

AGRONOMY

Batyakhina N.A. THE PROBLEM OF PRESERVING THE INTEGRITY OF NATURAL AND CULTURAL-HISTORICAL LANDSCAPES OF VLADIMIR OPOLYE

In modern agriculture in Russia there is a big problem namely the progressive degradation of soil cover as a result of the destruction of natural landscapes. Certain work is needed on the typification of lands, creation of a regulatory framework for the design of agricultural landscapes, agroecosystems and farming systems adapted to the agroecological requirements of crops, natural conditions, economic structure, as well as the requirements of a minimum risk of environmental pollution.

The article indicates that unique natural objects existing on the territory of Vladimir opolye determine the hydrological regime of the territories, the destruction of which leads to an emergency state of historical monuments. These lands should have a special status of agrolandscape areas, allowing the use of only justified resource-saving technologies.

An example of the preservation and recreation of cultural and historical landscape is the project of the natural and cultural park "Suzdal Land". Its essence lies in the comprehensive protection of historical and cultural monuments and natural landscapes in combination with the traditional economic structure and the development of tourism. Three categories of cultural landscapes are noted, and in the Vladimir opolye there is an example of the location of a cultural landscape within an agricultural landscape. During the period of extensive development of agriculture - a time of continuous chemicalization and plowing of land - the integrity of the cultural and historical landscape in the floodplain of the Nerl River was under threat.

The current situation was corrected by the implementation of the project of an adaptive-landscape farming system, providing for tinning and reforestation of arable land, based on the theory of relief plastics. Crop rotation is an integral part of such systems, and the order of tasks solved due to it depends on the soil and climatic characteristics and agroecological requirements of the landscape.

Restoration of meadows and forests, that is, the recreation of mosaic landscapes, increases the resilience of agroecosystems and is reflected in them in the form of increased productivity and profitability.

Keywords: *natural ecosystems, cultural and historical landscape, adaptive landscape farming systems, design of an agricultural landscape, environmental sustainability.*

Gulmamad S. STUDY OF CERTAIN PHENOLIC COMPOUNDS ANTIOXIDANT ACTIVITY IN WHOLE ROOTS OF EREMURUS (EREMURUS ROBUSTUS REGEL)

On the territory of Tajikistan more than 4000 - 4500 species of only higher spore and seed plants - ephemeroïds grow. One of the ephemeroïds is Eremurus. Many species of Eremurus growing on the territory of the Republic of Tajikistan are of interest as a little-known medicinal plant. Medicinal plants are useful both for maintaining human health and for treating human diseases due to the presence of components with antioxidant activity. In this regard, it is interesting to study the content of antioxidant compounds in some plants growing on the territory of the Republic of Tajikistan. Antioxidants play a big role in human life. Oxidation inhibitors of natural origin are of great interest as safe drugs, in contrast to synthetic drugs. Natural phenolic compounds are the most important secondary plant metabolites responsible for the antioxidant activity of plant products. The article provides brief information about the antioxidant activity of substances in the composition of Eremurus plant (Eremurus robustus regel). In recent years, natural antioxidant active compounds (AA) have increasingly attracted attention of scientists. In this paper, the author tried to present the composition of antioxidant active substances based on local plant materials. The data obtained make it possible to recommend the use of the Eremurus robustus plant as an additional source of natural antioxidant active compounds, as a promising raw material for pharmaceutical, medical, food, microbiological, chemical and other industries.

Key words: *Eremurus*, free radical oxidation, antioxidants, DPPH method, phenolic compounds.

Zatsepina I. V. **EFFECT OF PLANT GROWTH STIMULANTS KORNEVIN AND EPIN-EXSTRA ON THE ROOTABILITY OF PEAR VARIETIES AND FORMS USING ARTIFICIAL FOG**

