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STUDY OF SAP-SUCKING PESTS OF MUNG BEAN AND THEIR CONTROL

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ИЗУЧЕНИЕ СОСУЩИХ ВРЕДИТЕЛЕЙ МАША И БОРЬБА С НИМИ

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Abstract. Mung bean, a vital legume crop, faces significant challenges due to sap-sucking insect pests such as thrips, aphids, whiteflies, and stink bugs. These pests damage plants, causing chlorosis, leaf curling, and transmitting viral diseases. These infestations reduce yield, seed quality, and market value. Integrated Pest Management (IPM) is proposed as a sustainable approach, but there is a knowledge gap regarding its effectiveness in Central Asian agroecosystems. This study aims to examine key sap-sucking pests, analyze their biological and ecological characteristics, and evaluate the effectiveness of various pest management strategies. The study tested three types of chemical pesticides against spider mites on mung bean crops at the Scientific Research Institute of Plant Genetic Resources in Tashkent region. The results showed that applying these pesticides at the specified application rates provided a biological efficacy of over 87-95% against spider mites, making them suitable for controlling spider mites on mung beans. This research aims to develop a comprehensive, sustainable pest control framework that enhances mung bean productivity while ensuring environmental safety.

Аннотация. Маш (*Vigna radiata* (L.) Wilczek) является важной бобовой культурой, но сталкивается с серьезными проблемами из-за сосущих вредителей, таких как трипсы, тли, белокрылки и клопы. Эти вредители наносят ущерб растениям, вызывая хлороз, скручивание листьев и распространяя вирусные заболевания. Их воздействие приводит к снижению урожайности, ухудшению качества семян и снижению рыночной стоимости продукции. В качестве устойчивого подхода предлагается интегрированная система защиты растений (IPM), однако эффективность этого метода в агроэкосистемах Центральной Азии остается недостаточно изученной. В данном исследовании рассматриваются основные сосущие вредители, анализируются их биологические и экологические особенности, а также оценивается эффективность различных методов защиты растений. В ходе исследования в Научно-исследовательском институте генетических ресурсов растений Ташкентской области были протестированы три вида химических пестицидов против паутинных клещей на посевах маша. Результаты показали, что применение этих пестицидов в рекомендованных нормах обеспечило биологическую эффективность в диапазоне 87–95% против паутинных клещей, что делает их эффективным средством борьбы с данным вредителем на маше. Цель данного исследования – разработка комплексной и устойчивой системы защиты растений, направленной на повышение урожайности маша при соблюдении экологической безопасности.

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Ключевые слова: сосущие насекомые-вредители: трипсы, тли, белокрылки, клопы.

Keywords: sap-sucking, insect, pests, thrips, aphids, whiteflies, bugs.

Mung bean (*Vigna radiata* (L.) Wilczek) is a crucial legume crop cultivated worldwide due to its rich nutritional composition, nitrogen-fixing ability, and adaptability to diverse climatic conditions. However, its production is significantly hindered by various biotic stress factors, among which sap-sucking insect pests pose a major threat. These pests, including thrips (Thripidae), aphids (Aphididae), whiteflies (Bemisia tabaci), and stink bugs (Nezara viridula), damage plants by extracting sap, causing chlorosis, leaf curling, and transmitting viral diseases. Such infestations not only reduce yield but also compromise seed quality, ultimately affecting market value and farmer profitability [1, 6].

Recent studies have emphasized the economic impact of sap-sucking pests on leguminous crops (Figure).

Figure. Experimental process of the sap-sucking pest of mung bean

Research indicates that aphid infestations can lead to a 30–40% reduction in mung bean yield due to direct feeding damage and virus transmission. Similarly, studies conducted by highlight the increasing resistance of these pests to conventional insecticides, necessitating alternative management strategies. Integrated Pest Management (IPM) has been proposed as a sustainable approach, incorporating cultural, biological, and chemical control methods to mitigate pest populations while minimizing environmental risks [2].

