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EFFICIENCY METHODS OF INSECT CONTROLS IN THE COTTON GROWING

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Abstract. Harmful insects in the cotton industry not only hurt the growth and development of the cotton crop, but also reduce the quality of the harvest. This results in a dramatic decline in crop yields caused by insects. At the same time, the quality of the crop produced by the insect-infected crop elements causes a great economic loss to cotton farms.
At the same time, pest control, as well as all agro-technical activities, must be carried out using resource-efficient methods and tools. In the agricultural sector today, resource management is becoming increasingly important and its importance is growing.
In this article, the authors reveal the problems associated with the growing shortage of natural resources and the relevance of the development of organic agriculture, as well as put forward proposals to solve these problems.

Keywords: harmful insects, ecological balance, land resources, pollution, plant protection, biological method, toxic chemicals, cotton.

Introduction. As you know, an increase in population on the planet leads to an increase in demand for food. This, in turn, leads to an intensification of agricultural production, an increase in the use of machinery, and the use of a large number of mineral fertilizers and toxic chemicals to combat diseases and pests. At the same time, the attraction of additional financial and technological resources in production, problems associated with agricultural land, livestock, flora, water sources, cause a violation of the ecological balance in the activities of the agrocenosis, as well as pose a threat to humanity.

In Uzbekistan, over the past 15 years, as a result of the diversification of agricultural land, the sown area of cotton has been reduced, by 2018 it amounted to 1108.2 thousand hectares compared to 1472.3 thousand hectares in 2005, or decreased to 75.3 percent. However, the cotton sector, which still occupies the largest part (1/3) of the total sown area, more than any other industry, uses mineral fertilizers, harmful chemicals to control pests; during the growing season, cotton aisle is 2-3 times larger processed compared to other crops, is a source of environmental problems. In particular, to increase the production of food products, the need for intensive use of agricultural land for recultivation of re-food crops, ecological cleanliness of the soil is very important [3].

In view of the above, legal documents are being adopted at the national level to solve the problem of crop rotation in the cotton industry and the necessary mechanisms are being developed for their implementation. In addition, in the system of combating insects on cotton fields, the issue of resource conservation is very relevant, since by reducing harmful insects it is necessary to reduce the cost of resources in the context of increasing (or not reducing) the quantity and quality of the cotton crop.

As a results of the fact that cotton has been cultivated in Uzbekistan for many years, diseases and pests of cotton are developing, and insects such as aphids, trips, spiders and cotton-ness have begun to grow. In recent years, large-scale economic damage has been inflicted on farms by plant-based sugars (cotton and alfalfas insects).

In the Commonweals of Independent States 650 species (170 generations) of the Miridae family are common, 13 of which are harmful to crops. As an insect, harmful insects of cotton near the quails and causes a dramatic decline in productivity. At the same time, the deterioration of the crop elements of insect-affected cotton causes a major economic loss to cotton farms [7,8].

At the same time, it should be noted that the population structure of the sugarcane and the characteristics of development during the growing season of cotton, improving the agrotechnics of cotton cultivation based on the peculiarities of harmful insects, the development of effective methods of pest control, and the economic damage to the country's economy. Development of theoretical aspects is one of the most important scientific and practical issues.

Methods and results. In Surkhandarya region, seasonal studies of species composition, distribution, nutrition, and density of herbivores, which cause serious damage to agricultural crops, have been conducted and are found in the small and medium-fiber cotton fields in the Sherabad, Angor, Termez and Kizyryk districts. The effects of field insects (Lygus protensis) on cotton yield have been observed [5].

In the course of the research, the dynamics of cotton agrocenosis in the southern and northern districts of the Surkhandarya region, including:

1. Field insects (Lygus protensis) appeared in plants much earlier than alfalfas insects (Adelphocoris lineolatus), with a delay of 40-50 days.

2. Quail density of alfalfas insect is low, increasing from spring to late July and then declining. The intensity of cotton insects has been increasing from late May to early September, followed by a natural decline [5].

The entomologists used entomologists to calculate the candles. It was found that, on average, 21.9 individuals were exposed to 10 (5 + 5) swings in the field. The average difference of repetitions was ± 5. This figure was 7.1 ± 3.8 in average when the number of insects in each plant was gradually calculated. In other words, there are 21.9 species of hair on the plant, suggesting that there are 4 seeds per plant in the field and 400 seeds per 100 plants.

