

## ANNOTATION

**Kirpa M. Ya., Skotar S. O., Bazilyeva Yu. S., Styurko M. O. Stages of development and scientific achievements in postharvest handling and storage of maize seed.** The history of the domestic industry postharvest handling and storage of seed corn hybrids includes six stages. The stages correspond, establishment of agriculture in Ukraine, the evolution of grain in it, peculiarities of selection and seed corn. In the history of the Institute during its existence remains the leading scientific institution – coordinator of research and development work in the area of post-harvest handling and storage of seed corn. Creations of the technology, methods, techniques, means, rules, are constantly used in corn processing plants in seed farms, design organizations, industry and contributed to the development of domestic production of seeds of maize hybrids.

The first stage covers the period 20–30 years last century and is connected with the common organization of farms, the emergence of collective ownership. Were published scientific works of the Institute of maize, which presented the first results of experiments with drying corn ears.

The second stage of development of the industry associated with the widespread introduction of combine harvesting crops and covers the period 30–50's. Were deployed extensive experiments to study the timing of collection, drying and processing methods grains of high humidity. Especially large-scale experiments were conducted at the Institute, which since 1930 began operating a laboratory drying and storing grain under the direction of A. Repin. It made a number of important scientific and practical provisions for food and feed, seed grain. Designs corn dryer different sizes that were universal and meet the conditions of drying grain of different crops – sorghum, cotton, castor bean, peanut, soybean, sunflower, grain crops, melon seeds and vegetable.

The third stage of development of the industry accounts for 50–80-ies. In connection with the plan-ting of maize hybrid seeds, which required a new system of seed production, construction of factories specialized corn processing concentration near them seed growing farms with hybrid and varietal seeds. Became topical research and development of industrial technology acquisition and processing corn hybrids and their methods of storage, including insurance and reserve funds established methods of assessing the quality of the seed. Therefore, since the construction of the first plants (1956) were started at the Institute of studies that studied parameters of industrial processing and laws drying corn directly in terms of the plant. Developed new pre-sowing treatment techniques that included the use of film-forming compounds and growth activating agents. In addition, the proposed methods of calculating similarities based on quality indicators.

The fourth stage of development the industry lasted from the 80's to the 90's., built a series of plants tested new equipment (thresher, versatile grain separator, calibrating machine, operated hopper, sorting table) constructed two-chamber corn dryer and mechanized line capacity of 100 tons seed. Studied biological and physico-mechanical properties of the parental forms of hybrids of grain corn as decoration objects, set their thermal stability and signs of separation. Researched hygroscopic grain in the process of maturing and drying, the dependence moisture recoil of physical and mechanical properties: hardness, volume, mass, performing grains. It is shown that sowing could significantly affect the collecting moisture corn – it changed to 0,5–0,8 % at sowing time shift for 1 day.

To reduce energy costs developed new ways of drying – two-stage, intense and reuse coolant. Much attention is paid to the development of research methods of storage, including creating various reserves – insurance and reserve funds.

During the period 1990–2000, can be described as the fifth stage of history of the industry. Established new patterns formation seeds of maize hybrids in the process of ripening, harvesting, drying, separation and storage. Discovered value hydrothermal coefficient (HTC) and terms of harvesting hybrids with the highest certified seed yield, calculated the structure of energy consumption and heat balance chamber dryers and studied regime separation in different grain separators, found ways of storing – chemical protection seed. The technology of cleaning-drying corn hybrids under the "right-factory" from different seasonal harvesting capacity and volume.

After 2000 and to date can be identified as the sixth stage of the industry. The main areas of research was the development of innovative technical and technological methods of improving seed quality and reduce energy consumption in the process of harvesting, post-harvest handling and storage of corn hybrids. The methods of separation and peculiarities injury corn hybrids, mechanized methods of its prevention, defined methods and modes of preparation sugar type. The regularities of formation of hybrid corn seed germination during their maturation, the factors that affect the similarities in the process of harvesting and postharvest handling. It was shown harvest moisture level that corresponds to the conditioning seed germination of corn hybrids of different maturity groups established their heat resistance. The influence factors freezing (low temperature, exposure, humidity) on germination and growth of seeds and power of corn hybrids. For the first time theoretically grounded way of direct energy saving drying, preserving a high germination power and growth. The method of intensification and reduction of energy consumption in the dryer chamber type. Novel methods for determining seed germination of maize on the basis of the variables germination temperatures and conditions at modeling sowing period-east. Relevant dwell research aimed at improving postharvest handling and quality of seeds in terms of seed plant.

Carried out development work, developed a technical and technological scheme postharvest treatment of seeds of grain crops, including corn, the new mechanized line, optimum methods and options clearing-sort-seed enriching. A technical-technological concept of building optimized corn processing plant design capacity of 50 ths. tons of seeds per season. – P. 16–21.

**Satarova T. M., Filipov H. L., Abrahimova O. E. *The investigations on physiology and biotechnology in the Institute of Agriculture of Steppe Zone of NAAS Ukraine.*** The formation, development and further perspectives of fundamental and applied researches in the laboratory of biotechnology, physiology and breeding methods of SE IASZ NAAS are delighted in the article. The laboratory team provides the theoretical investigations on plant physiology, cell and genetic engineering, DNA-technologies and simultaneously fulfills the biotechnological insuring of maize breeding process. During past years the ecological and physiological model of a drought resistant maize hybrid was elaborated, the methods of selection of maize breeding material on the tolerance to stress conditions (drought, chill, heat, high density, layering) were developed. The great attention in the laboratory is paid to the development of the methods of breeding material complex estimation for adaptive resistance. For the representatives of different maize germplasms the technologies of callus tissue production, plant regeneration in vitro, suspension cultures, the production of haploids and double haploids in anther culture, for getting additional generations in embryo culture were developed by the laboratory staff. For years of the laboratory activity the basic foundations of maize cell selection on the resistance to abiotic factors were elaborated; altogether with the laboratory of early maize hybrids breeding the technology of rapid production of maize homozygous lines by matroclinic haploidy and genetic marking was developed. The investigations on maize genetic transformation for callus tissue of native lines and hybrids and the investigations for molecular estimation of initial and elite breeding maize and sorghum material are carried out. – P. 22–27.

**Klisha A. I., Kulinich O. O., Korj Z. V. *Selection of legumes: results and prospects.*** The article presents the results and main directions of breeding legumes in the Institute of Agriculture steppe zone and its breeding research stations. An origin and economic characteristics of varieties of legumes that have been created in the Institute are shown.

Selection work with leguminous at the Krasnogradsky Experimental Station began in 1934, but due to the war was interrupted for a while. After the cessation of hostilities, breeding work at the Krasnogradsky research station was restored in year 1944.

The starting material for breeding legumes were evacuated in 1941 from Krasnogradsky research station, that were local varieties and breeding, agronomic samples from the collection of VIR, natural and artificial hybrid population. Great importance for creation and selection of the starting material had contacts with scientific institutions in the western regions of Ukraine, including Lviv State University, who helped to create the collection of different forms.

In selection of leguminous crops at different times was involved: S. I. Chornobryvenko, O. P. Borozenets, K. Koval, M. F. Konovod, A. I. Suvora, Y. F. Kirichek, A. I. Klisha, M. Petrik, G. T. Bershak, L. G. Bilyavskaya. Scientific basis of selection were laid by Professor S. I. Chornobryvenko. Simple, and complex hybridization, individual and individual-group selection of the best plants remain the main methods for breeding. In recent years began to introduce chemical and physical mutagenesis coupled with hybridization and selection. Using these methods, the breeders Institute of agriculture of Steppe zone and its breeding research stations brought fruitful varieties of peas, grass pea, beans, chickpeas, soybeans, lentils, spring vetch, registered in many regions.

The most high yielding from registered varieties of legumes are peas. However, by collecting protein from 1 hectare of sown area, and by stability of yield top ranks of crop is grass pea. Best food grain quality are: lentils, beans, chickpeas. In this regard it should be noted that along with the peas must be propagated drought-resistant crops such as the grass pea, chickpeas, lentils.

Now legumes breeding aimed at creating high-yielding, drought-resistant, resistant to diseases and pests, high-quality varieties, for feed and human consumption. In the selection of crops used new approaches of rational selection of pairs for hybridization and matching parent components of elite plants by marks that closely correlate with productivity, also will be used the methods for accelerated breeding of new varieties.

The main aims of our work is to improve drought resistance of peas plants for it there will be involved in hybridization different germplasm of genetic sources material from Syria, Iran, Afghanistan and China. As for grass pea – it is important to create breeding material with a rounded form of seeds to improve flowability and cooking time of grains, for dry beans – to create small-seeded varieties bush shape type suitable to mechanical harvesting, and for lentils – the work will be focused on small-seeded forms as a drought resistant compared to large-seed varieties. – P. 27–32.

**Cherenkov A. V., Kompaniets V. O., Palchuk N. S., Pryadko Y. M. *Agricultural and technological aspects of effectiveness improvement of winter wheat cultivation in northern Steppe of Ukraine.*** The objective of this paper is to provide rationalization for ways of winter wheat grain production in the northern Steppe of Ukraine effectiveness improvement on the base of introduction of progressive elements of cultivation technology, associated with selection of forecrops, sorts and development of sustainable fertilization program.

As an information background of our complex analysis, there were the results of experimental studies for 2011–2013, that have been carried out in the State Enterprise “Research farm property “Dnipro” of the state institute-on – Institute for Agriculture of Steppe Zone of NAAS of Ukraine.

The carried out economic analysis demonstrates that during 2011–2013, the winter wheat sorts cultivation was profitable after all the forecrops and at all the studied backgrounds of nutrition. In addition, we have confirmed the provision that under the northern Steppe conditions, the dead fallow has indisputable economic advantages in comparison with other forecrops. Thus, the level of winter wheat grain yield, produced at dead fallow surpassed at

check similar data of other forecrops by 1,5–1,7 times. On the base of economic calculations, we have established that in case of the winter wheat seeding at crop rotation into the dead fallow, the reserves of wheat hectare profitability growth at the account of resources saving on a product ton basis and sale of more qualitative products (II class) at higher price was: 1,3–3,9 thousand UAH/ha in comparison with seeding after soy and 2,0–4,3 thousand UAH/ha – after summer barley (depending on sort and nutrition background). At the same time, in recommended cases, the level of the winter wheat grain production at dead fallow profitability was up to 84,0–102,9 % in comparison with after soy seeding with profitability performance profile at the level of 72,6 %, and after summer barley – just 54,9 %.

The best response to the forecrops and nutrition background selection demonstrated such sorts as Rozkishna and Zira, cultivation of which provided the best economic efficiency indices. At the same time, the lowest indices were obtained at cultivation of Zamozhnist sort. Thus, at the dead fallow the winter wheat sort Rozkishna productivity was 12–18 % higher in comparison with other sorts. In most cases of cultivation after soy, this increase was 3,7 to 16,2 % and after summer barley – 3,1 to 15,4 %.

The sale of yielded Rozkishna wheat grain resulted in 5,7–6,5 thousand UAH of net profit per hectare, whereas in case of Zira sort cultivation – 4,6–5,1 thousand UAH/ha, and Zamozhnist – 4,2–5,0 thousand UAH/ha depending on nutrition background. As a result, according to the profitability indices, the sorts Zira and Zamozhnist conceded to Rozkishna by 15,2–18,0 and 18,3–22,9 p.p. respectively.

Similar trend is also observed at comparison of the studied sorts in case of their cultivation after nonfallow forecrops; the only difference is that in case of winter wheat sorts seeding at crop rotation after soy and especially summer barley there have been observed considerably lower indices of yield and economic efficiency.

During the study period, the effectiveness of application of various options of nitrogen nutrition differed depending on forecrop. Thus, among the studied fertilization programs, in terms of provision of yield increase and economic return, we determined as the most effective the following options: in case of cultivation in dead fallow – background  $N_{30}P_{30}K_{30} + N_{30}$  in thawed and frozen soil (yield – 4,85–5,54 t/ha, net profit per hectare – 4,98–6,32 thousand UAH, profitability level – 84,0–102,9 %); after soy – background  $N_{45}P_{45}K_{45} + N_{30}$  in thawed and frozen soil +  $N_{30}$  locally at boot stage (yield – 3,75–4,29 t/ha, net profit per hectare – 3,01–4,06 thousand UAH, profitability level – 55,4–72,6 %); after summer barley – background  $N_{60}P_{60}K_{60} + N_{30}$  in thawed and frozen soil +  $N_{60}$  locally at boot stage (yield – 3,50–3,96 t/ha, net profit per hectare – 2,26–3,16 thousand UAH, profitability level – 40,3–54,9 %). – P. 32–38.

**Filippov G. L., Cherchel V. Y., Maksimova L. A. Selective and genetic evaluation of corn genotypes towards improving the competitive capacity of plants in crowded agroecosystems.** One of the most important parameters of agroecosystem which determine the achievement of the maximum potential of hybrid genotype is the optimum plant density which can be determined by various schemes of sowing. Preeminently the adjustment of parameters of plant density in maize agroecosystem determine further increase of its yield in production. Therefore, we proposed for a long-term prospective the different agrophysiological model of drought-resistant maize hybrid in steppe, which included parameters which seemed incompatible: not to decrease the plant density of crops, but vice versa – to increase it through the use of earlier maturity hybrids.

For the successful implementation of increased density crops into maize production technology it is necessary to synthesize the source material that is resistant to higher plant density, and the prerequisite of this is an appropriate methodological support. As a result of exploratory studies in the laboratory of biotechnology, physiology and breeding methods of SE IASZ NAAS there was developed, and then improved the method of selection of stress-tolerant breeding forms that have kept natural, usual for the wild progenitor inherent ability to exist in a multicomponent high plant density biocoenosis.

For leveling of root system competition in the top layer of soil between adjacent plants in a row the plastic cylinders (10,5 × 12,9 cm) were used. Each seed of initial breeding forms is sown isolated in such cylinders, which leads to the creation of provocative background to identify the valuable in terms of competitiveness genotypes. In one of the options the seeds were treated with bacterial preparations diazofit, phosphoenteryn and biopolitsyd.

As a result of observations a different competitive ability of samples was revealed depending on genetic origin. The breeding forms selected in restricted feeding area conditions have shown stable yield advantage compared with the control on 0,6–22,3 %. The forms that have passed selection on the background of complex of bacterial preparations have shown even more positive result if compared with the control – 3,1–27,1 %. The observed response is likely associated with the selection of genotypes, the root system of which is subject to intense symbiotic relationships with a set of soil bacteria.

