

Summary

Vozhegova R.A., Belov Ya.V. Influence of plant densities and nutrition background on water consumption and productivity of maize hybrids in irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 4-7.

The purpose. To scientifically substantiate the elements of technology of cultivation of corn hybrids for optimization of the total water consumption and increase of productivity of plants in the conditions of the Southern Steppe of Ukraine at application of irrigation.

Methods. Field experiments were conducted during 2016-2018. on the experimental field of the Nikolaev National Agrarian University. The bookmarking and conducting of experiments was carried out according to the usual methods of experimental business in crop production and irrigated agriculture.

Results. The total water consumption of maize crops varied depending on all factors studied in the experiment. For an average of three years, according to factor A (hybrid), the maximum total water consumption – 4683 m³/ha was established for DKS 4795 hybrid and averaged 4517 m³/ha. It is proved that the best performance indicators of hybrids DKS 4764 and DKS 4795 were at a standing density of 70 thousand/ha, respectively, 15.5 and 15.4 t/ha. The introduction of mineral fertilizers provided an increase in grain yield by an average of 1.8–4.7 t/ha compared to the control.

Conclusions. In field experiments it was found that the highest water consumption (4683 m³/ha) was observed in the hybrid DKS 4795, and in the hybrids DKS 4764 and DKS 4795 this indicator decreased by 2.3–12.0%. It is established that the lowest coefficient of water consumption (239 m³/t) was on the variant with the DKS 3730 hybrid at a plant density of 80 thousand/ha and dose of N120P120 fertilizer. On average, the hybrid composition is optimal in terms of economy of water consumption, the plant density of 70 thousand/ha to obtain maximum yield when growing hybrid DKS 3730, it is necessary to form the plant stand density at 80 thousand/ha; DCS 4764 – 70 thousand; DCS 4795 – 70-80 thousand/ha. The optimal fertilizer dose for growing all the hybrids under study is N90P90.

Key words: corn, irrigation, hybrid, plant density, fertilizers, water consumption, yield.

Vozhegova R.A., Biliaeva I.M., Kokovikhin S.V., Piliarskyi V.G., Piliarska E.A. Effective marketing and implementation of scientific developments of the Institute of Irrigated Agriculture of the NAAS. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 8-11.

Innovation activity – activity aimed at the use and commercialization of research and development results, which determines the launch of new competitive goods and services on the market.

Methodology. In marketing, various techniques and research methods are widely used, based on both theoretical and practical approaches to the development and improvement of the economic activities of market entities. In close cooperation with scientists and specialists of the Institute's network of pilot farms, domestic innovative developments aimed at water and resource conservation, increasing the

economic, energy and environmental efficiency of Ukraine's agriculture were introduced into production.

Research results. The result of the activities of scientists of the Institute of Irrigated Agriculture of the NAAS is the development and widespread introduction into production of new agricultural systems, rational and safe nature management, conservation of soil fertility and the environment, adapted to the arid conditions of the Southern Steppe zone of Ukraine; development of new genetic and biotechnological breeding methods, due to which more than 70 varieties and hybrids of wheat, corn, soy, alfalfa, perennial grasses, tomato, and cotton have been created, which are competitive and adapted to the irrigation conditions of the southern region. A significant part of the created varieties are national standards, which in terms of productivity are 15-30% higher than analogues. The Institute and pilot farms organized a high-level work on conducting primary and elite seed production with the subsequent sale of seeds of high reproductions to agricultural producers from different regions of Ukraine and abroad.

Findings. Today, a significant part of various organizations and associations act as consumers, therefore, to maintain a competitive position, scientists at the NAAS Irrigated Agriculture Institute pay great attention to marketing activities.

Key words: marketing, innovative developments, popularization, trade fairs, social media, advertising.

Vozhehova R.A., Biliaieva I. M., Bilyi V.M. Photosynthetic activity of winter wheat seed crops depending on the varietal composition, sowing time and fertilization in the South of Ukraine

The goal is to determine the parameters of photosynthetic activity of winter wheat seed crops depending on the varietal composition, sowing time and fertilization when grown under non-irrigated conditions in the South of Ukraine. **Methods.** Field, laboratory, dispersion. **Results.** It was found that the leaf area was the maximum for the cultivation of the Maria variety – 38.7 thousand m²/ha. The sowing time (factor B) has an effect on the leaf surface area of winter wheat sowing, since under conditions of early sowing in the second decade of September, a relatively stable decrease in the studied indicator for growing all varieties was observed. Photosynthetic potential varied according to the varietal composition: on the Antonovka variety – 258%, Blago – 278%, Maria – 244%. The net productivity of photosynthesis of winter wheat crops varied slightly depending on the varietal composition. The sowing period had the maximum effect on the net productivity of photosynthesis in the interfacial period "heading – poured grain". The use of fertilizers, from the point of view of the parameter under study, was successful under the condition of using schemes C-5 – 5.67 g/m² per day and C-4 – 5.52 g/m² per day. **Conclusions.** The leaf area of winter wheat crops differed depending on the varietal composition. There was also a tendency for this indicator to grow when moving from early sowing dates to later ones. The photosynthetic potential of seed crops of winter wheat, recorded by us throughout the study, primarily depended on the interfacial periods of observation, while this indicator was minimal at the initial

growing season – during the interphase period “growing season – entering the tube”, and reached its maximum values between renewal of vegetation in milk ripeness of grain. The use of fertilizers provided the greatest increase in the net productivity of photosynthesis in the fourth and fifth options up to 5.5–5.7 g/m² per day, which is more than the control option by 7.3–12.9%.

Key words: winter wheat, seeds, variety, sowing time, fertilizers, leaf area, photosynthetic potential, net productivity of photosynthesis.

Vozhegova R.A., Borovik V.O., Bidnyina I.O., Rubtsov D.K. The dependence of the biochemical composition of soybean seeds on various doses of nitrogen fertilizers and sowing density. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 11-15.

The purpose. To establish the optimum plant density on the background of nitrogen fertilizer in order to form maximum quality indicators for seeds of the mid-season soybean variety Svyatogor.

Methods – the laboratorial, field, statistical.

Results. The use of mineral fertilizers increased the protein content in soybean seeds by 1.4–5.5% compared with non-fertilized areas. The percentage of protein in soybean seeds increased markedly with increasing planting density, regardless of nutrition background. The largest amount of protein in the seeds was accumulated by plants in variants with a density of 1 million units/ha when applying N30 (40.3%) and with a planting density of 600 thousand units/ha – 1 million units/ha with N60 (39.0–39.4%). An increase in sowing density to 1 million units/ha contributes to a decrease in the content of crude oil in Svyatogor soybean seeds from 22.8 to 22.0% against N30 and from N60 – from 22.2 to 22.3%, in tons. hours and on non-fertilized options (from 22.2% to 20.8%). The maximum yield of protein per hectare 1514.62 kg and oil 864.94 kg was obtained by applying N60 and plant density of 600 thousand units / ha. The yield of protein and oil per hectare increased due to an increase in yield by 58% (1.62 t/ha) compared with the variant without the use of fertilizer. On average, over the years of research, a decrease in the oil content in soybean seeds was observed in variants with a lower sowing density of 300 thousand units/ha to a larger 1 million units/ha. Optimization of the studied factors allows the formation of high quality soybean seeds.

Conclusions. On average, for three years of research against the background of the use of nitrogen fertilizer, the maximum protein content in soybean seeds was 40.3%, oil – 22.8%. The use of mineral fertilizers contributed to an increase in protein content in soybean seeds by 1.4–5.5% compared with unfertilized areas. The percentage of protein in soybean seeds increased markedly with increasing planting density, regardless of the nutrition background: at a density of 300 thousand units/ha, it was in the range 36.2–37.2%, with 1 million units/ha – 37.5–40.3%. The maximum amount of protein was accumulated by the plants in the seeds in the variants with a density of 1 million units/ha when applying N30 (40.3%) and with a planting density of 600 thousand units / ha – 1 million units/ha with N60 (39.0–39.4%). The highest yield of protein per hectare 1514.62 kg and oil 864.94 kg was obtained with N60 and plant density of 600 thousand units/ha. The yield of protein and oil per hectare increased due to an increase in yield by 58% (1.62 t/ha) compared with the variant without the use of fertilizer. Optimization of the sowing

density and dose of nitrogen fertilizer allows the formation of high quality soybean seeds.

Key words: soybean, plant density, doses of nitrogen fertilizer, protein content, oil content.

