



EFFECTIVENESS OF THE METHOD OF BIOLOGICAL CONTROL AGAINST PESTS FOUND ON BAMIIYA VEGETABLE CROPS

Kholliyev Asamiddin Turayevich 

Professor

Jurayev Jakhongir Makhmudovich 

Basic doctoral student

e-mail: jaxogirjurayev@gmail.com

Tinchlikova Shafolat Ahtam qizi 

Master student

Tashkent State Agrarian University

Abstract. This article presents the results of studies on the effectiveness of biological control methods against the main pests of okra (*Hibiscus esculentus* L.). The effectiveness of lacewing and Bracon hebetor entomophages applied in different ratios against melon aphid and cotton bollworm was evaluated. In addition, the biological efficiency of microbiological preparations and their role in reducing pest populations were assessed. The obtained results provide a scientific basis for improving environmentally safe biological protection systems in okra agrobiocenosis.

Keywords: okra, *Hibiscus esculentus* L., biological control, entomophage, Bracon hebetor, lacewing, melon aphid, cotton bollworm, biological effectiveness.

Annotatsiya. Mazkur maqolada bamiya (*Hibiscus esculentus* L.) sabzavot ekinida uchraydigan asosiy zararkunandalarga qarshi biologik kurash usullarining samaradorligi o'rganilgan. Tadqiqotlar davomida poliz shirasi va g'oz tunlamiga qarshi oltinko'z hamda Bracon hebetor entomofaglarining turli nisbatlarda qo'llanish samaradorligi aniqlangan. Shuningdek, mikrobiologik preparatlarning biologik samaradorligi baholanib, zararkunandalar sonini kamaytirishdagi ahamiyati asoslab berilgan. Olingan natijalar bamiya agrobiotsenozida ekologik xavfsiz biologik himoya tizimini takomillashtirish uchun ilmiy asos bo'lib xizmat qiladi.

Kalit so'zlar: bamiya, *Hibiscus esculentus* L., biologik kurash, entomofag, Bracon hebetor, oltinko'z, poliz shirasi, g'oz tunlami, biologik samaradorlik.

Аннотация. В данной статье представлены результаты исследований эффективности биологического метода борьбы против основных вредителей овощной культуры бамия (*Hibiscus esculentus* L.). В ходе исследований



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изучена эффективность применения энтомофагов златоглазки и *Bracon hebetor* в различных соотношениях против бахчевой тли и хлопковой совки. Также была оценена биологическая эффективность микробиологических препаратов и их роль в снижении численности вредителей. Полученные результаты служат научной основой для совершенствования экологически безопасной системы биологической защиты агробиоценоза бамии.

Ключевые слова: бамия, *Hibiscus esculentus* L., биологическая борьба, энтомофаг, *Bracon hebetor*, златоглазка, бахчевая тля, хлопковая совка, биологическая эффективность.

INTRODUCTION

In recent years, large-scale reforms have been implemented in our country to increase the income of dehqan and farmer households through rapid population growth, ensuring food security, fully meeting the need for vegetable products, diversifying agriculture, rational use of existing land and water resources, and growing export-oriented products. In the conditions of Uzbekistan, this vegetable type is of particular importance as a unique object of introduction. Because it is promising to introduce varieties that are suitable for the soil and climatic conditions of our country, have high yields, are resistant to abiotic and biotic stress factors, are tolerant to major diseases and pests, and have high biological value. At the same time, the creation of new varieties resistant to pests, conducting breeding processes on a scientific basis, and developing modern agricultural technologies will serve to expand the range of vegetable crops, which are the basis of healthy nutrition in our country, strengthen public health, and increase export potential.

Also, the presence of proteins, vitamins (groups A, C, K, B), minerals (K, Ca, Mg, Fe), and a high level of pectin in the biochemical composition of the bamiya plant makes it a promising raw material not only for food safety, but also for the pharmaceutical and dietary industries. Therefore, the introduction and expansion of mass production of this crop is one of the important scientific and practical tasks in the direction of agrarian diversification and innovative agriculture.