Thus, the use of new provocative analyzing backgrounds with the limited feeding area as well as seeds inoculation with ground beneficial bacteria will allow improving the identification of genotypes with combined resistance to higher plant density of crops, tolerant to moderate feeding and able to cooperate effectively with the complex of rhizosphere soil bacteria. – P. 38–44.

**Kramaryov S. M., Artemenko S. F., Isayenkov V. V. The phosphate's state of different cenoses of usual black-soils in north Steppe of Ukraine.** It was conducted a comparative valuation of content of movable phosphorus' forms in usual black-soils on the virgin land and on the tillage. It was established that close to optimal is content of movable phosphorus' forms only in the arable soil's stratum. For providing with high yields on the usual black-soils it's necessary to apply the phosphorus' fertilizers as on the other types of soils. – P. 44–56.

**Tkalich Y. I., Tkalich I. D. Results of research into root system of winter wheat, corn, sunflower and buckwheat in the steppes of Ukraine.** A good development of embryonic and nodal roots of plants is an important condition for obtaining high yields of winter wheat. Plants have the most developed root system and high yield capacity when the soil moisture is optimal (60 % of maximum water capacity) and if sown in due time. Nitrogen, in its turn, enhances the physiological activity of roots and the aerial growth and increases yield, while phosphorus and potassium have a better effect on the growth of the mass of roots than on the aerial growth. Thus the physiological activity of plants is weakened, they die prematurely and hence their yield capacity is low.

A positive effect of nitrogen on the development of the root system and aerial mass of winter wheat was observed in the field experiments. On the soil lots with the introduction of  $N_{90}$  the weight of dry roots of 100 plants in the phase of full ripeness was 67 g,  $P_{90}$  – 50,3 g and in control – 53,0 g; the weight of the aerial part of a plant was 358,4; 208,3 and 246,7 g, and the grain yield was 3,86; 2,99 and 3,02 t/ha, respectively.

It should be noted that the terms of sowing have a significant effect on the development of the root system. In the field experiments, when sowing winter wheat on the 25<sup>th</sup> of August, the dry weight of the roots of 100 plants at the end of the autumn vegetation period was 21,4 g, when sowing on the 24<sup>th</sup> of September – 6,7 g; on the 25<sup>th</sup> of October – 0,6 g, in the phase of full ripeness it was 56,7 g; 49,9 and 26,4 g, and the root system penetrated to a depth of 250; 250 and 180 cm, while the weight of the aerial part of a plant was equal to 591; 614 and 496 grams respectively.

Experiments with corn have shown that plants of this crop properly grow and develop if they have well-developed embryonic and nodal (secondary) roots. The main and lateral roots appear during germination of grain. Their number is 4–12 pieces and they support the vitality of the plant till it completely forms its nodal roots. In dark chestnut soils, the roots of early-season hybrid Dniprovsky 160 MV sown with a row spacing of 70 cm reached the depths of 181 cm by the end of the vegetation period. In ordinary black soil, the roots of early-season hybrid Dniprovsky 187 MV were found at a depth of 175 cm, the roots of Slavutych 214 SV – at a depth of 190 cm, of Dniprovsky 358 MV – 220 cm and of Dniprovsky 476 MV – 230 cm with a height of plants reaching 180 cm, 198, 220 and 241 cm respectively and the radius of root spreading of 76 cm, 87, 110 and 120 cm.

Lifting of the root system of sunflower was carried out in the flowering stage. It was established that before the specified phase started the roots had time to penetrate into the soil to a depth of over 2 meters and spread in different directions to 1 m. In the crops with the row spacing of 70 cm, they gradually penetrated into the soil between the rows and reached the neighboring rows. The basic amount of skeletal roots moved 15–20 cm away from the row and then headed into the thickness of the soil environment. The main root penetrated to a depth of 235 cm with growing toward the row spacing, and the number and abundance of roots significantly decreased with their deepening into the soil. In the crops with the row spacing of 30–35 cm, the roots from one row quickly penetrated into the nearby row and used the soil there. Since plants with such density are placed in a row and on the sown area more evenly, they consumed moisture more effectively. In the crops with the row spacing of 35 cm, most of the roots (70–80 %) were centered at a depth of 60 cm and with the row spacing of 70 cm – at a depth of 50–55 cm. When growing sunflowers with narrowed row spacing, we managed to achieve more even distribution of plants in the area, as a result the root systems of plants better used the soil and penetrated to a depth of 2,6 m which provided increase in yields by 0,35 t/ha.

The root system of buckwheat in the conditions of the Steppe is much smaller than that of the above crops. The research has shown that when growing Lyubava variety in rows (15 cm), the individual roots penetrate to a depth of 125–135 cm by the end of the growing season which is 12–20 cm deeper than in the crops with the 45 cm row spacing. Most roots are concentrated in the 0–50 cm layer.

Thus the results of the research suggest that the most productive varieties and hybrids have better developed root systems and it is possible to improve their development in the conditions of the Steppe through irrigation, tillage, fertilizing, compliance with the terms of sowing and carrying out other agro-engineering activities. – P. 56–65.

**Tsilyuryk A. I., Sudak V. N., Sapka V. P. Productivity of shot crop rotation, depending on the systems on the background tillage stubble mulching continuum.** In the current economic conditions are self-repairing most rational system of agriculture involving alternative sources of mineral nutrition of plants, such as the use of stubble residues pre-decessor, providing increase its fertility and restoration of the natural soil black soil in agrocenoses. Management and distribution of plant remains on the surface of the field is regulated primarily improvement of basic methods and cultivation which is a fundamental aspect of any growing technology field crops in different farming systems.

At the beginning of spring field work in the fields of crop rotation consisted favorable density in all tillage systems: plowing – 1,09–1,17 differentiated – 1,12–1,23, shallow soil (mulching) – 1,23–1,29 g/centimeter<sup>3</sup>. For shallow soil (mulching) cultivation due to the reduction of the loosening to 12–14, 14–16 cm marked sealing layer (0–30 cm) on 0,12–0,14 g/centimeter<sup>3</sup>, which does not exceed the optimal parameters density for cultivation of crop rotation (1,30 g/centimeter<sup>3</sup>).

As the results of research moisture reserves in the soil before sowing of crops was higher than the shallow soil (mulching) and differentiated tillage systems on 7,1–8,5 mm and 3.2 mm, respectively, compared to plowing, due to the presence of mulch in the fields of crop rotation, which protects the soil surface from physical evaporation. Especially effective is the use of chiseling cultivation for shallow soil (mulching) and differentiated system that

contributes to the accumulation of moisture on 91,0–179,0 m<sup>3</sup>/ha in autumn and winter by plant remains that delay more snow, especially in the heat with little snow winter.

For the impact on yield of winter wheat, corn and sunflower cultivation different systems (plowing, differentiated, shallow soil (mulching)) in shot crop rotation were almost equal except spring barley, where the system of shallow soil (mulching) cultivation yielded differentiated depending on the background of fertilization on 0,21–0,22 t/ha and plowing – 0,19–0,40 t/ha due to increased weed-infested crops in shallow disking system (mulching) cultivation, as well as the significant amount of windfall and leafy weight predecessor (sunflower) on the surface of the field.

The use of different tillage systems ((plowing, differentiated, shallow soil (mulching)) in 5 fields grain-steam-tilled crop rotation on indicators of productivity is equivalent except variants without fertilization, where shallow soil (mulching) system yields for differentiated and plowing 4,0–6,2 %. The use of fertilizers in moderate doses greatly increases the productivity of crop rotation on 9,1–13,6 %, especially in shallow soil (mulching) cultivation of more stringent baseline mineral nutrition of plants they grow and exceed 14,0 %.

Minimizing tillage when growing of field crops provides an opportunity optimize operating costs for soil tillage, in particular provide economy fuel and energy resources at use chiseling at 7,0–8,3 l/ha. cultivation soil – 13,8–22,1, disking – 15,7–17,6 l/ha, which ultimately has a positive impact on the growth of net income and equivalent levels of profitability to 81,3–121,0 %. – P. 66–72.

**Cherenkov A. V., Zhelyazkov O. I., Khorishko S. A., Kozelskiy O. M. The photosynthetic activity of plants winter wheat depending on processing methods of cultivation in the northern Steppe of Ukraine.** The aim of the research was to establish the parameters of the photosynthetic activity of the modern sorts of winter wheat (Pysanka, Skarbnitsya, Apogej Luganskij), depending on the predecessors and level mineral nutrition. According to the scheme of experience feeding of ammonium nitrate and carbamide-ammonia mixture (CAM) was carried out in the tillering phase in autumn and spring, as well as frozen-thawed soil. In the phase of earing foliar fertilizer plant was carried out with solutions of CAM and urea.

The largest area of leaves, wheat plants are formed in the earing phase. Since the beginning of the resumption of the spring growing season to the phase earing the largest area of leaf surface winter wheat formed on the variants of the experiment, which provided the background of mineral fertilizers in the form of CAM, followed by dressing in a phase of tillering in spring. Thus, the average for the years of research on these areas for growing winter wheat on fallow maximum leaf area formed crop sort Skarbnitsya, after pea and sunflower – Pysanka. Area assimilation surface thus was 58,3; 51,8 and 45,9 thousand m<sup>2</sup>/ha.

Among the options with different levels of mineral nutrition, smallest assimilation acreage mentioned in the control variant of the experiment. Depending on the sort, when grown on fallow this indicator average for the years of research ranged 42,8–45,6 thousand m<sup>2</sup>/ha, after peas – 37,1–40,2 thousand m<sup>2</sup>/ha, after sunflower – 34,4–37,0 thousand m<sup>2</sup>/ha.

It was found that the highest amount of chlorophylls "a" and "b" was observed in plants of winter wheat, sown on the fallow. It should be noted that such pattern was observed in all phases of plant development during the spring-summer growing season. Thus, in the period of tillering in the spring, the amount of chlorophyll in winter wheat sort Pysanka, depending on the level of mineral nutrition, was 8,80–9,30 mg/g, at sort Skarbnitsya – 8,27–10,03 mg/g, at sort Apogej Luganskij – 9,39–9,80 mg/g. When grown winter wheat after pea size of this index was 7,59–8,50; 8,27–8,78; 8,39–8,55 mg/g, after sunflower – 7,59–8,12; 7,96–8,25; 7,90–8,14 mg/g respectively.

With the further development of winter wheat in the plant chlorophylls "a" and "b" content gradually increased. Their maximum total quantity in leaves of plants was noted in the earing phase, on options with the introduction of the background, followed by fertilizer fertilizing CAM in the phase of tillering in spring. On average for years of research at cultivation on fallow in sort Pysanka of this index was 12,53 mg/g, at sorts Skarbnitsya and Apogej Luganskij – 12,57 and 12,47 mg/g, respectively. At placement of crops after peas and sunflower content of chlorophylls "a" and "b" in the above variant was 10,85; 10,61; 10,53 and 10,17; 10,07; 9,98 mg/g respectively.

On average for years of research high photosynthetic potential were marked on the variants of the experiment, which was designed to make the background of mineral fertilizers, followed by nitrogen fertilizing in the spring phase of tillering. Among the nitrogen fertilizer, more efficient in the formation of this index was the CAM.

At cultivation on on fallow photosynthetic potential was the highest at crops of a sort Skarbnitsya – 2,64 m<sup>2</sup>-days/ha, after peas and sunflower – at sort Pysanka, respectively, 2,21 and 2,15 m<sup>2</sup>-days/ha.

According to the research connection was established a reliable link between the photosynthetic potential and yield of winter wheat ( $r = 0,601–0,635$ ), which is substantially dependent on the sorts, predecessors and level of mineral nutrition. – P. 73–77.

**Kyrpa M. Y., Skotar S. A., Roslyk O. A. Influence of modes and regimes of separation on sowing and har-vest properties of seed corn hybrids.** Level corn crop is largely depends on sowing qualities of seeds. In the process of preparation of seed material, operations of cleaning and sorting play an important role.

It should be noted that the separation of corn provides a greater number of operations compared to other crops.

The elements of separation are a number of consecutives operations of cleaning, sorting and calibration;

they

are conducted with regard to quality, purity, homogeneity smoothing of seeds. Sorting – calibration has the greatest influence on seed quality among these operations.

The aim of the work was to determine the effect of different ways of sorting – calibration on the fractional composition, sowing qualities and harvest properties of seeds of different corn hybrids.

It is studied the seeds of corn hybrids such as Dneprovsky 181 SV, Borozensky 277 MV, Yarovets 243 MV, Khmelnytsky, selection of agricultural Institute of steppe zone.

In experiments it is determined some influence of sorting scheme – calibration on sowing qualities and harvest properties of seeds. Based on the fractional composition it is investigated various schemes of calibration: I – on sieves with round holes, II – on sieves with round and oblong ones. By sorting on sieves with round holes got 3 different seed factions by quality (large, medium, small) by this the seed quality was improved with increasing seed size and seed width. During calibration by the scheme II at first seeds were divided into two sown groups (sieve Ø 8,0 – triage; sieve Ø 8,0 – passage), then from them got also 6 fractions on the sieves with oblong holes, the quality of which varied depending on the type-size of sieves. Sieves were selected depending of fraction composition of particular hybrid seeds.

In determining fractional composition of the hybrid seeds it was found that the main fraction of sowing material was formed on the sieves Ø 8-7 mm and its content ranged 47,7–82,4 %. The content of seed fractions by the type-size over Ø 8 mm and less than Ø 7 mm changed depending on the hybrid; for example in Dniprovsky 181 SV, it was practically the same. For hybrid seeds Yarovets 243 MV typical was growth of content of a large fraction, and for hybrid Khmelnytsky – small fraction.

During calibration by the scheme II seed quality was formed under the influence of separation, that is, it was defined by width and thickness of grains. On the example of hybrid Yarovets 243 MV it was found that the basic seed fraction obtained by passing the grain mass through the sieves  $\neq$  6–5 mm as during a separation of seed group I (trriage – sieve Ø 8,0), and – group II (passage – sieve Ø 8,0). The content of the main fraction was 50,0 and 65,3 % respectively. Output of a large fraction reached 12,3 and 16,1 %, and small – 22,4 and 33,9 % respectively sowing groups.

It was revealed new features of separation of seed corn hybrids in sort mode - calibration. Depending on the form of grains it was recommended two schemes of calibration: I – involves calibration on the basis of "width of grains" on the sieves with round holes Ø 9–6 mm and forming of three seed factions, as a rule, by this scheme more qualitative and productive seeds are concentrated in fractions I and II.

