УДК: 330

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THE ROLE OF BIOLOGICAL RESEARCH IN THE DEVELOPMENT OF A GREEN ECONOMY

The loss of opportunities to authorize the use of pesticides and environmental pollution has led to increased attention to the search for alternative means and methods that support natural pest control. The reorientation of plant protection systems should be specified at the regional level, taking into account the specialization of agriculture and climatic features. Most experts in many countries of the world believe that stable reduction of pests in agrocenoses can be achieved only by integrated plant protection, which includes pest control. According to various estimates, yield losses from pests reach 20-35% annually. [1]. Integrated plant protection is based on a harmonious combination of all known and developed methods (chemical, organizational and economic, agrotechnical, immunological, biological, etc.), and in modern conditions the emphasis is placed on the maximum use of biological resources. One of the main objectives of integrated plant protection is to create in the fields an optimal biocenosis environment for beneficial fauna, which is primarily an increase in the role of predators and parasites. This can be achieved by targeting the agrobiocenosis.

Key words: *green economy, pesticides, phytopha, entomophage, agrolandscape agrocenoses, preparations attractants, repellents, phytosanitary conditions.*

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ЖАШЫЛ ЭКОНОМИКАНЫ ӨНҮКТҮРҮҮДӨ БИОЛОГИЯЛЫК ИЗИЛДӨӨЛӨРДҮН РОЛУ

Макалада өсүмдүктөрдү коргоонун биологиялык ыкмасынын мааниси дүйнөдөгү жашыл экономиканын өнүгүү перспективаларынын бири катары каралат. Экологиялык таза айыл чарба өндүрүшүнө өтүү үчүн агрардык илимди өнүктүрүүнүн заманбап багыттары талданат. Тарыхый аспект биологиялык дары-дармектерди жана биологиялык агенттерди колдонуу практикасын карайт. Химиялык дарылоону колдонууга дифференцияланган мамиле сунушталууда, аны ишке ашыруу зыянкечтерди жайылтуу борборлорунда, чек ара аймактарында жана кармоо зоналарында гана мүмкүн болот, бул пестициддерди колдонууну дээрлик эки эсеге кыскартат. Пайдалуу энтомофаунанын сугарып жаткан агроландшоктордо мейкиндикте бөлүштүрүлүшүн изилдөө боюнча талаа изилдөөлөрүнүн натыйжалары көрсөтүлдү, агроценоздордо жана табигый агроландр устундарында энтомокомплекстин пайдалуу түрлөрүн кайра бөлүштүрүүнүн эсебинен агроценоздордо түрлөрдүн ар түрдүүлүгүн жана пайдалуу курт-кумурскалардын (энтомофагдар жана мителер) санын көбөйтүү жолдору көрсөтүлдү.

Өзөктүү сөздөр*: жашыл экономика, пестициддер, энтомофаг, агроландшафттык, агроценоз, аттрактанттар, репелленттер, фитосанитардык шарттар.*

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РОЛЬ БИОЛОГИЧЕСКИХ ИССЛЕДОВАНИЯ В РАЗВИТИИ ЗЕЛЕНОЙ ЭКОНОМИКИ

В статье обсуждается важность биологического метода защиты растений как одной из перспектив развития зеленой экономики в мире. Проанализированы современные направления развития сельскохозяйственной науки для перехода к экологически чистому сельскохозяйственному производству. В историческом аспекте рассмотрен опыт применения биологических препаратов и биологических агентов. Предложен дифференцированный подход к назначению химических обработок, их проведение только в очагах распространения вредителей, на пограничных землях и в зоне отлова, что позволяет почти вдвое сократить использование пестицидов. Представлены результаты полевых исследований по изучению пространственного распределения полезной энтомофауны в орошаемых агроландшафтах, показаны пути увеличения видового разнообразия и численности полезных насекомых (энтомофагов и паразитов) в агроценозах за счет перераспределения полезных видов энтомокомплекса в агроценозах и естественном агроландшафте.