Vozhegova R.A., Melnychenko A.V. Genetic diversity of Asian rice as a basis for breeding for resistance to biotic and abiotic environmental factors

The goal of the study is to assess the various by ecological and geographical origin of gene pools of Asian rice by the complex of economic and plant breeding characteristics to pick out the most valuable samples, provide their description and wide introduction into plant breeding both by conventional and new methods. The article presents the **results** of the study on the creation of Asian rice of various morphotypes with the features of high grain productivity and resistance to biotic environmental factors. The breeding assessment of Asian rice varieties of various morphotypes was carried out by the method of determination of the general combinative ability. The picked-out varieties with a high amount of grain in a panicle are prospective and they were used in plant breeding programs as parental forms in hybridization. Prospective high-productive lines with the features of increased resistance to biotic and abiotic factors were created by crossing with further isolation. The resistance to lodging in pre-harvesting period with the indices of 7–9 points was revealed in 59 samples, which allows, in the presence of other economically valuable features, to successfully use them in plant breeding programs. By the results of the study, the forms of various resistance groups with high genetic potential and a complex of economically valuable features were picked out in the primary links of plant breeding process. The regulations of inheritance and variation of the feature “productivity of the main panicle” in rice hybrids was revealed. By the results of the field assessments, 45 plots were chosen for further study of features and reproduction. Further scientific work will be carried out to determine indices in the conditions, which are different by the complex of characteristics, and to confirm the stability of their level over the years. According to preliminary data, the prospects of studying the named hybrids in plant breeding process as highly adaptive and highly productive lines and varieties of Ukrainian breeding were established.

Key words: rice, variety, genotype, high productivity, adaptivity, morphological feature, lodging.

Hranovska L.M. Scientific substantiation of the directions of solving the conflicts in the zone of reconstruction of the rice irrigation systems on the territory of Kherson region. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 15-20.

The purpose of the scientific study is to develop a scientific substantiation of the directions of solving the conflicts in the zone of reconstruction of the rice irrigation systems on the territory of Hola Prystan district of Kherson region.

The methodology of the study includes the use of classical and specific methods of scientific research, namely: analysis, synthesis, historical, field and analytical methods.

Results. Natural and artificial factors having a negative impact on the hydrogeological and meliorative situation in the zone of rice cultivation and on the territories of village Novochohornoriya are scientifically substantiated. Natural factors: intricate

geological, geomorphological and hydrogeological conditions of the territory of Hola Prystan district, leading to a high groundwater level, especially in the coastal zone; low technical condition of the irrigation systems, which are characterized by the low energy conversion efficiency that promotes the formation of a powerful infiltration stream; disposition of the village along the thalweg of a gorge on the way of natural unloading of surface and ground waters from the watershed area. Artificial factors include: the lack of water runoff from the territory of the village after its building up; the lack of continuous work of drainage wells and central sewer network on the territory of the settlement. All these factors have a negative effect on the hydrogeological and meliorative conditions of the agricultural lands and territory of the settlement vil. Novochnomoriya. To solve the tasks regarding the supplying the population of the region with high-quality domestic rice groats and in order to prevent the processes of secondary salinization and alkalination it is required to resume operation of the rice irrigation systems on the saline and alkaline soils with low natural fertility through their modernization and introduction of innovative resource-saving technologies of rice and accompanied crops cultivation, which will not deteriorate the hydrogeological and meliorative situation of the vil. Novochnomoriya, and will also provide ecologically favorable conditions within the sanitary zone of the Black Sea Biosphere Reserve.

Conclusions. In the intricate hydrogeological conditions of Hola Prystan district at the modernization of the rice irrigation systems we recommend to introduce innovative engineering solutions and innovative resource-saving technologies of rice cultivation, which will follow the requirements of environmental protection. To improve the hydrogeological situation on the territory of the village, it is required to deepen the outflow canals situated along the village Novochnomoriya at the side of the first and second rice crop rotations, and regulate surface runoff within the village and the neighboring watershed territory.

Key words: rice irrigation systems, geological and soil conditions, conflicts of interests, rice, conservation areas, modernization, resource-saving technologies.

Drobitko A.V., Kokovikhin S.V., Zayets S.O. Productivity and economic and energy efficiency of technology of cultivation of winter barley varieties in the conditions of the Southern Steppe of Ukraine

The aim is to establish indicators of productivity and economic and energy efficiency of technology for growing different varieties of winter barley in terms of genetic potential in the conditions of the Southern Steppe of Ukraine. **Methods.** Field, laboratory, statistical, economic, energy. **Results.** Grain yield of winter barley varieties fluctuated significantly in some years of research depending on the characteristics of hydrothermal conditions – under favourable conditions in 2009 in the varieties Worthy and Winter, it increased to 6.21–6.44 t/ha, and during the droughts of 2008 and 2012 – in the varieties Zymovyi and Trudivnyk – decreased to 3.21–3.29 t/ha or 1.9–2.1 times. The coefficient of variation decreased to 15.4–15.6% in the variants with winter barley varieties Trudivnyk and Osnova, and in the Zymovyi variety it increased to 25.0%. The use of plant protection has led to an increase in protein content in all varieties by 0.5–1.0%. The starch content in the grain of the studied crop had mostly the opposite trend. The economic analysis

determined that the conditional net profit was the largest (2,768 UAH/ha) for the cultivation of the dignified variety with plant protection against pests. The coefficient of energy efficiency of the maximum level – 2.48 acquired in the version with plant protection for growing the variety Worthy. **Conclusions.** It is established that the application of plant protection caused an increase in grain yield on average by varietal composition from 4.12 to 4.65 t/ha or by 12.9%. Statistical analysis showed that stress resistance was maximum in varieties Taman, Worthy and Aboriginal. Genetic flexibility increased to 4.81 in the cultivar Dostoyny, and in the cultivars Rosava and Aborigine it decreased by 12.1%. The protein content in the grain of the studied varieties, as grown without plant protection, exceeded 10% in the varieties Zymovyi and Trudivnyk. Plant protection provided an increase in the conditional net profit from 1840 to 2088 UAH/ha or by 13.5%. The level of profitability decreased to 38.8–39.1% in the variant with plant protection on the varieties Rosava and Trudivnyk, and the highest level (59.3%) it reached in the variant with plant protection on the variety Dostoyny. The increase in energy decreased in the variant without plant protection to 30.0–30.1 GJ/ha in the varieties Aborigine and Taman. The minimum energy intensity of products was recorded for cultivation with plant protection of the varieties Worthy (5.73 GJ/t), Zymovyi (5.87) and Basis (5.97 GJ/t).

Key words: winter barley, plant protection, variety, yield, quality, economic efficiency, energy assessment.

Zhuykov O.G., Burdiug O.O. Phenological and biometric features of sunflower hybrids in organic cultivation technology in the South of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 20-24.

The article presents the results of the analysis of the complex of basic phenological (the date of occurrence of the main phenological phases and the duration of interfacial periods, the total duration of vegetation) and the formation of the most fundamental biometric indicators (plant height, length of internodes, area, thickness and shape of leaf blades, their pigment content, the parameters of the assimilation apparatus and differentiation of the root system of culture in the soil profile) with traditional and organic cultivation technology.

The goal was achieved by laying down a two-factor field experiment in which factor A (sunflower hybrid) was presented in two variants: PR64F66 F1 and Tunca F1, factor B (cultivation technology) in five variants: traditional (intensive) control and four modifications of organic technology. The method of experience-split plots, repetition of experience – fourfold, all observations and studies were carried out on two non-adjacent repetitions according to conventional techniques.

It is established that organic technology compared to intensive, has contributed to prolongation of the duration of the main phases of growth and development, and interphase periods (from flowering to seed ripening) for 4–5 days while reducing the duration of the starting stages of ontogenesis (the germination–the formation of baskets). Also, the index of the average height of plants decreased while increasing their foliage, linear size and area of the leaf blade, its thickness and pigment filling, reducing the length of internodes and increasing the index of leafiness of agrophytocenosis.

Organic technology contributed to the more active development of the root system of sunflower and differentiation of its active mass on the soil profile. The organization of crop protection from weeds with the help of agrotechnical measures did not reduce the survival rate of sunflower plants: the number of plants killed per unit of acreage during the growing season was at the level of a similar benchmark with intensive cultivation technology.

Key words: sunflower of early maturing group, biologization, duration of interphase periods, habitus, leaf surface index, root system, plant survival rate.