For relatively flat seeds it was recommended the second scheme of calibration: on the first stage should involve sieves with round holes and form two sowing groups, on the second – sift each group on the sieves oblong holes and receive by this, as a rule, 6 fractions. It was recommended to calibrate seeds with rounded form by the scheme I in a sort mode that is on the sieves with round holes. Type-size of the sieves should not be permanent they should be selected, taking into account, forms, linear sizes, weight of seeds. – P. 78–81.

**Krasnenkov S. V., Dudka M. I., Chaban V. I., Nosov S. S., Berezovskyi S. V. Behavior of corn hybrids influ-enced by plant population increase in the Northern Subzone of Ukraine's Steppe.** Density of planting is an important element of corn cultivation technology. It influences significantly growth processes, commencement of the main periods of development and thus hybrids vegetation period duration. Planting density depends, in the first place, on soil and climate conditions of a particular zone and morphobiological features of hybrids.

It has been established that both corn seeding density decrease and increase result in sharp fall in harvest. Subject to researches performed before, in rainfed conditions of the northern subzone of Ukraine's steppe it is recommended to cultivate early-season corn hybrids for grain with pre-harvest planting density amounting to 55–60 thous./ha, middle-early: 40–45 thous./ha; mid-season: 35–40 thous./ha; middle-late: 30–35 thous./ha.

The problem of optimization of number of plants on area is especially important if plants are cultivated under conditions of changing moisture, which is a particular feature of the steppe zone. It was found that unfavorable climatic elements display during critical periods of plants development significantly restricts realization of their genetic producing ability potential.

Probability of average yield (3,4–4,1 t/ha) of a planting, depending on the part of the steppe zone, is 29–42 %; probability of under-average and poor yield is 27–37 %. Moreover, conditions of corn vegetation period significantly influence not only growth processes but also those of metabolism, reflecting on chemical composition of grain, which is very variable.

Constant updating of district-oriented hybrids list and climate aridity increase during the last years requires improvement of some elements of technology of cultivation of various biotypes of corn, including their behavior under conditions of planting density increase.

On the basis thereof, our work is aimed at determination of an optimal pre-harvest planting density of corn hybrids of various maturity groups for rainfed conditions of the northern subzone of Ukraine's steppe, relation between changes in chemical composition and quality of grain depending on planting density.

The research was conducted within 2012–2014 years at Erast Experimental Station of the State Establishment, the Institute of Agriculture of Steppe Zone of the National Academy of Agrarian Sciences of Ukraine. Soil of the area under investigation is common thin-humous loamy chernozem, contents of organic matter

in plowing layer amounts to 4,0–4,2 %. Research methods used were field and laboratory experiments. They have been carried out pursuant to the generally accepted methodologies.

We performed various researches and found that corn hybrids productivity depended greatly on hydrothermal conditions of vegetation periods, maturity groups of hybrids and planting density. It should be noted that the year 2013 was a year of the best realization of hybrids potential: in 2013 yield excess amounted to 1,5–5,0 times, in comparison with 2012 and 2014. Such excess resulted from favorable moisture during blossom and pollination periods.

We made a comparative analysis of hybrids productivity data for the last three years and determined optimal pre-harvest planting density figures for various hybrids, which are as follows: hybrids Pochaivskiy 190 MB and Yarovets 243 MB – 50 thous./ha, hybrid Krasyliv 327 MB – 40 thous./ha, hybrid Bystriysia 400 MB – 30 thous./ha.

Display of drouthy phenomena during blossom and pollination periods restricted realization of hybrids' genetic producing ability potential. In 2013, when moisture conditions were relatively favorable, corn hybrids' reaction to planting density increase was positive.

Grain productivity was definitely growing with the following planting density figures: 60–70 thous./ha for early-season and middle-early forms and 50–60 thous./ha for mid-season and middle-late biotypes in comparison with seeds of decreased planting density (40–30 thous./ha). We observed 15–18 % lowering of these figures under drought conditions of 2012, 2014 with maximal planting density amounting to 70–60 thous./ha. We observed the least influence of such principle on productivity of mid-season hybrid Krasyliv 327 MB.

In corn cultivation high nutritive value, showing the content of mineral elements, protein, starch etc., is of great importance. Corn is a high-yielding plant and it requires sufficient supply of nutrients to the soil.

Chemical composition of main products and by-products of corn characterizes conditions of nutrition during active vegetation and yield formation. We analyzed chemical composition of grain gathered in various years and found that content of principal nutritional elements varied a lot, which demonstrated individual reaction of corn biotypes to planting density increase under contrast weather conditions.

Elemental composition and grain quality indexes were within genetically determined parameters for the plant. We observed a tendency to increase of nitrogen and potassium content in grain of full-season corn hybrids. Phosphorus content fluctuations were less significant.

Full-season biotypes had a higher content of protein. A tendency to 0,3–0,6 % planting density lowering was observed under conditions of planting density increase per unit of area. Content of starch, fat and fibre was changing insignificantly. – *P. 81–86.*

***Solodushko M. M. The productivity of winter cereals depending on precursors and sowing in the Steppe zone.*** The results of research in 2009–2011. To determine the productivity of winter cereals in the conditions of Steppe Ukraine. Shows the yield of wheat, barley, rye, triticale and winter depending on precursors and sowing.

Grain farming is a strategic and Ukraine in recent years, the most effective sector in terms of national production. The demand for grain on-duktsii always been quite high in both the domestic market and abroad, as well as growing high yields of winter grain crops and increase their gross charges remains a priority in the development of domestic agriculture.

In the performance of treated task is to make a comparative analysis of the yield of winter cereals – wheat, barley, triticale and rye depending on precursors and sowing in a northern Steppe of Ukraine, which in most years is characterized by the hard hydrothermal regime preplant period can not get friendly and timely early shoots of winter and optimum sowing time.

Field experiments were conducted in 2009–2011 Sinelnikovskaye on selection and experimental station of the Institute of Agriculture steppe zone in the rotation NAAS laboratory technology of growing winter crops. We studied the different intensity of winter wheat varieties Selianka (Universal), Smuhlianka (high intensity), Zira (napivintensyv-nyy); winter barley – Myroniv's'kyi 87; rye – Kharkiv's'ke 98; triticale – Papsuiev's'ka. Winter crops sown in early (Sep-tember 5–7), optimal (20–22 September) and late (3–5 October) terms after three predecessors – black couple, peas and sunflowers.

Analysis of weather conditions during the tests showed that they were quite different than the temperature regime, and on rainfall during the growing season of winter crops. The most favorable for growing winter crops was in 2010, which provided obtaining maximum yields for the duration of the experiments. Least favorable weather conditions prevailing in 2009, when during the spring and summer growing season there were quite long periods bezdoschovi (April, June) due to high temperature, which adversely affected the general condition and performance of plant winter crops.

The results of the research the most fruitful of winter grain crops are sown in those predecessors that were studied, was winter wheat. Moreover, high intensity grade Smuhlianka ensure the absolute highest performance in the experiment – for sowing of different terms in both the black pair, and after peas and sunflowers.

By growing on black pair maximum performance of various grades of basic cereal formed at sowing 20–22 September (4,93–5,51 t/ha). However, after the peas and sunflower harvest the most important winter wheat, respectively 4,28–4,88 t / ha and 3,14–3,31 t/ha was obtained at a later date of sowing – 3–5 October.

Most plastic less demanding to sowing, rye and triticale were winter, the difference in yield between early and are better (depending on the predecessor optimal or later) sowing, which provided the highest yield of grain, varied, for example, after growing sunflowers – from 10 and 4%, respectively.

Of particular note is winter rye varieties Kharkivs'ke 98, the yield of which was high enough for different growing conditions, due to increased resistance of plants to abiotic factors, tolerance to major diseases and, in particular, resistance to lodging and shattering grain ear. It is possible to obtain average yield of barley under cultivation in black and after a couple of peas at 4,66 and 4,38 t/ha, respectively, which exceeded the performance of certain varieties of winter wheat (Selianka, Zira) the data predecessor. Moreover, when grown after winter rye sunflower received the highest average grain yield (3,20 t/ha) among others headed winter crops, which were studied in the experiment.

The lowest yield of winter crops in all predecessors and sowing barley was winter. A more effective when it was growing late sowing in terms: by placing on a pair of black maximum grain yields were 3,52 t/ha after peas – 3,18 t/ha after sunflower – 2,60 t/ha in compared with winter wheat, rye and triticale under predecessor was lower by 21–36 %, 21–29 % and 2–20.

Thus, winter wheat is the most productive cereals in the Steppe zone. Proper selection of varieties and compliance with technical requirements can receive consistently high grain yield in almost all predecessors. A significant increase in the reserve harvests products in the steppe zone belongs zhytu winter, which generally yields the yield of winter wheat, but is dominated by this indicator triticale and barley winter. With high adaptive capacity, the ability to form crop under different growing conditions, rye, compared with other crops, provides better results at sowing in neparovyh predecessors in earlier periods. – P. 87–91.

**Tkalich I. D., Bochevar O. V. Effectiveness of herbicides in chickpea crops.** It is established that to destroy weeds in chickpea crops better to use the soil herbicide harness, 2,5 l/ha and if necessary at the beginning of growing season the weed sprouts spray by herbicide betanal Ex-pert, 1/ha.

The researches were conducted during the 2012–2013 in conditions of experimental farm "Dnipro" SI Institute of Agriculture of Steppe zone. Soil of test plots – ordinary chernozem with humus content of 4,2 %, nitrogen – 2,2 mg/100 g of soil, phosphorus – 10,5; potassium – 11,3 mg/100 g of soil. Predecessor of chickpeas – winter wheat after corn. Soil preparation included the stubble ploughing to a depth of 7–8 cm plowing to 25–27 cm, in early spring harrowing of plowed soil, pre-sowing cultivation to 6–8 cm. Chickpea was sown by seeder C3-3,6 (seeding rate 0,6 million of germinated seeds/ha) at 10–12 °C of soil temperature that was a calendar time of 23 and 25 April. Chickpea variety Rosanna was grown. Accounting area of plot was 21 m<sup>2</sup>, with three replications.

The weather conditions in both years of research were adverse, that negatively affected the growth and development of chickpea plants and formation a grain yield.

Farming measures significantly influenced the weed infestation of chickpea crops. In experiment the most infested with weeds was a control variant without application of herbicides. In this variant on 1 m<sup>2</sup> of cultivated area there were 12,0–17,4 pcs., and dry mass of weeds was 244–314,3 g/m<sup>2</sup>. When making at before pre-sowing cultivation the herbicide treatment by harness (rate of application 2,5 l/ha) the number of weeds in chickpea crops decreased to 4,9–7,2 pcs./m<sup>2</sup>, and their air-dry weight – to 42,5–75,5 g/m<sup>2</sup>. High weeds infestation also were in plots with ladder after pre- and post-emergence harrowing.

Effective was also application of Harnes in pre-sowing cultivation (2,5 l/ha) and additionally of herbicide betanal Expert (1 l/ha) spraying chickpea plants at height of 15–20 cm. Relatively to control, the number of weeds in this variant decreased in 3,5–4,1 times and amounted 3,4–4,2 pcs./m<sup>2</sup>, and indices of their air-dry weight decreased in 6–9 times (35,3–40,7 g/m<sup>2</sup>). Processing chickpeas only with betanal Expert have contributed to reducing the number of weeds in crops on average by 47,6 %, and their air-dry weight – by 29,7 %. Worse was the effect of herbicides zenkor Liquid and lentagran Kombi. Before harvesting in chickpea crops were grown mainly weeds such as redroot amaranth, ragweed, lamb's-quarters, barnyard grass, water pepper, bearbine, yellow foxtail, but in the variants their species composition changed not significantly.

Analyzing the crop structural indicators revealed the positive effect of chemical weed control in chickpea crops. Most tall-growing chickpea plants were formed application of herbicide Harnes in pre-sowing cultivation (2,5 l/ha) – 49,6 cm or harness + additional spraying chickpea plants with insurance herbicide betanal Expert (1 l/ha) – 50,5 cm. In these variants, the number of pods per plant exceeded the control indices respectively by 8,1 and 9,6 pcs., and weight of 1000 grains increased by 17,9 and 24,1 g.

The highest chickpea grain yield obtained in variants with using only the soil herbicide harness, and also additional spraying with insurance herbicide betanal Expert – 1,38 and 1,45 t/ha. Spraying chickpea plants with herbicides betanal Expert, lentagran Kombi and zenkor Liquid provided chickpea grain yield formation at 1,15–1,20 t/ha, which is 0,16–0,21 t/ha more than in the control variant. At mechanical weeding by harrowing of chickpea crops in period before emerging crops and in the phase of 3–4 leaves, the grain yield increased by 0,17 t/ha.

Thus, in a 2012–2013 the most effective methods of weed control in chickpea crops were chemical measures. In variants of application the soil herbicide Harnes in pre-sowing cultivation (2,5 l/ha) or additionally spraying chickpea plants with insurance herbicide betanal Expert (1 l/ha) the grain yield increased to 0,39–0,46 t/ha. But the last preparation should be used in chickpea crops only after it registration. – P. 91–94.



**Gyrka A. D. Influence of sowing time, seeding rate and mineral nutrition on spring wheat productivity.**

Quoted the results of studies on the effects of sowing time, seeding rate and mineral fertilizers application on the characteristics of productive moisture using by crops, the level of water consumption by sowings and the formation of structure yield elements of spring wheat in the Northern Steppe of Ukraine. – P. 94–98.

**Cherchel V. Yu., Gaydash O.L., Tagantsova M. M. Morpho-biological characteristic of mixed germplasm maize inbred lines in the Steppe of Ukraine.** The focus of our research was to obtain new highly heterotic parent mate-

rial of mixed germplasm and make its comprehensive assessment for the breeding of early maturity maize hybrids.

We have selected 11 samples of inbred lines that were developed based on hybrids of foreign breeding.

All the test inbred lines were classified as “high” according to the height of plants; during the years of testing their height ranged from 155,6 to 189,5 cm on average.

The inbred lines considerably differed by the height of plants but were characterized by values permissible for cultivation regardless of year of testing.

The height of ear position in the studied inbred lines was  $56,7 \pm 5,6$  cm with fluctuations from year to year from 47,9 to 67,7 cm.

