

AGRICULTURAL SCIENCES

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THE PRODUCTIVITY OF WINTER WHEAT OF THE VOLZHSKAYA K VARIETY WHEN SOWING FRESHLY HARVESTED SEEDS AND A ROLLING STOCK

For winter cereal crops, the issue of using seeds of different years of harvest – the transfer fund or freshly harvested – remains debatable. Research conducted earlier in the Middle Urals has made it possible to establish that the use of a seed fund for sowing seeds, as a rule, ensures an increase in the yield of grain of winter cereals. This is due to the fact that freshly harvested seeds that have not undergone post-harvest ripening have low laboratory viability and germination energy. In 2014-2017 years at the Uva and Sarapul SVP of the Udmurt Republic in the competitive variety testing, the reaction of the winter wheat Volzhskaya K was investigated to the formation of the grain yield and the main indicators when sowing freshly harvested seeds and the transfer fund. The soil under the experiments at the Uva SVP is sod-medium podzolic sandy loamy, in the Sarapul SVP – gray forest podzolized medium loamy. The meteorological conditions of vegetative periods during the years of research were different. May 2014 was warm and arid, June is moderately warm, the amount of precipitation is 103 % of the norm, in July the amount of precipitation is 125 % of the norm. May and June 2015 were warm and arid, in July precipitation fell 186 % of the norm. The vegetation period of 2016 was characterized as hot and keenly arid, in 2017 it was cool and humid, June and July were characterized by cold weather and excessive moisture, the sum of precipitation was 208 and 222 % of the norm, respectively. On average, according to two SVP, the option – seeding with freshly harvested seeds had a relatively higher yield in 2014, in 2016 and in 2017. In 2015, an average yield increase of 5,2 centners per hectare or 22,4 per cent was observed when sowing seeds of a growing fund. Average for 2014-2017 years, when sowing seeds of different years of harvest, winter hardiness differed by 0,2 points. Resistance to lodging, the duration of the growing season, the mass of 1000 grains according to the variants of the experiment did not differ. The period of vegetation of winter wheat Volzhskaya K on the Uva SVP was longer by 7 days. When sowing with seeds of a passing fund, the plants were 4 and 5 cm taller than the plant in the variant – seeding with freshly harvested seeds. The defeat of snow mold decreased by 4 % and 9 % when sowing with freshly harvested seeds. At the Sarapul SVP, the snow mold damage was 15 % and 10 % more than at the Uva SVP. At the Uva SVP, the root rot damage was lower by 4 % when sown with seeds of the transferring fund.

Key words: winter wheat, Volzhskaya K grade, freshly harvested seeds, transitional fund, yield

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INFLUENCE OF SELECTION METHODS UPON COWS' MILK PRODUCTIVITY AT THE SPK – COLLECTIVE FARM “AVANGARD” OF UVISKI DISTRICT, UDMURT REPUBLIC

One of the main ways to increase productivity in animal husbandry is to improve methods of breeding. Breed selection – the most effective method of improving the existing and creating the new, more valuable breeds, types and lines of animals. At the same time, this is one of the most difficult and important issues in breeding work. The object of investigation was a herd of a breed reproducer: SPK – collective farm “Avangard” of the Uvinsky district, the Udmurt Republic; the studies were carried out by means of the analysis of the primary data of pedigree and zootechnical accounting, based on pedigree animals on pedigree cows of the form 2-MOL, data of zootechnical and pedigree records. On the results of researches made it is necessary to note, that the selection of bulls-manufacturers of the V.B. Idyl has proved to be the most successful for the cows of S.T. Rokyt line; the productivity of cows obtained from this selection was 8012.0 kg – 3.49% – 3.16%. Also, the most successful combinations for milking are the selection of bulls of M. Chiftein line for the VB Aidial and M. Chiftein lines, 7454.2 kg and 7588.3 kg respectively, and the R.Sovering line for the M. Chiftein and R. Sovering cows' lines – 7539.5 kg and 7432.1 kg, respectively. Analyzing the dairy productivity of cows obtained after related mating, we note that in general, inbreeding did not have a negative effect on milk production, thus in most cases over 6000 kg of milk were received from inbred cows, with a mass fraction of fat from 3.35 to 3.52 %. The best results were obtained with remote inbreeding at the ancestor of Ganoverhil Starbuck 352790 in grades V–IV, V–V – 7247.4 kg of milk with a fat mass fraction of 4.50%.

Key words: black-and-white cattle, lines, intraline selection, cross lines, breeding selection, inbreeding, selection.

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IMPACT OF PRE-SOWING SEED TREATMENT ON THE EARLY GROWTH PROCESSES OF WINTER TRITICALE

Modern technologies of crop production suggest wide application of fertilizers containing macro- and microelements, chemical and biological fungicides, growth stimulants, either separately, or in various combinations. The scientific literature indicates varying information on efficiency of these preparations for pre-sowing seed treatment. It may be ascribed to some reasons, including specific and varietal features.

