ABSTRACTS AND KEY WORDS
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AGRONOMY

Borin A. A., Loshchinina A. E. **INFLUENCE OF TILLAGE SYSTEMS WITH LONG-TERM USE IN CROP ROTATION ON THE SOIL FERTILITY, PLANT DEVELOPMENT AND YIELD**

Since 1989, various treatment systems have been studied on sod-podzolic light loamy soil: annual dump – generally accepted for the Upper Volga region (control), annual flat-cutting and annual combined (dump-flat-cutting). The studies were carried out in a stationary field crop rotation with alternating crops: pure steam-winter wheat-oats + clover-clover-winter rye-potatoes-barley. The aim of the research is to study the influence of different intensity cultivation systems in crop rotation on the soil fertility, plant development and yield. After four rotations, an increase in the content of mobile phosphorus, exchangeable potassium and acidity in the soil was noted, which is associated with annual application of mineral fertilizers. The distribution of humus in the arable layer according to the dump and combined systems is homogeneous, while in flat-cut tillage it is differentiated, with its predominance in the upper layer of the soil. Microbiological processes were more active in the dump system of tillage. As for winter crops, flat-cut tillage provided a more uniform depth of seed embedding, increased the density of standing, safety and survival of plants. The distribution of plants root system in the dump and combined processing on the arable layer is relatively uniform, with flat-cutting – a greater number of roots are concentrated in the upper layer of the soil. On average, for four rotations, a yield of 2.87 t / ha of grain units was obtained by the flat – cut tillage system, and 2.77 t / ha by the dump and combined tillage.

Keywords: *crop rotation, tillage systems, fertility, yield.*

Vasilenkov V. F., Vasilenkov S. V., Baidakova E. V., Torikov V. E. **THE ROLE OF CHEMEMELIORANTS AND INTENSIFIERS IN WASHING SOILS FROM CONTAMINATION WITH CESIUM RADIONUCLIDES-137**

This article presents the results of studies of chememeliorants and intensifiers effect on the washing of radio-cesium from the soil. The special importance of their use on the lands of small settlements and personal subsidiary farms is emphasized, where the issue of saving water and reducing the internal exposure of the population to the consumption of contaminated crop products is acute. When developing the technology for leaching caesium-137 from the soil, we considered many ways to affect soil particles. Trying to speed up the washing process, we used chemical fertilizers: potassium chlorine, ammonium nitrate, lime and dolomite. Water was also watered from the drainage channels, where an abundance of trace elements coming from the drainage drain contributes to the accelerated leaching of caesium-137 from the soil. Application of organic fertilizers, in particular peat and non-radioactive manure, improves the filtration properties of soils, significantly increases water savings for washing out the 1st Bq/kg. Methods such as treatment of water and soil with ultrasound and their saturation with air using a compressor are considered as intensifiers. These activities contributed to the decompression of diffuse layer, improving the leaching conditions of cesium. All the chememeliorants and intensifiers used by us have been repeatedly tested by us in (more than 100) laboratory experiments and field experiments. Concomitant natural phenomena contributing to the leaching of cesium-137 have been identified. Such as soil freezing and carbon dioxide release during soil thawing. All the measures we consider are paid off by the cost of the prevented dose and by increasing the crop.

Keywords: *chememeliorants, radio-cesium, washing intensifiers, cesium leaching, discrimination, desorption, illuvial horizon, prevented individual radiation dose.*

Ivanov D. I., Ivanova N. N., Prokina L. N. **YIELD AND SOWING QUALITIES OF SPRING WHEAT DEPENDING ON VARIETY AND FOLIAR TREATMENT WITH MANGANESE, COPPER AND MOLYBDENUM**