***Ключевые слова**: зеленая экономика, пестициды, энтомофаг, агроландшафтный, агроценоз, аттрактанты, репелленты, фитосанитарные условия.*

The aim of the study is to find ways to improve the effectiveness of biological method of plant protection in countries that promote the importance of organic agriculture and the development of green economy in rural areas. The materials of the study are Russian and foreign works in the field of biological protection of plants and the use of biological method in agriculture, as well as statistical data on the indicators of agricultural development. The study uses the methodology of system analysis.

Seven main directions of «Zhasyl Yel» economic development are currently envisaged in order to improve Kazakhstan's infrastructure, increase the efficiency of funds, predict the increase in the welfare of the population. The first direction is the introduction of renewable energy sources. The second direction is energy efficiency in the housing and utilities sector. The third direction-organic agriculture in agriculture.The fourth direction-improvement of waste management system. The fifth direction-improvement of water management systems. The sixth direction-development of "clean" transport. The seventh direction-conservation and effective management of ecosystems more and more attention is given to development and application of organic agriculture technologies in agricultural production. In this article we will talk about the development of the direction of organic farming in agriculture.In all countries of the world there is a growing demand for organic products.

The scientific literature notes the inadmissibility of the use of genetically modified synthetic growth regulators and pesticides in organic farming. All of the above suggests the expansion of the use of biological plant protection products. [2,3]. Kazakhstan agricultural science also defines the transition to a highly productive and environmentally friendly agricultural production as one of the priorities of its development, which is undoubtedly associated with the development of new high-quality and safe food based on the use of environmentally friendly methods of plant protection. Every year there is an increase in the areas under purely organic or biological farming. The use of new safe biopreparations in agricultural production in farms of different forms of ownership, the efficiency of which increases every year due to the introduction of new scientific research results, allows to reduce the pollution of agricultural landscapes with chemicals. Plant protection products, solving the problem of insect pest resistance to insecticides. With the expansion of the use of biological preparations it is possible to restore and increase the suppressive capacity of soils, improve the soil microbiocenosis in agricultural landscapes. All this creates a basis for the development of organic farming and production of environmentally friendly products.

Of particular importance in the further development of biological methods of plant protection is the expansion of scientific research related to the study of the influence of biological characteristics, in which beneficial arthropods (predators and parasites) play a leading role. The results of scientific research on the use of biological agents such as arthropods, nematodes, beneficial microflora, as well as on the study of ecological and biological characteristics under complex epiphytotic, invasive and epizootic conditions will be of great importance. The requirement to protect beneficial animals is usually very important when dealing with pesticides that kill more than just pests. Among agricultural plant pests, insects are the vast majority. There are currently about a million species of insects, but in fact there may be as many as 1.5 million. Insects are of great importance in nature, national economy and human life. Many useful species of arthropods live in the grass and on the ground.The most numerous groups of these insects are beetles, hymenoptera, flies, and spiders, among which the greatest number of species-useful in terms of humans, biocenoses [5].

Participation of biological organisms as predators and parasites and their use in combination with synthetic analogues of metabolic products is one of the leading directions of biological method of plant protection. The purpose of the biological method is to reduce the population density of phytophages, crop pathogens, weeds without the use of chemicals. For the first time to cereal beetles (Anisoplia austriaca Hbst.) application of mold spores was proposed by I. I. Mechnikov. This preparation based on Bacillus thuringiensis was first commercially released in France. And now more than 20 such preparations are produced. About the same time bioavailability began to spread in the United States. Cotton cushion (Icerya purchasi Maskell), accidentally introduced into California since 1872, caused considerable damage to citrus plantations. In 1889, Rhodolia cardinalis (Mulsant), which is an effective predator of this pest in its own country, was brought in from Australia to protect trees from Icerya acquisition. As a result of the active predation activity of Rhodolia cardinalis, the harmfulness of Icerya acquisition has been greatly reduced. Exactly so, in 50 countries of the world, where Icerya purchasi was one of the most harmful phytophages, this method was successfully repeated. [4].

