

## Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 01, Issue 01, November 2025



This article/work is licensed under CC by 4.0 Attribution

<https://eurekaopenaccess.com/index.php/7>

# EFFECTIVENESS OF NEW BIOSTIMULANTS AND INSECTICIDES AGAINST THE COTTON BOLLWORM

Ibragimova Dildoraxon Qaxramonovna  
Ibragimovadildora1991@mail.com

## Abstract

This study investigated the biological effectiveness of new biostimulants and insecticides against the cotton bollworm. Field experiments were conducted during the flowering–boll formation stage, evaluating the individual and combined applications of the Antikolorad Maks insecticide and the biostimulants Avangard Start and Gulliver. Changes in pest population density were recorded on the 3rd, 7th, and 14th days after treatment, and biological efficacy was calculated using Abbott’s formula. The results demonstrated that Antikolorad Maks exhibited rapid and high insecticidal activity, while its combined use with biostimulants significantly enhanced and prolonged protective effectiveness. The findings confirm the practical and scientific relevance of applying an integrated protection approach for effective cotton bollworm management.

**Keywords:** Cotton, cotton bollworm (*Helicoverpa armigera*), Antikolorad Maks, biostimulants, insecticides, biological efficacy, integrated pest management.

## Introduction

In the cotton production system, year-to-year fluctuations in pest populations—especially under conditions of high temperatures and drought—lead to a sharp increase in cotton bollworm (*Helicoverpa armigera*), thrips, aphids, and other harmful insects, which significantly and negatively affect both yield quantity and quality. During the cotton growing season, the crop serves as a favorable food

## Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 01, Issue 01, November 2025



This article/work is licensed under CC by 4.0 Attribution

<https://eurekaoa.com/index.php/7>

source for pests; therefore, timely identification of their occurrence periods, developmental stages, and population density, as well as the application of scientifically grounded control measures, is of great importance.

The formation and dynamics of pest populations may vary annually depending on weather conditions, the level of agronomic practices, and the phytosanitary status of cultivated areas. For this reason, in accordance with the requirements of integrated pest management (IPM), assessing pest population levels, determining the economic threshold of damage, and applying effective insecticides have significant scientific and practical value.

Scientific literature extensively addresses the development of cotton pests and the control measures applied against them. According to studies by F. Teshayev, Sh. Abdualimov, B. Niyozaliyev, and F. Hasanova [125, pp. 3–5], during drought years, pests such as cotton bollworm, aphids, plant bugs, and spider mites can rapidly increase in number, causing yield losses of up to 30–50%. The authors emphasize that continuous monitoring, timely detection of pest populations, and the application of chemical treatments only when necessary provide the most effective results within a sustainable protection system.

Research conducted by X. Kimsanbayev, N. Jumayeva, and Sh. Esanbayev [75, pp. 54–55] confirms the high efficacy of the biopreparation **PESTGUARD** against cotton bollworm. According to the study results, the effectiveness of the preparation reached 76.2% over a 21-day period, while cotton yield increased by 20.5%.

### Materials and Methods

The insecticide Antikolorad Maks, applied in the study, contains two active ingredients—imidacloprid (300 g/L) and lambda-cyhalothrin (100 g/L). Due to the presence of these two active components, the preparation rapidly translocates through plant tissues, enhances internal protection, and exerts a fast-acting effect on pests. The combination of these substances integrates contact and systemic

## Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 01, Issue 01, November 2025



This article/work is licensed under CC by 4.0 Attribution

<https://eurekaopenaccess.com/index.php/7>

modes of action, resulting in high efficacy against cotton bollworm and other harmful insects, as scientifically demonstrated in Table 1

Biological efficacy was calculated based on Abbott's formula. During the study, application rates of the preparations at the flowering–boll formation stage were presented in the table. In field experiments conducted with strict adherence to the recommended application rates, the reduction levels of cotton bollworm were determined on the 3rd, 7th, and 14th days after treatment, and biological efficacy was evaluated in comparison with the untreated control. The obtained results indicate that the use of chemical preparations is justified when considering the damage level caused by the cotton bollworm.

### Results and Discussion

The experimental results presented in Table 1 indicate that in the untreated control variant, where no chemical or biological control measures were applied against the cotton bollworm, the pest population increased naturally throughout the entire observation period. At the beginning of the experiment, the initial bollworm density was 16.0 individuals, which increased to 16.2 individuals by the 3rd day and reached 16.8 individuals by the 7th day. By the end of the 14th day, the pest population further increased to 17.5 individuals. This trend clearly demonstrates that under conditions without protective measures, cotton bollworm populations rapidly increase, resulting in a high level of damage to cotton plants. In contrast, a sharp reduction in pest population was observed in the treatment variant where Antikolorad Maks insecticide was applied. As early as the 3rd day after application, a significant decrease in bollworm density was recorded, with biological efficacy reaching 87.0%. During subsequent observation periods, the insecticide maintained a high level of effectiveness, with biological efficacy values of 84.5% on the 7th day and 76.6% on the 14th day, respectively.

## Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 01, Issue 01, November 2025



This article/work is licensed under CC by 4.0 Attribution

<https://eurekaopenaccess.com/index.php/7>

Table 1. Effectiveness of New Biostimulants and Insecticides Against Cotton Bollworm (*Helicoverpa armigera*) During the Flowering–Boll Formation Stage

No,	Treatment variants	Application rate (kg/L/ha)	Before treatment	Day 3	Day 7	Day 14	Efficacy Day 3 (%)	Efficacy Day 7 (%)	Efficacy Day 14 (%)
1	Control (untreated)	–	16,0	16,2	16,8	17,5	–	–	–
2	Standard (Universal) – biostimulant	1,0	15,4	12,2	13,0	14,4	20,7	15,6	6,5
3	Antikolorad Maks (insecticide)	0,3	15,7	2,1	2,6	4,1	87,0	84,5	76,6
4	Avangard Start – biostimulant	2,0	15,1	13,8	14,2	15,0	8,6	5,9	0,7
5	Gulliver – biostimulant	2,0	15,3	13,5	14,1	14,8	11,8	7,8	3,3
6	Gulliver + Avangard + Antikolorad Maks	1,5 + 1,5 + 0,5	15,6	1,8	2,3	3,8	88,9	86,3	78,3
7	Avangard + Gulliver + Antikolorad Maks	2,5 + 2,5 + 0,5	15,2	1,5	2,0	3,4	90,7	88,1	80,6
8	Separate application (A/G/A)	1,5 / 1,5 / 0,5	16,1	2,4	3,1	4,7	85,2	81,5	73,1
9	Avangard Start + Gulliver – biostimulants	2,5 + 2,5	14,9	13,8	14,3	15,0	7,4	4,0	0,7

In the treatment variant where Antikolorad Maks insecticide was applied, a sharp reduction in pest population was clearly observed. As early as the 3rd day after application, the number of cotton bollworms decreased significantly, with biological efficacy reaching 87.0%. During subsequent observation periods, the insecticide maintained a high level of effectiveness, with efficacy values of 84.5% on the 7th day and 76.6% on the 14th day. These results indicate that Antikolorad Maks has a rapid and strong insecticidal effect, and that its active ingredients quickly paralyze pests, leading to their mortality within a short period of time.

## Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 01, Issue 01, November 2025



This article/work is licensed under CC by 4.0 Attribution

<https://eurekaopenaccess.com/index.php/7>

The highest efficacy was achieved in treatment variants involving the combined application of biostimulants and insecticides. In the Gulliver + Avangard + Antikolorad combination, pest population reduction reached 88.9%, 86.3%, and 78.3% on the 3rd, 7th, and 14th days, respectively. The Avangard + Gulliver + Antikolorad variant demonstrated the highest effectiveness across all observation periods, achieving 90.7%, 88.1%, and 80.6%, respectively.

### Conclusion

The results of the study demonstrate that the application of modern insecticides and their combined use with biostimulants play a crucial role in the effective control of cotton bollworm. In particular, Antikolorad Maks insecticide showed rapid and high biological efficacy, significantly reducing pest populations within a short period after application. The highest and most stable effectiveness was achieved in treatment variants combining biostimulants with the insecticide, which ensured prolonged protective action against pests. These findings confirm that the integrated use of biostimulants and insecticides is a scientifically justified and practically effective approach for sustainable cotton protection under flowering–boll formation conditions.

### References

1. Sattarov N., Abduraxmonov Sh., Boboqulov O. "G'o'za va beda qandalasiga qarshi samarali insektitsid" Maxsus son [3]. 2023 // Agro kimyo himoya va o'simliklar karantini // B 32-33.
2. Sattarov R., Sattarov B., Qurbanov N., Abdullayev A. "G'o'zادا tripsning rivojlanishi va unga qarshi insektitsidlar samaradorligi" Maxsus son [2]. 2023 Agro kimyo himoya va o'simliklar karantini B 147-148.
3. Rustamov A., Mirzaraximov G'. "G'o'za tunlamlariga qarshi qo'llaniladigan insektitsidlarning lysiphlebus fabarum entomofagiga ta'siri" №2. 2022 //Agro kimyo himoya va o'simliklar karantini// B 13-15

## Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 01, Issue 01, November 2025



This article/work is licensed under CC by 4.0 Attribution

<https://eurekaopenaccess.com/index.php/7>

4. Rustamov A., Zuparov M., Ablazova M. “G‘o‘za tunlamlariga qarshi qo‘llaniladigan ayrim insektitsidlarning Aphidiidae oilasi entomofaglariga ta’siri “ //Agro kimyo himoya va o‘simliklar karantini// №6. 2021 B 7-9.
5. Urazbayev A., Murodov R., Nurumova Nilufar “Биологическая эффективность инсектицидов против сосущих вредителей озимой пшеницы” Maxsus son [2]. 2022//Agro kimyo himoya va o‘simliklar karantini// B 210-211.