The article presents data on grain yield and sowing qualities of the resulting spring wheat yield, depending on the variety and the use of microfertilizers of manganese, copper, molybdenum and "Ultramag combi". The research was carried out in a two-factor short-term field experiment carried out in 2018-2019 in Mordovian Research Institute of Agricultural Research, a branch of the North-East Federal State Budgetary Scientific Research Center under heavy loam leached chernozem condition. The experiment scheme included 21 variants: factor A: spring wheat variety: 1) Tulaykovskaya 10 (standard); 2) Tulaykovskaya 108; 3) Yoldyz; Factor B: foliar treatment with fertilizers: 1) control (tap water treatment); 2) N in amide form (background): 0.39 kg/ha 3) background + Mn+Cu; 4) background + Mn+Mo; 5) background + Cu+Mo; 6) background+Mn+Cu+Mo; 7) «Ultramag combi» – 2 l/ha. Mixtures of trace elements Mn, Cu, Mo were used in a total concentration of 0.03 %, equivalent to the total concentration of trace elements in the working solution of preparation "Ultramag Combi". The treatments were carried out twice in the tillering and earing phase. It was found that the best productivity indicators were formed in spring wheat of the Yoldyz variety. The highest yield of spring wheat of the Tulaykovskaya 10 and Tulaykovskaya 108 varieties was formed during foliar treatment of crops with a paired mixture of copper and molybdenum on the background of nitrogen, and the Yoldyz variety – manganese and copper, as well as manganese and molybdenum on the background of nitrogen. The Yoldyz variety had the greatest responsiveness in improving the sowing qualities under the influence of fertilizer preparations. Paired application of manganese and copper, manganese and molybdenum, as well as the preparation "Ultramag combi" was the most effective of the studied combinations of microfertilizers, in improving the complex of sowing qualities of spring wheat varieties Tulaykovskaya 10 and Yoldyz.

Keywords: *spring wheat; leached chernozem; variety; microfertilizers; yield; germination; germination energy; seed growth power.*

Utkin A. A., Lukyanov S. N. **THE EFFECT OF NITROGEN FERTILIZATION ON THE YIELD AND QUALITY OF WINTER WHEAT GRAIN**

In the field production experience on winter wheat with the use of different doses and terms of nitrogen application in the top dressing, it was found that the use of mineral fertilizers provided a significant (by 12.4 c/ha) increase in yield. The use of diagnostic doses of nitrogen fertilizers also significantly increased the yield of winter wheat in relation to the control by 16.5-20.8 c/ha, and to the background version – by 4.1-8.4 c/ha.

The additional application of diagnostic doses of nitrogen fertilizers was also justified by the higher payback of fertilizers. Thus, when applying calculated doses to the planned grain harvest, the payback was 9.5 kg of grain per 1 kg of active substance, and when applying diagnostic doses of nitrogen increased to 10.3-10.9 kg/kg, which is about 2 times higher than the standard (5-6 kg of grain/1 kg of active substance) value.

The introduction of mineral fertilizers and, above all, nitrogen, had a significant impact on the quality of grain. The application of the calculated background dose of fertilizers and diagnostic doses of nitrogen increased the protein content in the grain, the content of raw gluten and fiber in comparison with the control. The content of nitrates in the grain increased with an increase in the applied dose of nitrogen, but nevertheless was in low concentrations, significantly below the maximum permissible concentration.

The grown wheat grain of the control variant in terms of the mass fraction of raw gluten and protein belongs to class 5-feed grain. The use of full mineral fertilizer increased the class of the grown grain to class 4-food grain. The highest quality indicators of grain were achieved during fertilizing according to complex diagnostics, while the grown grain corresponded to class 3 (valuable grain).

The lowest cost and the highest profitability of grain production was obtained in the variant using a complex (soil and tissue) diagnostic dose of nitrogen on the background of mineral fertilizers.

Keywords: *nitrogen fertilizers, top dressing, yield, grain quality, winter wheat*

VETERINARY MEDICINE AND ZOOTECHNY

Lavrentiev A. Yu., Mikhailova L. R., Zhestianova L. V. **SPECIAL COMPOUND FEED AND IMMUNOSTIMULATOR FOR RAISING SUCKLING PIGS**

