Summary

Butenko A.O., Masyk I.M., Sobko M.G., Tykhonova O.M. Formation of soybean crop of different ripeness groups depending on sowing time and row spacing. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 9-13.

Purpose. To establish limiting influence of varietal composition, elements of sowing and harvesting complex on growth and development of soybean plants. Determine the optimal timing and methods of sowing soybean varieties of different groups of ripeness. Methods. Field experiments that included phenological, biometric observations and structural analysis of plants. Planning, conducting field experiments, observations and records were carried out according to B.O. Dospekhov. Statistical processing of the results of the experiments was carried out using the dispersion method, using software packages Statistica 6.0, Microsoft Excel. Phenological observations of plant growth and development and plant biometrics were determined by the main stages of plant organogenesis using the method of the State Service for the Protection of Plant Variety Rights. Results. The height of soybean plants of different maturity groups varied depending on the timing and methods of sowing. The highest values of this indicator were in the variety of Omega Vinnytska at the second sowing period (at RTR of soil at a depth of 10 cm – 12°C) and at a row spacing of 30 cm – 1.11 m for an average of three years. The influence of the terms and methods of sowing on the total number of beans was significantly expressed in the variety Omega Vinnitsa – 27.9 pcs/plant with a row spacing of 30 cm and the first sowing period. A slightly lower number of beans was formed in the KiVin variety – 27.3 pcs/plant with a row spacing of 30 cm and a second sowing period. The maximum manifestation of varietal features in terms of yield, on average during the years of research was recorded in early-ripe variety KiVin – 2.96 t/ha on variants with a row spacing of 15 cm and the second sowing period. The wide-row sowing method proved to be optimal for the medium-ripening Omega Vinnitsa variety – 28.2 t/ha at the second sowing period. Conclusions. Conducting research in the conditions of the North-Eastern Forest Steppe of Ukraine is conditioned by the need to study the agrobiological bases of soybean cultivation intensification, to develop effective elements of technology based on the principles of adaptive plant growing, the introduction of which ensures an increase in the production of high quality soybean grain.

Key words: sowing methods, seeds, productivity, adaptability, soil.

Vozhehova R.A., Holoborod'ko S.P., Dymov O.M., Hal'chenko N.M. Scientific bases of increasing productivity of forage production systems on irrigated and non-irrigated lands of the southern Steppe. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 14-20.

Purpose. To establish scientific bases for increasing productivity and effective use of energy-saving systems for feed production on irrigated and non–irrigated lands of the southern Steppe. **Methods.** The role of scientific support for improving the efficiency of feed production systems is determined on the basis of analysis and synthesis, as well as abstract logical analysis. Empirical studies of the feed production process were carried out using comparative, systematic and graphical analysis. **Results.** Established scientific basis for improving the productivity and efficient use of energy-saving systems of fodder production on irrigated and non-irrigated lands, namely: the amount of arable land field fodder production in relation to the total area of agricultural land, the availability and productivity of natural grasslands, the provision of basic means of production, species composition of animals, and also weather conditions, during which forage crops are grown in the southern Steppe of Ukraine. The effective functioning of forage production systems, which were formed after the land resources were split up, was hindered by the use by agricultural producers of the primitive farming system that has developed over the past years in the subzone of the southern Steppe. As a result, the structure of sown areas of farms of all forms of ownership does not correspond to the placement of crops under soil and climatic conditions. The structure of crops is dominated by soil-depleting crops, which has led to a decrease in feed production and a global decline in the number of cattle, as well as pigs, sheep and goats. Therefore, the current state of production of livestock products in farms of all forms of ownership in the subzone of the southern Steppe of Ukraine does not meet the physiological needs of the population in nutrition, as well as in the formation of food exports, which is associated with the organizational form of management of livestock producers. **Conclusions.** To eliminate the shortcomings in the existing feed production systems in the southern Steppe subzone and improve their efficiency, it is advisable to further develop them by creating highly productive pastures and hayfields based on cooperative formations with the participation of the dairy industry and meat processing enterprises. The solution to this problem will enable the population's farms to use more effective schemes for the production of livestock products and eliminate the aggravation of socio-economic relations in rural areas. The introduction of optimized feed production systems in the southern Steppe subzone will contribute to the growth of high-quality feed production at the lowest energy and financial costs per unit of feed produced, which will ensure the effective development of the livestock industry and food security of the population of Ukraine.

Key words: crop structure, agriculture, yield, livestock, energy intensity, feed units, digestible protein.

Gadzalo Ya.M., Vozhehova R.A., Kokovikhin S.V., Bilyaeva I.M., Drobitko A.V. Scientific substantiation of corn cultivation technologies on irrigated lands taking into account hydrothermal factors and climate change. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 21-26.

Purpose. The aim is to scientifically substantiate the intensive technologies of growing corn grain on the irrigated lands of the Southern Steppe of Ukraine, taking into account hydrothermal factors and climate change. **Methods.** The starting materials for modeling and forecasting were experimental

data of field experiments with corn in the research areas of the Institute of Irrigated Agriculture NAAS for the period 1970–2018. Agricultural techniques for growing corn in experiments were generally accepted for the irrigation zone of southern Ukraine. Research in this area has been conducted using special techniques for the use of information technology in agriculture. **Results.** According to the results of generalization of long-term data it is inserted that the maximum grain yield of maize hybrids of different maturity groups is formed in wet years, and the lowest - in dry years, and plants make best use of heat potential of southern Ukraine in wet and medium wet years. Using the obtained regression equations, it is possible to select the most optimal hybrid composition for regional and local agroclimatic conditions of the Southern Steppe of Ukraine. **Conclusions.** Different degrees of variability of meteorological and agronomic indicators have been established. The use of statistical methods allowed to estimate the years of research on the index of favorable agrometeorological conditions and to establish regression equations of plant productivity. Statistical analysis of yield data of different precocity hybrids of maize and thermal energy indicators allowed to establish different degrees and direction of the relationship between plant productivity in the differentiation of natural moisture conditions in the years of research. With the help of the created correlation-regression dependences it is possible to model the yield level of different precocity maize hybrids according to the actual indicators of the sum of air temperatures and the receipt of photosynthetically active radiation during the growing season of plants.

Key words: maize, irrigation, climate change, mathematical statistics, correlation, regression, photosynthetically active radiation.

Dudkina A.P., Vinyukov O.O. Efficiency of various expositions of using the Humic acid product for the growth and development of spring barley. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 27-31.

