

**THEORETICAL JUSTIFICATION OF PARAMETERS
THE PROCESSES OF LOADING, STORAGE AND UNLOADING OF
ANIMAL FEED**

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Key words: *all-mash, tanker, parameters, loading, storage, unloading.*

A tanker-type device with controlled technological processes for loading, storing and unloading bulk agricultural materials is considered. The device can be used for storing ready-made all mash and its components in feed mills, pig farms and other farms engaged in animal husbandry. The solution of set task is achieved in that in tanker for free-formative granular materials, containing vertical hull of mainly rectangular cross-section, the discharge device located at the bottom of the hull, and installed inside the enclosure pressure stabilizers fixed on opposite walls of the hull with displacement along its vertical axis, the lower of which is pivotally mounted on a wall of the hull and has a drive for adjusting the angle of its location relative to the hull wall. The basic constructive parameters of the unit are theoretically justified, such as the angle of installation of sieves, the number of sieves in the hopper, the constructive arrangement of sieves in the hopper cavity, and the minimum dimensions of the gap and the bridge in the sieve. It is found that to determine the optimal width of the gap in the sieve, it is necessary to identify the height of the layer of bulk cargo passing through the gap of the element of the hopper unit and the speed of the bulk material on the second bridge. At the same time, in order to ensure optimal operation of the element (sieve) of the device for

controlling the technological process of loading, storage and unloading, it is necessary that the loaded material evenly passes through the sieve, that is, it is necessary that the throughput of each slot of the device is the same. The obtained equations allow us to determine the minimum width of the gap and depending on radius of particle, the rate of material falling on the sieve, the coefficient of friction, and the width of the sieve connector.

Bibliography

1. Chkalova M.V., Shakhov V.A., Burlutsky E.M., Pavlidis V.D. Determination of the quantitative parameters of the air-product layer in the working chamber of a shredder. Achievements of science and technology of the agroindustrial complex. Scientific journal, 2017, - №12, - P. 57-60.
2. Gritsenko, G.M. Prerequisites for improving the strategic management of grainprocessing enterprises that have mixed fodder production. Fundamental research / G. M. Gritsenko, D. I. Svintsev // Scientific journal. – 2015. - № 10 (part 2). - P. 362-365.
3. Finite element analysis of failed slope by shear strength reduction technique : a case study for Surabhi Resort Landslide, Mussoorie township, Garhwal Himalaya / V. Gupta, R.K. Bhasin, A.M. Kaynia, V. Umar, A.S. Saini, R.S. Tandon, T. Pabst // Geomatics Nat. Hazards Risk. - 2016. - № 7 (5). – C. 1677–1690. - Doi:10.1080/19475705.2015.1102778, 2016.
4. Paramesh, V. Enhancing ecosystem services and energy use efficiency under organic and conventional nutrient management system to a sustainable arecanut based cropping system / V. Paramesh, V. Arunachalam, A. J. Nath // Energy. - 2019. - № 6. – P. 156-168.
5. Parajuli R. Can farmers mitigate environmental impacts through combined production of food, fuel and feed? A consequential life cycle assessment of integrated mixed crop-livestock system with a green biorefinery / R. Parajuli, T. Dalgaard, M. Birkved // Sci Total Environ. - 2018. - № 4. – P. 248-261.
6. The production of all -mash production in 2018. All- mash. - 2019. - № 3. - P. 13-23.

7. Energy budgeting of colocasia-based cropping systems in the Indian sub Himalayas / M. D. Tuti, V. Prakash, B. M. Pandey, R. Bhattacharyya, D. Mahanta, J. K. Bisht [et al.] // Energy. - 2012. - № 45. – P. 986e93.
8. Elizarov, V. P. Upcoming trend of development of native farming equipment / V. P. Elizarov, A. A. Artushin, Y. S. Tsench // Vestnik of VIESH. - 2018. - № 2 (31). - P. 12-18.
9. State program for the development of agriculture and regulation of markets for agricultural products, raw materials and food for 2013-2020 // Collection of legislation of the Russian Federation. – 2012. - № 30. - P. 146-158.
10. Liu, G. Energy analysis and economic assessment of a riceturtle-fish co-culture system / G. Liu, H. Huang, J. Zhou // Agroecol Sustain Food Syst. – 2019. - № 43. –P. 299-309.
11. A sustainability analysis of two rapeseed farming ecosystems in Khorramabad, Iran, based on emergy and economic analyses / Z. Amiri, M. R. Asgharipour, D. E. Campbell, M. Armin // J Clean Prod. – 2019. – 226. –P. 1051e66.
12. Comparing the environmental performance of mixed and specialised dairy farms: the role of the system level analysed / S. M. R. R. Marton, A. Zimmermann, M. Kreuzer, G. Gaillard // J Clean Prod. – 2016. – 124. – P. 73e83.
13. Patent № 2219118 Russian Federation, IPC B65D 88/64. Tanker for compacting bulk materials : № 2002112529 : application 13.05.2002: published 20.12.03 / Tretyakov G. M., Gorushinsky V. S., Gorushinsky I. V., Frolov N. N., Prusov M. V., Mosina N. N. – 5p. Applicants: OAO Promzheldortrans company, Samara state Academy of communication lines.
14. Goryushinsky, I. V. Technological systems for providing feed and livestock enterprises with raw materials: (speciality 05.20.01 - Technologies and means of agricultural mechanization.) : dissertation for the degree of doctor of technical Sciences / Goryushinsky Igor Vladimirovich; Orenburg SAU. – Orenburg, 2005. – 298 p.
15. Mosina, N. N. Method for determination of parameters of tanker loading process with bulk material / N. N. Mosina // Modern technology, means of

mechanization and technical service in agro -industrial complex : collection of scientific works of the Volga inter-University conference. – SAMARA : SSAA, 2003. – P. 55-57.

16. Ledyayev, T. B. Perspectives of all-mash production in Russian Federation / T. B. Ledyayev // Innovation territory. – 2017. - № 10 (14). - P. 68-71.

17. Lukiyenko, L. V. Equipment for all mash production / L. V. Lukiyenko, A. O. Raykov // Scientific innovations – agrarian production : Materials of National research to practice conference dedicated to 100th anniversary of OmskSAU. - 2018. - P. 229-231.

18. Konyaev, N. V. Design of energy-saving equipment for feed production / N. V. Konyaev, A. S. Skvortsov // Regional vestnik. - 2018. - № 4 (13). - P. 13-15.

19. Pakhomov, V. I. Theoretical background for the development of design methods for modular feed production / V. I. Pakhomov, S. V. Braginets, O. N. Bakhchevnikov // Innovation technologies in science and education (Heat and mass exchange institute-2017) : materials of the Vth World scientific research to practice conference - 2017. - P. 229-232.

20. Khalafyan, A. A. Statistical data analysis. STATISTIKA 6.0 / A. A. Khalafyan. – Moscow, 2007. - 512 p.

INFLUENCE OF PRE- SOWING TREATMENT OF SEEDS AND VARIETIES ON THE MOISTURE AVAILABILITY OF CROPS AND CONSUMPTION WATER USE OF SPRING WHEAT

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Key words: *variety, spring wheat, moisture availability, growth regulator Nano-Gro, seed protectant Benlat, water consumption coefficient.*

The article deals with the issues of water availability of crops and water consumption coefficients of spring wheat depending on varietal features, seed

protectant and pre-sowing treatment of seeds in the conditions of Chuvash Republic. The applicant studied three zoned and recommended for introduction into production varieties of spring wheat Margarita, Simbirsit and Prokhorovka. Factor A-Simbirsit, Prokhorovka and Margarita varieties. Factor B-means of protection: 1. Benet. 2. Nano-Gro. The results of the analysis of crop moisture availability and water consumption coefficients of spring wheat depending on the seed protectant with the grain protectant Benlat and with the preparation Nano-Gro are presented. Research results indicate the effectiveness of using elements of cultivation technology as a method of pre-sowing treatment of seeds and influence on the moisture availability of crops and water consumption coefficients of spring wheat depending on the seed protectant with the spring wheat grain protectant Benlat and with the preparation Nano-Gro. According to the analysis, it was found that the actual total water consumption (SW) in mm in 2015 was at the level of 472.3 mm, in 2016-at the level of 453.1, and in 2017-at the level of 245.8 mm. It was established that depending on weather conditions that were during vegetation, varietal characteristics of wheat and seed treatment, biological (Kbiol), commercial (Ctov) and daily (Csut) water consumption coefficients varied significantly. It was found that pre-sowing treatment of spring wheat seeds with Nano-Gro solution contributes to a significant reduction in the water consumption coefficient of spring wheat for the entire vegetation period of plants. The issue of improving the water availability of grain crops and the coefficient of water consumption of spring wheat depending on the seed protectant served as the object of study for many researchers. Therefore, the study of the regularities of moisture availability of grain crops and the coefficient of water consumption depending on the reception of pre-sowing treatment of seeds and varieties remains an eternal topic of research of scientists.

Bibliography

1. Terekhov, M. B. Water consumption coefficients of winter triticale depending on varietal features and the level of planned yield / M. B. Terekhov, I. V. Serazhetdinov // Agrarian science of Euro-North-East. – № 6. – 2011. – P. 32-35.
2. Nemchenko, V. V. Optimization of agricultural techniques for perspective spring wheat varieties / V. V. Nemchenko, A. S. Filippov // Agriculture. – 2011. – № 6. – P. 15-17.
3. Abramov, Alexander Ivanovich. Obtaining high yields of spring durum wheat in the Volga-Vyatka district: abstract of the dissertation of the candidate of agricultural sciences: 06.01.09 – crop science / A. I. Abramov . - Balashikha, 2000. – 20 p.

4. Zavalin, A. A. Biopreparations, fertilizers and yield / A. A. Zavalin. – M.: publishing house ARSRIA, 2005. – 302 p.

5. Kovalev, V. M. Application of plant growth regulators to increase the stability and productivity of grain crops / V.M. Kvalev. – M.: ARRITA Agroindustry, 1992. – 47 .

6. Kurkina, Y. N. Influence of Nano-Gro on yield and quality of spring wheat and barley grains / Y. N. Kurkina, R. O. Gazmanov, V.M. Kochetov // Scientific journal. – 2010.– № 9(80). – Pub. 11. – P. 59-64.

7. Terekhov, M. B. Water consumption coefficients of winter triticale depending on varietal features and the level of planned yield / M. B. Terekhov, I. V. Serazhetdinov // Agrarian science of Euro-North-East. – № 6. – 2011. – P. 32-35.

8. Ashaeva, O. V. Influence of seeding rates and doses of mineral fertilizers on water consumption by spring durum wheat crops / O.V. Ashaeva // Ways to increase crop productivity. – Collection of research papers. – N-Novgorod: NSAA, 2001. – P. 41 – 43.

9. Balakay, G. T. Irrigation guarantees stable grain production / G.T. Balakay, N.I. Balakay, S.G. Balakay // Agriculture. – 2011. – № 5. – P. 29-31.

10. Kargin V. I. The dependence of yield on agro meteorological conditions / V.I. Kargin // Materials of international scientific conference. – Cheboksary. CHSAA, 2005. – P. 53-55.

11. Kochetov, V.M. Water consumption of spring wheat crops of different maturation periods in the conditions of the Volga-Vyatka region / V. M. Kochetov // Scientific papers NSAA (Agronomy). – N. Novgorod, 2006. – P. 23-26.

12. Balakay, G. T. Irrigation guarantees stable grain production / G. T. Balakay, N. I. Balakay, S. G. Balakay // Agriculture. – 2011. – № 5. – P. 29-31.

13. Buriro, Umed Ali. Influence of seeding rates, tur preparation and irrigation on crop formation and its quality of different varieties of spring wheat: abstract dis.... candidate of agricultural Sciences: 06.01.09 / . Buriro Umed Ali;

[Place of presentation : Moscow order of Lenin and order of the Red Banner of Labor of Timiryazev agricultural Academy].- Moscow, 1982.- 20 p.

14. Vilkov, V. S. New varieties are the most important resource for increasing crop productivity / V. S. Vilkov // Nizhny Novgorod agricultural journal. – 2003. – № 1(16). – P. 7-8.

15. Gabdulin, V.R. Compatibility of biological and chemical preparations / V.R. Gabdulin, L. A. Garaeva, A. V. Kazakova // Actual issues of improving the technology of production and processing of agricultural products. Materials of the international research to practice conference. - Yoshkar-Ola: Mar. state University, 2005. – Pub. 7. – P. 115-118.

16. Dyakov, V. M. Environmentally friendly growth regulators Mival and Krezatsin / V. M. Dyakov, Y. S. Korzinnikov, V. V. Mostychenkov // Growth plant regulators. – M., 1990. – 52 p.

17. Ivenin, V. V. Optimization of biological and chemical factors in cultivation of spring wheat / V. V. Ivenin [et al.] // Agriculture and its resource provision. Materials of research to practice conference. – N. Novgorod, 2010. – 44-49.

18. Kuzminykh, A. N. Growth stimulators and spring wheat yield / A. N. Kuzminykh, A. Y. Guryev // Actual issues of improving the technology of production and processing of agricultural products: Mosolov readings: Materials of the international research to practice conference. Pub. IX. – Yoshkar-Ola: Mar. state. univer, 2007. – B. 1. – P. 46-47.

19. Kurkina, Y.N. Growth regulator Nano-Gro as a component of biological agriculture / Y. N. Kurkina // Col. Thesis All-Russian school seminar for students, candidates and young scientists (Belgorod 14-17 October 2009). – Belgorod: Publishing of BelSU, 2009. – P. 23-26.

PRODUCTIVITY OF SPRING WHEAT AND BARLEY WHEN USING FERTILIZERS AND GROWTH STIMULATORS

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Key words: spring wheat, barley, Megamix, Groth Matrix, Aminokat 30, fertilizer, yield

The aim of research is to increase the yield of spring wheat and barley through the use of drugs Megamix, Growth Matrix and Aminokat 30. The research was conducted on the experimental field of the Department of crop science and agriculture of Samara SAU. The maximum yield of spring wheat was obtained when dressing seeds with the preparation Megamix universal with yield of 2.39 t / ha with program execution for the planned yield of 99.7%. Research in the period from 2014 to 2017 it was established that the maximum yield is formed by barley crops when dressing according to vegetation with Growth Matrix and Megamix Nitrogen with a yield of 2.28 and 2.66 t / ha. The best yield is provided by crops of Helios, Sonet and Berkut.

Bibliography

1. Vasin, V. G. Crop science: study guide / V. G. Vasin, N. N. Elchaninova, A. V. Vasin. - Samara, 2009. – 358 p.
2. Serzhanov, I. M. Optimization of fertilizer system and technological methods of spring wheat cultivation in the Northern part of the forest-steppe of the Middle Volga region: abstract of the dissertation of agricultural sciences : spec. 06.01.04 agrochemistry ; 06.01.01 geponics, crop science / Serzhanov Igor Mikhailovich. – Kazan, 2013. – 40 p.
3. Vakulenko, V. V. Plant growth regulators / V. V. Vakulenko, O. A. Shapoval // Agro XXI. – 1999. – № 3. – P. 2-3.
4. Vasetskaya, M. N. Use of Biopreparations and biologically active substances in the protection of grain crops from fungal diseases / M. N. Vasetskaya, V. G. Krashenko, V. P. Golobkov // Production of environmentally safe crop production. – Pushino, 1995. – P. 136-139.
5. Nichiporovich, A. A. Light and carbon nutrition of plants (photosynthesis) / A. A. Nichiporovich. – Moscow : AS USSR, 1955. – 288 p.
- 6 Muzurova, O. G. Agroecological aspects of use of the drug Gumi in winter wheat cultivation / O. G. Muzurov // Chief agronomist. - 2007. – № 9. – P. 59-60.
7. Nichiporovich, A. A. Photosynthetic activity of plants in crops / A. A. Nichiporovich, L. E. Stroganova, S. P. Chmora. – Moscow : AS USSR, 1961. – 136 p. .
8. Panasin, V. I. Minor- nutrient element and yield / V. I. Panasin. – Kaliningrad, 1995. – 282p.

9. Peyve, Y. V. Agrochemistry and biochemistry of minor-nutrient elements / Y. V. Peyve. – Moscow : Science, 1980. – 430 p.

10 Peyve, Y. V. Main results of scientific research on the problem of minor-nutrient elements in crop science and animal husbandry in 1970/ Y. V. Peyve, I. P. Ayzupient // Minor-nutrient elements in USSR. – 1972. – № 19. – P. 3-47.

11. Rehovsky, A. V. Parameters and conditions for effective use of fertilizers in the steppe regions of the southern Urals / A. V. Rehovsky, I. Sh. Zaripov. – Orenburg, 1998. – 109 .

INFLUENCE OF MINERAL NUTRITION LEVEL AND SEEDING RATE ON PHOTOSYNTHETIC ACTIVITY AND PRODUCTIVITY OF BARLEY OF «GELIUS» SORT

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Key words: mineral fertilizers, seeding rates, leafage, leaf-area duration, photosynthetic potential, photosynthetic yield (kg of grain for 1 thousand units of photosynthetic potential), pure photosynthetic productivity, grain yield.

