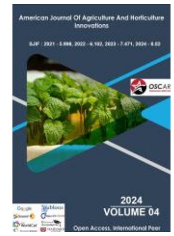
American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 04 ISSUE 07 Pages: 16-22
OCLC – 1290679216



Publisher: Oscar Publishing Services

Journal Website: https://theusajournals.com/index.php/ajahi

Research Article

EFFICACY OF CHEMICAL CONTROL METHODS AGAINST MAJOR WHEAT PESTS

Submission Date: July 21, 2024, Accepted Date: July 26, 2024,
Published Date: July 31, 2024
Crossref doi: https://doi.org/10.37547/ajahi/Volume04Issue07-04

Alamuratov Rayimjon Abdimurotovich
Scientific Research Institute of Plant Quarantine and Protection, Tashkent Region, Uzbekistan

Bababekov Q
Scientific Research Institute of Plant Quarantine and Protection, Tashkent Region, Uzbekistan

Sagdatova Mahbuba Jurayevna
Scientific Research Institute of Plant Quarantine and Protection, Tashkent Region, Uzbekistan

Mustafayev Khumoyun Buronovich
Scientific Research Institute of Plant Quarantine and Protection, Tashkent Region, Uzbekistan

ABSTRACT

This article investigates the insecticidal activity of the chemical preparation Antikolorad Max, sus.k., against major wheat pests such as harmful bugs, slimy worms, wheat thrips, and grain aphids. According to the results of the experiment, when this preparation was applied at a rate of 0.1-0.15 l/ha, it demonstrated a biological efficiency of 88.6-92.5% against harmful bugs, 91.6-94.8% against slimy worms, 89.4-95.8% against wheat thrips, and 89.4-93.1% against aphids 14 days after application.

KEYWORDS

Wheat, pest, larva, chemical preparation, biological efficiency.

INTRODUCTION

Today, one of the critical issues that humanity needs to address is meeting the food demands of the population. To fulfill this need, it is essential to achieve high yields from wheat (Triticum aestivum L.). Wheat ranks first among cereal crops in terms of nutritional value for humans, accounting for 35% of their food requirements. However, the main reason for the decline in wheat yield is the damage caused by pests that feed on wheat, resulting in significant yield losses. Among the wheat pests, six species of grain aphids, four species of harmful bugs, six species of thrips, and one species of slimy worms are known to cause significant damage.

One of the main pests widespread in all wheat-growing regions of Uzbekistan is the harmful bug. Adult bugs emerge from hibernation in March-April and initially damage the central leaf part of the plant, followed by the grain part, causing the whole plant to wilt. The germination rate of grains from fields infested with harmful bugs decreases by up to 50%. Additionally, wheat thrips can reduce yields by 5-13%. Adult thrips attach to the upper leaf sheath during the stem elongation phase of wheat, causing significant damage. Thrips larvae can lead to up to a 20% yield loss.

Scientists have identified 29 species of aphids that damage wheat yields. During the growth period of autumn wheat, aphid epidemics cause damage by sucking cell sap from the leaves. Yield losses due to aphids range from 7.9% to 34.2%. Some authors have noted that timely planting of wheat can reduce the damage caused by aphids. The slimy worm (pyavitsa) Lema melanopus L. (order Coleoptera, family Chrysomelidae) is a dangerous pest that significantly damages wheat, barley, and other cereal crops. Its larvae undergo four molts to reach adulthood, with the fourth stage larvae causing the most damage.

Given the above, it is crucial to find effective control measures against the main wheat pests to preserve wheat yields. For this purpose, we conducted research on the effectiveness of the chemical preparation Antikolorad Max, sus.k., against the main wheat pests.

METHODS

To determine the insecticidal activity of chemical preparations against the main wheat pests, experiments were conducted in 2024 on a 7.5-hectare field of the "Soxibkor agro" farm in Tayloq district, Samarkand region.

The timing of pest emergence and population counts were conducted according to the methods of Polyakov et al. (1984), Osmolovsky G.E., and Bondarenko N.V. (1978). Pest counts were performed during the stem elongation and heading phases of wheat. A logarithmic scale was used to determine the number of pests per plant and the population density in the wheat field.

The degree of leaf damage was assessed using the 0-5 scale of Stamenkov, S., and Pankov, L. (1991) and the methods of Rouag N. et al. (2012). The insecticidal activity of the preparations in field conditions was determined using the methodological guide of Khojayev (2004), and biological efficiency was calculated using Abbott's formula (1925).

Counts were performed on days 3, 7, and 14 after treatment. Experiments were conducted in three replicates for each variant, including control (untreated). A tractor-mounted sprayer was used to apply the working solution at a rate of 300 liters per hectare.

