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The Scientific Basis of Umo Spraying Chemicals against Locusters

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A B S T R A C T
Today, scientific research is being conducted in the world on the widespread use of modern technologies in the fight against harmful species of locusts. In particular, due to the unfavorable location of their distribution areas, based on the study of the biology, ecology and developmental characteristics of harmful locusts, it is of great importance to develop new, highly efficient resource-saving systems for combating them, to determine the effectiveness of modern means, and to develop technologies for combating harmful locusts.

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It is known that locusts are widespread in our Republic mainly in mountainous, pasture and desert areas, and they pose a threat not only to existing plants in these areas, but also to all agricultural crops when they multiply. In order to ensure the food security of our population, protection of seasonal and perennial plants in pastures and other agricultural crops from harmful locusts is one of our important tasks. According to the research conducted in the areas where locusts are widespread in the Kashkadarya, Jizzakh regions and the Republic of Karakalpakstan, as well as in the laboratory "Study of Harmful Locusts" of the Uzbek Institute of Geophysics and Geophysics

M.E. in determining the types of egg sacs of grasshoppers. According to Chernyakhovsky's method, counting the number and density of locusts, collecting samples in areas where locusts are common in spring and summer, E.P. Tsyplenkov, F.A. Gapparov et al. of the methods, species and age of locusts were determined using the detectors of G.Ya.Bey-Bienko, L.L.Mishchenko, A.V.Lachininsky and others.

The species of free-living and predatory insects in the areas where locusts are widespread were identified using L.M. Kopaneva's detectors. Laboratory and field experiments were conducted to determine the effectiveness of the ultra-low-volume spraying (ULP) method of Microneyer AU 8115 and Microneyer Ulvamast B3, specially installed on UAZ-469 and UAZ-PIKAP vehicles, against the main harmful species of locusts widespread in our republic: Moroccan, oasis, Turan, horse-drawn, desert and other types of locusts.

Our field experiments on determining the biological efficiency of other chemical insecticides, specialized in the special ultra-low volume (UMO) spraying method against harmful locusts, were performed using a working solution of 0.1 to 2 l/ha depending on the type of insecticide, while the OVX-600 tractor sprayer used 200 l/ha by spending the working solution on, and 120 on the K-90 suspension motorized hand apparatus l/ha was carried out by applying the working mixture.

In all experiments, entomological calculations were carried out in accordance with the mechanism of action of the drugs, their characteristics and the methods used. The method of V.V. Kurdyukov, Sh.T. Khodzhaev, F.A. Gapparov was used to calculate the biological effect of the drugs used against harmful locusts in the experiments.

It is found in the mountainous and desert regions of Kashkadarya region, but a smaller part of it is found in the nests of locusts in Jizzakh (14) and Karakalpakstan (13). According to the results of our studies on the species composition of harmful locusts distributed in the territory of the Republic of Karakalpakstan, it was found that mainly species such as Calliptamus italicus L. - Italian locust, C. Barbarus - desert locust, Locusta migratoria L. - Asian locust, Sphingonotus halocnemi Uv., C. turanicus are widely distributed in semi-deserts, steppes, pastures and hayfields.

According to the results of the research, it was revealed that the Moroccan locust (D. maroscanus Thunb) is dominant in the Kashkadarya and Jizzakh regions, and its share is 84.6%-86.5%, while in the Republic of Karakalpakstan, locust species belonging to the genera Calliptamus, Sphingonotus, Derycorus and Locusta are widespread, among which C. italicus is dominant, and its share is 84.6%..

In terms of species density, it was found that D. maroccanus, D. tartarus, and Notostaurus albicornis albicornis are dominant in the foothills, while C. turanicus., C. italicus., C. barbarus cephalotes., Ramburiella turcomana., O. decorus., and O. miniata are significantly more abundant in the mountainous regions, and D. kraussi nigrogeniculates is widespread in both geographical regions.

