

## TRICHOGRAMMA AND ITS INFLUENCE ON THE NUMBER OF CABBAGE MOTH IN SOUTH KAZAKHSTAN REGION

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This article describes the application of the biological method which will take an important place in the integrated system of plant protection in the Republic of Kazakhstan. In comparison with chemical, it does not require large energy costs, does not lead to contamination of agricultural products and the environment, does not violate the ecological balance. Currently, special attention is paid to the development of environmentally friendly methods of plant protection, namely the biological method. This article provides a description of Trichogramma, the natural enemies of cabbage in South Kazakhstan region. Treatment with Trichogramma cabbage. The entomophage is of great economic importance and independently suppresses the propagation of the pest of cabbage is the cabbage moth. Ecological links of insects were studied in the cabbage field biocenosis. Observations were carried out against pests of cabbage in South Kazakhstan region such as the cabbage cutworms (*Barathra brassicae* L.), cabbage white (*Pieris brassicae* L.), cabbage moth (*Plutella maculipennis* Curt.), cabbage aphid (*Brevicoryne brassicae* L.), cabbage flea beetles.

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Economic efficiency and prospects for the introduction of biological methods of plant protection in the agricultural formations of South Kazakhstan region lead to a decrease in losses and obtain a larger volume of high-quality crops.

The greatest interest in biological methods of plant protection in the Republic of Kazakhstan is associated with the trends of General greening of the environment, effective use of natural resources, concern for the health of the nation. Despite the progress made in the field of crop protection, according to FAO (food and agriculture organization of the United Nations), pests and diseases kill about 30% of the crop each year. Only on vegetable culture there are hundreds of pests. Of them are particularly dangerous scoop, aphid, whitefly. For example, in South Kazakhstan due to the cotton aphid is killed 40-50% of crops and whiteflies and mites putiny eat 15-20% [1].

Due to the sharp temperature difference characteristic of South Kazakhstan region, fruit trees, vegetable crops are attacked by aphids. The traditional culture of growing vegetables and gardening formed on the territory of South Kazakhstan region is based on the methods of agriculture using local fertilizers. To date, the area of application of biological plant protection has increased, resulting in improved crop quality and increase its volumes. However, it should be noted that the biological method of plant protection contributes to the conservation of biological balance and the restoration of biological diversity.

One of the main methods of biological plant protection method is to preserve and

improve the efficiency of entomophages and beneficial microorganisms. The enrichment of agricultural lands beneficial organisms is also widely used in plant protection. This action is carried out by means of methods of seasonal colonization, resettlement and acclimatization of useful organisms by means of application of industrial forms of biological preparations.

Identification of useful biological agents is an integral part of the integrated plant protection system, which involves: control of the phytosanitary state of the environment, a set of agricultural activities, including the cultivation of pest-resistant varieties, the use of environmentally friendly bioagents [2].

An important area of observation of populations of harmful organisms is the detection of insect diseases. These data allow us to accurately predict the viability of populations and to choose the right protection measures to be effective in this situation.

Currently, special attention is paid to the development of environmentally friendly methods of plant protection, namely biological method. The biological method of pest control is based on the use of living organisms and their products.

Thus, it should be noted that the prospects for the use of biological methods in rural areas of Kazakhstan have been steadily increasing in connection with the tasks, and the results of developments in the application of biological plant protection products indicate the prospects of their use in programs of integrated management of a number of pests, aimed at the restoration and maintenance of the biocenotic equilibrium in agroecosystems.

As experience has shown, the use of biological plant protection method is much more effective and cheaper than chemical protection and it can be used not only in the cultivation of cotton, but also vegetables and fruits. In the past, Kazakhstan used a lot organochlorine drugs grade DDT is a hexa-chlor drugs, medications, chlorinated diene terpenes and chlorinated insecticides. Material cumulation was observed, i.e. accumulation of toxic substance in the organism as a result of repeated treatments. The ability to material cumulation characterized by many drugs from the group of organochlorine compounds and mercury preparations.

Over the past 20 years, the use of pesticides in agriculture has decreased dramatically. But the problem of so-called "historical" pollution still remains acute. The fact is that hexachlor and dust both lay and continue to lie where agricultural products were grown – on arable land and even in greenhouses. In those days, we ourselves produced these preparations for the destruction of agricultural pests [3].

