Control of *Spodoptera exigua* Which Attacks Pepper Crop in Armenia Using Different Chemical Insecticides

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Abstract

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Spodoptera exigua (syn. *Caradrina exigua Hübner*) is a major pest of pepper in Armavir region, Armenia, and the damage is caused by the larval stage of the insect. During the 2020-2021 growing season, a field experiment was conducted at Khoronk, Armavir region, to control *Spodoptera exigua* using different chemical insecticides (Eforia, Coragen, Corragen, DecisProfi, Belt, Decis f-Lux, Movento, Ampligo 150, Vertimec, Prokleym, Spintor), in addition to the commonly used insecticide Arrivo, as a control. Results obtained showed that the insecticides Spintor, Belt, Decis f-Lux and Prokleym were the most effective against *Spodoptera exigua*.

Keywords: *Spodoptera exigua*, pepper, chemical control, Armenia.

Introduction

Spodoptera exigua is one of the main pests of pepper in Armavir region, and its larvae feeds on the leaves. *S. exigua* is native to Asia, from where it has spread all over the world, where agricultural crops are cultivated (Greenberg *et al.*, 2001). This insect is omnivorous (Saeed *et al.*, 2009), feeds on more than 185 plant species that belong to 50 families (Kuznetsov, 1999), with preference to the families Fabaceae, Solanaceae, Malvaceae, Faboideae and Rubiaceae (Vasiliev, 1988).

The larvae that hatch from the eggs feed first on the parenchyma of the leaves, then chew making round holes in them (Avetyan and Marjanyan, 1976). The larvae of *Spodoptera exigua* feed on tomatoes and pepper (Metcalf and Flint 1962; Terlemezyan, 1996).

Materials and methods

The treatments for the control of Spodoptera exigua were evaluated during 2020-2021 in the pepper fields of Khoronk community of Armavir region, using Hayk variety. The following preparations were selected for the experiments: Eforia (active ingredient: Lambda-cyhalothrin 106 g/l + Thiamethoxam 141 g/l), Coragen (active ingredient: Chlorantraniliprole 200 g/l), Decis Profi (active ingredient: Deltametrin 250 g/l), Belt (active ingredient: Flubendiamide 480 g/l), Decis f-Lux (active ingredient: Deltametrin 25 g/l), Movento (active ingredient: Spirotetramat 100 g/l), Ampligo 150 (active ingredient: Chlorantraniliprole 100 g/l + Lambda-Cyhalothrin 50 g/l), Vertimec (active ingredient: Abamectin 18 g/l), Prokleym (active ingredient: Emamektin benzoate 50 g/kg), Spintor (active ingredient: Spinosad 240 g/l), in addition to Arrivo (active ingredient: Cypermethrin 250 g/l), which was used as the control treatment. Three concentrations of each of the above-mentioned insecticides was tested with three replications, in plots of 50 m^2.

In the fight against *Spodoptera exigua*, biological efficiency of tested insecticides was calculated by the Gar method (Gar, 1963) using the following formula:

$$E = \frac{B-A}{B} \times 100$$

where E= biological efficiency of insecticides (%), B= the number of pests before treatment, and A= the number of pests after treatment.

Biological efficiency data was subjected to statistical analysis, by means of the dispersion analysis method (Mamajanyan, 2018).

Results and Discussion

Biological efficiency data of insecticides used against *Spodoptera exigua* in pepper fields are presented in Table 1 (2020) and Table 2 (2021). Provet was used as an adhesive additive at the rate of 0.4 l/ha. Results presented in Table 1 show that among the treatments tested in 2020, the following insecticides provided relatively higher biological efficiencies: Spintor (0.5 l/ha), Belt (0.2 l/ha), Decis f-Lux (0.4 l/ha) and Prokleym (0.9 kg/ha), and all of the tested insecticides were more biologically superior to the control Arrivo. One day after treatment, the biological efficiency of the best four insecticides mentioned above was 88.2-92.8% one day after the treatment, 85.0-88.8% five days after the treatment, 80.0-83.3% ten days after the treatment and 64.7-70.0% 15 days after the treatment.

Similar results were obtained in 2021 (Table 1), and the following treatments showed even higher biological

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efficiency compared to the previous year: Spintor (0.5 l/ha), Belt (0.2 l/ha), Decis f-Lux (0.4 l/ha) and Prokleym (0.9 kg/ha.), which once again have surpassed the control insecticide Arrivo. The biological efficiency of these four insecticides were 85.7-92.3% one day after treatment, 81.8-85.7% five days after treatment, 76.4-78.9% 10 days after treatment, and 61.1-72.7% 15 days after treatment, respectively.

The experimental error was S_{x0}%= 2.1 and 1% for 2020 and 2021 respectively. and $LSD_{0.5}$= 4.5 and 1.2 for 2020 and 2021, respectively.

