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SCIENTIFIC PROVIDING AND STAFF ASSISTANCE OF UDMURT AGRO-INDUSTRIAL COMPLEX – JSC «EXPERIMENTAL TRAINING FARM IYULSKOE OF IZHSAA» IS 45 YEARS

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JSC «Experimental training farm Iyulskoe of IzhSAA» is a large stud and elite-seed farm, highly developed agricultural company which annually has a relatively high output of agricultural production; it develops and implements innovations, provides practical training of students - future specialists of agro-industrial complex of the country. JSC «Experimental training farm Iyulskoe of IzhSAA» is a unique agricultural company that performs strategic objectives for the agro-industrial complex of the Udmurt Republic and the Russian Federation.

Key words: JSC «Experimental training farm Iyulskoe of IzhSAA»; innovative agricultural production; stud farm; elite-seed farm; experimental research; scientific and educational activity.

DEPARTMENT OF FEEDING AND BREEDING OF FARM ANIMALS: PAST AND PRESENT

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The Department of Feeding and Breeding of Farm Animals of Izhevsk Agricultural Academy, as a structural subdivision of the Faculty of Agronomy, unites staff and researchers in different fields of knowledge that are closely related to each other. The Department is the most important unit of the Academy; it provides educational, methodical, scientific, research and educational work as well as training of the teaching staff. The results of the internal activity of the Department and the Academy as a whole depend on the integration of the Department staff. Currently the Department has 11 lecturers: 4 professors,

5 associate professors, 2 senior lecturers, a zootechnician and 2 laboratory assistants. The Department conducts educational activity in 7 basic educational programs of higher education, including 3 specialties of higher education, 4 directions of bachelor's programme, 1 direction of master's programme, 3 specialties of postgraduate education. The Department staff pays special attention to the improvement of educational and methodical work, computer programs are used in the learning process. The research work of the Department is aimed at finding ways to improve production and breeding qualities of farm animals in the Udmurt Republic. The main scientific direction is creating intrabreed type of cattle of Black-and-White breed in the Udmurt Republic. Thus, the results of the Department of Feeding and Breeding of Farm Animals speak for themselves: our labor is in demand, not only within the Academy, but also in other scientific communities and in the workplace. Rich and advanced experience of the faculty allows us to obtain the desired result for a large community of specialists working in the livestock industry.

Key words: Department; scientific activities; educational and methodical work.

SCIENTIFIC SUPPORT OF AGRO-INDUSTRIAL COMPLEX – 60 YEARS OF CROP SCIENCE DEPARTMENT ACTIVITY IN UDMURTIA

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The main direction of Crop Science Department of FSBEI HPE Izhevsk SAA is close cooperation with agricultural farmers and it is a distinctive feature of the Department. Organizations of agro-industrial complex of the Udmurt Republic use modern adaptive technologies of crop production developed by scientists of the Department. Winter triticale, hulled and hulless oat, oil flax and fiber flax breeding is carried out by the Department. Crop Science Department is one of the seven breeding centers of oil flax and fiber flax in Russia.

Key words: Izhevsk State Agricultural Academy; Crop Science Department; adaptive technologies of crop production; plant breeding; scientific support of innovative development of agricultural commodity producers; graduates and academic staff training; further training of heads and experts of agro-industrial complex.