Table 1. Locust species and their density found in Kashkadarya and other regions

(Based on data from 2007-2023)

	Types of grasshoppers	Landscape	
		Foothills	Mountain areas, hills, hills and valleys
1.	*Dericorys albidula* Serv.	+	
2.	*D. tibialis* (Pall)	+	+
3.	*Conophyma uvarovi uvarovi* Sem.		+
4.	*Anacridium aegyptium* (L.)	+	+
5.	*Calliptamus turanicus* Tarb.	+	++
6.	*C. italicus* (L)		++
7.	*C. barbarus cephalotes* (Costa.)	+	++
8.	*Sphodromerus luteipes* Vv.		+
9.	*Pyrgomorpha conica deserti.* B.	+	+
10.	*Atrichotmethis semenovi* (Zub.)	+	+
11.	*Egnatius apicalis* Staf.	+	+
12.	*Truxalis eximia* Eichw.	+	+
13.	*Duroniella kalmyka* Ad.	+	+
14.	*Ramburiella turcomana* (F.d.W.)	+	++
15.	*Dociostaurus maroccanus* (Thunb.)	+++	+++
16.	*D. tartarus* Stshelk.	++	+
17.	*D. plotnikovi* Vv.	+	+
18.	*D. kraussi nigrogeniculatus* Serg.Tarb.	++	++
19.	*Notostaurus albicornis alpicornis* (Ev.)	++	+
20.	*Chorthippus higuttulus Meribionalis.*	+	+
21.	*Oedaleus senegalensis* (Krauss.)	+	+
22.	*O. decorus* (Germ.)	+	++
23.	*Pyrgodera armata* F.W.	+	+
24.	*Oedipoda miniata miniata* (Pall.)	+	+
25.	*O. caerulescens* L.	+	++

+ + + very much (in terms of density and level of damage); + + - medium; + -very little

During the implementation of control measures against the Moroccan locust using the very low-volume spraying method, it became clear that the timing of chemical control measures should be carried out taking into account the development conditions not only of the Moroccan locust, but also of the horse, desert, and desert locusts.

Based on the data in the table, it is advisable to set the period for the use of drugs for the first and second decades of April. Thus, in the Kashkadarya region, in areas where the Moroccan locust is widespread, scientifically based chemical control periods have been established based on the phenological development of locusts that damage agricultural crops (Table 2).

Table 2. Development phenology of harmful locusts in Kashkadarya region and timing of control measures

Types of grasshoppers	March			April			Mai			June			July			August		
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
Moroccan grasshopper	oo	oo --	oo --	--	--	--	-- +	+	+ oo	+ oo	+ oo	oo	oo	oo	oo	oo	(oo)	(oo)
Grasshopper	oo --	--	--	--	--	+	+	+ oo	+ oo	oo	oo	oo	oo	oo	oo	oo	(oo)	(oo)
Turan grasshopper	oo	oo	oo	oo	oo --	--	--	--	-- +	+	+	+	+	+	+ oo	oo	(oo)	(oo)
Desert locust	oo	oo	oo	oo	oo --	--	--	--	--	-- +	+	+	+	+	+ oo	+ oo	+ (oo)	+ (oo)

Conditional signs: oo – egg, -- - larva, + - mature breed, - period of scientifically based chemical control, (oo) – overwintering eggs.

In order to organize biologically based control measures against harmful locusts using a very low-volume spraying method, it was recommended to accurately predict the hatching and larval development periods of these species. Therefore, for effective control measures against several harmful species, their hatching and development periods were determined.

The results of experiments on the use of a 5% solution of Nomolt UMO insecticide by spraying in very small volumes in order to determine the effectiveness of new technical means and drugs used in the fight against harmful locusts, which has a special hormonal effect and is able to maintain its effect for a long time, are presented. The experiments were conducted in the conditions of Kashkadarya and Jizzakh regions in 2005 and 2006. The generalized results of the experiments conducted on the Gallakor farm of Kamashi district are presented in Table 3.