Purpose. The article presents the results of a study of the effectiveness of the use of the drug Humic acid on the growth and development of spring barley. **Methods**. Research on the assignment was carried out by a laboratory-field method in a field crop rotation in experimental plots. The repetition in the experiments is 3-fold. The location of the plots is systematic. Soil – ordinary chernozem of low humus, hard loamy. **Results.** The tillering phase for cereals is one of the most important, it is in this phase that the ear of the ear is laid, it was investigated that plant samples were selected in this phase to analyze the influence of factors that were studied on the barley plants of the spring reserve Variety. Analysis of the study showed that the coefficient of secondary roots exceeded the control against the background without fertilizers only on the variant with the integrated use of fertilizers Humic acid and Humic acid cereals by 3.9%. It was proved that against a moderate nutrition background, the best option was for seed treatment with Humic acid fertilizer, where there was a tendentious increase in both the coefficient of productive tillering of barley and the number of secondary roots (+ 5.9% and + 3.0%, respectively). Against a full mineral background, an increase in the coefficient of productive tillering and the number of secondary roots in the variant with foliar application of Humic acid fertilizers during vegetation. **Conclusions.** Having analyzed the biometric indicators of spring barley in the phase of full ripeness, we can say that the largest number of productive stems of the spring barley plant was formed against a moderate mineral background with the integrated use of humic preparations (+ 31.5% to control) according to preliminary sampling. The effectiveness of the influence of various nutrition systems on spring barley plants is better reflected in the coefficients of productive tillering in the phase of full ripeness. With moderate starting NPK application, the best results were obtained for applying Humic acid to cereals by vegetation and Humic acid fertilizers in the soil, the situation has not changed since the previous selection in the tillering phase. Against the background of the full introduction of mineral fertilizers, the best option was the integrated application of fertilizers Humic acid cereals and Humic acid. The grain yield of spring barley was studied, which shows that the effectiveness of the integrated application of biological fertilizers Humic acid is cereal, Humic acid. It is attractive from both the technical and economic point of view that the complex application of Humic acid in the soil and the treatment of seeds of Humic acid with spraying crops Humic acid grain in the tillering phase of barley against the background of $N_{15}P_{15}K_{15}$, which allows to increase productivity compared to purely mineral fertilizers by 0.7 t /ha or 20.6%.

Key words: barley spring, variety, scheme of experiment, biometric parameters, yield.

Kapinos M.V. Photosynthetic activity of sowing pea plants depending on cultivation techniques. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 31-34.

Purpose. The goal is to establish the photosynthetic activity of sowing pea plants depending on the cultivation techniques in the 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. the leaf surface area, the net productivity of photosynthesis, and the dry matter mass of plants were determined according to generally accepted methods. **Results.** The minimum leaf surface area of all pea varieties that were grown in the experiment was formed in the control variant with seed treatment with water. the maximum values of the net photosynthesis productivity for all varieties, in the interphase periods of 2–3 leaves – 3–4 leaves and flowering – grain formation were determined on the variant with the combination of AKM inlay and inoculation with Rizobofit, in the interphase periods of 5–6 leaves of stipules – budding – according to inlay seeds with AKM solution and in combination with AKM inlay and inoculation with the microbial preparation Rizobofit. It was established that due to the action of inoculation with Rizobofit, inlaid with AKM solution and their combination, the indicators of the dry mass of plants of all pea varieties grown in the experiment increased. **Conclusions.** It was established that in mid–ripening pea varieties of the sowing motto, motto, Glyans, ataman, leaf surface area, net photosynthesis productivity and accumulation of dry matter significantly depended on inoculation with the Rizobofit microbial preparation, inlaid with AKM solution and their combination. Inoculation increased the leaf surface area in the 2–3–leaf phase on the crops of peas of the motto variety by 1.3–4.3, Glyans – 2.1–5.1, Ataman – 1.8–2.5 cm2/plant. The minimum indicators of the net productivity of photosynthesis in pea plants were determined in the ataman cultivars, and the maximum in the motto varieties. Pea plants accumulated the maximum amount of dry matter in the phase of the

formation of the grain of the motto variety – 3.848 g/plant. Grade Glyans was slightly inferior to variety motto for this indicator, except for the phase of 5–6 sheets.

Key words: sowing peas, variety, seed inoculation, leaf surface area, net photosynthesis productivity, dry mass of one plant.

Karashchuk H.V., Fedonenko H.Yu. Productivity of hard winter wheat varieties depending on technological methods of cultivation in the south of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 35-38.

Purpose: to develop and improve a number of elements of hard winter wheat cultivation methods under conditions of the South of Ukraine. **Research methods:** field, laboratory and statistical. **Results.** Agro-meteorological conditions throughout the years of the research allowed obtaining the yield of 3.60–4.72 t/ha in the variety Kassiopeia on the average for three years depending on the sowing rate and plant growth regulators. The variety Dnipriana formed the productivity less by 2.6–5.3% depending on the research factors when compared to the variety Kassiopeia. The variety Kreiser showed the highest productivity being 3.65–4.86 t/ha depending on the application of plant growth regulators and sowing rates, being higher by 0.05–0.14 t/ha than that of the variety Kassiopeia and by 0.23–0.26 t/ha than that of the variety Dnipriana. The data obtained for the three-year research prove that the highest yields of hard winter wheat are formed when the sowing rate is 5 million pieces per hectare being 3.97–4.60 t/ha in the variety Dnipriana, 4.10–4.72 t/ha in the variety Kassiopeia and 4.19–4.86 t/ha in the variety Kreiser on the average for three years depending on the impact of plant growth regulators. Application of the growth regulator Kvadrostym for seed treatment contributed to an increase in the productivity of hard winter wheat when compared to the test variant by 15.2–15.9% in the variety Dnipriana, by 12. 8–15.3% in the variety Kassiopeia and by 6.0–16.0% in the variety Kreiser on the average for three years. **Conclusions.** The highest productivity of hard winter wheat was formed when the sowing rate was 5 million pieces per hectare and when the growth regulator Kvadrostym was applied for pre-sowing seed treatment being 4.60 t/ha in the variety Dnipriana,
4.72 t/ha in the variety Kassiopeia and 4.86 t/ha in the variety Kreiser on the average in 2017-2019. The increase caused by the application of the growth regulator was 6.0–16.0 %. An increase or a decrease in the sowing rate caused a reduction of the crop productivity index. The lowest yield of hard winter wheat was formed when the sowing norm was 3 million pieces per hectare. Among all the varieties, the variety Kreiser showed the highest productivity being 3.65–4.86 t/ha depending on the application of plant growth regulators and sowing rates, that is higher by 0.05–0.14 t/ha than that of the variety Kassiopeia and by 0.23–0.26 t/ha than that of the variety Dnipriana. In order to reach the grain productivity at the level of 4.72–4.86 t/ha when cultivating hard winter wheat in the South of Ukraine, it is recommended that the varieties Kassiopeia and Kreiser should be grown at the sowing rate of 5 million pieces per hectare and pre-sowing seed treatment should be performed 1–2 days before sowing time with the method of incrustation with the plant growth regulator Kvadrostym at the rate of 0.5 kg/t.

Key words: hard winter wheat, sowing rates, plant growth regulators, varieties, productivity.

Kokovikhin S.V., Kovalenko V.P., Naydenov V.G., Shevchenko T.V., Kazanok O.O. Alfalfa productivity models when grown in different soil-climatic zones of Ukraine depending on the influence of natural and agricultural factors. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 38-43.