In the article we described research results on leached chernozemic soil of Republic of Mordovia of complex influence of mineral nutrition level and seeding rates on leafage, leaf area duration, photosynthetic potential, photosynthetic productivity (in 1 kg grain for 1000 units of photosynthetic potential), pure photosynthetic productivity and grain yield of brewer's barley of Gelius sort. In 2016 – 2018 in PNT Luhovskoye of urban district of Saransk, Republic of Mordovia two-factors field experiments were carried out on field № 4 experiment scheme: factor A. – ground of mineral nutrition. A.1. – control – without fertilizers. A.2. – N30 P30K30. A.3. – N60P60K60. A.4 – N90P90K90; factor B. – grain seeding rate. B.1. – 2,5 mln fertile seeds for hectare (control). B.2. – 3,0. B.3. – 3,5. B.4. – 4,0. B.5. – 4,5. Results of our research testify, that leafage of common barley prevailed(18,5 %) on non-fertilized foil, at this rate of seeding 3,0 mln seeds on hectar, the biggest leaf area duration (44,5 and 45,4 thousand. m²/ha), photosynthetic potential is formed (2.03 and 2.06 mln • m² days./ha) on foils of mineral nutrition N60 P60K60 and N90P90K90 and seeding rate of 4,mln of fertile seeds on hectar, but pure photosynthetic productivity prevailed (2,0 g/m² per day) during application N90P90K90 and seeding rate of 4,5 mln. Minimum value of

photosynthetic productivity was observed on the foil of natural fertility with seeding 2,5 and 3,0 mln seeds (0.8 and 1,0 kg of grain for 1 000 units FP). Maximal yield of ground mass was formed at fertilizer doze N60P60K60 and N90P90K90 and seeding 4,5 mln seeds, that is for 127,3 and 136,5 % more than in control.

Bibliography

1. Saulin, A. A. Influence of seeding rates on productivity of multirow barley breed / A. A. Saulin, A. P. Eryashev // *Niva of the Volga region*. – 2010. – №1(4). – P. 11–15.

2. Influence of soil preparation and growth conditions on productivity and barley quality in Irkutsk region / A. Y. Puzyreva, V. Y. Grebeshikov, V. V. Verkhoturov, S. L. Belopukhov, R. F. Baybekov // *Crop-producing power*. – 2014. – № 1 (76). – P. 26-27.

3. Surin, N. A. Barley sample in East Siberia / N. A. Surin, N. E. Lyakhova // *Vestnik of Krasnoyarsk State Agrarian University*. – 2017. – № 4 (127). – P. 52 – 65.

Marcinkowski, P. Effect of climate change on sowing and harvest dates of spring barley and maize in Poland / P. Marcinkowski, M. Piniewski // *International Agrophysics*. – 2018. – № 32(2). – C. 265 – 271.

5. Eryashev, A. P. Influence of technological elements on multirow barley productivity / A. P. Eryashev, И. P. Bektyshkin, S. V. Kudashkina // *Feed production*. – 2013. – № 2. – P. 9 – 12.

6. Eryashev, A. П. Crop yield and grain quality of barley according to the plant nutrient status / A. P. Eryashev, I. P. Bektyshkin, S. V. Kudashkina // *Feed production*. – 2013. – № 8. – P. 14 – 16.

7. Dmitriyev, N. N. Barley productivity against the long fertilizer treatments in conditions of Irkutsk region / N. N. Dmitriyev, V. V. Zhito, N. I. Mokhosova // *Science and technology achievements of APC*. – 2011. – № 2. – P. 22 – 23.

8. Zavalin, A. A. Crop yield cultures and rotation productivity during the use of chemization and biologization means / A. A. Zvalin, S. N. Nikitin //

Agrarian science and production: problems and perspectives of cooperation : materials All-Russian research to practice conference. – 2014. – P. 141 – 151.

9. Gaysin, I. A. Effectiveness of foliage application by chelate micronutrient in connection with nitrogen in technology of cultivation of spring wheat in grey forest soil of republic of Tatarstan / I. A. Gaysin, M. G. Murtazin, S. G. Murtazina // Grain farming. – 2014. – № 2. – P.1 – 7.

10. Gushina, V. A. Biopreparational growth regulators in sustainable agriculture / V. A. Gushina, A. A. Volodkin. – Penza : Penza State agricultural Academy, 2016. – 206 p.

11. Kuzminykh, A. N. Crop yield and grain quality of winter rye according to application of growth regulators / A. N. Kuzminykh, G. I. Pashkova // Vestnik of Mari El State University. Series of agriculture. Economical science. – 2016. – № 1 (5). – P. 26 –30.

12. Danilov, A. V. Influence of time limit of seeding dressing with growth stimulators on crop yield of spring barley in conditions of Mari El Republic / A. V. Danilov, M. A. Evdokimova // Actual questions of technological development of production and processing of agricultural production. – 2017. – № 19. – P. 7 – 10.

13. Nikitin, S. N. Photosynthetic plant activity in seeding and dynamics of growth process applying of biological preparations / S. N. Nikitin // Progress of modern natural science. – 2017. – № 1. – P. 33 – 38.

14. Danilov, A. V. Influence of time limit of seeding dressing with growth stimulators on crop yield of spring barley in conditions of Mari El Republic / A. V. Danilov, M. A. Evdokimova // Actual questions of technological development of production and processing of agricultural production. – 2017. – № 19. – P. 7 – 10.

15. Adaptive potential of barley in East-Siberian selection / N. A. Surin, N. E. Lyakhova, S. A. Gerasimov, A. G. Lipshin // Science and technology of APC achievements. – 2017. – № 5. – P. 28 – 31.

16. Isaichev, V. A. Influence of growth regulators and mineral fertilizers on water regime and yielding capacity of barley plants / V. A. Isaichev, N. N. Andreev, K. A. Vinogradova // Research Journal of Pharmaceutical, Biological and Chemical Sciences. - 2018. – Vol. 9, № 2. - P. 1197 – 1202.

17. Isaichev, V. A. Influence of macro and microelements on protein producing capacity in feed barley grain / V. A. Isaichev, V. I. Kostin, N. N. Andreev // Research Journal of Pharmaceutical, Biological and Chemical Sciences. - 2018. – Vol. 9, № 3. – P. 1473 – 1477.

18. Methodology of state strain testing of agricultural cultures : methodological recommendations. – Moscow : Kolos, 1985. – 248 p.

19. Nichiporovich, A. A. Photosynthesis and theory of getting high yields / A. A. Nichiporovich. – Moscow : Publishing house AS USSR, 1961. – 93 p.

20. Shatilov, I. S. photosynthetic activity of corn according to population / I. S. Shatilov, A. G. Zamarev // Izvestiya TAA. – 1965. – Pub. 3. – P. 85–88.

21. Dospokhov, B. A. Methodology of field test (with basis of statistical research data processing : students book / V. A. Dospokhov. – 5 – the enlarged and processing .– Moscow : Agro industry publishing , 1985. – 351 c. ISBN 978-5-458-23540-2

**CHANGE OF BIOMETRIC INDICES AND PRODUCTIVITY FROM
MINERAL NUTRITION LEVEL AND SEEDING RATE AT COMMON
BARLEY OF «HELIOS»**

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Key words: mineral fertilizer, seeding rate, height of productive footstalk, head length, weight of 25 greed productive footstalks, protein gathering, agronomic effectiveness.

In this article research results on leached chernozemic soil in Republic of Mordovia of complex level of mineral nutrition and seeding on biometric indices and productivity of common barley of Helios breed are shown. In 2016 – 2018 in PNT Luhovskoye of urban district in Saransk Republic of Mordovia 2 factor field experiments were carried out on field № 4 Experiment scheme: factor A. – ground of mineral nutrition. A.1. – control – without fertilizers. A.2. – N30 P30K30. A.3. – N60P60K60. A.4 – N90P90K90; factor B. – seeding rates of grains. B.1. – 2,5 mln of fertile seeds for hectare (control). B.2. – 3,0. B.3. – 3,5. B.4. – 4,0. B.5. – 4,5. WE found out that plant stant was higher (56,1–62,9 cm) on all grounds of mineral nutrition and seeding rates, except for variant N30P30K30 with seeding rate of 2,5 mln (51,8 cm), in comparison to control (49,7 cm); primary head length was registered against N30P30K30 and seeding of 2,5 mln seeds (6,4 cm); in panicle stage green weight of 25 productive footstalks and protein gathering prevailed against N90P90K90 and seeding rate of 4,5 mln/ha (144 g and 351 kg/ha,); the biggest protein gathering was established in variant N90P90K90 with seeding rate of 4,5 mln seeds; the biggest agronomic effectiveness of fertilizers (11,6 kg for 1 kg of primary nutrient) was found against N30P30K30 and seeding rate of 2,5 mln; studied variants did not influence on grain nutrition.

Bibliography

1. Altukhov, A. I. Economic problems of innovation driven growth of grain product complex of Russia / A. I. Altukhov, V. I. Nechayev. – Moscow : publishing V.V. Nasirddinova, 2015. – 477 p. ISBN 978-5-905523-45-8
2. Morozov, V. I. Grain economy in market dimension and its effectiveness in Ulyanovsk region agriculture / V. I. Morozov, S. V. Basenko // The Volga region Agro. – 2014. – № 5. – P. 48 – 50.
3. Bekker, Kh. Plant selection / Kh. Bekker; translation from German by Doctor of Agriculture, professor V. I. Leuniv. – Moscow : Association of scientific issues KMK, 2015. – 425 p. ISBN 978-5-9906564-8-2
4. Význam znaků kořenového systému proefektivní využití zásoby vody a živin z půdního profilu: aktuální kapitoly z fyziologie rostlin a

zemědělského výzkumu 2011 / J. Haberle, P. Svoboda, L. Bláha, B. Šerá [eds.]
// Selected topics in plant physiology and agricultural research. – Praha, 2012.
– P. 138 – 145.

5. Toygildin, A. L. Permanent grasses in biologization of rotation in forest steppe of Volga region : monograph / A. L. Toygildin, V. I. Morozov. – Ulyanovsk : USAA, 2015. – 178 p.

6. Lukin, S. V. Experience of biologization of agriculture in Belgorod region/ S. V. Lukin // Agrochemical Vestnik. – 2017. – № 5. – P. 21–25.

7. Significance of predecessor for the raise of fertilizers effectiveness in research of geographic experience net / V. G. Sychev, V. G. Loshakov, V. A. Romanenkov, O. V. Rukhovich, M. V. Belichenko // Problems of agrochemistry and ecology. – 2016. – № 3. – P. 3 – 8.

8. Nikitin, S. N. Photosynthetic plant activity in seedings and dynamics of full-height process during biological preparation appliance / S. N. Nikitin // Success of modern natural science. – 2017. – № 1. – P. 33 – 38.

9. Danilov, A. V. Influence of time limits of seed development by growth stimulators on crop yield of spring barley in conditions of Mari El Republic / A. V. Danilov, M. A. Evdokimova // Actual question of advances in technologic productivity of production and processing of agriculture. – 2017. – № 19. – P. 7 – 10.

10. Influence of soil preparation and conditions of growth on productivity and quality of barley in Irkutsk region / A. Y. Puzyreva, V. Y. Grebeshikov, V. V. Verkhoturov, S. L. Belopukhov, R. F. Baybekov // Crop- producing power. – 2014. – № 1 (76). – P. 26 – 27.

11. Adaptive potential of barley in West- Siberian selection / N. A. Surin, N. E. Lyakhova, S. A. Gerasimov, A. G. Lipshin // Science and technology of APC. – 2017. – № 5. – P. 28 – 31.

12. Zavalin, A. A. Crop yield of cultures and productivity of rotation during the use of chemization and biologizaion means / A. A. Zavalin, S. N.

Nikitin // Agricultural science and production : Materials of All- Russian research to practice conference. – 2014. – P. 141 – 151.

13. Vakulenko, V. V. Epi-Extra, zircon and siliplants will increase crop yield quality/ V. V. Vakulenko // Protection and quarantine of plants. – 2017. – № 3. – P. 34.

14. Novoselov, S. I. Influence of mineral fertilizers on productivity of rotation with different kinds of fallows/ S. I. Novosyolov, N. I. Tolmachev, A. V. Murzhinova // Crop-production power. – 2014. – № 5 (80). – P. 14 – 15.

15. Isaichev, V. A. Influence of growth regulators and mineral fertilizers on water regime and yielding capacity of barley plants / V. A. Isaichev, N. N. Andreev, K. A. Vinogradova // Research Journal of Pharmaceutical, Biological and Chemical Sciences. - 2018. – Vol. 9, № 2. - P. 1197 – 1202.

16. Surin, N. A. Barley sample in East Siberia / N. A. Surin, N. E. Lyakhova // Vestnik of Krasnoyarsk State Agrarian University. – 2017. – № 4 (127). – P. 52 – 65.

17. Marcinkowski, P. Effect of climate change on sowing and harvest dates of spring barley and maize in Poland / P. Marcinkowski, M. Piniewski // International Agrophysics. – 2018. - № 32(2). – P. 265 – 271.

18. Adaptive potential of barley of East- Siberian selection / N. A. Surin, N. E. Lyakhova, S. A. Gerasimov, A. G. Lipshin // Science and technology of APC achievements . – 2017. – № 5. – P. 28 – 31.

19. Methodology of state strain testing of agricultural samples: methodological recommendations . – Moscow : Kolos, 1985. – 248 p.

20. Dospekhov, B. A. Methodology field test (with the basis of statistical research results development : book / B. A. Dospekhov. – 5 – pub., comp. and worked. – Moscow : Agro industry publishing, 1985. – 351 p. ISBN 978-5-458-23540-2

INFLUENCE OF SEEDING METHODS AND MICRONUTRIENTS ON THE PRODUCTIVITY OF SOYBEAN

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Key words: *soybean, seeding method, micronutrient, yield, profitability.*

The article presents experimental data on productivity and economic effectiveness of soybean cultivation with the use of micro-fertilizers Bloom grow, Immune System and various methods of seeding in light-gray forest soils of the Chuvash Republic. Production studies on the influence of elements of YCXII - 6 soybean cultivation technology on its productivity were carried out in USPC "Studentskiy" of FSBEI HE Chuvash SAA in 2017-2019. We used ordinary (15 cm) method of seeding soybeans and wide-row (30 cm) method, variants with treatment with the drug Immune System at the rate of 1 liter per ton of seeds and spraying: the first in mid - June, the second in early July at a rate of 300 ml per 1 ha of crops. 10 days before seeding Bloom grow was added at the rate of 1 liter/ha on the surface of field. The research results showed that the tallest plants were formed on a wide-row crop, micro-fertilizers treatment also significantly increased the growth of plants by 2.3-7.4 cm. This variant contributed to the formation of maximum number of beans (38.2 PCs.), the yield of seeds from one plant (58.2 PCs.) and the mass of 1000 seeds (145.1 g). With wide-row crops using microfertilizers, the plant safety was highest at 87% and the maximum yield was formed up to 2.04 t / ha. The research results show that soybean cultivation is economically profitable, the profitability for all options was 8.1-70.5 %, the highest indicator of 70.5 % was obtained at a wide-row method of seeding using microfertilizers.

Bibliography

1. Ibragimov, A. D. Soy is a unique protein and oilseed crop / A. D. Ibragimov // Innovative approach to strategy development of the Russian agro-industrial complex : materials of All Russian research to practice conference. – Makhachkala, 2018. – P. 40-44.
2. Lozhkin, A. G. Study of elements influence of the technology of cultivation of soybean varieties Chera 1 on the quality of seed material / A. G. Lozhkin // Vestnik of Chuvash State agricultural academy. - 2017. - № 1 (1). - P. 14-17.
3. Krivoshlykov, K. M. Current trends in the soybean market in the world and Russia / K. M. Krivishlykov, E. Y. Roshina // Oil production. – 2016. – Pub. 2 (166). – S. 68-72.
4. Gvaldova, V. V. Dynamics of soybean spread in the world / V. V. Gvaldova, E. V. [Kirsanova](#)// Agrobusiness and ecology. - 2015. - V. 2, № 2. – P. 45-48.
5. Krivoslykov, K. M. State analysis and development of soybean production in the world and Russia / K. M. Krivoshlykov, E. Y. Roshina, S. A. Kozlova // Oil cultures. Scientific technological bulletin ARRIOC. – 2016. – Pub. 3 (167). – P. 64-69.
6. Soy in Russia : monograph / V. A. Fedotov, S. V. Goncharov, O. V. Stolyarov, T. G. Vashenko, N. S. Shevchenko ; under the editorship of professors V. A. Fedotova, S. V. Goncharova. – Moscow : Agro league of Russia, 2013. – 432 p.(indicate ISBN)
7. Lozhkin, A. G. The study of soybean cultivation technology on the seed yield / A. G. Lozhkin, R. N. Ivanova // Actual issues of agricultural science development in modern economic conditions: materials of the IV-th International research to practice conference of young scientists. – Volgograd : Volgograd State agrarian university, 2015. - P. 48-50.
8. Vasilyev, O. A. Bulk chemical composition of soils of the Chuvash Republic and its influence on agrochemical properties / O. A. Vasilyev, D. P.