As a result of the observations, five areas with a high density of cotton insects were identified in the region. In these areas, the number of cotton insects in the 100 cotton fields ranged from 150-200 to 350-400 (Table 1).

According to observations in the cotton fields, the damage of alfalfas insects (Adelphocoris lineolatus), field insects (Lygus protensis) and new species for the region (Creontiades pallidus) is significant. The most common of these species, the dominant one, is the cotton insects (Creontiades pallidus).

Density of cotton was studied in South Angor, Muzrabot and northern Denau, Uzun districts. Cotton insects in the south is estimated at 98.0- 99.0%, alfalfas insects and field candy 1.0 - 1.5%; in the north, it is found that the cotton insects is 93.0-95.0% and alfalfas insects and field candles are 5.0-7.0% [6].

The methods of combating cotton pests can be divided into the following groups (Fig. 1).

Agrotechnical methods. This method is a set of measures to strengthen the plant body through faster plant development, to compensate for insect damage faster by multiplying crop elements and at the same time preventing insect development. These include agrotechnical measures such as feeding the cotton with fertilizer solution, weed control and inter-row cultivation, to help increase insect resistance to cotton. Activities such as eradication of foci from insect repellent and proper soil handling are also important.

At the same time, it is necessary to note that today the basis of combating cotton insects in the country is the treatment of the field with toxic chemicals, and biological methods are used very poorly and inefficiently.

At the same time, it should be noted that activities aimed at combating pests with biologically based chemicals are being carried out in developed countries. The basis of this method of fighting is insect hormones and insect-specific pheromones, the most important of which is that it affects only insects.

Genetic method of combating cotton insects can be done in the following areas:

a). With regard to plants: Activities such as the creation of insect resistant varieties of plants, as well as the creation of plant varieties that do not attract insects as feed based on gene engineering.

b). With respect to insect pests: Ways to fight pests by creating weak or non-seeded offspring.

However, it should be noted that today this method is not used in the fight against cotton insects. One of the reasons is the lack of specialists, lack of knowledge and experience in this field, as well as the lack of modern laboratory equipment and reagents.

The combinational methods to combat of cotton insects should be primarily biologically productive. Within each method, different amounts of labor, financial resources, and expenditure of material resources are monitored and intangible resources are involved. Taking into account the urgency of the introduction of resource-saving methods in cotton and insect control systems, different approaches can be used to determine the cost-effectiveness of anti-bullying methods.

However, at the present stage of agricultural production, we believe that the priority of modern organic agriculture, aimed at reducing the quality of food and reducing the level of harmfulness of products to the human body, should also be assessed by the environmental assessment of pest control methods [4].

Discussions and recommendations. The following approach is used to evaluate the effectiveness of pest management methods:

Biological effectiveness of insect controls in the cotton growing. The biological effectiveness of using a herbivore in the cotton industry can be summed up in two ways:

- Firstly, biological efficiency can be determined by reducing the number of candles in each 100-bale cotton fields in the pilot areas after the application of the method of struggle;

- secondly, biological efficiency can be determined by the degree of preservation of the crop elements formed in cotton under the influence of pest control methods, as well as by the reduction in the number of candy-harvested harvest elements (cranberries and beetles). You can use the following formula (BE):

$$\mathbf{BE} = \frac{\mathbf{NCI}_{\mathbf{A}}}{\mathbf{NCI}_{\mathbf{B}}} \times 100 \qquad (1)$$

Here, BE - biological effectiveness**,**

NCI_A - number of cotton insects after each anti-cotton measure in the cotton field under test, (units);

NCI_B - is the number of cotton insects that are preceded by the anti-bullying measure for every 100 seeds of cotton in the experiment.

Therefore, it is advisable to take into account the number of insects in determining the biological effectiveness of countermeasures in the cotton fields in order to protect against the negative effects of the candle, without comparing the performance of the experimental sites and control areas. If we look at the practices in the cotton industry, the main indication that cotton farms are currently using insecticides is biological efficiency, and other aspects of the methods of fighting (economic efficiency and economic efficiency of combating) are often ignored.

The economic efficiency of handcuffs in cotton production. In assessing the economic efficiency (based on cotton yield and fiber quality) of the anti-candlestick method, it is recommended that farms use separate pitches to compare the yields of past years and the average quality of raw cotton sold.

