

RESEARCH RESULTS OF THE PROCESS OF CLEANING POTATO TUBERS AND CARROT ROOT CROPS USING ULTRASOUND

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Key words: *potato, root crop, carrot, cleaning, ultrasound, multi-factor experiment, research, frequency, intensity, installation.*

The most promising of the known ways to reduce the content of soil bolsters during machine harvesting of tuberous roots should be considered pre-harvest moisturization of the soil layer in which the tuberous root are located. This significantly reduces the content of soil impurities in harvested tuberous roots. However, atomized spray of water, even under pressure, is not able to ensure its instant flow to the depth of tuberous roots and, moreover, to moisten the soil to the state that provides further intensification of the process of separation of tuberous roots from soil bolsters that are comparable to them. To eliminate this defect, it is necessary to provide an intensification of the water spraying process by one of the methods of physical influence, which provides instant soil moisture to the depth of tuberous roots. The article presents instrumentation for research of technological parameters of ultrasonic treatment on the quality of the cleaning roots crops from soil impurities, the method and results of laboratory studies of ultrasound effect on the cleaning process of potato tubers of the "Red Scarlet" variety and carrot root crops of «Shantane» variety . The optimal parameters of ultrasound influence that intensifies the process of cleaning root crops from soil impurities were determined. The results of comparative laboratory studies of cleaning potato tubers and carrot root crops from various root crops on the physical and mechanical composition of soil impurities (sandy loams and loam soils) allow us to conclude that the best indicators of intensification of ultrasonic influence with increase in the completeness of cleaning, despite the weight and type of contamination, are observed when processing carrot root crops, the completeness of cleaning is on average higher by 13...20 %.

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INFLUENCE OF AGROMETEOROLOGICAL CONDITIONS ON PRODUCTIONAL PROCESS OF THE NORTH ECOTYPE SOYBEAN

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Key words: *soybean, north ecotype variety, central nonchernozem zone, growing season, temperature degree days, hydrothermal index, yield* .

Soybean has ecological adaptability caused by deep selection of this culture in terms of particular characteristics of growing zone. In this respect it demands higher standards of warmth and moistness, especially in particular “critical” periods. The research aim is to determine degree of impact of agrometeorological conditions of growing season on productional process of soybean varieties of the north ecotype. The experiments were carried out in 2017–2019 on experimental facilities of ISA FSAC VIM with varieties of Magev, Svetlaya and Georgia. Phenological observations were conducted; temperature- humidity conditions of growing season

were measured. Limiting factor in particular critical periods of soybean growing and development in the Ryazan region is moisture problem. Lower threshold of dynamic daily mean temperature up to 15–17°C is formed to mid- May, but hereby drought conditions often take place. Biological temperature minimum keeps throughout growth and development, and if anomalous periods of drought or overwetting don't begin, north ecotype soybean varieties ripe in August- breaking of September. North ecotype soybean varieties are able to form straight yield in the Ryazan region. In this respect Kasatka variety showed weak reaction on the change of agroclimatic conditions, which had shortest growing season and yield on the level of 1,00 t/ha. Georgia variety responded better to weather condition changes, its yield varied by year of research from 1,24 to 1,72 t/ha. Magev and Svetlaya varieties fall in between.

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**INFLUENCE OF MINERAL FERTILIZERS ON CHANGES IN
BIOCHEMICAL COMPOSITION OF HETEROGENEOUS SEEDS OF
VARIAGATED ALFALFA WITH BLUEGRASS GRASSES ON
GREY FOREST SOILS OF THE CENTRAL REGION OF RUSSIA**

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Key words: *elements of agrotechnology, alfalfa, heterogeneous seeds, borofoska, ammonium saltpeter, biochemical composition.*

*Sustainable development of animal husbandry and feed production now can be characterized by a complex approach to the introduction of elements of intensive agricultural technologies, the main direction of which should be the rise of natural resource potential of agrocenoses and, as a result, achievement of the necessary amount of balanced carbohydrate-protein complex of highly nutritious feed. Until now, the structure of seeds of perennial grasses has been dominated mainly by bluegrass species. In the future, agricultural producers plan to expand the area of perennial grasses with an increase in the share of legume species in herbage mixtures. Perennial legumes in single and mixed sows are the main components in solving the problem of protein deficiency in the production of highly nutritious feeds. It is known that mixed (heterogeneous) sows of perennial legumes and bluegrass grasses have a clear advantage in productivity over single-species agrocenosis due to the fact that they are much more efficient in using nutrients from the soil and fertilizers, moisture, solar insolation due to the different structure of bush and root system of perennial grasses. When carrying out experiments in the fields of Bryansk SAU, a modern assortment of variable alfalfa and bluegrass perennial grasses was used. In herbage mixtures, the bean component varied from 40 to 50%. Seeding was carried out under the cover of annual ryegrass westerwold (*Lolium westerwoldicum* Wittm.), diploid variety Izorsky. As a legume component, we used variable alfalfa (*Medicago varia* Mart.). The bluegrass component is represented by the meadow Timothy (*phlum pratense* L.), meadow fescue (*Festuca pratensis* Huds.), cocksfoot (*Dactylis glomerata* L.), smooth brome (*Bromopsis inermis* Leyss.). at the present time, the introduction of modern science-based fertilizer systems and technologies for the cultivation of heterogeneous seeds based on the inclusion of crops with productive longevity in their composition will solve the problem of increasing production highly nutritious feed.*

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**COMPARATIVE EVALUATION OF GRAIN PRODUCTIVITY
AND ADAPTABILITY OF EARLY SEASON MAIZE HYBRIDS UNDER
CONDITIONS OF THE SOUTH-WEST OF BLACK EARTH**

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Key words: maize, early-ripe hybrids, grain productivity, adaptability, stability, regression coefficient, breeding value, stress resistance.

