E.F. Vafina, I.Sh. Fatykhov
Izhevsk State Agricultural Academy

LEVELLING THE YIELD OF SPRING RAPE WITH MINERAL FERTILIZERS

To determine the possibility of correcting the yield of spring rapeseeds on the sod-podzolic soils studies have been conducted on the use of micro fertilizers for the technology of the spring rap's raising for seeds. The scheme of field experiments included micro fertilizers - manganese sulfate ($MnSO_4 \times 7H_2O$), cobalt sulfate ($CoSO_4 \times 7H_2O$), zinc sulfate ($ZnSO_4 \times 7H_2O$), copper sulfate ($CuSO_4 \times 5H_2O$), a mixture of salts (Mn+Co+Zn+Cu), boric acid (H_3BO_3). As control options, they have been taken without and with water treatment. Micro fertilizers were used for pre-sowing treatment of seeds (3-4 days prior to sowing) and for treatment of plants in the budding phase. In the run of a separate experiment, the action of boric acid and zinc salt used in seed treatment took place, as well as plant treatment and double application (seed treatment and subsequent plant treatment) had been compared. In the control variants of the experiment with presowing treatment of seeds, epy rape has formed a yield of 1.15-1.16 t / ha. The use of boric acid, manganese salt, zinc, a mixture of salts allowed leveling the yield, which increased by 0.10–0.16 t/ha due to an increase in 6-8 PCs/m^2 of plant standing density just before harvesting, and 0.14–0.18 g of seed weight per a plant. Treatment of plants with MnSO4, CoSO4, ZnSO4, CuSO4, with a mixture of salts and with H_3BO_3 has positively leveled the seed yield by 0.06–0.07 t/ha, relative to the yield when micro fertilizers were not used. The increase in yield in these variants is due to the formation of more pods (43-44 PCs.) and seeds (558–563) on the plant. When comparing the methods of application of micronutrients, their equivalency over the positive correction of seed yield has been revealed. The use of zinc and copper salts has increased the fat content in rape seeds by 2.9–3.2 % with the seeds and by 1.8–2.6 % with the plant treated.

Key words: spring rape, levelling, yield, seed treatment, spraying plant, micro fertilize, fat.

Authors:
Vafina Elmira Fatkhullovna – PhD in Agriculture, Associate Professor of the Plant Production Department, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426069, Russian Federation, e-mail: vaf-ef@mail.ru).
Fatykhov Ildus Shamilevich – Doctor of Agricultural Sciences, Professor, Head of the Plant Production Department, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation, e-mail: nir210@mail.ru, tel. (3412) 58-99-64).

T. A. Babaytseva
Izhevsk State Agricultural Academy

INFLUENCE OF PRESOWING TREATMENT OF SEEDS ON YIELD AND SOWING QUALITY OF THE WINTER GRAIN CROPS

The results of studies are considered aimed at the development of technology of cultivation of winter crops for seed purposes with the use of pre-sowing seed treatment. The efficiency of etching

with chemical fungicides Fundazol, Dospeh, Bunker, Vial TT and Maxim in the production of seeds of winter wheat Moskovskaya 39 and winter triticale Izhevskaya 2 was also studied. Phyto-examination of the seeds prepared for sowing had been held, evaluated their strength of growth and the parameters of about-germs, determined germination and infestation of crops with root rot. The evaluation of the impact of this agricultural method on grain yield and sowing quality of grown seeds is given. According to the original method described by V.F Germanov, the infectivity of seeds, the strength of initial growth and the expected yield has been determined.

