

Conceptual approaches to building the Center of stock cultures of hexapods

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The purpose. To solve the problem of biologization of protection of plants a task raised of building frameworks, ensuring biofactories and biolaboratories with starting entomocultures. For that purpose it was necessary to develop main principles of building pedigree cultures of hexapods, methodological approaches to principles of operation of Centers of stock cultures of hexapods, and to determine the concept and program of reaching that aim. **Methods.** Theoretical generalization, probes in entomology, analysis, synthesis. **Results.** The offered concept of Center of stock cultures of hexapods is based on the principles of engineering and industrial entomology. For the first time they define the concepts «industrial entomology» as scientific direction and practical principle of use of entomocultures in industrial conditions for the purpose of deriving commodity output in the form of a part of culture of hexapods or products of their vital activity. The place of Center is determined in the system of protection of plants as intermediate structure between pedigree cultures, which are created and sustained in its content, and stock cultures, which are the part of pedigree cultures and which, in their turn, are taken and become the basis for cultivation of commodity output of biofactories and biolaboratories in farm-productions for protection of plants. They specified: content of biotechnological systems, principles of building stock cultures of hexapods, main principles of building and operation of Center. **Conclusions.** The offered concept enables to create regional Centers of stock cultures of hexapods for provision with necessary entomocultures of biofactories and biolaboratories of conforming regions of Ukraine, to solve questions of development of some principles of industrial entomology as the basis for operation of biofactories and biolaboratories on production of entomological protective means of plants.

Key words: *Center, concept, pedigree stock culture, hexapods, structure, program, techniques.*

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The accumulated scientific and technical potential of the developed countries of the world, as well as of Ukraine, allows to put on the practical rails the decision on the replacement of about 30 % of chemical pesticides and at least a quarter of mineral fertilizers on their biological analogues for their intended purpose.

The return to Ukraine of the image of the leading world in terms of the extent of practical biologization of plant protection and agriculture in general, taking into account the historical experience of organizing this work on a state scale, implies the availability of modern production of biological pesticides and the undeniable economic, environmental and social feasibility of investing in biomedical methods.

Proceeding from the current situation with the problems of controlling the use of plant protection products in Ukraine, the task of creating

Centers of purebred plants within the systems of production of biological means of plant protection.

Thus, there is a complex multistage task of developing the principles of functioning of the Center. The center includes the biotechnological system (BTS) for the breeding of mother cultures:

- 1 - basic insect collection (laboratory populations or starting colonies, etc.);
- 2 - Reserves and (or) potential sites of the collection area of the natural population from the range of the base collection;
- 3 - technological complex of breeding of mother cultures of certain (basic) assortment;
- 4 - a set of normative methodical, technological documentation on the introduction of the basic assortment into the culture and breeding of uterine cultures, as well as a computer database on their basis;
- 5 - a set of equipped laboratory facilities that can be used for basic tasks of the Center;
- 6 - staff.

Basic principles of the Center's creation and operation:

- Flexibility of the structure of the BTS, which allows changing the range of insects spreading;
- universality of the BTS on the breeding of the current assortment of insects, when the economic effect of the joint (in time or space) breeding exceeds the sum of the effects of separate (isolated) breeding;
- temporary adaptation of the BTS to change the current range from the established base at a certain interval of time [1, 2].

Tribal culture is formed by the method of individual selection of individuals that have certain beneficial properties.

Mother culture is formed at the expense of reproduction of breeding culture, or by returning to a technological cycle a certain amount of commercial products.

When considering the establishment of Centers of Insect Cultures used in the biomethode, it is necessary to determine their structure and recognize that it is based on two directions.

The first is a technical entomology.

Technical entomology is a branch of applied entomology, which sets itself the task of studying the theoretical and practical aspects of reproduction of insect cultures with given qualities. It is based on: physiology; genetics; ecology and ethology of insects; ecological physiology; physiological ecology; ecological and population genetics; selection.

Insect cultures with given qualities are essentially tribal cultures, the creation and support of which is dedicated to the activity of a certain part of the center [3, 4, 5, 6].

