guaranteed to improve dispersion. Made technical means, which are introduced into production.

Fertilizer, fertilizers, quality allocation, performance cars, spreaders parameters, modes of operation.

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The objective conditions DEVELOPMENT OF ADAPTYVNYHTEHNOLOHICHNYH agriculture

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Subject and author determined agrometeorological causes of adaptive technology systems of cultivation and sowing crops. Reveals the concept of improving the efficiency of these processes on the basis of adaptive execution of field work. Author determined scientific and methodical task to implement this concept in practice.

Soil culture conditions, variation, work, adapt, complex machines efficiency.

Formulation of the problem. The development of market relations between the subjects of agriculture of Ukraine objectively creates a need for constant search for opportunities to increase profitability of the relevant sectors of the economy, and in particular crop. Yield field crops farms (SHP) largely depends on the strategy of technology policy for the use of certain technologies mechanized cultivation of crops and tractor fleet of specialized vehicles corresponding loop, using worn withdrawal from the acquisition of new machinery and so on. Solving these problems is closely related to the assessment of efficiency of the relevant decisions concerning the implementation of adaptive set of technological operations, harmonization of systems of machines with the characteristics of the production program and tactics enerhomashyn renewal of its

Reserve power structure and so on. However, an objective assessment of these solutions require specific research methods, which would provide an opportunity to systematically take into account the peculiarities of the respective machines and systems, including variable and uncontrolled actions subject (ahrofonovyh) and agrometeorological conditions of spring and summer and autumn field works [2] efficiency corresponding complexes machines.

Analysis of recent research. The use of known methods and models of study options complexes agricultural machines (CST) [7] makes it impossible to take into account the variability of the subject and agrometeorological components cultivating, sowing process. This is because they are based on the regulations and requirements in technology make it possible to set "basic" machinery for agro-defined terms of [3]. Their use for the study of adaptive technology systems [9], unfortunately, does not allow objectively evaluate complex machines, which transform objects of labor (ahrofonu field crops and seeds, etc.) whose state defines the quality parameters of the conversion and determine the feasibility of the relevant work in cut a limited period of time.

The purpose of research - To reveal the scientific and applied problem of adaptive technology and cropping systems research methodology performance adaptive systems-cultivating sowing machines.

Results. Feature of processes of mechanized cultivation and planting crops is that the structure and pace of a plurality of manufacturing operations to qualitative transformation of the subject of work (ahrofonu field and seed crops) should coordinate with uncontrollable natural (biological, physical, chemical, etc.) processes [2] . Recent processes in terms of time and carry out an objective transformation ahrofonu the quality of field and characterized stochasticity. Accordingly, a system of coordination at the time controlled (technological) and unmanaged (objective) process makes it possible to meet the demands of crops to the initial conditions of their growth and development and therefore provide the prerequisites for obtaining high yields [4, 5].

Achieving these goals requires adaptive practice (and subject to agrometeorological conditions) execution of field work, and then use adaptive processing facility cultivating sowing-machines (ТКҐР). In addition, the use of machine units such complex machines requires a current analysis of the subject and agrometeorological components, and evaluation of trends of change in local conditions of a season of field work. It is necessary to develop and implement in practice SHP specialized automated support organizational and technological solutions

that are based on current monitoring and analysis of unmanaged and partially managed component would provide an opportunity to perform statistical simulation of relevant mechanized processes and thus perform their evaluation and selection of rational action to improve efficiency. This concept of efficiency-tillage sowing process requires the development of a system of knowledge, equipment and skills. However, its implementation makes it possible to ensure the quality and timeliness of relevant work in mechanized cultivation of crops, and make these processes are less expensive (enerhoschadnymy). This is done by running the technology necessary set of works that formed locally - in line with the quality of substantive and trends agrometeorological individual components of the calendar year.

Consider the reasons these provisions in more detail. It is well known that an essential precondition for mechanized process efficiency of growing crops is the timely provision of plant requirements on the quality of soil conditions for their germination and emergence friendly stairs [5]. Meeting these requirements is achieved due to the impact on its structure, density, weediness, humidity etc. working bodies of the relevant machine units [1], and because the flow rate of these natural processes are caused by the intensity of agrometeorological conditions of a particular season. Accordingly, to ensure the effectiveness of tillage, sowing process CST should monitor the status ahrofonu fields agrometeorological conditions and carry out the forecast of further development in order to take rational decisions on mechanized measures {d} transformation soil {ρ} of its original qualitative state in a that will ensure efficient development of agricultural crops (Fig.).