Kiryanov, N. A. Fadeeva // Agroecological and organizational-economic aspects of creation and effective functioning of ecologically stable territories : materials of the all -Russian research to practice conference. – Cheboksary, 2017. – P. 18-23.

9. Kiryanov, D. P. The content of heavy metals in light gray forest soil during the appliance as a fertilizer of SMW in feed rotation link / D. P. Kiryanov, A. G. Lozhkin // Problems of reclamation of household waste, industrial and agricultural production: the IVth International research ecological conference. – Krasnodar : Kuban agrarian state university named after I.T. Trubilin, 2015. - P. 216-219.

10. Biryulina, T. N. Fertilizing agents and soybean productivity / T. H. Бирюлина, К. V. Nyshonkova, Y. V. Koryagin // Scientific support for the development of the Russian agricultural sector : collection of articles of the Vth All-Russian research to practice conference ISIC PSAA. – Penza : RHS PSAA, 2015. - P.5-9.

11. Bukhanova, L. A. Application of growth regulators and micro fertilizers on soybean crops / L. A. Buhanova, N. V. Zarenko // Feed production. – 2014. - № 6. – P.21-24.

12. Eliseeva, L. V. Influence of top dressing with microbiological fertilizers on the yield and quality of soybean seeds / L. V. Eliseeva, O. V. Kayukova, I. P. Eliseev // [Vestnik of Kursk state agricultural academy](#). - 2019. - № 2. - P. 33-38.

13. Tishkov, N. M. Influence of microbiological fertilizer TegTIM LHO on yield and quality of soybean / N. M. Tishkov, M. V. Shkarupa // Agricultural science enthusiasts : materials of International research to practice conference. – 2018. – P. 99-105.

14. Zoloreva, A. V. Appliance of biopreparations during soy cultivation / A. V. Zolotoreva, Y. N. Dmitriyeva, Y. V. Koryagin // Research methodological XXI century : results of the past and problems of the present plus. Series: Ecology. - 2011. - № 1(1). - P. 134-137.

15. Fatina, P. N. Appliance of microbiological preparations in agriculture / P. N. Fatina // Vestnik ASTU. - 2007. - № 4 (39). – P. 133-136.

16. Biryulina, T. N. Fertilizing agents and soybean productivity / T. N. Biryulina, K. V. Nyshonkova, Y. V. Koryagin // Scientific support for the development of Russian agricultural sector : collection of article of V th All-Russian research to practice conference ISIC PSAA. – Penza : RHS PSAA, 2015. - P.5-9.

17. Piskunov, K. S. Application of biopreparations in pre- sowing treatment of seeds and in soybean crops in Primorye / K. S. Piskunov, N. S. Kocheva, E. E. Kuldyayeva // Agrarian Vestnik of Primorye. – 2019. - № 4 (16). – P. 15-18.

18. Omelyanyuk, L. V. The use of biological preparation Risobact SP for soybeans in southern forest- steppe of Western Siberia / L. V. Omelyanyuk, A. M. Asanov, O. A. Yusova // Oilseeds. Scientific technological bulletin ARRIOC. – 2018. – Pub. 1 (173). – P. 61-66.

19. Zvolinsky, V. P. Prospects for the use of nitrogen-fixing microbiological preparations and growth stimulators in soybean cultivation in light- chestnut soils of the North- Western Caspian sea / V. P. Zvolinsky, A. N. Bondarenko // Agricultural Vestnik of Stavropol. – 2016. - № 4(24). – P. 11-19.

20. Fedin, M. A. Methods of state strain testing of agricultural crops / M. A. Fedin. – Moscow : Kolos, 1985. - 263 p.

EVALUATING THE EFFECTIVENESS OF GROWTH REGULATORS ON SUNFLOWER YIELD AND OIL CONTENT

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Key words: *sunflower, melafen, heteroauxin, yield, oil content, huskness, seed quality.*

The article shows three-year laboratory and field studies on the effect of growth regulators melafen and heteroauxin on the initial growth processes, activity of hydrolytic enzyme amylase, field germination, yield, oil content and collection of sunflower seed oil. The reasearch was conducted with a hybrid "Orenbar"

according to standard techniques. It was established that the growth regulators melafen and heteroauxin cause activation of acid and alkaline lipase enzymes that control the hydrolytic breakdown of thriglycerines. The activity of acidic lipase increases by 4.3-16.5%, and the activity of alkaline lipase by 21.5-28.4%. The greatest activity is observed when melafen and heteroauxin are used together, reaching their maximum at 72 hours of germination. Under the influence of melafen and heteroauxin, more intensive accumulation of raw mass of seedlings and roots is observed. The ground part increases by 47.2-58.1 %, and underground part by 29.4-52.9 %. Field germination of plants increases from 91.3 to 95.8 %. Strengthening the initial growth processes leads to increase in yield by increasing the elements of the crop structure: increasing the diameter of the basket, weight of the basket's seeds, and 1000 seeds. A statistically significant increase in the yield of oilseeds was obtained. On average, the yield during 3 years increased by 5.9-10.0 %, which is 0.10-0.17 t / ha with a yield of 1.69 t/ha. Oil content of seeds increases by 0.578-1.51%. The highest oil content on the variant melafen + heteroauxin. Oil yield from 1 ha increases by 7.6-13.1 %. Pre-sowing seed treatment fits into the technology of this crop. The results of research show the feasibility of pre-sowing treatment of sunflower seeds with growth regulators Melafen and heteroauxin.

Bibliography

1. Patent № 2158735 Russian Federation, IPC A01N 43/00. Melamine salt bis(oxymethyl) phosphine acid (melafen) as growth regulator and development of plant and method of its producing / Fattkhov S. G., Loseva N. L., Reznik V. S., Konovalov A. I., Alyabyev A. Y., Gordon L. K., Zaripova L. P. Institution of organic and physical chemistry named after A.E. Arbuzova of Kazan scientific centre RAS, Kazan Institute of biochemistry and biophysics of Kazan scientific centre RAS. – enter. 13.07.1999; published. 13.07.1999. – 2 p.
2. Fattakhov, S. G. State of research and prospects for the use of new generation plant growth regulator "Melafen" in agriculture and biotechnology / S. G.

Fattakhov, V. S. Reznik, A. I. Konovalov // Collection of the all-Russian seminar-meeting. – Kazan, 2006.– P. 3-12.

3. The influence of melaphen on growth and energy processes of the plant cell / S. G. Fattakhov, N. G. LOseva, A. I. Konovalov [et al] // Reports of the Academy of Sciences. - 2004. – V. 394, № 1. - P. 127-129.

4. Karpova, G. V. The influence of Melafen , pirivena and pectin on the system physiological and biochemical processes in seeds of spring wheat during germination / G. V. Karpova // Vestnik of Saratov SAU. – 2008. - № 3. - P. 23-25.

5. Konovalov, A. I. Correlation of self-organization , physicochemical properties and biological activity of highly deluted solutions of Melafen / A. I. Konovalov, I. S. Ryzhkin // Melaphen: mechanism of action and applications. – Kazan : publishing house RAS ; Printing service-XXI century, 2014. – P. 25-46.

6. Barchukova, A. Y. Apliance of preparation Melafen in crop farming / A. Y. Barchukova, N. V. Chernyshova, Y. K. Tosupov // Melafen: mechanism of action and applications. – Kazan : publishing house RAS ; Printing service -XXI век, 2014. – P. 177-208.

7. Functional state of mitochondrial membranes of sugar beet root crops under the action of preparation Melafen / I. V. Zhigacheva, L. D. Fatkullina, A. G. Shugayev [et al.] // Plant psysiology . - 2007. - V. 54, № 5. – P. 672-677.

8. Zhigacheva, I. V. Organophosphorus plant growth regulator: resistance of plant and animal cells to stress / I. V. Zhigacheva, E. B. Burlakova, A. G. Shugayev // Biological membranes. - 2008. - V. 25, № 3. – P. 196-202.

9. Kostin, V. I. Melafen is a phyto regulator of new generation o / V. I. Kostin, O. V. Kostin, A. V. Romanov // Niva of the Volga region. – 2006. - № 1. – P. 13-16.

10. Kostin, V. I. Elements of mineral nutrition and growth regulators in the ontogenesis of agricultural plants / V. I. Kostin, V. A. Isaychev, O. V. Kostin. – Moscow : Kolos, 2006. – 290 p.

11. Antonova, T. A. Ecological perspectives of using Melafen as a phyto regulator of winter rye / T. A. Antonova // Noosphere knowledge in

technology: works of Ulyanovsk scientific centre. - Ulyanovsk, 2002. – V. 5, pub. 1. - P. 67- 69.

12. Chepko, S. S. Influence of growth regulator Melafen on productivity of grain crops / S. S. Chepko, L. N. Dolgova, V. P. Polozhentsev // State of plant growth regulators of the new generation. Melafen in agriculture and biotechnology: materials of All-Russian alignment meeting. – Kazan, 2006. – P.163-168.

13. Zhukova, P. S. Effectiveness of appliance of growth regulators in vegetable and potato production / P. S. Zhukova. – Moscow : Science, 1990. - 52 p.

14. Karpova, G. A. The influence of Melafen and pectin on amilolytic enzyme activity and seeding qualities of seeds of spring wheat / G. A. Karpova, E. N. Zyzina // Regulators of plant growth, development and productivity: works of International scientific conference. – Minsk, 2007. – P. 95-96.

15. Dospekhov, B. A. Field experience methodology (with the bass of statistical processing of research results)/ B. A. Dospekhov. – 6th pub., revised edition. – Moscow : Agro industrial publishing, 2011. – 352 c.

16. Tretyakov, N. N. Workshop on plant physiology / N. N. Tretyakov, T. V. Karnaukhov, L. A. Panichkin. – Moscow : Agro industrial publishing, 1990. – 271 p.

17. Grachova, N. M. Technology of enzyme prepatrations / I. M. Grachov, A. Y. Krivova. – 3rd pub., revised edition. – Moscow : Elevar, 2000. – 512p.

**PLANT HEIGHT OF WINTER SOFT WHEAT IN CONNECTON WITH
ITS CROP YIELD AND LODGING RESISTANCE IN FOREST STEPPE
OF MIDDLE VOLGA**

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Key words: winter soft wheat, plant height, lodging resistance, selection, crop, crop yield.

Important characteristic of variety of winter soft wheat is plant height. Parameters according to plant height are included in developed winter wheat sorts model variety in different cultivating areas. The aim of conducted research was to study plant height of assortment of winter soft wheat of different ecological and geographical origin in conditions of forest steppe of Middle Volga and to establish its influence on lodging resistance and crop yield of culture. The material for study was 16 varieties of winter soft wheat, included in State Register of Selection Achievements authorized for use for Production Purposes, admitted to use in Middle Volga region and 102 hybrids sent for study from All-Russian research institute of Horticulture named after N.A. Vavilov. Evaluation of plant height, crop productivity records, lodging resistance of winter soft wheat was carried out according to methods, recommended for strain testing. It was established that plant height of winter wheat is very changeable factor. In strain testings of winter soft wheat genotype contribution (variety) into total variability of character "plant height" is 65,2 %, environment conditions - 0,9 %, genotype environmental interference- 30,4 %. Factor "plant height" of all studied varieties of winter soft wheat is characterized by wide norm of reaction on the change of growth conditions- intravariety variability index- 22,0 - 31,9 %. The same variety of winter wheat in different environment conditions can be in different groups according to plant height. It was established that without drowning wheat of short-stalked group has the most productive crop with the height of 86-105 cm. This interval of plant height of winter soft wheat during many years can be optimal from the point of view of obtained high crop productivity of studied culture in forest steppe of Middle Volga. Minimal plant height of winter wheat, according to which its drowning was studied – 88-89 cm. As parent material in selection of winter soft wheat on combination of high crop yield and lodging resistance in conditions of forest steppe of Middle Volga, high productive variety of dwarf and semi dwarf types (height of 41-85 cm) – Don Lira (Russia), Zamozhnist, Yasnogorka (Ukraine).

Bibliography

1. Boroyevich, S. Principles and methods of plant selection / S. Boroyevich. – Moscow : Kolos, 1984. - 344 p.
2. Lyfenko, S. F. Semi dwarf wheat variety / S. F. Lyfenko. – Kiev : Urozhay, 1987. - 192 p.

3. Tishenko, V. N. Genetic basis of adaptive selection of winter wheat / V. N. Tishenko, N. M. Chekalin. - Poltava, 2005. - 250 p.
4. Nekrasova, O. A. Variety model in selection of winter wheat (survey) / O. A. Nekrasova, P. I. Kostylev, E. I. Nekrasov // Grain farming of Russia. - 2017. - № 5 (53). - P. 29-32.
5. Bespalova, L. A. Influence of Rht – genotype on structure elements of yield variety of winter soft wheat / L. A. Bespalova, V. V. Mokrousov // Materials of Kuban State Agrarian University. - KubSAU, 2010. - No. 6(27). - P. 27-35.
6. Yegortsev, N. A. Scientific –methodological problems of selection of winter wheat in Middle Volga and ways of their solution : monography / N. A. Yegortsev. – Kinel, 2003. – 354 p.
7. Fomenko, M. A. Selection of winter soft wheat in conditions of enhancement of climate aridity on Don : spec. 06.01.05- selection and seed farming of agricultural plants, on candidacy for a degree Doctor of Agricultural science / Fomenko Marina Anatolyevna. - Krasnodar, 2015. - 395 p.
8. State Register of Selection Achievements. - URL: <http://reestr.gossort.com/reestr>
9. Methodology of state strain testing of agricultural cultures second output corn, cereal, grain legumes, corn and forage crops . - Moscow, 1989. - 194 p. 10. Technical tips in study of world wheat collection. – 3-e pub., redaction. - Leningrad: ARIPB. – 1977. – 27 p.
11. Kolomeychenko, V. V. Crop science / V. V. Kolomeychenko. – Moscow : Agrobusiness centre, 2007. - 600 p.
12. Zakharova, N. N. Resistant to blast of winter wheat variety as the element of ecological land industry system / N. N. Zakharova, V. S. Khalzov, N. A. Pischaskina // Modern aspects of production and processing of agricultural yield : materials of the 3rd research to practice conference dedicated to 95th anniversary of Kuban SAU. – Krasnodar, 2017. – P. 474-478.
13. World wheat : species composition, selection achievements, modern problems and parent material / V. F. Dorofeev, R. A. Udachin, L. V. Semenova [and others.]. - 2-e pub., redaction. and added. - Leningrad : All-Russian Association Agrobusiness publishing, 1987. - 560 p. (State ISBN)
14. What is motel variety : monograph / S. F. Koval, V. S. Koval, V. M. Chernakov [and others.]. - Omsk, 2005. - 277 p.
15. Zakharova, N. N. Variety of winter soft wheat in conditions of practice ground of Ulyanovsk SAU / N. N. Zakharova, N. G. Zakharov // Scientific innovation- agrarian yielding : materials of World Wide Research to Practice Conference , dedicated to 100th anniversary of Omsk SAU. - Omsk, 2018. – P. 630-634.

16. Role of individual organs in productional process at plants of spring wheat of different ecological- geographical origin / N. E. Ionova, L. P. Khokhlova, R. N. Valiullina, E. F. Ionov // Agricultural biology. – 2009. - №1. - P. 60-67.

17. Dravavtsev, V. A. Modern approach to creation of ideal genotype for plant selection / V. A. Dragavtsev, V. A. Goncharov, G. V. Udovenko // Introduction of non-traditional and rare plants: materials of IV World Wide Research to Practice Conference . - Ulyanovsk, 2002. - V.1.- P. 34-36.

18. General plant selection / Y. B. Konovalov, V. V. Pylnev, T. I. Khupatsariya [and others.]. – Saint Petersburg : Lan, 2013. - 480 p.

19. Nikitin, S. N. Photosynthetic plant activity in seedings and dynamics of growth process during applying biological preparations / S. N. Nikitin // Success of modern natural science. - 2017. - № 1. - P. 33-38.

THE MAIN TECHNOLOGICAL PARAMETERS OF PRODUCING BIOPREPARATION FOR CONTROL OF THE BLACK ROT AGENT OF CRUCIFEROUS

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Key words: bacteriophages, Xanthomonas campestris pv. campestris, biopreparation, technological parameters, phytopathogene.