It was found out that etching the seeds with chemical fungicides helped to reduce the contamination of winter wheat seeds with pathogens of root rot from 36 % to 1–14 %, winter triticale – from 32 % to 0–22 %. The etched seeds had formed more powerful sprouts during germination and provided acceleration of emergency of the seedlings by 1-2 days. The most effective for the winter wheat have proved to be fungicides Vial TT and the Bunker, for winter triticale – Vial TT. In the application of these drugs there was an increase in germination by 14–17 % (LSD_{05} = 6 %), and their winter hardiness by 3-4 % (LSD05 = 3 %). By the time of wax ripeness phase, the defeat of winter wheat with root rots remaineed 14–20 % (with the control – 25 %), winter triticale – 22–23% (with the control – 30 %).

A significant increase in the yield of winter wheat – by 0.48 t / ha (or 15.5 %) has provided the seed treatment with fungicide Dospeh. Raised seeds had their germination energy of 92 %, laboratory germination of 94 %, weight of 1000 seeds 39.8 g. The expected yield from sowing these seeds appeared to be higher than those of grown with no etching, by 7 %. When growing winter triticale, high efficiency was shown by etching the seeds with a fungicide Vial TT. Increase of grain productivity was 0.42 t/ha (or 11.8 %). Seeds were characterized by high germination energy (95 %), laboratory germination (97 %), grain size (weight of 1000 seeds 43.3 g), low infection (8.8 %), and the expected yield was higher by 35 % than for sowing seeds of the control variant.

Key words: winter triticale, winter wheat, pre-sowing treatment, fidexperta of seeds, yield, infestation with root rots, strength of growth, expected yield.

Author:

Babaytseva Tatyana Andreyevna – Candidate of Agricultural Sciences, Associate Professor at the Plant Cultivation Department, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, e-mail: taan62@mail.ru).

A.N. Isupov, A.S. Bashkov
Izhevsk State Agricultural Academy

CHARACTERISTICS AND EFFECTIVENESS OF RAW GROUND LIME FROM THE FIELDS IN THE UDMURT REPUBLIC TO BE USED ON DERNO-MEDIUMPODZOLIC MEDIUMLOAM SOIL

Long-term studies are summarized of the influence of different doses of raw- ground lime from the Udmurt deposits on physical and chemical properties of derno-mediumpodzolic soil and its crop productivity. The results of long-term micro-field experience had been applied to. The aim of the research was to assess the effect of doses of raw lime from various fields of the Udmurt Republic on physical and chemical properties of derno-mediumpodzolic mediumloamy soil and the productivity of its crops. It is also shown that the introduction of raw lime into the derno-mediumpodzolic

mediumloamy soil improves physical and chemical properties of the soil. The use of raw- ground lime in varying doses quite differently reduced the acidity of the soil. Introduced lime dose of 0.5 G. K. had not lead to radical reduce of the acidity of the soil. Its effectiveness continued for four years, and then there was observed an increase in soil acidity.

Rising the lime doses from 1.0 at the G.K. to 3.0 by G. K. had reduced the soil pH from strongly acidic to neutral one. Annually, mineral fertilizes were introduced into the soil varied with raw-ground lime, commonly being able to acidify the soil infrastructure. It has been revealed that that raw lime having been introduced as much as 1.5 for G. K. in six years of its affection never raised the exchange acidity of the soil, and sustained it at the level of 5.8 un., and when at 3,0 G. K. at 6.2 un. thus remaining for ten years. Such efficiency is reasoned not only by the affection of raised doses of lime but also with various fractional composition of an ameliorant. Under the influence of soil factors, non-active particles > 1 mm (25 %) were being destroyed, gradually becoming involved in the neutralization of soil acidity.

Key words: derno-mediumpodzolic mediumloamy soils, mineral fertilizers, raw-ground lime, soil acidity, productivity of agricultural crops, agrochemical properties of the soil, fractional composition of lime, fineness of grind, the neutralizing capacity of the lime.

Authors:

Isupov Alexey Nikolayevich – Candidate of Agricultural Sciences, Associate Professor at Agrochemistry and Soil Science Department, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, e-mail: agrohim@izhgsha.ru).