Biometric factors of the lines basically meet the needs of production which suggests a possibility of their use as parent components of early maturity hybrids.

During determination of the earliness of ripening of the samples and of duration from germination to flowering of 50 % of ears, the studied set of inbred lines showed no big differences in this indicator which was  $56,1 \pm 1,36$  days on average with a fluctuation of 53,4–57,1 days from year to year. The samples with minimum and maximum average values of the length of this period were identified.

The studied inbred lines differ considerably in their ripening period, but in certain years this difference may be somewhat negated. 3 samples among the inbred lines that were studied are included into the State Register of Plant Varieties Suitable for Distribution in Ukraine. The analysis of the parameters of combining ability of the studied inbred lines in terms of their display of GCA effects was carried out.

3 parent lines, namely DK285, DK314 and DK281, were determined as the basis on which the maximum number of new inbred lines was obtained.

According to the results of comprehensive assessment of the 11 test inbred lines, the mid-early maturity inbred lines DK281 and DK314 were identified as sources of high combining ability in terms of grain yield and earliness and the middle-late maturity inbred line DK285 was shown as a source of stable high combining ability. For the next breeding cycles, inbred line DK281 should be used as a check for early ripening and inbred line DK285 – as a check for combining ability. A complex analysis of the morphological and biological parameters of the parent inbred lines indicates the advisability of preliminary careful selection of components for programs on development of new inbred lines suitable for drought conditions. – P. 99–104.

**Gorschar O. A., Pedash T. M. Microflora of winter wheat seeds as a source of root rot infection in conditions of northern Steppe.** Well known that as a source of root rot infection, except soil and plant residues, may be also seeds. Literary data indicates that the seed can be transmitter of fungi infection mainly of the genus *Helminthosporium*, *Fusarium* and *Alternaria*. About the *Ophiobolus*, *Pythium* and *Cercospora* root rot, it was established – pathogens of these diseases are not transmitted by seeds.

The meaning of seed infection in root rot restoration of varies in different climatic zones.

Therefore the purpose of our study was to determine the proportion of seed infection in root rot restoration in conditions of northern Steppe of Ukraine.

To determine the total microflora and germinative capacity of seeds in 2008–2010 in the laboratory of plant protection of the Institute of Agriculture of Steppe zone were analyzed the seeds of five varieties of winter wheat (Ukrainka odes'ka, Zamozhnist', Kuyal'nyk, Zira, Liona) by the biological method according to the conventional techniques. The seeds were grown in a moist chamber in the paper rolls for 7 days at temperatures of 20–25 °C. To identify and compare each of superficial and internal infection the one variant of seed (variety Kuyal'nyk) we previously treated with medical alcohol.

As shown the laboratory analysis of samples the germinative capacity of seeds in variants of experiment were as follows: 2008 – 80,7–91,0 %; 2009 – 86,7–94,7 %; 2010 – 85,0–92,3 %.

Rainy weather during the ripening and harvesting period in 2008 and 2010 contributed to the spread the seed diseases of winter wheat. So, it affection depending on the variety in 2008 was 34,7–56,3 %, 2009 – 27,0–51,3 %, in 2010 – 37,0–58,0 %.

Over the years of research on the affected seeds the most quantitative were spore formation of fungi genus *Alternaria* – ranging from 18,7 % on kernels of variety Ukrainka odes'ka in 2009 to 61,3 % – Liona in 2010.

Species of *Fusarium* were determined, depending on the variety, on the 0,7–10,7 % of affected kernels. At least amount (0,0–2,0 %) in seeds were presented fungus *Bipolaris sorokiniana*, the pathogen of *Helminthosporium* root rot.

On some samples were affected the coleoptile (within 0,3–4,0%), indicating the superficial type of affecting by the *Helminthosporium* or delicate superficial affecting by the *Fusarium*.

The obtained data indicates that after disinfection the germinative capacity of seeds decreased for 1,2 and affection – for 3,5 times. On seeds treated with medical alcohol, compared with the variant without disinfection, affection by the *Alternaria* species decreased for 4,2 times, and fungi of the genus *Fusarium* is increased for 1,7 times. The fungus *Bipolaris sorokiniana* was not determined.

Based on the above stated, we can conclude that the germinative capacity of seeds, affection and composition of seed microflora of winter wheat depends on the characteristics of the variety and weather conditions, settled during the ripening and harvesting period. It is established that from the epiphytic and endophytic microflora of winter wheat seed the largest proportion took *Alternaria* sp. But literature data suggest that this genus of fungus on wheat grain as a factor of root rot development have no practical significance.

Thus, in conditions of northern Steppe of Ukraine, during the years of researches, the winter wheat seed as a source of root rot infection had no significant importance. – *P. 105–108.*

**Belikov E. I., Kuprichenkova T. G. Determination of values selection sister maize lines in various climatic conditions.** An important reserve of increase of gross collection of grain corn is to increase the stability of yields. Among measures to help stabilize grain production, an important role of hybrid genotype. To address the complex unfavorable environment it must have sufficient adaptive properties expressed: refrigerants, heat- and drought resistance, tolerance to diseases and pests and endurance to other stress factors.

The aim of our study was to conduct a comparative assessment of the totality of basic economic features 8 sister lines related IKS 2173421 S, line which is the parent shape simple early hybrid Diana 180 SV.

Experiments were conducted on Sinelnivkivska Breeding and Rozovsky research stations (RRS) DU Institute of Agriculture NAAS steppe zone of Ukraine in 2011–2013. Farming is common for this area. Land area was 9,8 m<sup>2</sup> with three times repetition.

Weather conditions prevailing during the studies were varied. Optimal weather conditions for growing corn observed in Sinelnivkivska breeding in 2011 and 2013, slightly dry – on Rozovsky RS in 2013, and drought – on Sinelnikovskove breeding in 2012.

Hydrothermal factors years of research have provided significant variation in plant yield  $V = 15,8–32,0$  % of evaluated samples indicates the presence of this material genotypes with increased resistance to drought.

Overall, the study for the period 2011–2013 allocated lines ILK 366-14, ILK 212-25, ILK 212-26 and ILK 212-7 that provided by 2,6–3,1 t/ha seed, which exceeded at 0,2–0,7 t/ha on average value of experience and 0,1–0,6 t/ha level signs in IKS 2173421 S.

The calculated drought indices (DI) made it possible to differentiate the level of material resistance to drought. Among the estimated sampling line ILK 212-14 and ILK 212-21 characterized the average drought – DI = 0,61–0,79, while others are not attributed to the drought-resistant.

In contrasting conditions of plant growth and development all the lines have been able to reach their genetic potential for yield formation, but at the time of collection they had different grain moisture. High she was on Sinelnikovskove breeding 2011 in line ILK 212-14 and ILK 212-25 – 17,2–19,7 % and in 2013 line ILK 171-12, ILK 212-26, ILK 212- 7 and ILK 212-21 – 16,8–19,4 %. Other lines in these conditions characterized by low (12,1–16,0 %) harvest grain moisture. In unfavorable conditions in 2011 reduced the value of all the lines of this feature to the level of 10,1–12,9 %. In Rozivskiy RS high water-retaining capacity (16,4–17,4 %) had lines ILK 171-12, ILK 212-7, ILK 171-11, ILK 366-14. The remaining lines did not exceed 15,9 %.

Highly plastic and intense drought line ILK 212-7, ILK 212-25, ILK 212-26 have the advantage of yield formation in changing growing conditions and limited and homeostatic before, but with low ILK 212-21. It has properties at low competitive yield formation in these conditions.

Calculation of the selection criteria value (SC) and the selection index values (SIV) evaluated lines allowed to hold their ranking on the studied traits. As in the first and in the second case, the line ILK 212-7 occupied a leading place in the rank number, the parameters of her values were the highest – SC = 605,2 points, and the SIV = 12,59 points. So, this line is characterized by high yields formation at considerable stability of its implementation in various environmental conditions. High breeding value as established for lines ILK 212-26, ILK 212-25, with a score of ILK 366-14 SC = 415,4–330,0 SIV = 7,81–6,13 and scores. In the ordered number they held 2–4 seats.

Thus, as a result of studies found that in high yield and low grain harvest moisture of the best lines related IKS 2173421 C were lines ILK 212-7, ILK 212-26 and ILK 212-25. These lines will be involved in a program of simple hybrids nursing to improve profitability simple early hybrid Diana 180 SV. – *P. 108–112.*

**Chaban V. I., Podobed O. U. Entering of microelements into the soil with sideline products of agricultural in the rotations of steppe zone.** Chernozems of steppe zone have a high content of microelement's total forms (ME), however the mobility of the individual elements is low, that can limit productivity of agricultural crops and product quality. In conditions of manure usage reduction as the main source of ME to the soil, attract the attention of plant residues. However, the content data of the ME in the straw and field crops cormophyte weight of the steppe zone of Ukraine is limited. The purpose of research – definition of agricultural crops structure of ME, as part of the elements balance in crop rotations, with its plowing the soil.

In the preparation of article there was treated with an array of analytical data of trace-element composition of the vegetative mass of wheat, barley, peas, corn and sunflower for the last 25 years. Data received in the stationary experiments steppe zone of Ukraine. Use standardized methods of analysis of the plant material. The soil cover ordinary chernozem, typical chernozem with humus content 4,0–4,2 and 4,8–5,0 %. Objects of researches: 8-

course grain-fallow a crop rotation and 5-course grain a crop rotation with a ratio between stubble and row-crop cultures as 50:38 and 60: 40 %, accordingly.

Indicators of ME content in the side products are genetically determined with concentration gradation characteristic of each culture. The degree of their accumulation by straw and cormophyte weight in weight is reflected with functional value of elements and selectivity of absorption. The general feature of cultures is the highest level of receipt, first of all biogenic elements (Mn, Zn). Under their quantitative contents distribution ME in a commodity output of barley, peas, corn looks like:  $Mn > Zn > Cu > Ni > Co$ ; wheat –  $Mn > Zn > Ni > Cu > Co$ ; sunflower –  $Zn >$

$Mn > Cu > Ni > Co$ . Also the essential deviation of ME contents from average values are marked: for zinc it has made 1,8–4,0; manganese – 2,1–11,0; copper – 2,3–6,0; cobalt – 1,9–3,8; nickel – 2,0–4,8 times. The level of ME accumulation essentially differed with collateral production and depending on biological features of cultures. Under contents Zn and Cu, that in 2–6 times more, than the corn and sunflower (12,4–13,2 and 3,52–5,12 mg/kg) dominate over straw wheat and barley. High value of accumulation Mn characterizes cormophyte weight of corn. Proceeding from the data under ME contents, with the vegetative rests in ground can arrive: 10–64 g/ha zinc, 15–93 g/ha manganese, 2–15 g/ha copper, 4–11 g/ha nickel, 1,9–4,7 g/ha cobalt. Thus the greatest quantity of biogenic elements (Zn, Mn) is introduced to the mass of cormophyte sunflower and corn.

Calculations of balance ME in 8-course grain-fallow a crop rotation on the absolute control indicate, that it was sharply negative, especial for Zn and Mn which deficiency reached 85,9; 79,7 and 14,6 g/ha. The systematic termination of early spring crops straw for crop rotation did not lead to a reduction of the deficit. It remained at the level of unfertilized option (83,2; 79,1; 14,6). Only due to the additional revenue from the biomass of cobalt and nickel, there negative balance was reduced by 29 %.

Taking into significant excess of biogenic elements content in cormophyte weight of sunflower and corn, we performed simulation of the formation conditions of the ME balance with the seal by-products of crop rotation. The received data suggest that increased parameters of compensation for their losses by introducing elements from the entire biomass. Although the balance elements has remained negative, but zinc deficiency decreased to 22, copper – 32, manganese – 47 %, while cobalt and nickel – 71 %. Similar regularity was also typical for 5-pole grain crop rotation (34, 52 and 58 %). Also, there was a decrease deficit of nickel and cobalt in the 76–79 %. – P. 112–117.

***Sudak V. M. The effectiveness of minimum tillage and fertilize when growing winter wheat on a clean fallow.*** For agriculture Steppe are relevant issues connected with the development of methods of soil, mulch cultivation moisture preserve in crop rotation short rotation, use of crops grown stubble remains at moderate doses of mineral fertilizers.

The article presents the results of a four studies that show that the use of shallow mulch tillage when growing winter wheat on a clean fallow of improving the structural causes of cernozem condition, particularly an increase in the plow layer number of the most valuable agronomic fractions (10–0,25 mm) before sowing culture to 86,1–88,5 %. Besides mulch tillage (disking, cultivating tillage) improves the water regime of soil compared to deep plowing on ploughland. Absolute numbers of productive moisture content in the layer 0–150 cm at restoring spring vegetation wheat depending on basic soil fallow equaled: 198,8 plowing, disking 213,4; 209,9 mm cultivating tillage loosening. These values are 83–89 % of field capacity limit for conventional heavy black soil particle size distribution. In addition to the advantage cultivating tillage cultivation same time contribute to the growth of weed-infested crops of winter crops, which requires in some years making insurance herbicides in the technological cycle works. An important factor which influences the level of performance culture is the weather. Note that for the most favorable weather conditions was 2014, when the April-May fell to 175,6 mm of rain (2,1 normal). Combined with moderate temperature and relative humidity is positively influenced the growth, development and the formation of high-performance winter wheat. Extremely dry weather observed in 2012, especially during the third decade of april, the first and second decade of may. During this period the temperature deviation from the average long-term performance reached +6,7–7,9 °C and relative humidity in some hours it was reduced to 18–21 %, which resulted in the inhibition of growth processes cereal. The relatively favorable growing season for wheat was observed in 2011 and 2013.

According to the research the average yield of winter wheat on a clean fallow of power depending on the background option in plowing equal 4,97–5,22 t/ha, disking – 5,0–5,36, cultivating tillage loosening soil – 4,88–5,27 t/ha. Note reduce plant productivity by plowing cultivation (compared to disk and cultivating tillage) on fertilized plots in 2013 and 2014, due primarily to the reliance of crops in the phase of milk and wax ripeness. In 2011 and 2012 proved more productive wheat, which is grown by plowing cultivation, due mainly lower weediness of crops. The greatest decrease in productivity of crops by early fallow of observed natural (now fertilizers) background that gives grounds to suppose probability of negative impact is on the growth and development of plants of other factors (soil nutrient regime, fitotoksichnist stubble residues etc.). According to averaged data, plowing soil (25–27 cm) making  $N_{30}P_{30}K_{30}$  help additional 0,25, disk (10–12 cm) – 0,36, and cultivating tillage spring soil loosening (early steam) (12–14 cm) – 0,34 t/ha of grain from entering  $N_{60}P_{30}K_{30}$  respectively 0,17; 0,36 and 0,39 t/ha. According to calculations, the increase in production costs when applying plowing does not always pay off an additional harvest of grain, which affects the cost and profitability of production. Instead, shallow tillage in winter

wheat (disk, cultivating tillage) provides significant fuel economy (21,9–28,6 l/ha) and the highest profitability within 97–102 %. – P. 117–120.