The article shows the results of a comparative assessment of grain productivity and adaptability parameters of early-ripe maize hybrids in the South-West of non-chernozem region (Bryansk region). The aim of this work is to study and evaluate the

productive and adaptive potential of early-ripe maize hybrids in the agro-climatic conditions of the non-chernozem region. 22 hybrids of the early-ripe group (FAO 100-200) were taken as the object of research. The tasks of agroecological examining for the period 2016-2019. included an overall assessment of adaptive properties of studied maize genotypes in terms of environmental stability and plasticity, using the "yield" criterion. The features of the production process of maize seeds depending on changes in meteorological conditions of cultivation for the years of examining were studied, which allowed us to assess objectively the level of variation in the grain yield. We calculated the following indicators: index of environmental conditions (Ij), parameters of environmental plasticity - stability (Sd²) and plasticity (bi), stress resistance, yield span (d), ultrastability (Hom), variation coefficient (V). As a result of examining carried out over 4 years, the yield of maize grain varied from 6.02 t / ha of the LG 2195 hybrid of Limagrain Europe selection (France) to 8.69 t/ha of the Ladoga 181 MV hybrid (NGO "Kuban Seed Production"). According to the set of adaptability parameters, hybrids of domestic selection Ladozhsky 181 MV, Ladozhsky 191 MV, Krasnodar 194 AMV and foreign selection - P7954 (Pioneer, France) and Cromwell (KWS, Germany), which have stability, selection value, stress resistance and high productivity of grain in agro-landscape conditions of the Bryansk region were noted.

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INFLUENCE OF TIME OF BIO - AND HUMIC FERTILIZERS APPLICATION ON PRODUCTIVITY OF SPRING CROPS

MULTI-ROW BARLEY

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Key words: *spring multi-row barley, biopreparations, humic preparations, yield, number of plants, productive bushiness, weight of 1000 seeds.*

This article presents the results of research of the influence of bio-and humic preparations on the productivity of spring multi-row barley. It was concluded that they have an effective influence on plants. Studies have shown that when processing crops with potassium HUMATE in the tillering phase and entering the tube, the largest numbers of barley plants were preserved for harvesting and a higher productive bushiness compared to the control was observed. The third use of the preparation slightly reduced studied indicators. It was also established that, on average, for 3 years of research, the use of potassium HUMATE in the tillering phases, entering the tube and earing contributed to a significant increase in the number of grains in the ear and the mass of 1000 seeds. The research results indicate that the yield of spring multi-row barley of Vakula variety significantly changed according to experiment varieties. The maximum increase was provided by three-time treatment of crops with potassium HUMATE. After conducting a correlation

and regression analysis, it can be concluded that the yield of spring barley was equally dependent on the elements of productivity. There was a close positive relationship. Consequently, the productivity of spring multi-row barley plants is significantly influenced by bio-and humic preparations.

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DEPENDENCE OF YIELD AND GRAIN QUALITY OF WINTER SOFT WHEAT VARIETIES ON VARIOUS WEATHER CONDITIONS IN THE MIDDLE VOLGA FOREST STEPPE

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Key words: winter wheat, yield, variety, nature, protein.

The main biotic factors determining the level of productivity potential of winter soft wheat in the Samara region are the amount of rainfalls before seeding and during the vegetation period, as well as the optimal temperature regime. The aim of the research was to evaluate winter soft wheat varieties at the final stage of the selection process (competitive variety testing) in different weather conditions. The research was conducted in Povolzhye SRISB-branch of SamRC RAS in 2016-2019. Winter soft wheat varieties were selected as research objects: Volga 86, Povolzhskaya Niva (included in the State register of selection achievements), Povolzhskaya Nadezhda (undergoing variety testing since 2019), as well as Erythrospermum 3730 and Erythrospermum 3765 varieties that have been distinguished over the years of research. Varieties were seeded on autumn fallow in four-fold repetition with a registered plot area of 25 m². Meteorological conditions for 2016-2019 were analyzed, and their impact on the productivity and quality of grain of winter wheat varieties selected by Povolzhye SRISB was determined. Raindrop of the warm period (April-July) had a significant impact on the yield. The growth season of 2019 was characterized by less favorable weather conditions (the amount of raindrops to the norm – 65.3 %). The most adapted to the stress factors of the environment were varieties of local selection. In this regard, it is necessary to introduce varieties that are resistant to stress factors of the Middle Volga region, capable of producing stable grain yields with the use of mineral fertilizers.

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**EFFECTIVENESS OF BIOLOGIZATION TECHNIQUES IN LINKS OF
CROP ROTATIONS WITH WINTER WHEAT IN THE FOREST-STEPPE
ZONE OF THE VOLGA REGION**

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Key words: complete fallow, peas, white Lupin, winter wheat, biologization, soil treatment, fertilizers.

The performance of the set tasks for the production of the necessary volumes of grain is possible only on the basis of a scientific-based approach to the development of agricultural technologies on a systematic basis. Research aim: to evaluate the effectiveness of methods of biologization of crop rotation links with winter wheat at the expense of grain legumes and organomineral fertilizer systems in conditions of forest-steppe zone of the Volga region. The research was carried out in years long stationary field trial of the department of agriculture, crop production and breeding of FSBEI HE Ulyanovsk SAU in 4-6-month field crop rotations. The objects of study were of crop rotation links with winter wheat: 1) complete fallow-winter wheat; 2) peas - winter wheat; 3) Lupin - winter wheat; 4) Lupin + peas - winter wheat. In the structure of land use, there is still a high share of complete fallow, which has negative environmental consequences. The main reason for the introduction of complete fallows is the preservation of moisture for seeding winter crops. However, our research shows that when replacing complete fallows to grain legumes (peas, white lupine), 23.0-25.0 mm of productive moisture accumulates in the soil before seeding winter wheat, which, if agrotechnical requirements are met, allows you to get seedlings and sufficient development of winter wheat in the autumn period. Despite the higher yield of winter wheat by complete fallow, the productivity of links with legumes was higher. The inclusion of grain legumes in crop rotations as steam-generating crops can be used to eliminate the negative effects of complete fallow. The results obtained allow us to recommend combined tillage that includes soil loosening for grain legumes and surface tillage for winter wheat, as well as to use the organomineral fertilizer system straw + NPK, while the doses of mineral fertilizers are calculated on the planned yield of grain legumes of 2.5-3.0 t/ha and winter wheat - 4.5 t/ha.