Bashkov Alexander Stepanovich – Doctor of Agricultural Sciences, Professor at the Department of Agrochemistry and Soil Science, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, e-mail: agrohim@izhgsha.ru).

S.I. Kokonov
Izhevsk State Agricultural Academy

OPTIMIZATION OF AGROPHYTOCENOSES OF WINTER FODDER CROPS

In providing animals with high-quality balanced feeds, the creation of a solid fodder base is crucial. In the often-repeated droughts of the Middle Urals, one of the main directions for the implementation of the strategy for the development of field fodder production is the use of agrophytocenoses of winter fodder crops that provide fodder in the early summer period. The aim of the research is to increase the fodder productivity of winter fodder crops by optimizing the agrophytocenoses.

The article presents long-term studies of fodder productivity of winter rye and winter triticale with winter vetch at sowing with varing proportions of the meadow-grass and bean components. The following variants were studied: factor A – cereal component: A_1 – winter rye (6 mln pieces / ha of virgin seeds, 100 %, control), A_2 – winter triticale (6 mln units / ha of virgin seeds, 100 %). Factor B – norm of sowing components: B_1 – without winter vetch (control), B_2 – winter vetch (2.25 mln pcs / ha of virgin seeds, 75 % + 1.5 mln cereals, 25 %), B_3 – winter vetch (1.5 mln pcs / ha of virgin seeds, 50 % + 3.0 mln cereals, 50 %), B_4 – winter vetch (0.75 mln un. / ha of virgin seeds, 25 % + 4.5 mln cereals, 75 %). It has been established that agrocenoses of winter rye and winter

triticale with winter vetch during sowing with a sowing norm of 4.5 mln + 0.75 mln provide the highest fodder productivity of 7.75 t / ha of dry matter, 80.6 GJ / ha of the exchange energy, and 6,81 thousand / ha of feed units.

Key words: agrophytocenosis, winter rye, winter vetch, winter triticale, sowing rate, fodder productivity.

Author:

Kokonov Sergey Ivanovich – Doctor of Agricultural Sciences, Professor at the Chair of Plant Cultivation, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, tel. 8(3412)59 88, e-mail sergej-kokonov@yandex.ru)

O.V. Korobejnikova, T.A. Strot, M.P. Maslova, O.V. Esenkulova
Izhevsk State Agricultural Academy

EVALUATION OF POTATO VARIETIES OF DIFFERENT TIMELY RIPENING

In 2017–2018, on the experimental field of the Izhevsk State Agricultural Academy the research on the complex evaluation of potato varieties of different maturation periods was carried out. The aim of the research was to assess the yield and disease resistance of new and perspective varieties of potatoes with different maturation periods and suitable for cultivation in the Udmurt Republic. The tasks of the research were to determine the infestation of different potato varieties with diseases and pests during the growing season, and to calculate the biological yield and the coefficient of adaptability of the above varieties. We have studied 18 potato varieties differing in time of ripening. The survey of crops showed that by the end of the vegetation of 2017 all potato varieties had been affected with fitoftoros. Less infestation was observed in grade Alouett. In 2018, in potato plantings macrosporiosis was observed. The Colorado potato beetle damaged most potato varieties. When harvesting potatoes, the mass of tubers and the number of tubers in one bush were determined. On average for varieties, the number of tubers in a bush during the years of studies amounted 7 pcs. The average weight of one tuber in 2017 amounted 33 g, the mass of tubers from a bush 217 g. High yield have given the varieties of Bellarose (2.40 kg/m^2), Gioconda (1.84 kg/m^2), Red Fantasi (2.12 kg/m^2). In 2018, the weight of one tuber was 144 g. The mass of tubers from a bush 830 g. More productive were the early maturing varieties: Nandina, Red Sonja, Bellarosa, Rachoni; middle: Jelly, Captiva, Alouett; Red Fantasy and Cerate. During the two years of research, early maturing varieties (Ka = 1.09 and 1.15) were more adaptive to the conditions of the Udmurt Republic.