CHARACTERISTICS OF PAINTS OF VYATSKAYA HORSE BREED IN FARM UNITS OF THE UDMURT REPUBLIC

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The characterization of available paints among horses of vyatskaya breed and their percentage in the Udmurt Republic is of great interest. At the present stage there is a demand for certain paints of this native breed. The population of vyatskaya breed is represented by main paints characteristic for vyatskaya horse breed: light brown (bay-brown), dan, dun light-brown, light-chestnut. They are wild paints defined by gene «Dan». It is revealed that of all available major productive livestock in the farms of the republic the bay-brown has the largest number - 49.1%, the second position on the list takes mouse-colored horses - 40%, dun-light-brown has a small percentage (horses with a gene-clarifier Cremello in the genome). However, this relates to the distribution of colors among mares, a different picture can be seen among stallions. Thus, more than half of the stallions (56.6%) are the holders of mouse-colored of different shades - from light dan to dark dan, the second largest paint is bay-brown (34.7%). Stallions with showy dun-light-brown paint have a small percentage - 8.7%. There are no other colors in the breeding stock among stallions in the farms and in the private farms. The market of stud production dictates its own requirements and by far the most popular is mouse dan color. In this regard the farms wishing to obtain the most requested color in the offspring mostly use showy mouse-colored stallions for mating.

Key words: horse paints; light brown; dun light-brown; dan, mouse-colored; light-chestnut; bay-brown; vyatskaya horse breed.

NOMOGRAMS OF ENTROPY OF BIOPHYSICAL PROCESSES

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Similarly to the ideas of thermodynamics on the static entropy the concept of the entropy of spatial-energy interactions is used. The idea of entropy appeared on the base of the second law of thermodynamics and ideas of the adduced quantity of heat. These correlations are general assertions of macroscopic character, they do not contain any references to the structure elements of the systems considered and they are completely independent from microscopic models. Therefore the application and consideration of these laws can result in a large number of consequences which are most fruitfully used in statistic thermodynamics. In this research we are trying to apply the concept of entropy to assessment

of the degree of spatial-energy interactions using their graphic dependence, and in other fields. The value of the relative difference of P-parameters of interacting atoms-components – the structural interaction coefficient α is used as the main numerical characteristic of structural interactions in condensed media. Thus, the relative difference of spatial-energy parameters of the interacting structures can be a quantitative characteristic of the interaction entropy. The nomogram to assess the entropy of different processes is obtained. The variability of entropy demonstrations is discussed, including biochemical processes and economics.

Key words: entropy; nomogram; spatial-energy parameter; fermentation catalysis.

CALCULATION OF CYLINDRICAL INDUCTION WATER HEATER WITHOUT A MAGNETIC CIRCUIT

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The article considers the problems arising in the process of design of the inductor. The approach for the determination of structure and energy parameters is suggested. Induction heating is the heating materials by electric currents that are induced by an alternating magnetic field. It is heating of items of conductive materials by the magnetic field of the inductors. Indirect induction heating is used for process equipment heating, liquids heating, coating materials drying. Induction heating uses frequencies from 50 Hz to 5 MHz. The simplest inductor of devices of indirect induction heating of low frequency has the form of the insulated conductor placed inside a metal tube or on its surface. Current flowing through the conductor - inductor in the pipe, its induced eddy currents are tracing. The heat from the pipe passes to heated medium. A low temperature induction indirect method of heating water and other fluids at power frequency proposed for the use in agricultural production is one of the most promising methods of electric heating. It successfully competes with the fuel heating, steam heating or liquid coolants. Advantages of induction heating are: high efficiency; it does not form scales since the low-temperature heating; high electrical and fire safety; the possibility of heating of any coolant (antifreeze, water, oil, etc.). However, in the process of the design of the inductor there are some difficulties in the correct aspect ratio and energy parameters. This paper proposes a method of calculating of the inductor on the ground of which one can construct their own induction heater of indirect heating on currents of industrial frequency.

Key words: induction heating; inductor; capacity, electrical heating.

SYSTEM OF COMPUTER VISION FOR STATIC AND DYNAMIC OBJECTS OF THE ENTERPRISES OF AGRO-INDUSTRIAL COMPLEX OF THE UDMURT REPUBLIC

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The development of system of computer vision for the enterprises of agro-industrial complex and its application will allow producers to use actual resources of the enterprises more efficiently and due to this fact to increase output production decreasing its prime cost. The research objective is the development of the system of computer vision for static and dynamic objects in agriculture and checking its working capacity. Research material is systems of computer vision for static objects by the example of a white button mushroom (lat. Agaricus bisporus) and dynamic objects by the example of floor-raised poultry in the enterprises of agro-industrial complex of the Udmurt Republic. Theoretical researches were conducted with the use of fundamental laws of geometry, trigonometry, the differential and integral calculations, special methods of programming. Borland Delphi 7 and Microsoft Excel programs were used during the research. It is revealed that the application of system of computer vision in the enterprises of agro-industrial complex will undoubtedly lead to increase of overall effectiveness of production. The conducted pilot researches showed that the model of system of computer vision of search and determination of the linear sizes of bodies of a white button mushroom is efficient. Thus the term of its payback makes about 1 year.