One of the main problems during raising and organization of feeding piglets by sows is that they get used to eating various top dressings and special compound feeds, as soon as possible, warning against various diseases (diarrhea, anemia). Based on it, they should be provided with zoohygienic standards of maintenance, care and feeding. Compliance with all these conditions will ensure and strengthen the health of suckling piglets, improve their safety and survival. It will allow in the subsequent stages, that is, when growing, fattening or growing for repairs, to show high productivity at the expense of good health. Feeding piglets up to 2 months of age is the most important period in the life of a piglet. At the beginning of their life, the first two weeks, the only food of suckling pigs is sow's milk. The required amount of nutrients up to 3 weeks of age is met, as a rule, at the expense of sow's milk, but from the first days of life they need to be additionally fed. The aim of the article is to study the effectiveness of using special compound feeds (superstarter, prestarter, starter) as top dressing and feed for suckling piglets, as well as using an immunostimulator to maintain their health, better growth and development. As a result of the research, it was revealed that suckling pigs that received special superstarter, prestarter and starter feed, depending on their age, as well as young animals that were additionally intramuscularly injected with an immunostimulator, had a higher safety by 6.97% in the 1 experimental group and by 7.3% in the 2 experimental group, and growth rate. Suckling pigs of the second experimental group grew the best during the experimental period (60 days) and amounted to 17.68 kg, which is more than in the control group by 1.2 kg or 7.28% and by 0.63 kg or 3.7% in the first experimental group, respectively. The milk content of sows of the 2 experimental group was 59.0 kg, which is higher than in the control group by 11.1 kg or 23.2% and in the 1 experimental group-by 2.75 kg or 4.9%. The deviation between the experimental piglets of the control group and the 1 experimental group according to this indicator was 8.35 kg or 17.4% in favor of the 1 experimental group.

Keywords: *compound feed, suckling pigs, live weight, milk content, safety, growth.*

Lebedeva M. B., Kicheeva T. G., Glukhova E. R. **THE DEFEAT OF ANIMALS WITH TOXIC SUBSTANCES OF ANTHROPOGENIC NATURE**

Intensive pollution of natural environment occurs as a result of harmful substances emission into the atmosphere from stationary sources and motor vehicles. The emissions are based on carbon monoxide, sulfur dioxide, nitrogen oxide, hydrocarbons and others. The main contribution to emissions from stationary sources is made by enterprises of energy complex, mechanical engineering, chemistry and motor transport. A significant contribution to environmental pollution is made by enterprises and the processing industry of the agro-industrial complex in the form of various wastes.

Statistically unaccounted sources of pollution are boiler houses, thermal power plants in cities and in working settlements, settlements, where as a result of burning fuel at high temperature, a toxic compound – dioxin is released into the atmosphere. Dioxins are highly toxic and can cause problems in the field of reproductive health and development, hormonal disorders, damage to the immune system, as well as having a carcinogenic effect.

Agricultural territories and soils are polluted with heavy metal salts. This group has a negative effect on the animal's body. This is expressed in a violation of the digestive function, neurovegetative processes, an increase in the frequency of cardiovascular diseases, calcium metabolism, etc.

We cannot help taking into account the impact of emissions on environment at the locations of military units.

Thus, toxic substances of anthropogenic nature, entering human and animal bodies, cause metabolic disorders of the reproductive function, hereditary defects, decreased immunity, and in productive animals - a decrease in productivity and deterioration of their quality[4, pp. 64-67]. That is, an unfavorable sanitary-epidemiological and veterinary-sanitary situation is formed on a cumulative scale.

Keywords: *Toxic substances, heptyl, dioxin, heavy metal salts, T3, T4, insulin, cortisol.*

Shatokhin K.S., Nikitin S.V., Kochnev N.N., Zaporozhets V.I., Sedovich M.E., Korshunova E.V., Ermolaev V.I. **CHANGE OF HERD STRUCTURE OF MINI-PIGS ICG SB RAS, IN TERMS OF SYSTEMATIC INBREEDING**