The initial state ahrofonu individual field due predecessor culture and in particular the technology of mechanized cultivation and harvesting his crop. The final state ahrofonu field should be viewed through the prism grown crops (winter or spring), and in particular indicators such as the presence of available moisture uniformity and depth of location of seed layer of soil density, its temperature, and so on. In addition, an important indicator of evaluating the effectiveness of tillage, sowing process and in particular the relevant complex machines, is to ensure timely sowing of crops. The essence of this indicator stems from the objective need for coordination of biological processes growth and development of crop plants with unmanageable calendar "development" agrometeorological conditions relevant period by the plant which provided favorable conditions for maximum biological yield.

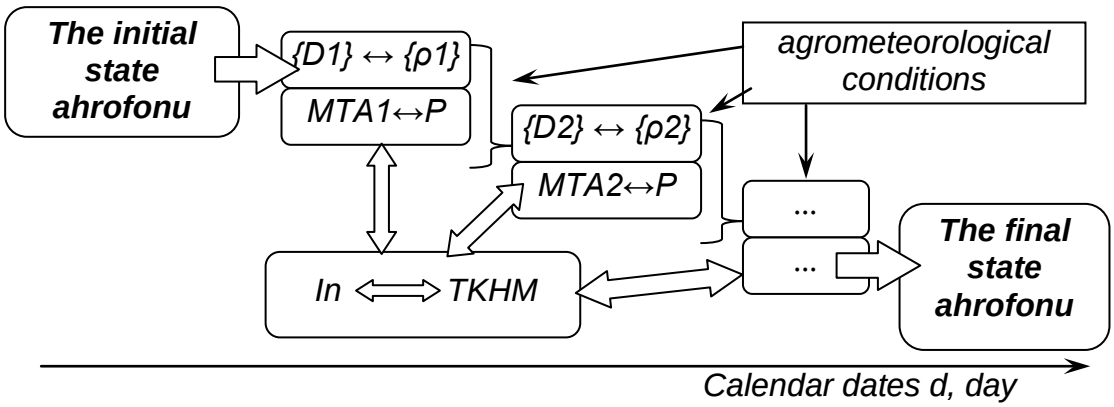

Fig. The main components of the system adaptive performance-tillage planting: In A - component management and related automated systems of decision making; MTA - tractor units; P - right to your ahrofonom.

System-chynnykovyy consideration the concept of efficiency (E) processes mechanized soil preparation and sowing of crops has made it possible to isolate a set of major groups of factors that cause it: 1) the subject (P); 2) Production (B); 3) Agrometeorology (A); 4) social (C); 5) technological (T); 6) technical (TN); 7) organizational scale (O); 8) management (a); 9) information (I); 10) Resource (Re):

$$E = f(P, B, A, C, T, Ts ,, O, U, I, Re). \quad (1)$$

Without going into the essence of each of these factors, we note that they are characterized handling, partial controllability and uncontrollability. Accordingly, deserve special attention factors that are uncontrollable (Agrometeorology) and partly managed (substantive and operational), systemic nature which, in fact, forms the basis for consideration of scientific and applied problems of adaptive technology of agriculture.

As to the nature of scientific and applied problems for the processes of mechanized cultivation and sowing crops it is determined by the need to provide appropriate timely ahrofonu the quality of field and minimal process losses set to perform work. Therefore, based on the substantive features of formation of efficiency-tillage sowing processes based on the methodology of solution to this problem should be based on system-caused trends qualitative transformation of the subject of work (ahrofonu field and seed crops) occurring within a limited time agrometeorological conditioned Fund, under the influence of working of the relevant machine units already mentioned and natural processes. To account for the impact of changing agrometeorological conditions on the ground state of the field, the possibility of cultivating operation-sowing machines and thus stochasticity agrometeorological authorized fund of

time (tpz), pursuant to the relevant work is necessary to develop specific methods and models for evaluating performance on TKĽP operation.

