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YIELD AND SEED QUALITY OF WINTER TRITICALE VARIETIES UNDER DIFFERENT SEEDING METHODS

The purpose of research is to establish the effect of seeding methods on productivity, sowing qualities of seeds and biological properties of winter triticale seeds. The objectives are to identify the yield of seeds, their sowing qualities; to analyze the parameters of sprouts seeds depending on the variety, method of planting and seeding rate. In the experiments we studied Izhevskaya 2 and Zymogor varieties. We applied the common row seeding method, the wide – row sowing method and the band two-line sowing method with a seeding rate of 6 and 3 mln pcs / ha. Sowing qualities of seeds were determined according to the methods of State Standards, the works of Y.S. Larionov, and the original procedure of scientists of Omsk State Agrarian University. We have established that seed yield of winter triticale Zymogor (3.32 t / ha) is higher than that of Izhevskaya 2 by 45.6%. The highest seed yield of Izhevskaya 2 (2.51 t / ha) was obtained by the common row seeding method, Zymogor (3.59 t / ha) by the band two-line sowing method. The seeding rate of 3mln pcs / ha has lowered crop yield of both varieties by 3-36% regardless of sowing methods. Sowing qualities of seeds (germination, laboratory germination and strength of growth) were high with all seeding methods. Morphological analysis of sprouts discovered the great impact of varieties (59-98%) on the degree of sprouts development, coleoptile length, sprouts length, the number of primary roots and sprouts symmetry coefficient. We believe that these characteristics are grading factors. Methods of seeding and seeding rates have not impacted uniquely on morphological indicators of sprouts. We have found that the band two-line sowing method of Izhevskaya 2, the common row seeding method of Zymogor with a seeding rate of 6mln pcs/ha will provide the seeds with a relatively high yield properties. The wide – row sowing method proved to be poorly suited for growing seeds of both varieties. This planting method significantly decreased crop yield of seeds in both varieties, in addition seeds gave weaker sprouts by the degree of development, with relatively low yield properties.

Key words: winter triticale; variety; sowing method; seeding rate; crop yields of seeds; morpho-physiological evaluation of seedlings; coleoptile; sprout; primary rootlets; sprouts symmetry coefficient.

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PHOSPHATIC STATE OF SOD-PODZOLIC SOILS OF UDMURTIA AND THE PROBLEM OF PHOSPHORUS NUTRITION OF AGRICULTURAL CROPS

The paper summarizes the long-term studies on the effect of lime, mineral and organic fertilizers on the phosphatic status of sod-podzolic soils. The results of two long-term field and micro-field experiments were used. Systematic application of lime and phosphorus in composition of the organic and mineral fertilizers has a significant positive effect on the formation of plant-available resources of mineral phosphates. For a more complete assessment of phosphate soil status it is necessary to determine the fractional composition of mineral phosphates, labile phosphorus content (capacity factor) and its degree of motion (intensity factor). The level of productivity of agricultural crops is in close correlation with the parameters of the phosphate status of sod-podzolic soils. The problem of phosphorus in agriculture by the example of the Udmurt Republic is considered. In recent years, the negative balance of phosphorus is formed due to the complete failure of phosphorite application and a sharp decline in the use of fertilizers. According to the data of 2014, in the Republic of Udmurtia the application of mineral fertilizers amounted to 16 kg of active substance / ha; the saturation of organic fertilizers was 1.6 t / ha. As exemplified by the Michurin Agricultural Production Company of Vavozhsky District, ways to improve the balance of phosphorus and conditions of phosphorus nutrition of crops were shown: the use of phosphorus as part of compost, straw, green manure. Recommendations on the use of phosphorite meal, the introduction of crops with high capacity of assimilation the phosphorus from difficult to access forms, the use of green manure crops were given. The need to develop a legal framework for the introduction of pecuniary sanctions for the diminishing of soil fertility and incentives for systematic work on their reproduction was underlined.

Key words: plant nutrition; phosphorous; mineral phosphates; sod-podzolic soils; phosphorus balance in agriculture.

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APPLICATION OF HUMIC PREPARATION «GUMOVIT» AS A STIMULATOR FOR ROOTING IN GROUND CHERRY PROPAGATION

The results of the application of the humic preparation «Gumovit» as a stimulator for rooting in the process of propagation of ground cherry were shown. The aim of the study was to evaluate the ability of stimulating root formation while using the pilot sample «Gumovit» obtained by mechanical and chemical processing of top peat with low degree of decomposition. It is shown that the treatment of cherry green cuttings with the solution of «Gumovit» in a concentration of 50 ml/l with an exposure of 16 hours provides the rooting acceleration on average in grades by 2 days, the increase in annual seedlings by 1.7 times, the nominal diameter of the root neck by 7.0%, the number of main roots – by 32.4%, the average length of main roots – 38.5% compared with treatment with water. In terms of influence on the rooting ability, the growth, the development of aerial part, the root system,

