of *Bombyx mori*.

Table 3. Effect of mulberry leaves treated with insecticides on cocoon shell ratio (%) of silkworm, *Bombyx mori* L

Treatments	Times of harvested			
	After 3 days(first group)	After 6 days(second group)	After 9 days(third group)	After 12 days(fourth group)
Cymbush®	14.23±0.7870	16.00±0.5445	17.10±0.0091	19.07±0.5609
Tracer®	12.00±0.5443	13.67±0.6009	15.11±0.8776	17.50±0.2323
control	18.21±0.7881	18.00±0.8900	19.08±0.5508	19.77±0.1230
F value	**	**	**
LSD at 0.05%	2.022	2.190	1.098

Table (4) indicate that the means of silk productivity of *B. mori* were 1.334 and 1.021 cg/day in Cymbush®&Tracer®, respectively in first group compared to 1.898 cg/day in control. In second group cocooning percentages were 1.400 and 1.211 cg/day in Cymbush®&Tracer®, respectively compared to 1.854 cg/day in control. Cocooning percentages in third group were 1.611 and 1.476 cg/day in Cymbush®&Tracer®, respectively compared to 1.900 cg/day in control. In fourth group cocooning percentages were 1.800 and 1.702 cg/day in Cymbush®&Tracer®, respectively compared to 1.910 cg/day in control. The illustrated data are in general agreement with the findings of Nasr, 2011 who found decreasing in cocoon production when using mulberry leaves treated with chlorpyrifos, chlorfluazuron, and oxymatrine on larvae of *Bombyx mori*.

Table 4. Effect of mulberry leaves treated with insecticides on silk productivity (cg/day) of silkworm, *Bombyx mori* L.

Treatments	Times of harvested			
	After 3 days(first group)	After 6 days(second group)	After 9 days(third group)	After 12 days(fourth group)
Cymbush®	1.334±0.0777	1.400±0.0880	1.611±0.0801	1.800±0.0800
Tracer®	1.021±0.3221	1.211±0.0543	1.476±0.1102	1.702±0.5660
control	1.898±0.8991	1.854±0.0577	1.900±0.0776	1.910±0.2213
F value	**	**	**
LSD at 0.05%	0.0016	0.0010	0.0021

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ARABIC SUMMARY

معاملة اشجار التوت ببعض المبيدات الحشرية وتأثيرها على إنتاجية دودة الحرير التوتية

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قسم وقاية النبات – كلية الزراعة – جامعة الفيوم – مصر

خلال فصل الربيع لعام 2019 تمت دراسة تأثير أوراق التوت التي تم جمعها على فترات مختلفة (بعد ثلاثة أيام من المعاملة – بعد ستة أيام من المعاملة – بعد تسعة أيام من المعاملة – بعد اثني عشر يوماً من المعاملة) من أشجار التوت المعاملة ببعض المبيدات الحشرية في قسم وقاية النبات بكلية الزراعة جامعة الفيوم على الإنتاج في دودة الحرير التوتية. تم الحصول على هجين محلي من قسم بحوث الحرير بمركز البحوث الزراعية بالجيزة. تم تربية اليرقات على ورق توت هندي بدون أي معاملة بالمبيدات خلال الأربع أعمار اليرقية الأولى، بينما العمر اليرقي الخامس تم تغذيته بالأوراق المعاملة التي تم جمعها على فترات مختلفة. بعد الانسلاخ الرابع تم تقسيم اليرقات إلى مجموعتين بالإضافة للكنترول. كل مجموعة قسمت إلى خمس مكررات وكذلك الكنترول. تم عمل أربع تجارب بهذه الطريقة مع اختلاف مواعيد جمع الأوراق من الأشجار المعاملة كما ذكر سابقاً. كان التركيز المستخدم من المبيدات هو 1مجم/ملتر من السميش و 0,1مجم/ملتر من التريس. وكانت أفضل النتائج هي مجموعة اليرقات التي تغذت على الأوراق التي تم جمعها بعد اثني عشر يوماً من المعاملة حيث كان الفرق غير معنوي في زيادة نسب الموت وانخفاض كل من نسب التشرنق ونسب وإنتاجية الحرير مقارنة بالكنترول.