The purpose of this article is to study the dynamics of progenitor genotype shares and the inbreeding coefficient in the context of history of laboratory mini-pigs breeding groups creation in ICiG SB RAS. It is shown that the herd is descended from five sows - the progenitors of a large white breed (KB1902, KB1906, KB1910, KB1912 and KB1926), three Svetlogorsk (MS2853, MS2913 and MS2987), two Landrass (LNDR03 and LNDR07) and two Vietnamese (VTN300 and VTN3000.1) boars. At the same time, at the present moment, only four progenitor boars (MS2853, MS2987, LNDR07 and VTN300) have direct male descendants, and only three sows (KB1902, KB1906 and KB1910) have given rise to families. Despite the fact that the effective number of the herd was no more than 77 individuals in each generation and 40 during each breeding campaign, the inbreeding rate of the reproductive group was in the range of 3-7 %, which corresponds to a moderate value. At the same time, the inbreeding coefficient was formed mainly due to the return crosses on the progenitors belonging to the small form of a domestic pig, namely, Svetlogorsk and Vietnamese boars. In the process of breeding, there was no complete loss of genotype shares in any of the progenitors. It was found that the inbreeding coefficient did not have a significantly negative dynamics per each parent in herd. The analysis of the results of this study showed that the differentiation of initial brood stock into the progenitors of families and the mothers of lines progenitors partially avoids return crosses and allows you to plan inbreeding only for outstanding boars-progenitors.

Keywords: *laboratory mini-pigs, closely related crosses, genotype shares, inbreeding coefficient, progenitors, reproductive number of herd*

ENGINEERING AGROINDUSTRIAL SCIENCE

Volkhonov M.S., Mamaeva I.A., Kovalenko R.M., Belyakov M.M. **CLASSIFICATION AND WAYS OF MOBILE GRAIN DRYERS IMPROVEMENT**

Grain drying, especially in small batches, is the most complex and energy-consuming technological operation of post-harvest processing. As a rule, manufacturers of grain dryers do not publish complete information about their main technological and economic performance indicators, which causes great difficulties for consumers when buying dryers. The analysis of designs and technical and economic indicators of mobile grain dryers produced in the world, which allowed to make their classification by design, mode of operation, nature of the interaction of the drying agent with grain layer, the organization of grain layer movement and its condition, energy-saving techniques, method of movement. In addition, a table has been compiled, the content of which mostly reflects technical and economic indicators for different types and brands of mobile grain dryers. To assess the effectiveness of this type of dryer, it is proposed to introduce a "comprehensive indicator of the perfection of dryer design", which takes into account specific metal consumption and specific heat consumption. The calculation of indicator for different types of grain dryers determined the range of its values: 0-91...5.85 (MJ · t·h)/(pl. t·kg. ev.m), while for a more efficient grain dryer it takes the lowest value. Such dryers include mobile grain dryers of bunker type Fratelli Pedrotti Large series, SZP-32, Mecmar CPT series, for which the complex indicator of design perfection is equal to 0.91, respectively; 1.54; 1.70 (MJ · t·h)/(pl. t · kg. ev. m). The introduction of a comprehensive indicator of dryer design perfection makes it easier for the consumer to choose a grain dryer. The selection method can be based on a graphical representation of this indicator and its unit cost. The results of the study allowed us to determine ways for improving the design of mobile dryers.

Keywords. *Grain dryer; mobile dryer; dryer; grain drying; efficiency; methodology; improvement; directions.*

Lebedev V.D., Smirnov S.F., Terentiev V.V. **CALCULATION OF MECHANICAL RELIABILITY OF TRANSFORMER HOUSING**

The paper marked that during operation of the current and voltages transformer, it is heated to 80°C, in this case, the connection of the wall (bottom) is often destroyed with a cylinder wall. As a result, the electrical insulation material does not provide protection against breakdown, and the transformers fail. In the paper, mathematical expressions are proposed for calculating the pressure on the housing of a current and voltages transformer made of steklotekstolit, due to the heating of the insulating material inside the housing during its work. Expressions for calculating internal forces, stresses, and displacements in the cylindrical part and the bottom (wall) of the transformer housing are obtained. The diagrams of moments along the length of the cylindrical part of the housing and the height of the housing cover are given. The dependences of the stresses in the wall on the wall thickness are obtained. To improve the strength characteristics of the transformer housing, it is proposed to take a number of design measures based on the calculated data. Calculations have shown that stresses in the transformer housing do not exceed the strength characteristics of the steklotekstolit with a transformer housing thickness of 2,5 mm. Therefore, no replacement of the housing material is required. According to the obtained data, the most effective is the thickness of the walls and bottom of the transformer housing, equal to 2,5 mm. It ensures high strength and flexibility of the housing elements. The increased flexibility helps to compensate for the thermal expansion of the electrical insulating material inside the current and voltages transformer housing. However, to ensure the integrity of the transformer housing during its operation and heating of the insulating material inside the housing, it is necessary to strengthen the coupling unit of the bottom with the housing by introducing additional connections in the form of nylon threads. The obtained dependences can be used to calculate transformers of similar design.