The use of pesticides is demanded by the commercial interest of industrial agricultural production, which is focused on simple indicators such as resistance and the size of the crop, its storage and resistance to transportation. But not considered significant decline in such qualities of the products obtained as the trace element composition, the usefulness and safety of consumers. The destruction of biocenoses in pesticide use areas has also become a global problem.

Toxicological residues of pesticides in food products of animal and plant origin and their derivatives metabolites exceeded several times the permissible norms. Toxic chemicals bring instant effect, but they can give a good effect only once, then there is an addiction to pesticides, that is, the second and third time the pests already react poorly to them. When spraying, by the way, they get only 5% of the drug, the rest – in the soil.

Biological agents and biological products are not aimed at the complete destruction of pests, but rather to regulate their number. Each species of living organisms has its own diseases and enemies, which we use in the biological protection of plants. Note: when we talk about diseases of insects, only those that are not harmful to non-target fauna.

Biological approaches, at first glance, are not as effective as chemical "weapons", but their effect is long and natural for nature. Earlier, for example, on cotton fields of Maktaaral

district of South Kazakhstan region there were hundreds of bio-factories, but after the collapse of the Union they were forced to move to pesticides. Firstly, it is cheaper, secondly, there is a momentary effect. However, every year we have to increase the dose and frequency of treatments with chemicals. Today, cotton producers have to carry out 8-9 treatments to achieve the effect. This, of course, can not like the residents of the area.

The Institute's scientists are asked by farmers and residents of the region to stop the use of pesticides. It is appropriate to say that about 200 million tenge is allocated annually from the state budget for the chemical control of only one pest – cotton scoop. But these targeted costs no longer achieve the desired results, as chemical insecticides have little effect on the pest.

In the future, this biological method will take an important place in the integrated plant protection system, as compared with the chemical it does not require large energy costs, does not lead to contamination of agricultural products and the environment, does not violate the ecological balance.

Since 2013 began to work on the Republican program for subsidizing of biological agents – beneficial insects. We have set a course for the revival of bio-factories, for the development of bacterial, viral and fungal drugs, and, of course, useful insects.

Now the question of the quality of bioagents, which are mainly imported from Uzbekistan, is acute, although in the South of Kazakhstan there are already a number of their own biofabrics.

In Uzbekistan, toxic chemicals are practically prohibited-they rely on bioagents. Therefore, together with its collective and state farms, the Republic has preserved bio-factories. In addition to cotton, there are grown silkworms, for which pesticides are extremely harmful. The bio-mills they have officially 1250. Russia produces more than one hundred of biologics.

A colleague from the Arab Emirates, Professor Khalid Bahri, demonstrated at the conference a laboratory, through which scientists not only identify pests at the gene level, but also expose all the data on a publicly available website – so that the world, buying products from the UAE, knows about pests, weeds and plant diseases, which, once in a favorable climatic environment, I think we should follow the example of our colleagues and get the same laboratory to successfully fight quarantine facilities.

The main task is to develop recommendations and an integrated system for the control of harmful organisms.

In scientific research Institute of protection and quarantine of plants of Maktaaral district of South Kazakhstan there is a Biofactory for the production of insects-entomophages. Laboratory of biological methods of plants in 2015-2017 work was carried out to identify enemies, their impact on pests of cabbage and on the use of the most important of them in the development of integrated methods of protection of cabbage against pests.

Species composition of harmful and useful insects inhabiting the anthropogenic ecosystems and agricultural crops are discussed in several papers [4]. It is established that their number in nature is governed by 40 kinds of primary and secondary entomophages.

In Kazakhstan, the species composition of entomophagous and their role and regulation of pest population of cabbage has not been studied.

This article presents data on the species composition and agrobiocenosis cabbage fields, relationships, phytophages and entomophages, highlights issues of colonization of *Trichogramma* and conservation of beneficial fauna on cabbage fields.

Each year observations were carried out on a stationary phase of cabbage by weekly surveys from the beginning of the growing season and before harvest 90 cabbage plants late cabbage.

Cabbage is the main vegetable culture, cultivated in all climatic zones of Kazakhstan. White cabbage is valued as a food and feed crop, widely cultivated in all regions of Kazakhstan, is a product of mass consumption. Food has the head – apical enlarged bud.

Cabbage is a source of carbohydrates, proteins, mineral salts (calcium, potassium, phosphorus, iron), vitamins C, PP, B group, carotene, organic acids and other valuable substances.

The largest areas are occupied by cabbage in Akmola, East Kazakhstan, Almaty, Zhambyl, Kostanay, Pavlodar and South Kazakhstan regions [5].