Based on the above, the condition for efficiency (E) of adaptive TKĽP in terms of years of its operation is to ensure consistency between the technology necessary to fund time (ttp) and tpz for meaningful and agrometeorological conditions particular year in which be satisfied priority requirements plants to the soil and climatic conditions of germination and germination and low total cost of mechanized process. In an implicit form of this functional relationship will look like:

$$E = f\left(t_{mn} \Leftrightarrow t_{nз}, \sum B\right), \quad (2)$$

Where: ΣV - the total costs (or costs of energy and technological losses due to untimely work) pursuant Soil-planting.

Thus, to improve the processes of mechanized farming seeds based on the use of adaptive technology of cultivation and sowing crops CST should have a corresponding set of machines as well as specific methods and models that allow the system to take into account the peculiarities influence the subject and agrometeorological components of the course ґruntoobrobno- sowing process and on this basis to evaluate the performance of systems appropriate machines. Getting these indicators justify enables rational decisions on harmonization of the complex characteristics of the production program for EGR condition which provided quality and timeliness of work and minimal costs of their implementation.

However, the development of methods and models necessary to have specific knowledge base on stochastic and trends agrometeorological conditions and their impact on the development of soil and crops. In particular, we have shown the possibility of forming such a knowledge base based on data from weather stations and formalize the main patterns of agrometeorological conditions these periods and their impact on the ground, the duration of fine and rainy periods, duration of course caused by the stock of time works, the start time of sowing and the risk of these indicators [8 10]. We also brought the possibility of creating adequate statistical simulation models that can objectively reflect the impact of system-event-work conditions on the course of cultivation [6]. Then an algorithm based on a reasoned decision about whether the implementation of certain manufacturing operations for various subject agrometeorological conditions and trends and their impact unmanaged tpz there is an opportunity to establish a set of integrated functional parameters cultivating, sowing process. Presentation of these indicators in terms of value and establishing patterns of the different characteristics of the production program CST, changing the subject and agrometeorological conditions and parameters

of the adaptive complex machines enables them to find a value at which the function achieved extreme performance.

However, the application we developed methods and models to study the effectiveness of adaptive technology systems still require improvement. To address this gap must have knowledge of: 1) the effects of winter on the initial state of the soil in the spring; 2) the impact of trends agrometeorological conditions on humidity, density, temperature, and microbiological processes weediness soil; 3) the impact of failure or of a combination of basic technological operations (using single and multi-process machines, minimum tillage, no-till systems, etc.) on soil quality status and trends of change due to the influence of agrometeorological conditions, productivity growth and development of crops in the initial phases of the growing season; 4) the overall impact the quality of the soil (at the time of sowing) and agrometeorological conditions on productivity growth and cultural development; 5) the degree of negative impact of frost on the development of crops such as phenological phases of germination, sprouting and tillering.

As a result, these tasks occur the opportunity to develop evidence-based recommendations: 1) adaptive performance and energy-efficient set of technological operations of tillage and sowing crops; 2) evaluating the degree of software quality requirements of the crops to soil and climatic conditions in the early phases of their growth and development; 3) Policy formation adaptive technological systems, trends and technical re-equipment of enterprises SHP technological service and their development; 4) improving the efficiency of the industry at the regional, inter-regional and national levels; 5) directions and trends in the domestic engineering on the concept of adaptive technology.

Conclusions

1. The initial state of the soil and the impact of agrometeorological conditions in terms of years of implementation of these works is variable, it is objectively different forms naturally caused by the length of time for their fund performance and the need for technological adaptation.

2. Scientific and applied problems of adaptive technology of field crop caused by the need to take account of objective tendencies partly driven the formation of the quality of the substantive conditions (ahrofonu field), software which enables you to ensure favorable conditions for obtaining high yields of crops and therefore profitability CST.

3. Adaptive performance set of manufacturing operations enables local agrometeorological conditions in a particular calendar year to fulfill "minimum" technology-desired set of mechanized work and ensure that: a) the necessary substantive qualitative state conditions (ahrofonu field of seed placed in it) at the time of favorable natural trends for productive

growth and development of cultivated plants; b) the prerequisites for obtaining high yields; a) minimum EGR technology costs.