The article presents the results of selecting the main technological parameters for the production of biopreparation on the example of the bacteriophage Xanthomonas campestris pv. campestris K134-Ulgau. Experiments were carried out to determine the best way to purify bacteriophage from the bacteria production culture, among which were temperature effect and trichloromethane, as well as filtration of the suspension through membrane filters with different pore sizes. It was established that cleaning suspension from bacterial cells by filtering through membrane filters with a pore size of 0.22 microns was the best way to clean it. The

optimal passage time for the production of phage preparation was established, which was 24 hours. At this time, the optimal ratio of the result (lytic activity of bacteriophage) and the time spent was obtained. Selection of optimal ratio of phage and bacterial culture for cultivation showed that the best ratios are 1:2 and 1:3. Similar results were obtained for these parameters. The optimal culture temperature of the bacteriophage is set at a temperature of 20-32 °C, at which activity of the bacteriophage is saved.

References

1. Black rot of brassicas in Russia – epidemics, protection, and sources for resistant plants breeding / A. N. Ignatov, S. V. Panchuk, Vo Thi Ngok Ha [et al.] // Картофель и овощи. – 2016. - № 2. – С. 15-16.
2. Occurrence and diversity of *Xanthomonas campestris* pv. *campestris* in vegetable Brassica fields in Nepal / B. D. Jensen, J. G. Vicente, H. K. Manandhar [et al.] // Plant Dis. – 2010. – Vol. 94. – P. 298-305.
3. Fundamental aspects of common bacterial blight (*Xanthomonas axonopodis* pv. *phaseoli* Smith): Characteristic, pathogenicity and control / N. Francisco-Francisco, G. Gallegos Morales [et al.] // Revista mexicana de fitopatología. - 2013. – Vol. 31, No 2. – P. 147-160.
4. ISTA. 7-019 Detection of *Xanthomonas campestris* pv. *campestris* on Brassica spp. (Prepared by Roberts, S.J. and Koenraad, H.) International Rules for Seed Testing, Annexe to Chapter 7: Seed Health Testing Methods, Bassersdorf, Switzerland, International Seed Testing Association (ISTA). – 2007. - URL: <https://www.seedtest.org/upload/cms/user/SH-07-019a-2014.pdf>
5. Biological control of Black Rot (*Xanthomonas campestris* pv. *campestris*) of Cabbage in Tanzania with Bacillus strains / S. M. S. Massomo [et al.] // J. Phytopathol. – 2004. – Vol. 152. – P. 98–105.
6. Monakhos, G. F. Symptoms of vascular bacteriosis in cabbage plants with different resistance genes depending on the concentration of inoculum *Xanthomonas campestris* pv. *campestris* / G. F. Monakhos, Vo Tkhi Ngok Ha, F. S. Dzhililov // Ivestiya TAA. – 2015. - № 1. – P. 26-34.

7. Bio-based products control black rot (*Xanthomonas campestris* pv. *campestris*) and increase the nutraceutical and antioxidant components in kale / M. P. Andrés [et al.] // Scientific Reports. – 2018. – Vol. 8. – P. 11.
8. *Xanthomonas campestris* pv. *campestris* race 1 is the main causal agent of black rot of Brassicas in Southern Mozambique / J. Bila, C. N. Mortensen, M. Andresen [et al.] // African Journal of Biotechnology. – 2013. - Vol. 12(6). - P. 602-610.
9. Phages in nature / M. R. Clokie [et al.] // Bacteriophage. – 2011. – Vol. 1. – P. 31–45.
10. Characterization of lytic bacteriophage XCC9SH3 infecting *Xanthomonas campestris* pv. *campestris* / M. S. Renu, U. B. Bhoyar, Singh [et al.] // Journal of Plant Pathology. – 2017. – Vol. 99 (1). – P. 233-238.
11. Algorithm of bacteria phage typing *Bacillus cereus* / A. I. Kaldyrkayev, D. A. Vasilyev, N. A. Feoktistova [et al.] // Agrobusiness and ecology. - № 2 (2). - P. 166-169.
12. . Feoktistova, N. A. Modification of method of *Bacillus anthracis* setting phage indication in samples of soil / N. A. Feoktistova, D. A. Vasilyev, C. N. Zolotukhin // Asian journal of microbiology, biotechnology and environmental sciences. – 2018. – Vol. 3, No 20. – P. 734-737.
- 13..Chugunova, E. O. Appliance of bacteriophages for bacteria detection (literature review) / E. O. Chugunova, N. A. Tatarnikova // Perm agrarian vestnik. - 2016. - № 4 (16). - C. 121-126.
14. Bacteriophages: A new weapon for the control of bacterial blight disease in rice caused by *Xanthomonas oryzae* / P. Ranjani [et al.] // Microbiol. Biotechnol. Lett. – 2018. – Vol. 46(4). – P. 346–359.
15. Considerations for using bacteriophages for plant disease control / J. B. Jones [et al.] // Bacteriophage. – 2012. – Vol. 2. – P. 208–214.
16. Mayorov, P. S. Development of scheme for bacteriophages allocation *Xanthomonas campestris* pv. *Campestris* / P. S. Mayorov, N. A. Feoktistova, D. A. Vasilyev // Modern science : actual problems of theory and practice Series : Natural and technical Sciences. – 2019. - № 6. – P. 20-25.

PRODUCTIVITY AND RESISTANCE OF SPRING RAPESEED VARIETIES TO FUSARIUM IN THE KURGAN REGION

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Key words: *spring rapeseed, breed, fusarium, crop yield.*

The article presents data on fusarium, the most common and harmful disease of spring rapeseed in Kurgan region. The agent of spring rapeseed fusarium is fungi of the genus Fusarium, the most common species in the region – F. oxysporum, F. solani, F. heterosporum, F. sporotrichiella, F. gibbosum and others. There was a tendency to increase the spreading of fusarium in the agroecosystem of spring rapeseed with decrease in hydrothermal coefficient, so when the SCC was reduced to 0.89-0.96, the incidence of fusarium increased to 18.0 %. Resistance to fusarium was characterized by the breed-standard Jubilee, DLE and Start disease damage did not exceed 14.8%. The most severely affected varieties during the years of research were Kupol and Granit. Fusarium damage did not exceed 21.7 %. The highest crop yield was formed in DLE, Granit and Start varieties and was 20.6-22.7 dt / ha, which is higher than the standard variety by 1.8-3.9dt / ha. Minimal productivity of varieties of Kupol – 15,9 dt/ha. With increasing SCC to 1.03 yield of spring rapeseed increased to 22.3 dt/ha, while reducing the SCC to 0,89-0,96 yield decreased to 18.5 dt/ha. Tendency of decreasing yields of varieties of spring rapeseed with the increase of destructiveness by Fusarium was noted.

Bibliography

1. Galitsky, D. N. Study of ecological plasticity of oil flax breed in conditions of south forest steppe of Omsk region / D. N. Galitsky // Modern problems of science and education. – 2014. - №4. – P. 515 – URL: <http://science-education.ru/ru/article/view?id=14229> (access date 25.12.2019 г.)

2. Konstantinova, O. B. Comparative evaluation of adaptability and quality of winter crop grains in conditions of forest steppe of Kemerovo region: spec.06.01.05 Selection and seed farming of agricultural plants: author's abstract for advanced competition for advanced degree of Master of Agriculture / Konstantinova Olga Borisovna (State Federal- Funded Educational Institution of higher professional training «Altay State Agrarian University»). – Barnaul, 2016. – 19 p.
3. Zhuchenko, A. A. Ecological genetics of cultivated plants and problems of atmosphere (theory and practice): monograph in 2 v. – Moscow: OOO Agrus Publishing, 2004. - V. 1. - 690 p. (ISBN-5-9900364-1-8).
4. Formation of Highly Productive Agrophytocenoses of Peas and Spring Rapeseed in Trans-Urals / Alexey Postovalov, Svetlana Sukhanova, Alexey Plotnikov, Svetlana Sazhina, Andrey Sozinov // Biological Resources Development and Environmental Management : KnE Life Sciences: International applied research conference. - 2020-01-15. - pp. 475 - 481. (DOI 10.18502/kl.v5i1.6109).
5. Piven, V. T. Main elements of integrated protection system from pests and diseases in South Caucasus / V. T. Piven, S. L. Gorlov, S. A. Semerenko // Land husbandary. - 2009. - № 2. – P. 36-37.
6. Epiphytological basis of plant protection system / E. Y. Toropova, G. Y. Stetsov, V. A. Chulkina ; edited by V. A. Chulkina. - Novosibirsk, 2002. – 580 p. (ISBN 5-94477-014-7)
7. Fodotov, V. A. Colza of Russia / V. A. Fedotov, S. V. Goncharov, V. P. Savenkov. – Moscow : Agroleague of Russia, 2008. – 328 p. (ISBN 978-5-85879-467-7)
8. Ashmarina, L. F. Prevalence of different colza breed by the most spread diseases in West Siberia / L. F. Ashmarina, N. M. Konyeva, A. S. Korobeynikov // Vestnik of Novosibirsk State Agrarian University. - 2015. – № 1 (34). – P. 28-34.

9. Phytosanitary situation in agrocoenosis of feeding crop in forest steppe of West Siberia / L. F. Ashmarina, Z. V. Agarkova, N. M. Konyeva [et al.] // Land husbandary. - 2015. – № 2. – P. 41-44.
10. Grigoriyev, E. V. Stability of spring colza breeds to diseases of fungus etiology in conditions of Kurgan region/ E. V. Grigoriyev, A. A. Postovalov // Izvestiya of Orenburg State Agrarian University. - 2018. – № 5 (73). – P. 95-98.
11. Postovalov, A. A. Pathogenic micromycetes feed crop rhizoplans / A. A. Postovalov // IOP: Earth and Environmental Science. - 2019. - Vol. 341. – 012158.
12. Colza Protection / C. M. Lukomets, V. T. Piven, N. M. Tishkov [et al.] // Appendix to journal «Plant protection and quarantine». - 2012. – № 1. – P. 1.
13. Lychkovskaya, I. Y. Main fungus diseases and insect pests of colza of European part of Russia : handbook / I. Y. Lychkovskaya, A. A. Artamonov, V. V. Karpachev. - Lipetsk, 2010. - 79 p. (ISBN 978-5-94286-097-4)
14. Colza rotection / V. P. Fedorenko, N. P. Sekun, I. L. Markov [et al.] // Appendix to journal Plant protection and quaranteen. - 2008. - № 3. – 32 p.
15. Brazauskiene, I. Peculiarities of phoma lingam epidemiology and occurrence on winter and spring oilseed rape (*Brassica napus* var. *oleifera*) in Lithuania / I. Brazauskiene, E. Petraitiene, E. Povilioniene // Proceedings of the 12th international Rapeseed Congress, Wuhan, China. - 2007. - C. 220-223.
16. Occurrence of fungal diseases on spring rape in Poland / Czeslaw S. [et al.] // Soest, Germany 23-24 April, 2001. – 2002. – T. 25, №. 2. – C. 1-12.
17. Ashmarina, L.F. Complex stability of spring colza breed to fungus phytopathogens in conditions of West Siberia / L. F. Ashmarina, N. M. Konyeva, A. S. Korobeynikov // Siberian Vestnik of agricultural science. - 2016– - №3(250). – P. 15-23.
18. Methodology of carrying out of field agro technical test with oil crop / V. M. Lukomets, N. M. Tishkov, V. F. Baranov [et al.] ; under the general editorship V. M. Lukomtsa. – Krasnodar : OOO RIA AlVi-design, 2010. – 327 p.

**COMPARATIVE APPRAISAL OF HORMONAL INDUCTORS OF
ARTIFICIAL SPAWNING OF FEMALE OF AFRICAN SHARPTOOTH
CATFISH**

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Key words: aquaculture, African sharptooth catfish, hormonal inductors , genital products.

This work is devoted to comparative appraisal of hormonal inductors of development of genital products of african sharptooth catfish female. Effectiveness of the use of fresh or acetonation of hypo physic and two synthetic preparations surfagon and nerestina 7A was compared. These preparations are often used in Russia in reproductive technology during fishfarming. The research object was african sharptooth catfish (Clarias gariepinus). The research was comparative appraisal of influence of hormonal inductors on reproductive characteristics of sharptooth catfish female during stimulation. It was shown that according to effectiveness of influence comparative inductors of gematogenesis had significant differences. Under the influence of inductors of ovogenesis member of dead-ripe female out of number of infected was 80%. Preparation nerestine-7A trial showed that for hormonal stimulation of development of genital products of African sharptooth catfish female in a dose of recommended by preparation producer is incapable. The results of compared research showed that the most effective stimulator of development of genital products of African sharptooth catfish is preparation on the basis of fresh and acetonation of hypophysic. However hypothesis is the most expensive preparation as its obtainment cost specimen's life, out of which it is obtained. Out of two compared synthetic preparations stable effect was peculiar only for surfagon, the use of nerestine-7A didn't give stable results.

Bibliography

1. Reproduction of endangered river lamprey (lampetra fluviatilis) in controlled conditions / R. Kujawa, J. Nowosad, D. Kucharczyk, B. I. Cejko, S. Judycka, D.

- Fopp-Bayat, K. Glińska-Lewczuk, C. M. Timofte // *Animal Reproduction Science*. - 2019. - T. 203. - C. 75-83.
2. Vlasov, V. A. Sharptooth (african) catfish (biology, pullulation, growing): monograph / V. A. Vlasov. – Moscow : Publisher RSAU-MAA named after K.A. Timiryazev, 2016. – 110 p.
 3. Factors for increasing the survival rate of catfish fertilized eggs and larvae / E. M. Romanova, M. E. Mukhitova, V. V. Romanov, V. N. Lyubomirova, E V. Spirina // *IOP Conference Series: Earth and Environmental Science The proceedings of the conference AgroCON-2019*. - 2019. - C. 012197.
 4. Khurstalyov, E. I. Evaluation of growing potential of channel and sharptooth catfish demonstrating polycyclic growth / E. I. Khrustalyov // *Fish farm*. - 2010. - № 7. - P. 65-68.
 5. Vlasov, V. A. Recommendations on reproduction and growing of sharptooth catfish with the use of closed circuit installation of water supply : guidelines and procedures publication/ V. A. Vlasov, A. P. Zavyalov, Y. I. Yesavkin. - Moscow : Rusinformagrotech, 2010. - 48 p.
 6. Pathology of cells and tissues of the gastrointestinal tract of african catfish in high-tech industrial aquaculture / E. Spirina, E. Romanova, V. Romanov, V. Lyubomirova, L. Shadyeva, T. Shlenkina, L. Rakova // *IOP Conference Series: Earth and Environmental Science 2019*.- p. 012220.
 7. Kozlov, V. И. Analysis of modern technologies in aquaculture : home-grown technology and Chinese experience/ V. I. Kozlov, A. V. Kozlov // *Fish farm*. - 2018. - № 1. - P. 73-76.
 8. Biology of reproduction of catfish (*Clarias gariepinus*, Burchell, 1822) in high-tech industrial aquaculture / E. M. Romanova, V. N. Lyubomirova, V. V. Romanov, M. E. Mukhitova, T. M. Shlenkina, L. A. Shadyeva, I. S. Galushko // *Journal of Fundamental and Applied Sciences*. - 2018. - T. 10, № 5s. - P. 1116-1129.
 9. Influence of hormonal preparations on development of genital products of sharptooth catfish (*CLARIAS GARIEPINUS* B.,1868) / V. V. Yarmosh, A. V. Astrenkov, A. V. Kozyr, T. V. Masaylo // *Vestnik of Polesk State University. Series of natural science* - 2017. - № 2. - P. 99-104.
 10. Spawning response of African catfish (*Clarias gariepinus* (Burchell 1822), *Claridae: Teleost*) exposed to different piscine pituitary and synthetic hormone / Gadisa Natea [et al.] // *International Journal of Fisheries and Aquatic Studies*. - 2017. - Vol. 5, iss. 2. - P. 264-269.
 11. Podushka, S. B. Новая литература о клариевых сомах на русском языке / С. Б. Подушка // *Научно-технический бюллетень лаборатории ихтиологии ИНЭНКО*. - 2015. - № 21. - С. 42-52.