Kapinos M.V. Agro-economic assessment of elements of pea cultivation technology in the conditions of the Southern Steppe of Ukraine

Purpose. The goal is to establish the productivity and economic efficiency of the technology for growing varieties of peas in non-irrigated conditions of the Southern Steppe of Ukraine. **Methods.** The studies were conducted on the experimental field of the Research Institute of Agrotechnologies and Ecology of the Tauride State Agrotechnological University during 2015–2017. Two-factor experience was laid by the method of experimental work. Economic calculations were carried out according to special techniques. **Results.** The maximum conditional net profit at the level was fixed in the variant with the Variety Motto, which increased to 15451 UAH/ha, and on the Ataman variety this indicator had the lowest level – 12912 UAH/ha. The highest level of profitability in the experiment – 24.1% was obtained for the cultivation of the pea variety Motto during seed treatment with the AKM biological product. The energy input with the crop was the largest in the Motto variety – 59.4 GJ/ha, while in other varieties this indicator decreased by 2.2–13.1%. Combined treatment of seeds with AKM and Rizobofit biologics made it possible to increase this indicator to 60.4 GJ/ha. The increase in energy during the cultivation of peas was largely dependent on the varietal composition. **Findings.** It was established that the cost of gross production when growing Ataman sowing peas using biological products and growth regulators for seed treatment was significantly lower than that of the Motto and Glance varieties. The prime cost of growing pea grain was the highest for the Ataman variety – 2631 UAH/t, which is 10.3–12.4% more than the other varieties studied. The maximum conditional net income is fixed in the variant with the motto Variety – 15451 UAH/ha. The highest level of profitability in the experiment – 24.1% was obtained for the cultivation of the pea variety Motto during seed treatment with the AKM biological product. The energy efficiency coefficient of the developed technology for the cultivation of plant peas varied little from variety – from 3.1 in the variety Ataman to 3.4 in the variety Motto.

Key words: sowing peas, variety, seed inoculation, productivity, variability of productive traits, economic efficiency.

Koloyanidi N.A. Water consumption and productive moisture reserves in chickpea crops depending on agricultural methods. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 25-28.

The aim of this work was to identify among studied chickpea varieties those that use soil moisture most effectively, as well as to research characteristics of chickpea water consumption depending on seeding methods and application of herbicides. Plot trial was carried out during 2008–2010 in FE "Rosena-Agro" of Nikolaev area. Soil cover of experimental plot is

represented by chernozem southern. Object of research were varieties of chickpeas: Rosanna, Pam'yat', Triumph, Budzhak. Experimental plan also included various seeding methods – solid drilling (15 cm) and wide-row sowing (45 cm) and application of herbicides: Pulsar (1 l/ha); Bazagran (2 l/ha); a tank mixture of Pulsar and Bazagran with half doses of each drug. Replications is three-fold, sown area of first order plot is 75 m², accounting – 50 m². Chickpea growing technology has been recommended for research area. Seeding rate: for continuous crops – 0.6 mln pcs. per 1 ha, for wide-row crops – 0.4 mln pcs./ha.

The main cause of unstable harvest of chickpea in Southern Steppe of Ukraine is insufficient moisture throughout year. With sufficient spring moisture reserves in meter layer of soil and precipitation in April–May, which keep soil moist, favorable conditions are created for growth and development of this crop.

The greatest total water consumption of chickpea crops was revealed with wide-row sowing method it against background of introducing the Pulsar+Bazagran tank mixture into phase of 2–5 true leaves of culture. When sowing with row-spacing of 15 cm, seeding rate of 0.6 mln pcs./ha, coefficient of water consumption of chickpeas was 2277 m³/t, lower this indicator was formed when sowing chickpeas by 45 cm with a seeding rate of 0.4 mln pcs./ha (from 2021 up to 2358 m³/t depending on variety). So-called large-seeded varieties Triumph and Budzhak consumed less water for formation of 1 ton of grain – 2055-2176 m³/t, and small-seeded Rosanna and Pam'yat' – 2264-2428 m³/t. The minimum expenditures of total amount of water per 1 ton of grain were noted during growing of Budzhak variety: solid drilling – 2089 m³/t, for wide-row sowing – 2021 m³/t.

Key words: chickpeas, variety, seeding methods, water consumption, herbicidal background.

Konovalov V.A., Konovalova V.N., Usyk L.A. Seed productivity of dye safflower varieties under different growing conditions in the South of Ukraine

The aim of the research was to establish optimal moisture conditions and doses of mineral nutrition that will increase the seed productivity and yield of conditioned safflower seeds.

According to the research results conducted at the Askaniya State Agricultural Research Station of the Institute of Irrigated Agriculture of NAAS, it was found that irrigation, regardless of variety, provided an average yield increase 0.3 t/ha. The highest yield of conditioned seeds on all varieties of safflower both under irrigation and in conditions of natural moisture was provided by the application of N₉₀P₆₀. Reducing fertilizer application rates (N₉₀P₆₀–N₆₀P₆₀–N₄₅P₆₀ – without fertilizers) reduces the yield and conditions safflower seeds. Among the studied varieties, both in terms of productivity and yield, the variety Zhyvchyk stood out, it formed the largest number of baskets per 1 plant and the mass of seeds per 1 plant. So on the irrigated the maximum number of baskets in the grade makes 20,8 pieces, weight of seeds thus makes 11,61 g. In the conditions of natural moisture these indicators are 15 pieces and 7.73 g, respectively. But the weight of 1000 seeds under rainfed conditions of growing safflower is 3.05 g greater than under irrigation conditions. So the highest weight of 1000 seeds was obtained in the variety Luggednay under conditions of natural moisture 38.04 g, while under irrigation this figure is at the level of 34.14 g/ha under

natural moisture conditions of, the seed yield of the variety was 1.39 t/ha.

Quality indicators of safflower dye indicate that the introduction of $N_{90}P_{60}$ provided higher oil content in all varieties. As for the influence of growing conditions on the oil content of safflower, when irrigated, the oil content is slightly higher than on bogar. The highest oil content was obtained under irrigation in the variety Zhyvchyk with the introduction of $N_{90}P_{60}$ – 33.5%, the oil yield was 570 kg/ha. In the conditions of natural moisture supply, the highest oil content of 30.6% with an oil yield of 387 kg/ha was also provided by the safflower variety Zhyvchyk with the application of $N_{90}P_{60}$.

Conclusion. The maximum profit on the experiment was obtained for the variety Zhyvchyk under irrigation conditions with the application of $N_{90}P_{60}$ 7902 UAH/ha with a profitability of 73%. In non-irrigated conditions, the highest profit at the level of 6,990 UAH/ha with a profitability of 106% was provided by the cultivation of Zhyvchyk safflower with the introduction of $N_{60}P_{60}$.

Key words: safflower dye, variety, irrigation, productivity, yield.

Kulyk M.I., Syplyva N.A., Babych O.V. The formation of yield of switchgrass depending on the width of row-spacings and fertilization of plants. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 28-34.

Purpose. Identify to influence elements of technologies of growing on formation of yield switchgrass for forest-steppe of Ukraine.

Methods. Yield of biomass switchgrass studied in field and laboratory conditions. Studied its dependence on fertilization of plants, optimal quantitative parameters and effects on plant growth and development.

Results. Based on the of research counted that of different of width of row-spacings and fertilization to affected on quantitative indicators of switchgrass. Study indicated to increase in dynamics of increasing plants height from the third to the sixth year of vegetation the 155,4 to 240,5 cm, for the years of middle 173,4 to 235,2 cm. The yield of dry biomass depended on factors of studied and varied by study of years from 10,7 to 15,9 t/ha and on average of years – 11,7 to 15,5 t/ha. Results of research installed, that for the years of middle are 11,7 t/ha (from width of row-spacings 15 cm, without fertilization) to 15,5 t/ha (fertilization of plants of azote from dose 45 kg/ga and from row-spacings 45 cm). Fertilization of plants of spring increases productivity for five years in middling to 3,8 t/ha or 22,9 %. Fertilization of plants with a dose of azote 60 kg/ha and increase of row-spacing influences to more height of plants but less thickness of stem and fall of plants from 14 to 27% during the summer growing season. There were not detecte change yields of plants from width of row-spacings 60 cm and fertilization of plants dose of azote 45–60 kg/ga. The best variant was from growing of plants from width of row-spacings 45 cm and use spring's fertilizer plants of dose of azote 30–45 kg/ga.

Findings. Result of studies showed that the greatest yield of biomass switchgrass is when grown with a row spacing of 45 cm and the use of spring's fertilizing plants at dose of nitrogen of 30–45 kg/ha. Reduction and most doses of nitrogen did not affect to increase yields significantly. The area of plant nutrition influences the productivity of plants. Reducing the row

spacing up to 15 cm and increasing it to 60 cm reduces the yield significantly.

Key words: bioenergy crops, biomass, yield, fertilizer of plants, row spacing.

Malyuk T.V., Kozlova L.V., Pcholkina N.G. Optimization of soil water regime in intensive sweet cherry trees plantations with drip irrigation and mulching. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 34-39.

Purpose. To establish peculiarities of hydrothermal regime formation of southern black earth in young intensive sweet cherry trees plantations under the influence of drip irrigation and different soil maintenance systems.