**Gyrka A. D., Sydorenko Yu. Ya., Iliencko O. V., Bochevar O. V., Kulyk I. O. Farming measures of stabilization the spring wheat grain productivity in Northern Steppe of Ukraine.** Taking into consideration the lack of knowledge of the effects of current farming elements to growing modern varieties of spring wheat in dry conditions Steppe of Ukraine, it is feasible to develop the agrobiological farming techniques aimed at improving the efficiency and stabilization of environmentally sound grain products. In this regard, relevant, in our view, is to identify the most effective ways of acclimatization the spring wheat plants to drought conditions by optimizing the sowing time, seeding rate, depth of seed placement, system of plant protection and mineral nutrition as consistent with agrobiological requirements of crops.

The study was conducted at the Erastivka Experimental Station of the Institute of Agriculture of Steppe zone of NAAS during 2009–2011, according to generally known methods. Soil of experimental field – ordinary chernozem, lowhumic, loamy. The humus content in arable soil layer (0–30 cm) – 4,0–4,5 %, total nitrogen – 0,23–0,26 %, phosphorus – 0,11–0,16 %, potassium – 2,0–2,5 %, pH of water extract – 6,5–7,0.

Field experiments with spring wheat were laid in six-field crop rotation after predecessor winter wheat on a background of different rates of NPK: without fertilizers and  $N_{40}P_{20}K_{20}$ . Seeding rate was 4,5 million of grains/ha. In experiments seeded varieties of spring wheat: Kharkivs'ka 27 and Kharkivs'ka 30 and included variants of application: growth stimulators (humisol, fumar and emistym); plant protection system (vitavaks 200 FF; tilt 250 EC; agat 25-K and granstar 75), depth of seed placement (3–4, 5–6 and 8–9 cm) and sowing time (early and optimal).

Soil preparation, sowing, care of crops and harvesting were carried out according to the zonal recommendations. Variants in a field experiment designed systematically, with three replications. Accounting plots area – 50 m<sup>2</sup>.

Weather conditions during the investigation were different, which made it possible to fully assess its impact on grain productivity potential of spring small cereals. Thus, in 2009, during the growing season dropped 235,7 mm of rainfall, which is 25 mm more than the average long-term rate, the average temperature was 17,7 °C, hydrothermic index (GTI) during the growing season was 1,33.

Extremely dry was 2010 (GTI = 0,61), which was characterized by higher temperatures (24,1 °C, which is 9,1 °C high than norm) and a deficit of rainfall (during the growing season dropped 172 mm of rainfall, 50 mm less the norm). Weather conditions in 2011 included both periods of drought and periods of abundant moisture (GTI = 0,77). The total depth of precipitation during the growing season in 2011 amounted to 141,2 mm and average atmospheric temperature 17,6 °C.

The aim of investigation was to identify effective agrobiological measures of increasing the grain productivity of spring wheat in Northern Steppe of Ukraine by choosing the best growth stimulators, plant protection system, sowing time, depth of seed placement and mineral nutrition.

Thus, the results of long-term experimental studies make it possible to conclude that the combined use of spring wheat seed treatment and spraying it crops by growth regulators provides increasing the grain yield for 0,22–0,68 t/ha. The higher additional crop yield of spring wheat provides preparation Emistim C.

To protect the spring wheat from diseases its expedient to apply complex protection (stimulator + fungicide + herbicide), which creates optimal conditions for the formation of above-ground and root system and provides an increase yield compared with the control at 0,68–0,92 t/ha.

Field germination rate of spring wheat seeds depends on sowing qualities of seeds, sowing time, varietal characteristics and depth of seed placement. High field germination rate obtained for early sowing at depth of 3–4 cm and under adverse conditions – at a depth of 5–6 cm. Wheat germs at sowing a depth of 3–4 cm there for 3 days earlier than seeding at depth 8–9 cm. Spring wheat plants were more productive when seeding at depth of 5–6 cm, regardless of the sowing time. Improving nutrient regime significantly increases the yield.

In conditions of Northern Steppe of Ukraine spring wheat should be sown in the early term with application of a moderate dose of fertilizer ( $N_{40}P_{20}K_{20}$ ), which provides a grain crop yield at a level of 2,70–3,27 t/ha. – P. 121–126.

**Dudka M. I. Fodder productivity of joint agrophytocenosis of winter rye with typhon depending on rate of seeding, method of sowing and interrelation of components.** Winter cabbage cultures (rape, wild cabbage, perco) are one of supply sources of high – protein forages for horned cattle at the early-spring season in the conditions of northern Steppe of Ukraine. In recent years some agricultural formations for the purpose of obtaining by spring of the earliest green forage have started to grow the new to the Steppe region precocious highly productive winter cabbage culture – typhon, as hybrid of the Chinese cabbage and turnip, created for the first time in the Netherlands by means of selection method. However low percentage of an overwintering of its plants in severe snowless winters does not allow to realize the potentially high productivity of this culture effectively.

For the purpose of working out of cultivation technology of typhon (*Brassica rapa*) together with the most early-ripe gramineous culture – the winter rye (*Secale cereale*) at use on the fodder purposes, in 2004–2007 were conducted the researches in a crop rotation of Laboratory of cultivation technology of forage crops at Erastivska experimental station (Dnipropetrovsk region, Pyatykhatskyi district, Institute of grain husbandry of Ukrainian

Academy of Agricultural Sciences (nowadays State Institution Institute of Agriculture of Steppe zone of National Academy of Agricultural Sciences).

Sowing of winter mixtures by autumn 2004, 2005 and 2006 years was carried out accordingly Sept. 8, Sept. 15 and Sept. 7. Duration of the autumn vegetation season of winter agrophytocenosis made up from 56 till 68 days. The change in the mixtures of an interrelation of a gramineous component from 25 to 75 % (from seeding in one-specific sowing) during autumn vegetation led to reduction of plant height of the cabbage component from 17,4 to 14,4 cm, and masses of 100 plants in an absolutely dry state – from 68,9 to 57,0 g at simultaneous reduction of quantity of leaves in the leaf rosette from 4,3 to 3,1 pieces. The best development of plants both gramineous, and cabbage components was observed on uncrowded plots of strip sowing where biometrical indexes of plants were up to standard of control plants in one-specific agrophytocenosis.

The biggest winter-hardiness in experience differed plants of winter rye both in one-specific sowings, and in joint sowings where during winter on the average only 16,4–21,7 % of its herbage were lost. Fallout of cabbage culture

from herbage of mixtures was on 14,9–27,9 % more than in one-specific sowing and sowing in strips. At the same time, the augmentation of seeding of the gramineous component in crowded joint agrophytocenosis from 25 to 75 % from norm of seeding in one-specific sowing resulted not only in reduction of height and masses of cabbage plants, but also has negatively affected adaptability of high-protein component to wintering unfavorable conditions. The destruction of typhon plants in the grass stand of mixtures thus increased from 50,7 to 63,6 %.

The period of spring vegetation of the winter rye plants to the leaf tube formation was 26 days, to the ear formation – 55 days. The stem growth at the typhon plants was noted on 14<sup>th</sup> day, the budding – on 21-st day and the flowering – on 37-th day after vegetation renewal.

Let's notice that at the identical general form of seeding of mixtures (150 % to one-specific sowings) the morphological elements of plants considerably depended on an interrelation of components in agrophytocenosis. So, at seeding in the mixture of the maximum norm of seeds of the winter rye (75 %) in herbage it was observed the biggest oppressing action of cereal on the growth processes of cabbage plants. The height of typhon plants during harvesting (the flowering phase) on the plots of this variant was the least and made up 79 cm that was less on 22,5 % than height of plants in one-specific sowing. The leaf formation of plants-components in joint agrophytocenosis at identical general norm of seeding (150 %) depended insignificantly on the interrelation of components in herbage and made up, on the average for years of researches, at plants of winter rye 29,6–31,6 %, and at typhon plants – 30,4–33,8 %. The maximum area of an assimilation foliage surface (23,9 thousand m<sup>2</sup>/hectare) was formed on the average the grass stand of the winter rye and typhon at strip placement of components. Thus the optimal combination of indexes of high productivity and quality of the forage sowings was remarkable for winter crops at strip placement of components on the area – winter rye and typhon. This mixture have provided the biggest yield of absolutely dry matter (3,45 t/hectare), fodder units (2,72 t/hectare) and digestible protein (0,32 t/hectare).

Approbation and industrial checking of the received results of experimental researches have been made in 2008/2009 and 2009/2010 years in located by form fodder crop rotation of Erastivska experimental station of State Institution Institute of Agriculture of Steppe zone of National Academy of Agricultural Sciences on the area 5,0 and 26,0 hectares accordingly. Industrial experimental researches have confirmed expediency and high efficiency of cultivation on the green forage of strip sowings of the winter rye and typhon for balancing green mass on the protein. Such method of sowing provides dimensional placement of components on the area. As a consequence decreases the oppressing influence of cereals on cabbage, improve conditions for their growth, development and an overwintering that predetermines obtaining of the high share of content of the protein component in fodder mass. – P. 127–133.

***Benda R. V., Bondarenko A. S., Pryadko Y. M., Fedorenko I. E. Research consulting support agricultural enterprises and rural Dnepropetrovsk region to master technologies and methods profitable management.*** A key component of solving the problem of filling the market seed crop breeding is to improve the national research and advisory support agricultural enterprises and rural.

For effective dissemination of innovative products for the agricultural market information necessary to create a structure whose primary function is to provide research and advisory services to agricultural enterprises and rural population.

Analysis of the literature showed that the current system of dissemination of scientific and technical information, scientific research and implementation of advanced technology does not meet the new relations of production. In the agriculture developed a large number of advanced technologies, but with 100 development stage to implementation reaches only 5–6, so we need to improve technology research and advisory assistance for businesses to create the conditions for the rapid spread of agricultural knowledge and information about scientific achievements and best practices of effective management.

Research and advisory support agricultural enterprises and rural population of Dnepropetrovsk region should be based on providing consumers with the necessary knowledge of good housekeeping, including: soil fertility, the impact of culture as precursors in rotation on nutrient and water regime of the soil, the use of some effective technological methods of cultivation, fertilizer or crop protection malicious of organisms using high-yielding seed varieties and hyb-rids, breeds animals. Providing research and advisory services is the focus of any institution that provides high returns and significant social impact.

The feature of the research and advisory support is that it is to some extent affect consumer behavior and cannot be evaluated at the conclusion of agreements, but after a while. Therefore we must pay attention not to the number of data services and their quality.

The basic options to provide research and advisory services at the Institute of Agriculture steppe zone NAAS's of Ukraine.

1. The use of individual counseling – providing informative assistance to a consumer economy;
2. Seminars and round tables for a wide range of representatives of agriculture in the region;
3. Organization of field days, on-site meetings, conferences and fairs for the population of a certain area to learn about the innovative achievements of the institution;
4. Performances on radio and television throughout the year on issues that have developed in the agriculture of the region, highlighting the main stages of the solution of these problems by implementing cutting-edge research results;
5. Production and distribution of printed materials advertising;
6. Organization of courses and schools training managers, professional agro-industrial units, farms and private households at the Institute.

To granted them a brief description of the most important distinguishing. To established that these measures make it possible to efficiently distribute innovative products for the agricultural market. Therefore, to effectively promote products in the market issues of information provision producers should be paid due attention. *P. 133–137.*

**Gangur V. V., Kochan A. V., Len' O. I., Semyashkina A. O. Growing of maize for grain in permanent crops and crop rotation.** Impact of permanent cultivation of corn yield and is studied in the laboratory of Agriculture and Technology cereals, legumes and oilseeds in Poltava State Agricultural Experimental Station named after M. I. Va-vilov of Institute pig and AIP, a stationary experiment that laid in 1963 year and reconstructed in 1984 year. Productivity permanent planting corn in the experiment compared with field crop rotation.

In the experiment were seeded such hybrids: Bukovina 3 (1963–1974 years); Zhrebkivsky 86 MB (1975–1987 years); Dniprovsky 273 MB (1988–2001 years); Frame 267 MB (2001–2005 years); Podolsky 274 MB (2005–2012 years); Orzhitsa 273 MB (2013–2014 years).

Productivity permanent crops maize for years was different. The level of yields is largely determined by weather conditions – rainfall during the growing season, especially in the second half. The highest grain yield (9,43–10,38 t/ha) was in 2008 year, and the lowest (1,45 and 1,21 t/ha) respectively in 1975 and 1992 years.

Studies show that productivity permanent crops maize is not reduced over the years, and even tendency to its growth. Thus, the average for the second decade (1974–1983 years) compared to the first (1964–1973 years) maize yield by fertilization variants was higher under 0,06; 0,15; 0,45 t/ha. In the rotation, in the same period, productivity grew by 0,75 t/ha. In the third decade, compared with the second, productivity of maize for versions with fertilizer increased respectively by 0,74; 0,24 t/ha, and crop rotation – 0,99 t/ha. A similar pattern persists for the fourth decade. On average, over the last 5 years (2010–2014 years) compared to the fourth decade, corn yield was higher under 0,35; 1,22 t/ha, in the rotation – 1,05 t/ha.

Comparison of growing crops in the rotation and permanent, on similar backgrounds fertilization showed that the average productivity of maize in monoculture for 1964–1983 years was only 0,05 t/ha lower, and in 1984–2014 years – 0,89 t/ha and totaled 5,0 t/ha. On average for 50 years (1964–2014 years) the cultivation of maize on an ongoing area of productivity was 4,43 t/ha or was 0,47 t/ha lower than in the rotation.

The magnitude of the maize crop in the permanent sowing fertilizer had a significant impact, but clearly most of their positive effect was observed after reconstruction experiment when it was introduced variant without fertilizers. Thus, on average 20 years (1964–1983 years) making 20 t/ha of manure and nitrogen 60, 40–80 phosphorus, potassium – 60–80 kg/ha, compared with  $N_{10}P_{10}K_{10}$ , provided a significant increase in maize. The increase was respectively 0,35; 0,39 t/ha. Increasing the dose of phosphorus from 40 to 80, potassium from 60 to 80 kg/ha, against manure is not encouraged by the significant increase in crop maize.