The results showed that the effectiveness of the drug depends on the amount of its application, and on the 6th day of the experiment, the effectiveness of the drug was 100% at the highest (0.175 l/ha) application rate, and 64.6% at the lowest (0.130 l/ha) rate. However, even in the variants where the drug was used in the lowest (0.130 l/ha) and average (0.150 l/ha) rates, its effectiveness increased until the 18th day of the experiment and reached high efficiency. showed, was the basis for determining the rate of use of this drug in the amount of 0.150-0.175 l/ha.

Table 3. Nomolt UMO 5% Oil Suspension Moroccan Locust biological efficiency against larvae

Kashkadarya region, Qamashi district, Gallakor farm, April 2005-2006.

Variants (preparation and dosage)	Density of locusts before spraying, units/m2	Density of locusts before spraying, units/m2					
		1	3	6	9	13	18
Nomolt 5% m.s. UMO, 0.130 l/ha	472,0	0,0	54,8	64,6	77,4	85,7	87,5
Nomolt 5% m.s. UMO, 0.150 l/ha	566,0	0,0	70,8	86,2	90,0	94,7	100
Nomolt 5% m.s. UMO, 0.175 l/ha	594,0	0,0	79,6	100	100	100	100
Cypermethrin 25% m.c., 0.2 l/ha (formula)	487,0	92,4	70,4	35,6	0,0	0,0	100
Control (idle)	563,0	Locust density, units/m2					
		558,0	552,0	543,0	536,0	529,0	506,0
EKF	*0.5*	*2.1*		*3.6*	*3.2*		*2.8*

The results of studies conducted to study the biological effectiveness of the Nomolt UMO preparation against non-swarming locusts, the harmfulness of which has been increasing in our republic in recent years, and the effects of chemical preparations used against locusts on other types of insects and arthropods were studied (Figure 1).

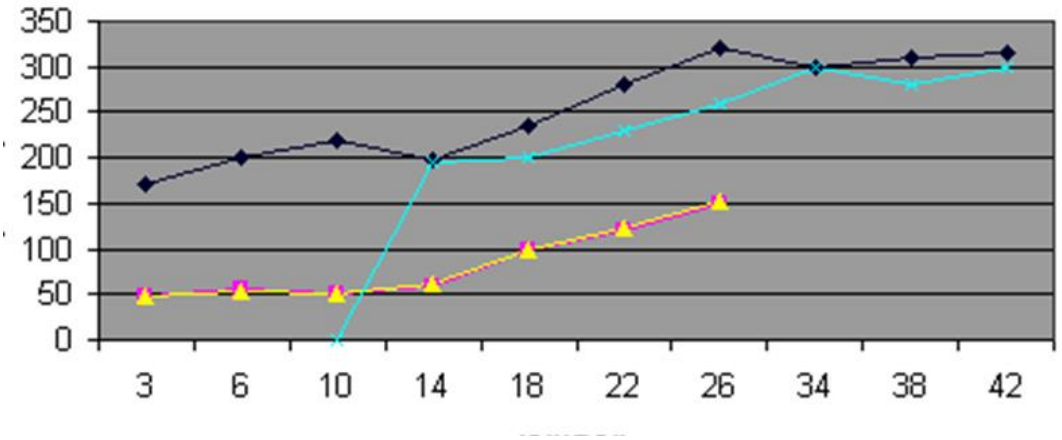

Figure 1. Dynamics of the number of arthropods treated with chemical preparations and in the control variant (Kashkadarya region, Guzar district, 2009-2010)

According to the received data, as a result of the use of pyrethroids such as Atilla, Cypermethrin against locusts, other insects and arthropods are killed and vice versa with 5% m.s. It was found that Nomolt UMO drug had no negative effect on this fauna. The number of arthropods in the area where Nomolt was used was much higher than in the control option, and the number of samples collected using entomological traps was 150-200 at the beginning of the experiment, and then their number increased to 300-320.