Purpose. The goal is to develop models of alfalfa productivity of different years of use depending on the influence of agrotechnical and natural factors when grown in the forest-steppe and steppe of Ukraine. **Methods.** The study was conducted during 2010–2018 in the conditions of the Forest-Steppe and Steppe of Ukraine. Field experiments and programming of alfalfa harvest, photosynthetically active radiation (PhAR) indicators, climate support, potential and programmed productivity were performed according to special techniques. **Results.** An analysis of the theoretical lines of the green mass yield of the studied culture revealed a high level of correlation (r = 0,6955–0,7503) with seeding rates. In the second year of use, the optimal sowing rate was in the range of 7,3–8,5 million / ha. It was proved that the content of nitrogen mineral compounds fluctuated to a large extent depending on the background of nitrogen nutrition. In the flowering phase, a significant (by 19,4–39,8%) decrease in the calculated indices of the content of mineral nitrogen compounds in the 0–20 centimeter layer of soil was noted. Calculations indicate a significant difference of 23% in the coefficients of the efficiency of using photosynthetically active radiation in various soil and climatic zones of Ukraine. **Conclusions.** Modeling of plant productivity made it possible to establish a direct positive effect of the use of Rizotorfin to increase the yield of green mass of alfalfa. In the flowering phase, a significant (by 19,4–39,8%) decrease in the calculated indices of the content of mineral nitrogen compounds was noted, but the dynamics of growth of this indicator appeared on options with high doses of nitrogen fertilizers. The optimal doses of nitrogen fertilizers were determined in the range from 120 to 145 kg per 1 ha, ensuring the yield of green mass at the level of 45–47 t/ha. The highest efficiency of using photosynthetically active radiation at the level of 1,25% was noted when growing alfalfa hay in the conditions of the Forest-Steppe of Ukraine. As a minimum, this indicator was recorded for the third year of using the studied culture in the Steppe Zone.

Key words: alfalfa, productivity, fertilizers, mathematical statistics, correlation, regression, photosynthetically active radiation.

Kokovikhin S.V., Pisarenko P.V., Bidnina I.O., Shariy V.O., Boyzenyuk Kh.I. Scientific and practical aspects of planning and operational management of crop irrigation regimes using information technologies. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 43-49.

Purpose. The goal is to develop scientific and practical approaches to the planning and operational management of crop irrigation regimes using information technology in southern Ukraine. **Methods.** Field experiments were carried out according to the experimental practice during 2016–2018. On the experimental field of the Institute of Irrigated Agriculture of the NAAS. Parameters modeling of production processes of the studied crops for planning and operational management of irrigation regimes were carried out using the UN FAO computer program CROPWAT 8.0. Results. An analysis of meteorological conditions

during the years of research indicates significant fluctuations in daily average temperatures and relative humidity – from minus 8,5 °C in January 2016 to 25,4–25,5 °C in August 2017 and 2018. The indicators of relative humidity and sunshine had a clear relationship with the temperature regime. Evapotranspiration was also closely related to meteorological indicators. The average monthly rainfall fluctuated significantly – from 0,2 mm in January 2016 up to 93 mm in June 2019. The modeling carried out allowed us to establish the conditional dates of the growing season for each crop, which is of paramount importance from the point of view of forming the water demand of crops and calculating their irrigation regimes. It has been proved that taking into account the soil water balance elements, current weather and agrotechnical conditions in the CROPWAT program makes it possible to accurately plan the irrigation regime for each crop and reduce irrigation water consumption for: winter wheat – by 17,1%; corn – by 21,3%; soybeans – by 20,8%; sorghum – by 13,6%. **Conclusions.** Analysis of weather conditions for the period 2016–2019 it indicates a high level of aridization of the Southern Steppe of Ukraine, and violation of the natural moisture supply cycles and justifies the need for irrigation. By calculations it was determined that the maximum supply of irrigation water requires crop rotation – corn and soy, to a lesser extent – winter wheat and sorghum. The models obtained using the CROPWAT toolkit allow us to clearly establish the water shortage and the corresponding irrigation and irrigation norms, plan and promptly adjust irrigation regimes, reduce the consumption of water and other resources, which is of important agroeconomic and ecological reclamation value.

Key words: irrigation, crops, crop rotation, weather conditions, evapotranspiration, moisture deficit, modeling.

Lykhovyd P.V., Lavrenko S.O. Application of CROPWAT program for assessment of sweet corn water use. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 50-53.

Purpose. To investigate the potential ways for the accuracy improvement of the calculated estima- tion of crops water use by CROPWAT 8.0 program through the adjustment of crop coefficients on the example of sweet corn. **Methods.** Field experi- ments related to the determination of the actual water use of sweet corn were conducted during 2014–2016 at the irrigated lands of AC “Radianska zemlia”, Belozersky district, Kherson region, in accordance with modern requirements and stand- ards of the experimental work in agronomy. The calculation of the crop’s water use was performed using CROPWAT 8.0 program applying the recom- mended by FAO and adjusted crop coefficients. The accuracy of the calculation method was evalu- ated by determining the relative and absolute er- rors. **Results.** It was found empirically that with a decrease in the coefficient of the crop for the mid- season from a recommended by FAO value of 1,00 to 0,80, the error in the estimation of sweet corn water use decreases and averages to 5,16%, against 45,99% at modeling with a standard coeffi- cient value. The absolute value of the error distorts the actual crop’s water use by +12,15 mm, which makes it possible to avoid the risk of insufficient and excessive humidification of the crop when creating the irrigation schedule. Reducing the coef- ficient to 0,75 is impractical due to the risk of un- derestimation of evapotranspiration and the risk of insufficient wetting. **Conclusions.** The use of the adjusted crop coefficient for the mid-season al- lowed to significantly increase the accuracy and reliability of the studied calculation method for assessing the water use of sweet corn; we believe that further empirical studies on the adjustment of the coefficients of major crops should be performed to provide high-precision automated calculations, modeling and forecasting of water use by CROPWAT 8.0 program.

Key words: modeling, irrigation, water use, agriculture, evapotranspiration.

Malyuk T.V., Kozlova L.V., Pcholkina N.G. Efficiency of drip irrigation of young intensive sweet cherry plantings in southern Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 53-59.