Methods. The research was conducted on the basis of Melitopol Research Fruit Growing Station named after M.F. Sydorenko Institute of Horticulture during 2016–2018 in young sweet cherry trees plantations according to the requirements of “Methods of conducting field research with fruit crops”. The soil was southern light loam black soil. Soil maintenance system was black fallow (control) and mulching of neartrunk strips: with sawdust, straw and black agrofiber. Garden irrigation was carried out by a stationary drip irrigation system while maintaining the soil moisture at 70% of the lowest moisture content. Soil moisture was determined in the dynamics by the thermostatic-weight method. Soil temperature was determined with soil thermometer on the surface and at a depth of 10 cm.

Results. The use of natural mulching materials, namely sawdust and straw, resulted in a 26% precipitation moisture reservation relative to the fallow soil maintenance under unirrigated conditions. In addition, depending on the weather conditions of the year, the temperature in conditions of mulching with natural materials was lower by 5.8–24.7°C compared to the black fallow. Black agrofibre did not possess such properties: in some periods the temperature under it was even higher than the black fallow by 3–5°C. Mulching in combination with irrigation at a pre-irrigation level of soil at 70% of the lowest moisture content allowed to reduce the number of irrigations and to increase the inter-irrigation period, which provided the saving of irrigation water from 11 to 49%. The use of natural materials for mulching resulted in the saving of irrigation water during three years of research on average more than 36%, with condition of observance the soil pre-irrigation moisture level at 70% of the lowest moisture content, and saving of black agrofibre by 19.8%.

Conclusions. The mulching of the sweet cherry neartrunk strips with straw and sawdust in conditions of natural moistening cannot be a complete alternative to irrigation in the arid conditions of southern Ukraine, but it causes a reduction in the period of critical lack of moisture in the soil. Mulching in combination with irrigation allows to reduce the number of irrigation by 2–3, increase the inter-irrigation period up to 20 days, which causes a decrease in consumption of irrigation water. The greatest savings in water resources (over 36%) were observed when straw and sawdust were used as mulch. The use of drip irrigation and mulching with natural materials causes a decrease in the maximum soil temperature in the hot season at least 5.7°C and a decrease in the amplitude of daily fluctuations in soil temperature.

Key words: sweet cherry trees planting, light loam black soil, soil maintenance system, mulching, drip irrigation, hydrothermal regime.

Maliarchuk N.P., Tomnitskiy A.V., Maliarchuk A.S., Isakova G.M., Mishukova L.S. Influence of basic tillage on the salt mode of soil and productivity of crop rotations in the area of action of Ingulets irrigatory system. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 39-43.

Purpose: establishment of directions of changes of the reclamative state of livery soil under act of the different systems of basic tillage in the cultivated 4-fields crop rotation on irrigation in the area of action of Ingulets irrigatory system.

Methods: the field, in-gravimetric, visual, laboratory, calculation-comparative and mathematically-statistical methods with the use of confessedly in Ukraine methods and methodical recommendations.

Results. It is set that over the protracted irrigation (over 50 years) on a background the systems of basic tillage, which was investigated, poorly mineralized waters of Ingulets irrigatory system brought to the accumulation of salts in the meter layer of soil. Less of salts accumulated in the variant of the different depth ploughing and in variants of different depth without dump and differentiated-1 systems of tillage of them, vice versa, accumulated anymore. The greatest productivity of cultures of crop rotation was provided by top-dressing the dose of N120P60 on a background a different depth dump and differentiated - 1 system of basic tillage of soil at which the productivity of corn on grain accordingly was 14,44 and 14,82 т/ha, soy – 4,31 and 4,34 т/ha, wheats winter 6,81 and 6,90 т/ha and sorghum grain-growing – 7,09 and 7,70 т/ha. Providing the substantial economy of charges on implementation shallow and different depth without dump systems of tillage of soil in a crop rotation, they small influenced on general charges on technology of growing of agricultural cultures on the whole.

Conclusions. Application differentiated-1 system of basic tillage with one subsoiling on a depth a 38–40 cm for the rotary press of 4-fields of the cultivated crop rotation on Ingulets the irrigated array, with the use for watering of water limitedly suitable for irrigation, assists slowing down of accumulation of salts in arable horizon, improves physical and chemical properties of soil and phytosanitary state of sowing, providing the greatest level of profitability and profitability of production.

Key words: cultivated crop rotation, dark chestnut soil, maintenance of water soluble salts, ion-salt composition, productivity.

Onufran L.I. Dates of sowing of various varieties of winter barley under irrigation conditions in the south of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 43-47.

Purpose. To study the influence of sowing dates on the productivity and quality of grain of modern varieties of winter barley and determine the optimal timing of their sowing under conditions of irrigation in the south of Ukraine.

Methods: field, laboratory, analytical.

Results. When sowing winter barley on September 20, plant vegetation lasted an average of 82 days in autumn, and the sum of daily average temperatures was 724°C, when sowing October 1–72 days and 540°C, when sowing October 20–52 days and 330°C, respectively. When winter barley was sown on September 20, plants of all varieties

managed to grow well in the fall, had a bushiness of 3.5–5.2, when sowed on October 1, the bushiness was 2.3–3.2, and when sown on October 20, the plants did not have time to seed, they entered winter in the phase of 2–3 leaves. For good development, winter barley plants should vegetate in the fall of 55–60 days, and the sum of temperatures before the cessation of vegetation should be 500–550°C. The highest productivity and grain quality of all studied varieties of winter barley were formed during sowing from September 20 to October 1. At the same time, the yield of the Akademichesky variety was 6.88–6.93 t / ha, the Ninth shaft – 6.95–6.98, Decent – 5.85–5.90 t / ha. Transfer of sowing to a later date on October 20, led to a significant – a decrease in the yield of the Akademichesky cultivar – by 0.61–0.66 t / ha, of the Ninth Val cultivar – by 0.45–0.48, of the Dostoyny cultivar – by 0,44–0.49 t / ha. When sowing on October 20, all varieties nevertheless formed a satisfactory grain yield of 5.41–6.50 t / ha, therefore this sowing period can be considered permissible. For all sowing dates, the highest yields and feed quality of grain were provided by the Academic and Ninth Val varieties, and the Decent variety was inferior to them by productivity by almost 1 t / ha of grain.

Conclusions. On irrigated lands in the south of Ukraine, the optimal period for sowing winter barley varieties Akademichesky, Ninth Val, and Decent is the period from September 20 to October 1. The valid term for their sowing is October 20. In terms of yield and grain quality, the best varieties for irrigation conditions are Academic and Ninth Val.

Key words: plant bushiness, productivity, grain quality, sugar content, structural elements.

Osgchipok O.S. Influence of chemical and biological protection systems of grape nursery varieties of different resistance to pathogens on the spread of *Plasmopara viticola*

Purpose is to determine the effectiveness of the use of chemical and biological means of protection of grape school, depending on the field hardness of different grape varieties to *Plasmopara viticola* in the South of Ukraine. **Methods.** The research was carried out in the conditions of the Right-bank Lower Dnieper zone of viticulture of Ukraine – on the basis of the Agrofirma “Belozersky” (Kherson region, Belozersky district, Dneprovskoe village) during 2011–2013. Field experiments were laid according to generally accepted experimental techniques. **Results.** It has been established that the use of fungicides (chemical protection) and biological product Mikosan B (biosecurity) has a high level of efficiency with some advantage of the former. Based on the studies carried out, it is possible to recommend the use of the biological product Mikosan B to protect the vineyard from *Plasmopara viticola* instead of fungicides on slightly and moderately affected (by leaves) grape varieties. **Conclusions.** On the leaves of cultivated grape seedlings of Isabella, Vostorg *Plasmopara viticola* without protective measures developed to a lesser extent than on the leaves of Bianca and Arcadia varieties, however, the most widespread damage was when cultivars Pervenets Magaracha, Rkatsiteli and Chardonnay were grown. So, the Isabella, Delight varieties in the studied viticulture zone are characterized as highly resistant, Bianca and Arcadia – as medium-resistant, and Firstborn Magaracha, Rkatsiteli and Chardonnay – as low-resistant to *Plasmopara viticola*. It has been established that the development of *Plasmopara viticola* on leaves with an indicator of more than 30% leads to a decrease in the quality of planting material,

causes the output of non-standard products. The level of protective measures when using biological products to protect the grape school from *Plasmopara viticola* 50% or more allows you to grow standard seedlings of grape varieties with high, medium and low field hardness.

Key words: grape varieties, grape school, *Plasmopara viticola* spread, biosecurity, protection efficiency.

