E. F. Vafina
Izhevsk State Agricultural Academy

ASSESSMENT OF SPRING RAPESEED PRODUCTION IN THE UDMURT REPUBLIC

Spring rapeseed is currently the leading oilseed crop in the Udmurt Republic. In the last century, it was cultivated in the Republic as a green manure, a forage crop. Currently, interest in this culture has increased, both in the Russian Federation as a whole, and in the region. The purpose of this work is comparing analysis of the data on the possibilities, state and perspectives of spring rapeseed cultivation in the Udmurt Republic. To achieve the goal, statistical and reference data were compared and analyzed. Calculations of the level of predicted seed yield based on programming principles have proved the conditions of the region meet the biological requirements of the crop. The arrival of photosynthetically active radiation (FAR) makes it possible to form a seed yield of 3,92 t/ha. According to calculations, the climate-guaranteed seed yield is 91 % of the potential crop yield for FAR, or 3,57 t/ha. The moisture availability of the vegetative period contributes to the seed yield at the level of 2,0 t/ha, and thermal resources (according to the hydrothermal indicator of the GTP) – 3,77 t/ha. According to the analysis of statistical data for 1999–2019, in twenty-two of the twenty-five administrative districts of the Republic, spring rapeseed was cultivated with a change in the area of sowing from 2 to 2234 hectares, and the yield from 0,05 to 2,09 t/ha, respectively. Among currently cultivated oilseeds in Udmurtia (spring and winter rapeseed, mustard, curly flax, sunflower), rapeseed occupies a larger area of sowing. The relatively high price of rapeseed at the market (20,000 rubles per ton and above) indicates the prospects of the crop.

Key words: spring rapeseed; seeds; sown area; yield; yield programming.

Author:
Vafina El'mira Fatkhullovna – Doctor of Agricultural Sciences, Associate Professor at the Department of Horticulture, Izhevsk State Agricultural Academy (16, Kirov St.,Izhevsk, Russian Federation, 426069, e-mail: vaf-ef@mail.ru).

A. V. Yastrebova, S. I. Kononov, T. N. Riabova
Izhevsk State Agricultural Academy

COMPARATIVE ASSESSMENT OF ADAPTIVE PROPERTIES AND THE EFFICIENCY OF THE BLUE LUPINE VARIETYIES CULTIVATION

Important reserve that determining the efficiency of agriculture with developed dairy cattle breeding is the selection of field crops for universal use, ensuring the procurement of high-quality fodder. The aim of the research is to study the adaptive properties of the lupine culture in the Udmurt Republic, analysis of the blue lupine varieties cultivation efficiency. The studies were carried out in the southern agroclimatic region of the Udmurt Republic, on the grey forest soil. The arable soil

layer was characterized by a humus content of 2,1–2,6 %, mobile phosphorus by 100–101 mg/kg of soil, mobile potassium by 101–170 mg/kg of soil and from medium acid to close to neutral soil with pHKCl reaction (5,0–5,6). Research included four varieties of blue lupine: Snezhet', Kristall, Vector, Fazan. In the run of the years of research the yield of blue lupine varieties had a significant variation, as indicated by the collection of dry matter of the Kristall variety 5,26 t/ha and 0,81 t/ha of the Fazan variety. During the research period a relatively high yield of 1,36–4,95 t/ha was formed by the Snezhet' variety. This variety formed a significantly high yield by 0,51 t/ha or 17 % in 2005 (LSD_{05} = 0,37 t/ha), by 0,16 t/ha or 13% in 2009 (LSD_{05} = 0,12 t/ha), by 0,31 t/ha or 28 % in 2010 (LSD_{05} = 0,06 t/ha) regarding the yield of the Kristall variety. The Snezhet' and Vektor varieties (S^2d = 0,05...0,14) were distinguished by their high resistance to changes in agro-ecological conditions. The combination of indicators of ecological plasticity (bi = 0,60) and phenotypic stability (S^2d = 0,60) of the Kristall variety indicates its high adaptive properties. The difference in productivity of blue lupine varieties influenced the economic efficiency of their cultivation. Green mass with the lowest cost price of 1370 rubles/t and a level of profitability of its production of 9 % has been provided by the Snezhe't variety.

Key words: variety; blue lupine; adaptability; productivity; economic efficiency.

Authors:

Yastrebova Aliona Vladimirovna – Postgraduate, Department of Horticulture, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: agro@izhgsha.ru).