Purpose of the research is to justify the expediency of the drip irrigation technology components of young intensive sweet cherry plantings and to determine their impact on the efficiency of water, material resources, and labour force. **Methods.** The research was carried out at Melitopol Research Fruit Growing Station named after M.F. Sydorenko Institute of Horticulture NAAS during 2016–2018 in young sweet cherry trees plantations of 2015 planting according to the requirements of “Methodology of conducting field research with fruit crops”. Soil is a southern light loam black soil. Soil maintenance system was black fallow (control) and mulching of neartrunk strips: with sawdust, straw and black agrofiber. Garden watering is a stationary system of drop irrigation. Soil humidity was determined in the dynamics according to the thermostat-weighted method. The evaporation (E_0) was calculated according to the formula of M. Ivanov, total water consumption for vegetation – according to the simplified formula of water balance. The value of the work indices, irrigation water, electricity, materials for mulching, transportation of materials, duration of drying, power and energy consumption of the well pump, and irrigation rate were used to calculate irrigation and mulching efficiency. **Results.** For young unbearing plantings, it is advisable to use irrigation at 90 and 70% of the difference between evaporation and precipitation ($E_0 - O$). In addition to agronomic efficiency, the use of the computational method can reduce the cost of irrigation by 1,8–3,2 times compared to the traditional thermostat-weighted method. The latter requires high costs of physical force and does not meet the requirements of efficiency setting of watering during the vegetation. The mulching of the near trunk strips in combination with irrigation (pre-irrigation level of soil humidity 70% of lowest moisture content) allowed to reduce the number of irrigations, to increase the inter-irrigation period, which resulted in water savings of 11–49%. From the point of view of saving water resources, it is most appropriate to use natural materials that reduce irrigation water consumption by more than 36%. Compared to the black fallow, the material costs were reduced by more than 50% by saving water and reducing weed control costs. In order to save resources, it is advisable to apply water-soluble fertilizers by a method of fertigation, which reduces labor costs – up to 80% compared to the surface application of fertilizers in irrigated gardens. **Conclusions.** The highest saving of water, material resources and labour force (up to 80% depending on the elements of drip irrigation technology and their combinations) in young intensive sweet cherry plantings in the conditions of the south of Ukraine is caused by the use of natural mulching

materials, the use of the computational method of irrigation and fertilizer application together with irrigation water.

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

Maliarchuk N.P., Tomnitsky A.V., Isakova H.M., Maliarchuk A.S., Myshukova L.S., Markovska E.E. Phy-tosanitary state of sowing and productivity of winter wheat at different methods of basic tillage in a crop rotation on irrigation of the south of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 59-63.

Purpose – is establishment of the economic justified method of basic tillage of soil and dose of bringing of mineral fertilizers which create the most favorable phytosanitary state of sowing and provide realization of potential possibilities of the productivity of sort of wheat winter Konka in the cultivated crop rotation on irrigation of south of Ukraine. **Methods:** the field, analytical, calculation-comparative, mathematical statistics. **Re-sults.** The least impurit of sowing of wheat at the be-ginning of proceeding in a spring vegetation with the amount of weeds 11,7 pc./m^2 was at dump tillage of soil on a depth a 14–16 cm on the unfertilized back-ground, at bringing of mineral fertilizers the dose of $N_{90}P_{60}$ quantity of weeds grew to 12,6 pc./m^2, or on 7,8%, at the dose of top-dressing of $N_{120}P_{60}$ impurit made 14,9 pc./m^2. Substituting of ploughing the chisel loosening by the same depth resulted in the increase of impurit on 2,9, 3,3 and 2,4 of pc./m^2. Account of defeat of sowing of wheat winter-annual root rots on the vari-ants of treatment of soil testifies that the greater amount of the staggered plants and high degree of defeat of surface of sheets was marked at the begin-ning of spring vegetation in the variants of tillage of soil without the turn of layer. Least fusarium of root rot showed up in autumn at the beginning of vegetation in the variant of the different depth ploughing with the depth of tillage under a winter wheat on 14–16 cm. In the variant of tillage of soil without the turn of layer with the depth of the disk loosening under all cultures of crop rotation on a 12–14 cm prevalence of fusarium of root rot grew on 5,6–7,5%, and intensity of defeat – on 1,4–1,9% comparatively with the variant of the different depth ploughing. The maximal harvest of wheat winter in the variant of the disk loosening on a depth a 8–10 cm at differentiated – 1 system of tillage of soil with one subsoiling for the rotary press of crop rotation and made 5,41 т/ha, on the average on a factor A. **Conclusions.** At growing of wheat of winter in the conditions of south Steppe Ukraine the greatest productivity at the level of 6,94 т/ha is provided by the disk loosening on a 8–10 cm on a background differentiated – 1 system of basic tillage of soil in a crop rotation, with the dose of bringing of mineral fertilizers of $N_{120}P_{60}$ and realization of watering with maintenance of pre-watering threshold of moistening at the level of 70% of the soil water-holding capacity during a watering period.

Key words: productivity, impurit, crop rotation, method of tillage of soil.

Matkovska M.V. Influence of intensification factors on photosynthetic productivity and yield of winter barley in the condition of Western Forest-Steppe. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 63-66.

Purpose. To determine the influences of fungicides of winter barley Wintmalt variety on the photosynthetic and grain productivity. **Methods.** Field, statistical (statistical processing of research results) and comparative calculation. The studies were conducted during the period 2016–2018 in the Western Forest-Steppe in accordance with the conventional methodology. **Results.** The influence of fungicides application on the formation of plant assimilation surface was investigated. The area of leaf surface increased due to increasing number of fungicidal treatments. The highest area of photosynthetic surface of 51,7 and 51,3 thousand m^2/ha was obtained on the treatments of Capalo, 1,0 l/ha (BBCH 31) + Abacus, 1,25 l/ha (BBCH 39) + Osiris Star, 1,5 l/ha (BBCH 65) and Systiva, 1,5 l / t (BBCH 00) + Abacus, 1,25 l / ha (BBCH 39) + Osiris Star, 1,5 l/ha (BBCH 65). Fungicidal protection allows to increase the activity of photosynthesis up to 37,1% and increase the accumulation of dry matter up to 29,8%. Increased photosynthetic activity helped to increase yields. The application of Systiva, it is fungicide which applied on the seeds before sowing, provided a yield increase of 0,68 t/ha. The highest yield in the trial was obtained on the variant of plant protection by Systiva, 1,5 l/t (BBH 00) + Abacus, 1,25 l/ha (BBH 39) + Osiris Star, 1,5 l/ha (BBH 65) and Capalo, 1,0 l/ha (BBH 31) + Abacus, 1,25 l/ha (BBH 39) + Osiris Star, 1,5 l/ha (BBH 65) – 8,6 and 8,63 t/ha respectively. **Conclusions.** According to the researching results, the highest yield (8,60–8,63 t/ha) was found on the variants of three-time application of fungicides: Capalo or Systiva, Abacus and Osiris Star. Among the two-fold fungicide variants, the highest increasing of yield (+ 1,31 t/ha) compare check was obtained on plots with Systiva and Adexar Plus.

Key words: winter barley, leaf area, photosynthetic potential, photosynthesis productivity, yield.

Moroz V.V., Nykytiuk Y.A. Carвon absorption ability of pine forest plantations in Zhytomyr Polissya. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 67-73.