The results of research on green cuttings of pear varieties and forms are presented. The use of plant growth stimulants kornevin and epin-extra led to an increase in rooting up to 85.4% and the quality of rooted cuttings of pear forms PG 12 (k), PG 2, PG 17-16. As a result of the conducted studies, it was found that when treated with the plant growth stimulator kornevin (30.0 mg/l), the forms PG 12 (k) – 75.5%, PG 2 – 80.0%, PG 17-16 – 85.4% had the highest rootability indicators of green pear cuttings. When using the plant growth stimulator epin-extra (1.0 mg/l), the pear forms PG 12 (k), PG 2, PG 17-16 had the greatest rootability (from 69.8 to 80.3%). Without the use of plant growth stimulants, the forms PG 17-16 (71.4%), PG 2 (70.8%), PG 12 (k) (60.5%) were characterized by the greatest result of rooting green pear cuttings. The forms PG 12 (k), PG 17-16, PG 2 had the highest plant height, the diameter of the conditional root neck, the number of roots, and the length of the roots when using the plant growth stimulator kornevin (30 mg/l). When using epin-extra (1.0 mg/l), the forms PG 12 (k), PG 17-16, PG 2 were characterized by the highest height of increments, the diameter of the conditional root neck, the number of roots, and the length of the roots. Without treatment with plant growth stimulants, pears PG 12 (k), PG 17-16, PG 2 had the highest plant height, the diameter of the conditional root neck, the number of roots. The largest root length was demonstrated by the pear forms PG 12 (k), PG 17-16, PG 2, Caucasian, K-1, K-2 and varieties Hera, Severyanka krasnoschekaya, Extravaganza, August dew.

Keywords: *growth stimulants, varieties, green cuttings*

Loshchinina A.E. **STUDY OF NEW GENERATION HERBICIDES ON SPRING WHEAT CROPS**

The effect of new generation herbicides and their tank mixtures on the weed component of agrophytocenosis, plant development and yield was studied on spring wheat crops. A comparative assessment of new herbicides with the herbicide Agritox, widely used in production for weed control in spring grain crops, was carried out. Juvenile weeds were predominant in the crops, there were root weeds. The technical efficiency from the use of herbicides on juvenile weeds was 60.1 - 81.3%, on perennial 50.0 - 75.0%. Tank mixtures of herbicides more actively suppressed weeds, compared with their separate use. The best results in reducing the contamination of crops were obtained from a tank mixture of herbicides Herbitox + Ballerina. Reduction of contamination in herbicide variants contributed to better preservation and survival of spring wheat plants. It was found that the accumulation of raw and air-dry mass of wheat plants was more active in variants with the use of herbicides, this is due to the lack of competition between cultivated and weed plants. There were no significant differences in the indicators of the crop structure by variants. Herbicides of the new generation and their tank mixtures are more effective than the herbicide Agritox in weed control. The maximum yield increases (3.0 - 3.6 c /ha) were obtained from tank mixtures of herbicides, without reducing the quality of grain and straw.

Keywords: *herbicides, tank mixtures, weediness of crops, yield.*

Torikov V.E., Pakshina S.M., Melnikova O.V., Torikov V.V., Salnikova I.A. **DEPENDENCE OF SPRING BARLEY VARIETIES PRODUCTIVITY ON THE ELECTROSTATIC FIELD INTENSITY OF THE 'ROOT-SOIL' SYSTEM WITH DIFFERENT CULTIVATION TECHNOLOGY ELEMENTS**

The applicability of electro-diffusion-convective model is considered in the paper in order to explain the reasons for differences in productivity of spring barley varieties with various cultivation technology elements. A quantitative assessment of all indicators included in the model solutions is given: productivity, relative transpiration, the rate of grain yield growth in comparison with the control, depending on the dose of mineral fertilizers and seeding rates, the Peclet number, electrostatic field intensity of 'root-soil' system, the surface density of root and soil electric charges. A linear, directly proportional dependence of spring barley productivity on the moisture availability to the root system, the yield growth rate, the Peclet number, electrostatic field intensity of the 'root-soil' system, the surface density of roots and soil electric charges has been established. An increase in the rate of NPK-compound resulted in the values of electrostatic field intensity of 'root-soil' system, the surface density of roots and soil electric charges, as well as, the yield of spring barley varieties. There was no linear dependence between the yield and the electrostatic field intensity of 'root-soil' system with the same NPK doses, but different seeding rates. The data obtained prove the influence of electrostatic fields of the root hair suction zone on spring barley yield. The calculated values of the surface density of roots and soil electric charges confirm the dependence of spring barley variety productivity on alterations in the charge density of the 'root-soil' system.

Keywords: *spring barley, variety, productivity, relative transpiration, electrostatic field intensity, 'root-soil' system, seeding rate, mineral fertilizers.*

VETERINARY MEDICINE AND ZOOTECHNY

Arkhipova E.N. CHANGES IN THE BACTERIAL COMPOSITION OF GASTROINTESTINAL TRACT, GROWTH AND DEVELOPMENT OF ROSS-308 CROSS BROILER CHICKENS WITH THE USE OF COLLOIDAL SILVER

This article describes the results of microbiocenosis studies in gastrointestinal tract of Ross-308 cross broiler chickens when drinking a 1% solution of colloidal silver from the age of three days, according to the proposed scheme of LLC IZS, as well as growth and development of poultry.