Kokonov Sergey Ivanovich – Doctor of Agricultural Sciences, Professor at the Department of Horticulture, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: sergej-kokonov@yandex.ru).

Ryabova Tatyana Nikolaevna – Candidate of Agricultural Sciences, Associate Professor at the Department of Horticulture, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: agro@izhgsha.ru).

F. A. Guliyev[1], M. M. Gurbanov[2], L. A. Guseinova[3]

[1] Lenkoran' Regional ANAS Scientific Centre

[2] Guba Regional Agrarian Research and Innovation Center

[3] Research Institute of Plant Protection and Industrial Crops, Azerbaijan

ZITHIOSIS FRUIT ROT OF POMEGRANATE BUSTS IN WESTERN AZERBAIJAN

Mycological and phytopathological examinations of pomegranate plantations were carried out in 2018-2020 in the western part of Azerbaijan. The surveying method involved a systematic inspection of pomegranate plantations. All aboveground plant organs were subjected to continuously examination. Microscopic analyzes of the collected material were carried out at the Central Phytosanitary Laboratory of the Azerbaijan Institute of Food Safety. After identifying the causative agents of the most dangerous diseases, there were carried out the studies on their prevalence in the western regions of the republic. According to the results of 3-year phytosanitary monitoring, it was established that the dominant role in the frequency of occurrence in young fruiting plantations of pomegranate in the western part of Azerbaijan belongs to the causative agents of anthracnose or scab of pomegranate and zithiosis.

One of the most harmful diseases affecting pomegranate in all western regions of Azerbaijan cultivating this crop is zithiasis fruit rot. In damp years, zithiasis fruit rot can cause a harvest shortage of 50 %, and with epiphytotic development of the disease up to 95–100 % of the harvest. The dynamics of the disease progressing was studied in the Geranboy area, at a special plot. Under laboratory conditions, pathogens were isolated into a pure causative agent culture, the growth and development of the of zithiasis fruit rot causative agent was studied. The biological features of the of zithiasis fruit rot causative agent were studied in pure cultures in various natural and artificial environs with a large variety of pH and temperatures.

The implementation of the developed and proposed complex for the management of the phytosanitary state of pomegranate orchards makes it possible to obtain optimal yields of high-quality fruit even in the years with the extreme weather conditions. Thus, the data on the biology of development, distribution and intensity of zithiasis fruit rot had been presented. Agrotechnical and chemical measures regulating the prevalence and development of zithiasis fruit rot had been described.

Key words: pomegranate; prevailing pomegranate diseases; zithiasis fruit rot; controlling measures; agrotechnical controlling method; chemical controlling method.

Authors:

Guliev Farman Agadede – Professor, Lenkoran Regional ANAS Scientific Center (18, Sh.Akhundova St., Lenkoran, Azerbaijan, e-mail: prof.f quliyev@mail.ru).

Gurbanov Medet Mirzakhmed – Candidate of Biological Sciences, Associate Professor, Guba Regional Agrarian Research and Innovation Center (Guba, settlement Timiryazev, Azerbaijan, e-mail: madat.qurbanov@gmail.com).

Huseinova Lala Almaz – Member of the Research Institute of Plant Protection and Industrial Crops (91, A. Aliyeva St., Ganja, Azerbaijan, e-mail: fitopatoloq.Lale@mail.ru).

L. G. Tsema, A. L. Latypova

Perm' Federal Research Center (Ural Branch of the Russian Academy of Sciences)

PERSPECTIVE FOOD POTATO VARIETIES FOR CULTIVATION IN PERM' REGION CONDITIONS

The article distinguishes perspective potato varieties of Russian selection been identified as resistant to biotic and abiotic environmental factors after research work fulfilled in 2019–2020, at the Perm' Agricultural Research Institute – the Branch of the Perm' Federal Research Center. The aim of the research was to determine promising and adaptable to the soil and climatic conditions of Perm' Region food potato varieties capable of combining high yields and resistance to pests and diseases. The object of the study was 18 potato varieties of unlike rapid maturity groups from the leading Russian selection centers. The research method applied to was the field experiment. The phonological phases differed as per fast maturity group varieties. Thus, early shoots on the 20th day of planting were noted for the varieties of Krepysh, Gulliver, Ariel, Armada, 179-10. The prevailing weather conditions in 2019 had ensured the flowering for all investigated varieties, though dry July 2020 provided none of the latter. Flowering was noted only for the varieties of Reggae, Krepysh, Ariel, 12-29-14, 90-09, 179-10, Lugovskoy. The variety Udacha was able to provide early tuber yield exceeding 12 t/ha and maximum total yield 30,5 t/ha in the group of early varieties. For the group of middle-early varieties it was Samba variety – 30,0 t/ha, Armada – 32,1 t/ha, Ariel – 29,6 t/ha, 179-