In agrocenoses of crops in biological control of weeds, mycoherbicides based on spores of pathogenic fungi are used. The current direction of cultivation of useful species in biological laboratories (e.g., Trichogramma and Cryptolaemus montrouzieri (Mulsant) species), which are then sent to nature. Attractors and repellents are also widely used; an interesting and promising method of disorienting insect pest populations could be to bring large numbers of sterilized males into the wild.

The scientific literature on Orobanche spp. provides information on the control of noxious persistent weeds. Fusarium species and Phytomyza orobanchiae Kaltus. It should be noted that when using the biological method, one of its features is a tough interaction between biological agents and their enemies, i.e. a certain type of biological agent or biopreparation is designed to combat a particular type of weeds, insects or pathogens. Only recently, significant polyphagous entomophages capable of reducing the population of not one but several phytophage species have become widely used. In recent years, the role of the biological method in agricultural production abroad has been steadily increasing. In the U.S. 8% of the cultivated area is protected with biological agents, and in China cotton plantations have reduced the use of pesticides by 90% thanks to the biological method. In Russia, the scope of application of the biological method is also expanding, in particular, the protection of forest plantations in the country is carried out mainly by the biological method. Thus, the bacterial strains of the Bacilus thuringiensis group referring to the most dangerous forest pest, the Siberian silkworm (Dendrolimus sibiricus Tschetv.), have become widely used in the fight against the invasive

species of phytophages. It is known that the butterfly Cactoblastis cactorum (Berg) was used in Australia to limit the reproduction of Opuntia species and suppress Salvinia molesta L. Weeds Cyrtobagous salviniae Calder and Sands were used. Expanding the application of biological methods of plant protection will reduce the chemical load on agricultural landscapes, improve the quality of agricultural products and the sustainability of agricultural producers in the competitive market.

Another way to reduce the pesticide load on agricultural landscapes is a differentiated approach to the prescription of chemical treatments and their implementation only in the centers of pest distribution, in the border areas and in the catchment area, which, according to some authors, allows to halve the use of pesticides. When integrated plant protection systems are implemented, pesticide consumption is reduced by 50-70%. In addition to significant cost savings, all this is important for environmental sustainability. More than forty years of research conducted at the All-Russian Research Institute of Irrigated Agriculture have revealed the possibility of increasing the efficiency of biological method by expanding useful species and biodiversity in entomocomplexes of crops under irrigation.

Predators and parasites can be controlled by spatial redistribution of beneficial insects between natural biotopes of agrocenoses and agrolandscapes. O. G. Guseva, A. M. Shpaneva, A. G. Koval. Studies have established that zones of natural and anthropogenic origin (border areas and forest margins) can contribute to an increase in the biodiversity of beneficial insects. The degree of anthropogenic impact during cultivation of crops and under irrigation conditions has a significant impact on entomofauna. The optimal microclimate created on herbaceous crops, minimal soil treatment, and long-term stable growth in one place for several years allow insects to find suitable habitat conditions on perennial grass crops (mainly alfalfa and legume-green mixtures).

In recent years, biological preparations, attractants and repellents have become more and more used worldwide, and the production of predators and parasites has increased. The use of biopreparations and biological agents is one of the promising areas for the promotion of organic agriculture in rural areas and the development of a green economy. A differentiated approach to the prescription of chemical treatments and their implementation only in the centers of pest distribution, border areas and catchment areas can almost halve the use of pesticides. With the introduction of integrated plant protection systems, pesticide consumption is reduced by 50-70%. In addition to significant cost savings, all this is important for environmental sustainability.

A growing source of biodiversity, abundance and even distribution of beneficial species in irrigated crop rotations are perennial cereal crops. They should be located near regions where anthropogenic pressure is more intense. In addition, horizontal migration of entomophages and parasites to neighboring crops has been noted to increase the biodiversity and abundance of beneficial species. Thus, it leads to an increase in the stability of the phytosanitary state of the agricultural landscape and a decrease in pesticide load.

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