2 groups were formed for the experiment: control and experimental ones. The conditions of keeping and feeding broiler chickens were the same and corresponded to zoohygenic requirements.

Live weight of broiler chickens was determined by weighing on the scales of t VLKT 500 brand with an accuracy of 0.1 g once a week; livestock safety was determined by daily accounting of poultry.

To study the composition of gastrointestinal tract microflora, namely, in the contents of the goiter, glandular stomach and duodenum, 6 heads of chickens were selected and slaughtered at the age of 14 days.

As a result of the studies, it was found that at the beginning of the experiment, the differences between the groups were minimal, but starting from the age of 35 days, chickens of the experimental group outperformed the chickens of the control group by 5.4%, and in the 42-day – by 7.2%. The experienced chickens had better developed internal organs.

The drug had a beneficial effect on the development of the gastrointestinal tract microflora. Bifidobacteria were found in the bifidum medium in the contents of goiter, glandular stomach and duodenum in both groups. In the study on E. coli bacteria, traces were noted in the control group, and in the experimental group – their complete absence. In glandular stomach and duodenum on bifidum medium, E. coli growth was observed in both groups.

Thus, the use of 1% colloidal silver had an impact on the development and growth of boiler chickens and on the normalization of microflora of the studied organs.

Keywords: *broiler chickens, colloidal silver, live weight, goiter, glandular stomach, duodenum, E.coli, bifidobacteria.*

Zavaleeva S. M., Chirkova E. N., Sadykova N. N., Mardanova I. M.

HAIR COVER FEATURES OF THE BREEDLESS RATS

The paper examines that hair determines the basic tone of wool and performs a protective function. It is arranged in groups. In the center of the group there is guide hair with three or more bundles of underwool and seven, ten bundles of downy hair around. Two-week rats have got 36 ± 4 ; $55\pm 4,5$; 55 ± 3 hair of wither, abdominal cavity and croup on the measured area. The number of underwool hair ranges from 80 ± 6 on the withers, $104\pm 3,5$ on the abdomen and $110\pm 6,5$ on the croups; downy hair: $104\pm 4,5$ on the withers, 126 ± 5 on the stomach, $134\pm 5,5$ on the croup. The guide hair of two-month-old rats on withers, abdomen and croups was 57 ± 6 ; 72 ± 5 ; $81\pm 3,5$, underwool $93\pm 3,5$; 115 ± 4 ; 119 ± 4 and downy - 109 ± 8 ; $132\pm 5,5$; 137 ± 4 . Six-month rats have got 69 ± 7 ; $80\pm 3,5$; $101\pm 3,5$; underwool - $114\pm 5,5$; 126 ± 5 ; $132\pm 9,5$; downy - $122\pm 4,5$; $142\pm 4,5$; $152\pm 4,5$ hairs. Two-year rats have got 95 ± 5 ; 113 ± 5 ; 122 ± 4 of guide hair on withers, abdomen and croups, underwool 124 ± 6 ; 136 ± 6 ; $152\pm 5,5$ and downy $136\pm 4,5$; 147 ± 6 ; 175 ± 7 . The length of the two-week guide hair of rats ranges from 1,0 to 1,2; 0,5 to 1,0 underwool; 0,4 – 0,5 sm downy, 2-month rats 1,2 – 1,4; 1,1 – 1,3 and 0,7 – 1,0. Six-month rats had the following indicators: guide hair from 1,6 to 1,8; underwool from 1,4 to 1,6; 1,0 to 1,2 and 1,8 to 2,0 in two years; 1,6 – 1,8; 1,3 – 1,4 sm.

Keywords: hair, hairline, breedless rats.