The paper presents findings of the research of the response of winter triticale cultivars Izhevskaya 2 and Zimogor to pre-sowing seed treatment with Vial TT, Agree's Forsage, Mival-Agro, Emix, and their combinations. The aim of the studies is to determine effects of pre-sowing seed treatment of winter triticale on early growth processes at seed germination. To achieve the aim the parameters of germinant parts (length of coleoptile and spread, length and number of radicles) were assessed, the level of seed development and their germinative power were also determined. The germinative power, morphological parameters and germinant development level were determined using the procedure of the State Seed Inspection Agency and procedures described by Yu. S. Larionov.

Varietal features of seed germination have been identified. The average values of length of coleoptile (6.6 cm), germinants (9.0 cm) radicle (13.3 cm) of Izhevskaya 2 cultivar proved to be higher than those of Zimogor cultivar. These values of Zimogor were of 3.8 cm, 6.8 cm, and 10.6 cm, respectively. As per the number of radicles, the Zimogor cultivar had an advantage (4.6 pcs), whereas Izhevskaya 2 cultivar formed, on average, 4.3 radicles. We have also noted a different response of these cultivars to pre-sowing seed treatment. Preparations Agree's Forsage, Mival-Agro and tank mixture of Mival-Agro and Vial TT had provided stimulation of seed germination of Izhevskaya 2 cultivar, which explicated an increase of coleoptile length by 13-17%, whereas the number of radicles – by 10–12%, length of radicles – by 14–29%, spread – by 15–17%. However, the listed preparations, on the contrary, contributed to inhibition of early growth processes for Zimogor cultivar.

Key words: winter triticale, seeds, pre-sowing seed treatment, morpho-physiological assessment of germinants, coleoptile, sprouts, radicle.

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FACTORS OF LABOUR POTENTIAL FORMATION FOR RURAL AREAS OF UDMURTIYA

In the article, aspects of social and economic development of rural territories are under consideration by an example of the Udmurt Republic. The depth of differentiation of level of social development for rural areas is shown. Based on the correlative analysis and sociological researches live factors are chosen to prove an increment of population at a particular territory. The interrelations of socio-economic factors with population of the territory, with migration and a natural increment are determined. Dependence of the reasons for differentiation of indicators of development of areas from objective and subjective factors is suggested. Models of formation of a social and economic infrastructure of development of labour potential are constructed. The indicator of social and economic development of a region is worked out. Values of this indicator for rural areas of Udmurtia are calculated. Comments on results of calculations and recommendations are given about application of the technology developed by the authorities and business structures.

Key words: social conditions, increment of population, migration; gasification; living conditions; the correlative analysis; regress model; level of development.

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ATMOSPHERIC CIRCULATION AS FACTOR OF DEVELOPMENT OF EROSION PROCESSES IN BASHKIR PREDURALIYE

The paper studies the relationship between erosion processes and the atmospheric circulation. The region subjected to research is characterized by water erosion due to surface stream flow impact being the result of the total moisture in the area. Runoff flow is a natural water streaming over the earth's surface and in the soil. Among diverse physical and geographical factors, affecting the

climate is the most important one. It also causes the wind erosion occurrence that is widespread in the South of the studied area. Macro circulation processes being developed in the area have a great impact on the runoff flow, and, consequently, on the erosion development. They undergo changes in space and time and fluctuate over a long period. The total atmospheric circulation is characterized by the process of dividing all synoptic processes into elementary ones (ESP), to be followed by their generalization in three types of circulation: western (W), eastern (E) and meridional (C). Western circulation processes are characterized by zonal circulation components and rapid movement of pressure centres from the west to the east. At E and C circulations, there are permanent waves of high amplitude in the meridional and eastern directions. Varying in the types of atmospheric circulation results in water content changes in rivers and in the total moisture of the area. The latter being a rather long process that takes place for many years though not exceeding the current climatic period. Effective anti-erosion preventive measures for the above area can be developed thus based on forecasting the atmospheric macro circulation.

Key words: erosion processes, atmospheric circulation, climatic conditions, hydrometeorological regime, cyclones and anticyclones, long-term fluctuations of moisture.

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COMPARATIVE PRODUCTIVITY OF PEA SEEDS AT THE STATE-GOVERNED BREEDING-SPACES IN THE UDMURT REPUBLIC

In the State Register of Breeding Achievements approved for utilization in the Udmurt Republic from 2014, there were varieties of pea seeds included: Aksajskij usatyj 55, Krasnous, Marathon, and Pamyati Hangil'dina. The study of the productivity of new selections of pea seeds under specific abiotic conditions created an opportunity to identify the most adapted seeds and recommend them to producers in rural areas for cultivation. Therefore, the study of the yield of new pea seed varieties under specific abiotic conditions, like other crops, had a certain scientific and practical interest. The research tasks were: to calculate the share of each sowing pea grade which is included in the State Register of Breeding Achievements and approved for utilization in the Udmurt Republic

from 2014, in the sowing areas; to identify the most productive varieties in various abiotic conditions at state-governed sites; to do a comparative analysis of the mass index of 1000 pieces of seeds in the crop, and the height of the plants before planting the four varieties of pea seeds. The object of the research was: varieties of pea sowing Aksajskij usatyj 55, Krasnous, Marathon, Pamyati Hangil'dina memory.

