



SEED-EATING BRUCHUS OF MUNG BEAN AND EFFECTIVENESS OF APPLICATION OF CHEMICAL AGENTS IN THE CONTROL OF BRUCHUS

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ABSTRACT

This article reveals the results of the research on the control of bruchus in the agrobiocenosis of mung bean planted as a second crop with the application of the chemical preparations BI-58 (new) 40% em.c. in consumption rate of 1.0 l/ha, Imidogold 35% w.s.p. in consumption rate of 0.25 l, Lamdex SC 5% sus.c. in consumption rate of 0.5 l/ha and biological efficiency was more than 85-90%.

Keywords: Mung bean, types of pests, dominant species of pests, amount of economic damage, pest control, biological efficacy.

INTRODUCTION

Leguminous crops, which are considered the main branch of world agriculture, are a food product in high demand by the human body, as they are rich in protein, fat and carbohydrates, which are the most necessary for humans.

Mung bean (*Phaseolus aureus* Piper) and the last classification *Vigna radiata* ((L.) Wilczek) is a widespread crop in the world and it is valuable for food. Mung bean grain contains 24.8% protein, 1% oil, 3.5-4.5% fiber, 4.5-5.5% ash and 62-65% carbohydrates, 50.4% carbonated water, 1.5% oil acids, vitamins A, B1, B2, B3, B6, B9, C, E, K, sodium, phosphorus, potassium, magnesium, copper, zinc, minerals and antioxidants.

One of the main factors of obtaining a high and quality harvest from the mung bean plant is protection from pests that cause serious damage to crops and are of high economic importance.

Mung bean is mainly planted as a second crop on lands that have been cleared of winter cereals, potatoes, vegetables and other crops. The land is plowed in autumn

for planting in spring, and harrowed in early spring. Cultivation is carried out when the soil is compacted by the growth of weeds before planting. If it is planted in stubble field, the harvest of the previous crop is collected and the land is irrigated. The land is plowed at a depth of 22-25 cm. Before plowing, 40-60 kg of pure phosphorus and 20-40 kg of potassium are applied per hectare. 20-30 kg of phosphorus and 10-20 kg of potassium are applied during the period of budding and flowering. Nitrogenous fertilizers are used if the soil is low in humus and nitrogen. Nitrogen fertilizers can be applied during the growing season, its application rate is 20-30 kg in pure form. If the rate of nitrogen fertilizer is exceeded, biological nitrogen will not be assimilated.

In recent years, in all districts of the regions of our republic, cultivation of mung bean, soybean, and bean crops with second cropping method after the grain crops is increasing. Unfortunately, these second crops are damaged by some special and polyphag pests in field conditions and during grain storage, which leads to a decrease in productivity. According to the received data, it is known that 80-90 percent of stored grains of leguminous crops, especially mung beans and beans are damaged by bruchus. Therefore, it is very crucial to determine the cause of these problems, to identify the types of pests that found in second crops such as, mung bean and other crops belonging to this family, to control pest quantity by studying the bioecological characteristics of the dominant species of pests [Kholliiev A., Dusmanov S. 2014], [Kholliiev A, 2016].

Presently, three types of seed-eating weevils belonging to the *Bruchidae* family are known in mung bean crops, including the pea weevil (*Bruchus pisorum* Z), the bean weevil (*Acanthoscelides allectus* Sag) and the four-point weevil (*Callosebruchus maculatus* Z). Adults of these weevils develop in the field, and their larvae develop in grain seeds in warehouses, the seeds heavily infested with bruchus become completely unfit for planting or consumption [Makhmudhojaev N.M., Isaev M., 1994].

Adult bruchus come out by opening 2-3 mm holes in the seed walls. In this case, the harvested infested crop becomes unfit for consumption and planting. As a result, the germinability of pea grains decreases from 10% to 90% [Gerding, M., J. Tay, M. Paredes, 1987]. Other researchers state that pea bruchus overwinter inside the infested grain until the following spring [Hardie, D., G. Baker, and D. Marshall, 1995].

V. Sumeet et al. have shown in the studies that 15-20% of pea grains can be damaged in the fields heavily infested by pea bruchus. Larvae of bruchus eat up to 25% of infested grains and such damaged grains are dropped before ripening [Sumeet Verma, Anjay Kumar Gupta and Nupur Mittal, 2015].

According to V.Sumeet, A.Kumar Gupta and N.Mittal, *Bruchus pisorum* is one of the harmful pests of chickpea, which was first identified in 1964 in South Africa. Although this pest is called the pea weevil, its lifestyle is not the same as that of the warehouse weevil and rice weevils. The difference between the pea bruchus and other grain weevils is that the pea bruchus does not reproduce in warehouses. If the pea grains stored in warehouse are infected during the growing season of plant, then the pea bruchus can continue to develop and reproduce in storage [Sumeet Verma, Anjay Kumar Gupta and Nupur Mittal, 2015].