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ISSUES OF IMPROVING THE SEMIEMERIC MODEL OF SOIL FOR DETERMINING ITS WATER CONTENT

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Key words: soil, model, water content, remote sensing, calibration.

The article is devoted to modeling the process of determining the water content of the soil. Monitoring of soil water content can be conducted using various contact methods, including gravimetric, electromagnetic, thermal, and other methods. The most promising method is considered to be hyperspectral, where the measuring signal is dependent on the color of the soil and its texture, as well as on the content of organic substances in it. In General, remote sensing methods with higher resolution rates both in time and in space allow us to achieve high efficiency in solving this issue. The proposed method of calibration of a known model uses as a starting position a known model relationship between the percentage of water content of the soil and quantity of reflected signal, averaged over all types of soil. Analysis of the well-known method of the inverse semiempirical model of the reflection signal showed that for the accurate realization of this method, used semiempirical model itself must be pre-calibrated. It is shown that an exponential generalized model developed on the basis of data from the XS1 SPOT channel can be used for preliminary calibration of the semiempirical model. Expressions are obtained for performing preliminary calibration of the semiempirical model and thus eliminating the error of measurement of the "miss" type when realizing this method using the inverse semiempirical reflection model. Despite the use of different wavelength ranges, obtaining the same mathematical expressions of the two models under consideration allows to make preliminary calibration of the semiempirical model used to determine the water content of the soil.

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POSSIBILITIES OF APPLICATION THE EFFLUENT OF BIOGAS UNIT

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Key words: *effluent, biomass, Amaranthus retroflexus L., organic fertilizers, composite fuel.*

As the result of the biogas plant work , a lot of sludge (effluent) is formed, which can be used for various purposes. This article shows the possibility of appliance solids of effluent as an organic fertilizer, as well as fuel for generating thermal energy. The studied effluent was obtained after anaerobic fermentation of cow dung and biomass of the plant Amaranthus retroflexus L. In addition, mixtures of effluent with residues of plant biomass were examined . They are a mixture of seeds, stems and leaves in a ratio of 1:1,1:1,6. Five samples were examined: 100% effluent; 75% effluent and 25% biomass; 50% effluent and 50% biomass; 25% effluent and 75% biomass; 100% plant biomass. The content of nutrients (total nitrogen, phosphorus, potassium) in the samples significantly exceeds the indicators recommended by GOST 33380-2015. It was established that studied samples have high concentrations of copper and zinc. The studied effluent can not be used in its

pure form as a fertilizer, but it is advisable to mix it with other components characterized by a "poor" mineral composition, such as peat. For the production of soil additives, the weight ratio of dry raw materials of effluent to lowland peat is 1:5. The lowest heat value of effluent in a mixture with plant biomass was from 12.4 MJ/kg to 14.1 MJ/kg. For heat value, it is most effective to use pure effluent and composite fuel consisting of 75% effluent and 25% biomass of the plant *Amaranthus retroflexus* L. The high ash content of the studied samples is due to the increased content of CaO and SiO₂ oxides.

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SEPTIC CONDITION OF ARRIGATED MEADOW SIEROZEM SOILBY PESTICID RESIDUES

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Key words: *organochlorine pesticides, soil, pest and blast pesticides, agrochemicals, organochlorine insecticides, net output, toxic pesticides, fertility, irrigated lands, natural environment, admissible concentration limit.*

In the Republic of Uzbekistan widespread agrotechnical and melioration measures are carried out, aimed to meet the population demands on the ecologically clean agricultural products. The output quality can be improved through quantity reduction of residue toxic pesticides accumulating in soil. Study of soil quality, development of agro-engineering measures on pollution decrease are an important problem today. The research was conducted in the fields of meadow sierozem soil with a total area of 5 hectare of selected agricultural holding. In 5 key fields soil samples were taken for chemical analysis. As an experimental zone the 1st cut was chosen, placed with a height of 420 meters above sea-level. In the first ten days of April 26 soil samples were selected from soils 0-30, 30-50, 50-80, 80-100, 120-150 centimeters with 3 cuts and 2 borer points (hand drill). The research was conducted in field and laboratory conditions. Solution of obtained soil samples was tested on Mass- chromatograph machine. In determining of initial ecological state of soil, the main focus was given to organochlorine pesticides with toxic effect. Admissible quantity (MAC) in soil for pesticides HCCH and its metabolites is 0,1 mg / kg. Laboratory research showed that in analytics in all cuts the number of pesticides is high, that is 1-35, 3 times higher than MAC, determined for soil.

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INFLUENCE OF DOSES AND TERMS OF APPLICATION OF MINERAL FERTILIZERS ON THE FORMATION OF WINTER WHEAT YIELD

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Key words: winter wheat, mineral fertilizers, terms and doses of application, crop quality, yield

In 2016-2019, research was conducted on the experimental field of the Ulyanovsk research Institute for the purpose of determining the effectiveness of starting doses of mineral fertilizers, as well as nitrogen fertilizing on the productivity and quality of winter wheat grain Marathon. Studies have established the optimal lead time of nitrogen fertilization and doses of mineral fertilizers. Weather conditions over the years of research were contrasting, which allowed us to assess the responsiveness of winter wheat to mineral fertilizers in conditions of different moisture availability. The most effective options were those with nitrogen fertilization at a dose of 34 kg/ha in the spring period on frozen soil, which allowed to obtain an additional 0.51 t/ha and, conversely, the lowest-in the autumn period (+0.16 t / ha). The maximum yield of winter wheat (3.72 t / ha) is formed during the seeding with the simultaneous introduction of 45.5 kg/ha of complex fertilizers in the rows against fractional application of ammonium nitrate in spring during tillering and booting of plants in the amount of 34 kg/ha and top dressing in the phase of earing with urea at a dose of 15

kg/ha. Correlation analysis showed a positive close relationship between the elements of the structure of the winter wheat crop depending on different doses and methods of applying mineral fertilizers and nitrogen fertilizers ($r=0.82-0.96$). The highest content of protein (on average 14.1%) and gluten (33.0%) was provided on the control background without use of ordinary fertilizers. The use of complex fertilizers during seeding resulted in a slight decrease of amount of protein (by 14%) and gluten (up to 32.4-32.9%). Nitrogen fertilizer had a greater impact on these indicators.

