

AGRICULTURAL SCIENCES

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PATHOMORPHOLOGIC ESTIMATION OF THE STATUS OF THROMBOCYTOPOESIS IN THE SPLEEN OF SIBERIAN STURGEONS AT THE PSEUDOMONOSIS

Wide circulation among the sturgeon fishes that are grown up in the installations of the closed water supply (ICWS), a pseudomonosis and absence reliable data on mechanisms of development of platelets in an organism of these animals have become the basis to carry out comparative histological morphometric and statistical levels of a trombositopoesis of an assessment at fishes healthy and sick with this bacteriosis. It is established that sources for development of platelets in the sturgeons' spleen are small, and to a greater degree - big megakaryocytes represented in the form of symplastlike multinuclear cellular educations up to $4685,95 \pm 158,34 \mu\text{m}^2$. Process of platelets formation most actively proceeds in cytoplasm of large megakariocytes. Because of numerous splittings and differentiation of a kernel, enriched by euchromatin, they have turned into small structures possessing of condensed chromatin. Numerous kernels in the megakariocytes acquired horseshoe and helicoids arrangement in the cytoplasm. Gradually moving in megacariocyte's cytoplasm hyperchromic kernels were reaching cytolemma's area and leaving its boards having turned into platelets, and surrounding itself with hardly noticeable the thinnest layer of cytoplasm. Platelets at sturgeons had the extended oval form in the majority and have intensively basophile coloring. Процесс выработки тромбоцитов у исследованных больных псевдомонозом осетров происходил с многочисленными

нарушениями. Process of development of platelets with the studied pseudotients pseudomonosis sturgeons took place with multiple violations. For 2-4 week of the fishes' disease reduction of quantity of megakariocyte by surfaces of a cross cut of a spleen ($4,01 \pm 0,27$) has been fixed, cage cytoplasm's smaller of smaller square were prevailing ($4155,45 \pm 253,85 \mu\text{m}^2$), the number of the kernels ($10,10 \pm 0,60$) and created platelets near a caryolemma was reduced ($2,40 \pm 0,17$). Thus, process of thrombocytopenia increase plays an important role in development of the pseudomonosis with the Siberian sturgeons.

Key words: siberian sturgeons; spleen; pseudomonosis; trombotsitopoesis; ICWS.

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EFFICIENCY OF PEAT-MANURE COMPOST, GREEN MANURE AND STRAW DEPENDING ON THE DEPTH OF THEIR FINISHES IN SOIL

The aim of the research is to study the influence of the depth of sealing of peat compost (PMC), green manures and straw on their efficiency. Research tasks: to reveal the influence of doses, the depth of embedding of PMC, green manures and straw on productivity, crop rotation productivity and humus content in the soil. In experiment 1 (1989-2000) the alternation of cultures: black pairs, winter rye, maize, barley, clover 1 and 2 year, winter rye, barley. According to the scheme of experience PMC were dosed in doses of 60, 90, 120, 150, 180 tons/ha, mineral fertilizers $N_{60}P_{90}K_{60}$ for winter rye and barley, $N_{90}P_{80}K_{120}$ for corn and $P_{30}K_{45}$ for clover 1 and 2 year. The compost was fixed to a depth of 8-10, 18-20, 25-27 cm. In experiment 2 (2009-2015) the alternation of crops: pure steam, green manure, winter rye, spring wheat, clover 1 year, winter rye, barley, oats. Cedar and straw were sealed to a depth of 8-10 and layered by 8-10 and 18-20 cm. The introduction of PMC in doses of 60-180 tons / ha increased the yields of the first five crops by an average of 0.47-1.23, the subsequent two crops - by 0.24-0.16 (least significant difference - LSD_{05} - 0.09) tons of grain units / ha, respectively. Against the backdrop of its superficial closure, a dose of 150 tons / ha was more efficient (productivity was 4.14 tons of grain units / ha). Against the backdrop of plowing plow - 120 tons / ha productivity – 4.08 tons of grain units / ha. With deep composting, the productivity increased as the dose had been increased to 180 tons / ha (4.38 tons of grain units / ha). Deep embedding of 60-120 tons / ha PMCs had been operated on crop yields for 7 years, higher doses – for 8 years. The increase in doses up to 150 tons / ha stabilized the humus content. The deep seal of 120-180 tons / ha PMC had increased its content by 0.31-0.36 abs.%. The layered sealing of the green manures and straw ensured an increase in the yield of four crops as compared to surface

plugging, the last crops (barley and oats) at the level of the trend. Straw in its pure form had increased the productivity of crop rotation by 7.1-7.9%, together with mineral fertilizers - by 23.0-31.3%, layer-by-layer sealing - by 8.6%.