Introduction. According to the signed climate Paris Agreement, Ukraine is faced with the task to prevent the global average air temperature from rising above 2 °C in order to avoid an increase in droughts, extinction of certain species of plants and animals, drying up and diseases of tree species, etc. **Results.** To preserve and increase the number of natural carbon sinks, scientists pay attention in particular to the system of improving forest, soil, and other natural resources management. Among thirty main forest-forming species in Ukraine, Scots pine (Pinus silvestris L.) is the predominant tree species, in Zhytomyr Polissya, in particular, its amount is 776,7 thousand hectares, which is 59% of all tree plantations. To establish the carbon absorption capacity of pine plantations of Zhytomyr Polissya, we have laid temporary test squares (CCIs) in state-owned enterprises: Baran Forestry (LMG); Belokrovytsia Forestry; Gorodnitsky LH; Emilchinskoye LH; Zhytomyr LH; Korostensky LMG; Malinsky LH; People's Specialized Forestry (SLG); Novograd-Volyn Experienced Forestry (DLMG); Ovruch SLG; Olevsky LH; Slovenian Forestry APC. According to the methods of P. I. Lakida, A. A. Storochinsky, O. I. Poluboyarynova, A. S. Atkin, A. I. Kobzar, we established a phytomass of pine plantations in a completely dry state and obtained conversion coefficients that made it possible to estimate the difference between CO2 emissions and carbon sequestration. **Conclusion.** According to the analysis of the distribution of areas of forest land areas for pine plantations in Zhytomyr Polissya, the overwhelming majority is occupied by pine forests of IV category (operational), their share is 68%, and thus their carbon

absorption capacity is higher. It was found that the pine forests of Zhytomyr Polissya annually absorb from 5,0−13,0 thousand tonnes of carbon from the air, which is approximately 0,5–2,3% of the annual carbon emissions into the atmospheric air, which in turn has a positive environmental impact on the research area.

Key words: climate change, Paris Agreement, pine plantations, phytomass, conversion factors, carbon sequestration.

Mostipan M.I., Kovalov M.M., Umrykhin N.L. Protein content in winter wheat grain depending on weather conditions in early spring. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 73-79.

Purpose. The main objective of the study was to develop scientific and methodological bases for growing high quality winter wheat in the northern Steppe of Ukraine. **Methods**. The research was conducted over the period of 1986–2005 at Kirovohrad State Agricultural Research Station. Winter wheat was sown in three terms: on September 2nd, 17th, and on October 2nd, after black fallow and non-fallow corn for silage forecrop. The protein content in the grain was determined by the standard method. **Results**. In the conditions of the northern Steppe of Ukraine, the highest amount of protein in winter wheat grains is accumulated over the years with a mean renewal of spring vegetation of plants and equals 14,12% after black fallow and 13,37% after non-fallow corn for silo forecrop. During the years with early renewal of spring vegetation, the least amount of protein in winter wheat grains is accumulated after both of its forecrops. It is proved that the terms of transition of the average daily air temperature above 0ºC determine protein content in winter wheat grain. When grown on black fallow, the highest amount of protein in grain is accumulated in the years when the average daily temperature transition above 0ºC occurs in the third decade of February and is 14,45%, and after non-fallow forecrop in the first decade of March it equals 14,16%. The lowest protein content in grain after black fallow is observed in the years with the duration of the period from the transition of the average daily air temperature above 0ºC to active vegetation of plants from 20 to 30 days and after black fallow is 14,57%, and non-fallow forecrop – 13,35%. In the years with the duration of the specified period more than 30 days the grain with the least amount of protein is formed. **Findings**. Higher average daily air temperatures above 11ºC during the period of "renewal of spring vegetation – stem elongation" reduce protein content in winter wheat after black fallow from 15,0 to 13,0%, and after non-fallow forecrop – from 14,3 to 13,3%. Extending the duration of the "renewal of spring vegetation – stem elongation" period increases the amount of protein in winter wheat. In years with a period of up to 25 days, protein content in winter wheat after black fallow is 13,0%, and after non-fallow forecrop is 12,2%, whereas in the years with the period of more than 35 days, protein content increases accordingly to 14,7 and 13,0%.

Key words: renewal of vegetation, forecrop, sowing time, rainfall, average daily air temperature.

Nazarenko S.V., Holovashenko M.F., Kotovska Yu.S. Methods for detecting emergency trees in urban and suburban green spaces. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 79-85.

Purpose. To carry out an analysis of the effectiveness of methods of identification of emergency trees and individual large skeletal branches in urban and suburban green plantations. **Methods.** Materials for writing work were personal experience of authors and original studies carried out during 2018−2019, as well as analysis of publications on phytopathological examination, instrumental determination of sanitary condition of individual trees. **Results.** The paper describes the most common and accessible method of terrestrial visual forest pathological examination of trees. The orthophoto plan in the visible range can be used for visual assessment of trees, area measurements, identification of problem areas and traces of human or animal activity, pests of insect pests, as well as trees affected by forest diseases. Advantages of ground method application combined with remote aerial visual examination of green plantations involving unmanned aerial vehicles (UAVs) are disclosed. The results of the test experimental works concerning the identification of the condition of the tree trunk by a non-invasive method using a georadar have been submitted. **Conclusions.** Thus, there is no universal method to solve the problem of identifying emergency trees and individual skeleton branches in urban and suburban green plantations. Basic methods are those based on an integrated approach, visual and aerial with the use of unmanned aerial vehicles. Auxiliary methods, in the following after rework, consider the method of thermography and the method of magnetic conductivity measurement using georadar. The remaining methods of instrumental diagnostics can be used in detailed examination of undefined objects to determine whether trees or skeletal branches should be removed.

Key words: green plantations, emergency trees, detection methods, visual examination, unmanned aerial vehicles, georadar.

Nazarenko S.V., Holovashenko M.F., Kotovska Yu.S. Stem pests of middle-aged and older pine plantations on Oleshkovsky sands. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 85-92.

Purpose. To identify and characterize the factors that negatively affect the survival of pine seedlings in forest crops in the conditions of Oleshkov sands. **Methods.** The research was carried out on the territory of the Oleshkov Sands in 2008−2020. On firefighters: in 2007, in 2012, 2014, 2017, where artificial pine plantations used to grow. Forest crop research techniques have been used. **Results**. The article describes the factors that negatively affect the survival of pine seedlings during artificial reforestation on large garns in the conditions of the Oleshkov Sands, and presents the results of studies on increasing the survival of pine seedlings in forest pine crops. It has been found that the most negative factor for artificial renewal of forests on the Oleshkov Sands is long dry periods. It has been determined that in order to significantly (more than 2 times) increase the survival rate of pine seedlings when planting forest crops on garns, iron cupro should be introduced into the planting slots. **Conclusions.** The safety of forest crops in the conditions of the Oleshkov Sands is significantly influenced by more than ten factors. Drought, a moisture deficiency in soil and air, is paramount among these factors. Long observations showed that the most unfavourable year for artificial reforestation on the Oleshkov Sands was 2017, because the arid period with missing useful precipitation lasted 12 decades. Despite the fact that the Lower Nefneprovsk method of afforestation of sands and prevents wind erosion, under the influence of strong winds pine seedlings on vitroimpact slopes are loosened and around their

trunks, below the root neck, a kind of funnel is formed in the soil, which contributes to the burn of the root neck. In order to significantly (more than 2 times) increase the survival rate of pine seedlings during planting of forest crops on firefighters, iron dome should be introduced into planting slots.

Key words: Oleshkov sands, Crimean pine, gari, forest cultures, survival, factors, iron cuprois.