Kletikova L.V., Ponomarev V.A. MORPHOSTRUCTURAL CHANGES IN LIVER AND PANCREAS OF A PHEASANT ON THE BACKGROUND OF PSYCHO-EMOTIONAL STRESS

*The object of the study was common pheasants (*Phasianus colchicus*, L), subjected to extreme psycho-emotional stress as a result of an attack by a pack of dogs. The subject - morphological changes in the liver and pancreas. During the attack, we note such patterns as agitation, palpitations, open beak, vocalization, striving forward, flapping wings, mydriasis, muscle tension, pallor of mucous membranes and death in pheasants. For histological examination, organ pieces were fixed in 10% neutral formalin solution. The material was routed in a histoprocessor, paraffin embedding was carried out at the embedding station, sections were prepared with a thickness of 5–8 μm on a semi-automatic rotary microtome, stained with hematoxylin and eosin, histological preparations were examined using a microscope, followed by measurement and photodocumentation. As a result, a violation of the trabecular structure of liver, swelling, expansion of the lumen of sinusoids, their overflow with blood cells, the presence of hemosiderin; lymphoid infiltration. The borders of hepatocytes are poorly defined, there are cells with a poorly visualized nucleus or its absence, the volume of hepatocytes is $476.22\pm 11.46\ \mu\text{m}^2$, nuclei - $51.88\pm 4.39\ \mu\text{m}^2$. In the cytoplasm was found granularity, the presence of vacuoles. NCO 0.1312 ± 0.097 . Puffiness of the pancreas was revealed, in the lumen of the vessels - accumulations of blood cells. Diameter of acini – $32.54\pm 3.73\ \mu\text{m}$; acinar cells are indistinguishable in places; there are cells with a poorly visualized nucleus or its absence. Thus, in the liver there can be found acidophilia, discomplexation of the trabecular structure, focal hemorrhages, congestive hyperemia, granular and granular-fatty degeneration, lymphocytic infiltration, hyperchromatosis, karyolysis; in the pancreas there can be found discomplexation of acini, edema, hemolysis, acidophilia, hyperchromatosis, karyolysis.*

Keywords: common pheasant, psycho-emotional stress, morphostructure, liver, pancreas.

Krivoruchko A.Yu., Kanibolotskaya A.A., Katkov K.A.

USE OF A COMPLEX INDICATOR OF PRODUCTIVITY FOR ASSESSING PHENOTYPE IN SHEEP OF THE NORTH CAUCASIAN MEAT AND WOOL BREED

For a genome-wide association studies, one of the important conditions is a high quality mathematical and statistical assessment of animals based on a large amount of productive indicators. This also prompts the need to create a new approach to assessing the array of data on the phenotype, which creates

the prerequisites for the creation of new complex numerical indicators, on the basis of which it is possible to rank animals in terms of productivity. This approach makes it possible to identify the most significant features in the formation of the phenotype and productive qualities of animals, the best individuals, as well as to determine an effective breeding strategy. This article presents the results of the formation of a complex indicator of animals productivity (KPi). In its formation, the results of the Principal Components Analysis were used, the main purpose of which is to reduce the dimensionality of the data and identify the most significant features that form the phenotype of the animal. The studies were carried out on one-year-old rams of the North Caucasian meat and wool breed (n=50). The calculations were carried out using the integrated mathematical package MATLAB. Six main components were identified that characterize 82% of phenotypic variability, among which the most significant features are the thickness of the femoral muscle and the thickness of fat. The numerical values of the complex indicator of productivity made it possible to rank the animals into two groups: "MED" and "MIN". It is expedient to use the research results in scientific research with a genome-wide search for associations to identify genes that form the phenotype of sheep meat sheep and in practice in assessing the productivity of a population.

Keywords. *Phenotypic variability, sheep, meat production, animal breeding and selection, body measurements, principal component analysis, variables, dimensionality reduction*

Mednova V.V., Buyarov V.S. **EFFICIENCY OF PHYTOBIOTIC FEED ADDITIVES USE IN BROILER MEAT PRODUCTION TECHNOLOGY**
Various biologically active additives (probiotics, prebiotics, synbiotics, phytobiotics) are used to increase the productivity and viability of poultry, to obtain environmentally safe products, including as an alternative to feed antibiotics. It is important to comply with the technological parameters of growing broilers, in particular, the stocking density, which determines the yield of meat from 1 m² of the poultry house floor area. In two scientific and economic experiments, a positive effect of the preparations «GerbaStor» and «Sangrovit WS» on the productivity of broilers kept at different planting densities was revealed. In the first experiment, the European productivity index, which is a complex indicator of the zootechnical efficiency of growing broilers, in experimental groups 3 and 4 was 6.1% and 7.1% higher than in control groups 1 and 2, respectively. The highest meat yield of eviscerated carcasses from 1 m² of floor was obtained in experimental group 4, where broilers were grown at an increased stocking density (21.5 head/m²) using the «GerbaStor» preparation. In the second experiment, the European productivity index in experimental groups 3 and 4 was 6.6% and 3.4% higher than in control groups 1 and 2, respectively. The highest meat yield of eviscerated carcasses from 1 m² of floor was obtained in experimental group 4, where broilers were grown at an increased stocking density (21.5 head/m²) using «Sangrovit WS». The expediency of using these preparations for outdoor cultivation of broiler chickens in the winter period of the year at an increased stocking density (21.5 birds/m²) has been confirmed.