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VARIETAL DIFFERENTIATION OF WINTER SOFT WHEAT BY MATURITY GROUPS IN THE FOREST-STEPPE OF THE MIDDLE VOLGA REGION

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In wheat selection, the earing period is a fairly reliable criterion for determining the ripeness group of the variety. The aim of the research was to determine the maturity groups of winter soft wheat varieties of various ecological and geographical origin in the middle Volga forest-steppe. 18 varieties of winter soft wheat included in the State register of selection achievements for the middle Volga region of Russia were used for research in machine seeding. 102 varieties originating from 11 countries were used in manual seeding. It is established that the intra- and intervarietal change of the date of winter soft wheat earing is weak and moderate. The share of genotype (variety) influence in the variability of the duration of the growing season of winter soft wheat is 56.1 %, the year conditions-4.4 %, and the "genotype-year" interaction-36.5 %. Among the assortment of winter soft wheat of domestic selection, 54% of varieties showed themselves to be medium – ripe, 24% – medium-early, 10% - medium-late. The late-maturing, early-maturing, and ultra-early-maturing groups only included single varieties in certain years. Among the studied assortment of the world wheat collection late maturity had variety of Germany, the earliness and medium early–wheat of China, Japan, Bulgaria and the North Caucasus region of Russia, medium maturing varieties of the Siberian region of the country. Wheat of different groups of ripeness were represented by varieties of Ukraine. The ultra-early and late-maturing varieties of foreign selection selected in the study are valuable as a source material for the selection of soft wheat for the duration of the growing season in the middle Volga forest-steppe.

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**INFLUENCE OF METEOROLOGICAL CONDITIONS ON
ECONOMICALLY VALUABLE FEATURES OF OILSEED FLAX IN THE
FOREST-STEPPE ZONE OF THE MIDDLE VOLGA REGION**

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Key words: oilseed flax, correlation, coordination, yield, temperature, rainfall, HTF.

The research was carried out in the fields of Povolzhsky research Institute of selection and seed farming named after P. N. Konstantinov in the laboratory of introduction, selection of feed and oilplants in 2016-2019. The soil of the experimental field is typical low-humic medium-sized light clay chernozem. The object of research was a variety of oilseed flax Kinelsky 2000, approved for use in the Middle Volga region. Agro-climatic conditions in the years of research during the growing season differed both in the amount of rainfalls from 74.3 mm in 2019 to 187.0 mm in 2017, and in the temperature conditions from 1776.50 C in 2017 to 2074.00 C in 2018, which allowed to determine objectively the productivity of oilseed flax. The article shows the results of studying the influence of meteorological conditions on the length of vegetation season, yield, oil content in seeds, oil collection per hectare, plant height, the number of capsules per plant, the number of seeds in a capsule and the weight of 1000 seeds. The correlation of the sum of active temperatures, rainfalls and hydrothermal factor (HTF) for the vegetation period with the main economically valuable characteristics of oilseed flax is established. Analyzing the data obtained, it can be concluded that the yield of oilseeds, plant height, number of seeds in the capsule and oil collection per hectare were significantly affected by the amount of rainfalls during the vegetation period and the HTF. The sum of active temperatures affected the length of the vegetation period and the number of capsules on the plant.

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**SPACKLED YELLOWS OF WHEAT LEAVES: DISTRIBUTION,
INJURIOUSNESS, RACIAL COMPOSITION
(REVIEW)**

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Key words: *spacked yellows of wheat leaves, Pyrenophora tritici-repentis, distribution, injuriousness, racial composition*

Spackled yellows of wheat leaves is caused by pathogen Pyrenophora tritici-repentis (Died.) Drechs.). This is a widespread disease and in addition to wheat, the pathogen affects more than 60 species of cereals and wild relatives. The review presents spread of pathogen in the world and in Russia, its biological features and injuriousness, which is associated with reduction of yields up to 60% in the years of its epiphytotic development. Special attention is paid to the racial composition of P. tritici-repentis in various geographical zones and the heterogeneity of the distribution of races in the world. The most common races of spacked yellows pathogen are races 1 (Tox A, Tox C), 2 (Tox A), 7 (Tox A, Tox B), 8 (Tox A, Tox B, Tox C). The formation of atypical races that cannot be referred to the existing classification is noted, which indicates high adaptive properties of the phytopathogen. At present, ubiquitousness of fungus, its high adaptive abilities, saturation of crop rotations with grain crops, cultivation of unstable varieties, minimization of soil cultivation and other reasons will contribute to further spread of the harmful disease, which actualizes the need to develop integrated systems for protecting crops from spackled yellows pathogen.