Osgchipok O.S. The effectiveness of the application of biologized measures to protect the grape school depending on the field endurance of grape varieties to Plasmopara viticola under drip irrigation. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 92-95.

Purpose. The goal is to determine the effectiveness of the application of biologized measures to protect the grape school depending on the field endurance of grape varieties to Plasmopara viticola in the conditions of the South of Ukraine. **Methods.** The studies were conducted in the conditions of the Right-Bank Lower Dnieper Viticulture Zone of Ukraine − on the basis of the Belozersky agricultural firm (Kherson region, Belozersky district, Dneprovskoye village) during 2011−2013. Field experiments were laid in accordance with generally recognized methods of experimental work. **Results.** It has been established that the development of Plasmopara viticola on grape leaves varies significantly over the years of research depending on the variety composition – from 5.4 to 33.8% in the Vostorg variety and from 15.4 to 20.8% in the Arcadia variety. The maximum development by Plasmopara viticola was noted on the Bianca cultivar in 2013 – 31.7%, on the Firstborn Magarach cultivar in 2012 – 36.5%, on the Rkatsiteli cultivar in 2013 – 55.0% and on the Chardonnay cultivar in 2013 – 58.0%. The technical effectiveness of protection against Plasmopara viticola in the studied varieties with medium and low degrees of field endurance with the use of the traditional protection system was high, on average over three years it exceeded 65%. **Findings.** The effectiveness of protective measures against diseases (for example, Plasmopara viticola) at a grape school depends on the degree of field endurance of the varieties to the disease. It is established that when cultivated in the conditions of the Right-bank Lower Dnieper zone of viticulture of Ukraine Isabella varieties, it shows a high degree of field endurance to Plasmopara viticola. Varieties Vostorg and Arcadia are characterized as varieties with an average degree of field endurance, and varieties Bianka, Pervenets Magaracha, Rkatsiteli and Chardonnay are classified as varieties with a low degree of field endurance. The level of protective measures when using biological products to protect a grape school from Plasmopara viticola – 50% or more – allows you to grow standard seedlings of grape varieties with high, medium and low field endurance.

Key words: grape varieties, grape school, Plasmopara viticola, biological products, effectiveness.

Palamarchuk V.D., Kovalenko O.A., Krychkovskyi V.Yu. Improving the efficiency of biogas complexes due to the use of digistate in the growing of agricultural and vegetable houses. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 95-101.

The article presents the results of studying the bioorganic fertilizer Efluent. It is a by-product of obtaining biogas from pig manure, which farm uses for fertilizing field and vegetable crops. The use of this fertilizer solves the ecological problem of animal waste utilization, the energy problem – biogas production in biogas installation as well as the agronomic problem – provides an increase in yields and improve the quality of agricultural and vegetable crops. The research was conducted on the basis of LLC Organic-D, during 2018–2019. The farm receives organic manure residues in the form of pig manure at LLC Subekon, which holds about 12 thousand pigs. The pig farm uses a litter-free method of keeping animals. Liquid pig manure is produced due to intensive technologies of keeping animals, where slit floors and leak-free drainage system instead of straw bedding are used. This manure is then passed through the biogas installation to produce biogas. The residue from the detoxification process is used as bioorganic fertilizer Efluent. Peculiarities of animal housing and feeding may significantly affect the chemical and microbiological composition of manure. In non-fermented manure, the number of fungi is 118.8 thousand/g, and in fermented manure their number grows and reaches 193.8 thousand/g. The number of pathogenic species in non-fermented form is 79,2 thousand/g, saprophytic species – 39,6 thousand/g, and in fermented manure – 12,6 and 181,2 thousand/g, respectively. In fermented manure the number of pathogenic fungi from genus Fusarium decreased to 3,2 %, while in non-fermented manure it was 9,5%. In addition, there are no fungi of the genus Aspergillus in fermented manure at all, whereas in non-fermented manure they amount to 57.2 %. The passage of pig manure through the biogas plant reduces the number of pathogens and increases the number of saprophytes, significantly improves the microbiological composition of the resulting bioorganic fertilizer Efluent. It is characterized by an alkaline reaction (pH salt 8.5), a high amount of moisture, which in the mass fraction is 98.4%, a significant content of nitrate nitrogen (18.2 mg/kg), copper (4.6 mg/kg), zinc (32 mg/kg), manganese (20 mg/kg) and iron (120 mg/kg). According to the nutrient content of the active ingredient for 1 ton of bioorganic fertilizer Efluent, it contains – 2.9 kg of nitrogen, 0.9 kg of phosphorus, 3.2 kg of potassium, 3.5 kg of calcium and 0.42 kg of magnesium. Therefore, the use of this fertilizer will provide plants with both macro and microelements. Application of bioorganic fertilizer Efluent due to high content of calcium (CaO – 0.35%, or 3.5 kg/t) and magnesium (MgO 0.042%) will reduce the acidity of soil, which is very important in conditions of long-term use of saline-sour mineral fertilizers.

Key words: bioorganic fertilizer, animal waste, pig manure, saprophytes, pathogens, Efluent, microelements, macroelements.

Reznichenko N.D., Galchenko N.N. The effect of green manure on different systems of primary tillage on the nutrient regime of dark chestnut soil. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 102-107.

One of the main factors for improving fertility and regulating soil humus is the use of organic fertilizers. However, the decline in livestock has led to a significant reduction in organic fertilized areas. In this regard, there is a need to use other types of organic fertilizers that would be equally effective and would not require significant logistical costs. Substantial replenishment of organic matter is ensured by the use of siderate fertilizers. **Purpose.** To investigate changes in the nutrient regime of soil in crop rotation on irrigation under different systems of basic tillage and fertilizer use of post-

harvest green manure and by-products of crop rotation. **Methods**: field, laboratory, calculation and comparative and statistical. **Results.** Information was obtained on the influence of green manure fertilizers in different systems of primary tillage on the content of organic matter and basic nutrients in dark chestnut soil. Based on the results of the studies, it was discovered that the content of mo- bile phosphorus in soil increased by 7.9–20.4%, and the content of exchange potassium – by 27.3– 37.5% on the background of the use of green ma- nure compared with the control (versions without the use of green manure). Significant changes in the content of mineral nitrogen in the soil layer of 0–40 cm, depending on the use of green manure fertilizers, are not observed. The nitrogen content in the upper soil layers (0–10 and 10–20 cm) was 4–5 times higher than in the control only in the options of sowing in previously untreated soil using postharvest green manure. An increase in humus by 0.2–0.6% is also observed in all layers of the arable horizon against the background of green manure. **Conclusions.** In short term crop rotation in irrigated lands of southern Ukraine, the effective measure of increase of dark chestnut soil fertility are mineral organic fertilizer systems that use spring mustard for green manure in postharvest crops on the background of by-products of agricul- tural crops and mineral fertilizers with a dose of $N_{120}P_{40}$.

Key words: dose of fertilizers, corn, soil cultivation, direct sowing, winter wheat, fertility, crop rotation, green manure, soybean, density, winter barley.

Tkach O.V. Storage of chicory root crops depending on the timing of sowing. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 107-111.