Key words: computer vision; video monitoring; dynamic objects; static objects; ethological reactions.

JUSTIFICATION OF AN ENERGY SAVING MODE OF RADIATION OF PLANTS

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Existence of two stages of photosynthesis allows offering a new way of radiation of plants. Thus irradiation facilities have to work only in a light stage of photosynthesis that leads to rational use of electric energy for the purpose of radiation. The purpose of the article

is to give a scientific justification of the development of technical solutions providing parameters of the most effective mode of radiation for the meristematic cultures allowing to save electric energy for the purpose of radiation (lighting) and to increase production output of the cultures grown in vitro (in a test tube). The research problem is the development of technical solutions for realization of the combined mode of radiation of the meristematic cultures. Data for study are the meristematic plants allowing us to receive a large amount of planting material of high quality in short terms. Research methods: the measuring of stage lighting quantities was conducted by the gaged light-intensity meter TKA-PK 04/3 type, electrical quantities – by the multimeter Mastech MAS830L. Results of research (expected): the application of the combined mode of radiation will reduce costs for radiation (lighting) not less than by 30%. Taking into account the existence of two stages of photosynthesis the combined mode of radiation of plants is offered consisting of a combination of pulse and continuous way of radiation (lighting). The analysis of special literature shows that the meristematic method is the most perspective for reproduction and improvement of berries and other plants. Studying of special literature has shown the expediency of carrying out scientific justification and development of the technical solutions providing determination of parameters of the most effective mode of radiation for the meristematic cultures allowing to save electric energy for the purpose of radiation (lighting) and to increase production output of the cultures grown in vitro (in a test tube).

Key words: meristematic plants; radiation mode; pulse mode of the radiation; the combined mode of radiation; dark and light stage of photosynthesis.

USE OF A SOUR-MILK DRINK «FERMENTED BAKED MILK» IN THE PROCESS OF MANUFACTURING OF TRADITIONAL BOILED SAUSAGE PRODUCTS

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The article studies influence of a sour-milk drink «Fermented baked milk» on qualitative characteristics of sausage mixture and ready boiled sausage product of category B «Dairy». The consistence of the sample with replacement of dry milk by «Fermented baked milk» had more delicate flavor. The sausage product of a test sample had more delicate taste without flavors-off. On the results of tasting assessment preference has been given to the sample with replacement of dry milk by a sour-milk drink «Fermented baked milk». Thus, a new component used in a formula of boiled sausage «Dairy» does not have negative influence on physical and chemical parameters of a finished product (content of chloride

sodium). The analysis of the microbiological status of ready boiled sausage products has shown that both samples met requirements of sanitary regulations and standards SanPiN 2.3.2.1078-01. The first and fifth day of storage of sausage products following parameters were analysed: QMAFAnM, CFU/g and CGB. So, the fifth day of storage the level of QMAFAnM, CFU/g in the control sample was $0.03 \cdot 10^2$, and in a test sample – 0.02·102 that was within the established standard indicators. Thus bacteria of Escherichia coli group were not detected in both samples. According to the received results of the microbiological analysis recommended shelf life of a ready product can be up to 5 days at temperature 4±2°C. The presented results of research confirm that the use of a sour-milk drink «Fermented baked milk» in a formula of boiled sausage «Dairy» in quantity of 3 % from weight of unsalted raw material would have positive influence on formation of organoleptical properties of a ready product and allows the producers to receive a product of functional purpose.