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COMPARATIVE ANATOMY OF LACRIMAL BONE OF BACTRIAN CAMEL

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Key words: *bactrian camel, livestock animals, comparative anatomy, skull morphology, lacrimal bone.*

The aim of anatomy- morphometric research was explanation of comparative anatomy of lacrimal bone of bactrian camel with other livestock and domestic animals. The material for craniometrical research of lacrimal bone in Bactrian camel in comparative aspect was tilled skulls of mature animal. Anatomical study was conducted according to definite methods, clean of soft tissues skull bones underwent treatment using maceration and cooking in dishes over a low heat. Lacrimal bone of bactrian camel is represented by pair bone, as all livestock and domestic animals, in contrast to other ruminants, the studied bone of given type of animal is small against skull size and located fully inside the eye pit as in dogs. Lacrimal bone of bactrian camel in contrast to other animals borders only with frontal, upper jaw and process bones, it doesn't border with nasal bone. Between nasal and lacrimal bone topographically there is a passage that form because of immaturity of frontal and upper jaw bones and has different shape and size, suture of bactrian camel leans perpendicularly front jaw outside oval of the passage. Other ruminants and types of animals don't have the passage, only goats have it and it is called lacrimal fontanelle. The results of our research in cranial anatomy of Bactrian camel in comparative aspect fill in the gaps when writing relevant parts in manuals and study guides in morphology of livestock and domestic animals and in topographic anatomy

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ASSESSMENT OF THE NATURE OF THE MICROCIRCULATORY RESPONSE TO EXPERIMENTAL THERMAL INJURY

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Key words: *thermal injury, burn disease, pathogenesis, microcirculation, cutaneous blood flow*

Burn disease affects the functioning of almost all functional systems, having a negative effect on them due to the development of endotoxemia and vascular disorders. At the same time, the greatest attention is paid to the shifts that form in the systemic hemodynamics, primarily in the coronary and pulmonary blood flow, which can cause the development and progression of life-threatening conditions. At the same time, the microcirculatory system is also undergoing changes, but these changes have been studied in much less detail. The aim of this research was to study the state of skin microcirculation in healthy and burned rats. The experiment was carried out on 20 adult male Wistar rats divided into two equal groups. The first group of animals (n=10) was a control group (intact), with its representatives there were not any manipulations, except for a single study of the state of microcirculation. Rats of the second (main) group (n=10) were simulated contact thermal burn using their own patented method. The assessment of microcirculation parameters in the main group of animals was carried out by laser Doppler flowmetry on the device "LAKK-M" on the 1st day (2-3 hours after the injury), on the third and tenth days after the burn period. It was found that thermal injury has a negative impact on the microcirculation system, which is seen in a decrease in the intensity of blood flow through small-diameter vessels. This is achieved by reflex vasospasm, reducing the release of nitrogen oxide by endothelial cells and activating precapillary sphincters, and simultaneously activating the shunting ways of cardiac shunt from the arterial directly to the venous channel, bypassing the capillaries. Thus, in the post-thermal period, a compensatory "robbing phenomenon" is realized in the border zone of the burn, which requires pathogenetic correction.

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**BACTERIOPHAGE PREPARATION ENGINEERING FOR
BIOCONTROL OF *PSEUDOMONAS SYRINGAE* IN CROP SCIENCE**

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Key words: *Pseudomonas syringae*, bacteriophages, lytic activity, specificity, stability

Phytopathogenic bacteria Pseudomonas syringae cause diseases of many cultivated plants, causing tumor neof ormation, rot, chlorosis, necrosis, etc . The advanced biological mean to control bacteriosis in crop science is bacteriophages. In this work full biological characteristic of 8 bacteriophages is shown, active according to Pseudomonas syringae. The studied phages formed similar negative colonies- clear, rounded, in diameter of 5-9 mm. Lytic actifity of phages Pseudomonas syringae by Appelman from 10^{-4} to 10^{-8} ; by Gratia from $1,0\pm 0,1\times 10^6$ to $2,0\pm 0,1\times 10^9$ (BFU/ml). Bacteriophages Ps.s-7 UlGAU, Ps.s-13 UlGAU and Ps.s-27 UlGAU did not change lytic activity when storing in fridge during 12 months. Lytic activity of phages Ps.s-1 UlGAU, Ps.s-8, Ps.s-15 UlGAU, Ps.s-30 UlGAU, Ps.s-77 UlGAU in the same conditions fell within 1-2 orders. Spectrum of lytic activity of phages varied from 21,4% (Ps.s-13 UlGAU) to 85,7% (Ps.s-7 UlGAU, Ps.s-27 UlGAU). The study of phage specificity on 15 species og heterologous cultures showed that phages are specific for Pseudomonas syringae. Phages are moderately stable to heating and lose activity during 30 –minute temperature effect above 62°C. The optimal way to relieve phage lysate from living cells of Pseudomonas syringae was thrichloromethane at a ratio of 10:1and temporal exposition 45 minutes. On the basis of obtained data we determined capacity of each bacteriophage for the use as biocontrol agent. For further research for the study of molecular genetic characteristics we selected advanced strains of phages Pseudomonas syringae - Ps.s-7 UlGAU u Ps.s-27 UlGAU.

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DEVELOPMENT OF SELECTIVE MEDIUM FOR BACTERIA *Y. RUCKERI*

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Key words: *Y. Ruckeri*, bacteria, identification, selective medium, substrate, sodium azide, sodium dodecyl sulphate.

*In this work the research results on development of selective biphasic medium for detachment and bacterial identification of microorganism *Y. ruckeri* are shown. The selective medium consists of 2 phases: 1) liquid, on the basis of meat-peptone broth, sodium azide (NaN_3) and sodium dodecyl sulphate; 2) dense, including agar, maltose, trypton and bromthymol blue. It was established that substrate on the basis of sodium azide and dodecyl sulphate admit growth of *Y. ruckeri* on dense phase only under condition of weakening NaN_3 with 0,08%, based on its molecule migration into agar. During the test on specificity, engineered biphasic medium showed presence of adequate stability of microorganisms of *Yersinia* species to inhibitory environmental components. Bacteria *Y. ruckeri*, *Y. enterocolitica*, *Y. pseudotuberculosis* species showed good growth even in weak concentrations, but it*

was not showed by used I experiments bacteria of gram-positive and gram-negative groups, such as *Staphylococcus aureus*, *Bacillus cereus*, *Escherichia coli*, *Flavobacterium psychrophilum*, *Aeromonas hydrophila*. So the use of this selective medium is entirely sufficient for primary differentiation carrying out of bacteria *Yersinia* species from other gram-positive and gram-negative microorganisms found in fish water area. For further differentiation of *Yersinia ruckeri*, cultures it is enough to cultivate cultures, obtained on experimental medium, on Giss medium with arabinose 48 hours at the temperature of 26⁰C. Bacteria *Y. species* doesn't ferment arabinose, in contrast to other bacteria *Yersinia*, which allows to make clear specific belonging of studied cultures.