10 – 30,0 t/ha, among the middle maturing group of varieties there were Vympel – 29,6 t/ha, Krasa Meshchera – 32,7 t/ha, 10-22-23 – 31,3 t/ha, 232-12 – 30,5 t/ha. The marketability for varieties of early mature was 89,4 %, middle-early – 86,3 %, middle mature – 82,4 %. The high starch content (more than 14 %) had been determined for the following varieties: Reggae, Salsa, Samba, Armada, Ariel, Vostorg, Vympel, and Krasa of Meshchera. According to the compound of parameters, the Udacha, Reggi, Samba, Armada, Ariel, 179-10, Vympel, Krasa Meshchera and 232-12 varieties were determined as the most perspective ones.

Key words: potato; varieties; yield; dry matter; starch; Perm Region.

Authors:

Tsema Lyubov' Gennadievna – Candidate of Agricultural Sciences, Senior Researcher, Perm' Federal Research Center (Ural Branch of the Russian Academy of Sciences) (12, Kul'tura St., Lobanovo Village, Perm' Krai, Russian Federation, 614532, e-mail: lyba_cema@mail.ru).

Latypova Anna Leonidovna – Researcher, Perm' Federal Research Center (Ural Branch of the Russian Academy of Sciences) (12, Kul'tura St., Lobanovo Village, Perm' Krai, Russian Federation, 614532, e-mail: ann.latypowa@yandex.ru).

S. P. Bass[1], A. V. Borisova[2]

[1] Izhevsk State Agricultural Academy

[2] Federal State Budgetary Institution for Research of Horse Breeding, Divovo village, Ryazanskaya Oblast'

BREEDING RESOURCES OF HORSES OF THE RUSSIAN HEAVY BREED IN UDMURT REPUBLIC

Currently, horse breeding in the republic experiences hard times. A positive point is the work of the republican race-track, where horses of all zoned breeds are being tested. Our region has three zoned breeds the breeding work is carried out with. The purpose of the present studies is to assess the Russian heavy truck population in the Udmurt Republic as to develop further strategy for the breed raising in the region. The research was carried out on the principal breeding farms in the Udmurt Republic. The object of the research were 113 heads of the Russian heavy-draft horses breed. The material for the research was the data of the primary zootechnical registration, the data of the CPC for the Russian heavy-draft breed, and the statistical reports on the horse population in the republic. The assessment of qualitative and quantitative traits was also carried out as per the methods commonly recognized in zootechny; zootechnic evaluation of the Russian heavy-draft horses bred in Udmurt Republic was carried out. The principal breeding work had been arranged at three farming enterprises where the indices of the core stock of mares proved to be on the level of middle-bread data. Breeding work is carried out with taking into account the breed lines, though the line diversity was not large.

Key words: Russian Draft breed; breeding work; male lines; measurements; indices.

Authors:

Bass Svetlana Petrovna – Candidate of Agricultural Sciences, Associate Professor at the Department of Feed and Breeding of Farm Animals, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: sveta.bass@inbox.ru).

Borisova Anna Vyacheslavovna – Candidate of Agricultural Sciences, Senior Researcher, All-Russia Research Institute of Horse Breeding (Rybnovsky District, Ryazanskaya Oblast', Russian Federation, 391105, e-mail: vniik@mail.ru).

