

## Helitec To Combat Phytonomus In Uzbekistan

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**Annotation:** One of the dangerous pests of alfalfa of the second and subsequent years of standing is the leafy alfalfa elephant phytonomus (*Phytonomus variabilis* Ilbsu). The article presents the results of studying the properties of liquid mineral fertilizers mixed with bioinsecticides, their application on alfalfa against phytonomus larvae. The results obtained in the course of these studies could be the basis for an effective environmentally friendly fight against phytonomus. As a result of feeding and assimilation of fertilizers through the leaves of plants, the increase in the yield of alfalfa was 16.4 to the control. These measures make it possible, without polluting the environment, to reduce the number of phytonomus on alfalfa crops and to increase the yield of this valuable forage crop. From the results obtained, it can be seen that the yield of alfalfa in the control was 54.5 c / ha, and from the experimental options - 70.9 c / ha. The saved yield as a result of the use of preparations and mixtures was 16.4 c / ha.

**Keywords:** Alfalfa, phytonomus, Helitec, bioinsecticide, plant protection, foliar feeding, urea, mineral fertilizers, harmfulness.

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### Introduction

Meat at all times has been and remains the main food product. Every house in the countryside contains pets that need food. The problem of providing animals with fodder protein has been and remains one of the most important tasks of the agro-industrial complex. Alfalfa is given priority in its solution. The practical value of alfalfa is not limited only by its fodder merits, alfalfa enriches the soil with nitrogen, is a good precursor for many crops, and reduces the effect of water and wind erosion (Ivanov 1980). In addition to the benefits of alfalfa for agriculture as feed mixtures and hay, alfalfa is also used to meet the needs of pharmacology. Alfalfa preparations help people suffering from diseases of the circulatory system, lower cholesterol levels, increase immunity, are used for exhaustion and physical weakness, normalize lactation of nursing mothers, normalize digestion, eliminate constipation, have the property of lowering blood sugar, and are also recommended for diabetics. In addition, they have a wound healing and hemostatic effect. Bowyer labeled alfalfa in his

research as a "miraculous plant" or "great healer", after he discovered in its composition the concentration of eight amino acids. It is not for nothing that Dr. F. Flatnitzer called alfalfa the "queen of forage plants".

In Uzbekistan, alfalfa is of particular value. Both as fodder for livestock and as a crop, it is an ameliorant that prevents severe salinity in our soil. Alfalfa is most needed in this region. However, the practical implementation of this problem is hindered by the lack of seed material due to the low productivity of seed crops. One of the main reasons for the significant discrepancy in the potential productivity of alfalfa grown for feed and grown for seeds practically obtained in agricultural production is the harmful activity of insects. In the regions of the Russian Federation, a significant number of works have been devoted to the study of the biology of pests of alfalfa and the fight against them in the main areas of alfalfa growing (Shatskiy, I.M. 1999, Sinitsina A.A. 2000., Artokhin, K. S. 2000., Devyatkin A. M. 2004, Prokopchuk A E, Dobrynin N D. 2014, Karpova T.L., Komarov E.V. 2018 and others). However, the problem of reliable and effective protection of alfalfa in Uzbekistan has not yet been finally resolved.

The species composition of the entomofauna of alfalfa agrobiocenosis has not been studied. Many aspects of pest biology remain insufficiently studied, and methods of pest control are not sufficiently developed and effective. Dangerous pests of alfalfa of the second and subsequent years of standing are, according to our observations and analysis of literature data: alfalfa bug (*Adelphocoris litolfus* Goeze); alfalfa beetle (*Bruchophagus roddi* Guss.), Tichius seed-eaters (*Tychius fjavus* Beck., *T. medicaginis* C. Bris, horseflies (family *Miridae*), nodule weevils (*Sitona* spp.), phytonomuses (*Phytonomus* spp.) *Elateridae*), twenty-four-point alfalfa ladybug, alfalfa moth, alfalfa gall midge, leaf aphid, etc. up to 60-65%. To prevent the harmfulness of this phytophage by the previously recommended means and methods, for some reason, in recent years it becomes almost impossible. The use of insecticides damages the environment and destroys numerous entomophages. Agrotechnical measures are not so effective that suppress a significant part of the large population of phytonomus and other pests. complex of protective measures, the search for more effective means and methods of dealing with phytonomus and other harmful organisms is topical and relevant.