Pinkovski H.V., Tanchik S.P. productivity and water consumption of mid-early sunflower hybrids depending on periods of seeding and plant stand density in the Right-Bank Steppe of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 47-52.

Purpose. Increasing productivity by improving the timing of sowing and density stand of sunflower plants and their impact on soil water regime in the conditions of the Right-Bank Steppe of Ukraine.

Methods. The researches were conducted during 2016–2018 on the fields of the Kirovohrad State Agricultural Experimental Station (KSAES NAAS), now the Institute of Agriculture of the NAAS Steppes according to field and laboratory research methods.

Results. The article presents the results of scientific research on the influence of sowing time and plant stand density of sunflower plants on the water consumption of mid-early hybrids and their productivity in the Right-Bank Steppe of Ukraine. It is established that the limiting factor in the growing of sunflower in the Steppes of Ukraine is moisture. On average, over the years of research, the most accessible moisture in the 0–10 cm soil layer was for the first sowing period - when it was heated at a seed placement depth of 5-60C and amounted to 25.0 mm. Under such conditions, quite favorable conditions are created for moistening the sowing layer of the soil in order to get friendly and full seedlings when sowing in the first or second decade of April. However, at the end of the third decade of April, there is a significant decrease in gross water reserves in the sowing and deeper layers of the soil, which may limit the productivity of the resulting crops. It was also established that the reserves of moisture available to plants in the meter layer of soil during sowing significantly affected the dynamics of emergence. On average, over the years of research, the most accessible moisture in the 0–100 cm soil layer was for the first sowing period - when it was heated at a seed placement depth of 5–60C–178.6 mm for the second sowing period – 172.1 mm for the third sowing period – 169.7 mm.

It was also established that the reserves of moisture available to plants in the meter soil layer during the flowering phase and before harvesting were uneven during the years of research and varied in terms of sowing and depended on the density of plants. So, according to the average data of 2016–2018 the highest reserves of moisture available to plants in the soil layer were 0–100 cm, in sowing of hybrid of the Forward, LG 56.32, LG 54.85 and LG 55.82 with a plant stand density of 60 thousand per hectare, for the first sowing period, it was 127 mm in the flowering phase, for the second sowing period – 121 mm, for the third sowing period – 121 mm.

A study of the features of using soil moisture in sunflower hybrids showed that they require different moisture supply during the growth and development phases. The total water consumption of hybrids during the growing season was 3202–3271 m³/ha. Such

moisture supply of crops can be considered satisfactory for the formation of high yield.

It was established that the moisture of the plant of the LG 55.82 hybrid was used much more effectively for the first sowing period, when the soil at the depth of seed placement warms up to 5–60C and plant density of 60 thousand / ha, the water consumption coefficient was 849 m³/t. Hybrid plants Forward, LG 56.32, LG 54.85 most effectively used moisture for the third sowing period, when the soil at the seed placement depth is heated up to 9–100C and placed on an area of 60 thousand / ha, the water consumption coefficient was – 1036, 884, 886 m³/t, given that in arid conditions, sunflower used moisture very rationally.

The optimal sowing time for sunflower hybrids for LG 55.82 and LG 54.85 in the Right-Bank Steppe is heating the soil at a depth of seeding up to 5–60C, for Forward and LG 56.32 hybrids it is heating the soil at a depth of seeding up to 9–100C, the optimal density is 60 thousand per. ha. Under such conditions, the LG 55.82 hybrid formed yield of 3.85 t/ha, the LG 54.85 hybrid 3.64 t/ha, the Forward 3.09 t/ha, the LG 56.32 hybrid 3.62 t/ha.

Conclusions. In the region, the soil moisture deficit is an important limiting factor in obtaining high yields of sunflower seeds. Therefore, the full satisfaction of the needs of sunflower hybrids of different ripeness groups in moisture is crucial in realizing their genetic potential opportunities.

At the first sowing period, the highest seed yields were provided by the hybrids LG 55.82 3.85 t/ha and LG 54.85 – 3.64 t / ha, and the hybrids Forward and LG 56.32 when sowed in the third term in accordance with 3.09 and 3.62 t/ha.

Shifting the sowing dates to earlier ones makes it possible to change the conditions for the growth and development of sunflower plants, namely, plants are better supplied with moisture, and it is possible to bypass critical temperature periods of plant development.

Key words: sunflower, hybrids, sowing time, plant stand density, productive moisture, yield.

Sinchenko V.V., Tanchyk S.P., Litvinov D.V. The water regime of the soil when growing soybean in the right-bank Forest-Steppe of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 52-56.

Purpose – determine the ways of rational use of moisture in soybean soil depending on the predecessors and tillage in the Right-Bank Forest-Steppe of Ukraine.

Methods. The field, in-gravimetric, visual, laboratory, calculation-comparative and mathematically-statistical methods with the use of confessedly in Ukraine methods and methodical recommendations.

Results. The article shows the features of the formation of stocks of available moisture for the cultivation of soybean, depending on the predecessors and tillage. It was established that in the Right-Bank Forest-Steppe for the period of sowing of soybean the largest reserves of available moisture (0–100 cm layer) of the soil were formed after winter wheat and spring barley from 163,7 and 151,6 mm in the variant with plowing, in 173,5 and 172,3 mm with direct seeding. The smallest reserves of available moisture were provided by corn for grain – from 140,1 to 154,1 mm. For the placement of soybean after sunflower and soybean, the available moisture

reserves in the meter-thick layer of the storm are equivalent and amounted to 149,3 and 150,0 mm in plowing, in 162,2 and 164,1 mm with direct seeding.

Conclusions. On the black soil of the typical Right-Bank Forest-Steppe, soybean plants most effectively during the growing season consume moisture for placement after winter wheat for chisel treatment and the most expensive - after corn for grain and sunflower for surface tillage and direct sowing. The total water consumption for the formation of a unit of dry matter of the soybean yield for placement after corn for grain ranged from 475 m³/t in the variant with plowing to 623 m³/t with direct seeding. After sunflower depending on tillage they ranged from 442 to 621 m³/t, spring barley – from 436 to 521 m³/t, soybeans – from 412 to 476 m³/t, winter wheat – from 408 to 500 m³/t.

Key words: soybean, predecessor, reserves of available moisture, tillage, water consumption.

Tanchyk S.P., Pavlov A.S., Chumbey V.V. The impact of soil tillage on weediness of buckwheat in the Carpathian region of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 56-60.

Purpose. Achievements of effective control of weeds in the crops of buckwheat at various primary and pre-sowing tillage in the Carpathian region of Ukraine.

Methods. The research was conducted in the conditions of the Carpathian State Agricultural Research Station of NAAS and the Laboratory of the Department of Agriculture and Herbology of NULES of Ukraine during 2015–2017. General scientific, laboratory and statistical methods were used for the research. Statistical processing of data was performed using the program, named “Statistica 10”.

Results. The article presents the results of research on the influence of the primary and pre-seeding tillage on the weediness and yield of buckwheat in the conditions of the Carpathian region of Ukraine. Statistical analysis showed the impact of tillage on weediness culture in both experiments. Buckwheat yield correlates with the number of weeds and their weight. In Experiment 1, the correlation coefficient (*r*) between yield and weed count varied from -0.64 during the germination period to -0.48 – flowering and -0.72 – fruit ripening, and between yield and weight this index was -0,58. In the second experiment, the correlation between yield, number and weight of weeds was expressed by the following correlation coefficients: -0.85; -0.86; -0.83; -0.85.

Conclusions. According to the results of two experiments, the combination of basic chisel soil tillage on 20–22 cm and the successive conducting of early spring harrowing, harrowing with heavy tooth-boring harrows and pre-sowing cultivation at the depth of the seed placement is optimal. This ensured the control of the number of weeds at the level of 10 pcs./m² during the stairs, 15 pcs./m² – flowering and 17 pcs./m² – maturation. The mass of weeds was 194 g/m². This provided the highest yield of buckwheat in experiments – 3.61 t/ha.

Key words: buckwheat, weediness, the mass of weeds, soil tillage, plowing, chisel plowing, disking, productivity.

Balashova G.S, Kotova E.I., Yuzyuk S.M., Kotov B.S., Shepel A.V. Effect of growth regulator and nourishing environment replacement period on potato tuber induction in in vitro condition. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 61-64.

Purpose. Determine the optimal mode of in vitro cultivation of potatoes of the Yavir variety, depending on the composition and timing of the replacement of the nutrient medium in order to increase the yield of improved seed material.

Methods. comprehensive use of laboratory, mathematical-statistical, computational-comparative methods and system analysis.