Keywords: *current and voltages transformer, bending moment, strength, longitudinal force, pressure, normal voltage.*

Nikolaev V.A. **LIMITING THE ANGULAR SPEED OF SEMI-AUTOMATIC GRAIN CLEANING MACHINE**

The main drawback of grain-cleaning machines with rectangular grids is limited bandwidth, due to logical contradiction? that is as you pass through the sieve, the amount of material being cleaned on the grid decreases and the width of the sieve remains the same. At the same time, a large part of the sieve works inefficiently, as only part of its surface is covered with cleaned material. To overcome this shortcoming, a high-performance semi-automatic grain-cleaning machine with grids representing, together, an infused truncated cone, making vertical vibrations is proposed. The housing of semi-automatic grain-cleaning machine rotates. To clean grids from grains stuck in the holes without the use of additional devices a sufficient force of impact on the grain should act at the moment of change in the direction of movement in lower position. To clean the lattice from the grains stuck in the holes, there should be sufficient force of impact on the grain at the moment of change in direction of movement in the lower position. Since the inertia force of the grain at the time of changing the direction of movement of the sieve in the lower position is an order of magnitude greater than gravity, at the time of changing the direction of movement of the sieves in the lower position, the grains that are stuck in the holes of the sieves will be removed from them. In order to ensure rational separation of grain pile, angular velocity of the body of a semi-automatic grain cleaning machine should be determined. As a result of calculations, the angular velocity of the body of a semi-automatic grain cleaning machine is determined.

Keywords*. Grain cleaning machine, infused truncated cone, vertically oscillating sieve, grain interaction with grill, force of impact on the grain, angular speed.*

Semichev S.V., Panov A.I., Mosyakov M.A. **TECHNIQUE OF CARRYING OUT FIELD STUDIES OF A CONTROLLED ATTACHMENT ON SUGAR BEET CROPS**

The article notes a tendency to increase the acreage of sugar beet. Correlation data of indicators of gross harvests, sown areas and sugar beet yield in the Russian Federation are given. The volume of production could be increased due to the intensification of agricultural production. At the same time, it is necessary to minimize damage and loss of sugar beet root crops in the harvested heap, there should not be more than 20 % of them, including severely

damaged ones, no more than 5 %. The presence of an extensive root system complicates the harvesting process and makes it the most energy-intensive technological operation. To reduce damage to root crops and their efforts to extract from the soil during harvesting, we used a unit as part of an MTZ-1523 tractor with navigation equipment and controlled attachment withUSMK-5.4V hiller cultivator. Carrying out field tests established the optimal operating modes for the controlled attachment: the machine-tractor forward speed V_{MTA} = 1.4 m/s, transverse speed of the tool V_p = 0.1 m/s. The evenness of sugar beet root crops increased up to 20 %, in the longitudinal position relative to the line of their planting and along the height of the heads relative to the field surface, which subsequently made it possible to reduce the damage of root crops during harvesting by 10…12 %. It has been determined that a decrease in effort makes it possible to increase the productivity of root-harvesting machines by 12…15 %.

Keywords: *sugar beet, harvesting, controlled attachment, damage of root crops, extraction forces reducing*

SOCIO-ECONOMIC SCIENCES AND HUMANITIES

Antonov A. A., Fomichev D. S., Romanov A. G., Shalenkova N. V., Maryina N. V. **ROLE OF PHYSICAL EDUCATION IN STUDENTS ADAPTATION (ON THE EXAMPLE OF FSBEI HE IVANOVO STATE AGRICULTURAL ACADEMY AND FSBEI HE IVANOVO STATE MEDICAL ACADEMY)**