Aim. The research aim was to study the effect of various storage methods on the safety of chicory root crops depending on the sowing time. **Methods**: Analysis, synthesis, generalization, laboratory and field experience aim. **Results**. It was established that the best yield of root crops was obtained in cold rooms in plastic bags from a harvest of winter sowing dates of 97.3% and early spring 98.1%. The losses during the storage period were 2.7% and 1.9%, respectively. Minimal losses of root crops were also noted less by microbiological diseases, as well as by a decrease in the number of sodden and germinated root crops. The chicory root vegetables were also well stored in plastic bags in the vegetable store. So, the total losses in these cases amounted to 10.7% from winter crops, 10.1% from early spring. Then, as during the storage of root crops in vegetable storages in containers, the total losses were large and, accordingly, they amounted to 14.8% and 17.7%.

The methods and storage period of chicory root crops affect the change and weight loss. The greatest mass losses of root crops of winter sowing periods were noted in the variant with storage of root crops in temporary collars without sand intercalation. So, on the 55−65th day of storage, the losses were 5.8 g on the 105−115th day − 8.2 g and on the 155-165th day − 13.1g. Somewhat smaller losses were found in collars with sandwiching root crops. Root crops were better stored in the refrigerator in plastic bags. So, on the 55-65th day of storage, the weight loss of root crops was 1.9 g on the 105-115th day − 2.6 g and on the 155−165th day − 5.2 g, the total loss over the entire period was 9.7 g. **Conclusions.** Chicory root crops are better preserved and with less losses in the shoulders and trenches that are sandwiched, it is effective in the vegetable store and the refrigeration chamber in plastic bags, because good waterproofing prevents the evaporation of moisture.

Key words: chicory root, root crop yield, weight loss, storage period, dry matter, sugars, inulin.

Ushkarenko V.A., Sileckaya O.V., Priymak V.V. Sowing feed crops and fertilizers - a reserve for increasing the productivity of crops of old-age alfalfa in the year of its plowing. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 111-116.

Purpose. The goal is to determine the effect of planted fodder crops and nutrition background on the productivity of old-age alfalfa in the conditions of the South of Ukraine. **Methods.** Field experiments to study the comparative effectiveness of sowing old-age alfalfa with winter and spring spike forage crops were carried out under irrigated conditions in the South of Ukraine by laying two-factor field experiments in 2009−2014 on dark chestnut soils of the Sovetskaya Zemlya, Belozersky District, Kherson Region. **Results.** Analysis of the data shows that cultures consume significantly more nitrates than phosphates. This dependence is also observed against the background of the studied mineral fertilizers (N90P60). Compared with corn, its consumption over a six-year observation was higher by 27%. Corn and Sudanese grass on the background of mineral fertilizers consumed more nutrients than winter crops and early spring sown. It was established that the best sowing crops in the early spring on both food backgrounds are rape and oilseed radish. In the late spring sowing, Sudan grass turned out to be the best sowing crop, thanks to which 85.4 on average for the years of research were obtained on the background of $N_{45}P_{30}$, and 94.5 t/ha of green mass on the background of $N_{90}P_{60}$. Findings. Sowing alfalfa old-age crops with fodder crops in combination with and without fertilizers reduces the weediness of the grown green mass according to their timing as follows: in autumn without fertilizer for the studied crops from 35.8 to 62.2%, against fertilizers from 70 to 78.6; with early spring on the studied nutritional backgrounds, respectively, from 26.1 to 34.9 and from 59.4 to 64.8%. The conventional consumption of nitrates by plants is 3 times higher than phosphates. The yield of green mass on crops of old-age alfalfa in the year of plowing the field substantially depends on the timing of sowing them with forage crops in conjunction with and without fertilizers. The best winter crops were rye and rapeseed. The best of the studied crops was Sudanese grass grown in late spring sowing. Against the increased background of mineral nutrition $N_{90}P_{60}$, the yield of green mass was 94.5, and the increase in yield due to a satiated crop was 50.2 t/ha.

Key words: alfalfa, sowing fodder crops, mineral fertilizers, conditional consumption of nutrients by plants, shared participation of plants in the green mass, green mass productivity.

Ushkarenko V.A., Shepel A.V., Kokovikhin S.V., Chaban V.A. Plant density and weediness of clary sage crops depending on the effect of winter hardiness and years of use of the crop in the southern Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 116-120.

Purpose. The goal is to study the influence of the depth of the main tillage, nutrition background and sowing dates on the formation of plant stand density

and weediness of clary sage crops when grown in southern Ukraine. **Methods.** Field experiments were conducted according to the methodology of experimental work during 2011−2018 on the experimental field of PE “Agrofirm-Dodola” of Beryslav district of Kherson region, located in the area of the Ingulets irrigated massif. **Results.** When determining the use of sowing in the second year for winter sowing periods in 2010, with the option of plowing depth of 20−22 cm and a N60P90 food background, the number of clary sage plants was 40 pieces per 1 running meter (pcs./r.m.), and without fertilizer application – 38 pcs./r.m. A deeper plowing of 28−30 cm led to an increase in the number of plants in sowing in this variant. In the future (the second or third year of use), the number of plants per unit area continued to decline to 21 pcs./r.m. In the fourth year of using sowing as a result of increasing soil density and aging of plants (reduction of their assimilation apparatus), a significant loss of plants occurred in the sowing of clary sage. By plowing to a depth of 28−30 cm during winter sowing, the number of weeds in the sowing of clary sage was 6 pcs/m2. When applying mineral fertilizers for the main tillage at a dose of N60P90, an increase in the number of weeds to 8 pcs/m2 was established. In subsequent years of use, the number of weeds in the sowing of clary sage decreased. **Findings.** In the first year of use of clary sage crops in the variant with a plowing depth of 20−22 cm and a N60P90 food background, the number of clary sage plants was 40 pieces per 1 running meter (pcs./r.m.), and without fertilizers − 38 pcs./r.m. In the second year, with a winter sowing period, a decrease in standing density by 9 pcs was noted. In the future (second or third years of use), the number of plants per unit area continued to decline to 21 pcs./r.m. In the fourth year, the use of nutmeg sage crops was inappropriate due to the mass loss of plants on average 3 pcs./r.m. Studies have proven that when deep plowing was carried out to a depth of 28−30 cm, the number of weeds was less than when plowing to a depth of 20−22 cm − from 4−7 to 6−8 pcs/m2. On average, the factor of deep plowing ensured a decrease in this indicator by 7.2−12.8%. When applying mineral fertilizers for the main tillage in a dose of N60P90, the growth of the number of weeds up to 8 pcs/m2 was recorded. The highest level of contamination by species composition was observed in wild radish (15 pcs/m2), and the lowest − in bluish and green mice (1 pc/m2).

Key words: clary sage, cultivation agricultural technique, plant stand density, weed infestation, species composition.

Fedorchuk M.I., Karashchuk H.V., Ilchuk V.T. Productivity of common pumpkin varieties depending on agro-technical cultivation methods in the south of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 120-123.