Results. The experimental data are presented the effect of the concentration of succinic acid in the nutrient medium and the period of its replacement on the growth, development and productivity of potatoes in vitro of the mid-season variety Yavir. It was established that the height of plants was significantly influenced by all the studied factors, as well as their interaction. The formation of the number of internodes significantly depended on the concentration of the growth stimulator on the 20th day of cultivation, and on the interaction of both factors on the 40th day. The formation of stolones of Yavir potato plants on the 20th day of cultivation depended on all the studied factors, their interaction also had a significant effect, on the 40th day, factor A did not significantly affect the formation of stolones. The formation of micro-tubers on the 20th and 40th days of cultivation was influenced by both studied factors and their interaction, on the 60th and 80th days - the effect of factor A (replacement of the nutrient medium on the 20th day) was not significant. It should be noted that the replacement of the nutrient medium and the concentration of succinic acid, both separately taken factors and mutually acting, had a significant effect on the formation of the mass of micro-tubers per plant.

Conclusions. Based on the results of three years of research on the effect of succinic acid concentration on the potato tuber formation rate in in vitro conditions, the best performance indicators of the Yavir cultivar were obtained when growing with an amber acid content of 1.0 and 2.0 mg/l, the mass of the average microtuber was 506.9 and 481.0 mg, microtuber mass per plant - 508,6 and 493,8 mg with the intensity of tuber formation 101.3 and 102.7%.

Key words: in vitro culture, growth regulator, seed material, microtuber, productivity.

Vlaschuk A.N., Drobit A.S., Prishchepo N.N., Shapar L.V., Konashchuk E.P. Scientific bases of seed production system of southern Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 64-68.

Purpose. To study the condition of the system of crop production in the conditions of the south of Ukraine.

Methods. Field studies were conducted during 2003-2018, on dark chestnut soils under the conditions of the experimental field of the Institute of Irrigated Agriculture of NAAS, located in the south of Ukraine. The planning and conduct of the research was performed according to generally accepted field experience, methodological recommendations and manuals.

Results. Technologies for growing winter, soybean, corn, grain, leguminous, industrial crops and white annual donut have been developed and improved in southern Ukraine.

Conclusions. The system of seed production in the south of Ukraine is built on a scientific basis, which provides rapid reproduction and introduction into production of new varieties of crops, production of varietal seeds in the amount necessary to provide seeding and the creation of insurance funds. In market conditions, the present basis of effective farming is the use of intensive crop cultivation technologies, which are based on the use of high-

yielding varieties and the rational use of optimal technology elements.

The Department of Seed Production of the Institute of Irrigated Agriculture, NAAS is working on the solution of applied problems, the development of methodological recommendations, the introduction into the production of scientific and technical programs and the scientific support of agrotechnics for the cultivation of high-quality seed. The main area of scientific activity is the development and improvement of elements of technologies for growing agricultural seeds, as well as the introduction into production of new varieties and hybrids of cereals, legumes, oilseeds and herbs listed in the State Register of Plant Varieties of Ukraine.

Key words: seeds, seed production, breeding, variety, yield, profitability.

Vozhegova R.A., Balashova G.S., Boiarkina L.V. Growth and development of seed potatoes in summer planting freshly harvested tubers in southern Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 68-72.

Purpose. To study the influence of planting density and the term for the removal of tops of irrigated seed potatoes of the summer planting period on the formation of the tuber crop, its quality and economic efficiency.

Methods of research: field, analytical, mathematical-statistical.

Research results. An analysis of the data obtained from two-year studies showed that, on average, over the years of research, the planting density of 80 and 100 thousand tubers/ha ensured a yield increase of 11.4–20.1% compared with the planting of 60 thousand pcs/ha. Harvest when removing tops on September 10 and planting density of 60, 80 and 100 thousand units/ha was at 79.0; 67.0 and 75.8 % lower than yield of the control variant (without removing tops). Until September 10, plants according to the actual stand density of 39, 41 and 53 thousand/ha managed to accumulate 21.0; 33.0 and 24.2 % of the final crop. After 10 days, the yield level reached 56.7; 64.4 and 47.4 %; until September 25 – 91.1; 89.3 and 94.0 %. The later the time for removing the tops was, the higher the yield of tubers. In 2007, the harvest was much less (in individual variants more than 10 times) than in 2008, while the difference between the variants with different planting densities was not significant. The year 2007 was extremely arid and generally unfavorable for the potato crop.

Conclusion. The density of the summer planting of potatoes 60 thousand tubers per 1 ha is economically justified. Until the end of September, more than 90 % of the final crop is formed. An increase in planting density to 60 and 80 thousand contributes to higher yields, but the rise practically does not exceed the additional amount of potatoes consumed during planting.

Key words: planting density, term of removal of the bud, yield, weight of tubers, weight of buds, fractional composition of tubers.

Zaiets' S.O., Kysil' L.B., Halchenko N.N. The yield of modern winter barley varieties for different sowing periods and the use of growth regulators in irrigation. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 72-76.

Aim. To determine the influence of varieties, sowing periods and growth regulators Humifild Forte Brix, MIR and PROLIS on the yield formation of winter barley when grown after soybean in irrigation conditions.

Methods. The research was conducted on the field of rotation of the Department of Agrotechnology of the Institute of Irrigated Agriculture NAAS in the period from 2016 to 2019 according to the methods of field and laboratory research on irrigated lands (IZZ NAAS, 2014).

Results. It is established that in different weather conditions of the seeding years, the use of growth regulators in different ways influences the formation of grain yield of modern varieties of winter barley. Significant impact of growth regulators was observed in 2017 and 2019, sowing dates – in 2017 and 2018, and varieties – in 2019. The highest grain yield of barley varieties was formed in the conditions of 2018 – 7,55 t/ha on the Akademichnyi grade and 7,86 t/ha on the Deviatyi val variety, and the highest grain increments of 0,49–0,77 t/ha – in 2019 year.

The use of growth regulators Humifild Forte Brix, MIR and PROLIS helps to increase the yield of both varieties of winter barley. The average increase in grain yield from the use of growth regulators in the Akademichnyi varieties for sowing on October 1 was 0,32 t/ha, for the Deviatyi val – 0,40 t/ha, and for sowing on October 20 – 0,34 and 0,38 t/ha, respectively. In of variety Deviatyi val, growth regulators deliver higher yields. That is, the use of growth regulators helps to increase the yield of both varieties of winter barley, but more significant increments of grain provide plants of the ninth shaft.

For the average of three years of research, the Deviatyi val yielded the highest yield (7.03 t/ha) for the sowing on October 1 of the seed of the MIR biological preparation, and the Akademichnyi variety for the Humifild treatment of 6.59 t/ha. For sowing on October 20, the maximum yield of 6,41 t/ha was cultivated by the Ninth Shaft for seed treatment with PROLIS, and Academic grade 5,51 and 5,54 t/ha for seed treatment with PROLIS and spraying with Humifield.

Conclusions. To increase the yield of winter barley, it is necessary to use growth regulators Humifild Forte Brix, MIR and PROLIS, both for the treatment of seeds and spraying of plants in the spring bush.

Key words: winter barley, varieties, sowing time, growth regulators, yield, irrigation.

Zayets S.O., Piliarska O.O., Fundirat K.S., Shkoda O.A. Evaluation of sowing and quality indicators of the winter triticale seeds varieties depending on the treatment microfertilizers. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 77-83.

The Aim of research was to establish sowing and food parameters of seed quality, to identify their relationships on winter triticale varieties, depending on the treatment microfertilizers of parent plants under irrigated conditions.

Methods. Determination of sowing and quality indicators of seeds was carried out in the laboratory of analytical research of the Institute of Irrigated Agriculture in 2014–2016 biennium according to the standard methods and standards of DSTU 2240-93, DSTU 4138-2002; DSTU 4762: 2007. Evaluation of baking qualities was carried out by the method of trial laboratory baking.

Results. The highest germination energy was characterized by the Bogodarske variety when using Nanovit microfertilizers - 96.8% and Humifield - 96.5%, which is 1.95% and 1.65% more than the control. The varieties Rarity and Bouquet also showed a positive effect of these drugs, respectively, this figure was 96.0 and 96.1% and 95.3 and 95.2%, which is more than the variant without microfertilizers by 1.9 and 2.0% and 2,15 and 2.0%.

It was found that the fertilization of the parent plant by the Nanovit and Humifield microfertilizers contributed to the seed germination of 98.8% and 98.5% higher in the Bogodarske variety, which is 1.2 and 0.9% more than in the control. In varieties of Rarity and Bouquet when using these drugs, the laboratory germination of seeds was 98.3–98.5 and 98.0%, which is 1.15–1.30 and 1.35% more than in the control areas.