Average for the past 30 years yield data show that in making 30 t/ha manure once in three years and every year and different doses of mineral fertilizers, productivity of maize was respectively 1,54 and 1,52 t/ha higher than in option without fertilizers.

Thus, obtained research results point to the possibility of permanent cultivation of corn in black soil typical low- and middle-central part of the left-bank forest-steppe of Ukraine. Duration permanent cultivation of maize in black soil permissible for 6–7 years and silage – 10 years. However, it should be noted that the possibility of growing maize in the same field for several years in a row does not serve as a pretext for refusal of rotation. – *P. 138–140.*

**Kvaschuk E. V., Pastuh A. D. The impact of biopreparator on the yield of crops compatible millet and buck-wheat.** Current output of buckwheat and millet do not meet the constantly increasing demands on it because of insufficiently high yield. The average yield of buckwheat in the last five years was less than 0,8 t/ha.

Solutions to the problems must be sought in improving existing and developing new technology elements of cultivation; especially in mixed crops – a technologically simple and cost-effective, requiring no additional measures and special machines.

In this regard, the problem of developing the basic elements of growing technology in compatible crops of millet and buckwheat in terms of southern part of western forest-steppe is very relevant: important for agricultural production.

The aim of our research is in increasing productivity per hectare of arable land, increasing yields of buckwheat and millet compatible with their cultivation.

During the research the following objectives are solved: selection of varieties of millet for joint cultivation of buckwheat; study of the conditions of growth and development of buckwheat and millet in pure (single-species) and compatible crops; determining the productivity of compatible crops of buckwheat and millet using biological agents.

Results of experiments conducted over two years revealed patterns of formation of grain yield of millet and buckwheat, as in single species crops and in compatible crops depending on the impact of biologics.

Productivity of single-species of buckwheat and millet crops depended not only on the varietal characteristics and biological products, but also on weather conditions of the year. Weather conditions were favorable in 2014 for growth and development of millet and buckwheat. Thus, in 2013, the yield of buckwheat variety Synthetic was on the control variant (without the use of biologics) 1,87–2,0, variety Ukrainka – 1,77–1,99 t/ha, in 2014, the yield of these varieties was 3,14–3,10 and 2,87–3,0 t/ha.

According to the results of field experiments with millet, its yield was much higher compared with buckwheat, both in single-species and in compatible crops.

Studying of the impact of pre-seed treatment with biological products showed that the highest yield of buckwheat and millet was obtained in the variant with seed treatment of drug agate-25K. On average for two years compatible crops in this variant formed from 3,29 to 3,69 t/ha of grain. Surplus of yield compared to the control variant (without drug treatment) was 0,39–0,37 t/ha in compatible crops of buckwheat in Synthetic variety with millet varieties of Poltava 87 and Omriyane, and 0,33–0,50 t/ha in compatible crops of buckwheat variety Ukrainka with millet varieties of Poltava 87 and Omriyane.

It should be noted that Synthetic variety was better among the varieties of buckwheat, Omriyane variety was better among the varieties of millet.

So compatible crops of millet and buckwheat form high yield (13,69 t/ha) using a biological agate-25K. Particularly buckwheat variety Synthetic and millet variety Omriyane were the most well-proven. – P. 141–144.

**Gyrka A. D., Kulyk I. O., Chaban V. I. Crop yield and grain quality of naked and hulled oats in the Northern Steppe of Ukraine.** Among the crops occupies a special place oats, which are valuable from forage (an important and indispensable food for horses) and food (production of cereals, baby food, rolled oats, oatmeal, biscuits, coffee sub-stitute) culture. Grains of naked oats contains all essential for human and animal amino acids. In their number in oats protein is not inferior protein of wheat, and even surpasses it. Products with oats differ most calories compared to other cereal products, very high in protein and fat. And thanks to the large number of mucous substances oat products have nutritional properties. These products also contain a lot of vitamins – thiamin, riboflavin, niacin and several micro-elements.

However, a high percentage of flim grain oats is causing an increase in the amount of waste, leading to significant cost when used in food purposes. So now widespread naked varieties of oats, which have several advantages over hulled, especially when used for food purposes. The high content of protein, fat and starch, which grain naked oats is superior hulled grains and other crops, causing high nutritional value of this crop.

Varieties of naked oats not common production due to insufficient developed technology of cultivation. Therefore it is necessary to prove the effectiveness of culture and develop technological options growing high yields of quality grain.

The experiment was laid after three predecessors: winter wheat, corn and sunflower. Fertilizers scheme developed by the experiment made by pre-sowing cultivation. In the field experiment used a variety of naked oats – Skarb of Ukraine, variety of hulled oats – Skakun.

Studies have shown that the variety treasure Ukraine more precocious (the length of the growing season 85–87 days) for oat varieties jumper (92–93 days) but prone to shattering when permutation.

Panicle length and number of grains in it in naked varieties of oats more than hulled to 0,3–1,8 cm and 24,0–27,8 pieces, respectively. This is due to morphological structure panicle naked varieties of oats that has 5–6 productive flowers in the spikes, while hulled varieties developed is only 2–3 flowers on the spike. Under the influence of fertilization panicle length and number of grains in it increased by 2,8–5,1 and 6,0–9,7 % respectively – the variety Skakun and 5,6–9,0 and 5,8–7,4 % respectively – in a variety Skarb of Ukraine.

In the absence of flowering films weight of 1000 grains of naked oats averaged 22,2 g against 25,9 g – hulled variety. It should be noted that the application of fertilizer dose  $N_{20}P_{20}K_{20}$  weight of 1000 grains in a variety of Skarb of Ukraine grew by 2,8–7,2 % and grade Skakun – on 1,7–6,9 %.

Established that the yield of naked oats average was lower than hulled 0,8 t/ha. During the processing of naked oats very high yield of finished products (95%) due to the lack of flowering films on the grain, while the processing hulled oats loss to collapse films, on average, ranging at 30,40 %. In light of this can be considered that useful for producing naked oat yield on 1,022,9 % higher than hulled.

Thus, for a set of morphological, economic and qualitative properties of naked oats favorably with hulled and is a promising crop for food production. *P. 144–146.*

**Krasnenkov S. V., Dudka M. I., Isaenkov V. V., Pinchuk N. I., Berezovskyi S. V., Nosov S. S.** *Optimization of harvesting times of corn hybrids of different groups of ripeness.* Process of grain harvesting is one of the important elements of corn cultivation technology on grain. Grain losses, it injuring and humidity depend on harvesting time. It is expedient to combine the corn in optimum tight timetable that gives the chance to reduce the losses of grain and to keep high quality of production. Considerable losses are predetermined by breath of grain respiration on the plant, affection by diseases and deterioration of quality of harvesting by combines as a result of sagging of ears and lodging of plants.

It is necessary to pay the special attention on preparation of harvesters, first of all, on regulation of height of the cut of stalks which should make no more than 10–12 cm from the soil surface. This measure prevents the spreading of the corn borer. The increase in height of the cut of plants leads to deterioration of the further soil tillage. The corn harvester of the combine should mow down as much as possible the inclined and lodged corn stalks.

Maintenance of qualitative crushing and even distribution of the afterharvest rests at harvesting is the important measure in technology of cultivation of the cultures following after corn. If the harvesting is being held in late times at wet weather the corn plants are crushed and dispersed low-quality, that increases losses of grain and complicates the further soil tillage.

Influence of harvesting times of grain by the combine «CASE» (from September 15 till November 5) on efficiency, quality of grain and level of its losses by early – ripening hybrid Ushytskyi 167 SV, middle-early-ripening hybrid Podilskyi 274 SV, middle-repening hybrid Monika 350 MV and middle-late ripening hybrid Sokolov 407 SV studied on the Erastivska Experimental Station of State institution Institute of Agriculture of the Steppe zone of Ukraine in 2007–2009 years. Sowing of hybrids was in the first decade of May.

The corn cultivation technology except for investigated factors, answered to the standard technology for conditions of northern subzone of Steppe of Ukraine. The estimates and observations were conducted according to existing techniques. The work purpose – to establish the optimum harvesting time of corn hybrids of different groups of

ripeness for conditions of northern subzone of Steppe of Ukraine.

It is established, that lodging of plants depends first of all from morphological and physiological properties of hybrids: early growth, thickness of the stalk, stability of plants to overripe, etc. Also sagging of ears depends from morphological and physiological properties of hybrids and harvesting times. The corn hybrids of different groups of ripeness formed unequal productivity of grain with different preharvest humidity. We will notice, that delay with harvesting times led to increase of humidity of grain owing to decrease in daily average temperature of air and increase of its relative humidity.

The timely harvesting and avoidance of overripe of crop essentially reduce the microflora development on plants and its influence on quality of grain and its commodity condition. The plants of early-ripening hybrid at overripe were more infested by root moulds. The middle-early-ripening hybrid Podilskyi 274 SV long time remained green and juicy both its ears and stalks were more insect-infested, than at other hybrids. The increase in affection of ears by causal organism of diseases was defended also at hybrids of all groups of ripeness at delay with harvesting.

The biggest content of a protein in grain is noticed when corn was harvested in October, and at its harvesting in late term (on November 5) its content in grain was decreased a little. The starch content in grain did not change essentially depending on harvesting time. However the general tendency of reduction of indicators is noted at late harvesting time. We will notice, that harvesting times did not influence almost on the content of fat and cellular tissue in grain.

The grain losses are the important factor which influences on the productivity of corn hybrids of different groups of ripeness at the mechanized harvesting. They depend on biological features of hybrids, times of harvesting and humidity of grain. It is established, that delay with corn harvesting leads to increase in lodging of plants owing to affection by root and stem moulds and sagging of ears. Late time of harvesting (on November 5) did not lead to increase in damage of ears by pests, but thus the quantity of causal organisms of diseases essentially increased.

The least losses of grain of all investigated hybrids were at harvesting on September 15 when in corn crops we marked the least quantity of the sagging ears and lodging plants.

At definition of optimum harvesting times of grain of corn hybrids of different groups of ripeness it is necessary to consider not only level of technological losses, but and humidity of grain that is the defining factor at calculation of industrial expenses, in particular on drying of wet grain mass. They were the least at early time of harvesting (on September 15), and the greatest – at displacement of time of harvesting till November 5.

Level of production profitability was the highest at harvesting of early-ripening hybrid Ushytskyi 167 SV on September 15, and corn hybrids Podilskyi 274 SV, Monika 350 MV and Sokolov 407 SV – on October 5. – *P. 147–151.*



**Zhelyazkov A. I. Features of formation and filling grain winter wheat depending on agrotechnical methods of cultivation and hydrothermal conditions.** The purpose of this work – to explore the dynamics of the grain filling of winter wheat at different hydrothermal conditions of cultivation, depending on the impact of agricultural practices.

Studies on the effect of sowing dates, predecessors, the sowing of seed and the hydrothermal conditions during the growing season were carried out on Genichesk experimental station IASZ NAAS (Kherson region).

Analysis of the decrease in grain moisture during the growth of winter wheat on different predecessors suggests that, on fallow, as a result of less intense loss of water from the grains, the plants were more resistant to the adverse effects of drought. It is caused big, in comparison with the predecessor sunflower, moisture reserves in the soil under crops winter, placed on the fallow predecessor. After nonfallow predecessors, due to the scarcity of water, the grain moisture decreased considerably faster, resulting in the formation of grain puny low mass of 1000 grains. The value of the predecessor is not limited moisture supply of winter wheat in the main phases of plant growth and development, and plays an important role in the formation, filling and ripening grain. Affects the dynamics of the grain filling and, consequently, on the weight per 1000 grains in our experiments not only predecessors, but also seeding dates. For each of the predecessors of the largest mass of 1000 grains were plant early seeding dates, she decreased gradually shifted seeding dates towards later. Plants in crops of winter wheat of late seeding dates the early began later flowering, formations and filling grain and, thus, got under drought action, were more intensively damaged by dry winds.

Seeding rates also affect the dynamics of grain filling, creating a different density of plants per unit area. In areas of experience where wheat sowing norm 3 million seeds/ha of grain moisture was higher compared to the more thickened crops.

In order to determine the effect of mineral nutrition level on the dynamics of grain filling for the 2010–2014 years. To conduct research in experimental farm "Dnipro" IASZ NAAS (Dnipropetrovsk region). By results of researches it is established that at cultivation on stubble predecessor of a plant on control variant of experience reduced humidity of grain more intensively and formed the smallest mass of 1000 grains. Less intensively humidity of grain was reduced by plants of winter wheat on options with the highest level of mineral nutrition.

Analyzing loss water weevil wheat per day found, that moderate the temperature conditions days grain moisture during maturation decreased to on 1,0–1,5 % in the presence of hot winds, on separate days – on 2,0–3,0 %

Thus, winter wheat that was grown on fallow and which is and has been adequately provided batteries, proved to be more resistant to drought conditions during grain filling.

In such crops of accumulation of solid in grain and, respectively, growth of an indicator of mass of 1000 grains was higher in comparison with winter that was grown up after nonfallow predecessors. It should be noted, that during the years of research the most intensive accumulation of dry weight of winter wheat weevil noted in frontdairy and dairy phases when the grain moisture content was 85–70 % and 69–50 %. – *P. 151–158.*

**Vinyukov O. O. Influence of sowing time on plant productivity of winter wheat from different breeding centers of Ukraine.** Sowing to obtain high yields of winter wheat is no less important task, than tillage and fertilization.

They are closely related to the intensity of growth and development of plants in autumn, the accumulation of reserve substances in the leaves and tillering nodes, the acquisition of plants resistant to unfavorable conditions of winter.

Studies were carried out in the laboratory field rotation farming, crop production and mechanization of the Donetsk State Agricultural Experiment Station National Academy of Agricultural Science of Ukraine. In the experiment, we studied the effect of four sowing dates on the productivity of different varieties of winter wheat breeding centers of Ukraine: Kraplyna, Dar Luganshyny, Kniagynia Ol'ga, Myrlena. Autumn weather of 2011–2013 contributed to satisfactory development of the vegetative parts of plants. The root system is well developed.

Plants of winter wheat variety Kraplyna, sown in the first term sowing had the highest coefficients, both general and productive tillering. Among the plants of the second period of sowing the best performance was variety Myr-lena (productive tillering coefficient – 2,06).