Wide distribution of it is promoted by high productivity, good keeping quality, resistance to low temperatures, transportability.

In specialized vegetable farms of cabbage, a cost – effective culture: using the cover film, different ways of growing plants (without potting and potting), different dates of transplanting and sowing seed in the open ground, the organization of secure storage of cabbage in

fresh form during autumn winter and spring you can create a year-round supply of the population of this valuable products.

In the southern regions of Kazakhstan, early maturing cabbage varieties are grown in a seedling way to obtain a very early and early harvest.

Maktaral farmers, who collected the first harvest in April last year, provided cabbage to several regions of the Republic and Russia. However, Maktaral farmers also grow Dutch cabbage “Pandion”, the weight of which does not exceed 1-1.5 kg. This product is in demand among Russians and Europeans.

It should be noted that last year in Maktaaral district vegetables were grown on 3877 hectares, on average, from 231.3 quintals 89 689 tons of products were collected. Of these, more than 50 thousand tons – cabbage.

From specialized pests of cabbage in South Kazakhstan region are cabbage cutworms (*Barathra brassicae* L.), cabbage white (*Pieris brassicae* L.), cabbage moth (*Plutella macilipennis* Curt.), cabbage aphid (*Brevicoryne brassicae* L.), cabbage flea beetles.

All of these types can give mass outbreaks. In South Kazakhstan region in 2015, there had been a mass reproduction of the cabbage white, in 2016 – cabbage moth.

We made observations of the cabbage moth. Cabbage moth prefers the vegetable cabbage and its relatives of the cabbage family. Gardeners don't like its law – it can completely deprive the crop.

Dates of departure of butterflies cabbage moth in the spring of pupa due to weather conditions, but as a rule, it is the beginning of may. The spring generation of cabbage moth is mainly not numerous. Butterflies soon after departure mate and lay eggs one by one or in small groups on the leaves of cabbage weeds, and then on the cultivated vegetation. After the revival of the caterpillars gnaw mines in the tissues of the leaves, and after 2-3 days crawl to the surface and eat on the underside of the leaves. They gnaw out small areas of leaf tissue and leave the cuticle. The damage looks like Windows covered with a transparent film. The greatest number of caterpillars of cabbage moth on cabbage appears in July-August. The most dangerous damage that cause caterpillars in the phase of formation of “hearts” of cabbage.

We have investigated that older caterpillars sometimes move from the leaf area to the middle parts of the plants, sometimes damaging the growth point, the crown is not formed. For the season develops

3-4 generations of the pest. Dates of departure of butterflies cabbage moth in the spring due to weather conditions, but usually it is the beginning of May. The spring generation of cabbage moth is mainly not numerous. Butterflies soon after departure mate and lay eggs one by one or in small groups on the leaves of cabbage weeds, and then on the cultivated vegetation. After the revival of the caterpillars gnaw mines in the tissues of the leaves, and after 2-3 days crawl to the surface and eat on the underside of the leaves. They gnaw out small areas of leaf tissue and leave the cuticle. The damage looks like windows covered with a transparent film. The greatest number of caterpillars of cabbage moth on cabbage appears in July-August. The most dangerous damage that cause caterpillars in the phase of formation of "hearts" of cabbage. Older caterpillars sometimes moving from the region of leaves on middle parts of the plants, sometimes damaging the growing point, the crown is not formed. For the season develops 3-4 generations of the pest.

Does the pest in fields and gardens completely unattractive, like all moths. The color of wings are gray-brown. On the wings there is a bright picture. The size of the wings does not exceed 8 mm, and the rear fenders are different from the front by the presence of fringe.

The coloring of the butterfly is perfect in order to be completely invisible on the plants. Flying mole is bad, and so far from the place of supply is not flies. As a rule, she spends her entire life in the area where hatched from the pupae. The butterfly emerges in April-June. It feeds on plant SAP, which is a parasite. The butterfly flies in the evening, during the day she hides.

We have investigated that the butterfly lays its eggs on the leaves, attaching them on the underside. Small eggs – 0.4 mm, green. Lay butterfly eggs is about 10-20 days in the spring. After 3 days of egg out of the caterpillar is green with a length of 12 mm. The caterpillars dwell on the leaves. After two weeks of the caterpillars formed a chrysalis, and after 2 weeks the pupae emerge the butterfly. The whole cycle is 35 days. So a season can bring out the 6 offspring of the moth. That is why this pest is considered to be so dangerous – since April-the month mol devastates the gardens [6].