yield and quality of annual seedlings of ground cherry the humic preparation «Gumovit» is not inferior, and in some cases superior to the indolebutyric acid, and can be used as a rooting stimulant when breeding fruit and berry crops. The effectiveness of the «Gumovit» as a top dressing when growing young plants of ground cherry is confirmed. Thus, the use of the «Gumovit» with the concentration of the working solution 7.5 ml/l and the normal flow rate of 2 l/m^2 in the form of liquid (five times) foliar feeding of seedlings of the ground cherry varieties Altayskaya Lastochka and Shadrinskaya when completing of growing provides on average in grades the increase of the height of the aerial part of the two-year old seedlings by 35.6%, trunk diameter – 25.0%, in the number of main roots by 27.3%, the average length of main roots – 26.9% and is the most effective in comparison with the use of the humic preparation at concentrations of 2.5 and 5.0 ml/l. It is appropriate for this method of application of «Gumovit» to continue studies for determination of the optimal concentration of working solution in the area to 10.0 ml/l and above.

Key words: ground cherry; propagation by cuttings; rooting ability; green cuttings; liquid humic preparations; rooting stimulants; humic preparation «Gumovit».

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ADAPTIVE PROPERTIES OF WINTER TRITICALE HYBRIDS AND THEIR DRY BASIS QUALITY IN THE MIDDLE CIS-URAL REGION

Comprehensive assessment of promising hybrids of winter triticale in adaptability, stability and forage nutrient characteristics are necessary before state variety trials. The aim of the research is to study the winter triticale hybrids and to identify samples on valuable characteristics for feeding purposes. The research objectives are to study the feed productivity of winter triticale hybrids depending on abiotic conditions; determine their feed nutrition; calculate and analyze the adaptive properties of winter triticale hybrids. The article presents the results of studying winter triticale hybrids in Izhevsk State Agricultural Academy in 2013-2016. Field experiments were carried out on sod-podzolic medium loamy

soils with low humus content 1.98-2.00%, with a slightly acid exchange acidity pH 5.2-5.4, with a high content of labile phosphorus 115-146 mg /kg and exchangeable potassium 159 - 168 mg / kg. The experimental scheme consisted of variety Izhevskaya 2 which was accepted as a standard, and hybrids 114/00, 121/99, 125/99, 136/00. In order to assess the ecological flexibility the regression coefficient (bi) was calculated. It characterizes the average grade reaction of a hybrid to changing environmental conditions. Statistical analysis of the obtained data revealed that hybrid 125/99 has high stability of feature (bi = 1.27) and sufficient flexibility with the greatest feed nutrition of exchange energy 40.7 GJ/ha. Hybrid 125/99 conforms to the standards (not less than 11.0%) of crude protein content in the dry basis (12.5%).

Key words: winter triticale; fodder productivity and nutritional value; adaptive properties.

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INFLUENCE OF TILLAGE SYSTEM ON AGRICULTURAL STATE OF GREY FOREST SOILS OF PREDKAMJA ZONE OF TATARSTAN

The investigations were carried out in 2005-2011 in the research and production experiment in the LLC “Saba” of Sabinskiy district of the Republic of Tatarstan. The aim of research was to identify the changes in fertility and structural and aggregate composition of grey forest soils according to different processing methods. Tyurin method was used to determine the content of humus, the structural and aggregate composition of topsoil was determined by the method of N.I. Savvinov. The authors studied different options for minimum tillage technologies and zero (direct seeding) in comparison with the traditional technology based on moldboard plowing (control option). On the basis of research results it was found that the tendency of humus content increase is observed (in a layer of 0-10 cm to 0.04%, in the layer of 10-20 cm to 0.02%) with minimum tillage technologies, and the technology with moldboard plowing, conversely reducing its content (in the layer of 0-10 cm to 0.03%, in the layer of 10-20 cm to 0.01%) in regard to the original data of 2004 year. The

highest content of agronomically valuable and water-resistant aggregates was also observed in cases of technologies with minimum tillage. Thus a structural factor in a layer of 0-10 cm was made 1.75 in the autumn minimum tillage option, in a layer of 10-20 cm - 3.25, which is above by 0.36 and 1.97 compared with control option respectively.

Key words: humus; soil; soil structure; topsoil; soil treatment techniques.

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DISTRIBUTION AND PRODUCTIVITY OF PINE PLANTATIONS DEPENDING ON THE MORPHOMETRIC PARAMETERS OF RELIEF (BY THE EXAMPLE OF BUGULMA-BELEBEY UPLAND WITHIN THE REPUBLIC OF BASHKORTOSTAN)

The research purpose is analysis of the influence of morphometric characteristics of the relief on the placement and productivity of pine plantations (Pinus sylvestris L.) of the upland. The maps were constructed on the basis of the digital elevation model SRTM-3 the software SAGA GIS. They reflect hypsometry, steepness, exposure, and shape of the slopes. The schemes of the 14 forestry divisions of the upland were laid on the maps and for each allotment the aforementioned indicators were calculated. Their analysis revealed the regularities of the distribution of the main forest forming species and productivity of pine plantations by relief elements. The effect of altitude factor is expressed in the formation of a

certain composition of woody vegetation. In the lowlands, at the first altitude level (below 150 m) the pine forests are prevalent, only here there are elm plantations and a half of volume of speckled alder. Here you can observe the most average volume of pine trees per unit area. The predominant species above 150 m are alternately linden, birch, and aspen. A large part of the forested area is located on slopes of 1-3°. Lowland areas are predominantly given to agricultural exploitation. The steepness of terrain increasing, the average volume of pine plantations decreases. The forest forming species grow on all slope exposures, but minimally in the north and north-east directions. The south-western exposures are optimal in humidification and heat provision for pine forests. By applying multivariate analysis of variance the interaction effect of the factors "form" and "steepness of slope" was discovered. Pine forests are more productive on convex slopes than on concave ones which are best manifested in areas with a steepness of 1-5°.