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MAIN GROWTH CHARACTERISTICS OF BACTERIA *BORDETELLA* *TREMATUM* SPECIES

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Key words: *bacteria, Bordetella, B. trematum, tinctorial properties, cultural properties, biochemical activity.*

*The article is concerned with the study of main biological properties of bacteria *B. trematum* species. In this work the research results of their tinctorial, cultural and biochemical properties are shown, with the view to grounding for setup scheme of isolation and bacteriological test of stated microorganism. According to obtained data bacteria of the given species represents gram-negative, coccoid bacillus that are able to grow both on usual and differentially diagnostic mediums.*

Bacteria B. trematum grow in temperature range of 17-42⁰C, optimal temperature of cultivation is 37°C. It should be noticed that the most relevant medium for cultivation is bordetellagar. It was established that bacteria grow on the sodium chloride mediums in the range of 3-5%. It was found that studied culture of bacteria *B. trematum* shows проявляет asugarlytic properties, has positive reaction on catalase, negative reaction on cytochrome oxidase and DNase. Also during the research it was established that bacteria *B. trematum* doesn't utilize urea and citrate, has weak proteolytic activity and doesn't utilize a number of amino acids. Similar results were obtained when using the set Api 20 E and NEFERMtest 24. Additionally it was established that *B. trematum* doesn't reconstruct nitrates to nitrites, doesn't enzyme β -galactosidase, adrinin hydrolase, triptophane dyaminaze, lysine decarboxylase, ornithine decarboxylase and urea doesn't utilize citrates, doesn't produce H₂S, indole and acetone, doesn't oxidate sucrose, melibios, amigdalín . Research results represented in the article provide the basis of isolation scheme and identification of bacteria of given species.

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IDENTIFICATION PARAMETERS OF PSE-DEFECT AND MYOPATHY OF INFECTIOUS AND INFECTIVE AETIOLOGY

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Key words: *broilers, poultry meat, muscles, causative agents, pathognomonic features, veterinary-sanitary evaluation.*

The materials on identification in broiler meat the features of PSE- defect and myopathy are shown, associated by causative agents of various infectious and infective diseases. Specific differences in pathomorphology symptoms of PSE-meat and myopathy of infectious origin are established. Symptoms of PSE- defect in broiler meat emerge more often (11,7 – 21,7%), than signs of degenerative changes from exposure of infectious disease agents and muscle invasion(4,19-7,61 %). It was established that changes in muscles depend on degree of development PSE-defect. That's why during veterinary –sanitary inspection of organs and broiler carcasses we can determine not only features of PSE-defect, but degree of their development . During veterinary- sanitary inspection of poultry meat, four development stages of PSE-defect can be determined: extreme, florid, moderate, ill-defined. The criteria of such meat assessment are best attested pH value, muscle color, water capacity, muscle consistency on a cut and other deviations in organo-leptic attribute. The most reasonable procedure of poultry meat processing with signs of PSE-defect and myopathy of infectious aetiology. It is recommended in all cases of muscle fiber defeat as a result of PSE- defect or infectious and invasive diseases, broiler carcasses, to consider “limitedly suitable” and undergo laboratory research. In case of weak localized muscular tissue affect of carcasses it is wise to aim for boiling. In case of infectious and invasive disease, associated with evident muscle disorder, carcasses need to aim for utility waste. Meat of forcedly killed poultry after thermal antiseptis can be used for production of cooked sausages and tinned meat.

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BACTERIOLOGICAL CHARACTERISTICS OF THE EFFECTIVENESS OF VARIOUS METHODS OF ACCIDENTAL WOUND DRAINAGE

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Key words: *wounds, bacteriological control, domestic and farm animals, drainage, deep antiseptics, primary surgical debridement, dialysis.*

The article presents data on the bacteriological control of the effectiveness of various methods of draining fresh accidental wounds with a wide area of damage in different species of animals: semipermeable membranes and tubular perforated drains. Semi-permeable cellulose membranes (experimental group) were inserted into the wound of animals with absolute indications for drainage at the final stage of surgical treatment. These membranes were filled with a hyperosmolar dialysis solution containing antibacterial preparations. The comparison group used the introduction of antiseptics through perforated tubular drains. In order to study the quantitative and qualitative composition of microflora in the wound process, bacteriological studies of swabbings from the wound surface and from the wound canal were performed on 1-3-7-9 days. As the result, it was established that the degree of tissue contamination depends on the duration of surgical debridement, type and conditions of animals. The study of quantitative composition of micro flora in 1 g of tissues, in farm animals, with accidental wounds was up to 10⁵. The appliance of wound dialysis gave rapid destruction of associations of 2 and 3 types of microorganisms, in contrast to the control group of animals. The effect of applying membrane dialysis

devices, in case of accidental wounds, allows to achieve positive results for 3-4 days. Bacteriological studies confirm the high antibacterial activity of dialysate, which was provided by the introduction of antibiotics and antiseptics into its composition. The introduction of antibiotics and antiseptics into the membrane drainage cavity once a day in the amount of a single therapeutic dose, allows for 7.1 ± 1.3 days ($P > 0.001$) to suppress the microflora in the wound. Higher antiseptic effectiveness of dialysates from semipermeable membranes is connected with their ability to create a constant high concentration of antibacterial substances in the wound focus. The mechanism of therapeutic effect is in a gradual and constant flow of antiseptics into the paravulnar tissues, by diffusion. This improves the conditions for the development of the body's own phylactic power against infection and raises regenerative processes in the wound.