Key words: crop rotation; peat-manure compost; dose; green manure; straw; depth of embedding; humus; crop capacity; productivity.

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FORMATION OF PRODUCTIVITY AND QUALITY OF TOMATOES BASED ON PLANT GROWTH REGULATORS' APPLICATION

Tomatoes are the main culture not only all over the world, but also in the vegetable-growing area of the Lower Volga region. The use of growth regulators is an eco-logical method for increasing crop yields and product quality. The results of researches on the effectiveness of the use of the Energy-M growth regulator in the soil and climatic conditions of the Lower Volga region of the Russian Federation are presented in order to study the effect of growth regulators on the seed quality, growth, development, productivity and quality of tomato fruit grown in the open ground. The research tasks included studying the comparative reaction of tomato varieties and hybrids by the formation of yields for processing by growth regulators in vegetation, and scientifically justifying the yields of the experiment by its structure. Studies were conducted in 2008-2015. In the conditions of the

economy of LLC "Urozhay" in the Gorodishchensky district of the Volgograd region, according to the "Technique of an Experimental Business in Vegetable Growing and Melon-growing", "Methods of Field Experiences". The irrigation of the studied crops was carried out by a system of drip irrigation. The irrigation was carried out to maintain the tentative soil moisture threshold in the active layer of 80 ... 85% HB in the first half of the vegetation and 70 ... 75% of the HB in the second half. Varieties and hybrids were taken as objects: Volgograd 5/95 (as a standard), Fokker F1, and Hercules. The repetition of the experiment is threefold. The arrangement of the plots is systematic. During the cultivation of the tomato in the drip irrigation system, the sowing scheme was 0.90 + 0.50 m. The seeding rate was 1 kg per ha (35,000 plants per hectare). The yield of tomato in the variants in the control varied in varieties and hybrids from 7.50 kg / m² to 9.80 kg / m². When the growth regulator Energia-M was used throughout the vegetation, it admitted the increase of the tomato yield from 10.15 kg/m² to 12.62 kg/m². Thus, the use of growth stimulants had had a positive effect on the yield of tomatoes.

Key words: varieties and hybrids of tomatoes; technology of tomato cultivation; growth regulator; Energia-M; pre-sowing seed treatment.

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THE FORECAST ANALYSIS OF THE PORK PRODUCTION TECHNOLOGY

The paper deals with pork production technology, one of the processes of cattle breeding. To facilitate the delivery, maintaining and growing of healthy piglets, it is essential to provide sows with adequate nutrition during the gestation and suckling periods. The level and quality of feeding during the lactation period affect the nutrient content of milk and sows' lactation performance. It is proposed to increase pork production through the introduction of biologically active additives into the diets of lactating sows in order to correct their metabolism and increase lactation performance. During the first stage several experiments with the drug "Selmik" were held. The "Mikrolakt" drug was tested during the second stage. These drugs are based on malt sprouts having the multicomponent composition of minerals and vitamin E, thus positively affecting sows' lactation performance and safety of piglets delivered by them. The addition of a number of essential amino acids - lysine (lysine hydrochloride) and methionine - to the "Mikrolakt" drug strengthens the result, which is the volume of pork production. The best growth and preservation of piglets after weaning in experimental groups testifies to the positive effect of these drugs on both the lactating sow organism and the piglets obtained from them. To substantiate the positive direction of research in the development of intensive pork production technology, it was decided to apply mathematical modeling, allowing to analyze the dynamics of the process and to determine the best intensive option for technology. The first mathematical model allows proving the efficiency of newly developed products, and the second one allows determining the optimal duration of sow's use as working material. Applied together, both models allow identifying the likely direction for further researches.

Key words: sow; piglet; productivity; feeding; mathematical models; forecasting.