In studying the biological effectiveness of Best Alfa UMO (10% m.w.), Fascord MR UMO, and Pali UMO (1.25% m.w.), which are produced for the use of oil pyrethroid preparations against harmful locusts by spraying in very small volumes, their effectiveness against different ages of oasis locust larvae was determined, and the results were as follows (Table 4).

Table 4. Biological efficacy of the insecticide Pali, UMO against larvae of the oasis locust

Karakalpakstan, Muynak district, Porlatau district, MICRONAIR B3 (0.5 l/ha), 06.2009-2010.

Options	The average number of locusts per 1 m2 of land, in pieces, after n hours:									Efficiency, % after n hours:		
	24			48			72					
	Alive	Dead	Total	Alive	Dead	Total	Alive	Dead	Total	24	48	72
Against 2-3 young larvae												
Pali UMO 1.25% m.s., 1.0 l/ha	0,7	44,9	45,6	47,1	0,0	47,1	46,7	0,0	46,7	98,4	100	100
Pali UMO 1.25% m.s., 1.4 l/ha	0,4	43,4	43,8	42,6	0,0	42,6	43,1	0,0	43,1	99,0	100	100
Nomolt UMO 5% m.s., 0.175 l/ha (template)	47,1	2,6	49,7	37,2	11,1	48,3	23,7	18,5	42,2	5,2	22,9	43,8
Control	46,0	0,1	46,1	47,1	0,1	47,2	39,5	0,2	39,7	-	-	-
Against 4-5 year old larvae												
Pali UMO 1.25% m.s., 1.0 l/ha	0,9	35,2	36,1	0,2	30,6	30,8	0,0	29,1	29,1	97,5	99,3	100
Pali UMO 1.25% m.s., 1.4 l/ha	0,4	31,9	32,3	0,0	31,1	31,1	0,0	30,6	30,6	98,7	100	100
Nomolt UMO 5% m.s., 0.175 l/ha (template)	32,6	1,6	34,2	26,1	6,6	32,7	17,1	12,7	29,8	4,6	20,1	42,6
Control	29,6	0,0	29,6	33,0	0,1	33,1	27,3	0,1	27,4	-	-	-

EKF $_{0.5}$ 0.4 0.2 0.1

Due to the lack of specialized ready-made oil preparations for spraying against harmful locusts in Uzbekistan, it was noted that the biological effectiveness of the Atilla preparation against the Moroccan locust larvae was determined by spraying insecticides belonging to the pyrethroid group in the form of an aqueous working solution in a very small volume using an aqueous solution of 0.2 l/ha and a working solution of 1.0-2.0 l/ha, respectively, by spraying in a very small volume (Table 5). The effectiveness of the Atilla preparation in an aqueous solution of 2.0 l/ha was significantly higher, namely 95.6% and 96.5% (Table 5).

The study, conducted to determine the economic and financial effectiveness of using insecticides at very low doses in locust control, showed that the use of the Nomolt UMO preparation at very low doses compared to the use of the Atilla preparation at full doses, has economic advantages.

Table 5. Biological effectiveness of ultra-low volume spraying with Atilla insecticide using various devices against the Moroccan locust

Jizzakh region, Arnasoy district, Khorezm farm, 05. 2009-2010.