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**HISTOLOGICAL CHARACTERISTICS OF REPARATIVE
PROCESSES OF THE SOFT TISSUES IN THE HOOVES
IN ORTHOPAEDIC COWS**

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Key words: *purulo necrotic ulcer, color, tissue specimen, cow, hoof, derma, inflammation, infiltration, hyperkeratosis*

Over the past 30 years, diseases in the hoof area in cows are a very serious and actual problem for all dairy farming. During the treatment of purulo-necrotic diseases of fingers, particular importance should be given to the search of new means of facilitating the cleansing of the wound surface from purulent exudate, early elimination of inflammation and a more rapid formation of healthy granulation tissue in the wound and quicken the transition of the inflammatory-dystrophic phase (hydration) in the regenerative phase (dehydration). This article shows the results of histological studies of selected tissue samples with puruo-necrotic ulcerative lesions in the hoof area against the complex therapy. The research was conducted on the basis of LLC PSK "Krasnaya Zvezda" of the Ulyanovsk region, on cows suffering from purulo-necrotic ulcers in the hoof area. The material for histological studies was selected after mechanical treatment of the limbs from the areas of affected soft tissues in the hoof area before treatment, on the 7th and 14th days, with subsequent fixation in 10 ... 12% formalin. The sections were colored using hematoxylin and eosin and Van Gizon staining. During conducted research it is established that when using biologically active Diotevin sorption preparation in complex treatment of orthopedic ill cows on histological level revealed weak evidence of the inflammatory process, changes of angiogeneses structure of granulation tissue in the form of increased vessel density, capillary type and number of fibroblastic cells with further proliferation of epithelial cells in the dermis with recovery of epidermis with signs of hyperkeratosis.

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MICROBIAL LANDSCAPE IN COWS MASTITIS

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Key words: *cows, mastitis, microorganism association, farm biogeocenoses.*

Despite the subdivision of livestock farms in the process of agricultural reform, obstetric and gynecological diseases in farm animals, including mastitis, remain key problem for veterinary medicine specialists. Studies on the bacterial etiology of mastitis in cows were conducted in 12 farms in the Moscow region with a population of 12254 cattle, including 4445 cows. When studying microbiocenoses during mastitis in cows on farms in the Moscow region, it was found that the microbial landscape of cow udder secretions in mastitis is very diverse and heterogeneous. Thus, 486 pathogenic and conditionally pathogenic microorganisms were isolated from 103 cows with mastitis, which were referred to 11 species. More often, during mastitis in cows, representatives of *Streptococcus* SP. p., *Staphylococcus* sp. p., *Lactobacillus* sp. p. and *Escherichia* sp. p. were isolated from udder secretions. – 25,7 %; 20,8 %; 18,3 % and 9.6 %, respectively. It was established that mastitis in cows is caused not by a single pathogen, but by microbial associations, which include from 2 to 7 isolates. When serotyping *E. coli* cultures, it was established that from the milk of cows with mastitis, O8 and O18 were most often isolated by 7 (15.2 %), O78 – 6 (13.1 %), and O101 and O126 by 5 (10.9 %) cases out of the total number of isolated serotypes. Of the udder secretions of cows with mastitis, 37 (80.4 %) isolates from the total number of *Escherichia coli* also had hemolysin-producing properties. In the milk of cows with mastitis, the highest concentration contains representatives of the species *Staphylococcus* sp. p.; *Escherichia* sp. p.; *Pseudomonas* sp. p. and *Streptococcus* sp. p.,

respectively, 5.67 ± 0.08 lg; 4.37 ± 0.32 lg; 4.24 ± 0.20 lg and 4.13 ± 0.15 lg. Fungi of *Candida* species varied at the level of 102 CFU. More often, pathogenic properties were found in cultures of *S. aureus* 48 (27.7 %), *E. coli* 22 (12.7 %), *S. uberis* 18 (10.3 %) and *S. dysgalactiae* 17 (9.8 %) of the total number of pathogenic isolates for white mice. Of the 11 isolated cultures of *Candida* fungi, 5 (2.9 %) isolates were pathogenic. The highest antimicrobial activity was observed in enrofloxacin, cephalixin, norfloxacin, cobactan and ofloxacin. The number of microbial isolates sensitive to these antimicrobial agents was 466 (98,1 %); 455 (95,8 %); 440 (92,6 %); 438 (92,2 %) and 432 (90.9 %). The most effective antimycotic agent was intraconazole, which showed activity to all 11 (100.0 %) isolated fungi.

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INDIRECT SELECTION OF FEMALE TROUT AS A SELECTION METHOD TO INCREASE THEIR PRODUCTIVITY AND RESISTANCE

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Key words: *trout, exterior, selection, morphometry, reproduction, immunity, immunoglobulins, blood proteins, hematopoiesis.*

The scientific work considers the selection method of selection in a herd of producers of rainbow trout Kamloops, taking into account values of positive correlation of some morphometric characteristics and degree of development of their reproductive products, as well as the features of natural protective functions of their body at the age of three. It is established that the somatic structure and, development of postorbital region largely determine the functional features of trout, as well as their reproductive qualities. In the indirect selection of three-year-old breeders,

taking into account morphometry and correlation, females with a size of postorbital head region greater than 55 mm exceeded by 29.2% the live weight and by 40.4% the weight of trout caviar with a length of this head region less than 55 mm. When comparing the resistance of two experimental groups of three-year-old breeder flock, certain differences in immune proteins and hemoglobin content in blood were revealed. Note that in the selected group of fish, a large degree of saturation of red blood cells with hemoglobin is observed, which indicates increased share of oxygen absorption by the body, as well as the intensity of redox processes of metabolism. Indicators of serum proteins of trout in experimental groups vary ambiguously. So in the experimental group, producers had an average total protein in blood of 63.26 g / l, which is significantly 17.5% more than in the blood of fish in the control group. This can be explained by the relationship of the globulins with the immune status of fish of experimental group and its resistance by raising the level of globulin fraction, a high amount of Ig M` protein (by 42.9%) in the blood of trout in the experimental group suggests more aggressive immune system in these fish to viral, invasive and other infections, indicating improved adaptability of selected herds.