Key words: potatoes, varieties, maturity groups, phytosanitary condition, late blight, macrosporiosis, biological yield, diseases, pests.

Authors:

Korobejnikova Olga Valentinovna – Candidate of Agricultural Sciences, Associate Professor of Agriculture and Land Management Department, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, e-mail: korobejnikova.olga@inbox.ru).

Strot Tatyana Aleksandrovna – Candidate of Agricultural Sciences, Professor of the Department of Agriculture and Land Management, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, e-mail: tatyanastrot@yandex.ru).

Maslova Maria Pavlovna – Candidate of Agricultural Sciences, Associate Professor of the Department of Agriculture and Land Management, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, e-mail: mary.maslova2009@yandex.ru).

Esenkulova Olga Vladimirovna – Candidate of Agricultural Sciences, Associate Professor of Agriculture and Land Management Department, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, e-mail: o.w.esen@mail.ru).

M.R. Kudrin, S.I. Evstafiev
Izhevsk State Agricultural Academy

RESERVES TO INCREASE THE DURATION OF PRODUCTIVE USE OF COWS AND THEIR MILK PRODUCTIVITY

The article presents the results of the researches over maintenance of the cattle of different age and sex groups at different technologies of their maintenance. Technological operations and indexes of technological elements have been studied at maintenance of cows in a maternity section, of calves from birth to 20 days after birth in individual cages (preventive period), replacement heifers and bull-calves at the age of 6 months, replacement heifers at the age from 6 to 12 months, bull-calves at the age from 6 to 12 months up to coupling period and springer heifers, cows of control court, and cows of a productive group. The estimation of accordance is given to the normative indexes of sizes of stalls, of the feed table, of the feed and dung passageways, of drinking bowls, pasture grounds per a head of different половозрастных groups of the cattle at different technologies of maintenance. Actually, the square of areas per one animal on farms corresponds and even exceeds normative indexes. All this allows creating more comfortable conditions at the maintenance of the cattle as groups of different age and sex.

During the reconstruction or construction of new livestock facilities, the length and width of the stalls must be brought into compliance with the regulatory indicators and taking into account the size of modern animals. On the farm, between the constructions there are many empty spaces, so it is necessary to organize passage-runs for active exercising the repair heifers, springer heifers and cows. The servicing staff should be enlisted with the position of the driver to arrange and carry out the exercise to animals as per the developed schedule.

Key words: cattle; maintenance, feeding, milking, microclimate, milk, quality.

Authors:

Kudrin Mikhail Romanovich – Candidate of Agricultural Sciences, Associate Professor at the Department of Animal Food Processing, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation, e-mail: kudrin_mr@mail.ru).

Evstafiev Stanislav Igorevich – Master Student, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation).

M.P. Maslova, E.V. Korepanova, I.Sh. Fatykhov
Izhevsk State Agricultural Academy

REACTION OF FIBER-FLAX VARIETIES TO METEOROLOGICAL CONDITIONS OF THE MIDDLE URALS

In the article, the reaction of fiber-flax varieties to the meteorological conditions of the Middle Urals is studied. The object of research were flax varieties from the world collection of VIR and the national collection of VNIIL. The aim of study is to identify the reaction of fiver-flax varieties to the meteorological conditions of the Middle Urals. The objectives of the research included: to determine the meteorological conditions per phases of development of flax varieties; to define the closeness and the form of correlation between the economically valuable features of flax varieties and meteorological conditions as per the periods of vegetation; to calculate the regression equation of dependency of the yield of entire flax fiber upon the meteorological conditions during the «fir»-flowering. The arable soil layer of the experimental plots had an average and increased humus content (2,3–2,8 %); high and very high content of mobile phosphorus (156–372 mg/kg of soil). Exchanging acidity of the experimental soil was from very concentrated acid to closely neutral one (RNA – 4,0–5,7). It has been determined that cool (+16,9...+17,2 °C) and humid weather (67,9 mm), particularly during the first half of the flax vegetation (the period of «fir»-flowering) contributes to the formation of a relatively high yield of the entire flax all fiber 87–96 g/m^2, of seeds 111–133 g/m^2 with good technological indicators. For studied flax varieties: Voskhod, Sinichka and Tomskij 18, regression equations for calculating the yield of the entire fiber had been defined, with the account of meteorological conditions for the periods of vegetation determined.

