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PREDICTION OF CROP YIELD AND QUALITY BASED ON INFORMATION FROM METEO PROGRAMS

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ABSTRACT

In the cognitive structure, the formal formulation of the problem and model synthesis, the choice of method and the concept of solving the problem are based, a brief description of the systematic-cognitive analysis (SC-analysis) method, its theoretical premises are revealed, the mathematical model, digital computing techniques, special software tools of SC-analysis are described. .analysis ("Eidos" system), cognitive structure of the subject area, formal statement of the problem and formation of a study sample.

INTRODUCTION: The study is devoted to solving the current problems of predicting the quantitative and qualitative results of the cultivation of pomegranate fruit crops based on the determination of causal relationships between meteorological factors and these results (using apples as an example).

When formulating the problem and choosing the method of solving it, the relevance, object and subject, purpose and tasks of the research are based, the sources of the primary data are indicated, the characteristics of the primary data are indicated. the requirements for the method of solving tasks are based, the traditional methods of solving are briefly described, and the main conclusion is made about the inadequacy of traditional approaches and

the feasibility of using new methods for solving tasks.

The formal formulation of the problem and the synthesis of the model, the choice of the method and the concept of solving the problem are based on it, a brief description of the systematic-cognitive analysis (SC-analysis) method, its theoretical premises are revealed, the mathematical model, digital computing techniques, special software tools of the SC-analysis are described. analysis ("Eidos" system), the cognitive structure of the subject area, the formation of a formal statement of the problem and an educational model. done; done. In particular, classification and descriptive scales and gradations, as well as an electronic form of presentation of preliminary data were developed, and a software interface of SC analysis was used to convert preliminary data from the form by dates to a standard form through phenophases. , the initial data were imported from the standard form by phenophases into the databases of the "Eidos" system, then the synthesis of the semantic information model, its optimization and adequacy were checked. According to the results of the second chapter, the main conclusion is made that the study of the formed model has a high enough adequacy to be considered as the study of the object itself.

The following tasks were solved in the study of the semantic information model:

1. Predicting the results of growing a given crop at a certain point.
2. To support decision-making on the rational selection of zones and microzones for growing a given crop and variety.
3. Support decisions on the rational selection of crops for growing in a given zone and microzone.
4. Constructive and systematic-cognitive analysis of cluster-cultivation results and factors.

In order to solve the above problems, it is shown that first of all, it is necessary to solve the problem of determining the periods of phenophases and determining the values of meteorological indicators for a certain variety in a certain growth zone and microzone. The point is given from their values at the three nearest weather stations, which are not the subject of this work. In the third chapter, it was concluded that the proposed approach allows to successfully solve the tasks and achieve the work goal.

RESULTS: The effectiveness of using the obtained solution, its limitations and prospects for development, possibilities of using the proposed technology in design and production organizations, as well as in educational institutions are briefly described. The limitations of the developed technology and its development prospects are shown. A conclusion is made about the effectiveness of the proposed technology and the feasibility of its application and further development.

The relevance of the work topic is determined by the possibility of applying its results in practice in a number of organizations in various fields of activity: design; production; educational.

Methods of reliable prediction of the quantitative and qualitative results of apple production in the design organizations could be the basis for making a number of responsible decisions related to the design of new orchards.

This involves solving two problems:

1. Decision on the location of the garden (reasonable selection of the zone and

subzone for growing certain varieties and crops).

2. Selection of varieties for planting (wise selection of varieties and crops for cultivation in a certain zone and subzone).

Currently, these decisions depend on large fruit farms based on empirical test data at *individual* points, often without the opportunity to test the entire set of crops and without taking into account and analyzing the adaptive and natural resource potential of a particular fruit. lang. growth point. Such an approach leads to the fact that crops are grown not where natural conditions exist, but where the necessary infrastructure (population) exists. As a result, for example, in the Krasnodar region, any plot of the variety does not produce more than 4 apricots every 10 years. The situation is the same when choosing crops for growing in the fields, choosing agrotechnologies for growing them.

of using the produced products (sale, storage, processing). Thus, favorable conditions are created for the implementation of the chosen method. :

- registration of partnerships on price determination and futures and lease agreements;
- preparation of the material and technical base for storage and processing.

DISCUSSION: Methods of reliable prediction of quantitative and qualitative results of apple cultivation can be used to develop a complete laboratory work during the educational process.

The relevance of this work is determined by its scientific novelty. At present, such research and development is primarily carried out by Honored Scientist of the Russian Federation, Doctor of Agricultural Sciences, Professor IA

Thus, the object of research is to study the influence of various natural factors on the quantitative and qualitative results of crop cultivation.

The goal is achieved by solving the following tasks step by step:

1. Designing the cognitive structuring of the subject area and the formal statement of the problem, the structure and content of the primary data.
2. Obtaining the initial data of the planned composition in the form collected in the organization that supplies them (magazines).
3. Development of an electronic form of preliminary data submission.
4. Transfer of initial data to electronic form.
5. Control of reliability of initial data and correction of errors.
6. Using the software interface to convert the initial data in the form by date to the standard form by phenophases.

The use of a software interface to convert the initial data in the standard form for phenophases into databases used in the tools of systematic-cognitive analysis (SC-analysis) - cognitive analytical system "Eidos" ("Eidos system").

8. Semantic information model (SIM) synthesis.
9. SIM card optimization.
10. Measuring the adequacy of the SIM card.
11. Solution to the problem: "Predicting the results of growing a certain crop at a certain point."
12. The solution to the problem: "Helping to make decisions on the rational selection of zones and microzones for the cultivation of a certain crop and variety."
13. The solution to the problem: "Helping to make decisions on the rational selection

of crops for cultivation in a certain zone and microzone."

14. Solving the problem: "Constructive and systematic-cognitive analysis of cluster cultivation results and factors".

15. Development of the principles of economic efficiency assessment in the application of technologies under development:

- in design organizations;
- in production organizations;
- in educational institutions.

16. To study the limitations of the developing technology and its development prospects.

Technologies of intensive cultivation of gardens, new promising varieties, their storage in fruit storage areas with controlled gas atmosphere, commercial processing of fruit on the Dutch line and branded corrugated packaging - all this ensures that the agricultural company's products are competitive in the new market conditions.

Traditional statistical models:

- having strict limitations on the number of factors under study, as a rule, should not exceed 10, the factor model under study has 559 scales with a total of 2795 levels;

of all combinations of the studied factors ("replication"), which is practically impossible even with several factors in the field of the studied science.

It should be noted that it is impossible to fill in the missing data from experience, because the object of study fundamentally does not allow repeating the conditions of past periods with a given combination of factors that are not dependent on human will. Filling in the data by interpolation is also incorrect because each row and column of the correlation matrix has several gaps.

In addition, meaningful interpretation of statistical models is very difficult, requiring a lot of work by skilled analysts.

Thus, *it can be concluded that the use of traditional mathematical models to model a complex and little-studied object such as an artificial ecosystem of an apple orchard is problematic.*

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