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INFLUENCE OF GROWING HEIFERS INTENSITY ON MILK PRODUCTIVITY OF RED-AND-WHITE COWS

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Key words: *breed, live weight, milk productivity, fat, protein, diet, average daily growth, feeding level.*

Therefore the intensification of the dairy cattle breeding industry gives priority to the realization of the genetic potential of dairy productivity of cows, the preservation of their health, good reproductive qualities and the duration of economic use. In this regard, the study of the influence of the intensity of cultivation on the productive qualities of red-and-white cattle is of scientific and practical importance. 5 groups of red-and-white animals (20 heads in each group) were formed to conduct the experiments. Feeding was planned to receive an average daily increase in the first experimental group within the range of 850-900 g, the 2nd group received a diet planned for 800-850 g, the 3rd group for 750-800 g, the 4th for 700-750 g and the 5th household diet for 650-700 g of average daily growth. Based on the conducted research, it can be concluded that red-and-white animals are able to grow live weight at a young age, which indicates earliness of animals. Heifers of the first experimental group reached a live weight of 380 kg at 13 months of age, the 2nd experimental group at 14 months, the 3rd experimental group at 15 months, the 4th experimental group at 16 months, and the control group at 17 months. From heifers that reached a live weight of 380 kg and sired at the age of 14-15 months, they were subsequently milked for the first lactation of 6192 and 6345 kg, for all lactation of 24684-24944 kg of milk.

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INDIRECT METHODS OF NUTRIENTS DETERMINATION IN FEED STUFF FOR DIARY CATTLE, SHEEP AND PIGS

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Key words: feedstuff, feedstuff nutrition, chemical composition of feedstuff, norms of demands, dairy cattle, sheep, pigs.

We considered the question of demand parameters correspondence in feedstuff nutrition of separate groups of animals to parameters of feedstuff nutrition and

possibility of their determination in feedstuff. For comparison we chose methods of determination of feedstuff chemical composition during zootechnic analysis, actual data of feedstuff nutrition on a database and estimate indicators of feedstuff chemical composition. Under factory conditions it is practically impossible to make full zootechnic feed analysis of diet according to specified parameters on grounds of analysis cost, laboratory opportunities and time conditions. Indirect methods of feedstuff nutrition index obtainment from data base and calculation with the help of regression were developed. However from database it is not always possible to get comprehensive information. There is not enough information in database on content in feedstuff microelements, vitamins, ADF, NDF, starch, sugar, etc. For calculation of feedstuff nutrition formulae were used in indirect method. They fully provide calculations of energetic partially protein feedstuff nutrition, but also calculations of separate parameters of carbohydrate nutrition. For calculation of mineral and vitamin and specific parameters of lipidic and carbohydrate nutrition there are no certain calculation formula. Consequently, along with advance of analysis methods of feedstuff chemical composition, it is necessary to broaden and deepen databases of feedstuff and continue research to establish mathematical models for calculations of feedstuff chemical composition. These developments will allow significantly speeding up calculations of diets, reducing costs and time on feedstuff analysis.

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**EFFECTIVENESS OF APPLICATION OF FILLING AGENT
BASED ON MODIFIED DIATOMITE
IN DAIRY FARMING**

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Key words: mineral, feed additive, cow, milk, blood.

The manifestation of mineral deficiency in the body of animals contributes to a decrease in their productivity and the development of diseases such as perversion and loss of appetite, anemia, endemic goiter, rickets, and osteoporosis. One of the ways to solve the problem of mineral insufficiency is the scientific search and development of advanced formula of feed additives based on natural minerals processed by high technologies. The aim of this study is to determine the effectiveness of using modified diatomite as a feed additive for dairy cows. The experiment was carried out in Ulyanovsk region during 100 days. We formed groups of animals of 50

cows, the 1st group (control) did not receive additives, but only a household diet, in the 2nd group an additive based on modified diatomite was additionally introduced into the diet in a mixture with feed at the rate of 250 g/head/day, . For the physiological experiment, 5 cows were selected by the method of pairs of analogues. It was established that the introduction of additives based on modified diatomite into the diet of cows improves the morphological composition of their blood. Intake of the additive increases milk yield by 24.7% at $p < 0.05$, the amount of milk fat by 16.2 % compared to the control. The effect of afteraction after stopping feeding the additive was revealed. The use of an additive based on a modified mineral is a cost-effective measure that reduces feed costs and gets additional profit. The average daily yield of natural milk increased by 8.2 % for 1 ruble, and a profit of 4.30 rubles was received . There was a decrease in feed costs for the production of 1 kg of natural milk, up to 0.85.

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EGG PRODUCTIVITY OF LAYING HENS OF VARIOUS CROSSES

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Breeders of edible eggs, using various crosses of chickens, try to reduce the cost of production. In this regard, interests of hen crosses that produce egg products with low feed costs and low cost. One of these egg crosses of hens is "Lohmann brown light". At the same time, domestic poultry farms successfully use the "Lohmann Braun classic" cross poultry. The aim of the study was to evaluate the egg productivity indicators of laying hens of the industrial herd of crosses "Lohmann brown classic" and "Lohmann brown light". The study was carried out in the conditions of LLC Poultry Farm "Varaksino" of the Udmurt Republic. For the research, 2 groups of hens were formed, consisting of 6 batches each. As a result, hens of the studied crosses were characterized by approximately the same viability and level of livestock preservation – 94.1 – 94.3 %. Crosses of hens "Lohmann brown classic" and "Lohmann brown light" had minor differences in quantitative and qualitative indicators of egg production. Thus, egg production for the initial and average laying hens in the groups was at the level of 348.2 – 350.5 and 353 – 355.2 eggs, respectively. The amount of egg mass from the cross "Lohmann brown classic" hens was 22.9 kg, and from the cross "Lohmann brown light" - 22.6 kg. On an equal background of feeding, there were no differences in the cost of feed for the

production of 10 eggs (1.29 – 1.31 kg) and 1 kg of egg mass (2.03 – 2.05 kg) in the studied hen crosses.

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