As can be seen from the above-mentioned problems, the development of highly effective control methods based on the study of the bioecology of the pests of the mung bean, planted as a second crop, is one of the urgent problems of today.

MATERIALS AND METHODS

The research was carried out in 2023-2024 in the "Hakimjon fayzli bogi" farm, "Nurmuhammad ishonch" farm of Yangiyol district of Tashkent region, in experimental plots of Plant Science Research Institute in Kibray district and "Innovative development and consulting center in agriculture" SUC at TashSAU, and also in the fields of "Husanjon Sanjar" farm in Okkurgan district of Tashkent region.



The distribution area of mung bean bruchus on the territory of the republic was studied on the basis of directional observations. Their species composition was determined with the help of experts based on the samples collected from the places of infestation. Dominant species of pests were isolated and their bioecological characteristics were studied. Phenological observation of pests was carried out in laboratory conditions and in lysimeters, and it was studied that under which conditions they hibernate, air temperature and relative humidity favorable for their development, fecundity of pests and in which plant they feed well and develop.

In each region, infestation rate of pests to leguminous crops and the density of the pest population in the regions were determined. When monitoring the pests of leguminous crops, their main predators and parasitic entomophages were studied and made their collection. Among them, species important for reducing the number of harmful pests were identified, and additional information on their bioecology was collected. All observation work and records was carried out by the method of M.I.Rashidov et al. [1: 12-p.]. Samples were collected from each monitored field every 10 days from early spring to the end of the season. To record entomophages, infected insects were collected from experimental fields and the percentage of parasites released from them was determined. Species of predatory entomophages and their population density were determined by carrying records of parasites and predators from infected insects collected using entomological traps. These records and observations [1: 12-p] were carried out according to the method of M.I.Rashidov. To determine the number of entomophages (beetles and larvae of coccinellids, golden-eye lacewing larvae), a sample was taken from the area size of 25x25 cm and its average per 1 m² was calculated. Calculations and records were carried out before treatment and after treatment every 3, 7, 10, and 15 days [7: 3-30-p].

RESULTS AND DISCUSSION

With the purpose to protect mung bean crop from bruchus, we tested chemical preparations BI-58 (new) 40% em.c. in a consumption rate of 0.5-1.0 l/ha, Imidogold



35% w.s.p. at a rate of 0.2-0.25 l/ha, Lamdex SC 5% sus.c in consumption rate of 0.4-0.5 l/ha against the adults of mung bean bruchus. Each option of our experiment was triplicated. The control option was free from treatment with insectacaricides. According to the research results when the preparation BI-58 (new) 40% em.c. was applied at a rate of 0.5 l/ha, 48.9% biological efficiency was achieved on the 3rd day of the record, and by the 7th day of the record, the biological efficiency reached 78.9% compared to the control option.

According to our studies on mung bean crops, the highest biological efficiency was observed on the 14th day of the record and it was 89.4%. When we used this preparation at the consumption rate of 1.0 l/ha against the bruchus, 54.2% biological efficiency was achieved on the first day of the record, while the highest biological efficiency 92.0% was achieved on the 14th day of the record, then efficiency decreased slightly on the rest of the observation days.

In the next option in which the preparation Imidogold 35% w.s.p. was applied in consumption rate of 0.2 l/ha, the biological efficacy was 47.5% compared to the control option on the first day of record, while on the 7th day of record this indicator was 73.8% compared to the control, and by the 14th day - 86.6%. At the application of Imidogold 35% w.s.p. in consumption rate of 0.25 l/ha the biological efficacy was 53.6% on the first record day, 75.0% on the 7th record day, 88.2% on the 14th record day, and after the 14th record day it was 86.3%.

In the option where the preparation Lamdex SC 5% sus.c. was used at the rate of 0.4 l/ha, the biological efficiency on the first day of the record was 50.4% compared to the control option, on the 7th day it was 64.9%, and on the 14th day - 79.1%. In the last option where Lamdex SC 5% sus.c. was used at the consumption rate of 0.5 l/ha, the biological efficiency was 52.4% on the first record day compared to the control, and the highest efficiency was 88.6% on the 14th day of record.

In 2018, the options that manifested highly effective results were selected and in 2019 the preparations BI-58 (new) at a rate of 1.0 l/ha, Imidogold 35% w.s.p. in consumption rate of 0.25 l, Lamdex SC 5% sus.c. in consumption rate of 0.5 l/ha

were tested in wide experimental fields. In this experiment, the highest biological efficiency reached 93.3% on the 14th day of the record while BI-58 (new) preparation was treated with consumption rate 1.0 l/ha, and this indicator varied from 91.1 to 90.4% in the other options. It was observed that the indicator decreased slightly in the following record days.

Summarizing the results of our research, it can be stated that when chemical agents BI-58 (new) 40% em.c. in consumption rate of 1.0 l/ha, Imidogold 35% w.s.p. in consumption rate of 0.25 l., Lamdex SC 5% sus.c. in consumption rate of 0.5 l/ha were applied against mung bean bruchus in our experiments of the research, more than 85-90% biological efficiency was achieved (Table 2).