12. Cloning, localization and differential expression of Neuropeptide-Y during early brain development and gonadal recrudescence in the catfish, *Clarias gariepinus* / Cheni-Chery Sudhakumari [et al.] // *General and Comparative Endocrinology*. - 2017. - Vol. 25. - P. 54-65.
13. Vlasov, V. A. Reproduction and growing of sharptooth catfish (*CLARIAS GARIEPINUS*) in recirculating aquaculture system / V. A. Vlasov, A. P. Zavyalov // *Zootechnology*. - 2014. - № 12. - P. 22-24.
14. Research on reproductive performance of carp breeds (*Cyprinus carpio* L.) frasinet, ineu and ropsa / R. Daniela, C. Mihail, C. Mioara, M. Nino, D. Nicoleta // *International Multidisciplinary Scientific GeoConference SGEM*. - 2018. - T. 18, № 6.2. - C. 513-520.
15. Khabjokov, A. B. Ways of product increase of commercial fish farm / A. B. Khabjokov, S. Ch. Kazanchev // *Izvestiya of Kabardino- Balkariya state agrarian university named after V.M. Kokova*. - 2017. - №4(18). - P. 34-39.
16. Shinkarevich, E. D. Artificial caviar detachment from African sharptooth catfish (*CLARIAS GARIEPINUS*) / E. D. Shikarevich // *Scientific support of development of AIB in conditions of import substitution : collection of research papers of World Research to Practice Conference devoted to 115anniversary of St Petersburg State Agrarian University*. - 2019. - P. 293-296.
17. Shourbela, R. M. Are pre spawning stressors affect reproductive performance of african catfish *clarias gariepinus* / R. M. Shourbela, A. M. Abd El-latif, E. A. Abd el-Gawad // *Turkish journal of fisheries and aquatic sciences*. - 2016. - T. 16, № 3. - C. 651-657.
18. Influence of surfagon injections on biochemistry of blood and structure transformation of germanium of hybrid Russian sturgeon (*acipenser gueldenstaedtii brandt, 1833 × acipenser baerii brandt, 1869*) in conditions of closed cycle of growing / G. F. Metallov, E. N. Ponomareva, V. A. Grigoryev, A. V. Dubovskaya, P. P. Geraskin, O. A. Levina, M. N. Sorokina // *Vestnik of Astrakhan State Technical University. Series : Fish farm*. - 2018. - № 4. - P. 117-131.
19. Zworykin, D. D. Reproduction and spawning behavior of the climbing perch *anabas testudineus* (perciformes, anabantidae) in an aquarium / D. D. Zworykin // *Journal of Ichthyology*. - 2012. - T. 52, № 6. - C. 379-388.
20. Biofloc technology application in african catfish fingerling production: the effects on the reproductive performance of broodstock and the quality of eggs and larvae / J. Ekasari, M. A. Suprayudi, R. F. Hazanah, G. S. Lenggara, R. Sulistiani, M. Alkahfi, M. Zairin, W. Wiyoto // *Aquaculture*. - 2016. - T. 464. - C. 349-356.
21. Development of new methods of biotechnic of fish reproduction on the basis of analysis of mechanisms of neuroendocrinal control of their breeding / P. E.

Garlov, N. B. Rybalova, T. A. Nechayeva, S. U. Temirova, E. D. Shinkarevich, B. S. Bugrimov // Theoretical and applied problems of farming sector. - 2018. - № 2(35). - P. 57-64.

LEVEL OF CORTISOL AND PARAMETERS OF CYTOGENIC HOMEOSTASIS IN FISH ORGANISM AGAINST SPORE TERM PROBIOTICS

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Key words: aquaculture, African catfish, probiotic spore term, red blood cells, micronucleus test, cortisol.

With the aim of productivization and ecological safety of fish in growing technologies of aquaculture objects, biologically active agents are often used, including probiotics. The research aim was the study of cortisol level and results of the process of micronucleation in red blood cells of peripheral blood of African sharptooth catfish during growing in conditions of RAS against probiotics of spore term and without it. Blood selection was made for life, cortisol concentration was determined by the use of commercial kits «Cortisol-IFA». For the conduction of micronucleus test of blood films were recorded in anchor May- Gryunvald, they were colored in Romanovskiy- Gimza stain, circulation number of cells with micronucleuses for 2000 cells was made. Differences were established according to degree of incidence of micronucleus and their types between fish group, grown with the use of spore-term and without it. Accurate three time concentration override of cortisol, in blood of sharptooth catfish was found, in traditional technological context as compared to containing of cortisol at fish, grown with the use of spore term. The use of spore term leded also to decrease of micronucleus incidence degree in peripheral blood of sharptooth catfish. Against spore term dose of cells with micronucleus of A type decreased from 2,9 to 1,9. Red blood cells of peripheral blood with micronucleus of B and V types during the use of spore term were not found. Obtained results show that micronucleus test can be successfully used during predictive appraisal of cytogenetic homeostasis during fish growing in conditions of industrial aquaculture.

Bibliography

1. Seasonal studies of caviar production and the growth rate of the african catfish (*Clarias Gariepinus*, Burchell, 1822) / E. M. Romanova, V. N. Lyubomirova, V. V. Romanov, M. E. Mukhitova, T. M. Shlenkina // Egyptian journal of aquatic research . - 2018. - Vol. 44, № 4. - P. 315-319.
2. Artemenkov, D. V. Breeding of sharptooth catfish (*Clarias gariepinus*) on all-mash with supplement feeds of probiotic subtilic in conditions : author's abstract on competition for degree of Master of Agricultural science : 06.04.01 fish farming and aquaculture / Artemenkov, Dmitry Vladimirovich. – Moscow : Russian state agrarian university , MAA named after K.A. Timiryazev, 2013. – 23 p.
3. Probiotics in aquaculture / E. A. Kotova, N. A. Pyshmatseva, D. V. Osepchuk, A. A. Pyshmantseva, L. N. Thakushinova : Collection of research papers of All-Russian research and development centre of sheep and goat raising . - 2012. – V. 3, № 1-1. -P. 100 - 103.
4. Design of functional fish product in conditions of industrial aquaculture / V. V. Romanov, E. M. Romanova, V. N. Lyubomirova, M. E. Mukhitova // Vestnik of Ulyanovsk State Agricultural Academy. - 2018. - № 1. – P. 151-156.
5. Factors, influencing on the growth of sturgeon fish in industrial aquaculture/ S. V. Ponomarev, N. V. Bolonina, B. T. Sariev, A. N. Tumenov, Y. M. Bakaneva // Vestnik of Novosibirsk State Agrarian University. - 2010. - № 4 (16). - P. 52-55.
6. Taufik, L. RAS- Modern technologies of aquaculture/ L. Taufik, A. Nevsky // Quality control. - 2019. - № 1. - P. 66-69.
7. Rostovtsev, A. A. On the question of aquaculture and development in the South of West Siberia / A. A. Rostovtsev, E. V. Egorov, V. F. Zayev // Siberian vestnik of agricultural science. - 2015. - № 6 (247). - P. 89-96.
8. Kashmilova, T. B. Influence of cortisol analogue and transport stress on frequency of micronucleus in red blood cells of peripheral blood of sterlet *Acipenser ruthenus* L / T. B. Kashmilova, V. R. Mikryakov, D. V. Mikryakov // Biology of inland water. - 2013. - № 2. – P. 94-96.

9. Fomina, L. L. Influence of cortisol on some immunological indicators of carp / L. L. Fomina, D. I. Berezina, E. A. Perestoronina // *Diary farm Vestnik*. - 2019. - № 2 (34). - P. 41-52.
10. Fenech, M. The in vitro micronucleus technique / M. Fenech // *Mutation Research*. - 2000. - № 455. - P. 81-95.
11. Mersh, J. Induction of micronuclei in gametocytes and gill cells of zebra mussels, *Dreissena polymorpha*, exposed to clastogens / J. Mersh, M. N. Beauvais, P. Nagel // *Mutation Research*. – 1996. - № 371. - P. 47–55.
12. Rebrova, O. Y. Statistical analysis of medical information. Appliance of software package STATISTICA / O. Y. Rebrova. – Moscow : MediaSphere, 2000. - 312 p.
13. Gökalp Muranli, F. D. Induction of micronuclei and nuclear abnormalities in erythrocytes of mosquito fish (*Gambusia affinis*) following exposure to the pyrethroid insecticide lambda_cyhalothrin / F. D. Gökalp Muranli, U. Güner // *Genetic Toxicol and Environ. Mutagenesis*. - 2011. - Vol. 726. - P. 104 - 108.
14. Micronucleus analysis in cytogenetic instability / N. N. Ilyinskikh, A. S. Ksents, V. N. Ilyinskikh [et al.]. – Tomsk : TSPU, 2011. – 312 p.
15. Kryukov, V. I. Frequency of micronucleus in fish blood of fresh basins of Taimyr peninsula / V. I. Kryukov, P. V. Kochkaryov // *Education, science and production*. - 2013. - № 1. – P. 35-37.
16. Alimba, C. G. Cytogenotoxicity and histopathological assessment of Lekki Lagoon and Ogun River in *Synodontis clarias* (Linnaeus, 1758) / C. G. Alimba, Joseph Saliu, O. A. Ubani-Rex // *Toxicological & Environmental Chemistry*. - 2015. –Vol. 97, № 2. – P. 221-234.
17. Evaluation of chromosome aberrations, sister chromatid exchange and micronuclei in cultured cord-blood lymphocytes of newborns of women treated for epilepsy during pregnancy / M. Witczak, I. Kociszewska, J. Wilczynski [et al.] // *Mutation Research*. - 2010. - Vol. 701(2). - P.111-117.
18. Ahmed, S. A. Harabawy Sublethal toxicity of carbofuran pesticide on the African catfish *Clarias gariepinus* (Burchell, 1822): Hematological, biochemical

and cytogenetic response / S. A. Ahmed, Th. A. Ibrahim Ahmed // *Ecotoxicology and Environmental Safety*. - 2014. – Vol. 103. – P. 61-67.

19. Shakhtamirov, I. Y. Micronucleus test in fish red blood cells, dwelling near persistent organic pollutant of river- basin Terek / I. Y. Shakhtamirov, V. Y. Kravtsov, V. P. Terletsky // *Izvestiya of St Petersburg State Agrarian University*. - 2014. - № 34. - P. 89-92.

20. Pashkov, A. N. Micronucleus test: past, present and future / A. N. Pashkov // *Vestnik of Voronezh State University. Series: Chemistry. Biology. Pharmacy*. - 2016. - № 3. - P. 150.

21. Kaur, J. Micronucleus to distinguish adenocarcinoma from reactive mesothelial cell in effusion fluid / J. Kaur, P. Dey // *Diagnostic Cytopathology*. – 2010. - № 38(3). – P. 177-179.

22. Evaluation of the genotoxicity of 10 selected dietary/environmental compounds with the in vitro micronucleus cytokinesis-block assay in an interlaboratory comparison / J. Katic, E. Cemeli, A. Baumgartner [et al.] // *Food and chemical toxicology*. – 2010. - № 48(10). - P. 2612-2623.

23. Low-dose radiation employed in diagnostic imaging causes genetic effects in cultured cells / M. V. Ponzinibbio, C. Crudeli, P. Peral-García [et al.] // *Acta Radiologica*. – 2010. - № 51(9). – P. 1028-1033.

24. Emergence of micronuclei and their effects on the fate of cells under replication stress / K-i. Utani, Y. Kohno, A. Okamoto [et al.] // *PLoS ONE*. – 2010. - № 5(4).

25. Basal levels of DNA damage detected by micronuclei and comet assays in untreated breast cancer patients and healthy women / R. A. Santos, A. C. Teixeira, M. B. Mayorano [et al.] // *Clinical and Experimental Medicine*. – 2010. - № 10(2):87. - P. 92.

**INFLUENCE OF SHE-HOG ANESTHESIS DURING PARTURATION
ON CLINICO-MORPHOLOGICAL PARAMETERS OF BLOOD, POST
PARTURIENT COMPLICATIONS AND RACE QUALITY**
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Key words: farrow sow, parturition pain relief, stress, reproduction characteristics.

In this article possibility of raising of farrow sow reproduction quality by the way of painful stress coping during farrows was studied. Experiments were carried out in collective farm named after V.Y. Gorin in Belgorod region on she- hogs large white breed. It is known that painful stress at farrowing she-hogs leads to explosive growth of cortisol level, decrease of eosinophils number, depression of oxytocin production, it leads to weakening of parturation. That is why anesthesia can be one of the factors influencing the characteristics of she- hog production As anesthetic solution we used preparation Baralgin-M, containing active principle metamizol sodium. Four groups of she-hogs were formed with 50 heads in each: control and 3 experimental. From therapeutic indications we determined arterial tension (systolic and diastolic), beat, body temperature, breathing rate in 1 minute. In she- hogs' blood we determined activity of aspartate (AST) and alanine (ALT) transaminase, alkaline phosphate, cortisol content, eosinophis. Anaesthetization before parturition was carried according to reduced scheme. It was established that anaesthetization of she-hogs before farrow influences clinical characteristics of she-hogs, and also morphological blood characteristics. During parturition of she-hogs with anaesthetization cortisol level grew at 1, 2 times, that is lower than in control, but decrease of eosinophils level was insignificant. Duration of farrows and productivity level of she-hogs of experimental groups was higher than of control groups The best results were obtained during the use of single injection of Baralgin with suppository, double injections of Baralgin- M at 6 hour interval.

Bibliography

1. Levin , K. L. Physiology and pathophysiology of pig reproduction / K. L. Levin. – Moscow : Russian Agricultural industrial publishing, 1990. – 255 p.
2. Pokhodnya, G. S. Theory and practice of pig reproduction and growing / G. S. Pokhodnya. – Moscow : Russian Agricultural industrial publishing, 1990. – 265 p
3. Increasing the pig productivity / G. S. Pokhodnya, G. V. Yeskin, A. G. Narizhny, V. I. Vodyannikov, Y. V. Zasukha, E. G. Fedorchuk. - Belgorod, 2004. – 516 p.

4. Vodyanikov, V. I. Biological aspects of the intensification of pig reproduction on an industrial basis : dissertation for the degree of doctor of biological Sciences in the form of a scientific report: spec. 06.02.01-diagnostics of diseases and therapy of animals, pathology, oncology and morphology of animals / Vladimir Ivanovich Vodyanikov. - Dubrovitsy, 2000. – 54 p.
5. Polyantsev, N. Modern view on the nature of MMA syndrome / N. Polyantsev, N. Ushakova // Pig farming. - 2007. - № 3. – P. 30-32.
6. Organization and technology of pork production / V. Y. Gorin, N. I. Karpenko, V. M. Borzenkov, A. A. Faynov, G. S. Pokhodnya. – Belgorod : Vezelitsa, 2011. – 703 p.
7. Nezhdanov, A. G. Control of reproductive function of pigs /A. G. Nezhdanov, V. N. Kotsarev, A. G. Narizhny // Veterinary. – 2009. - № 9. – P. 38-40.
8. Ustinov, D. A. Stress factors in industrial farming // D. A. Ustinov // Moscow : Russian agricultural publishing, 1976. – 165 p.
9. Kotsarev, V. N. Modern view on the problem of birth and postpartum complications in sows. / V. N. Kotsarev, A. G. Nezhdanov // Materails of Internatioal research to practice conference SRVIPFT. – 2012. – P. 290-297.
10. Ponomarev, V. K. Obstetrics and animal reproduction biotechnics / V. K. Ponomarev, N. A. Sivozhelezova, T. A. Struchova. – Orenburg : Publishing Centre OSAU, 2013. – 158 p.
11. Filatov, A. V. Postpartum endometritis and MMA syndrome in sows: prevention and treatment / A. V. Filatov, V. KH. Khlopniisky, A. M. Ushakov // Pig farming. – 2013. - № 3. – P. 51-54.
12. Manteka, Khavier. Pain when farrowing sows / Khavier Manteka. – Pig 333.ru. – 2014.
13. Magda, I. I. Animal anaesthesia / I. I. Magda, I. I. Voronin. – Moscow : Kolos, 1974. – 208 p.
14. Baralgin, M. Application intructions. Metamizole sodium 500 mg /ml. SANOFI.

15. Methods of veterinary clinical laboratory diagnostics : Handbook / edited by I. P. Kondrakhina. – Moscow : Kolos, 2004. – 520 p.
16. Shalyapina, V. G. To the method of determining corticosteroids in a small volume of blood / V. G. Shalyapina, B. N. Narbaeva // Laboratory science. – № 2. - 1971. – P. 77-78
17. Bakman, S. M. To the method of calculating eosinophils in peripheral blood // Laboratory science. – 1958. - № 5. – P.13-15.
18. Lakin, G. F. Biomerrics / G. F. Lakin. – 4rd edition. – Moscow : Higher education, 1990. – 352 p.

EPIZOOTOLOGICAL FEATURES OF CTENOCEPHALIDES OF CATS IN ULYANOVSK

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Key words: *cat, flea, parasite, ctenocephalides, ectoparasite.*

Arachnoentomoses of cats and other domestic creophagous animals have wide spread occurrence and often are registered in nosological field of animal infectious diseases. Besides as the result of pruritus on skin cover of animals scratches appear, the disease can be complicated by allergodermia. This causes sufferings to animals, and to wide extent increases time and cost of treatment. As the result study of regional specific features of ctenocephalides of cats has absolute practical significance. It is necessary for the choice of correct schemes of medical and preventive services. Analysis of epizootological features of ctenocephalides of cats was carried out on the basis of veterinary hospital «Doctor Zoo» in Ulyanovsk. Conducted research showed that ctenocephalides of cats differs by wide spread occurrence. Extensivity of ctenocephalides invasion was 57%. Disease is marked by seasonality. Maximum of infected animals was registered during astivo-autumnal period. Extensivity of invasion in summer months 29%. Number of infected animals was growing in autumn for 48%. Analysis of age-dependant aptitude showed that maximal invasiveness was registered at young cats at the age from 1 to 3 years old. Extensivity of invasion at this age group was 50 %. Kittens under the age of 1 year are also amenable to invasion (18 %). Cats at the age of more than 3 years are also infected by ctenocephalides, but

their number is fewer than the number of young animals (32 %). Ctenocephalides is not marked by pedigree aptitude. Flea invasion is registered equally among cats of various breed of cats. Fur length of animals influences on disease incidence. Cats of long-wool breed are invaded more often. Extensivity of invasion of long-wool breed cats was 63%, short-wool breed was 37 %. Knowledge of regional epizootological disease features is important from the practical point of view, as it allows to give early medical treatment and disease prevention.