Key words: a sour-milk drink; a sausage product; sausage mixture; the organoleptical properties; physical and chemical properties; microbiological indicators.

EVALUATION OF EFFECTIVENESS OF LAND RESOURCES

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The article describes the methodological aspects of evaluating the effectiveness of land-use and cultivation of agricultural crops. Objective assessment of land use should reflect the real result. Economic efficiency of land use can be measured by the size of the increase in output and economy of labor and capital costs per unit of land and per unit of material costs. In our opinion, the most objectively the relative efficiency of land use (crop) can be expressed in terms of the ratio of yield per hectare of farmland to the cost of 1 ha of farmland. This indicator can be used in the evaluation of cropping placement in crop rotation. Identifying the areas of economic efficiency of the production of various plant products, as well as the efficiency of land use can be based on comparison of the level of yield per ha in feed units and the costs per ha of agricultural land. The average long-term yield on a particular site (field) culture is determined for the purpose of calculation; then these figures refer to the similar magnitude in the average household, thus the output index is determined. In the similar way the cost index is determined. The cumulative score of land use (cultivating crops) is determined by the yield index to cost index ratio. Thus, the «Composite Index» is a synthesizing indicator since it reflects the fertility of soil, capital

equipment and the level of production costs. The results of research state that the maximum yield of crop production does not always provide the best economic effect.

Key words: efficient use of land resources; evaluation of land use; efficiency of crop production; relative index of the production efficiency; cumulative score of land use efficiency.

IMPROVING OF COST ACCOUNTING OF ROOT CROPS PRODUCTION

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Cost of production under market conditions is taken into account and remains one of the key indicators of measuring the efficiency of agricultural production. Calculation is a methodical technique of accounting designed for grouping, distribution and calculating the output cost determination (work, services) to the units of accounting supervision and generalization of costs facts. Calculation of the cost of production is closely connected to the existence of commodity-money relations, the influence of the law of value under the market conditions on which the process of reproduction either individual organizations or the entire social production is based. Calculation of the cost is of paramount importance for assessment the scientific validity of norms and standards of costs, monitoring their changes over time, identification of reserves to reduce costs as well as for the establishment and operational revision of prices for products (work, services). This article discusses the importance of the calculation. Cost accounting objects, objects of calculation and accrued items in the agricultural organizations of root crops production are justified. At the same time the objects of cost accounting are offered as species of these cultures and stages of their biotransformation. The application of the classification of calculation units is suggested for calculating the cost per unit of output root crops. The article mentions disadvantages of the current system of cost accounting and calculation of the cost of crop production. In connection with this it is proposed that all production costs should be allocated among types of products obtained (roots and tops) in proportion to their content of metabolic energy and feeding units for animals. The proposed method of calculation of the costs of root crops production will make it possible to have more objective information and increase the responsibility of organization members for the effective use of root crops tops.

Key words: calculation; the objects of costing; cost accounting objects; accrued items; spreadsheet period; biotransformation; feed units; the metabolic energy; consumer prime cost.

STRATEGIC (MANAGEMENT) ACCOUNTING AND COST CONTROL IN AGRICULTURE

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This article discusses the compilation of the strategic model of managerial accounting of costs and control of their performance in agriculture, the choice of cost center provides a systematic way to improve the efficiency of agricultural production, the achievement of performance monitoring and economic benefits. Any management decision and optimization of production factors, including the rational use of all productive capacity should be based on reliable, relevant, timely and complete information of management accounting. The information about costs, expenses, income and results of operations necessary for management purposes of the analytical sections is formed in the system of management accounting. At this time the company's management decides independently in which sections they should classify objects of management and how to realize their accounting. Management accounting information is its content and is intended for executives and managers; it is a business secret and is strictly confidential. Operational strategic calculation of costs is necessary for any agricultural enterprise in order to determine the most appropriate timing of the output, selling their products and profit maximization.

Key words: accounting; management accounting; responsibility center; costs; cost centers; organization; management.