«Сейфуллин оқулары – 18(2): «XXI ғасыр ғылымы – трансформация дәуірі» халықаралық ғылыми -практикалық конференция материалдары = Материалы международной научно-практической конференции «Сейфуллинские чтения – 18(2): «Наука XXI века - эпоха трансформации» - 2022 .- Т.I, Ч.IV. – Р.106-109

ENVIRONMENTAL AND ECONOMIC EFFICIENCY OF THE APPLICATION OF BIOLOGICAL MEANS OF PLANTS PROTECTION

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The purpose of the work is to substantiate the economic efficiency of the use of biological methods of plant protection, to identify its positive and negative aspects, to summarize foreign experience in the use of biological methods in plant protection, to analyze the development of rural areas, taking into account their natural features, economic and social conditions, to draw up a map of Kazakhstan and Poland on crop production, summarizing the socio-economic factors that ensure the environmental safety of crop production;

Today's problems lead to the creation of a unanimous opinion on the need to form an ecologically based plant protection system based on the non-use of strong technologies based on agricultural chemistry. The created sets of agents have many useful qualities. Not to mention the variety of actions for their formation all over the world and in the Commonwealth of Independent States, a greater number of plant protection agents have been developed, in different scope and process of exposure.

Today, among microbial insecticides, most are bacterial agents, and agents based on different strains of Bacillus thuringiensis predominate in their number. In different states, research has been developed and new agents based on environmental antagonists and phytopathogens, most of which are representatives of soil microflora, have been developed. Not to mention that in these studies began in the middle. XX century, and today have reached a good development.

Orientation of crop production towards environmental safety, resource and energy saving and profitability implies a reduction in the pesticide load in agrobiogeocenoses, primarily due to the biologization and ecologization of the production and environment-forming functions of agroecosystems and agrolandscapes. Biological methods and means of plant protection occupy an important place among the biologization factors. One of the directions of the biomethod is the use of entomophages, which, along with other entomopathogenic

organisms, regulate the number of phytophages, maintaining the biocenotic balance in agroecosystems.

The use of the biological method of plant protection is much more efficient and cheaper than chemical protection, and it can be used not only in the cultivation of cotton, but also in vegetables and fruits. For the economic justification of the organization of protective measures in the country, determining the rational level of use of pesticides, the need for chemical, biological and microbiological agents, equipment for their application, storage facilities for storage, vehicles for transportation, it is important to address the following issues: assessment of the potential hazard of crop losses from pests, pathogens and weeds at a specific level of agriculture; assessment of the economic efficiency of using plant protection products to prevent crop losses; search for ways to increase the economic efficiency of the use of plant protection products.

Economic efficiency or significance of the work - the greatest interest in biological methods of plant protection is associated with trends in the overall greening of the environment, the efficient use of natural resources, and concern for the health of the nation. At the same time, the biologization of agriculture involves the use of biological means in order to increase soil fertility and increase the yield of crop products. Scientists have proven that the economic efficiency of using biological methods of plant protection is 70-80% effective compared to chemical protection products.

When carrying out measures to protect plants, it is advisable to calculate the effectiveness of the use of bioagents [1]. Within this concept, there are:

– technical (biological) efficiency, determined through the mortality of harmful organisms, reduction of damage or infestation of plants (%);

- economic efficiency, estimated in the form of an increase in yield due to the use of bioagents (c/ha);

- economic efficiency calculated by compiling the costs of carrying out plant protection measures with the cost of the produced crop (r/ha).

The technical, or biological, as well as the economic and economic efficiency of a drug or technological method are the main indicators on the basis of which a decision is made about their competitiveness and introduction into production.

Plant protection is an obligatory link in the system of measures for growing high crop yields. Its effectiveness largely determines the efficiency of crop production. The intensification of agriculture requires more perfect and reliable methods of plant protection, the implementation of which requires large sums of money. This, as well as the need to determine a rational combination of preventive (agrotechnical, breeding and quarantine) and destructive (chemical, physical, mechanical and biological) methods of plant protection, make the task of cost-effective use of plant protection products one of the most important[2].

Research including Kazakhstan and Polish experience in the use of bioagents, to substantiate and calculate the effectiveness of the use of biological methods, to summarize the results of research are a topical issue.