The best indicator of productivity factor tillering plants of the fourth sowing time had variety Dar Luganshyny.

Comparing the degree of development of winter wheat plants on biometric indicators, we can conclude that, regardless of the best varieties of biometric indicators have plants of first sowing time.

Based on analysis of these table it can be concluded that the later were seeded winter wheat, the lower was the number of grains in the ear, while the weight of 1000 grains were increased.

Other terms of sowing unequally affect the level of yield of winter wheat. Sowing at 10 of September was the highest yield varieties Kraplyna and Kniagynia Olga, while variety Dar Luganshyny formed smaller grain harvest of 0,5 t/ha. In the second period of sowing crops provided the highest Myrlena (2,9 t/ha).

Variety by Kniagynia Olga third sowing had the highest yield (3,1 t/ha) among varieties. The most productive in the last sowing was variety Myrlena – 3,5 t/ha.

The weather conditions in spring of 2012–2014 contributed to the uniform development of plants, regardless of sowing time.

Therefore, fluctuations in the yield on grades and terms of minor (2,9–3,1 t/ha). High performance plant last sowing dates (3,5 t/ha) due to the fact that they were less affected by diseases and pests in autumn, and their phase of development is not allowed to spend the nutrients in the winter thaw.

Thus, based on comparison of biometric indexes of winter wheat plants, we can conclude that, regardless of their values best varieties distinguished first term sowing plants.

In terms harvest structure were revealed that the later were seeded winter wheat, the lower was the number of grains in the ear, while the increased weight of 1000 grains. – *P. 158–162.*

**Khalak V. I. The effectiveness of the use of integrated indicators for the estimation of young pigs for fattening and meat quality.** The purpose – to investigate the fattening performance and meat quality of young pigs of large white breed different strains and families to determine the effectiveness of the use of assessment indices that characterize these groups of traits, based on the calculation of pair correlation coefficients between characteristics determine the direction of further breeding work. The experimental part of the research conducted in the conditions of breeding reproducer of pigs of large white breed LLC AF "Revival" Novomoskovsk district of Dnepropetrovsk region. The control fattening of young pigs and their evaluation for meat quality were performed according to the requirements of the "Methodology of evaluation of boars and sows on the quality of offspring in terms of breeding plants and breeding reproducers" (2005). Index M. D. Berezovsky, B. Tyler and the index of Wangen was calculated on the basis of the use of absolute values, namely: age achieve a live weight of 100 kg, the absolute increase for an accounting period, an accounting period of growing average daily gain in live weight during the period from the day of birth to the age of reaching a live weight of 100 kg and backfat thickness at 6–7 thoracic vertebrae.

It is established that the young pigs of large white breed of the experimental group ( $n = 63$ ) had reached a live weight of 100 kg for  $189,5 \pm 0,74$  days, provided that the average daily live weight gain during the fattening period, the control amounted to  $719,4 \pm 7,51$  g, the cost of feed per 1 kg gain –  $3,97 \pm 0,027$  food units. The calculations of the indices of the assessment of young pigs on growth energy and the backfat thickness (Ia) and Wangen (I) showed that

they are equal  $89,98 \pm 0,334$  and  $26,35 \pm 5,23$  points respectively. In animals of the experimental group ( $n = 28$ ) length of chilled carcasses amounted to  $95,1 \pm 0,28$  cm, backfat thickness at 6–7 thoracic vertebrae –  $28,6 \pm 0,65$  mm, mass posterior third of chilled half-carcasses –  $10,3 \pm 0,11$  kg, the area of the "eye muscle" –  $35,6 \pm 0,49$  cm<sup>2</sup>. Having regard animals of the experimental group to a particular genealogical line was established that the young pigs of large white breed lines Gultar outperformed peers lines Docker, Dollar and Slavutych on average daily gain in live weight 49,3 g ( $td = 2,19$ ,  $B > 0,95$ ), 21,0 g ( $td = 0,96$ ,  $B < 0,95$ ) and 3,5 g ( $td = 0,15$ ,  $B < 0,95$ ), by age reaching a live weight of 100 kg – 5,8 ( $td = 2,90$ ,  $B > 0,99$ ), 1,9 ( $td = 0,87$ ,  $B < 0,95$ ) and 0,3 days ( $td = 0,14$ ,  $B < 0,95$ ), cost of feed per 1 kg gain – 0,20 ( $td = 2,75$ ,  $B > 0,95$ ), 0,08 ( $td = 1,12$ ,  $B < 0,95$ ), 0,02 food. units ( $td = 0,29$ ,  $B < 0,95$ ), respectively. The assessment index of young pigs on growth energy and the backfat thickness (Ia) and the index of Wangen (I) ranged from 88,7 to 91,2 and from 25,6 to 26,8 points respectively.

According to the research results of the meat quality of calves of different genealogical lines found that animals line of Slavutych was characterized by greater length chilled carcasses and square "eye muscle". Compared with peers of the lines of the Dollar, Gultar and Docker difference on these grounds was 1,7 cm ( $td = 2,39$ ,  $B > 0,95$ ) and 3,4 cm<sup>2</sup> ( $td = 2,12$ ,  $B > 0,90$ ), 1,8 cm ( $td = 2,36$ ,  $B > 0,95$ ) and of 2,3 cm<sup>2</sup> ( $td = 1,21$ ,  $B < 0,95$ ), 1,0 cm ( $td = 1,88$ ,  $B > 0,90$ ) and 0,4 cm<sup>2</sup> ( $td = 0,41$ ,  $B < 0,95$ ). The minimum value of the thickness of fat at the level of 6–7 thoracic vertebrae was detected in the progeny lines of Dollar –  $26,1 \pm 1,26$  mm, and the maximum rate of mass posterior third of chilled half-carcasses – line Docker –  $10,6 \pm 0,13$  kg.

To determine the effectiveness of the use of evaluation indexes, we performed the separation of animals into classes, provided that the average quadratic deviation from the average of Ia and I is 0,67  $\sigma$ .

It is established that the young pigs of class M<sup>+</sup> compared with peers of the class M<sup>–</sup> was characterized by a higher average daily liveweight gain for the period of control feeding (at 78,6 g;  $td = 4,12$ ,  $B > 0,999$ ). This had a positive impact on reducing the cost of feed per 1 kg increase in body weight (0,31 feed. units;  $td = 4,16$ ,  $B > 0,999$ ) and reduction of age live weight of 100 kg (8,0 days;  $td = 5,88$ ,  $B > 0,999$ ).

Assessment of young pigs on meat quality showed that animals of the class M<sup>+</sup> index Ia prevailed peers of the class M<sup>–</sup> backfat thickness at 6–7 thoracic vertebrae 6,7 mm ( $td = 4,49$ ,  $B > 0,999$ ), but along the length of the chilled carcass mass posterior third chilled-carcasses and area of "eye muscle" conceded to them by 0,3 cm ( $td = 0,35$ ,  $B < 0,95$ ), 0,7 kg ( $td = 2,59$ ,  $B > 0,99$ ) and 0,5 cm<sup>2</sup> ( $td = 0,28$ ,  $B < 0,95$ ), respectively.

Analysis of fattening and meat qualities of young pigs of different classes distribution by index of Wangen showed that animals of the class M<sup>+</sup> compared with peers of the class M<sup>–</sup> characterized by higher indices of fattening qualities. So, on average daily gain in live weight difference was 71,4 g ( $td = 3,47$ ,  $B > 0,99$ ), by age reaching a live weight of 100 kg to 5,8 days ( $td = 2,69$ ,  $B > 0,99$ ) and cost of feed per 1 kg gain was 0,26 fodder units ( $td = 3,13$ ,  $B > 0,99$ ). For mass posterior third chilled-carcasses and area of "eye muscle" had the edge peers of the class M<sup>–</sup> – 0,2 kg ( $td = 0,91$ ,  $B < 0,95$ ) and 1,2 cm<sup>2</sup> ( $td = 1,14$ ,  $B < 0,95$ ). Animals in which the index of Wangen ranged from you 24,50 to 25,26 points (class of distributions M<sup>–</sup>), relative to peers, class M<sup>+</sup>, was characterized by greater length of the chilled carcass (0,7 cm;  $td = 1,12$ ,  $B < 0,95$ ) and lower backfat thickness at 6–7 thoracic vertebrae (5,1 mm;  $td = 2,45$ ,  $B > 0,95$ ).

Found that the number of significant coefficients of pair correlation between the index of Wangen, the assessment index of young pigs on growth energy and the backfat thickness, fattening and meat qualities amounts to 71,4 %. This biometric indicator ( $r$ ) between the estimated indices (I), (Ia), and absolute indicators of fattening and meat qualities ranged from  $< 0,95$ ). This biometric indicator ( $r$ ) between the estimated indices (I), (Ia), and absolute indicators of fattening and meat qualities ranged from  $0,838 \pm 0,1070$  (index assessment of young pigs on growth energy and the backfat thickness  $\times$  backfat thickness at 6–7 thoracic vertebrae) to  $+0,690 \pm 0,1419$  (index of Wangen  $\times$  average daily live weight gain during the fattening period, the control, the index of Wangen  $\times$  backfat  $0,184 \pm 0,1928$ ;  $r = 0,95$ ,  $B < 0,95$ ). – P. 163–168.

Antonenko P. P., Pushkar T. D., Kozyr' V. S. *Sanitation and hygiene indicators in disinfection of dairy milking equipment*. The question of improving the sanitary processing of dairy equipment with ozone- air mixture has been considered. The prospects of ozone technology for disinfection of processing equipment have been shown. It is established what treatment of dairy milking equipment by ozone-air mixture in concentration 10 mg/l decrease of number of mesophilic aerobic bacteria similar to use of 0,25 % solution of dezmol. Increasing the level of mixture to 15–20 mg/l a significant decrease of number of bacteria. – P. 168–169.

Logvinenko V. I., Zeldin V. F., **Sizintsev A. G.** *A method for prophylaxis and treatment of dyspepsia in calves*. Disease prevention in young cattle, is the basis for obtaining further valuable in breeding and productive aspect, the main herd animals. This issue is relevant for livestock breeding cattle subjects breeding Holstein-Friesian cattle breeding especially the higher category, which further supply network for equine farms producing milk, the securities in respect of breeding heifers of different ages.

Currently, in the field of animal much attention is paid to increase the number of livestock and livestock productivity. In this case, it is particularly topical issue of preservation of the young. With the birth of calves undergoing complex processes of adaptation of the organism to new environmental conditions, and their further development is largely determined by the level of reactivity and resistance.

The occurrence of diseases in young due to the poor conditions, feeding and the presence of pathogenic micro-flora in the environment. At a young body lesions develop very quickly and is involved in the process of the whole organism. Therefore, at the first sign of the disease is an urgent need to provide medical assistance.

The research methodology. Scientific and experimental studies on the application of pulsed electrical stimulation, as a therapeutic and stimulating action, diseases of calves simple dyspepsia were held in 2013 in terms of "Privat-Agro" Dnipropetrovsk region on 40 calves Ukrainian Red dairy cattle under the age of 3 days. A comprehensive study of the clinical and physiological status of the calves were performed by standard methods in veterinary clinical diag-nostics, allowing to allocate sick animals simplest form of dyspepsia. Isolated calf isolated, refined diagnosis of the disease and prescribe treatment. Medical procedures performed drugs that have been on the farm at the time of research. Calves in the control group ( $n = 20$  animals), bolevshih simple dyspepsia, the following treatment: 12-hour starvation diet with mandatory watering calves 0,9 % sodium chloride solution 1,000–1,500 ml enema with a 0,1 % solution of potassium permanganate 0,5 ml/head/day Farmazin intramuscularly sintomitsina 0,5 g per os 3 times per day and three times 1 ml Tetravita 5 days subcutaneously 20 % camphor oil 2 ml 1 time per day. Another group of calves in the amo-unt of 20 goals, in addition to medical treatment, electrical stimulation was applied by the method of pulse current (Sun-dukova P. P., Kalinichenko V. K., Nachatova N. Y., Sizintseva A. G., 1976). All patients were followed for calves until recovery.

Morphological and biochemical blood tests carried out before and after pulsed electrical stimulation at 2, 4 and 6 hours by conventional methods in clinical diagnosis.

Statistical processing of data was performed by the method of GF Lakin using computer software SPSS 17 and Misrosoft the Excel.

In conducting clinical and physiological studies of calves that had features characteristic of gastrointestinal disorders, we treat sick animals. These calves were found more frequent bowel movements with the release of a sparse stool yellow-pink color with a grayish tinge, hairy wool cover, oppression, kyphosis, lethargy, perineum and tail contaminated feces. Thready pulse, acceleration, heart sounds muffled, rapid breathing, low body temperature.

Patients on dyspepsia animals compared with the norm (for Kondrakhin I. P. 1985) Nabli increased the amount of hemoglobin, red blood cells and white blood cells, which is associated with elements of violations of water-salt metabolism and blood clots. In this case, there are characteristic changes in the leukocyte formula: there is a moderate leukocytosis. Along with the increase of neutrophils in leucogram growing number of band forms, and even appear younger, disappear eosinophils. A decrease in calcium and phosphorus. The total protein content and an alkaline reserve is maintained at a low level of physiological norm. Thus, changes were observed in the content of calcium, phosphorus and reserve alkalinity indicates a shift acid-base balance toward acidosis, and changes in water-salt metabolism must first compensatory in nature, but if you do not take action therapeutic nature, that may occur significant violations of water-salt metabolism, which will increase the severity of a pathological condition.

On the second day after electrostimulation general condition of patients gradually improved animal: body temperature, pulse and respiration – normalized, improved appetite and stop gastrointestinal disorders. In the blood

of animals compared with baseline was observed decrease in hemoglobin, red blood cells and neutrophils ( $P > 0,95$ ). 4–6 hours after electrostimulation in most calves observed normalization of morphological and biochemical indices of the blood of animals (the difference between the indices of the blood of calves before and after exposure to highly reliable at  $P > 0,999$ ). Mortality in calves to be pulsed action was not, therapeutic efficacy was about 100 %. In calves in the control group who were with the same disease and medication-treated without electrical stimulation, on the second day, still marked lethargy, depression, poor appetite, varying degrees of gastrointestinal disorders, subfebrile temperature. In the blood of animals was observed reduced amount of hemoglobin and red blood cells, high leukocytosis. 6 days of the study and treatment of 3 calves process moved into a toxic form of fatal and other animals in 10–12 days cured. Therapeutic efficacy was 70 %.