Key words: forest forming species; pine forests; stand volume; morphometric parameters of terrain; altitude above the sea level; steepness; exposure and form of slopes.

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INITIAL STAGES OF FOREST FORMING PROCESS IN CLEARINGS OF THE SOUTHERN TAIGA OF WESTERN SIBERIA

The final cuttings have been conducted for over 70 years in Tomsk region. Renewal of hardwood cuttings has not been studied for a long time except for the surveys in forest management. Studies of young trees formation dynamics were not practically carried out.

The research purpose is to study the natural regeneration progress in final cuttings in birch and aspen woods which are typical for the southern taiga. The analysis of forest formation initial stages in the southern taiga cuttings (the Western Siberia) has revealed various direction and intensity of forest regeneration process at a sufficiently homogeneous structure forest fund. This forest formation process dynamism is determined by using different harvesting techniques and equipment. It is established that technology has more significant effect than equipment. In addition the influence of a human factor is significant. By the example of a particular enterprise in Tomsk region it is shown that resource-saving technology training takes certain time. These technical and technological features alter the direction of forest formation process up to the replacement of hardwoods to softwoods.

Key words: Western Siberia; the southern taiga; forest formation process; final cuttings; logging; the formation of forest stands; deforestation; technologies.

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DEVELOPMENT OF WORKING CHAMBERS OF MICROWAVE INSTALLATIONS FOR THERMAL TREATMENT OF INEDIBLE MEAT PRODUCTION WASTE

The working chambers of the microwave installations for heat treatment and disinfection of inedible meat production waste with regard to the given below technical requirements are developed. Continuity is achieved by perforation of the resonators and the dissector. High intensity up to 5 kV/cm, at which bacterial microflora is destroyed, is achieved by the special design of the toroidal cavity and the superposition of two electric

fields of different wave lengths. High basic Q-factor of the resonator is achieved due to its spherical or toroidal implementation. Electromagnetic compatibility of installation is achieved by use of a shielding housing of non-ferromagnetic material and the below-cutoff waveguides instead of intake and discharge nozzles. Installation versatility for a wide range of raw materials is achieved by regulating the diameter of the perforating holes and the pump performance of viscous product. The uniformity of electric field distribution and raw materials in volumetric resonator is achieved due to its spherical performance and the use of dissector. The dissector simultaneously provides the raw materials distribution through the volume of the resonator and the protection of adjoining magnetrons from reflected flux of radiation. The increase in productivity is achieved by means of use of several low-power generators, air-cooled and without the need for protection from reflected power. They provide a uniform heating of raw materials due to design techniques in the development of cavities filled with small volumes of raw materials. The dismantling of the installation units is aimed at ensuring sanitary treatment after the thermal treatment of raw materials. Compliance with the duty cycle of the technological process is less than 0.5 with multiple cyclic effects of the electromagnetic super-high- frequency field is aimed at the stabilization of temperature and pressure by volume of raw materials.

Key words: microwave generator; cavity resonator; inedible waste of slaughtering; heat treatment and disinfection.

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ECONOMICAL SCIENCES

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ETHNODEMOGRAPHICAL ASPECT OF STAFFING OF AGRO-INDUSTRIAL COMPLEX IN THE UDMURT REPUBLIC*

The key issue in the agro-industrial complex of the Udmurt Republic despite dynamic modernization is the personnel problem. A broad range of measures is obviously required to solve this problem, the consideration of ethnodemographical factor being one of them. On the basis of unpublished documents it was found out that ethnic composition of agricultural workers of the Udmurt Republic has prominent imbalances including the discrepancy of shares of a particular ethnic group in total population, and among those employed in the agricultural industry. For example, the share of the Udmurts employed in the agriculture of the Republic is far above the one that they occupy in the ethnic composition of the population. The opposite pattern is observed among Russians and Tatars: their share in the total population is much higher than the share of employed in agriculture. It is proposed to take into account more national specificities in various government programs. It is necessary to introduce changes in the programs providing more attention to the satisfaction of national and cultural needs. This is especially relevant to rural areas. By enabling ethnic self-expression in rural areas, conducting competent national policy we can achieve greater foothold occupational stability of agricultural education institutions graduates, which should to some extent contribute to the solution of personnel problems in the agro-industrial complex. It is expedient to include the issue of employment into the All-Russian population census program of 2020, which will clarify current national structure of employees in various sectors of the economy.

Key words: agro-industrial complex; rural population; occupational stability; staffing; ethnicity; population census.

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