One of the main tasks of modern education is the preparation of a highly qualified motivated graduate with the relevant competencies. This system will not be fully implemented without sufficient adaptation of first-year students to the new learning environment. Adaptation of first-year students of a narrow-profile university (medical and agricultural in the field of veterinary medicine) is one of the fundamental conditions for high-quality training of a graduate. The level of their professional activity and, as a consequence, the level of development of medicine and health care in the Russian Federation depends directly on it. In our study, we used the data of a survey conducted among first-year students of Ivanovo State Agricultural Academy and Ivanovo State Medical Academy of the Ministry of Health of Russia. As a result, it was revealed that one of the main mechanisms aimed at the implementation of adaptive reactions of students can be educational and extracurricular physical culture activities. 88.6% of students answered in favor of the fact that physical culture helped them to adapt faster within the walls of a specialized university and helped to establish new interpersonal relationships; 9.3% of students found it difficult to answer these questions, and 2.1% answered that they did not feel the difference and did not note help of physical culture in their adaptation at the university. Based on these results, it is possible to emphasize the important role of physical culture in the adaptive changes of students, as well as in the formation of their not only physical, but also mental and social health.

Keywords: *adaptation, physical education, student, higher educational institution.*

Bashmakova E. V., Guseva M. A. **MEDICINE IN ENGLAND IN THE MIDDLE XVI-EARLY XVII CENTURIES AND METHODS FOR COMBATING INFECTIOUS DISEASES**

The explosive rise of production in England throughout the 16th century contributed to the rapid growth of the population in the cities. A particular growth in the population of cities was noted during the reign of Elizabeth I Tudor. Overcrowding and a relatively low standard of living of the population led to an increase in outbreaks of epidemics. It posed the challenge for the central authorities of the kingdom to develop national measures to combat major infectious diseases.

Central and city authorities took various sanitary and administrative measures to prevent the spread of plague and other diseases. So, in 1578, 17 instructions were issued on measures to combat the plague and methods of its treatment. In London, a «death register» was introduced, which included basic information about the number and causes of death among residents of the capital. The parish authorities also pledged to inform about the number of

the dead. It marked the beginning of demographic and health statistics in the country. Specialized hospitals and clinics were opened. The methods of combating plague and other infectious diseases are being unified. The latter include smallpox, scurvy, malaria and fever, measles, etc.
At the same time, the theories of Hippocrates and Galen continued to dominate the medicine of that time. Most of the medicines were based on the medicinal properties of herbs and plants, the use of methods of bloodletting and perspiration. And for miraculous tinctures and medicines, ordinary Englishmen preferred to contact the merchants in the market or follow the recommendations from all kinds of publications.

Keywords: *medicine, methods and rules of treatment, diseases, England.*

Itkulov S.Z. **TEACHING SCIENTIFIC STYLE TO FOREIGN STUDENTS OF SENIOR COURSES OF AGRARIAN UNIVERSITY**

The article deals with the peculiarities of teaching written scientific speech in the teaching of Russian as a foreign language in senior courses. The importance of training in professional communication, the most important condition of which is the mastery of written scientific speech, is emphasized. It is noted that the student needs to learn how to evaluate information in terms of its significance, that is, to be able to shorten the text at the expense of duplicate information. Examples of the most frequent cases of duplication and signals of duplicate information are considered. Some cases of transformation of a scientific text are analyzed, namely, the exclusion of sentences from the text that do not carry important information. It is suggested that it is possible to combine the information of these proposals if there are similar relations between the thematic and the rematic parts, as a result of which one of the ways of expressing the topic and one of the ways of expressing the relationship between the topic and the rema is chosen. The role of text formatting in teaching written scientific speech is emphasized, for which special text compression strategies are used. The choice of the strategy depending on the type of the abbreviated text is considered. It is concluded that teaching the scientific style to foreign students in senior courses requires an integrative approach, taking into account the specifics of the scientific disciplines taught, since in the practice of teaching the scientific style within the framework of the RCT, it is very important to develop the skills of analyzing written scientific speech: topics and rhymes of the text, theses of the text depending on its type, as well as access to the construction of one's own scientific utterance.

Keywords: *scientific text, duplicate information, topic, rema, thesis.*