Table-2

Biological efficacy of insectoacaricides against mung bean bruchus.

(Plant Science Research Institute, Kibray district, Tashkent region, in 2023-2024)

№	Options	Consumption rate of preparation, l/ha	Q-ty of pests per 1m ² , pcs					Biological efficacy, %			
			Pre-treatment	Post-treatment, day.							
				3	7	14	21	3	7	14	21
In 2019											
1.	BI-58(new) 40 % em.c.(standard)	0,5	8,2	4,9	2,7	1,4	1,8	48,9	78,9	89,4	87,9
2.		1,0	6,9	3,7	2,5	0,9	1,3	54,2	76,8	92,0	89,9
3.	Imidogold 35% w.s.p	0,2	8,3	5,1	3,4	1,8	1,7	47,5	73,8	86,6	85,9
4.		0,25	7,9	4,3	3,1	1,5	1,9	53,6	75,0	88,2	86,9
5.	Lamdex SC 5% sus.c.	0,4	6,2	3,6	3,4	2,1	2,2	50,4	64,9	79,1	79,9
6.		0,5	7,0	3,9	2,8	1,3	2,1	52,4	74,5	88,6	83,9
7.	Control (without treatment)	-	7,6	8,9	11,9	12,3	13,4	-	-	-	-
In 2019											
1.	BI-58(new) 40 % em.c.	1,0	6,8	3,2	1,7	0,8	0,9	60,1	84,8	93,3	93,9
2.	Imidogold 35% w.s.p	0,25	7,1	3,6	2,1	1,1	1,2	57,1	81,2	91,1	91,9
3.	Lamdex SC 5% sus.c.	0,5	7,6	4,8	3,1	1,3	1,4	46,5	74,1	90,1	90,9
4.	Control (without treatment)	-	7,7	9,1	12,1	13,4	14,7	-	-	-	-



LSD₀₅=

2,1CONCLUSION

In our research, at the application of chemical preparations BI-58 (new) 40% em.c. at a rate of 1.0 l/ha, Imidogold 35% w.s.p. at a rate of 0.25 l., Lamdex SC 5% sus.c. at a rate of 0.5 l/ha against the mung bean bruchus, more than 85-90% biological efficiency was achieved.

References

1. Adashkevich B.P., Rashidov M.I., Atamirzaeva Kh.Kh. et al // Recommendations on the biological protection of tomatoes from the cotton bollworm - Tashkent, - 1986. –P.12.
2. Kambulin V.E. // Control of insects - pests of fodder crops and pasture plants.- Alma-Ata: Edit. All-Un.Acad.Agr.Sci.named after Lenin, 1987. –PP. 118-130.
3. Kholliiev A.T. Control measures against bruchus on leguminous plants // “Scholars Journal of Agriculture and Veterinary Sciences”. 2016.- PP.448-449.
4. Makhmudhojaev N.M., Isaev M. Efficacy of some chemical drugs against four-point weevil / The integrated method of protection of plants from harmful organisms and environmental protection: a collection of articles, - Tashkent, 1994. –P. 123.
5. Rashidov M.I. Integrated protection of nightshade vegetable crops from pests. - Tashkent, 2008. – P.190.
6. Khojaev Sh.T. Methodological guidelines for testing insecticides, acaricides, biologically active substances and fungicides. (Revised and supplemented II edition). - Tashkent, 2004. – PP. 3–30.
7. Makhmudova Sh.A., Irgasheva N.R. Types of soybean pests and measures against them// E3S Web of Conferences 371, 01031 (2023) P. 37-45
8. Makhmudova Sh.A. Pest control for moong crop insulates. International Scientific Journal Theoretical & Applied Science. Published: 07.09.2023. P. 185-188
9. Махмудова Ш.А. Manage sucking insects and caterpillars in moong crop.



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10. Махмудова Ш.А. Moong grop insect pest control // Научный журнал “Интернаука» Москва 2024. №17(334) Часть 6. Р. 17-19 Journal of Agro science.-Tashkent, 2014.-№ 4(32).-PP.45-46.

11. Gerding, M., J. Tay, M. Paredes. 1987. Incidencia de Bruchus pisorum (Coleoptera: Bruchidae) en arveja, segun epoca desiembra. Agricultura Tecnica 47:160-162.

12. Hardie, D., G. Baker, and D. Marshall. 1995. Field screening of Pisum accessions to evaluate their susceptibility to the pea weevil (Coleoptera: Bruchidae). Euphytica 84:155-161.

13. Sumeet Verma, Anjay Kumar Gupta and Nupur Mittal.GC - MS Analysis of *Bruchus pisorum* Extract to Analyze the Presence of Semichemical Components International Journal Current Microbiology and Applied Sciences ISSN: 2319-7706 Volume 4 Number 8 (2015) pp. 474-478.