The peculiarity of the natural and climatic conditions of Uzbekistan determines the bioecological features of the existence of a pest population here. A special study of pests and methods of effective protection of alfalfa from them in this region is still an urgent problem. It was the correction of the existing situation that prompted us to carry out this research. The aim of the work is a comprehensive study of the biological and ecological characteristics of the local pest

population. Influence of foliar feeding in the regulation of the number of harmful entomofauna on the growth and development of alfalfa.

#### **Materials and research methods.**

Soil and climatic conditions.

The climate of the tops plain of the Kashkadarya region is sharply continental, relatively dry, with large fluctuations in day and night temperatures. The winter is short and warm, the spring is early, favorable to the cultivation of alfalfa in the irrigated zone. The presence of abundant food creates conditions for the mass development of phytophages. Field experiments were carried out in alfalfa agrocenoses of the Kasba region, which is considered the center of the Karshi steppe.

Research methodology.

The count of the number of insects was carried out according to the method proposed by V.A. Megolev (1968). Field experiments were carried out according to the method of B.A. Dospekhova (1973).

The biological effectiveness of drugs was determined by the Abbot formula (1925).

When processing the obtained data, in order to determine their reliability, they used the guidance of A. I. Fedorov (1967).

Determination of the economic efficiency of the use of drugs against larvae was carried out according to the method of V.A. Zakharenko (1975).

When studying the entomocenosis of seed alfalfa according to the method of K.S. Artokhin (2001), the number of phytophages, entomophages and pollinating insects was determined by mowing an entomological net, and their species composition was determined according to the Keys to insects of the European part of the USSR (1978). When processing the obtained data, in order to determine their reliability, we used the guidance of A. I. Fedorov (1967), Khodzhaev Sh.T. and others. "Guidelines for testing insecticides, acaricides, biologically active substances and fungicides" 2004. Means of protection for seed alfalfa were selected according to the data of the "List of agrochemicals and pesticides permitted for use in the territory of Uzbekistan" 2012-2014. At the same time, special attention was paid to the ecological component of the preparations.

Developed by Helitec from Kenya Biologics. The eco-friendly product has recently been certified organic by CCPB in Italy.

The active ingredient in Helitec is a naturally occurring indigenous pathogen of the African moth, called the *Helicoverpa armigera* nucleopolyhedrovirus (HearNPV). Kenya Biologics Ltd. developed it as a highly effective bioinsecticide. When Helitec is sprayed on a plant, the caterpillars absorb the viral particles and become infected. The virus multiplies in the insect's body, causing the

caterpillar to die. A sluggish caterpillar bursts spontaneously, releasing millions of viral particles into the environment, ready for absorption by other caterpillars. Helitec is completely safe for humans, livestock and the environment. Extensive toxicological testing and years of intensive use in many countries has never resulted in any negative effect, and it is also harmless to natural enemies of insect pests.

The field was treated with Helitec in the afternoon to reduce UV degradation of the active ingredient.

Helitec can be applied using conventional spray equipment.

### **Research results.**

Many researchers (Loginova, 1971; Polevshchikova, 1974; Karavyansky and Sergeev, 1977; Maksimov, 1979; Akhmetzyanova R.R. 2017.) Note the positive effect of the use of liquid mineral fertilizers mixed with insecticides on crops of cultivated plants. These mixtures have a direct effect on phytopathogens and harmful organisms both in soil and plants. The solution to the problem of studying the properties of liquid mineral fertilizers mixed with insecticides, their application on alfalfa against phytonomus larvae requires a large-scale scientific research. The results obtained in the course of these studies could form the basis for an effective fight against phytonomus using environmentally friendly methods.