Bibliography

1. Kruglov, D. S. The occurrence of ctenocephalides at dogs and cats in Tyumen / D. S. Kruglov, O. A. Stolbova // Vestnik of agrarian university of Northern Trans-Urals - 2017. - № 2 (37). - P. 67-70.

2. Modelling the current distribution and predicted spread of the flea species *Ctenocephalides felis* infesting outdoor dogs in Spain / R. Gálvez, A. Montoya, R. Checa, V. Marino, O. Martín, G. Miró, V. Musella, M. A. Descalzo, G. Cringoli, L. Rinaldi // Parasites & Vectors. - 2017. - V. 10, №1. - P. 428.

3. Identification of genes associated with blood feeding in the Cat flea, *Ctenocephalides felis* / W. K. Greene, M. G. Macnish, K. L. Rice, R. C. A. Thompson // Parasites & Vectors. - 2015. - V. 8, № 1. - P. 368.

4. The Cat flea (*Ctenocephalides felis*) immune deficiency signaling pathway regulates rickettsia typhi infection / S. A. Rennoll, K. E. Rennoll-Bankert, M. L. Guillotte, S. S. Lehman, M. Beier-Sexton, M. Sayeedur Rahman, J. J. Gillespie, A. F. Azad, T. P. Driscoll // Infection and Immunity. - 2018. - V. 86, № 1. - P. e00562-17.

5. A reverse vaccinology approach to the identification and characterization of *Ctenocephalides felis* candidate protective antigens for the control of cat flea infestations / M. Contreras, M. Villar, S. Artigas-Jerónimo, J. De La Fuente, L. Kornieieva, S. Mytrofanov // Parasites & Vectors. - 2018. - V. 11, № 1. - P. 43.

6. Out-of-Africa, human-mediated dispersal of the common cat flea, *Ctenocephalides felis*: the hitchhiker's guide to world domination / A. L. Lawrence, G. Brown, J. Šlapeta, C. E. Webb, N. J. Clark, A. Halajian, A. D.

Mihalca, G. D'Amico, J. Miret, B. Kumsa, D. Modrý // International Journal for Parasitology. - 2019. - V. 49, № 5. - P. 321-336.

7. Responses of artificially reared cat fleas *Ctenocephalides felis felis* (bouché, 1835) to different mammalian bloods / T. Kernif, I. Bitam, D. Raoult, P. Parola, K. Stafford, G. C. Coles, K. Papa, J. Chiaroni // Medical & Veterinary Entomology. - 2015. - V. 29, №2. - P. 171-177.

8. Medvedev, S. G. A variety of flea - vectors of plague pathogens: the gopher parasite-flea *Oropsylla silantiewi* (Wagner, 1898) (Siphonaptera, Ceratophyllidae) / S. G. Medvedev, D. B. Verzhutsky // Parasitology. - 2019. - V. 53, №4. - P. 267-282.

9. Kotti, B. K. Fleas (Siphonaptera) of small mammals of the Western Caucasus forest belt / B. K. Kotti, V. V. Stakheev, M. V. Zhiltsova // Medical parasitology and parasitic diseases . - 2019. - № 2. - P. 30-36.

10. Bagamaev, M. M. Animal ectoparasitoses : monograph / B. M. Bagamaev. - Stavropol : OOO "Respect", 2017. – 173 p.

11. Yakubovsky, M. V. Parasitic diseases of cats (analytical review) / M. V. Yakubovsky // Ecology and animal world - 2019. - № 2. - P. 26-32.

12. Prokhorova, I. A. Epidemiological significance of fleas, lice and hair-eaters in the Kostroma region / I. A. Prokhorova, O. V. Ostapchuk // Vestnik of Kostroma state university named after N.A. Nekrasov. - 2014. - V. 20, № 6. - P. 36-38.

13. Fadeeva, A. N. Parasitic diseases of domestic carnivores in Nizhny Novgorod/ A. N. Fadeeva, N. G. Gorchakova // Veterinary science. - 2016. - № 6. - P. 33-35.

14. Fadeeva, A. N. Parasitosis of domestic carnivores in urban areas / A. N. Fadeeva // Worldwide Vestnik of veterinary science. - 2016. - № 2. - P. 30-33.

15. Belova, S. N. Ectoparasitoses of cats and dogs / S. N. Belova // Bio-VK. - 2006. - № 6. - P. 19-20.

16. Prokopenkova, I. A. Spreading of ctenocephalides of dogs and cats in the city of Moscow / I. A. Prokopenkova, I. A. Arkhipov ; executive editor JI. V. Nacheva // medico- biological problems : collection of research papers. - Moscow - Kemerovo, 2004. - Pub. № 13. - P. 39 -40.

17. Prokopenkova, I. A. Analysis of infestation of dogs and cats Ctenocephalides felis in Moscow / I. A. Prokopenkova // Theory and practice of fighting parasitic diseases: materials of reports of the scientific conference of VOK- Moscow, 2005. - Pub. № 6. - P. 292-293.

18. Babaylov, V. A. Allergic dermatoses of dogs and cats / V. A. Babaylov, V. B. Markov // Young people and science. - 2019. - № 2. - P. 5.

19. Stolbova, O. A. Insecticidal effectiveness of preparations at ctenocephalides of dogs in Tyumen / O. A. Stolbova, D. S. Kruglov // Transactions of Kazan State academy of veterinary medicine named after N.E. Bauman. - 2017. - V. 231, № 3. - P. 136-139.

20. Stolbova, O. A. Seasonal dynamics of ectoparasitosis at small domestic animals in Tyumen / O. A. Stolbova, L. N. Skosyrskih, D. S. Kruglov // Modern problems of science and education. - 2017. - № 2. - P. 237.

**ECONOMIC DAMAGE DURING LIGULEZ AND MIXED FORMS
OF HELMINTOSIS, INFESTATION OF FISH IN THE KOSTROMA
REGON IN GORSKY STORAGE RESERVOIR**

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Key words: *fish, parasitic diseases, economic damage, eutrophication, indicators, the Kostroma region.*

In Kostroma region (over-water length of Volga, Kostroma freshet) during carrying out of full helminthological fish examination of cyprinoid fish we got data on extensity and intensivity of bream infections by helminthes and parasitic crostacei. Species diversity and dimention-age dynamics of parasite diseases was studied. High rates of infection *Ligula intestinalis* was established (12,9-19,6 %). With ligulez complex combined invasions were registered: diplostomosis – at 92-100 % fish, lernaecosis and ergasilus – 29,6 - 62,7 %, piscoles – 8-70 %. At mixed fish parasitosis we established higher indicators of invasion intensivity in comparison with single component, a remarkable degree pathological process in gills, internal organs, on skin cover are marked; fatness decreases, growth rate slows. By comparison of dimentional- weight indicators of infected and noninvasive bream of the same age we marked degrowth by an average of 35 % (for 85,5 g) and length– 11 % (for 2,4 cm). Maximal slowing growth rate and decrease of fatness is typical for fish of 6-7 age: weight decreases for 56,2 % (for 126 g), length – 12,2 % (for 2,6 cm) in comparison with non- infected fish of the same age In sites of ligulez fish died massively, that leads to decrease of bream number for 65-72 %. Common economic damage from fish death in liguloz site is more than 10 mln. rubles. For the prevention of of infected fish death it is necessary to carry fishing out in autumn and in the beginning of summer Large rise of infection fish by plerocercoid *L. intestinalis*, metacercaria fluke from class Strigeidida, species *Diplostomum*, monogenies *Diplozoon paradoxum*, *Dactylogyrus vastator* is the characteristic of basin eutrophicaion.

Bibliography

1. Kleymenova, T. N. Reasons of the Volga river pollution in Astrakhan region / T. N. Kleymenova, D. V. Shivyakov // Ecological problems of natural and urban areas: materials of the IX World research to practice conference. – 2018. – P. 11-14.

2. Novak, A. I. Parasite cenosis of aquatic ecosystem of Volga basin : monograph / A. I. Novak, M. D. Novak. – Ryazan : RSATU, 2011. – 241 p.

3. Trifonova, I. S. Longstanding dynamics of planktonic communities and interaction in mesotrophic lake in conditions of climate changes and eutrophication / I. S. Trifonova, E. S. Makartseva, E. N. Chebotarev // Thesis of IX Congress of hydrobiological association RAS (Tolyatti, Russia, 18-22 September 2006). – Tolyatti : ШУМИ RAS, 2006. – V. II. – P. 252.

4. An attempt to prepare Macrophyte Index for Rivers for assessment watercourses in Kazakhstan / R. Muratov, K. Szoszkiewicz, A. Zhamangara, S. Jusik, D. Gebler, R. Beisenova, L. Akbayeva // Meteorol. Hydrol. Water Manage. - 2015. – Vol. 3(2). – P. 27-32. DOI: <https://doi.org/10.26491/mhwm/59592>.

5. Neverova-Dziopak, E. New approach to trophic state assesement of running waters in Poland / E. Neverova-Dziopak, Z. Kowalewski // Meteorol. Hydrol. Water Manage. – 2013. – Vol. 1(1). – P. 15-22. DOI: <https://doi.org/10.26491/mhwm/20551>.

6. Matyukh, V. A. About possibility of income reduction of bigenic elements into storage reservoir of Volga basin / V. A. Matyukh // Russian cities: problems of construction, engineering support, improvement and ecology : collected papers of XIX International research to practice conference. – 2017. – P. 44-48.

7. Kozhunratov, A. A. Helminthosis diseases of fish in North region of Akmolinsky region / A. A. Kozhunratov // Vestnik of science of KazAU. – 2003. – V. 3, № 9. – P. 102-108.

8. Novak, A. I. Correlation of water enrichment level and composition of fish parasite cenosis / A. I. Novak, M. D. Novak // Collection of research papers of academic teaching staff of Ryazan State agricultural academy. – Ryazan, 2006. – P. 187-190.

9. Novak, A. I. Ecological basis of prophylaxis of fish invasive diseases in conditions of pond cultures in Ryazan region / A. I. Novak, M. D. Novak, N. V. Zhavoronkova // Healthy environment is safety basis for regions: collection of

papers of the first International ecological forum in Ryazan. – Ryazan, 2017. – P. 237-243.

10. Structure-functional analysis of achthyocinosis: problems and perspectives/ S. V. Shibaeyev, K. V. Tylik, Y. K. Ruygite, O. A. Novozhilov, T. S. Gulina, G. E. Maslyankin // Abstracts of IX Congress of Hydrobiological associations RAS(Tolyatti, Russia, 18-22 September 2006). – Toyatti : IEVB, 2006.). – V. II. – P. 238.

11. Climate analysis as a basis for a sustainable water management at the Lusatian Neisse / Th. Pluntke, S. Schwarzak, K. Kuhn, K. Lünich, M. Adynkiewicz-Piragas, I. Otop, B. Miszuk // Meteorol. Hydrol. Water Manage. – 2016. – Vol. 4(1). – P. 3-11. DOI: <https://doi.org/10.26491/mhwm/61735>.

12. Vasilyev, A. V. Problems of water quality assurance of Kuybyshev storage reservoir in the region of Tolyatti, Ecological problems of large basins / A. V. Vasilyev, V. V. Zabolotskih, O. V. Rynina // Materials of International conference , on the occasion of 35th anniversary of the Institute of ecology of Volga basin RAS and 65th anniversary of Kuybyshev biological research station. – 2018. – P. 48-50. DOI: 10.24411/9999-002A-2018-10012.

13. Gorky storage reservoir : aims, solving and perspectives / A. A. Molkov, I. A. Kapustin, D. V. Kaliskaya, E. N. Korchemkina, V. V. Pelevin, E. L. Vodeneeva // Modern problems of remote sensing of Earth from space: book of abstracts of the fourth all-Russian open conference. – 2016. – 273 p.

14. Ieshko, E. P. Infection characteristics and distribution of nuber of metacercaria *Diplostomum huronense* (La Rue, 1927) Hughes, 1929 in roach of Ladoga lake / E. P. Ieshko, D. I. Lebedeva // Parasitology. – 2007. – V. 41, pub. 3. – P. 195-200.

15. Radchenko, N. M. Spreading and ecology *Ligula intestinalis* (L. 1758) in large basins of Volgograd region / N. M. RADchenko, A. A. Shabunov // Cestology problems. – 2005. – T. 3. – C. 229-336.

16. Characteristics of ecological function changes of abiotic sphere of the Earth in regions of hydropower complex/ V. T. Trofimov, M. A. Kharkina, T. A.

Baraboshkina, A. D. Zhigakgin // Bulletin of Moscow society of nature analysts. – 2017. – Pub. 92 (1). – P. 57-70.

17. Bauer, O. N. Population ecology of fish parasites, some results and perspectives / O. N. Bauer // Morphology , systematization and faunology of parasitic animals collection : collection. – Leningrad, 1986. – P. 185.

18. Goloshapova, O. N. Study actuality of liguloze in Mokhaylovskoye storage reservoir / O. N. Goloshapova, N. S. Malysheva // Theory and practice of control of parasite disease. – 2016. – Pub. 17. – P. 140-142.

19. Gorbunov, P. A. Quality evaluation, biological and ecological fish safety in conditions of Nizhniy Novgorod region // Veterinary surgeon. – 2016. – № 1. – P. 29-34.

20. New aspects of control of infections of main aquaculture objects in Belarus / A. V. Bepaliy, S. M. Degtiryag, G. V. Slobodnitskaya, S. V. Poloz, E. I. Grebneva // Theory and practice of control of parasitic diseases. – Moscow, 2019. – № 20. – P. 102-107.

ASSESSMENT OF THE SAFETY OF ANTIRABIC LIVE VACCINE

"FERARABIVAK" FOR WILD CARNIVORES

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Key words: *rabies, RV-97 strain, anti-rabic vaccine, oral immunization, vaccine harmlessness.*

Special attention is paid to improving the quality of rabies prevention among wild carnivores in the Russian Federation and around the world. The effectiveness and quality of modern oral vaccine preparations are directly combined with the determination of safety for animals, and are one of the necessary areas of research of the properties of vaccine preparations. In FSBI "ARRIAH" a vaccine against rabies in wild carnivores live "Ferarabivak", which was studied for security

applications to target animals. An attenuated rabies virus of the RV-97 strain was used as an antigenic viral material for the production of the vaccine preparation. To study the harmlessness of vaccine preparations, seronegative rabies patients were used as a model: 75 red and silver-black foxes at the age of 9-12 months, 72 raccoon dogs at the age of 9-12 months, and 34 ferret mustela furo at the age of 6-9 months. Virus isolation and detection were conducted in the mouse neuroblastoma cell line and in the immunofluorescence reaction (IFR) using an anti-rabic immunoglobulin labeled with a fluorescent dye. In the study of vaccine safety it is established that the rabies virus strain RV-97 in the blood and saliva after vaccination was detected in 100% of foxes (32 animals) and 100% raccoon dogs (32 animals), as well as 100% ferret mustela furo (14 animals). In brain samples using the IFR method, the rabies virus was not detected in 100 % of foxes (33 animals) during 360 days, 100% of raccoon dogs (30 animals), 100% of ferret mustela furo (15 animals) during 180 days after the introduction of the vaccine. Based on the results obtained, it is proved that the attenuated strain RV-97 of the rabies virus is safe for target animal species. When conducting experiments on all target animals, it was found that the vaccine is safe and can be recommended for further use.

Bibliography

1. OIE. Manual of diagnostic tests and vaccines for terrestrial animals. – Paris, 2018. – Chapter 3.1.17. – P. 578-612.
2. Makarov, V.V. Bat and humans rabies / V.V. Makarov, D.A. Lozovoy, N.I. Briko // Epidemiology and infectious diseases. Topical issue. – 2016. – № 6. – P. 3-8.
3. Chen J. Epidemiological and Genetic Characteristics of Rabies Virus Transmitted Through Organ Transplantation / J. Chen, G. Liu, T. Jin, R. Zhang [et al.] // Front Cell Infect Microbiol. – 2018. – V.8: 86.
4. Chupin, S.A. Genetic characteristics of rabies virus isolates isolated in the Vladimir region / S.A. Chupin, M.I. Doronin [et al.] // Veterinary today. – 2015. – № 4 (15). – P. 46-48.