Compared to the control of the application of microfertilizers, the nanowire increased by 1.2–3.8 g the mass of 1000 seeds. The use of Gumifield and Nanomix micro fertilizers also increased the mass of 1000 seeds by 0.4–0.6 g in the Bouquet variety, 1.8–1.7 g in the Bogodarske variety and 0.9–0.6 in the Rarity variety.

Conclusions. Feeding mother plants with microfertilizers has a positive effect on the sowing properties of winter triticale varieties. The seeds of winter triticale varieties were of high seed quality and conformed to the state standard of Ukraine (DSTU 2240-93). Germination energy for all varieties on the variants of the experiment was in the range of 93.2–96.8%, laboratory germination 96.7–98.8%, weight of 1000 seeds 47.4–52.1 g. The best conditions for the formation of complete seeds were created by the application of nanowire and Humifield microfertilizers on the mother plant. Among the varieties should be noted the variety of winter triticale Bogodarske, which was distinguished by the best sowing qualities.

Key words: germination energy, laboratory germination, 1000 seeds weight, variety, microfertilizers.

Kosenko N.P., Pohorielova V.A., Bondarenko E.A. Scientific achievements of the laboratory of vegetable growing at the Institute of Irrigated Farming: history and results. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 83-88.

Purpose. To investigate the historical path of the Department of Horticulture of the Institute of Irrigated Farming, to analyze the creative achievements of scientists and the results of scientific research from the creation of the department to this day was our goal.

Methods. The main research methods are general scientific principles of historical authenticity, scientific objectivity and a dialectical analysis of the historical process through a problem-chronological analysis.

Results. The main stages of development of one of the units of IIF NAAS over a 60-year period of work are highlighted. The analysis and systematization of the scientific heritage of the staff of the vegetable growing laboratory was carried out, the significance of individual scientific developments for modern agricultural science and vegetable producers was substantiated. Researchers have developed and introduced into production resource-saving technologies for growing vegetable plants on non-irrigated and irrigated lands in the south of Ukraine, aimed at increasing the efficiency of irrigation water use, maintaining soil fertility, increasing yield and quality of vegetables.

New varieties of tomato of industrial type have been created: "Nadnipyriansky 1", "Cimmerian", "Sarmat", "Inguletsky", "Time", "Legin", "Kumach", which are listed in the Register of plant varieties of Ukraine. Scientists have developed and introduced in the farms of southern Ukraine the technology of seed production of tomato, onion, beetroot, table carrot, which can significantly increase productivity and improve the quality of seeds.

Scientists worked out and inculcated in the farms of south of Ukraine of technology of seed growing of tomato, onion, red beet, carrot, allowing substantially

to increase the productivity and improving quality of seed.

Conclusions. Scientific developments of laboratory are presented in more than 600 scientific works and protected by the 30th patents of Ukraine, seven from that got on the sorts of tomato.

Key words: laboratory of vegetable growing, technology, selection, sort, seed, irrigation, tomato, productivity.

Kosenko N.P., Serheev A.V. Seed growing of carrot (*Daucus carota* var. *sativa* L.) in the conditions of drip irrigation. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 88-91.

Purpose. Improvement of basic elements of the technology of cultivating carrot seed plants at drip irrigation in the conditions of the southern Ukraine.

Methods. The researches were based on complex use of field, calculated-comparative mathematical-statistical, methods and system analysis.

Results. Considerable influence of size of mother root crops of carrot and planting schemes set on a height, development and seed productivity at drip irrigation on the south of Ukraine. Large mother root crops were better rooted in the field conditions, than small. Most percent of getting accustomed plants (of 70.1) was observed at large mother root crops. Charts of planting rendered most influence on forming of the productivity of seed. Inter placing of seed plants in a row a from 30 to 15 cm substantially increases the productivity on 47.6%. At the use of mother roots of medium-sized there was an increase the productivity of seed on 9.0%, more large roots – on to the 19.2% comparing to the small roots. From data of cross-correlation-regressive analysis dependence is certain and the mathematical model of the productivity of seed is built depending on the diameter of roots and chart of planting. The quality of seed substantially did not change from the chart of planting and size of roots. When planting large mother roots, seed germination is 84%, small – 80%. With a planting of 70x30 cm, the germination energy and seed germination were 1.0–2.0% more than with 70x15 cm.

The use of stecklings gives an opportunity to get seed with the same high quality of seed, as well as from standard mother roots.

Conclusions. The most productivity of seed (1.14 t/ha) was characterize plants, that was formed from large root crops by a diameter a 31–40 mm that were planted at a chart 70x15 cm, from stecklings – 0.94 t/ha. A seed grown from steckling meet the requirements of the state standard of Ukraine, presented to the certified seeds of the first reproduction.

Key words: carrot, mother root, steckling, seed, productivity, drip irrigation.

Lavrynenko Yu.O., Marchenko T.Y., Zabara P.P. Breeding properties and their role in stabilizing corn grain production in Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 91-100.

Aim. The aim of this work was to develop morpho-physiological and heterozyotic models of corn hybrids FAO 150-600 for irrigation conditions. A morpho-physiological model was developed and the FAO 150-600 corn hybrids were created on its basis for irrigation conditions of the South of Ukraine with grain yield 11-17 t/ha.

Methods. The general scientific, special selection genetic, computational and comparative research methods were used.

Results. The results of multi – years research for morpho-physiological and heterozyotic models of corn hybrids of different maturity groups within the

conditions of irrigation were presented. The main parameters of models of maize hybrids of different FAO groups are determined. The parameters of heterozygosis models are determined and the lines with high combining ability were created, which are involved in the pedigree of early-ripening, early ripe medium group, mid-ripening, middle-late and late maturity groups of maturity of newly created hybrids. The results of new hybrids on the irrigation methods and irrigation regime were presented.

Defined universal hybrids, adapted to a wide range of external conditions, are inferior in performance to genotypes with narrow adaptability on every agri-environmental gradient. Adaptive properties should be distinguished: hybrids of intense type with a strong reaction to the environment; homeostatic, providing stable yields under conditions of fluctuating growing conditions; plastic ones that respond adequately to changing agrophone levels. For adaptability selection, an environmental gradient must be provided that objectively reflects the range of agro-ecological conditions of the predicted corn hybrid distribution region.

Conclusions. There were created new innovative FAO corn hybrids 150-600 for irrigation conditions, which are possessing a complex of economic complex and valuable features which are able to form high yields during the irrigation (11–17 t/ha). The irrigation water, mineral macro- and microfertilizers are effective in use in this process. Also new hybrids have a rapid moisture content of grain during the ripening, have a high resistance to major diseases and pests, which are laid in their genetic potential.

Key words: corn, morpho-physiological model, hybrid, irrigation, group maturity FAO, yield.

Nazarenko S. V., Kotovska Yu. S. Stem pests of middle-aged and older pine plantations on Oleshkovsky sands. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 100-104.

Purpose. To establish the species composition of stem pests in middle-aged and older stands of common (*Pinus sylvestris*) and Crimean (*Pinus nigra* subsp. *Pallasiana*) pine on Oleshkovsky sands, taking into account the harmfulness of these insects.

Methods. The studies were conducted in 2012 - 2018. in the pine forests growing on Oleshkovsky sands, conventional insect collection techniques were used. The category of the sanitary condition of the trees was determined according to the "Sanitary Rules in the Forests of Ukraine". **Results.** It has been established that the species composition of stem pests in middle-aged and older stands of ordinary (*Pinus sylvestris*) and Crimean (*Pinus nigra* subsp. *Pallasiana*) pine on Oleshkovsky Sands is represented by 30 species. The feeding places and harmfulness of these insects are determined. **Conclusions.** Stem insects in middle-aged and older pine plantations on Oleshkovsky Sands include 1 representative of the Hymenoptera series and 29 - Coleoptera. Of the last 6 species of goldfish, 11 are barbel, 3 are weevils, 9 are bark beetles. Slightly weakened trees can be populated only by blue pine goldfish (*Phaenops cyanea* F.), large pine beetle (*Tomicus piniperda* L.) and pine tarry (*Pissodes pini* L.), and the latter species is rarely found in the region. The large pine beetle additionally weakens the trees when feeding the imago in the crowns, causing the so-called "cutting of shoots", and then populates the weakened trees as a result of this. Blue pine goldfish is dangerous for both living trees and timber.

Key words: pine plantations, stem pests, Oleshkovsky sands, Buprestidae, Cerambycidae, Curculionidae, Scolytidae.

Panfilova A.V., Hamaiunova V.V., Fedorchuk M.I., Nahirnyi V.V. Photosynthetic activity of spring and winter barley crops depending on the elements of cultivation technology in the conditions of the southern steppe of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 104-112.