V. M. Yudin, A. I. Lyubimov
Izhevsk State Agricultural Academy

STATISTICS ON THE INBREEDING OCCURRENCES DURING THE SELECTION OF SIRES

Applying to inbreeding is based on the use of specially selected matching lines for the formation of which, as a rule, inbreeding is used at the preliminary stage of selection for heterosis. In this regard, the goal was to study the influence of various methods of breeding bulls' selection on the indicators of daughters' milk production, their productive longevity, fertility qualities and economic efficiency of breeding. The research results have revealed the highest (6555,8 kg) milk yield with a fat content of 4,01 %, exposed by the inbred daughters of the Favourite-38999 bull. The greatest difference in milk yield (+503,5 kg) when using inbreeding, was observed for the Bazl-M 11230448 bull, whereas his outbred daughters had proven the smallest milk yield of 4800,6 kg. Then the Oscar-600 bull is worth noting since the use of inbreeding has led to a difference of +145,1 kg, which cannot be implied to the Guidon-1219 bull inbred daughters where they are inferior to their outbred peers in milk yield by 121,1 kg. The average productivity for a number of lactations in the inbreeding group was 6185,1 kg, which is by 12,9 % more (5983,1 kg) than in the outbreeding group. The highest lifelong milk yield of 25003,1 kg was in moderate inbreeding, as well as fat – 1047,6 kg, and age lactations age – 3,7, which is exceeds the average by 6617,2 kg – 275,4 kg with 0,9 lactations, respectively. The lowest results for all criteria were shown by close inbreeding – 12442,2 kg of milk, 532,6 kg of fat, with 2,2 lactations.

Key words: inbreeding; outbreeding; breeding selection; Push-Shaporuz; Wright-Kislovsky; degree of inbreeding; coefficient of inbreeding; coefficient of homozygosity.

Authors:

Yudin Vitaly Maratovich – Candidate of Agricultural Sciences, Associate Professor, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: vitaliyiudin@yandex.ru).

Lyubimov Aleksandr Ivanovich – Doctor of Agricultural Sciences, Professor, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: korm@izhgsha.ru).

O. S. Utkina, S. S. Vostrikova, A. F. Kalashnikova
Izhevsk State Agricultural Academy

PRODUCTION TECHNOLOGY AND QUALITY EVALUATION OF PUDING PRODUCED ON DAIRY WHEY

Getting functional products is becoming more and more relevant. To create desserts with increased biological value you can use whey. At the same time, two tasks are to be solved. The first, more complete use of all macro and micronutrients in dairy raw materials, and the second, reducing the burden on the environment, and solving environmental problems. The purpose of the work is to develop a technology of production of pudding based on the whey. Formulation had been developed for production of vanilla and chocolate pudding. As raw materials for production of pudding, saltless whey, granulated sugar, egg yolk, stabilizer, vanilla and cocoa were used. The quality of raw materials had met the requirements. Thus, pudding production technology included: pasteurization of whey with sugar (t = 92–95 °C), dissolution of additional ingredients in a small amount of whey, adding the mixture to hot whey with constant stirring, cooling (55–60 °C), bottling, packaging, labeling, cooling (4 ± 2 °C) and structuring (3–3,5 hrs.). When tasting for the assessment, both pudding samples have scored high marks. The chocolate pudding had a thick, uniform consistency, a pleasant smell of milk chocolate, and a sweet chocolate taste. The vanilla pudding had a pleasant vanilla smell, sweet taste, and light-yellow colour. Physical and chemical indicators of the pudding had proved as follows: pH – 7,30–7,45, the moisture content of the product was 76,01–78,72 %, carbohydrates – 21,9–20,2 %, fat – 0,7 % and protein – 0,8–1,1 %. The pudding had a low calorie content, i.e. vanilla pudding 92,6 kcal/100 g, chocolate – 100,2 kcal/100 g. The product had good organoleptic indicators, low cost and could be recommended for production.

Key words: whey; pudding; starch; stabilizer; recipe; mass fraction of moisture; caloric content; tasting.

Authors:

Utkina Ol'ga Sergeyevna – Candidate of Agricultural Sciences, Associate Professor at the Department of Technology of Livestock Product Processing, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: utkinaolga1982@yandex.ru).

Vostrikova Svetlana Sergeyevna – Candidate of Agricultural Sciences, Microbiologist in Gambrinus OJSC (77, Salyutovskaya St., Izhevsk, Russian Federation, 776053, e-mail: svetlana.sidrenk@rambler.ru).

Kalashnikova Anastasia Feliksovna – Master Student, Zooengineering Department, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: vissarionova.elizaveta@yandex.ru).