5. Gruzdev, K.N. Animals rabies / K.N. Gruzdev, A.E. Metlin. – Vladimir: FSBEI “ARRIAH”, 2019. – 394 p.
6. Gruzdev K.N., Nedosekov V.V. Animals rabies . – M., «Aquarium», 2001. – 304 p.
7. Rybakov, S.S. Safety and immunogenicity of oral anti -rabies vaccines / S.S. Rybakov, E.V. Belik, A.E. Metlin [et al.] // Veterinary. – 2010. – № 8. – P. 18-22.
8. Methodological recommendations for the control of rabies in animals / A.E. Metlin, S.S. Rybakov, E.V. Belik [et al.]. – M., 2009. – 58 p.
9. Pukhova, N.M. Methods of rabies control in carnivores / N.M. Pukhova, A.Y. Samuilenko, N.K. Eremets [et al.] // Veterinary and feeding. – 2014. – № 6. – P. 48-50.
10. Balashov A.N. Evaluation of effectiveness and safety of inactivated anti-rabies vaccines from the "ARRIAH" strain for cattle using of different adjuvants / A.N. Balashov, D.A. Lozovoy, M.I. Doronin [et al.] // Veterinary today. – 2019. – № 4– P. 37-42.
11. Makarov V.V. Oral vaccination of foxes against rabies without alternatives // Vestnik of the Russian Academy of Agricultural Sciences. – 2010. – № 2. – P. 57-58.
12. Nazarov N.A. Evaluation of the quality of anti-rabic oral vaccination of wild carnivores in the Russian Federation in 2008-2014/ N.A. Nazarov, A.Y. Sukharkov, E.V. Chernyshova [et a;.] // Works of the Federal center for animal health protection . – 2015. – V.13. – P. 31 - 42.
13. Guidelines for the selection and transfer of samples of brain, blood serum and bone tissue for the purpose of diagnosing animal rabies and evaluating the effectiveness of oral anti-rabies vaccines / E.M. Chernyshova, A.Y. Sukharkov, A.E. Metlin [et al.]. - FSI "ARRIAH". – Vladimir: 2010. – 23 p.
14. Comparative analysis of Mouse Inoculation Test and Virus Isolation in Cell Culture for rabies diagnosis in animals of Parana, Brazil / T.F. Corona, B.

Böger, T.D. Rocha, W.K. Svoboda, E.C. Gomes // Rev Soc Bras Med Trop. 2018 Jan-Feb; 51(1):39-43.

15. SAUS 26075-2013 Animals. Methods of laboratory diagnostics of rabies: interstate standard / Interstate. Council for standardization, Metrology and certification (IGU). – M.: Standartinform, 2014. – 15 p.

EARLY SELECTION OF TROUT PRODUCERS WITH CORRELATION OF GONADS AND EXTERIOR FEATURES

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Key words: *rainbow trout, morphometry, index, reproduction, Kamloops, selection, indirect indicator, correlation, ontogenesis.*

The main aim of genetics in global aquaculture is to provide heterozygosity of cultivated population, to improve the exterior qualities of fish and the gene pool of target breeds of rainbow trout and other salmon. The development of selective breeding direction of salmon aquaculture is based on mix of different methods and selections. Different ecological and biological differences of breeds allow to form a year-round laying of hardroe, choose the perfect pair of producers without distortion basic properties of the species, and get the effect of heterosis. The article represents allometry data, which show that according to secondary features of the exterior, it is possible to select early-maturing females with an increased mass of gonads in replacement stock. While, using biometric indicators of fish, there is a complex dependence during the three-year period of their cultivation. These "signal" signs are indirectly related to the mass and, accordingly, to the exterior of fish, both at one-year-old and two-year-old females. When calculating the correlation between exterior features and mass of reproductive products of three-year-old female trout, some distinctive feature of correlation is noted, compared

with previous years of their cultivation. So, at three-year-olds, the correlation positive dependence of gonad on development of postorbital part is $r=0.899$, pectoral fins $r=0.960$, and the abdominal fins $r=0.920$, that is, the tendency of age-stabilization is clearly visible. The analysis of indirect indices allowed us to identify the most significant of them for the formation of economic and useful qualities at salmon fish in the research group in the future. In this way, you can form a stable selection and breeding work.

Bibliography

1. Schaperclaus, W. Fischkrankheiten / W. Schapperclaus, H. Kulow, K. Schrekkenbach // Aufl. Berlin. – 1979. – P. 4.
2. Steffens, W. Der Karpfen / W. Steffens // Die Neue Brehm-Bucherei, Wittenberg Lutherstadt. – 1975. – P. 203.
3. Agleev, I. N. Estimation of variability of weight and size of rainbow trout eggs of different subspecies on the process of embryogenesis / I. N. Agleev // [Transactions of Kazan state academy of veterinary medicine named after. N.E. Bauman](#). – Kazan : KSAU, 2017. – P. 4 – 6.
4. Bushov, A. V. Individual biometrics and selection of rainbow trout / A. V. Bushov, I. N. Agleev. – Saarbrücken : Lambert Academic Publishing, 2017. – 81p.
5. Pravdin, I. K. Guide to fish study / I. F. Pravdin. – Moscow : Food industry, 1966. – 96 .
6. Privezentsev, Y. A. Workshop on pond fish farming/ Y. A. Privezentsev. – Moscow : HIGHERSCHOOL, 1992. – 208 p.
7. Kopecka-Pilarczyk, J. Effects of dietary probiotics supplementation on several biomarkers in rainbow trout (*Oncorhynchus mykiss*) / J. Kopecka-Pilarczyk // J. BioSci. Biotech. – 2013. - № 2(3). – P. 189-193.
8. Shah Morphometry, length-weight relationship and condition factor of farmed female rainbow trout (*Oncorhynchus mykiss* Walbaum) in Kashmir / H. Shah Tasaduq, M. H. Balkhi, A. M. Najar, Oyas A. Asimi // Indian J. Fish. – 2011. - № 58(3). – P. 51-56.
9. Agleev, I. N. Biological evaluation of reproductive products of female rainbow trout of two subspecies / I. N. Agleev, A. V. Bushov // In the world of scientific discovery. – Ulyanovsk : USAA named after P.A. Stolypon, 2016. – V. II. – P. 9 – 11.
10. Gavrilenko, V. P. Computerization in animal husbandry / V. P. Gavrilenko, P. S. Katmakov, A. V. Bushov. – Ulyanovsk : USAA, 2004. – 114 p.

11. Donnik, I. M. Quantitative dependence of the biological characteristics of female rainbow trout on fish weight / I. M. Donnik, Y. I. Yesavkin, V. V. Masloboyshikova // *Agrarian Vestnik of the Urals*. - 2014. - № 12. – P. 26 – 32.
12. Titarev, E. F. Cold-water trout farming / E. F. Titarev. – Moscow : MARF, 2008. – 280 p.
13. Leary, Robb F. Developmental stability and enzyme heterozygosity in rainbow trout / Robb F. Leary, Fred W. Allendorf, Kathy L. Khudsen. - USA : University of Montana 59812, 1983.
14. Carlson, S. M. A review of quantitative genetic components of fitness in salmonids: implications for adaptation to future change / S. M. Carlson, T. R. Seamons // *Evol. Appl.* – 2008. - Vol. 1. - P. 222-238.
15. Wada, K. T. The present status of genetic conservation of cultured aquatic species in Japan / K. T. Wada // *Action before extinction*. B. Harvey, C. Ross, D. Greer, J. Carolsfeld (eds.). - Victoria, British Columbia, Canada. – 1998. - P. 225-230.
16. Piironen, J. Preservation programs for endangered fish stocks in Finland / J. Piironen, P. Heinimaa // *Action before extinction*. B. Harvey, C. Ross, D. Greer, J. Carolsfeld (eds.). - Victoria, British Columbia, Canada. – 1998. - P. 105-113.
17. Sevostyanova, G. G. Origin, breeding and selection of rainbow trout in the USSR and abroad / G. G. Sevostyanova // *Inveshtiya NRILRF – 1976*. - V. 117. - P. 3-13.
18. Kincaid, H. L. Trout strain registry / H. L. Kincaid // Kearneysville: National Fisheries Center-Leetown. – 1981. - 118 p.
19. Gjedrem, T. Breeding plans for rainbow trout / T. Gjedrem // *Aquaculture*. – 1992. - Vol. 100. - P. 73-83.
20. Kirpichnikov, V. S. Genetics and fish selection / V. S. Kirpichnikov. - 2-e pub., updated and revised. – Leningrad : Science. – 1987. - 520 p.
21. Artamonova, V. S. Genetics methods in salmon and trout farming : from traditional breeding to nanobiotechnology / V. S. Artamonova, A. A. Makhrov. – Moscow : Association of scientific publications CMC, 2015. - 128 p.

COMBINING ABILITY OF LINES IN SIMMENTAL

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Key words: simmental, line, selection, pure breeding, cross, in line selection, judging practice, heredity, heterosis, genetic potential

In this work the results of line crossing and in line selection during development of Simmental are shown. The research showed that the lines of Simmental are not equally and effectively combined. It was established that at APC «Combayn» representatives of Florian 374 lines combined well with breeding stock of Zipper line 085, and with Krepysh 50. Milch cow productivity was 4250 and 4111 kg, this is higher than milk production of herd mates obtained from cross of Florian × Victor, for 979 and 840 kg at relevant difference ($P < 0,001$) and specifications of Simmental (1991) for 1550 and 1411 kg, or for 57,4 and 52,2 %. Fat content of milk at descendant during such selection grew by an average of 0,21($P < 0,001$) and 0,06 %. Cross of lines Florian × Victor was not effective, it gave negative result in milk production and in fat content of milk. The effective cross was line Zipper × Victor. Average milk production because of such selection for 9 mil secretions was 4153 kg of milk with fat content of 4,05%. Lines Zipper × Florian mismatch. Milk production from this cross for 8 mil secretions was no more than 3580 kg with milk fat 4,0%. In herd of cattle of EPF «Central» bulls' descendants of crossed lines Florian × Rezviy, Florian × Rezviy (reciprocal crosses кроссы) raised milk yield in comparison with herd mates obtained from in line selections for 368 and 686 kg (10,1 and 19,3 %) at relevant difference ($P < 0,05 - 0,001$). In line selection of Florian × Florian and Rezviy × Rezviy turned out to be ineffective, it lowered descendant productivity.

Bibliography

1. Yudin, V.M. Improving the productive qualities of black-and -white cattle using inbreeding / V.M. Yudin, A.I. Lyubimov// Izvestiya of Samara State Agricultural Academy- 2015. -№1.- P. 163-168.

2. Setsov, V.И. Tasks of breeding work with simmentals / V.И. Seltsov // Zootechnics. – 2001. – № 3. – P. 2–5.

3. Anisimova, E.I. Evaluation of Simmental bulls by productivity of daughters and the ratio of forms of inheritance of milk yield / E.I. Anisimova, P.S. Katmakov // Zootechnics. - 2019.- № 6.- P. 14-19

3.Dedov, M.D. Creating a factory type of Simmental cattle meto-house of purebred breeding / M.D.Dedov, N.V.Spivak // Agararian Russia.- 1999. - № 2(3). - P.38- 45.

4. Selection-genetic and ecological - technological valency of dairy cows to long- term productive use / Under the editorship of E.Y. Lebedko. - Bryansk, 2012. - 278 p.

5. Velmatov, A.P. Genetic resources of Simmental and Holstein breeds and their interaction in the selection of cows suitability for machine milking / A.P. Velmatov, T.N.Tishkina, N.N.Neyaskin // Vestnik of Ulyanovsk state agricultural academy.- 2018.- №1 (41).- P.69-73.

6. Productive qualities of crossbreeds of Simmental and Holstein breeds / A.A. Velmatov, A.V. Erzamaev, T.N. Tishkina, A.I.A.A. Khamza, A.P. Velmatov // Main zootechnician .- 2018.- №1.- P.43- 50.

7. Nemtseva E.Y. Dairy productivity of cows of different linear belonging // food security and sustainable development of the agro-industrial complex: materials of international research to practice conference (20 – 21 october). – Cheboksary: Chuvash SAA, 2015. – P. 317 – 321.

8.Tatueva, O.V. The influence of genetic factors on lifetime production of cows vazuzskiy type of sychevskaya breed / O.V. Tatueva, D.N. Koltsov // International scientific- research journal. - 2016. № 11-5 (53). - P. 47-52.

9. Karamayev, S.V. Bestuzhevskaya breed of cattle and methods of its improvement / S.V. Karamayev.- Samara, 2002.- 378 p.

10. Merkuryeva, E.K. Genetic bases of selection in cattle breeding / E.K.Merkuryeva. - M.: Kolos,1977.- 239 p.

11.Sharafutdinov, G.S. Improvement of Kholmogorsky cattle in Tatarstan / G.S. Sharafutdinov, F.S. Sibagatullin.- Moscow, 2001.- 239 p.

12. Plokhinsky, N.A. Guide to biometrics for livestock specialists / N.A. Plokhinsky.- M.: Kolos, 1969.- 256 p.

13. Lebedko, E.Y. Increasing the duration of productive use of dairy cows / E.Y. Lebedko // Agrarian Russia.- 1997.- №2.- P.30 - 31.

14. Babaylova, G.P. Influence of linear affiliation , methods of selection and compatibility of lines on dairy productivity of cows / G.P. Babaylova, E.N. Usmanova, E.D Buzmakova // Agrarian science of Europe-North -East. – 2013. – № 3. P.49-51.

15. Kohanov, A.P. The role of long- lived cows in the formation of families of cows in breeding herds / A.P. Kohanov, M.A. Kohanov // Izvestiya of Nizhniy Novgorod agrouniversity complex. – 2015. – № 2 (38). – P. 152- 156.

YOUNG BULL BEEF PRODUCTION OF VARIOUS EXTERIOR – CONSTITUTIONAL TYPES

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Key words : *body weight, kill out, young bulls , constitutional type, beef production, fat, protein.*

Selection and breeding work to improve Simmental cattle has led to a change in the quality of the animals. Animals that differ sharply from the Simmental breed in terms of productivity, appearance, and constitution were obtained. Therefore, the aims of our research were to study the meat productivity of crossbred steers with different genotypes with a balanced feeding. The research was carried out since 2016-2018 in OOO SUE PM «Fruit and berry breeding nursery» Krasnoslobodsky district PM on crossbred Simmental x Holstein animals, having in genotype 62,5 - 75,0 % heredity of red and white Holstein cows . Body

weight at young bulls obtained from mothers of eyrisomnic type at birth for 1,6 – 2,5 kg higher than herdmates, at three months age differences between groups of animals reach 8,0 – 13,0 kg ($P \leq 0,01$, $P \leq 0,001$), at six months age 15,0 – 25,0 kg, ($P \leq 0,001$) at nine months age 17,0 – 28,0 kg, ($P \leq 0,001$) at twelve months age 25,0 – 44,0 kg ($P \leq 0,001$), at 12 months age 25,0– 46,0 kg ($P \leq 0,001$) and at 18 months age 30,0-52,0 kg ($P \leq 0,001$). Crossbred bulls of eyrisomnic type of meat productivity are superior to their counterparts of shallow and mezosomnic type. The results of the slaughter showed that young bulls of the eyrisomnic type have full-bodied carcasses with a high yield of protein and fat. The transformation of the protein and energy of the feed into the food protein of the edible part of the carcass was higher at the young bulls of eyrisomnic type.

Bibliography

1. Anisimova, E. I. Development strategy of cattle breeding in Volga region / E. I. Anisimova, O. S. Karpova // Diary and meat cattle breeding. – 2001. – № 7. – P. 2 – 4.
2. Anisimova, E. I. Formation of meat herds in Volga region / E. I. Anisimova, A. P. Semenov, E. R. Gosteva // Diary and meat cattle breeding. – 2008. – № 2. – P. 13 - 15.
3. Meat production of black and white bulls during growing in light room and exposed station and feed- lot farm to body weight 550 kg / E. M. Afanasyev, G. P. Legoshin [et al.] // Diary and meat cattle breeding. – 2013. – № 6. – P. 6 - 7.
4. Kaydulina, A. A. Meat production of calf bulls of different breed in industrial complex / A. A. Kaydulina, O. V. Ostanina // Vestnik of Altay SAU. – 2012. – № 7 (93). – P. 51-53.
5. Kozankov, A. G. Basis of intensification of breeding and usage of diary breed cattle in Russia / A. G. Kozankov, D. B. Pereverzev, I. M. Dunin. - Moscow, 2002. – 352 p.
6. Popov, V. V. Meat production and meat quality of young cattle of different breed and productivity current / V. V. Popov, A. V. Salo, F. F. Akhmetov

// Vestnik of meat cattle breeding : materials of World research- to –practice conference. – Orenburg : ARRIMS, 2008. - V. 1, bul. 61. – P. 243-245.

7. Cherey, A. Meat production of calf bulls of black and white breed of different genotypes in conditions of Volgograd region / A. Cherey // Diary and meat cattle breeding - 2010. – № 7. – P. 21 – 23.