The effectiveness of biological control methods against pests found in the vegetable crop of *licorice* (*Hibiscus esculentus*) plays an important role in the modern agricultural system. Biological control, unlike chemical pesticides, has the advantages of maintaining ecological balance in cultivated areas, preserving beneficial entomofauna, and not harming human health and the environment.

MATERIALS AND METHODS

There are several biological methods for controlling the natural population of pests found on the bamiya crop, and in 2023-2024, in the educational and scientific experimental farm of the Tashkent State Agrarian University in the Kibray district of the Tashkent region, the entomophage of the golden eagle was tested against the





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melon aphid found on the bamiya plant in various ratios, that is, 1:5, 1:10, 1:15, and 1:20 ratios.

According to the results of the conducted research, when using the lacewing entomophage against melon aphid in a ratio of 1:5, the biological effectiveness compared to the control was 66.3% on the 3rd counting day, respectively, and by the 21st day this indicator was 84.6% (Fig. 1). When using golden-eyed entomophage in a 1:10 ratio, the biological effectiveness was 65.4% on the 3rd day compared to the control, and by the 21st day it was 79.2%.

In the variant with the use of the lacewing entomophage in a 1:15 ratio, the effectiveness compared to the control was 61.1%, and on the 21st day this indicator was 76.5%, and when distributing the lacewing entomophage in a 1:20 ratio, the biological effectiveness was 60.4% on the 3rd day and 74.5% on the 21st day, respectively.

In the control variant, it was observed that the amount of melon juice in nature did not decrease.

