

FORMALIZATION OF KNOWLEDGE IN THE PRODUCTION OF BIOLOGICAL PLANT PROTECTION PRODUCTS

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The research is devoted to the issue of information structuring regarding the formalization of knowledge in the production of biological plant protection products when developing expert systems. The relevance of the work is due to the need to increase the efficiency of the processes of managing the production of biological plant protection products.

The aim of the work was to develop a structure for formalizing knowledge regarding the processes of managing the production of biological plant protection products in the form of an ontology.

The object of the research is decision support processes for biological plant protection. The subject of the study is the digitalization of production management processes for entomological and microbiological plant protection products.

Research methods – analytical and ontological approaches, free software Visual Understanding Environment.

The materials of the work were the results of scientific research on the use of modern methods of formalizing knowledge in the processes of managing the production of biological plant protection products.

A structure for formalizing knowledge regarding the processes of managing the production of biological plant protection products has been developed in the form of an ontology, which contains concepts (1–ontological models; 2–knowledge bases; 3–predicate semantic networks; 4–databases; 5–frames; 6–associative maps; 7–algorithms) and explanations for them (1.1– ontological model of an innovative intelligent production control system the entomophage *Habrobracon hebetor*, 1.2– ontological model of an intelligent decision support system in entomophages production; 2.1–ontological knowledge base of the decision support system in entomophages production, 2.2–knowledge base in the form of “if-then” production rules in the production of the entomophage *Habrobracon hebetor*; 3.1–predicate semantic

network for formalizing the process of building a hybrid intelligent decision support system in entomophages production, 3.2–predicate semantic network for building a hybrid intelligent air temperature control system for a box for growing entomocultures; 4.1–database of promising entomophages, 4.2–database of technical means in the processes of growing entomocultures in both open and protected soil; 5.1–frame structure of information flows in the management of entomophages production; 6.1–associative map of components of an ontologies-based decision support system in entomophages production, 6.2–associative map of an innovative intelligent production management system the entomophage *Habrobracon hebetor*; 7.1–algorithm for designing a cyber-physical system for managing the production and use of biological plant protection products, 7.2–algorithm for obtaining a complex preparation for biological protection of plants from pests and diseases, 7.3–algorithm for developing complex biotechnological plant protection measures).

The research results are useful in improving decision-making support processes for biological plant protection through systematic knowledge processing using modern software tools.

Keywords: Biological plant protection products, production, ontology, formalization.

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