It can be concluded from the experiments conducted in 2020 and 2021, in the pepper fields of Khoronk community of Armavir region, that the insecticides Spintor (0.5 l/ha), Belt (0.2 l/ha), Decis f-Lux (0.4 l/ha) and Prokleym (0.9 kg/ha) gave the best results in controlling *Spodoptera exigua.*

Table 1. Biological effectiveness of insecticides against *Spodoptera exigua* in Khoronk community in 2020 and 2021

			Biological efficiency (%) according to period after application in days							
			1		**5**		**10**		**15**	
Insecticide	**Active ingredient**	**Consumption norm l/ha, kg/ha**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**
Eforia	Lambda-cyhalothrin+ Thiamethoxam	0.2	70.8	78.9	56.2	71.4	47.6	64.7	36.3	46.6
		0.3	80.0	80.0	77.7	76.9	68.7	72.7	58.8	63.1
		0.5	85.7	84.6	80.9	83.3	78.9	78.9	65.2	61.1
Coragen	Chlorantraniliprole	0.3	26.3	36.3	18.7	35.2	12.5	26.6	5.5	10.0
		0.5	35.2	44.4	29.4	38.4	18.7	33.3	11.1	18.1
		0.7	45.0	76.9	42.1	63.6	30.0	44.4	13.3	30.7
Decis Profi	Deltametrin	0.2	45.4	55.5	33.3	53.3	23.5	47.0	15.7	27.2
		0.3	64.7	63.6	58.8	63.1	47.3	53.8	22.2	38.4
		0.5	72.7	76.9	69.2	72.2	57.8	64.2	35.0	45.4
Belt	Flubendiamide	0.05	68.1	77.7	63.1	73.3	53.8	64.7	31.2	54.5
		0.1	85.7	81.8	81.2	80.0	77.7	76.9	64.7	68.7
		0.2	89.4	92.3	85.0	85.7	80.9	77.7	68.4	72.7
Decis f-Lux	Deltametrin	0.2	80.0	81.8	68.7	81.0	61.5	73.6	45.4	69.2
		0.3	86.6	83.3	84.2	81.8	76.1	77.7	54.5	71.4
		0.4	92.8	90.9	88.8	84.6	83.3	78.9	70.0	72.2
Movento	Spirotetramat	0.7	28.0	35.2	22.2	31.5	18.1	21.4	10.0	12.5
		1.3	33.3	43.7	31.5	33.3	20.0	26.6	14.2	18.1
		2.3	41.6	57.1	39.1	42.8	30.7	29.4	15.3	22.2
Ampligo 150	Chlorantraniliprole + Lambda-Cyhalothrin	0.5	64.2	68.4	52.9	63.6	36.8	52.9	22.2	26.6
		0.7	75.0	72.2	72.7	69.2	68.7	57.1	45.4	31.2
		0.8	80.0	78.5	78.9	71.4	70.5	61.5	46.1	47.0
Vertimec	Abamectin	0.8	20.0	22.2	12.5	18.7	11.1	17.6	0	13.3
		1.3	23.8	26.6	17.6	22.2	15.7	18.1	10.5	15.3
		1.7	30.0	37.5	28.5	29.4	20.0	28.5	12.5	18.7
Prokleym	Emamektin benzoate	0.4	72.7	72.7	61.1	68.4	54.5	55.5	43.7	36.3
		0.7	81.2	84.6	78.5	78.5	73.6	72.7	61.5	57.8
		0.9	88.2	90.0	86.6	81.8	80.0	76.4	64.7	61.1
Spintor	Spinosad	0.2	73.3	76.9	70.8	72.2	65.0	64.7	30.4	43.7
		0.3	81.2	82.3	76.4	80.9	71.4	76.9	60.0	54.5
		0.5	90.9	85.7	87.5	84.6	81.8	78.9	69.2	64.2
Control "Arrivo"	Cypermethrin	0.3	73.6	76.9	61.1	71.4	46.6	61.6	29.4	41.1

الملخص

تيرليمزيان، هـ.ل و م.هـ. غازاريان. 2023. مكافحة حشرة *Spodoptera exigua* التي تهاجم محصول الفليفلة/الفلفل في أرمينيا باستخدام مبيدات حشرية كيميائية مختلفة. مجلة وقاية النبات العربية، 41(1): 37–39. https://doi.org/10.22268/AJPP-41.1.037039

تعدّ *Spodoptera exigua* (*Caradrina exigua* Hübner) آفةً رئيسةً على محصول الفليفلة/الفلفل في منطقة أرمافير، أرمينيا، حيث ينتج الضرر عن الطور اليرقي للحشرة. أجريت تجربةٌ حقلية في خورونك، منطقة أرمافير، خلال الموسم الزراعي 2020–2021، بهدف مكافحة *Spodoptera exigua* باستخدام مبيدات حشرية كيميائية مختلفة (Eforia، Coragen، DecisProf، Belt، Decis، f-Lux، Movento، Ampligo 150، Vertimec، Prokleym، Spintor) إضافةً إلى المبيد الحشري شائع الاستخدام Arrivo للمقارنة. أظهرت النتائج المتحصّل عليها أنّ المبيدات الحشرية Spintor، Belt، Decis f-Lux و Prokleym كانت أكثر فعاليةً في مكافحة *Spodoptera exigua*.

كلمات مفتاحية: *Spodoptera exigua*، الفلفل/فليفلة، مكافحة كيميائية، أرمينيا.

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