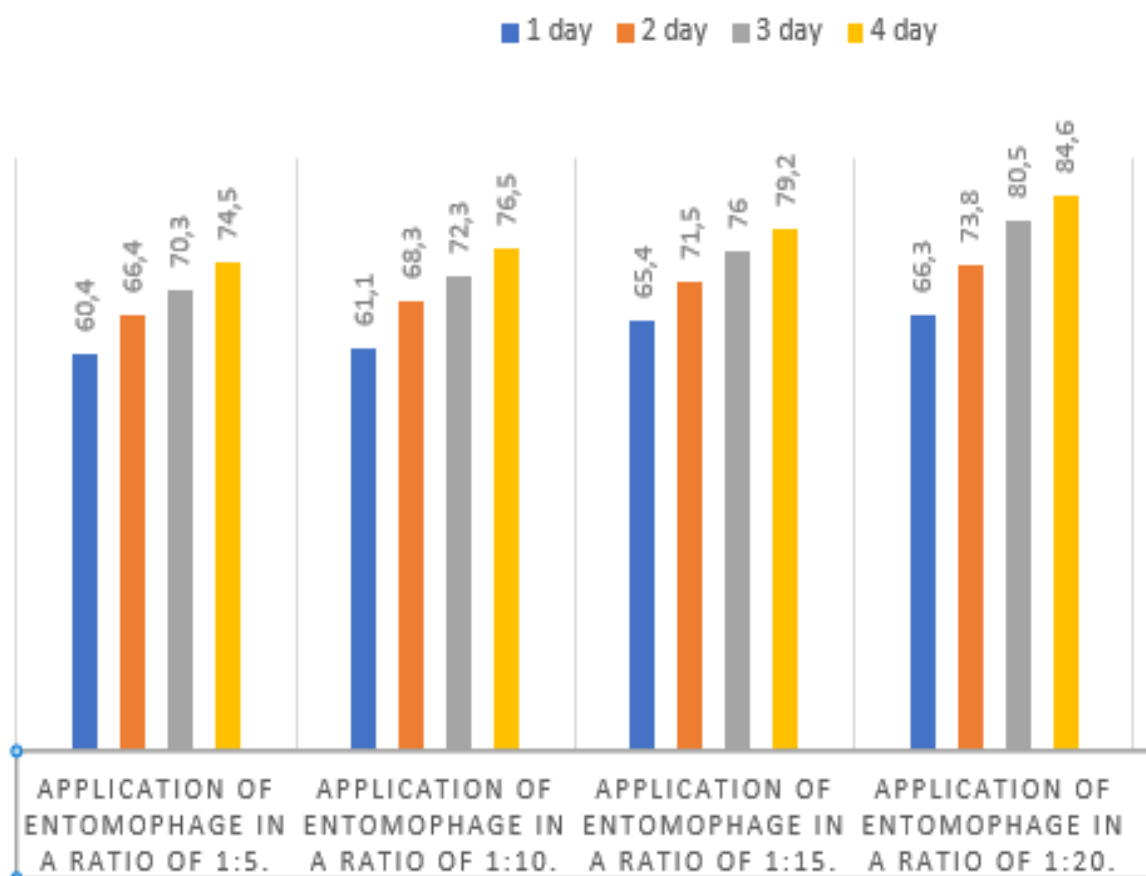


Figure 1. Biological effectiveness of the use of the golden-eyed entomophage against the melon aphid found on the vegetable crop of licorice (*Hibiscus esculentus L.*) by days

Also, according to the results of scientific research on the use of the Bracon entomophage against the cotton bollworm, when using the Bracon entomophage in



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a 1:5 ratio, the effectiveness compared to the control was 76.3% on the 3rd day and reached 86.1% by the 21st day (Fig. 2). When using Bracon entomophage in a 1:10 ratio, the biological effectiveness was 66.4% on the 3rd day compared to the control, and by the 21st day it was 83.4%.

In the variant with the use of the Bracon entomophage in a 1:15 ratio, the effectiveness compared to the control was 65.8%, and on the 21st day this indicator was 79.6%, and when distributing the Bracon entomophage in a 1:20 ratio, the biological effectiveness was 63.7% on the 3rd day and 75.4% on the 21st day, respectively.