Keywords: *poultry farming, broiler chickens, productivity, biologically active additives, phytobiotics, stocking density.*

Khromova O.L., Selimyan M.O. **INFLUENCE OF CROSSING WITH GOLSHTINSKAYA BREED ON REPRODUCTIVE CHARACTERISTICS OF CATTLE OF DOMESTIC DAIRY BREEDS**

Crossbreeding of breeding stock of domestic dairy breeds with bulls-producers of the Holstein breed had an ambiguous effect on the reproductive characteristics of their offspring. The aim of the research was to study reproductive characteristics of breeding cows of the 1st calving of various genotypes for the Holstein breed in the populations of Black-and-White, Kholmogorsk and Yaroslavl breeds of the Vologda Oblast. Calculation of the correlation coefficients in the populations of dairy breeds between the degree of bloodiness in the Holstein breed and the reproduction rates of cows of the 1st calving revealed a weak dependence of the frequency of insemination, service period and live weight at the 1st fruitful insemination on the genotype of animals ($r = 0.002-0.07$). In the populations of the Black-and-White and Yaroslavl breeds, a highly reliable ($P \leq 0.001$), negative, moderate strength ($r = -0.24; -0.26$)

correlation was found between the degree of blood in the Holstein breed and the age of the 1st fruitful insemination and 1- calving. Trends in the change in age indicators of the 1st fruitful insemination with an increase in the proportion of blood in the Holstein breed in dairy breed populations indicate a decrease in these indicators with an increase in the degree of blood. In cows of the 1st calving in the population of the Kholmogory breed, there is a trend towards a reduction in the duration of the service period with an increase in the degree of blood in the Holstein breed. And in populations of black-and-white and Yaroslavl breeds, another pattern is observed - with an increase in the degree of blood, the duration of the service period also increases, which is due to a positive correlation between the duration of the service period and the milk productivity of cows in these breed populations ($r = +0.33$; $+0,27$ at $P \leq 0.001$). The results of the study showed that crossing with the Holstein breed did not worsen the reproductive characteristics of dairy cows. A decrease in the age of the first fruitful insemination of cows contributes to an increase in the efficiency of dairy cattle breeding.

Key words: *cattle, dairy breeds, crossing, Holstein breed, reproduction.*

Yurova O.V., Sudarev N.P. **NATURAL AND ANTHROPOGENIC IMPACT ON BREAM POPULATION IN THE IVANKOVO RESERVOIR**

The article considers natural and anthropogenic impact on the aquatic biological resources of the Ivankovo reservoir on the upper Volga. Water regime of the reservoir in 2020 was the most favorable for ensuring normal natural reproduction of earlier and medium spawning fish species. Volume of water inflow in 2020 amounted to 11.418 km³, which is 15% higher than the average annual inflow volume and 53% higher than the inflow volume in 2019, due to which the spawning areas were flooded with water throughout the entire spawning period of fish. In previous years, some spawning areas were not flooded with water and spawning was not carried out on them. Fodder value of the reservoir was assessed. Selection of hydrobiological samples was carried out in a seasonal aspect on 6 sections, covering both the channel and shallow water zones in all reaches. The reservoir in 2020 was characterized as a highly fertile reservoir. The ichthyofauna is mainly represented by the following species: bream, roach, perch, silver bream, bleak, pike. A smaller role is played by pike perch, ide, burbot, ruff, there are also dace, asp, catfish, gudgeon, crucian carp and other species. Sterlet, carp, herbivores, which appeared in the reservoir due to sporadic plantings, are single caught. Commercial fish stocks in the reservoir have increased over the past 5 years and are in the range of 1907-2318 tons. It is necessary to resume industrial fishing. To do this, it is necessary to carry out scientific research of a water body, determine quotas for the extraction (catch) of aquatic biological resources, and calculate the volume of total allowable and possible catches.