8. Formation of exterior characteristics and meat qualities of red and white cattle in case of different energetic nutrition of feed / A. P. Velmatov, A. M. Geryanov, R. A. Abushaev, A. A. Velmatov, N. N. Neyaskin // Russian veterinary journal. Agricultural animals. – 2014. – № 1. – P.7 - 10.

9. Golubkov, A. A. Meat production and quality of bull of red and white breed and its hybrids, obtained from crossbreeding with Swedish red cattle / A. A. Golubkov, A. I. Kuznetsov, A. I. Golubkov // Vestnik of KrasSAU. – 2017. – № 2. – P. 72 - 82.

10. Katmakov, P. S. Effectiveness of cross breeding of Simmental in Volga region / P. S. Katmakov, K. V. Baryshnikov, A. V. Vorobyov // Zootechnics. – 1990. – № 5. – P. 27 - 28.

11. Kotlov, P. I. Chemical composition of the longest back muscle of culled simmental and simmental Holstein cows / P. I. Kotlov // Use of genetic resources for development of native species of cattle. – Moscow : ASRI of pedigree work, 1990. – P. 133 - 135.

12. Formation of meat productivity of calf bulls of different genotypes during intensified culture / N. G. Fenchenko, N. I. Khairullina, D. Kh. Shasutdinov, R. F. Galimov, V. V. Evstigneev // Science and technology achievements. – 2010. – № 1. – P. 56-58.

13. Influence of technological factors on nutrient transformation and food energy into meat production / N. G. Fenchenko, N. I. Khairullina, A. Z. Shaikhutdinova, R. F. Galimov, I. R. Kilmetova // Science and technology achievements. – 2011. – № 2. – P. 45- 46.

14. Meat production by steers of different geotypes / A. Velmatov, A. Velmatov, Al – Isawi, A. A. H. Tishkina, T. Neyaskin // Iraqi Journal of Agricultural Sciences. -

2018. - Vol. 49, Is. 1. - P. 71 – 77.

15. Standarts and diet of agricultural animals: handbook / A. P. Kalashnikov, N. I. Kleymenov, V. N. Bakanov [et al.]. – Moscow, 2003. – 486 p.

16. Merkur'yeva, E. K. Biometrics in selection and genetics of agricultural animals / E. K. Merkur'yeva. - Moscow : Koloss, 1970. – 365 p.

17. Plokhinsky, N. A. Guideline on biometrics for zootechnicians : education guidance / N. A. Plokhinsky. – Moscow : Koloss, 1969. – 256 p

REPRODUCTIVE QUALITIES OF RED GOBATOV COWS AND THEIR CORRELATION WITH PRODUCTIVE LONGEVITY

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Key words: *cows, productive longevity, service period, age of the first parturation, milk productivity.*

The article analyzes correlation of the level of reproductive qualities and the productive longevity of red Gorbatov cows. The age of the first fertilization did not have a significant impact on the duration of economic use of cows. A small but reliable influence of the service period on the life expectancy of red cows was established. Studies were conducted on the basis of breeding plant RAO

"Ababkocskoe" in Nizhny Novgorod region. The aim of the work was to study the correlation of reproductive characteristics of red Gorbatov cows with indicators of their productive longevity. The age of the first fertilization and the first calving did not significantly affect the indicators of productive longevity of red Gorbatov cows. Cows that calved at 38-40 months – 5.11 lactation-live longer, but there is no reliable effect of the age of the first calving on productive longevity. The correlation between them is very weak, although positive ($r = + 0.1$). This group also has a maximum lifetime milk yield (19663 kg of milk). With an increase in the age of the first calving to 35-37 months, the yield of the first calves increases slightly to 3625 kg, the influence of this factor on the yield for 1 lactation is small- $N_2=3.1\%$ ($p \leq 0.05$). In a herd, most animals have a service period of 60-120 days (69.4 %). The service period had a small but significant impact on the life expectancy of red cows – $N_2=7.7\%$ ($p \leq 0.001$). The most productive longevity is observed at animals with an average service period of 211-240 days – 5.5 lactation, slightly less remain in the herd of cows with a service period of 91-120 days – 5.13 lactation. Cows with a service period of 151-180 days (4100 kg) have the highest milk yield per 1 lactation, 211-240 days for the highest lactation and lifetime productivity (5052 and 22,815 kg, respectively), the share of the service period influence on these indicators was $N_2=10-11\%$ ($p < 0.001$). The most optimal duration of the service period for red Gorbatov cows can be considered 91-120 days. With this service period, high milk yield and productive longevity are combined.

Bibliography

1. Sarapkin, V.G. Productive longevity of cows depending on paratypical factors / V.G. Sarapkin, S.V. Alyoshkina // Zootechnics. – 2007. – № 8. – P. 4-7.
2. Bydantseva, E. Dependence of productive longevity of cows on genetic factors / E. Bydantseva, O. Kavardakova // Dairy and beef cattle breeding. – 2012. – № 3. – P. 17-18.

3. Titova, S.V. Influence of a number of factors on lifetime milk yield and duration of productive use of cows / S.V. Titova // Agrarian science of Euro-North-East. – 2014. – №3. – P. 57-62.
4. Khachkaeva, E.I. Reproductive capacity of red -and-white cows / E.I. Khachkeyeva, M.G. Tleynsheva, F.A. Vologirova et al. // Scientific report. – 2018. – № 12. – P. 20-25.
5. Tagesu A. Review on the Reproductive Health Problem of Dairy Cattle // Dairy and Vet Sci J. 2018; 5(1): 555655 DOI: 10.19080/JDVS.2018.05.555655
6. Baimishev, Khamidulla B. Increase in reproductive ability of high-producing cows, and qualitative parameters of their offspring, under conditions of intensive milk production / Khamidulla B. Baimishev, Murat H. Baimishev, Vasily S. Grigoryev, Alexander P. Kokhanov, Inna V. Uskova, Ismagil N. Khakimov // Asian Pacific Journal of Reproduction. 2018; 7(4): 167-171. DOI: 10.4103/2305-0500.237054
7. Yashin, I.V. Optimization method of reproductive function of cows after calving / I.V. Yashin, Z.Y. Kosorlukova, G.V. Zotkin et al. // Agrarian science of Euro-North-East. – 2017. – № 5 (60). – P. 52-56.
8. Rushen Jeffrey. 2013. The importance of improving cow longevity [Electronic source]<http://www.milkproduction.com/Library/Scientific-articles/Management/The-importance-of-improving-cow-longevity1/> (access date 19.02.2020)
9. Wu, J.J., Wathes, D.C., Brickell, J.S., Yang, L.G., Cheng, Z., Zhao, H.Q., Xu, Y.J., Zhang, S.J., 2012. Reproductive performance and survival of Chinese Holstein dairy cows in central China. Animal Production Science 52, 11-19. DOI: 10.1071/AN11146
10. Bogolyubova, L.P. Reasons for the retirement of cows from the main herd in 2018 / L.P. Bogolyubova, A.V. Dyuldina, E.E. Tyapugin // Zootechnics. – 2020. – № 2. – P. 14-16. DOI: 10.25708/ZT.2020.71.93.005
11. Cooke, J.S., Cheng Z., Bourne N.E., Wathes D. C. Association between growth rates, age at first calving and subsequent fertility, milk production and survival

- in Holstein-Friesian heifers. *Open Journal of Animal Sciences*, 2013, Vol.3 No.1, January 24 DOI: 10.4236/ojas.2013.31001
12. Voronina, I.P. Influence of genetic and paratypical factors on the productive longevity of cows / I.P. Voronina, A.E. Kolodkina // *Vestnik of agroindustrial complex of Upper Volga region*. – 2009. – № 2 (6). – P. 24-28.
 13. Petruhina, L.L. Influence of the age of the first calving on lifetime productivity and productive longevity / L.L. Petruhina, S.L. Belozertseva // *Scientific support of animal husbandry in Siberia: materials of the III international research to practice conference, Krasnoyarsk, 16-17 May 2019*. – P. 201-204.
 14. Sergeev, I.I. The practicability of early heifer fertilization / I.I. Sergeev // *Zootechnics*. – 2005. – № 4. – P. 25-27.
 15. Badingla L, Thatcher Inter relationships of milk yield, body weight, and reproductive performance // *Dairy Sci*. 2009; 68: 1828-1830.
 16. Mamatova, N.D. Influence of the age of first insemination on the productive longevity of cows / N.D. Mamatova // *Vestnik of Altay SAU*. – 2018. – №3 (161). – P. 110-114.
 17. Belozertseva, S.L. Influence of paratypical factors on the productive longevity of cows in Irkutsk region / S.L. Belozertseva, A.I. Kuznetsov, R.K. Meshеров et al. // *Vestnik of Irkutsk SAA*. – 2019. – № 91. – P. 101-109.
 18. Nilforooshan M.A., Edriss M.A. Effect of Age at First Calving on Some Productive and Longevity Traits in Iranian Holsteins of the Isfahan Province. *Journal of Dairy Science*, 2004, Volume 87, Issue 7, P. 2130–2135 DOI: [https://doi.org/10.3168/jds.S0022-0302\(04\)70032-6](https://doi.org/10.3168/jds.S0022-0302(04)70032-6)
 19. Mishenko, V.A. Economic assessment of herd reproduction in intensive dairy farming / V.A. Mishenko // *Zootechnics*. – 2005. – № 3. – P. 35-37.
 20. Ivanov, V.A. Reproductive function in cows and growth of calves depending on the method of maintenance during the newborn period / V.A. Ivanov / « Ways to extend the productive life of dairy cows on the basis of optimization of breeding, keeping and feeding technologies »: materials of international research to practice conference. – Dubrivitsy, 2015. – P. 189-194.

21. Unified state information system for accounting of research, development and technological works for commercial value USIS SRECW [Electronic recourse] <https://esu.citis.ru/ikrbs/SAHNPSQFD6GYEM41VXAEPGVN> (access data 15.10.2019 .)

REPRODUCTIVE QUALITIES OF FIRST -CALF COWS WHEN USING NATURAL FEED ADDITIVE IN FEEDING DIETS

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Key words: *cattle, dairy cows, anti-oxidant, feed additive, reproducing.*

Today, the optimization of feeding of heifers and first-calf cows during the milking period is achieved by creating balanced diets, both for nutrients and biologically active components. The aim of the research was to study the effectiveness of the effect of a natural feed additive containing dihydroquercetin on the change of live weight of first-calf cows during milking period and their reproductive abilities. The research was conducted in AO "Uchkhoz July Izhevsk State Agricultural Academy" Votkinsky district of the Udmurt Republic. To carry out the experimental part of the work, two groups of cows were formed-first-calf cows of the black-and-white breed (10 heads each). During the experiment, all animals were in similar conditions. Animals in groups were selected based on age and body weight. The first-calf cows of the experimental group received a natural feed additive in addition to the main diet. The composition of natural feed additives is feed salt and dihydroquercetin (purity 92 %).The change in live weight of first-calf cows was evaluated on the twentieth day after calving, in a month, and in the dynamics up to the fourth month of lactation. Reproductive abilities were evaluated on the basis of the length of the service period and conception rate. It was established that the use of a natural feed additive did not completely prevent

the decrease in the live weight of first-calf cows, but had a significant influence on the intensity of the processes of live weight saving. Thus, by the fourth month of lactation, animals of all groups had gain in the live weight. In the control group, the increase was 3.0 kg or 0.6%, in the experimental group-8.2 kg or 1.7 %. The difference in comparison to the control group analogues was 27.3 kg or 5.6 % ($P \geq 0.999$). When studying the reproductive abilities of first-calf cows, depending on the natural feed additive used in the feeding diets, a reduction in the service period in the experimental group of animals was observed by 11.9 days in comparison to analogues in the control group.

Bibliography

1. Problems of realization of dairy cattle productivity potential / R. V. Nekrasov, A. S. Anikin, V. M. Duborezov, M. G. Chabaev, A. A. Zelenchekova, A. A. Sermyagin // Zootechnics. – 2017. - № 3. – P. 7-12.

2. Ulimbashev, M. B. Reproductive abilities of black-and-white and Holstein cattle of different selection / M. B. Ulimbashev, Z. T. Allagirova // Zootechnics. – 2016. - № 4. – P. 28-29.

3. Correlations of the productive parameters of cows of black- and -white breed and reproductive qualities / G. Y. Berezkina, S. L. Vorobyeva, E. M. Kislyakova, A. A. Korepanova // Dairy and beef cattle breeding. – 2019. - № 7. – P. 39-42.

4. Kudrin, M. R. Reserves for increasing the duration of production use of cows and their milk productivity / M. R. Kudrin, S. I. Yevstafyev // Vestnik of Izhevsk state agricultural academy. – 2018. - № 2 (55). – P. 44-56.

5. Martynova, E. N. Milk productivity and longevity of highly productive cows depending on the blood relationship of Holstein breed / E. N. Martynova, V. Y. Yakimova // Perm agrarian vestnik. – 2019. - № 2 (26). – P. 128-136.

6. Milk productivity and reproductive qualities of cows of different lines in breeding farms of Kaluga region / N. M. Kostomahin, O. A. Voronkova, M. A. Gabedava, T. N. Pimkina // Main zootechnician. – 2017. - № 5. – P. 31-36.

7. Milk productivity and reproductive qualities of cows in Tyumen region / M. G. Volynkina, I. E. Ivanova, O. V. Kovaleva, N. M. Kostomahin // Main zootechnician. – 2018. - № 12. - P.3-10.

8. Kostomahin, N. M. Productive and reproductive qualities of cows depending on the degree of inbreeding/ N. M. Kostomahin, O. A. Voronkova, M. A. Gabedava // Main zootechnician. – 2019. - № 5. – P. 11-16.

9. Milk productivity and reproductive qualities of black- and-white cows of different genotypes / S. K. Abgaliyev, A. S. Shamshidin, A. Kharzhau, A. S. Alentayev, G. V. Rodionov, V. P. Popov // Competitive recovery of animal husbandry and staffing tasks: materials of XXV Worldwide research to practice conference, 24-25 June. 2019. – Podolsk, 2019. – P. 157-164.

10. Lubimov, A. I. Influence of different types of inbreeding on milk productivity and reproductive qualities of black-and -white breed/ A. I. Lubimov, V. M. Yudin, K. P. Nikitin / Agrarian Vestnik of Urals. – 2016. - № 5 (147). – P. 56-60.

11. Lyubimov, A. I. Reproductive qualities of cows depending on the linear affiliation and application of various methods of breeding selection / A. I. Lyubimov, V. M. Yudin, K. P. Nikitin // Innovative capacity of agricultural science of the XXI century: contribution of young researchers: materials of All-Russian research- to- practice conference, 24-27 October 2017 г. – Izhevsk, 2017. – P. 107-110.

12. Chabaeva, M. G. The use of various feed phosphates in the nutrition of freshly calved cows and young cattle / M. G. Chabaev, R. V. Nekrasov, A. M. Gadzhiev // Zootechnics. – 2015. - № 15. – P. 13.

13. Ulimbashev, M. B. Reproductive capacity and immunological status of Simmental and crossbreed cattle / M. B. Ulimbashev, A. S. Tkhashigugova, E. R. Gosteva // Investiya of Timiryazev agricultural academy. – 2015. – № 2. – P. 82-91.

14. Bulatov, A. P. Effectiveness of using complex additives in diets of lactating cows / A. P. Bulatov, Y. A. Karmatskih, N. M. Kostomakhin // Feeding of farm animals. – 2017. - № 6. – P. 3-11.

16. Biologically active substances in cattle feeding: educational book / R. V. Nekrasov, N. И. Anisova, A. S. Anikin, M. G. Chabayev. – Dubrovitsy : SSI ARSRIC RAAS, 2013. – 67 p.

17. Krasnova, O. A. Natural feed additive in feeding diets of first calf cows / O. A. Krasnova, E. V. Khardina // Scientific support for innovative development of agro-industrial complex of Russian regions: materials of worldwide research to practice conference, 06 February 2018 г. – Lesnikovo, 2018. – P. 799-802.

18. Krasnova, O. A. Productivity of black-and-white cattle when using a natural feed additive / O. A. Krasnova, E. V. Khardina, M. V. Loshkareva // Vestnik of Altay state university. – 2018. - № 4 (162). – P. 111-115.

19. Krasnova, O. A. Dihydroquercetin in dairy farming / O. A. Krasnova, E. V. Khardina, M. R. Kudrin // Main zootechnician. – 2019. – № 1. – P. 11-18.

20. Khardina, E. V. Physico- chemical properties and technological features of first-calf cows when including dihydroquercetin in diet / E. V. Khardina, O. A. Krasnova, S. A. Khramov // Perm agrarian vestnik. – 2019. – № 1 (25). – P. 137-144.

21. Production and processing of cattle products: monograph / M. R. Kudrin, O. A. Krasnova, E. V. Khardina, A. L. Shklyayev. – Izhevsk : RHS IzhSAA, 2019. – 160 p.