D. A. Vakhrameyev[1], Ye. A. Potapov[2], A. A. Martyushev[1], I. A. Deryushev[1]
[1] Izhevsk state agricultural Academy
[2] JSC «IEMZ» Kupol»

TEMPERATURE PARAMETERS OF A DIESEL TRACTOR ENGINE AT THE WHEN USING THERMAL PRE-START PREPARATION

Starting a tractor diesel engine is particularly difficult in the conditions of low machinery storage temperaturesю. During start-up, the wear-and-tear of parts and interfaces, fuel consumption and engine oil fumes increase significantly, and the toxicity of the exhaust gases increases considerably as well. Due to high viscosity of the engine oil, the engine is not able to gain the necessary speed, and compression, whereas due to the thrust of the heat against the cylinder walls, the fuel-air mixture is not sufficiently heated. By the example of the D-240 engine, the temperature of the fuel-air mixture was calculated at the end of the compression stroke during the start-up at low temperatures. An effective method for heating the air supplied to the engine during start-up, for heating the engine oil and the coolant was presented. Based on the results of calculations analyzed, the directions to ensure the guaranteed start-up of the diesel engine in winter had been proposed. As a result of the calculations done, it had been established that the guaranteed start of the diesel tractor engine would occur when the temperature of the fuel-air mixture at the end of the compression stroke reached 240 degrees Celsius. At the same time, to achieve high-quality compression, it was necessary to twist the crankshaft to a speed equal to 100 revolutions per minute. The investigation has shown that already at the ambient temperature of -15 *°C*, the guaranteed start of the engine may not occur, since the temperature of the working mixture at the end of the compression cycle could be only 126 *°C*. When developing heater designs, the possibility of using heat accumulators should be taken into account, and that would allow to reduce the external energy consumption for heating the engine utterly Thus, there appears a opportunity to get the engine ready for start-up using inter-shift machinery storage.

Key words: process; start-up; engine; tractor; mixture; temperature; compression.

Authors:

Vakhrameyev Dmitry Alexandrovich – Candidate of Technical Sciences, Associate Professor at the Department of Tractors, Automobiles and Agricultural Machines, Izhevsk State Agricultural Academy (11, Studentskaya St., Izhevsk, Russian Federation, 426069, e-mail: vdaig@yandex.ru).

Potapov Yevgeny Alexandrovich – specialist of Kupol IEMZ JSC (3, Pesochnaya St., Izhevsk, Russian Federation, 426033, e-mail: agroingener.ep@yandex.ru).

Martyushev Alexey Anatolievich– Post-graduate at the Department of Tractors, Automobiles and Agricultural Machines, Izhevsk State Agricultural Academy (11, Studentskaya St., Izhevsk, Russian Federation, 426069, e-mail: alex100883@yandex.ru).

Deryushev Ivan Alexandrovich – Candidate of Technical Sciences, Associate Professor at the Department of Tractors, Automobiles and Agricultural Machinery, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: deryshev_ivan@mail.ru).

N. P. Kondratieva[1], R. G. Bol'shin[2]
[1] Izhevsk State Agricultural Academy
[2] OOO «Omega»

EFFECT OF SYNERGISM FROM THE EXPOSURE OF BLUE AND RED RADIATION ON HYDROPONE GREEN FEED

The article discusses the synergistic effect that obtained from the simultaneous influence of blue and red optical radiation on the growth and the development of hydroponic green feeds of wheat of the Irgina variety, barley of the Gergey variety and oats of the Galop variety that results in the increase of the plants' growth rate. Hydroponic feeds is a perspective direction for the reason that in seven days a complete green feeds are obtained from wheat, oats and other crops possessing of high biological activity due to being harvested as green feeds at the peak of enzymatic activity. Green foods are especially important in winter. They are of particular importance for the organization of animal feeding on farms and in zoos. Therefore, the improvement of lighting energy-saving technologies for obtaining environmentally friendly hydroponic feed is a task of relevant value.

Key words: synergistic effect; hydroponic environmentally friendly green forage; blue-red optical radiation; LED phytoinstallations; minimum reduced unit costs

Authors:

Kondrateva Nadezhda Petrovna – Doctor of Technical Sciences, Professor at the Department of Automated Electric Drive, Izhevsk State Agricultural Academy (11, Studencheskaya St., Izhevsk, Russian Federation, 426069, e-mail: aep@izhgsha.ru).

Bol'shin Roman Gennadievich – Candidate of Technical Sciences, Energy Auditor, OOO "Omega" (Sportivnaya St., Izhevsk (Starki Settlement), Russian Federation, 426062).