Foliar dressing as additional plant nutrition allows more efficient use of fertilizers, faster introduction of them into plant tissues and organs. The assimilation of nutrients occurs with the help of the leaves of the plant. Foliar feeding provides plants with nutrients during periods of intense growth. If the crops are suffering from pests, the fertilizer mixture helps to destroy them at the same time. This has been proven by many scientists (Loginova, 1971; Shuster 1979; Blagoveshchenskaya, 1989 Karavyaneky, 1990; Zhononova 2020) Some fertilizer mixtures, such as urea and ammonium nitrate (UAN - carbamide ammonium nitrate) have a pronounced insecticidal effect. On the other hand, feeding plants through the leaves, accelerating the growth and development of plants, increases their resistance to pests, as a result of which the yield increases. The use of UAN is associated with lower material costs and less pollution with biogenic elements of the environment.

The main fertilization is done before sowing agricultural crops. During this period, they undergo transformation processes in the soil, or pass into an inaccessible form, or are unproductively lost from the soil (Loginova, 2011). Here you still need to pay attention to the time of use and to abiotic factors affecting the absorption rate of the drug used. In the practice of long-term

use of urea and ammonium nitrate for foliar feeding, the best result is obtained when they are applied in the spring in the evening or in cloudy weather at an air temperature not higher than 25°C. More information in the author's recommendation. (Jononova R.N. 1998). Considering the above, in the fight against phytonomus, foliar dressings were applied with a mixture of mineral fertilizers (urea and ammonium nitrate) with Helitec bioinsecticide (half the recommended dose). Also insecticide Helitec (0.4 l / ha) was present as a new environmentally friendly bioinsecticide. In the experiments, we used a fertilizer mixture with a half dose of Helitec (0.2 l / ha). Urea was used to determine the effectiveness against phytonomus. It was noted that the urea solution is rather quickly absorbed by cultures; foliar feeding does not cause burning of leaf plates in plants (5–10 g per 1 liter of water); already 48 hours after foliar feeding with urea, the amount of nitrogen in the protein of plants increases; spraying plants with a urea solution in early spring helps to fight pests, as well as pathogens; allows you to increase the yield of plants. The implementation of the planned studies was carried out by setting up experiments, the purpose of which was to develop an environmentally friendly effective fight against phytonomus, which ensure an increase in alfalfa yield. At the experimental site, before laying the experiment, the number of phytonomus and entomophages was determined. As a result, an average of 420-425 phytonomus larvae per 100 plant stems, 0.25 - coccinellids, 1.0 - lacewing and 2 other ground beetles were identified. Field experiments were laid on March 22, 2021, on the alfalfa fields of A.G. Aminov's farm in the Kasbinsky district. In the fight against phytonomus larvae, the experiments included the following options:

1. A mixture of fertilizers (urea 2 kg / ha + Ammonium nitrate 3 kg / ha + bioinsecticide 0.2 l / ha)
2. Helitec 0.4 l / ha.
3. Urea 4 kg / ha.

The processing was carried out with tractor equipment. The volume of water for preparing the solution was 200 liters per hectare.

The results of field experiments showed before treatment the number of phytonomus larvae per 100 stems was 420-425, after treatment, on the 3rd day, the difference between the options was very significant. In the variant with a mixture of fertilizers with bioinsecticide, the number of phytonomus larvae sharply decreased and new green leaves appeared. In the variant with urea, on the 3rd day, the number of larvae also decreased and many shoots appeared. In the control variant, the number of larvae at this time increased (due to the release of larvae from the leaf axils), the leaves and buds of alfalfa were heavily infected with phytonomus (Fig. 1). Experiments have shown that the most effective against the pest was a mixture of fertilizers with bioinsecticide. In control, alfalfa had a yellow, burnt-out appearance. In this experiment, the biological efficiency of fertilizer

mixtures with bioinsecticide was 97.7%.

In the variant with urea, the biological efficiency was 70.5%, the yield increase in the variant of fertilizer mixtures with bioinsecticide was 16.4 c / ha.