An important role in improving the efficiency of agricultural production is played by the plant protection system. In the crop industry of the Republic of Kazakhstan in the fight against pests, the leading position is occupied by the chemical method of control, which involves the use of synthetic organic pesticides. Their widespread use in practice leads to pollution of water bodies, and soils, and the accumulation of harmful substances in crop products, which subsequently have a negative impact on human health (cause various oncological and allergic diseases, infertility, and pathologies in newborns, etc.). resistance to pesticides of pests of plants, the efficiency of their application decreases.

The scale of application of the biological method of plant protection in the protected ground is increasing from year to year. For example, in some federal states of Germany, the share of the biological method of controlling plant pests reaches 97% of the complex plant protection measures [3]. Almost all greenhouses use lacewing larvae, riders, or predatory mites. At the same time, biological preparations can be used in the fight against plant diseases and pests in greenhouses: verticillin in the fight against greenhouse whiteflies, thrips, and aphids; trichodermin - root rot, white rot, black leg, and root rot; rhizoplan - bacteriosis, root rot, powdery mildew, bitoxibacillin - spider mites [4].

The development of a system of biological plant protection, and the introduction of a biomethod into agricultural practice is the most topical issue. Thanks to the efforts of domestic scientists of the Kazakh Research Institute of Plant Protection and Quarantine, a modern biological laboratory was created in 2010 in the Maktaaral district of the South Kazakhstan region. On the territory of the region as of 01.10.2017. there are 10 biolaboratories and 9 biofactories for the production of beneficial insects-bioagents: Bakhyram kazhy, Kulanda, Zhanar, Inter-T LLP, Ketebay, Altyn Koz, South Kazakhstan Experimental Biofactory, Toikul ", "Alatau", "Zhetisay", "Atakent", "Ak-altyn", "Nesibeli", LLP "BIO LIFE", etc [4].

All biofactories and biolaboratories produce products mainly for the protection of cotton.

Pest control is carried out by multiple resettlements of beneficial insects that breed in biological laboratories. All fields of cotton are processed on average 9-10 times.

According to biofactories and biolaboratories of the South Kazakhstan region, the average cost of production of biological plant protection products: 1 gram of trichogramma 310 tenges, 1 habrobracon 2.48 tenge, 1 lacewing 1.75 tenges. If we take into account that the percentage of reduction in the cost of one unit of subsidized bioagents and biological products purchased from bioagents suppliers is currently 40%, then the cost of biological protection of cotton, respectively, is reduced by 40%. As simple economic calculations show, the cost of bioagents per 1 hectare of cotton will amount to 8643 tenges (3714+2481+2448). The amount of the subsidy is 3457 tenge, and the actual costs of raw cotton producers for pest control will be 5186 tenges. For comparison, the cost of effective chemical plant protection products on the market for the treatment of 1 ha of plants averages 15,650 tenges. This clearly shows that the use of biological methods of plant protection is almost 2 times more cost-effective, taking into account state subsidies - three times. As

experience has shown, the use of the biological method of plant protection is much more effective and cheaper than chemical protection, and it can be used not only in the cultivation of cotton but also in vegetables and fruits [4].

In order to increase the effectiveness of the biological method, it is important to strengthen control over the technology of production and use of biological agents, in particular, over high-quality breeding, timely use of entomophages and biological preparations, and over the maximum and priority use of incoming microbiological agents. At the same time, it is necessary to clearly organize work in laboratories and bioshops, aimed at a comprehensive increase in labor productivity.

From January 1, 2014, Polish farmers have integrated plant protection, where more attention will be paid to alternative plant protection in connection with the use only chemical plant protection products against pests Currently, 10 biological and biotechnical plant protection products are registered in Poland (including 4 products containing bacteria, 2 products containing viruses, 2 products containing fungi, 1 natural plant protection product and 1 product based on chitosan obtained from mold fungi or mollusc shells) [5].

In Poland, biological protection has a long tradition, and Polish scientists have developed the technology for the production of many biological products, only a part of which has been produced and used on a larger scale.

For the economic justification of the organization of protective measures in the country, determining the rational level of pesticide use, the need for chemical, biological and microbiological agents, equipment for their application, storage facilities for storage, and vehicles for transportation, it is important to address the following issues:

1) assessment of the potential danger of crop losses from pests, pathogens and weeds at a specific level of farming;

2) evaluation of the economic efficiency of using plant protection products to prevent crop losses;

3) search for ways to increase the economic efficiency of the use of plant protection products.

Scope - the results of the conducted research can be used in practical work on the organization of biolaboratories by specialists and leaders of agricultural formations, as well as government authorities when making decisions at the regional and republican levels.

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