When using electrical stimulation for the prevention of dyspepsia in the two days of calves (without clinical signs) after exposure to pulsed current for 4–6 hours the animals were in a sleepy, dormant, and then becomes mobile, fully drank a portion of colostrum. On the second day, some of them experienced a slight disorder of the gastrointestinal tract without bright display signs of disease. This situation prevailed 24–36 hours at a physiologically normal body temperature, pulse, respiration, and the morphological composition of the blood. Then gastrointestinal disorders in calves stopped and will not be repeated.

Calves that have not been preventive stimulation, on the second day in some animals there were gastrointestinal disorders severe lay for medical treatment. At this time, the animals drank bad colostrum lost fatness, stale, body temperature decreased by 0,3–0,5 °C. The course of treatment lasted for up to 9 days.

The results of comprehensive studies showed conclusively that electrical in animals strengthens and continuously maintains a high level of functional state of neurohumoral regulation mechanisms and biochemical defense. In particular, changes morphological and biochemical composition of the blood, increasing the assimilation of nutrients, motor and secretory function of the stomach complicated. It was established that in electrical isolation increases several times rennet juice, its proteolytic activity increases the total free and bound hydrochloric acid enhances motility rumen and abomasum grid. All observed changes are explained by functional rearrangement of neurohumoral regulation of digestion, that is, they are associated with the work of the mechanisms which determine the pathogenic disorder are some dyspeptic conditions of the gastrointestinal tract. Practically this means that electrical efficiently and reliably restores the physiological condition in animals with digestive diseases of the gastrointestinal tract.

Thus, in Disease calves alimentary dyspepsia electrical pulse in combination with medication reduces the treatment assignments for 2–3 days and calf raises safety 17–20 % compared with the control ( $P > 0,95$ ). Cost-effectiveness of the developed method of prevention and treatment of dyspepsia in calves is about 200 hryvnia per calf prices for 2014. – P. 170–172.

**Sokrut A. V., Cherniavsky S. E. The system kofermentatsiyi substrate for anaerobic digestion.** In the context of rising prices for traditional energy special importance to develop technologies using alternative energy sources for the purposes of agriculture, including livestock.

For agriculture special interest biogas energy production from waste (manure, feed residues) and plant material (such as crop residues and specially grown crops). Experiments have shown that in terms of biogas production is more productive plant material, but on the other hand there is a problem on the farm manure utilization, which also can be used to produce methane.

Among the ways to improve the process of digestion for biogas and processing it into fertilizer is to develop efficient methods kofermentation (combination with fermentation of various raw materials).

In our studies using plant material (Sudan grass, green fodder maize, silage maize) and manure of cattle, pigs and poultry manure as coenzymes. The study was conducted on experimental biogas plants БГУ-3 and БГУ-5 in the laboratory of the State Institute of livestock farming steppe zone. Studies have shown that more productive in terms of biogas substrate was comprised of Sudan grass and manure from animals bird droppings: 5,68 (first digesters with manure of cattle) and 5,72 m<sup>3</sup> (second digesters with manure of pigs). Was slightly below the figure for the material component of which was green mass of corn, respectively, 5,10 and 5,14 m<sup>3</sup>. Performance digesters where the substrate was laid with silage corn, poultry manure from cattle manure was 2,99 m<sup>3</sup> swine manure – 3,04 m<sup>3</sup>.

The results of these studies suggest the possibility of using plant materials and animal manure bird droppings as coenzymes for biogas installations for energy livestock farms. The results of biogas substrate various components of plant and animal origin allow us to offer a system kofermentation for such raw components.

In powerful biogas plants large livestock farms in most use manure of cattle and pigs. At lower power settings that can be implemented in small agricultural enterprises or farms may be more widespread use of different substrate nucleotides organic material from plants and animals in different ratios of components.

Consider, for example energy dairy farm for 100 cows using as raw material for installation biohaz manure and silage corn animals. The estimated demand for energy process dairy farm is 441,5 kg of fuel per day. Due to fluctuations in energy needs, depending on weather and seasonal factors, this number should be increased by 30 %, or 132,4 kg (as an insurance fund). The total energy requirement farms is 574 kg of fuel.

Livestock farms for 100 cows provides daily output of 4,5 tons of manure processing which has the same number in the substrate, such as corn silage makes it possible to produce 1012,5 m<sup>3</sup> biogas or 883,0 kg of fuel per day.

The energy balance of the farm takes into account the energy that was used to maintain anaerobic bioreactor process, energy commodity that can be used on the farm and the total energy demand (to replace petroleum products, obtain process heat, electricity receipt).

For the operation biohazoeneryhetyc installation (maintenance mode mesophilic and electrical work) cogeneration unit consumes 25 % of the produced biogas (220,75 kg of fuel). It also uses commodity biogas to produce process heat and electricity consumed by farm equipment (122 and 30,1 kg of fuel). Thus, process dairy farm for 100 cows can be completely energy independent of external power sources when used as a feedstock for biogas mixture silage corn and cattle manure.

Thus, the system kofermentation substrate components are raw vegetable (Sudan grass green mass of corn silage maize) and animal (manure of cattle, pigs, poultry manure) origin provides a substrate with 21 kg from 2,99 to 5,72 m<sup>3</sup> of biogas.

The use of vegetable raw manure of cattle, pigs and poultry manure as coenzymes for biogas plants can be an effective factor in improving productivity and increasing the yield of biogas. In terms of 1 ton of substrate materials studied productivity in different ratios of components made from 112,5 to 286,0 m<sup>3</sup> biogas or 98,1–249,4 kg of fuel. – P. 173–177.

***Chernenko M. O. Reproductive ability of cows of золотинської of Holstein breed of different somatotypes.***

It is set that heifers arrive at economic maturity, and consequently and sizes of mass of body not below 360 kg, in early age – 13,7–14,8 months, but that of them, which in subsequent ontogenesis grow for that large volume constitution animals, arrive at it on 1,0 month before, than coevals of other groups ( $P > 0,95$ ). At the index of inseminations within the limits of 1,5–1,9 eyelids of first fruitful inseminations comes for them in 14,8 months, that before from coevals of other groups on 1,2–1,7 months after  $P > 0,95$ . In the total first births for them takes a place in age 23,8 month, that on 1,3–1,7 months before animals of other groups ( $P > 0,95$ ).

However, early inseminations corrects the perceptible operating loading on the organism of animals, that appeared in the presence of abortions and born dead for the cows of large-, middle- and small volume constitution cows, in an amount, accordingly: 4 (28,6 %), 4 (18,2 %) and 2 (14,3 %) cases.

It is found out, that index of inseminations for the cows of large- and small volume constitution of constitution outside technologically possible (to 2,0) and makes 2,6–3,1 inseminations on one fruitful, however for the yearlings of middle volume constitution cows this index is satisfactory and averages 1,4.

The cows of all of groups have duration of the second service period within the limits of 84,3–91,3 days. The cows of all of groups have duration of period of dead trees short and makes 38,0–40,7 days, which consider possible in this enterprise, as animals on his completion have middle fattened. Duration of period from births to births is within the limits of 359,0–400,9 days. Comparatively with by coevals of small volume constitution, for the cows of middle volume constitution cows this index is more short on 38 days after  $P > 0,95$ . This period is longer in all for the cows of large volume constitution.

The index of fecundity for the cows of all of groups makes over 48 marks, that fecundity is good, that is confirmed the prognosis of output of calves on 100 cows at the level of 97,1–99,0 % but by the coefficient of reproductive ability at the level of 0,91–1,00. However presence of abortions and born dead in large-, middle- and small volume constitution cows in an amount, accordingly: 14,3; 22,7 and 35,7 % cases, in fact of considerably reduces the output of calves on 100 cows.

It is found out the analysis of variance of onefactor complexes, that particle of hereditation, which predetermines a somatotype, on the results of early inseminations and indexes of reproductive ability for first of calving is in a range 1,3–19,2 %. This influence appeared the least on the index of inseminations – 1,3 % at  $P < 0,95$ , and most on age of first births – 19,2 % for  $P > 0,95$  and forecast output of calves on 100 young cows – 15,9 % for  $P > 0,95$ .

For second of calving it is set the analysis of variance of indexes of reproductive ability, that after first births efficiency of inseminations cows substantially depended on their constitutional descriptions after the size of OVK, as a particle of influence as a constitution on the index of inseminations is 28,4 % at  $P > 0,99$ , however on other indexes a particle of influence of this factor was less than and made within the limits of 3,8–12,8 % for  $P < 0,95$ .

Poednanist' of productive and reproductive qualities appeared the best for an animal with the size of OVK, which makes 0,6 l/kg and anymore. – P. 178–182.

***Dimchya G. G., Maystrenko A. N., Petrenko V. I. Efficiency of the use of energy of forages by heifers at different methods of growing.*** Researches were conducted in agricultural private enterprise (PRE) «Chumaky», Dnepropetrovsk district on the heifers of the Ukrainian red milk breed at growing from 7-th one for a 15-th month inclusive. In the conditions of scientific production experience the control and experimental groups of animals were selected, for 20 heads in each. All period of experience in feeding of heifers was used of the same type in the generalmixed ration, which consisted of silo corn, hay an alfalfa, cereal concentrates, pomace a sunflower, soybean

meal, salt of kitchen and premix. Setting of norms of amount of forages and nutritives in the rations of control group was conducted on the Nozdryn norms (moderate method of growing), and in experimental – on new national norms, adapted to the modern systems of feeding of cattle (intensive method of growing).

Consumption of nutritive of ration by of heifers of experimental group, by comparison to a control, in all periods was anymore ( $P < 0,01$ ) and, on the average, made: dry matter on 20,6 %, metabolisable energy (ME) – on 20,8 %, raw protein – on 19,5 %, fissionable protein – on 19,2 %, unfissionable protein – on 27,9 %, raw cellulose – on 14,4 %, neutral detergent fiber – on 17,4 %, acid detergent fiber – on 17,8 %.

Material well-being by energy hesitated and by comparison to norms were in a control group: for period 7–9 months – 123,7 %, for period 10–12 months – 117,6, for period 13–15 months – 101,7 %; in an experimental group, according to 105; 93,5 and 101,1 %.

It should be noted that in the norms of the moderate growing of heifers is brought high enough indexes over of consumption by the heifers of dry matter of rations in age 7–13 months during the low concentration ME (2,59–2,88 kg/100 kg live weight during the ME 7,0–7,37 MJ/kg dry matter concentration). In our researches of consumption of dry matter by heifers on 100 kg live weight there were 2,1–2,3 kg at level and appropriately went down at the decline of concentration of energy in the dry matter of ration.

The body weight of heifers of control group practically answered norms in all periods of growing, and in an experimental group, although average daily increases and corresponded to the norms, in age 15 months living mass of heifers was on 3,2 % less from a norm.

Energy consumption per unit of increase in all periods of growing of heifers were less in an experimental group ( $P < 0,05$ ). Contents of fat in 1 kg of increase of heifers of experimental group in all periods of growing was higher, comparative with a control group, and maintenance of albumen, opposite, was anymore at the heifers of control group. To energy was anymore contained in the increase of heifers of experimental group.

Conversion of energy of ration in energy of increase grew at the heifers of both groups with the increase of age of animals. Conversion of energy of ration in energy of increase at the heifers of experimental group on the whole was less by comparison to a control, without regard to the greater amount of fat in 1 kg of increase.

As is generally known, on 1 kg of increase of mass of body due to fat more of energy are needed, than due to an albumen. At identical efficiency of synthesis of fat and albumen, for the in-crease of BW on 1 g due to fat more of ener-gy are needed in 11 times, than due to an albumen. Con-sequently, our information confirms the results of other authors.

Analyzing the experimental findings, it is possible to do a conclusion, that the charges of exchange energy of ration on unit of increase for period of growing were in middle on 15,3 % less at the heifers of experimental group with the promoted level of feeding and more high increases. Taking into account that at the increase of increases main-tenance of fat in him grows appropriately, conversion of energy of ration in energy of increase at the heifers of expe-rimental group on the whole was less on 10,1 %. – *P. 182–185.*

***Marshalkina T. V., Zaikina G. V., Bila N. V., Martynenko G. N., Zaichenko O. U. Influence of complex anthelmintic substances on homeostasis with mixed invasion of chicken.*** The aim of research was to study the effect of complex application anthelmintic substances on hematological and biochemical parameters of the blood of chickens that affected a mixed nematode-cestodes invasion.

Research methods – biochemical (content of total protein, albumin and globulin fractions, uric acid, bilirubin, cholesterol, vitamin A by the liver); hematologic (hemoglobin, erythrocytes, leukocytes, leukocytic formula); experi-mental and statistical.

After giving medications studied basic clinical parameters overall health, hematological and biochemical parameters of the blood dehelminization of poultry. Blood samples were taken from vein to under the wing of appli-cation preparations and after – through 7, 14 and 21 days.

Hematological of parameters testify to restoring the development of process in the infected organism against the background of complex application anthelmintic substances displayed renewal of hemoglobin concentration and morphological structure of blood on the 21 day studies.

In blood of chicken first and second values of the research groups content albumin constituted  $35,7 \pm 11,14$  and  $32,93 \pm 9,91$  % after application anthelmintic substances against  $18,0 \pm 9,0$  % in the control 21 days after application of preparations.

During the experiment among livestock research groups found a decrease of 1,5 times relative content of  $\gamma$ -glo-bulin fraction under control.

In studying the dynamic changes of cholesterol in the blood serum of laying hens research groups installed its significant reduction ( $3,36 \pm 0,22$  ( $P < 0,01$ ), and  $2,88 \pm 0,41$  mmol/L ( $P < 0,05$ )) relative to controls ( $5,21 \pm 0,76$  mmol/L) on 21 day of the experiment. Application of anthelmintic substances does not have a significant impact on biochemical parameters of uric acid and bilirubin.

In conducting biochemical studies revealed liver increased content of vitamin A in laying hens first experi-mental group by 62 % relative to the control and 23,5 % more than in laying hens second experimental group.

So, in the study of hematological and biochemical parameters of blood it was found after complex application anthelmintic substances was observed to increase the number of erythrocytes, reducing the total number of leukocytes with a decrease in the relative amount eosinophils. In the blood of experimental of poultry installed

increased content of albumin and decrease the relative content of  $\gamma$ -globulin fraction and cholesterol and increasing the content of vitamin A in the liver. – *P.* 185–189.