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**INFLUENCE OF WHEAT STRAW, NITROGEN FERTILIZER
AND THE MICROBIOLOGICAL PREPARATION "STUBBLE"
ON THE FERTILITY OF LEACHED CHERNOZEM**

The article presents the results of studies on the effect of wheat straw, nitrogen fertilizer and the microbiological preparation "Stubble" on some indicators of fertility of leached chernozem in conditions of laboratory experiment. Discusses the concentrations of total nitrogen and humus, mobile humus, the release of CO₂ by the soil, activity of soil enzymes. The results of the experiment revealed that the combined soil application of wheat straw, nitrogen fertilizer and the microbiological preparation "Stubble" greatly accelerates the process of decomposition and humification of plant residues, increase the content of organic matter and mobility legkomotornyh organic compounds, increase the intensity of the release of CO₂ by the soil and the enzymatic activity of leached chernozem. Mineralization loss of organic matter of leached chernozem increased by

incubation of the soil without any crop residues of spring wheat. Lowering the temperature to +20°C reduces the accumulation and mobility of newly-formed humic substances and products of decomposition of wheat straw than at the temperature of +30° C.

Key words: leached chernozem; wheat straw; humus; nitrogen; soil respiration; enzymes.

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TECHNICAL SCIENCES

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DETERMINATION OF SEED GERMINATION OF PLANTS BY THE LUMINESCENCE METHOD

The aim of the article is to develop a method of determining seed germination of plants according to their fluorescent properties. To create a theoretical base of the method of optical fluorescent diagnostics spectral characteristics of the excitation (absorption) $\eta_e(\lambda)$ and luminescence spectra of $\varphi_l(\lambda)$ of seeds of agricultural plants of various germination (B , %) have been

investigated. To obtain batches of seeds with different germination the method of artificial aging was used. Measurement of characteristics was carried out at the spectrofluorimeter diffraction "Fluorat-02-Panorama" with the previously developed methodology in the areas of absorption and luminescence of seeds. Explored were the seeds of wheat, rye, triticale, barley, oats, peas, beans and white mustard. According to the obtained spectral characteristics in the program PanoramaPro relative flow photoluminescence of F was calculated and calibration characteristics of the analyzer of luminescence were reconstructed as dependencies of germination upon the stream follow. Dependence data with the accuracy errors up to 7-14% could be approximated by linear functions. The error occurred could be reduced with integrated dimensions taken over the seed surfaces. Whereas the dependencies are falling for all seeds based on $B(\Phi)$. The obtained dependences can be of calibrating parameters of the express quality control of grain device projected on the basis of the analysis of the curves of absorption and photoluminescence. The luminescence analyzer with the radiation source, radiating in the range from highs of 370-430 nm and a radiation detector with a sensitivity range 410-650 nm is able to analyze the germination and seed moisture content for the following crops: cereals (wheat, rye, triticale, barley, oats), legumes (peas, soybeans, beans), vegetables (pumpkin, cucumber, pepper, tomato, beet). This analyzer is the most versatile as it works in the spectral range of luminescence of most cultures.

Key words: seeds; germination; excitation spectrum; the spectrum of luminescence; luminescence flow; linear approximation; calibrating characteristics.

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ON DURABILITY OF AGRICULTURAL MACHINERY CONSTRUCTIONS OF POLIMERIC MATERIALS

Thus were studied the creep and relaxation of fiberglass reinforcement (ASP-10), determining mechanical characteristics in bending, impact and cyclic loading. The study of creep of ASP-10 were performed for cantilever-loaded samples of the working length of 120...125 mm with a diameter of 9.44 to 9.81...mm when a load of 10 to 70 N. Testing samples in bending had been done on the upgraded tensile testing machine Mr-0,5-1 provided with a loading device, which is a base plate with guides. With the help of loading devices the specimen were tested in bending according to the design scheme pivotally-supported beam loaded with concentrated force in the middle. Analysis of the data showed that the tested material is viscoelastic. The rate of creep for the first 60...120 seconds was relatively high: 0.01...0.02 mm/min, then declines sharply and remains low for 10 hours. It was revealed that the fatigue strength of fiberglass rebar is more than 10 times lower than for the steel samples. Calculation of polymer composite materials for fatigue life were also held. By the example of the digging collector's rod Elevator, recommendations are given for the design and evaluation of its reliable operation. To prevent the appearance of residual strain, which can cause mounting stress, excessive tightness or clearances in mating parts, and low material stiffness, it is necessary to apply limits to the estimated voltage with the value less than the limit of proportionality, the allowable stresses $[\sigma] \leq 90$ MPa.