Key words: fiber-flax, variety, entire fiber yield, productivity of long fiber, temperature, precipitation, index of environmental conditions.

Authors:

Maslova Maria Pavlovna – Candidate of Agricultural Sciences, Associate Professor of the Department of Agriculture and Land Management, Izhevsk State Agricultural Academy (16, Kirov Str., Izhevsk, 426033, Russian Federation, e-mail: mary.maslova2009@yandex.ru).

Korepanova Elena Vitalievna – Doctor of Agricultural Sciences, Professor of Crops of Plant Production Department, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation, tel. 8 (3412) 58-99-64, e-mail: nir210@mail.ru).

Fatykhov Ildus Shamilevich – Doctor of Agricultural Sciences, Professor, Head of the Plant Production Department, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation, tel. 8 (3412) 58-99-64, e-mail nir210@mail.ru).

A.A. Nikitin, S.I. Kokonov
Izhevsk State Agricultural Academy

PHOTOSYNTHETIC ACTIVITY OF SUDANESE GRASS DEPENDING ON SITTING CARE TECHNIQUES

Modern agronomic practice has a rich and diverse arsenal of techniques to manage the process of crop formation. All of them are aimed at creating favourable conditions during the period of maximum laying of organs. Modern technologies in agriculture pursue not so much the growth of

crop productivity as the increase in production efficiency. The objective of the paper is to develop and scientifically substantiate the methods of caring the sowings of the Sudanese grass, thus ensuring high feeding efficiency in the conditions of the Middle Urals. The article presents the results of studies for 2013–2016. Experiments had been laid in the JSC "Uchkhoz July IzhGSHA" on derno-medium podzolic medium-loamy soil. The content of humus in the arable layer was from low to high (1.6–3.3%), of labile phosphorus 87–279 mg / kg of soil, and the exchanging potassium (144–359 mg / kg of soil – from the average to very high, exchanging acidity – from weakly acid to closely neutral one (pH_{KCl} 5.1–5.7). The results of the research have proved the tendency of photosynthetic activity increase in plants of Sudanese grass against the background of soil coiling after sowing, while the dry matter gathering has increased in average by 0.18 t / ha. The highest yield of dry matter (5.24 t / ha) was obtained by complex harrowing over the shoots, and feeding of N_{30} on the base of post-sowing packing the soil to follow. The correlation analysis held has revealed a direct strong correlation of the yield of dry matter with the photosynthetic potential and with the net productivity of photosynthesis (r = 0.72...0.95 where 0.5 = 2.12, and tf = 4.16...12.59).

Key words: Sudanese grass, techniques for caring crops, gathering of dry matter, photosynthetic activity of plants.

Authors:

Nikitin Aleksandr Aleksandrovich – Candidate of Agricultural Sciences, Associate Professor at the Department of Agriculture and Land Management. Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation, e-mail: aanikitin_0@mail.ru).