### **Conclusions**

The results of the experiments allowed us to recommend a mixture of urea, ammonium nitrate and Helitec for wide industrial use in the fight against phytonomus at doses (2 kg / ha + 3 kg / ha + 0.2 l / ha).

Favorable climatic conditions of the Karshi steppe, especially warm winter, contribute to the massive development of phytonomus.

In the conditions of the Karshi steppe, on alfalfa crops, the release of beetles from wintering and the laying of eggs begin from the second decade of February, at the beginning of March there is a mass emergence of larvae. Their average number per 100 stems is at this time 68-150 pieces, later it reaches 341-449 pieces.

The application of the biological insecticide HELITEC (0.2 l / ha) and a mixture of fertilizers (urea 2 kg / ha + ammonium nitrate, 3 kg / ha) leads to an effective decrease in the number of phytonomus.

A mixture of fertilizers with bioinsecticide reduces the number of phytonomus on alfalfa on the 15th day after treatment to 97.7%.

The applied bioinsecticide Helitec sharply reduced the number of phytonomus, and the mixture of fertilizers with bioinsecticide not only suppressed the pest, but also accelerated the growth and development of plants as a result of the penetration of fertilizers into plants through the leaves. The increase in yield at the 1st cut was -16.4 c / ha.

In the conditions of the Karshi steppe, high economic efficiency is achieved when a half dose of the insecticide HELITEC (0.2 l / ha) is applied against the larvae of phytonomus on alfalfa, together with a mixture of fertilizers (urea 2 kg / ha + ammonium nitrate 3 kg / ha).

The use of a mixture of fertilizers with bioinsecticide increases the yield of alfalfa to 70.9 c / ha, while in control the yield is 54.5 c / ha, thus the yield increase is 16.4 c / ha.

A mixture of fertilizers with bioinsecticide requires less material costs than chemical and biological preparations, and ensures the achievement of high yields. At the same time, the cost of production is reduced by 2-3 times, compared with other options.

The use of a mixture of fertilizers with bioinsecticide makes it possible, without polluting the environment, to reduce the number of phytonomus on alfalfa crops and increase the yield of this valuable forage crop

Table **Biological effectiveness of promising protective agents against phytonomus**

№	Experience options	Consumption rate of the drug l / kg / ha	The number of phytonomus larvae per 100 stems							Increase in yield c / ha	Height of Stems cm.
			Before processing	Effectiveness after treatment, per day							
				3		7		15			
				things	%	things	%	things	%		
1	HELITEC	0,4	444	160	71,7	124	68,02	77,6	81,1	5,6	85
2	Urea	4	419	162	69.13	128	65,1	116	70,5	8,6	90
3	Mixture HELITEC + urea + ammonium nitrate	0,2+2+3	407	85	83,6	13,3	96,3	8,6	97,7	16,4	98
4	Control (no processing)		388,7	495	0,0	340,	0,0	360	0,0	0,0	80