RESULTS AND DISCUSSION

Field trials were conducted to determine the effectiveness of Antikolorad Max, sus.k. (Imidacloprid + lambda-cyhalothrin) against major wheat pests at rates of 0.1-0.15 l/ha (Figure 1).

American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 04 ISSUE 07 Pages: 16-22
OCLC – 1290679216
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

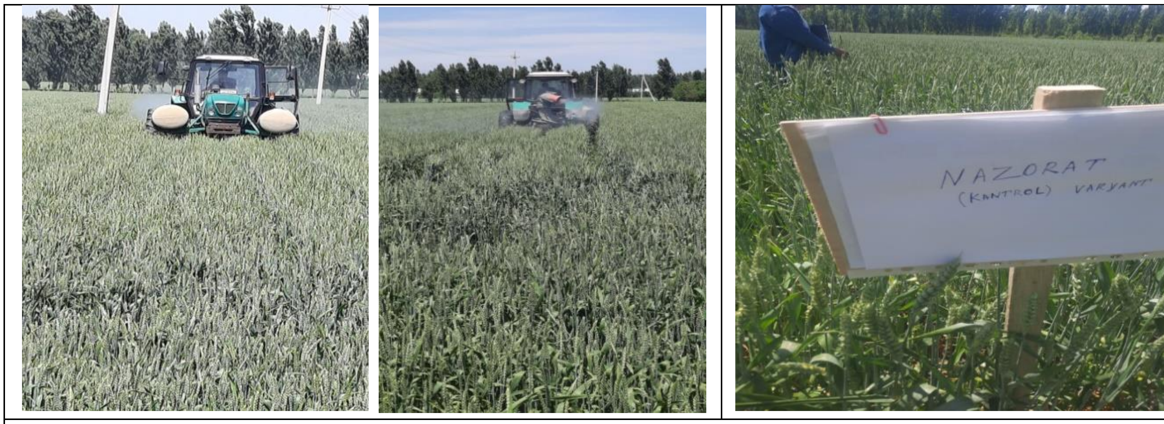


Figure 1: Testing the chemical preparations against pests using a tractor-mounted sprayer

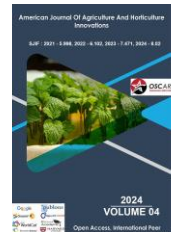
According to the results, Antikolorad Max, sus.k. demonstrated a biological efficiency of 78.7% on day 3, 85.0% on day 7, and 88.6% on day 14 at a rate of 0.1 l/ha against harmful bugs. At a rate of 0.15 l/ha, the biological efficiency was 82.0% on day 3, 90.4% on day 7, and 92.5% on day 14. The standard preparation Borey, 20% sus.k., showed 78.3% on day 3, 87.3% on day 7, and 89.2% on day 14. In the control variant, the number of pests increased from 8.1 to 14.1 per plant over 14 days.

Against slimy worms, Antikolorad Max, sus.k. demonstrated a biological efficiency of 60.0% on day 3, 82.2% on day 7, and 91.6% on day 14 at a rate of 0.1 l/ha. At a rate of 0.15 l/ha, the biological efficiency was 62.2% on day 3, 89.5% on day 7, and 94.8% on day 14. The standard preparation Borey, 20% sus.k., showed 62.0% on day 3, 86.2% on day 7, and 93.2% on day 14.

Table 1. Biological efficiency of Antikolorad Max, sus.k. against harmful bugs and slimy worms in wheat (Tayloq district, "Soxibkor agro" farm, Samarkand region, 2024).

№	Experimental Variants	Active Ingredient	Application Rate (l/ha)	Average Number of Pests per m2				Biological Efficiency (%)		
				Before Treatment	**After Treatment Days** 3	7	14	3	7	14
				1. Harmful bug						
1.	Antikolorad Maks, sus.k	*Imidacloprid + lambda-cyhalothrin*	0,1	9,1	2,1	2,0	1,8	78,7	85,0	88,6
			0,15	8,4	1,7	1,2	1,1	82,0	90,4	92,5

American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 04 ISSUE 07 Pages: 16-22
OCLC – 1290679216



Publisher: Oscar Publishing Services

2.	Borey, 20% sus.k (standard)	*Imidacloprid + lambda-cyhalothrin*	0,12	7,9	1,8	1,5	1,3	78,3	87,3	89,2
3.	Control	-		8,1	8,8	11,9	14,1	-	-	-
				2. Slimy worms						
1.	Antikolorad Maks, sus.k	*Imidacloprid + lambda-cyhalothrin*	0,1	5,8	2,6	1,2	0,6	60,0	82,2	91,6
			0,15	6.3	2,5	0,8	0,4	62,2	89,5	94,8
2.	Borey, 20% sus.k. (andoza)	*Imidacloprid + lambda-cyhalothrin*	0,12	6,0	2,4	1,0	0,5	62,0	86,2	93,2
3.	Control	-	-	5.6	5,9	6,8	6,9	-	-	-

The results of our experiments against wheat thrips and grain aphids are presented in Table 2. The data show that against wheat thrips, Antikolorad Max, sus.k. demonstrated a biological efficiency of 62.7% on day 3, 79.5% on day 7, and 89.4% on day 14 at a rate of 0.1 l/ha. At a rate of 0.15 l/ha, the biological efficiency was 64.7% on day 3, 83.7% on day 7, and 95.8% on day 14. The standard preparation Borey, 20% sus.k., showed 65.4% on day 3, 86.0% on day 7, and 96.2% on day 14.