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

N.Yu. Petrov[1], V.P. Zvolinsky[2], E.V. Kalmykova[1], O.V. Kalmykova[1]

[1]Volgograd State University

[2]FBNU Prikaspiysky Arid Federal Research Center of the Russian Academy of Sciences

DEVELOPMENT OF THE INTEGRATED SYSTEM OF INCREASING THE QUALITATIVE CHARACTERISTICS OF TOMATO FRUIT AT IRRIGATION IN THE CONDITIONS OF THE LOWER VOLGA REGION

Tomatoes are the main culture in the whole world, vegetable farming of the Lower Volga region included. The effect of macro- and microelements on the process of accumulation of sugars, organic acids and of vitamin C in tomato fruits under conditions of dripping irrigation was studied. At the same time, optimal dosages were recommended to the industry as well as combinations and timing of macro and micro fertilizing favouring the accumulation in the fruit of the largest content of nutritiously valuable metabolites - sugars, dry matters and vitamin C, contributing to the improvement of production quality. High doses of nitrogen-phosphorus-potassium fertilizer have favored accumulation of sugars in ripe fruits of tomatoes. The introduction of microelements against the background of the principle fertilizer has intensified their effect. The microelements' greatest effect has proved to demonstrate at a single (before the onset of technical maturity of the fruit) and a double (in the flowering phase and before the onset of technical maturity of the fruit as well as in the phase of mass fruit formation and before the onset of technical ripeness of the fruit) spraying

the plants. Nitrogen and phosphorus fertilizers, especially their high doses were rising the intensity of accumulation of the ascorbic acid. This has also been contributed by a single spraying of tomato plants with solutions of the boron, cobalt, zinc at the phase of mass fruit formation and two-fold spraying at the flowering phase, and before the onset of technical ripeness of fruit, as well as at the phase of rapid fruit formation and before the technical ripeness of the fruit. Introduction of basic fertilizers has greatly contributed to an increase in the content of dry substances in tomato fruit. Their greatest accumulation occurred when high doses of nitrogen and phosphorus fertilizers had been applied to. Microelements introduced against the background of basic fertilizers, especially in the flowering phase and before the onset of technical ripeness of the fruit, have created an additional increase in the number of dry substances. Macro and micro fertilizers have contributed to an increase in the yield of tomatoes. The introduction of basic fertilizers led to an increase in yield by 20, 1...79, 3 %, and the use of microelements against their background - by 20, 1...92, 2 %.

Key words: tomato, macro and microelement, accumulation of sugar, dry substances, vitamin C, dripping irrigation.

Authors:

Petrov Nikolay Yurievich – Doctor of Agricultural Sciences, Professor, Professor at the Department of Technology of Storage and Processing Agricultural Raw Materials and Public Catering, Volgograd State Agrarian University (26, Universitetsky Ave., Volgograd, 400002, Russian Federation, tel. (8442) 41-10-79, e-mail: tehnolog_16@mail.ru).

Zvolinsky Vyacheslav Petrovich – Doctor of Agricultural Sciences, Professor, Academician at the Russian Academy of Sciences, FBNU Prikaspiysky Arid Federal Research Center of the Russian Academy of Sciences (8, p. Solenoye Zaimische, Chernoyarsky District, Astrakhan Region, 416251, Russian Federation).

Kalmykova Elena Vladimirovna – Candidate of Agricultural Sciences, Associate Professor at the Department of Chemistry, Food and Sanitary Microbiology, Volgograd State Agrarian University (26, Avenue University, Volgograd, 400002, Russian Federation, tel. (8442) 41-18-35, e-mail: kalmykova.elena-1111@yandex.ru).

Kalmykova Olga Vladimirovna – Candidate of Agricultural Sciences, Senior Lecturer at the Department of Technology of Storage and Processing of Agricultural Raw Materials and Food, Volgograd State Agrarian University (26, Universitetsky Ave., Volgograd, 400002, Russian Federation, tel. (8442) 41-10-79, e-mail: tehnolog_16@mail.ru, lelya.kalm.90@mail.ru).