**Infected plant with phytonomus. On the experimental site during the survey**



**Pic.1**





### Literature

1. Artokhin, KS Entomocenosis of alfalfa: monitoring and management. Rostov-on-Don. 2000.200 s
2. Artokhin, K.S. Mowing method with an entomological net // Plant protection and quarantine. - 2010. - No. 11. - S. 45-48.
3. Akhmetzyanova R.R. Agrotechnological methods of increasing seed productivity and seed quality of variegated alfalfa on gray forest soils of the forest-steppe of the Middle Volga region. Dissertation for the degree of candidate of agricultural sciences-2017.138s
4. Blagoveshchenskaya.ZK. Grishin T.A. Effects of liquid mineral fertilizers on harmful organisms. // Plant Protection-1989 №5.-C.55.
5. Golikov VI Bioecological bases of pollination of some field and fruit crops by bees in the Western Ciscaucasia. Krasnodar. 2000.192 s.
6. Devyatkin AM Ecological system of protection of alfalfa from pests in the Western Ciscaucasia - Dissertation for the degree of Doctor of Agricultural Sciences. 2004, 429s.
7. Dobrynin, ND - Ecological conditions for the regulation of the number of useful entomofauna on crops of perennial grasses [Text] / N.D. Dobrynin, A.E. Prokopchuk // Agricultural sciences and agro-industrial complex at the turn of the century. - 2013. - No. 1. - S. 92-94.
8. Dospekhov BA - Method of field experiment. M .: Kolos. 1973 .-- 336 p.
9. Jononova R.N., Jumanov B.J. and others - Recommendations for the use of safe methods of dealing with the leafy alfalfa elephant. (in Uzbek) - Tashkent. - 1998, - 7 p.
10. Jononova R.N. and others - Natural regulators of the phytonomus number Agrochemical protection and Plant quarantine. Journal "Scientific and practical" №2. 2020.71.
11. Jumanov B.J. Jumaev Sh.B.-Harmful influence of superparasites on the number of

bathyplectis *Batheplectis curculionis* Thoms in the Karshi steppe // Abstracts of the symposium VEO on parasitic hymenoptera entomophages -L-1992, S, -38

12. Zakharenko V.A. Methodological guidelines for determining the economic efficiency of pesticides in agriculture 1975, -S, 11
13. Ivanov I.A. - Lucerne. Moscow: Kolos, 1980.349 p.
14. Karavyansky NS Sergeev VV - Extra root dressing increases the stability of clover. // plant protection - 1977-11, -C-120
15. Karavyansky N.S. Protect alfalfa from pests and diseases. Moscow: Rosagropromizdat, 1990, 112 p.
16. Karpova T.L., Komarova E.V. et al. - Ecological protection of seed crops of perennial leguminous grasses in irrigated agricultural landscapes of the Lower Volga region-Journal Izvestia of the Lower Volga agro-university complex: science and higher professional education. No. 4.- 152-158s
17. Loginova K.M. On the issue of cabbage resistance to damage by cabbage flies // XIII International Entomological Congress - Tashkent 1971. - P.354-355
18. Maksimov I.V. The influence of mineral fertilizers on the defeat of sugar beet diseases- 1979.-P.15
19. Megolev V.A. Identification of pests of field crops. - Moscow: Kolos, 1968.-- p. 176.
20. Polevshchikova V.N. Alfalfa protection in the Uzbekistan-Tashkent irrigation zone. Fan 1977 a. s112
21. V. N. Polevshchikova. Bitoxibacillin to combat phytonomus. // Plant protection. - 1974. No. 6.-P.14.
22. Prokopchuk AE, Dobrynin ND The role of mineral fertilizers in the regulation of the number of harmful entomofauna on seed crops of perennial legumes. - Scientific journal KubSAU, No. 95 (01), 2014 215-231C
23. Sinitsina A.A-Protection of alfalfa from pests and preservation of its pollinators in the Krasnodar Territory. dissertation for the degree of candidate of b. n. -2000 167S.
24. Fedorova AI .- "Methods of mathematical statistics in biology and experimental work.", Published: Alma-Ata - 1967. -163 p.
25. Xodjaev Sh.T. and b. - Guidelines for testing insecticides, acaricides, biologically active substances and fungicides. - Tashkent. 2004. - 104 p.
26. Yakhontov V.V. Ecology of insects - Moscow: Higher school, 1969 - p. 10-45.
27. Friedrich Flatnitzer - "Lucerne: Practical advice for ensiling the queen of forage plants", brochure-2014 p-70.

28. Shatskiy I.M. Development of agricultural techniques for alfalfa variety Voronezhskaya 6 for seeds in the steppe conditions of the Central Chernozem region - candidate of agricultural sciences. 1999 year,

29. Shuster M.M. Shuster E.M. - Effect of some phenolic compounds of alfalfa on the physiological state of the alfalfa leaf elephant. // Issues of Ecology, Physiology of Insects and Problems of Plant Protection-Leningrad, -1979.-P.95-100.