However, there remains a knowledge gap regarding the region-specific effectiveness of these strategies, particularly in the context of Central Asian agroecosystems. Despite the growing

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awareness of pest-related losses in mung bean cultivation, efficient and regionally adapted pest control measures remain insufficiently explored.

The primary objective of this study is to examine the key sap-sucking pests affecting mung bean crops, analyze their biological and ecological characteristics, and evaluate the effectiveness of various pest management strategies. By integrating agro-technical, biological, and chemical approaches, this research aims to develop a comprehensive, sustainable pest control framework that enhances mung bean productivity while ensuring environmental safety. We conducted research on the biological efficacy of chemical pesticides against spider mites on mung bean crops at the experimental farm of the Scientific Research Institute of Plant Genetic Resources in Qibray district, Tashkent region. During the study, we tested three types of chemical pesticides (acaricides) against spider mites on mung bean crops. In the experiment, the insectoacaricides Vertimek 1.8% EC (0.3 L/ha), Uzmayt 57% EC (1.2 L/ha), and Nurell-D 55% EC (1.5 L/ha) were applied in three replications. In the control variant, no insectoacaricides were used.

The working solution was prepared at a rate of 300 L/ha and applied using a K-90 motorized hand sprayer. The experiment was conducted following generally accepted methodologies, and biological efficacy was calculated using Abbott's formula (1925) [3].

As shown in the table, the results indicate that in the variant where Vertimek 1.8% EC was applied at a rate of 0.3 L/ha, biological efficacy was 43.5% on the first assessment day compared to the control, increasing to 78.6% on the 7th day and reaching 88.0% on the 14th day. In the variant where Uzmayt 57% EC was applied at 1.2 L/ha, biological efficacy was 53.3% on the first assessment day, 76.9% on the 7th day, and the highest efficacy of 89.6% was achieved on the 14th day.

For Nurell-D 55% EC applied at 1.5 L/ha, biological efficacy was 43.2% on the first assessment day, 76.3% on the 7th day, and reached a maximum of 87.4% on the 14th day (Table).

Table

BIOLOGICAL EFFECTIVENESS
OF CHEMICAL AGENTS AGAINST SPIDER MITES
IN MUNG BEAN CROPS

Variants	Amount of drug consumption, l/ha	*Average number of pests per leaf*						*Biological effectiveness, %*				
		Before spraying the chemical	*Aays after spraying the chemical.*									
			1	3	7	14	21	1	3	7	14	21
Vertimek 1.8% e.m	0,3	42,2	25,6	18,1	12,2	9,2	10,7	43,5	62,8	78,6	88,0	87,6
Uzmayt, 57% e.m	1,2	38,5	19,3	16,2	12,0	7,3	8,8	53,3	63,5	76,9	89,6	88,8
Nurell-D, 55% e.c.	1,5	41,0	25,0	19,1	13,1	9,4	10,9	43,2	59,6	76,3	87,4	87,0
Control (untreated)	-	43,0	46,2	49,7	58,1	78,6	88,4	-	-	-	-	-

Based on the results of the study, it can be concluded that applying the chemical pesticides Vertimek 1.8% EC (0.3 L/ha), Uzmayt 57% EC (1.2 L/ha), and Nurell-D 55% EC (1.5 L/ha) at the specified application rates provides a biological efficacy of over 87–95% against spider mites on mung bean crops, making these pesticides suitable for use in controlling spider mites on mung beans [4, 5].

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Conclusion

When applied at the specified rates Vertimek 1.8% EC (0.3 L/ha), Uzmayt 57% EC (1.2 L/ha), and Nurell-D 55% EC (1.5 L/ha) these chemical pesticides provide biological efficacy of over 87–95% against spider mites on mung bean crops.

Therefore, these pesticides can be effectively used for spider mite control in mung bean cultivation.

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