A.G. Ipatov, V.I. Shirobokov, S.N. Shmykov
Izhevsk State Agricultural Academy

INFLUENCE OF A HIGH-SPEED LASER HARDENING OF A SEPARATING SIEVE UPON THE HAMMER GRINDER'S OPERATION

In animal husbandry, the greatest attention is paid to forage production – ensuring high digestibility of feed with minimal economic costs. In particular, it concerns the preparation of fodder crops by crushing, using hammer grinders that have proved themselves at minor- and medium-size agricultural enterprises. The most vulnerable units of hammer grinders are the operating parts – hammers and sieves. The issues of rising their operating resource are relevant, especially the resource-saving conditions. The aim of this paper is to describe the effect of laser thermal hardening on the efficiency of a separating sieve of the hammer grinder DKR-5M. The object of the study is a separating sieve of the hammer grinder DKR-5M. To analyze the state of separating sieves after having been tested, the methods of physical analysis were used – metallographic studies of the sieve hardening zone and determination of microhardness in the laser thermal hardening zone. In order to determine the effect of thermal hardening on the efficiency of the separating sieve, micrometric studies of worn out holes had been held, on the basis of which the lessening in relative tear and wear of hardened holes by more than 10 % was reached. Results of the studies have ensured visual presentation of the implementation of self-sharpening effect of a cutting wedge at the boundary of the sieve's hole due to structural gradiency in the thermal-hardened zone. The researches done to determine the microhardness confirm the fact. The hardness in the thermal treated zone exceeds the hardness of the base-frame by more than 80 %, and thus makes 720 kg/mm^2. The performed studies on the effect of thermal hardening on the performance of a hammer grinder evidence an increase in the efficiency of processing the material by the parameter P3 (residues on the screen) by 22 %. Thus, the presented research results allow to judge of prospects of the separating sieves' hardening for hammer grinders.

Key words: thermal hardening, laser radiation, hammer grinder, cutting wedge, tear and wear, separating sieve.

Authors:

Ipatov Alexey Gennadievich – Candidate of Technical Sciences, Associate Professor at the Department of Operation and Repair of Vehicles, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation).

Shirobokov Vladimir Ivanovich – Candidate of Technical Sciences, Associate Professor at the Department of Operation and Repair of Vehicles, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation).

Shmykov Sergey Nikolayevich – Candidate of Economic Sciences, Associate Professor at the Department of Operation and Repair of Vehicles, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation).

P.V. Dorodov[1], N.V. Guseva[1], M.M. Kiselyov[1], G.M. Mikheyev[2]
[1]Izhevsk State Agricultural Academy
[2]Institute of Mechanics UD of RAS

ON THE METHOD OF DISPLACEMENT OF THE INTERFERENCE PATTERN BY THE INJECTION CURRENT OF THE SEMICONDUCTOR LASER

The present article is devoted to experimental research methods of the stress state, temperature, strain gauges where there is the problem of automatic account of the interference fringes. To solve this problem, a technique and installation have been worked out thus operating as follows. A parallel beam of laser light enters the temperature sensor, is reflected from the front and rear surfaces, then enters the photodetector, which forms the interference pattern. When the sensor temperature changes due to its deformation, the optical path difference of the rays reflected from the front and rear faces changes also.

Key words: thermometry, strain measurement, the interference pattern, the laser, the injection current.

Authors:

Dorodov Pavel Vladimirovich – Doctor of Technical Sciences, Professor at the Department of Theoretical Mechanics and Resistance of Materials, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation, e-mail: pvd80@mail.ru).

Guseva Natalia Viktorovna – Senior Teacher at the Department of Theoretical Mechanics and Resistance of Materials, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation).

Kiselyov Mikhail Mikhailovich – Candidate of Technical Sciences, Engineer at the Department of Theoretical Mechanics and Resistance of Materials, Izhevsk State Agricultural Academy (11, Studencheskaya Str., Izhevsk, 426069, Russian Federation).

Mikheyev Gennadi Mikhailovich – Doctor of Physical and Mathematical Sciences, Head of the Laboratory, Institute of Mechanics of the Ural Branch of RAS (34, T. Baramzina Str., Izhevsk, 426067, Russian Federation).