Keywords: *the Ivankovo reservoir, level mode, natural factors, anthropogenic factors, aquatic biological resources, population, bream.*

ENGINEERING AGROINDUSTRIAL SCIENCE

Morozov I.V., Osadchy Yu.P., Markelov A.V., Osadchy D.Yu.

WHEY ULTRAFILTRATION USING EFFECTIVENESS

Analysis of ultrafiltration use in dairy industry, both in our country and abroad, shows that with the use of this method for the separation and concentration of raw milk materials, the main attention is paid to the processing of concentrate, and the processing of ultrafiltrate is not given much attention. When processing agricultural products at present, with the aim of achieving high quality products, an increase in production efficiency and compliance with environmental requirements is used by new technologies. Among them in the dairy industry, the production of lactose from milk serum based on membrane

processes. The expansion of practical application of membrane methods for separating multicomponent liquid mixtures demanded to increase the performance of installations, complicate their schemes. This is how multistage installations are used, since in some cases a diagram consisting of a larger number of steps, especially when installing on a high pressure line, turns out to be more rational. Methods for calculating such systems are quite complex and are under development. Development of methods for calculating membrane processes and devices is related to the mechanism of processes. When solving this problem, various approaches are possible. One approach is to obtain an equation to determine the basic technological characteristics of the selectivity F , on the basis of the hydrodynamics of the Navier - Stokes and mass transfer, permeability of G and the desired surface of the membrane S . This process is divided into separate stages. Next, the equations are found to determine the transfer rate at each stage and by the mass transfer equation calculate the necessary surface of the membrane.

Keywords: *dairy industry, lactose production, baromembrane separation, liquid multicomponent mixtures, high molecular compounds, anisotropic polymer membranes, metal-ceramic membranes, selectivity, permeability, intensification, complexation, ecology.*

Nikolaev V.A. DETERMINATION OF FORCES ACTING ON GRAIN WITH A UNIFORM UPWARD MOVEMENT OF SIEVE IN A SEMI-AUTOMATIC GRAIN CLEANING MACHINE

Main disadvantage of grain cleaning machines equipped with rectangular grates is the limited throughput. To overcome this drawback, a high-performance semi-automatic grain cleaning machine with grates is proposed, representing, in aggregate, an inverted truncated cone that makes vertical oscillations. Earlier, as a result of the analysis of the grain interaction with vertically oscillating sieve, parameters of grain trajectory after the first touch of the sieve of semi-automatic grain cleaning machine were revealed. The profile of track on which grate rests through the rollers of the lower ones is determined. The angular velocity of the body of semi-automatic grain cleaning machine and the period of oscillation of grids, which allow rational separation of grain pile, are calculated. To determine the optimal angle of inclination of lattice, corresponding to the inclination to the horizontal forming an inverted truncated cone, it is necessary to analyze the dynamic parameters of grain that fell on the sieve during the period of change in the direction of movement of the sieve in the upper position. As a result of calculations, it was established that it continues to accelerate in the area of increasing the acceleration of the grid downwards. Grain in the area of increasing the acceleration of the grid will not have time to stop, since time of its stop is greater than time of increasing the acceleration of the grid downwards. Therefore, in order to finally determine the optimal angle of inclination to the horizontal of the forming lattice, it is necessary to analyze the movement of grain with an equally accelerated downward movement of sieve.

Keywords. *Cleaning machine, infused truncated cone, vertically oscillating sieve, grain interaction with a sieve, force of impact on the grain, angle of sieve inclination.*

Smirnov V.A., Volkhonov M.S. ECOLOGICAL AND ECONOMIC EFFICIENCY OF A NEW DESIGN WATER DE-IRONING PLANT BASED ON AN OZONE-AIR MIXTURE

In the central Federal District of the Russian Federation, a high content of dissolved iron is observed in groundwater, leading to the failure of drinking equipment at animal and water complexes, animal diseases, and economic losses. Practice shows that a large amount of harmful gases, mainly ammonia and hydrogen sulfide, is also contained in the underground horizons of water supply wells of livestock farms, therefore, when cleaning water from iron, it is important to minimize the concentration of polluting gases in the purified water and air of the production area. The methods of de-ironizing water from underground water sources are based on the conversion of dissolved iron into hydroxide, and an ozone-air mixture is often used as an oxidizer. In the developed water degreasing plant of a new design based on an ozone-air mixture, ozone is generated by ultraviolet emitters. It has been experimentally established that during water purification, ozone primarily reacts with harmful associated gases — hydrogen sulfide and ammonia. During laboratory

testing before and after water purification in the combustion chamber of the degreasing plant, a decrease in hydrogen sulfide was obtained by more than 10 times — from 0,038 to 0,004 mg/m³, the ozone content in the discharge gases was less than 0,05 mg/m³, the iron content in the water decreased from 2,58 to 0,02 mg/liter, which 15,0 times lower than the maximum permissible values of sanitary requirements of the Russian Federation. Saving money on filtration of the working area air from associated hydrogen sulfide aquifers for a farm of large cattle per 1000 heads when using a new de-ironing plant is about 28 thousand rubles per year in prices of 2022.