Consequently, the effectiveness of the method of combating the harmful effects of candy on cotton farms should be determined as follows:

$$\mathbf{EE} = \frac{\mathbf{PC}_{\mathbf{X}} - \mathbf{PC}_{\mathbf{Y}}}{\mathbf{PC}_{\mathbf{X}}} \times \mathbf{100} \qquad (2)$$

Here, EE - is economic efficiency,

PC_X - the average cotton yield in the previous year (one of the non-affected years is selected), (t / ha);

PC_Y - cotton yield for current year (year of economic performance), insect infestation (t / ha).

Ecological efficiency of cotton fighting methods in cotton production. Due to the environmental problems, the method of struggle is caused by the increase or decrease of the total environmental load on the soil, water bodies and the atmosphere. In particular, environmental effectiveness should be assessed by means of a relative reduction in, or increase in, levels of pollution of soil, water bodies and the atmosphere by the use of a struggle method. It is recommended to use the following formula (EKSam):

$$\mathbf{Ec\ E} = \frac{\mathbf{TCHc}}{\mathbf{TAc}} \times \mathbf{100} \qquad (3)$$

EcE- is ecological efficiency,

TCH_C - is the cost of using the total toxic chemicals in the farm cotton industry during the anti-candle fight activities (soums);

TA_C - is the total amount of expenses incurred during the anti-slavery activities in the cotton sector of the farm (soms).

The index determined by this formula is in the range 0-1, expressed in coefficients and reflects an increase or decrease in the total cost of protection against cotton insects in cotton farms. Increasing the coefficient (approximation of 1.0) indicates a decrease in the environmental effectiveness of the insecticide treatment method used by the farm, while the decrease in the coefficient indicates the increased environmental effectiveness of the method used.

Conclusion and suggestions. Global climate change is favorable for the growth of plant pests creating new conditions for the emergence of new diseases and pests is coming. This is more of a biological method of pest control Improvement, demand for environmentally friendly agricultural products the priority of biological methods of plant protection in the future requires submission.

Protection of agricultural crops from pests and diseases The biological and chemical services are mainly cotton and grain farming greenhouses ignored) cover the affected areas completely will not allow you to Therefore, all agriculture in the regions protection of plants with full coverage of oilseeds establishing special associations to coordinate their services as intended.

Reference:

Journal article	[2] Bababekov Q, Khodzhamshukurov M., Agzamova H. Factors to reduce the harm of using chemical methods of cotton pests and increase the role of biological methods. Agro Science. J. - Tashkent, № 4. 52 p. (2016). [4] Khushmatov N.S., T. Fayzullaeva. Cost savings depend on planning. "Agro ilm", Agriculture of Uzbekistan No. 2. 56 p. (2010) [5] Kuchkarov A.Kh., Khamriev A.Sh. Kholmurodov I., Musaev D., Development and harmfulness of alfalfa bug. Uzbekistan National University news, 2011. special issue. 128-129. (2016)
Book chapter	[7] Puchkov V.G. the most important horsefly bugs are pests of agricultural crops. Kiev, (1968) [8] Puchkov V.G. Hemoptera, horseflies, or myrinds (group overview). Plant protection. №. 12. 33-36 p. (1973)
Recommendations	[1] Alimukhimedov S.N., Khodjaev Sh.T., Eshmatov O.T. Recommendations for the control of harmful bugs that populate cotton. Tashkent, 14 p. (1984) [6] Ochilov R.O., Bobobekov K., Sagdullaev A.U., Khozhayev Sh.T., Sattarov N.R. Holmato B.R. Musaev D.M. measures to control harmful insects in the conditions of Surkhandarya. (recommendation). Tashkent, 18 p. (2016)
Others	[3] Information of the Ministry of Agriculture of the Republic of Uzbekistan (2007-2017 years).

Table 1

Dynamics of cotton insects (Creontiades pallidus) in cotton agrobiocenosis of Surkhandarya region

№	Districts	Distribution of harmful insects																	
		April			May			June			July			August			September		
		I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
1	Angor	-	-	-	-	-	-	-	-	-	-	+	++	++	++	++	++	+	+
2	Denov	-	-	-	-	-	-	+	+	+	+	++	++	++	++	++	++	+	+
3	Jarkurgan	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
4	Qyziryk	-	-	-	-	-	-	+	+	++	++	++	++	++	++	++	+	+	+
5	Qumkurgan	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
6	Muzrabad	-	-	-	-	+	+	++	++	+++	+++	+++	+++	+++	+++	+++	+++	++	++
7	Altynsay	-	-	-	-	-	-	-	-	+	+	+	+	+	++	++	+	+	+
8	Saraosiyo	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+
9	Termez	-	-	-	-	+	+	+	+	+	+	+	++	++	++	++	++	++	+
10	Uzun	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+
11	Sherabad	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
12	Shurchy	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+