This part of the Center should also include the structure of insect reservoirs, which provide it with the necessary primary biomaterial, which is the basis for the creation of tribal entomocultures.

Thus, it should be recognized that the creation and support of tribal cultures is based on technical entomology [7, 8, 9, 10].

The other part of the Center supports mother cultures of insects, which is the basic element of industrial entomology.

Industrial entomology is a direction, which aims to develop scientific and practical principles of exploitation of entomocultures in industrial conditions with the aim of obtaining commercial products in the form of a part of insect cultures or products of their livelihoods.

According to its principles, industrial entomology is a part of biotechnology and is based on: technical entomology; system theory; the principles of biotechnology; principles of development of industrial production; principles of climatic and refrigeration technology; theoretical metrology; theoretical and practical bases of automation and mechanization of technological processes; theoretical foundations of information support; machinery engineering; principles of standardization of production processes [1, 2].

Centers of mother crops thus are a chain linking technical and industrial entomology among themselves and is an initial element in the creation of biotechnological systems that are the basis of

biofacies and biolabs that provide the biotechnology with entomological means of plant protection and are the basis for creation, for example, viral insecticides.

As you know, the Concept consists of defining the main ideas of the Center's tasks and ways of solving them (Fig. 1) [11].

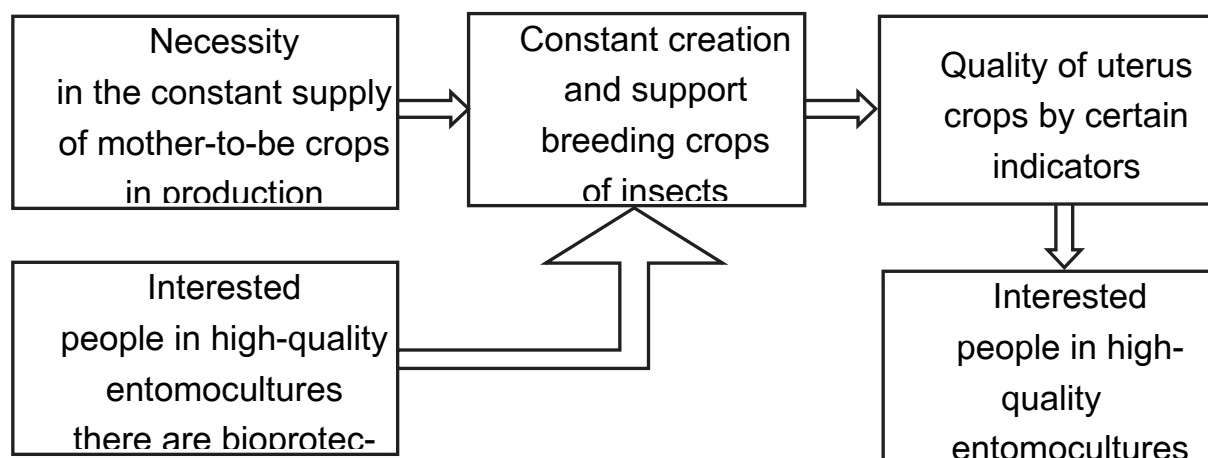


Figure 1 - The structure of the concept

In order to ensure the quality of the final commodity products of bioproducts, it is necessary to have a good starting material, that is, high-quality mother-worm cultures of insects. Mother cultures are a part of the tribal entomocultures that are created, stably and permanently maintained in certain laboratories of the Center.

In order to constantly control the quality of insect cultures at the Center, it is necessary to establish a laboratory of quality of both tribal and uterine entomocultures according to certain indicators that are defined for each culture.

Such a structure will ensure the permanent and stable functioning of the Center as a system and provide quality reproductive cultures of the bioproduction of its region.

After determining the location of the Center and the structure of the concept of its creation, consider the program for its implementation (Fig. 2).