Overwinter pupae of butterflies and the butterflies in the weeds and the remains of garden plants of the cabbage family. Therefore, the responses must include the cleaning phase in the fall of all plant residues.

Most damage to garden plants damage the moth, and its larvae – the caterpillars. They feed on the leaves of plants. In result, the plants don't just lose the look. Cabbage, moth damaged, poorly stored and quickly deteriorates.

Heaviest moth attacks plants in the hottest time of the summer. Damaged leaves lose their ability to proper metabolism and prone to burns from the sun. Also the caterpillars eat the ovaries and buds. They damage the crops, significantly reducing it.

Occurring oviposition, caterpillars and pupae of cabbage butterflies, cabbage moths and moth of cruciferous bugs were collected from nearby cabbage plants in the amount of at least 50-100 copies, were transferred to the insectarium, in cages, watched the development. The percentage of infestation by parasites of caterpillars of Lepidoptera was determined by autopsy.

However, the next year after the mass breeding of some species drops sharply, and pests do not cause significant economic damage to the cabbage crop.

This happens largely as the result of useful activity of parasites and predators, which in the agrobiocenosis of the cabbage field are effective regulators of the population of many harmful types.

We have studied the types of trichograms common in South Kazakhstan region. These are very small insects up to half a millimeter long. The peculiarity of these insects is that their larvae develop only inside the eggs of other insects. For procreation, the females living for up to five days, the entire period of his life looking for the eggs of insects pests. Each female can lay up to 40 eggs. The period of development from egg to adult insect in trichograms is about 20 days. The research Institute produces trichograms in the form of packets with eggs of grain moth infected by this insect. Such a package usually contains up to fifty thousand individuals and it is stored in the refrigerator so that the trichograms do not fly prematurely. 1-2 days before the release of the package is placed in a warm place to adult insects began to lay eggs. For release use a simple device—a half-liter jar with finely chopped paper poured inside (1-2 cm) and the contents of the packages, the Bank is covered with gauze and put on infected crops. Each Bank should account for no more than 200 square meters of field. The rate of production of trichograms is taken into account from the average number of eggs of pests in the cultivated field.

Effectiveness of Trichogramma in the fight against Cabbage moth

Options	Inspection of plants, pieces	Found the egg-bed sites, pieces	Them eggs, pieces	Infected Trichogramma, pieces	The percentage of infection	Inspected the heads before cleaning, pieces	Damaged, piece	The percentage of damage
Dark Trichogramma 0.5 g/ha – Trichogramma evanescens Westw.		5	125	100	70	95	12	7
Male yellow Trichogramma, 0.5 g/ha – Trichogramma euproctidis Gir.		4	95	50	58	95	31	15
Devil male yellow Trichogramma, 0.5 g/ha -Trichogramma embryophagum Htg.		4	60	17	24	95	49	24
Control	90	6	161	0	0	95	60	30

We recommend that with an average contamination of 100 eggs per square meter to produce 50 thousand insects per hectare, reducing or increasing consumption depending on the actual calculation of the number of pests. Recently, methods of mechanized distribution of trichograms on the field have been developed: spraying of infected eggs with water or wet sawdust, scattering of paper capsules with trichograms Packed in them. In the field eggs of the cabbage moth infect the following types of trichogramma – Dark Trichogramma (Trichogramma evanescens Westw.), Male yellow Trichogramma (Trichogramma euproctidis Gir.), Devil male yellow Trichogramma (Trichogramma embryophagum Htg.). Trichogramma developing inside infected eggs of insect pests. A parasitic way of life are only the larvae and adult insects feed on nectar and dew. Affected Trichogramma eggs after a few days turn brown.

Through research in the laboratory of biological control, we have experience in breeding and use in the fight against cabbage moth forms Trichogramma (2016).

Against cabbage moths produced Trichogramma: 0.5 g per 1 ha (90 thousand individuals per 1 ha). Removing control from experienced plot was 60 m. The Area of cabbage – 40 ha, each variant of 8 hectares. The Production was

held on 25 June during the mass oviposition of the cabbage moth. Three days after release were accounted for by infected eggs (table).

As can be seen from the table data form of Trichogramma (Trichogramma evanescens Westw) has infected 70% of the eggs of the cabbage moth, thereby reducing the damage of the cabbages to 7%; in the control the damage was 30%.

Trichogramma (Trichogramma evanescens Westw) is quite effective in reducing the number of this pest in the seasonal colonization.

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