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Insecticidal Activity Of The New PILARURON 50% SC Preparation Against Melon Aphid Aphis Gossypii Glov (Hemiptera:Aphididae) On Greenhouse-Grown Tomato Plants

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Abstract: In this article, experimental trials were conducted to evaluate the efficacy of a new insecticide formulation, PILARURON 50% SC, against Aphis gossypii Glov., a pest currently infesting greenhouse-grown tomatoes in our Republic and negatively affecting crop quality. The product was tested at an application rate of 0,8–1,2 liters per hectare, and its insecticidal activity was determined.

Keywords: Agriculture, vegetables, tomato plant, pest damage, chemical control measures, insecticidal activity.

Introduction: Aphids that harm agricultural crops are soft-bodied, small insects, with adults measuring 1,8-2,1 mm in length. They occur in both winged and wingless forms. The winged forms possess two pairs of wings, with the forewings being significantly longer than the hindwings. Their development is incomplete and typically parthenogenetic, involving live birth with no pupal stage. Aphid populations consist of different morphological forms, including viviparous wingless females, oviparous wingless females, viviparous winged females, and winged (sometimes wingless) males [6;8;9].

In greenhouses, two widespread aphid species - Aphis gossypii Glov (melon aphid) and Aphis craceivora Koch (cowpea aphid) - cause considerable damage to a wide range of host plants [10]. Aphids are a serious problem in greenhouses, where favorable environmental conditions allow them to reach high population densities in a short time throughout the year. The traditional method of controlling these pests in greenhouse conditions is through the use of insecticides [11].

According to conducted research, several species of aphids, which are sucking pests, cause damage in tomato fields. When tomato plants are affected during the seedling stage, it often results in plant death. If infestation occurs later, more than 50% yield loss can be observed [5].

Many species of aphids infest tomato plants from the emergence of the first leaves to the end of the vegetation period, feeding on the leaves, stems, and fruits. This feeding process inhibits the growth and development of the plants. Additionally, the sticky honeydew secreted by the pests contaminates the lower leaf surfaces, disrupting the plant’s metabolic processes and thereby reducing both the yield and quality of the crop [1;3;4].

METHODS

A field trial was conducted in September 2024 in the Kibray district of Tashkent region, on the field of "Boburkhodja, Nodirkhodja Baraka" LLC, to test the effectiveness of the insecticide PILARURON 50% SC against Aphis gossypii, one of the main pests of tomato. The insecticide was applied at a rate of 0,8–1,2 liters per hectare. The timing of pest occurrence and population counts were determined using standard methods described by Bondarenko N.V., (1978); Polyakov et al., (1984) and Osmolovsky G.E., (1980) [2;12;13].

The trial was conducted during the flowering stage of the tomato plants. The experiment included treatment, reference, and control variants, each replicated three times. Pest counts were recorded before treatment and on the 3rd, 7th, 14th, and 21st days post-treatment. The effectiveness of the insecticide was evaluated by comparing it to the control variant. Field trials were conducted following the methodological guidelines of Khodjaev Sh.T., (2023) [7], and biological efficacy was calculated using the methodology and formula of Po'ntener W., (1981) [14].

RESULTS

Experimental trials were conducted in September of this year to test the effectiveness of the chemical preparation PILARURON 50% SC (active ingredient: Diafenthiuron 500 litr per hectare) against aphids on tomatoes, at application rates of 0,8-1,2 liters per hectare. For comparison, Raudo 50% SC (Diafenthiuron) at a rate of 1,0 liter per hectare was used as a reference standard.

The trial results for PILARURON 50% SC at application rates of 0,8–1,2 litr per hectareare presented in table-1. According to the data, prior to applying PILARURON at 0.8 litr per hectare, the average number of aphids on 10 tomato leaves was 72,5. After application, the aphid population steadily decreased, reaching 6,3 on day-3, 4,5 on day-7, 8,3 on day-14, and 12,5 on day-21.

The biological efficacy was 93,7% on day-3, 96.5% on day-7, 92,4% on day-14, and 87,8% on day-21.

When applied at 1,2 litr per hectare, the average number of aphids on 10 tomato leaves was 67,3 before treatment. This number decreased to 4.8 on day-3, 3,1 on day-7, 6,5 on day-14, and 10,3 on day-21. The biological efficacy was 94,8%, 97,4%, 93,6%, and 89,2% respectively. In the untreated control variant, the number of aphids increased over time. From an initial average of 64,6 per 10 leaves, the count rose to 89,5 on day-3, 114,3 on day-7, 98,4 on day-14, and 91,5 on day-21.

In the reference treatment using Raudo 50% SC, the initial aphid count was 81,5 per 10 leaves. After application, the counts dropped to 7,5 (day-3), 5.9 (day-7), 11,5 (day-14), and 14,7 (day-21), with corresponding biological efficacy rates of 93,4%, 95,9%, 90,7%, and 87,3%. The experimental and reference variants both demonstrated peak biological efficacy on day-7, after which the insecticidal effect gradually declined.

CONCLUSION

When applied at rates of 0.8-1.2 litr per hectare, PILARURON 50% SC demonstrated high biological efficacy (96,5–97,4%) on the 7th day against Aphis gossypii, a harmful pest of greenhouse-grown tomatoes. The formulation is user-friendly and readily forms a working solution when mixed with water. No phytotoxic effects on the plants were observed.

Table-1

Field Efficacy of the Chemical Preparation "PILARURON 50% SC" Against Aphids on Tomato (Field Trial, Tashkent Region, Qibray District, "Boburkhodja Nodirkhodja Baraka" LLC, Manual Application, September-6, 2024).

№	Experimental options	Active ingredient	Preparation consumption rate	Average number of pests per 10 leaves, units					Biological efficacy %, days			
				Before spraying medicine	Дори сепилгандан кейинги кунлар							
					3	7	14	21	3	7	14	21
1.	PILARURON 50% SC	*Diafenthiuron 500 g/l.*	0,8	72,5	6,3	4,5	8,3	12,5	93,7	96,5	92,4	87,8
2.	PILARURO	Diafenthi	1,2	67,3	4,8	3,1	6,5	10,3	94,8	97,4	93,	89,2

	N 50% SC	uron 500 g/l.									6	
3.	Raudo 50% SC. (standard).	Diafenthiuron 500 g/l.	1,0	81,5	7,5	5,9	11,5	14,7	93,4	95,9	90,7	87,3
4.	Control (no work done).	-		64,6	89,5	114,3	98,4	91,5	-	-	-	-

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