The purpose of the study was to determine the indices of photosynthetic activity of spring and winter barley crops depending on the improvement of the technology of cultivation of crops in the conditions of the southern steppe of Ukraine by studying the terms of sowing, application of seed treatment with microfertilizers and fertilizing crops during the vegetation period with modern organic mineral fertilizers and growth-stimulating substances on the background of the main application of a moderate dose of mineral fertilizers for pre-sowing cultivation.

Material and methods. The results of researches carried out during 2013–2017 in the conditions of the educational-scientific-practical center of the Mykolayiv NAU (barley spring) and during 2015–2018 in FG Fantasy of the Greater Alexander district of Kherson region (winter barley).

Results. It has been determined that for the cultivation of spring barley, the introduction of pre-sowing cultivation of mineral fertilizer at a dose of N30P30 (background) and the application of foliar fertilization of crops at the beginning of the phase of the output of barley spring plants in the tube and spiking with complex organic-mineral fertilizers Organic D2 and Escor-bio for the formation of the largest leaf area in plants and, accordingly, the highest value of photosynthetic potential and pure productivity of photosynthesis of the crops of the studied varieties. For example, on average during the years of research, the plants of spring barley Aeneas, according to these fertilizer variants, formed the area of leaf area at the level of 36.7–37.4 and 41.1–41.7 thousand m²/ha, depending on the phase of plant development, while in the control variant – 26.9–30.0 thousand m²/ha. The formation of the area of winter barley leaves in all phases of plant growth and development depended on the sowing time, variety and fertilizers. It was found that the microfertilizers increased the formation of the assimilation apparatus, especially for the sowing of the Ninth Shaft variety in the second decade of October. The highest indices of photosynthetic potential were observed for sowing of winter barley of the Ninth shaft in the second decade of October and the combined use of the fertilizers Mifosat 1 and Chelat Kombi – 1.84 million m²/ha x days.

Conclusions. In the conditions of the Southern Steppe of Ukraine for the cultivation of spring barley, on average during the years of research, the introduction of mineral fertilizers at a dose of N30P30 under pre-sowing cultivation and the application of foliar fertilization of crops with fertilizers Organic D2 and Escort-bio ensures the formation of an optimal area of leaf surface of barley plants functioning, especially for the cultivation of Aeneas. The sowing of winter barley of the Ninth Shaft in the second decade of October and the pre-sowing of its seeds with the fertilizers Mifosat 1 and Chelat Kombi (combined) provided, on average, during the years of research, the best indices of photosynthetic activity of crops in all phases of plant growth and development.

Key words: barley spring, winter barley, variety, sowing time, plant nutrition, rhegulatory preparations, microfertilizers.

Reznichenko N.D. Dynamics of accumulation of raw weight and dry matter by winter barley varieties under different growing conditions.

Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 113-117.

Purpose – to study the effect of different methods of basic tillage and doses of mineral fertilizers on the accumulation of raw weight and dry matter by plants of winter barley (*H. vulgare* L.) of cultivated varieties in irrigation conditions.

Methods: field, laboratory, comparative, and statistical.

Results. The results of experimental studies on the influence of basic tillage methods, sowing in previously untreated soil, and application of different doses of mineral fertilizers on the accumulation of raw weight and dry matter by plants of winter barley of cultivated varieties under irrigation conditions are presented in the article. It was established that during the cultivation of winter barley in irrigation conditions of the South of Ukraine, the highest daily average increase in the raw weight of plants of winter barley Dostoinyi and Zymovyi was recorded during the earing phase in all the studied systems of basic tillage. The highest dry matter content of both winter barley varieties was formed under the conditions of disc tillage and application of mineral fertilizer N120P40. When sowing the varieties in the untreated soil and the application of the fertilizer N120P40, they had the lowest dry matter in the plants. A most effect from fertilizers was marked in the phase of earing, where on variants with disk tillage of soil accumulation of raw mass the plants of barley winter sort Dostoinyi at the high doses of mineral fertilizers increased on 60%, with the chisel loosening – on 40% and at sowing in preliminary untilled soil – on 50%. For a sort Zymovyi these indexes presented accordingly 42%, 32% and 89%.

Conclusions. When growing winter barley in irrigation conditions of the South of Ukraine, it is recommended to apply disc tillage to a depth of 12–14 cm and apply mineral fertilizers with a dose of N120P40, which will ensure the accumulation of optimal vegetative mass of plants.

Key words: winter barley, tillage, No-till technology, raw weight, dry matter.

Tishchenko O.D., Tishchenko A.V., Piliarska O.O, Kuts G.M. Features of the morphology of the root system in alfalfa populations. Irrigated agriculture: interagency thematic scientific collection. 2019. Issue 72. P. 118-121.

Purpose – to assess the various populations of alfalfa in the form of the root system, to determine the relationship between the root system and the main economically valuable traits.

Research methods. The objects of study were different species of *Medicago* alfalfa: *M. sativa* L., *M. varia* Mart., *M. falcata* L., *M. poluchroa* Grossh., *M. quasifalcata* Sinsk. Alfalfa plants were analyzed 2.5 months after sowing with plants being dug up to a depth of 30 cm. The shape, volume of the root system, the number of lateral branches taking into account their thickness, and the presence of root hairs were analyzed.

Research results. According to the results of studying various populations of alfalfa, it was found that two forms of the root system (rod and rod-branched) appeared in them, which differed in volume and weight of the aerial and root masses. The calculated correlation relationships showed that the main economically valuable traits are closely related to the volume of the root system. First of all, a strong positive relationship between the volume of the root mass and the aboveground ($r = 0.48-0.86$) and root mass ($r = 0.63-0.96$), the height of the plants ($r = 0.31-0.72$). Two cycles of selections by volume of the root mass contributed to its increase, increased plant

growth and higher yields of aboveground and root masses. By the number of stems, an average and above average connection is observed, and only in some years in some populations does the strength of this connection increase in the population Nadezhda/*M. quasifalcata*, Flora 2/Nadezhda, Peschanaya/Raznotsvetnaya.

Conclusions. The studies made it possible to develop a method for selecting high-performance breeding material with an increased volume of the root system (utility model patent No. 18659), a method for selecting alfalfa for an increased level of root mass accumulation (Copyright certificate on the work No. 32134).

Key words: alfalfa, rod and rod-branched root system, volume of the root system, selection, aerial and root mass.

Ushkarenko V.O., Shepel A.V., Kokovikhin S.V., Chaban V.O. Rationality of moisture use in crops of nutmeg under drip irrigation in the South of Ukraine

Purpose. The aim is to scientifically substantiate a set of agrotechnical measures for growing sage nutmeg for the rational use of moisture for growing the studied crop under drip irrigation in the South of Ukraine. **Methods.** Field research to improve the technology of growing sage by using a drip irrigation system was conducted on the lands of PE "Diola" Beryslav District of Kherson Region from 2011 to 2018 according to the methodology of the research case. The amount of water consumption of the culture was calculated by the method of water balance. Control of moisture reserves was performed by thermo-static-weight method. **Results.** It is established that the water consumption of sage varies slightly over the years of life - in the first year it is 4873-5856 m³/ha, in the second year 4811-5560, in the third year - 4811-5540, and in the fourth year 4862-5680 m³/ha, which can be explained by the high moisture cost of evaporation from the soil surface. The timing of sowing had a weak effect on the value of the studied indicator with a weak increase in sowing in the first decade of December (winter) compared to the first decade of April. The recorded tendency of growth was the consumption of moisture in the variants with a row spacing of 70 cm compared to 45 cm. In the first year of water consumption, nutmeg exceeds 5 thousand m³/ha for sowing in the first decade of December. **Conclusions.** It is determined that the maximum share in the water balance of the crop is occupied by precipitation - 47.5-49.3%. Also significant (35.4-43.3%) is the proportion of wet soil, and the irrigation rate is 13.5-15.4%. In the fourth year of use on unfertilized control, the total water consumption was 5130 m³/ha for sowing in the first decade of December, and when sowing in the first decade of April it was reduced by 5.2%. The lowest value of the water consumption coefficient - 362 m³/t in the first year of crop use was for a combination of options - plowing to a depth of 28-30 cm, fertilizing at a dose of N₆₀P₉₀, sowing in the first decade of December with a row spacing of 45 cm in the second and third years the most economical use of moisture for fertilizer application at a dose of N₆₀P₉₀, sowing in December with a row spacing of 45 cm, and the effect of changing the depth of plowing was insignificant - from 0.7 to 2.3%. In the fourth year of sage use there was a sharp decline in moisture efficiency, and the water consumption ratio decreased significantly - compared to the first year by 3.5-6.9 times, and the second and third - by 6.4-7.5 times.

Key words: sage, drip irrigation, nutrition background, tillage, sows period, years of use, water consumption, moisture efficiency.