options (various devices)	Consumption rate, l/ha	Average number of locusts per 1 m2, pcs, after n hours									Efficiency, %		
		24			48			72					
		Alive	Dead	Total	Alive	Dead	Total	Alive	Dead	Total	24	48	72
Ulvamast V3, 1.0 l/ha	0,2	24,2	124,0	148,2	12,1	155,7	167,8	7,9	140,2	148,1	83,6	92,7	94,6
Ulvamast V3, 2.0 l/ha	0,2	19,2	146,7	165,5	10,8	160,4	171,2	8,0	157,4	165,4	88,3	93,6	95,1
AU 8115, 1 l/ha	0,2	24,1	129,1	153,2	9,1	159,0	168,1	6,8	146,3	153,1	84,2	94,5	95,6
AU 8115, 2 l/ha	0,2	17,6	134,6	152,2	7,0	133,8	140,8	5,1	147,1	152,4	88,4	95,0	96,5
OVX sprayer (200 l/ha)	0,2	16,1	155,2	171,3	7,7	152,3	160,0	5,0	166,5	171,5	90,6	95,1	97,1
Control (unprotected)	-	148,0	0,2	148,2	129,0	1,1	129,1	168,0	1,2	169,2	0	0	0
EKF $_{0.5}$												1,2	0,9 0,7

In order to determine the effectiveness of spraying in large volumes, the Atilla preparation was applied at a rate of 0.2 l/ha using a TTZ-80.10 tractor with an OVH-600 sprayer, as well as a TTZ-80.10 tractor with an additional 2PTS-4 water tanker, and the costs incurred were also determined. When determining the economic effectiveness of the method of spraying in very small volumes, it was found that, despite the relatively high price of the Nomolt UMO preparation, due to its convenience and low cost in spraying in very small volumes, 18772.3 soums/ha were saved from the total cost of processing one hectare of land.

In conclusion, we can say that in the pastures of Kashkadarya and Jizzakh regions, locust species belonging to the genera Dociostaurus and Calliptamus are widespread, with the Moroccan locust (Dociostaurus maroccanus Thunb) dominating, accounting for 84.6% - 86.5%, and the specificity of each species should be taken into account when combating these locusts.

In the Republic of Karakalpakstan, locust species belonging to the genera Calliptamus, Sphingonotus, Derycorus and Locusta are widespread, with Calliptamus italicus L. dominating, accounting for 84.6%, and it is appropriate to use methods used in oasis areas to combat these pests.

When using the 5% m.s. Nomolt UMO preparation at a rate of 0.150-0.175 l/ha against Moroccan locust larvae by the ultra-low volume spray (ULS) method, its biological effectiveness was 94.6 - 100%.

The biological effectiveness of using the Nomolt UMO preparation at a rate of 0.15 l/ha against non-swarming locust species by the ultra-low volume spray (ULS) method was 91.0% after 6 days after treatment, and 100% biological effectiveness was recorded on the 13th day and is recommended for use against harmful locusts.

References.

1. Utapov N.E. The use of modern environmentally safe drugs in the fight against locusts. // AGRO ILM. Scientific supplement to the journal of agricultural science of Uzbekistan. –Tashkent, 2010. – No. 2(14). –P. 37. (06.00.00; No. 1).
2. Latchininsky A.V., Gapparov F.A., Utapov N.E. Improving chemical control of locusts in Central Asia: ULV or full-volume spraying. // Journal of Plant Protection and Quarantine. – Moscow, 2011. – No. 6. – P. 5-10. (06.00.00; No. 18).
3. Gapparov F., Utapov N., Hamraev I., Eshchanov B. Modern technologies for locust control in Uzbekistan. / 10th international congress of Orthopterology, 21-25 June, 2009. - Antalya, TURKEY. – P. 38.
4. Tufliyev N.Kh., Utapov N.E., Nurjonov F.A. Economic efficiency of using ULV by the barrier method against locusts in Uzbekistan // EUROPE, SCIENCE AND WE EVROPA, ЕВРОПА, НАУКА И МЫ International Scientific and Practical Conference, 29-30 June, 2020. - Praha, Czech

Republic. – P. 23-24.

5. Bekzod Djurayev, Utapov Nematullo Egamkulovich Conceptual Foundations of Marketing Organization and Logistics Management in Agribusiness // https://journal.silkroad-science.com/index.php/JMGCB JMGCB, Vol. 1, No. 12, November 2024 Page 35-43.