May 2014 was warm and arid, June was characterized as moderately warm, the amount of precipitation is normal, in July and August – the temperature and precipitation are within the norm. In 2015, May and June were warm and arid, July and August were cool and humid. The vegetation period of 2016 was characterized as hot and acute drought, in 2017, it was cool and humid, June and July were characterized by cold weather and excessive humidity with the total precipitation 208% and 222% of the norm, respectively. In the Udmurt Republic, pea crops were cultivated at 11936–13052 hectares, from 2014 to 2017, areas under the Aksajskij usatyj 55 had declined from 6,842 hectares to 3,418 hectares, or 2.0 times. Crops of Krasnous had increased by 2,645 hectares or 6.86 times. In productive crops there were no pea grades of Marathon and Pamyati Hangil'dina. Varieties without a title occupied 252 3165 ha or 21.2–34.7%. In 2014–2017, in average, at the Balezinsky SVP, with a yield of 21.6 centners per hectare, Krasnous had increased by 5.3 c/ha the Aksajskij usatyj 55, 5.2 centners per hectare – Marathon and 5.1 centners per hectare, Pamyati Hangil'dina. At the Uvinsky SVP, yields of more than 20 centners per hectare had Krasnous varieties – 20.5 centners per hectare, the grade of the Pamyati Hangil'dina was 21.6 centners per hectare, and the Aksajskij usatyj 55 grade was 55.21 c/ha. At the Sarapulsky SVP, the Aksajskij usatyj 55 with a yield of 25.5 c/ha was 2.7–4.8 c/ha, higher than that of other varieties. The highest yield of Mozhginsky SVP was 29.2 centners per hectare in the Aksajskij usatyj 55, in Marathon it was 0.6 c/ha lower, and 0.4 c/ha in the Pamyati Hangil'dina. The weight of 1000 seeds of sowing pea varieties differed according to the years of research due to the abiotic conditions that were developing during the growth season. At all state-governed sites the highest weight of 1000 seeds had formed a grade of Pamyati Hangil'dina, the lowest weight of 1000 seeds was Marathon. In average, for 2014–2017, at the Balezinsky, Uvinsky and Mozhginsky SVP, the Marathon variety exceeded other varieties in plant height, the height of the Aksajskij usatyj 55, the Marathon and the Pamyati Hangil'dina height was the same at Sarapulsky SVP – 81–82 cm. At all state-govern sites, the plants of the Krasnous variety were relatively low, thus reaching the height 64–72 cm.

Key words: pea seeds, seed variety, yield of seeds, weight of 1000 seeds, height of plants.

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PECULIARITIES OF MODIFICATION OF TRIBOBEJECTS BY GEOMODIFIERS BASED ON SERPENTINE

The present article depicts studies devoted to substantiation of the conditions and regimes in which a stable modified layer based is formed based on hydrosilicates i.e. serpentinites. The main directions of implementation of the technology for surface modification are analyzed, initial data are determined under which a stable process of coating creation is taking place. The composition of the solution based on the geomodifier is justified as well as the technology for preparing the solution used is also shown. Laboratory studies on the synthesis of modified coatings in tribocouples with various mechanical properties of surfaces were carried out. The temperature in the friction zone was analyzed, which ensures a stable modification of coating. The metallographic data of a thin modified layer on the surface of the counter body are presented.

The obtained data are of great practical importance, since it allows to predict the probability of forming a modified coating with unique antifriction properties directly under operating conditions.

Key words: geomodifier, serpentinite, friction, wear, reduction, hydrosilicate, layered structure, tribocoupling.

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INCREASING THE MACHINERY PARTS' DURABILITY BY OPTIMIZATION OF THE FORM OF SURFACES AT CLOSE TO CONCENTRATORS OF STRESSES

Many of the machinery spares possess of different technological elements those of sudden transitions, openings, cutouts breaking their smooth geometry and creating significant concentration of stresses. Under the impact of external loading at the cross-sections of such machinery parts there appear the most local stresses causing exceeding limiting values; all this can lead to emerging residual deformation, or a fragile cracking, and, as a consequence a failure of the machine, or its units. The article is devoted to an actual problem of raising the constructional reliability of machines by raising the machinery parts' durability close to nearby different stress concentrators, and which is

ensured by optimization of their transition surface shapes. The study of a stressed condition implicates an obvious ability of the developed method of machinery parts' shape optimization to lower stress concentration by 30...72%, thus raising the durability and fatigue longevity of the machine's parts.

Key words: concentrator of stresses; optimal designing; structural reliability.

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