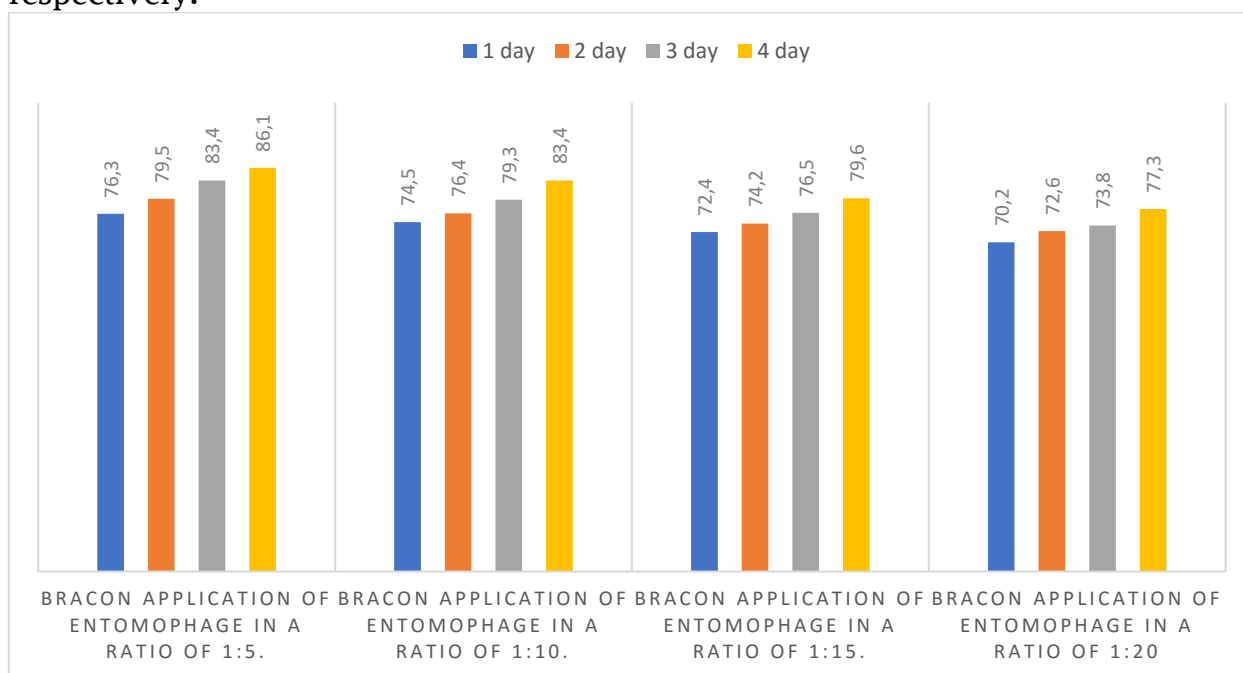


Fig. 2. Biological effectiveness of the use of the Bracon entomophage against the cotton bollworm found on the vegetable crop of licorice (*Hibiscus esculentus L.*) by days

In the control variant, it was noted that the number of cotton bollworms in nature did not decrease.

In subsequent studies, the use of Prestige Plus BA-3000EA/ml e.c. in the control of melon aphid and cotton bollworm found in the biocenosis of the bamiya plant was studied. (1, 0; 1.5-2.0 l/ha), Bolshevik sus.k. (0.5; 0.75-1.0 l/ha) and in the standard variant Bioslip BT kuk. (1.0 kg/ha) of microbiological preparations were tested.

Prestige Plyus BA-3000EA/ml e.c. preparation was used to control melon aphids found in the Bamiya plant biocenosis by 1.0; At the application rate of 1.5-2.0 l/ha on the 3rd day of accounting, the biological effectiveness compared to the control was 57.1%, 58.8%, and 63.4%, respectively, and the highest indicator was 75.7%, 82.5%, and 84.1% on the 14th day.



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Bolshevik sus.k. preparation - 0.5; When using 0.75-1.0 l/ha, the effectiveness by the 3rd day was 54.5%, 58.2%, and 63.3% compared to the control. In these variants, the highest indicator by day 14 was 74.4%, 79.7%, and 85.7%.

When using the microbiological preparation Bioslip BT kuk. at a rate of 1.0 kg/ha in the standard variant, the biological effectiveness was 54.1% on the 3rd day of treatment compared to the control, and by the 14th day it was 73.4%.

In the fight against the cotton bollworm, Prestige Plus BA-3000EA/ml e.c. preparation was used for 1.0; When applying at a rate of 1.5-2.0 l/ha, the biological effectiveness compared to the control on the 3rd day of accounting was 58.3%, 63.5%, and 60.7%, respectively, and the highest indicator was 79.0%, 82.0%, and 85.6% on the 14th day.

Bolshevik sus.k. preparation - 0.5; When using 0.75-1.0 l/ha, the effectiveness was 56.0%, 62.7%, and 66.9% by the 3rd day compared to the control. In these variants, the highest indicator by day 14 was 75.0%, 82.7%, and 86.9%.

When using the microbiological preparation Bioslip BT kuk. at a rate of 1.0 kg/ha in the standard variant, the biological effectiveness compared to the control was 53.3% on the 3rd day, and by the 14th day it was 74.9%.

CONCLUSION

As a result of the biological control method against the main pests found in the desert, it is considered the most important tool for obtaining a high-quality and high-yielding harvest, maintaining ecological balance, and ensuring the stability of the agricultural system. With the timely implementation of measures such as weed control, fertilization, proper organization of irrigation, regulation of sowing dates and density, and elimination of post-harvest residues, the natural resistance of bamiya to pests increases, and the volume and quality of the harvest improve. Consequently, the effective use of the biological control method remains one of the main directions of pest control in the cultivation of bamiya.

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