Against grain aphids, Antikolorad Max, sus.k. demonstrated a biological efficiency of 79.5% on day 3, 86.2% on day 7, and 89.4% on day 14 at a rate of 0.1 l/ha. At a rate of 0.15 l/ha, the biological efficiency was 80.2% on day 3, 89.4% on day 7, and 93.1% on day 14. The standard preparation Borey, 20% sus.k., showed 78.4% on day 3, 89.6% on day 7, and 90.7% on day 14.

Table 2. Biological efficiency of Antikolorad Max, sus.k. against wheat thrips and grain aphids in wheat (Tayloq district, "Soxibkor agro" farm, Samarkand region, 2024).

№	Experimental Variants	Active Ingredient	Application Rate (l/ha)	Average Number of Pests per m2				Biological Efficiency (%)		
				Befo-re Treatment	**After Treatment Days**					
					3	7	14	3	7	14
				1. Wheat thrips						

American Journal Of Agriculture And Horticulture Innovations
(ISSN – 2771-2559)
VOLUME 04 ISSUE 07 Pages: 16-22
OCLC – 1290679216
Publisher: Oscar Publishing Services

1.	Antikolorad Maks, sus.k	*Imidacloprid+ lambda-cyhalothrin*	0,1	6,6	2,5	1,6	0,6	62,7	79,5	89,4
			0,15	6,4	2,3	1,0	0,3	64,7	83,7	95,8
2.	Borey, 20% sus.k (standard)	*Imidacloprid+ lambda-cyhalothrin*	0,12	7,2	2,2	0,9	0,2	65,4	86,0	96,2
3.	Control	-	-	5,6	5,7	5,4	4,8	-	-	-
				2. Grain aphids						
1.	Antikolorad Maks, sus.k	*Imidacloprid+ lambda-cyhalothrin*	0,1	9,2	2,1	1,9	1,7	79,5	86,2	89,4
			0,15	8,2	1,8	1,3	1,1	80,2	89,4	93,1
2.	Borey, 20% sus.k (standard)	*Imidacloprid+ lambda-cyhalothrin*	0,12	7,5	1,8	1,2	1,3	78,4	89,6	90,7
3.	Control	-	-	7,9	8,8	11,9	14,1	-	-	-

CONCLUSION

Based on the results of the field trials, it can be concluded that Antikolorad Max, sus.k., at a rate of 0.1-0.15 l/ha, demonstrated a biological efficiency of 88.6-92.5% against harmful bugs, 91.6-94.8% against slimy worms, 89.4-95.8% against wheat thrips, and 89.4-93.1% against aphids 14 days after application. Therefore, Antikolorad Max, sus.k., at a rate of 0.1-0.15 l/ha, can be considered an effective chemical control measure against the major pests of cereal crops.

REFERENCES

1. Abbot W.S. A method of computing the effectiviness of an insecticide // J. Econ. Entomol. – 1925. – V.18. - №3. – P. 265-267.
2. Ali A, Ali H (2015) Population dynamics of cereal aphids in wheat crop at District Swabi. Int J of Agric and Environ Res 1(1):25–31
3. Anbessie D, Abebe M, Dechassa H (2020) Effect of Plant Population on Growth, Yields and Quality of Bread Wheat (Triticum aestivum L.) Varieties at Kulumsa in Arsi Zone, South-Eastern Ethiopia. IJRSAS 6(2): 32-53.
4. Aslam, Muhammad Razaq, Muhammad Akhter, Waheed, Faheem. Effect of sowing date of wheat on aphid (Schizaphis graminum Rondani) population. Pakistan Entomologist. 2005; 27:79-82.
5. Buntin GD, Flanders RW, Slaughter, De Lamar ZD. Damage loss assessment and control of the cereal leaf beetle (Coleoptera: Chrysomelidae) in winter wheat. Journal of Economic Entomology. 2004. 97:374-382.
6. Getahun D (2020) Predictions of climate change on agricultural insect pests Vis-a-Vis food crop productivity: A critical review. Ethiopian J of Sci and Sustainable Development 7
7. Herbert, Kuhar Thomas, Reisig Dominic, Thomason Wade, Malone Shannon. Fifty Years of Cereal Leaf Beetle in the U.S.: An Update on Its Biology, Management, and Current Research. Journal of

Integrated Pest Managament. 2. 10.1603/IPM11014, 2007.