Legend: - unobtrusive, + dilute, ++ moderate, +++ widespread

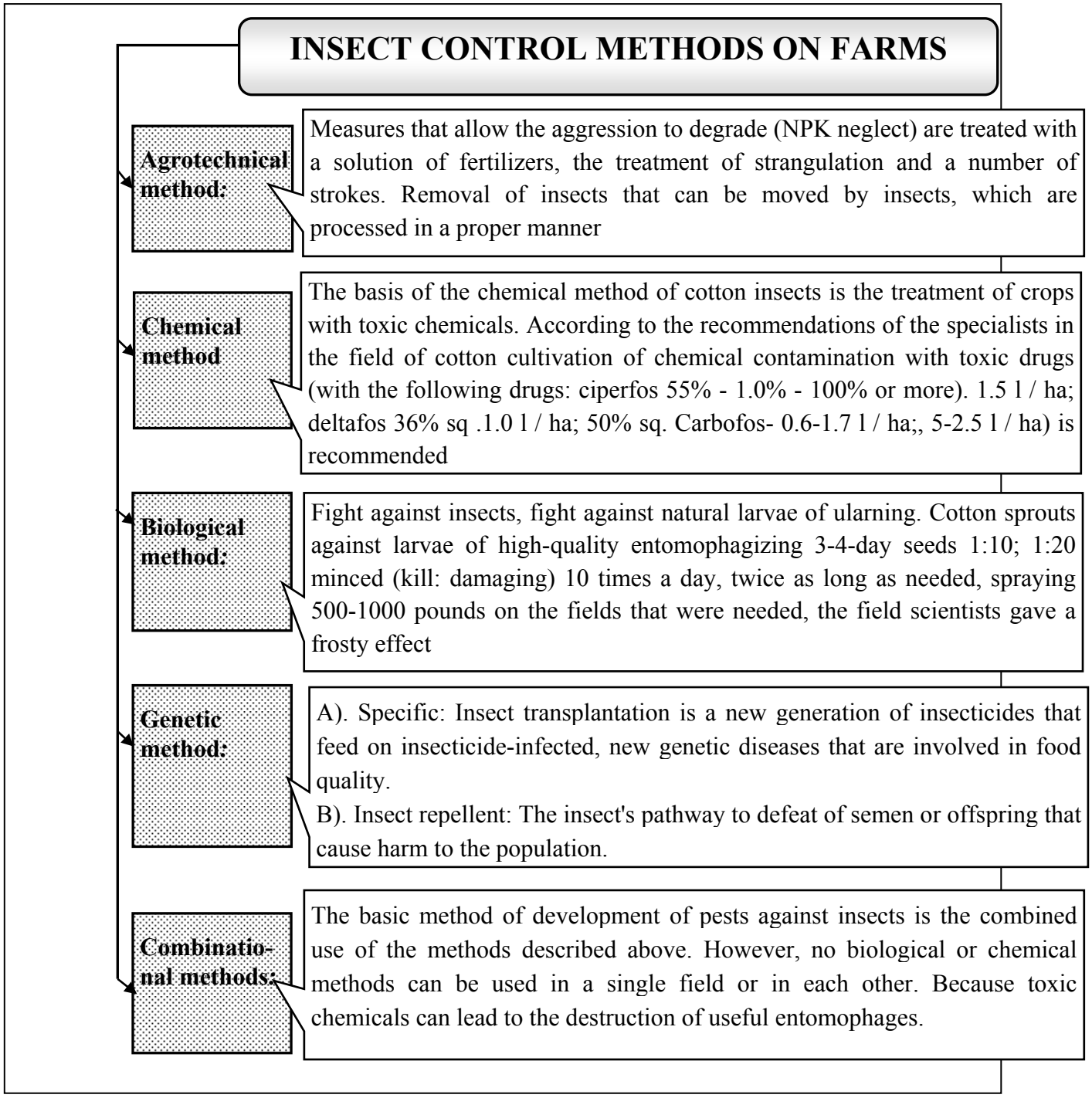

Figure 1. Insect control methods on farms