Key words: reduction of material input per unit; polymeric composite materials; glass-fibre plastic reinforcement; mechanical properties; durability; operational reliability; fatigue longevity.

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**DISTRIBUTION OF THE CHARGED PARTICLES CREATED
BY THE GENERATOR OF ELECTRICAL AEROSOLS**

Relevance of a research is reasoned by the need for improvement of methods of electroaerosol disinfection and disinsection of air and the surfaces of rooms, treatment-and-prophylactic processing of animals and protection of plants. The

purpose of article is directed to detection of regularities of electrophysical processes at distribution of an electrical aerosol in rooms. The leading approach to a research of this problem is the mathematical modeling of electrotechnical, dynamic and kinetic processes in electroaerosol systems allowing to reveal the main regularities of distribution of an electrical aerosol. As a result, a mathematical model of distribution of an electrical aerosol in space had been obtained. The analysis of model of process showed that concentration of particles in a cloud of aerosol depends on their size, charge and power of a source. The provision on uniformity of concentration of particles did not follow. The essential moment was that concentration of particles and electric field strength depended on distance from the source of the particles. Therefore, the uneven tension in the field created by charged particles near the generator could lead to the digit phenomena in air, and the increased concentration of particles would influence the speed of their evaporation. The latter needs to be considered when calculating electroaerosol processings indoors.

Key words: electrical aerosol; electroaerosol generator; electric field; electric field strength; electric charge; volume charge, electroaerosol processing.

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ASYMMETRICAL LOADING AND SHORT CIRCUIT OF THE THREE-PHASE TRANSFORMER AT CONNECTION OF WINDINGS ACCORDING TO THE Y/ Δ SCHEME

It is shown that at connection of windings of the three-phase transformer according to the scheme Y/ Δ -11, when there is no making current of the zero sequence, primary and secondary currents are conducted from the equilibrium condition of primary and secondary magnetomotive forces. Owing to this, there is no need to display currents on symmetric components, and it is possible to simplify the task of analysis, neglecting the currents of magnetization, and calculate a usual electric chain with three unknown currents. The vector diagrams of single-phase and two-phase loading and the mode of single-phase short circuit are represented as an example. Ratios for calculation of current of single-phase short circuit are also disposed.

Key words: three-phase transformer; the winding connection scheme of the transformer "star-delta"; asymmetrical loading; short circuit; resistance of short circuit.

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RESEARCH OF PARAMETERS OF THE CLOSED TYPE SEPARATING SIEVE OF THE GRAIN CRUSHER

The article is aimed at researching the parameters of the separating sieve and their influence on quality of the crushed grain. According to the aim, the following tasks are defined: - to carry out the analysis of quality indicators of the research of a crusher of grain of the closed type; - to suggest the ways to improve constructive and technological parameters of closed type grain a crusher. The wear of the sieve is caused by the accepted mode of crushing of grain and is inevitably to arise. Methods of instrumental control were used to determine the size of wear of a working face of the sieve. Research of parameters of the worn-out separating sieve of the sucking-discharge of the grain crusher of the closed type allowed to draw the following conclusions: - increase in the size of a bore leads to increase in the module of a grinding by 2,8... 19,4%; wear of crossing points between holes leads to formation of a greater number of dust-like fraction; a sieve deflection by 0,47... 2,65 mm leads to increase in the module of a grinding by 0,05... 0,3 mm, and remained residuals on sets with the diameter of holes 3 mm at 1,0... 5,6%. To increase the quality indicators of closed type grain crushers operation it is recommended to increase wear resistance of the sieves by hardening the edges of

bores of the sieve using modern technologies. As well as not to admit prominent wear and tear of crossing points between the bores of the separating sieve, and timely turn out or bend the sieve to let the streaming grain escape worn-out surface of the sieve as it is normally being done about crusher hammers. To remove the sieve from the crushing camera and install it in the cyclone or in the mixer bunker that would allow to raise the quality indicators of the final product and to increase the crusher's throughput capacity thus reducing energy expenses.

Key words: grain crusher; product quality; indicators; wear and tear; seave's crossing points; bores; crossing points; research parameters; improvement.

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