The first of the main questions is to determine the composition of entomocultures that will be pro-

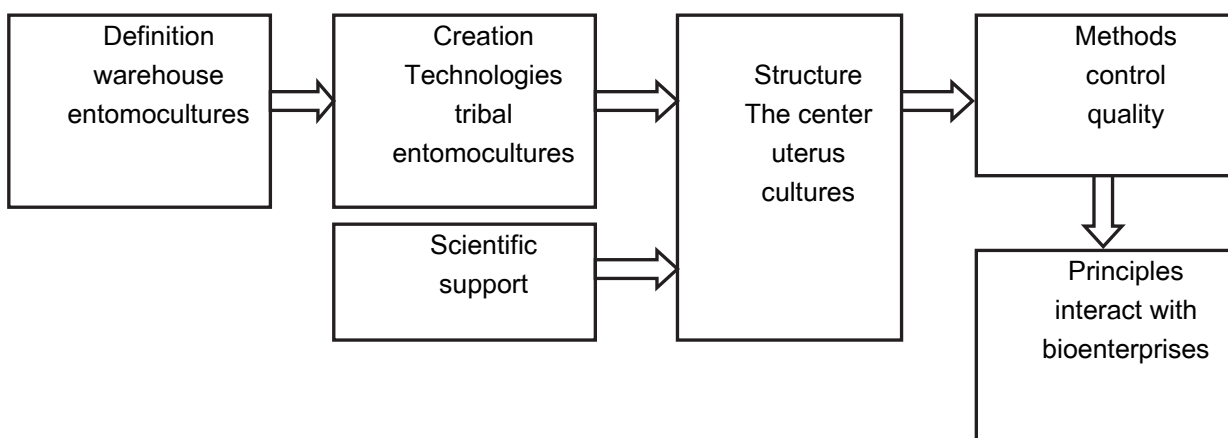


Figure 2 - Goal Program

duced and maintained at the Center. At the Center, which is proposed for creation at ITI "Biotechni-

ca" of the National Academy of Sciences of Ukraine, this is: a large moss; ordinary cereal aphid; cereal moth; mill firefighter; *Trichogramma bracon* Gold Point is common; aphidimiza cape.

To ensure the quality of accepted entomocultures, technologies for the creation of tribal entomocultures based on the general principles of technical entomology have been developed.

Maintenance of the Center's stable functioning is based on scientific support, which is provided by: Institute of Zoology named after. I.I. Shmalgauzen of the National Academy of Sciences of Ukraine, which is involved in the identification of entomocultures used in the Center's work (departments: taxonomy of entomophages and ecological bases of a biomedical, acarology, general and applied entomology).

The second group of scientific organizations includes the institutes of UAAS of Ukraine:

- plant protection (entomophage application sector);
- Engineering and Technology Institute "Biotechnica" (Department of Industrial Entomology).

The task of these institutions is to develop technologies for the creation and use of entomophages for plant protection and for the control of the quality of entomocultures.

Based on such a scientific and technological basis, the structure of the Center is proposed, which will be composed of laboratories for the creation and maintenance of the above mentioned entomocultures, reservoirs, which will be the basis for the selection of insect cultures that will be used in the creation and maintenance of insect breeding cultures, laboratory of entomoculture quality, engineering support conditions of technocenoses for insects.

The Center should provide methodical and technological documentation for the breeding crops of the basic assortment and create a computer database on their basis, define the principles of interaction with bio-enterprises and control by the State Service of Ukraine for food safety and consumer protection.

Conclusions

The developed concept of the Center of Mother Cultures has identified its place in the system of plant protection, noted that it is an intermediate structure between the system of creation and support of breeding cultures and mother crops that are selected from them and become the basis for the cultivation of commercial products of biofuels and biolabs.

The structure of the Concept defines the main stages of the Center's functional activities. The program aims to achieve the objectives of the Center.

The first basic task is to define the range of entomocultures of the Center and to develop methods for the creation and maintenance of insect breeding cultures. This is reflected in the relevant sections of the report. The basic principles of analysis of the processes of creation of the Center's cultures are presented: entomophages, acarifas and phytophages.

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