8. Irshad M (2001) Aphids and their biological control in Pakistan. Pak J Bio Sci 4:537–541. https://doi.org/10.3923/pjbs.2001.537.541
9. Kostov K (2001) Breeding wheat lines for host-plant resistance to cereal leaf beetle by using the cross-mutation method. Bulg J Agric. Sci 7:7–14
10. Kumar P, Sarangi A, Singh DK, Parihar SS, Sahoo RN (2015) Simulation of salt dynamics in the root zone and yield of wheat crop under irrigated saline regimes using SWAP model. Agric Water Manag 148:72–83
11. Kundu PK. Acharjee TK, Mojid MA. Growth and yield of wheat under irrigation by sugar mills wastewater. Progress Agric. 2006; 24(1-2):211-218.
12. Lowe H. The assessvent of populations of the aphid Sitobion avenae in field trials// J. agr. Sc. – 1984. - № 2. – P.487-497.
13. Maryam S, Sandhu AA, Bodlah I, Aziz MA, Aihetasham A (2019) Contribution to Aphid's Fauna of Gujranwala (Punjab). Pak Punj Uni J of Zool 34(1):09–16
14. Miedaner T, Akel W, Flath K, Jacobi A, Taylor M, Longin F, Würschum T (2020) Molecular tracking of multiple disease resistance in a winter wheat diversity panel. Theoretical and Appl Genetics 133(2):419–431.
15. Osmolovsky G.E., Bondarenko N.V. Entomology. 2nd ed., reprint. and additional. L.: Kolos: Leningrad department, 1980. 359 p.
16. Polyakov I. Ya., Persov M. P., Smirnov V. A. Forecast of development of pests and diseases of agricultural crops (with a workshop): textbook for higher agricultural educational institutions in the specialty «Plant protection». L.: Kolos, 1984. 318 p.
17. Stamenkov, S. & Pankovi, L. 1991. Evaluating of wheat and barley resistance to the cereal leaf beetle (Lema melanopus L.). Zbornik radova Instituta za ratarstvo i povrtarstvo, Novi Sad, 19:247-251.
18. Tunio SD, Korejo MN, Jarwar AD, Waggan MR (2006) Studies on indigenous and exotic weed competition in wheat. Pak J Agri Biol 5(4): 1-8
19. Wilson MC, Shade RE. Survival and development of larvae of cereal leaf beetle, Oulema melanopus (Coleoptera: Chrysomelidae), on various species of Gramineae. Annual Entomological Society of America. 1966; 59:170-173.
20. Xie H, Shi J, Shi F, Xu H, He K, Wang Z (2020) Aphid fecundity and aphid defenses in wheat exposed to a combination of heat and drought stresses. J of Experimental Bot 71(9):2713–2722
21. Yahya M, Saeed NA, Nadeem S, Hamed M, Shokat S (2017) Role of wheat varieties and insecticide applications against aphids for better wheat crop harvest. Pak J Zool 49(6):2217–2225
22. Бондаренко Н.В. "Биологическая защита растений". Колос 1978 й. -С.176-178.
23. Васильчук, Н. С. Оценка прочности клейковины в процессе селекции твердой пшеницы (Triticum durum) / Н. С. Васильчук, С. Н. Гапонов, Л. В. Еременко [и др.] // Аграрный вестник Юго-Востока. – 2009. – №3. – С. 34-39
24. Жичкина Л.Н. Влияние агротехнических приёмов на развитие пшеничного трипса // Зашита и карантин растений. – 2003. №7. – С. 20.
25. Махмудходжаев Н.М. ва б., «Бошоқли дон экинларининг касалликлари, зараркунандалари ва бегона ўтларига қарши курашиш» (Тавсиянома). Тошкент, 2000. – 21 б.
26. Романюкина, И. В. Результаты изучения коллекционного материала озимой пшеницы на продуктивность и качество / И. В. Романюкина, Д. М. Марченко, Т. А. Гричаникова, И. А. Рыбась // Аграрная наука Евро-Северо-Востока. – 2015. – №6(49). – С. 4-8.

27. Сандухадзе, Б. И. Сортимент озимой мягкой пшеницы для Центрального региона России с повышенным потенциалом продуктивности и качества / Б. И. Сандухадзе, Г. В. Кочетыгов, М. И. Рыбакова [и др.] // Вестник Орел ГАУ. – 2012. – №3 (36). – С. 4-8.
28. Xo‘jayev Sh.T. Insektitsid, akaritsid va biologik faol moddalar va fungitsidlarni sinash bo‘yicha uslubiy ko‘rsatmalar// Toshkent. -2004. –B. 37.