Keywords: ozone, oxygen, hydrogen sulfide, ammonia, ozone-air mixture, deferrization of water.

Smirnov S. V., Trofimov M. A., Lobachev A. A., Sokolov V. N. **SUBSTANTIATION OF PARAMETERS AND OPERATING MODES OF MECHANISM FOR SHIFTING THE TAPE OF DOUBLER FLAX TRUSTS**

In the process of the technology of harvesting and preparation for processing trusts proposed in the Kostroma State Agricultural Academy, it is necessary that the butts of most of the stems in the roll be located close to its ends. To implement a new method of doubling tapes, a technological scheme of a doubler has been developed and its prototype has been manufactured.

One of the requirements for the mechanism under study is the displacement of stems along the conveyor without increasing the angle of their deviation in the tape. To do this, the stem must make a plane-parallel movement.

To study nature of the impact of elements for shifting the tape on the stems, the process of shifting unlinked stems was studied.

When moving in the shearing mechanism, stems are in contact simultaneously with four different surfaces: fixed metal surface of the table, rubber surface of two conveyors, metal surface of the blades fixed on the conveyors, and rubber surface of the shearing belt. The first three surfaces indicated create resistance to shearing of the stems.

We considered the system of forces acting on the stem in the process of steady motion.

To justify angle α between the working branch of the shearing belt and the direction of transporting conveyors movement, we considered the forces arising from the interaction of the butt of a single stem with the shearing belt. The condition of non-slip of the butt of the stem relative to the shearing belt was substantiated.

From this condition it follows that for the correct operation of the mechanism for shifting the belt (excluding the skew of the stems), angle α of the installation of working branch of the shifting belt with respect to the direction of conveyor movement should not exceed the value of the angle φ_{com} of rest friction of the butts of stems on the material of this belt. Thus, the speed of the working branch of the shearing belt depends on the angle α between the working branch of the shearing belt and the conveyor belts.

Keywords: flax, stalk, cleaning, flax trust, selection, doubling, flax harvesting machine.

Smirnov S.F., Terentiev V.V., Krasnov A.A. **CALCULATION OF THE STRENGTH OF VERTICAL TANKS ON AN ELASTIC-PLIABLE BASE**

The article notes that currently a significant number of tanks of various capacities are used in agricultural production for storing technological materials in liquid form. Metals (steel) and plastics are widely used as materials for the manufacture of tanks. Various types of bases, which differ in their rigidity, are used when installing the reservoirs. It is noted that due to the lack of rigidity of the base on which the vertical reserves are installed; their mechanical strength does not ensure operability due to increased stresses in the deformed bottom. The article presents calculation formulas that allow a refined calculation of the strength of vertical tanks designed for storing various kinds of liquids (fuel and lubricants, milk, dairy products, fertilizer solutions and pesticides, etc.), made of various materials and located on an elastic-yielding base (soil). Calculated expressions of stresses in the cylindrical part and the

bottom of the tank have been obtained, according to which a refined strength calculation can be carried out. As an example, the results of calculations of a standard barrel with a capacity of 200 liters installed on various bases are presented. The article shows that the strength of the tanks can be increased tenfold when the bottom of the tank is installed on a rigid base, which will lead to a significant reduction in the likelihood of environmental and material damage from the violation of the strength and hermeticity of the tanks. The presented calculation formulas allow us to justify the type of foundation for the installation of tanks, based on their strength characteristics, the degree of filling and the type of liquid in the tank.