List of references

1. *Bomb MJ*Scientific and practical bases of cultivation, tutorial / MJ bomb Z. Tomaszewski. - Ivano-Frankivsk: Galicia - 1993. - 148 p.
2. *Hrynhof I. I.* Ahrometeorolohyya / Al Al Hrynhof, VV Popov, VN Strashnыy. - L .: Gidrometeoizdat, 1987. - 310 p.
3. Zavalishin FS Basics mehanyzyrovannыh calculation processes in rastenyevodstve / FS Zavalishin. - M .: Kolos, 1973. - 319 p.
4. *FM Kuperman* Morfofyzyolohyya plants. Morpho-physiologic analysis stages ohranoheneza DIFFERENT zhyznennыh forms of angiosperms plants / FM Kuperman. - 3rd ed., Ext. - M .: Higher School, 1977. - 288 p.
5. *Likhochvor V.* Plant growing. Technology of growing crops / VV Likhochvor. - Lviv: Firm "Eng. Technology ", 2002. - 800 p.
6. *Lub PM* Justification complex parameters tillage machines agricultural enterprise. Author. Thesis ... candidate. Sc. .: sciences - Lviv, 2006. - 20 p.
7. *Pastukhov V.* Justification best machinery for mechanization of field work: Author. Dis. for the degree of doctor. Sc. Sciences specials. 05.05.11 "Machines and mechanization of agricultural production" / VI Shepherds; Hark. nat. Sc. Univ villages. households islands named. P. Vasilenko. - H., 2004. - 38 p.
8. *Sydorchuk AV* Agrometeorological reasons adaptability technological systems of fertilization, soil preparation and sowing crops / AV Sydorchuk, VA Ukrainian, P. Lub, VV Grabovets // Agricultural Machinery. - Luck: LNTU, 2011. - number 21, v. 2. - P. 83-90.
9. *Sydorchuk AV* Technological requirements mechanized crop the pace to machinery / OV Sydorchuk, M. Karp, VA Tymochko, SA Fedosenko // Increasing organizational and technical level of repair and recovery processes in agricultural region: Pr . Inst / Lviv Agricultural Inst. - Lviv, 1990. - P. 84-90.
10. *Sydorchuk AV* The formalization of the conditions of use set tillage machines / AV Sydorchuk, P. Lub // Mechanization and electrification of agriculture. - Glevaha, 2005. - Vol. 89. - P. 109-119.

Otmecheno predmetnыe ahrometeorolohycheskye Causes and development of adaptive tehnolohycheskyh obrabotku soil and poseva cult. Increase of the effectiveness solved Concept эtyh processes to perform adaptive grounds polevыh works. Otmechenы scientific Methodical task for Implementation эtoy concept in practice.

Soil, culture, terms, variability, work, adaptyrovanye, complex machines, effectiveness.

The subject and agricultural meteorology reasons of the adaptive technological systems development of soil-tillage and sowing are marked. Conception of efficiency increase of these processes on the basis of adaptive implementation of the field works is exposed. The

scientifically-methodical tasks of this conception realization in practice are marked.

Soil, culture, conditions, changeability, works, adaptations, complex of machines, efficiency.

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METHOD CONSIDERING objective reasons Beet stochasticity TERMS OF WORK

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Reveals the methodology taking into account the impact of the natural stochastic allowed time to fund technological operation

system of sugar beet harvesting in the relevant statistical simulations.

Foundation time stochasticity, sugar beets, hardware, simulation, performance parameters.

Formulation of the problem. Efficiency of technological systems (TS) sugar beet (ZTSB) largely depends on the consistency of quantities of technical parameters of equipment, which operates in a limited time on fund mechanized cleaning processes grown crop. This limitation is due to the biological characteristics of growth and development of sugar beet and stochastic influence agrometeorological conditions on vegetation culture and the appropriate course of mechanized processes. Accordingly, establishing statistical regularities functional parameters TS ZTSB the appropriate parameters requires the development of new methods and models that enable you to take into account the cumulative effect of its components on system performance of said TS.

Analysis of recent research made it possible to establish that the timing of field crops mechanized processes reflect as determined on the basis of [2, 7] and stochastic [5, 8] indicators. It is known [8], the timing of