Keywords: *capacity, elastic-pliable base, rigid base, bending, radial moments, strength.*

SOCIO-ECONOMIC SCIENCES AND HUMANITIES

Zhichkin K.A., Kirov Yu.A., Zhichkina L.N., Titorenko K.V. **AVAILABILITY OF AGRICULTURAL MACHINERY AND STATE SUPPORT FOR ITS ACQUISITION**

The article discusses the features of the modernization of machine and tractor fleet of agricultural enterprises. In modern conditions, it is necessary to restore the degree of mechanization of agricultural production, but on fundamentally newer conditions than before. Changes in market conditions compared to previous periods, introduction of counter-sanctions, the use of more powerful power machines and wide-span units require the purchase of more expensive and productive complexes. In this regard, the use of new methods of state support in the industry is relevant.

The purpose of the study is to determine the possibilities of using mechanism of commodity lending to upgrade the machine and tractor fleet in modern conditions. In the course of the study, an analysis was made of the current provision with the means of mechanization of agricultural production in the Russian Federation; new instruments (commodity lending) of state support for the renewal of machine and tractor fleet were proposed. The concept of "grain equivalent" is proposed to increase the profitability of agricultural production in crisis conditions (when the price of agricultural products falls). With an integrated approach to the modernization of the machine and tractor fleet in agriculture, it is possible to solve several problems through commodity lending: the acquisition of equipment, replenishment of the reserve fund, stabilization of incomes of agricultural producers, etc. The performed calculations showed that it is rational to use the repayment of the principal amount, both in cash and in commercial products. Why use a grain equivalent, the base of which will be the price of wheat grain of the 4th class.

Keywords: *machine and tractor fleet, state support, commodity lending, price, grain equivalent.*

Itkulov S. Z., Marushkina N. S. **WRITING A SCIENTIFIC PAPER IN TEACHING FOREIGN STUDENTS OF AGRICULTURAL UNIVERSITY RUSSIAN LANGUAGE**

The article examines the specifics of writing a scientific paper as the most important stage of teaching Russian as a foreign language. It is noted that in order to present the essence of scientific work, to present its main topics, results and progress, it is necessary to adhere to a clear composition of the description of the process and the results of scientific research. The role of the abstract-annotation and the communicative aspect in the analysis of a scientific text is stated as an important component of the formation of skills of generalization in the research material. The opinion is expressed that when analyzing a scientific text, it is important to pay attention to the communicative aspect – to the retelling of the theoretical and practical parts of the scientific work, the presentation of the further prospects of the research, as well as comments on the writing of the abstract. The types of tasks are analyzed when working on the introduction and conclusion as the most significant parts of scientific work. The specifics of writing a fragment determining the relevance of the topic, as well as the types of tasks for the formulation of research goals and objectives are considered. The necessary grammar models are proposed, which are necessary when writing such fragments of scientific research as "the purpose of the work", "scientific novelty", "research methods", "research

results", "theoretical and practical significance of the work". Attention is drawn to the importance of a clear formulation of the object and subject of the study. It is concluded that writing a scientific paper while teaching Russian as a foreign language gives students the opportunity to improve the skills and abilities of productive oral and written speech, leads to the formation of communicative competence of foreign students, and also contributes to the transition from the educational situation of communication to real, that is, to independent communicative and cognitive activity.

Keywords: *scientific work, report-annotation, introduction, conclusion, grammar model.*

Karmanova G.V. DEALING WITH PROFESSIONALLY-ORIENTED TEXTS OF A FOREIGN LANGUAGE ORIGIN

The article is devoted to the analysis of different types of reading and methodological assistance to students of technical higher schools in the work on the translation of professionally oriented texts of a foreign language origin. The discipline "Foreign language"(FL) is included into the mandatory part of the curriculum of the humanities, social and economic cycle of training bachelors of a technical (agricultural) higher school. Among all the humanitarian subjects, foreign languages occupy a special place in training specialists in terms of specifics and complexity of mastering. It is due to the fact that the previous language training often leaves much to be desired. Secondly, the discipline (FL) is multidimensional (it involves the study of phonetics, vocabulary, grammar, theory of text translation). Thirdly, according to the modern tasks that are formulated in the current Federal State Standard of Higher Education, teaching a foreign language includes, in addition to improving the basic speech actions (listening, speaking, reading, writing), also teaching adequate translation of authentic texts (original, not adapted) and familiarity with the elements of business writing (resume, business correspondence, abstract, abstract, etc.). However, the volumes given for studying a foreign language at a higher school have been regularly reduced in recent years. The purpose of this article is to review the work of students with professionally oriented authentic texts in German and to provide methodological assistance in the form of tips and recommendations from the teacher.

Keywords: *discipline "Foreign language", German, professionally oriented texts, types of reading, learning reading, methodological recommendations.*