Purpose: to develop and improve a number of agro-technical methods of common pumpkin cultivation under conditions of the South of Ukraine. Research **methods**: field, laboratory and statistical. **Results.** According to the results of our research, the productivity of the variety Dolia was 16.1–26.7 t/ha on the average depending on the row spacing and nutritional regime of the plants in 2017−2019. The productivity of the variety Yanina was less by 6.0–20.1% depending on the research factors when compared to the variety Dolia. The variety Rodzynka showed the highest productivity of 19.2–30.3 t/ha depending on the nutritional regime and row spacing, that is higher by 2.9–4.1 t/ha than that of the variety Dolia and by 5.1–5.9 t/ha than that of the variety Yanina. The results obtained on the basis of the three-year research prove that the highest productivity of common pumpkin varieties is formed when the row spacing is 140 cm being 15.5–25.2 t/ha in the variety Yanina, 17.3–26.7 t/ha in the variety Dolia and 21.0–30.3 t/ha in the variety Rodzynka on the average for three years depending on the impact of the nutritional regime. When the row spacing was 70 cm, the productivity of the variety Yanina decreased by 2.1–3.9 t/ha, that of the variety Dolia – by 1.2–3.0 t/ha, that of the variety Rodzynka – by 1.8–3.2 t/ha, and when the row spacing was 210 cm – by 0.8–1.2, 0.7–1.6 and 0.5–1.3 t/ha respectively. The application of mineral fertilizers with the rate $N_{60}P_{60}$ contributed to an increase in the productivity of common pumpkin varieties when compared to the variant with no fertilizers by 50.7–59.4% in the variety Yanina, by 39.8–55.4% in the variety Dolia and by 35.9–42.4% in the variety Rodzynka on the average for three years. Reducing the rate of fertilizers to $N_{30}P_{30}$ caused a decrease in the productivity of common pumpkin by 18.1–20.0%, 13.1–16.6% and 14.1–16.0% respectively. It should be mentioned that the yields were almost equal under the nutritional regime of $N_{60}P_{60}$ and $N_{90}P_{90}$: 20.2–23.7 and 21.3–25.2 t/ha in the variety Yanina, 22.5–25.3 and 23.7–26.7 t/ha in the variety Dolia and 26.1–29.2 and 27.1–30.3 t/ha in the variety Rodzynka. The difference was within the least essential difference. **Conclusions**. The highest productivity of common pumpkin varieties was formed when the row spacing was 140 cm and under the nutritional regime of $N_{60}P_{60}$ and $N_{90}P_{90}$, and the difference of this index in the mentioned fertilized variants was within the least essential difference on the average in 2017−2019. At this background the variety Yanina showed the productivity of 23.7–25.2 t/ha, the variety Dolia – 25.3–26.7 t/ha and the variety Rodzynka – 29.2–30.3 t/ha. The increase caused by the application of $N_{60}P_{60}$ was 39.0–52.9%. In order to reach the crop productivity at the level of 25–30 t/ha when cultivating common pumpkin under conditions of the South of Ukraine, it is recommended that the pumpkin varieties Dolia and Rodzynka should be grown with the row spacing of 140 cm under the nutritional regime of $N_{60}P_{60}$.

Key words: common pumpkin, varieties, row spacing, nutritional regime, productivity.

Shevchenko I.V., Minkina G.O. History and future of viticulture on the low-productive lands of the left bank of the Lower Dnieper. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 123-128.

Purpose. To establish the most effective use of environmental conditions and to improve the technology of cultivation of plantations of industrial grapes in the area of the Lower Dnieper sandy massif. **Methods:** analytical, calculation and comparative. **Results.** The planting of table grape varieties on the low-productive lands of the left bank of the Lower Dnieper in the farms, today are created with the obligatory prospect of artificial regulation of the soil moisture regime, using mainly drip irrigation. When designing irrigation of young plantations of grapes, irrigation rate should be calculated on moistening 12−15% of the projected volume of soil, to ensure optimal conditions for the development of 60−65% of the roots of the bushes. The actual irrigation rate, which is supplied with each irrigation, provides moistening of 3−5% of the projected volume and increases the humidity of

mainly the upper 0−20 cm layer of soil, where the development of the majority of roots is observed. In turn, localization of development of the root system within the axis of a series of bushes and a protective strip, violates the nutritional regime of plants as existing machines for fertilizer application, place them outside the moist circuit. The application of mineral fertilizers with irrigation water (fertigation) cannot provide a complete nutritional regime of plants due to the absorption of nutrients (P_2O_5; K_2O) soil and a small distance of movement. Significantly reduces the effectiveness of irrigation of vineyards and the practice of diagnosis of irrigation regime, resulting in significant fluctuations in the humidity of the active soil layer, causing stress of plants, when stopping growth and development, reducing productivity, quality of berries, resistance to shrubs to adverse environmental conditions. It is quite possible to eliminate these shortcomings by applying soil moisture monitoring using a well-proven TV method, tensiometry or well-known diagnostic methods. **Conclusions.** Of the many grape growing technologies used by farmers in their practice, only one in terms of manufacturability may be optimal for the sands area. To this end, not only the standards for the final product, but also for the technology of cultivation, taking into account energy and resource conservation, with minimal environmental and human impact, are developed and implemented in developed countries.

Key words: unproductive land, grapes, features of crop management, drip irrigation, sands, cultivation technologies.

Shkoda O.A., Martynenko T.A. The influence of mineral fertilizers and ameliorant on the water consumption of onion with drip irrigation. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 128-131.

Purpose. To define influence of phosphogypsum and mineral fertilizers on the water consumption of onion on drip irrigation on dark-brown soil of south of Ukraine. **Methods.** The methodological basis of scientific research methods are: field, analytical, laboratory, computational and comparative, statistical. **Results.** It was found that the moisture reserves in the soil layer of 0−50 cm in the control without irrigation were 15,3%. The remainder in the total water consumption of the crop was accounted for by atmospheric precipitation – 84,7%. The application of drip irrigation (without fertilizers and ameliorants) increased the total water consumption of the crop by 1372 m^3/ha. The introduction of mineral fertilizers helped to increase the total water consumption of onions by 80−120 m^3/ha compared to irrigated control without fertilizers and ameliorants. In the total moisture balance, the proportion of soil moisture increased to 0,5−1,6%. The highest total water consumption of onion was noted in the variant with the introduction of the calculated dose of mineral fertilizers (nitrogen fertilizer − calcium nitrate) against the background of the application of phosphogypsum 1,9 t/ha in the sowing tape. It was found that the most economically expended moisture for forming a unit of onion crop on the variant with the introduction of a calculated dose of mineral fertilizers against the background of the application of phosphogypsum in the sowing tape. Here the coefficient of water consumption was 67,9 m^3/t, which is 1,9 times less than the variant without irrigation and less 1,4 times than the control with irrigation without fertilizer and ameliorant. Conclusions. Application of calculation dose of mineral fertilizers (there is nitrogen in form calcium nitrate) on a background bringing of phosphogypsum 1,9 т/ha in the ribbon of sowing, provided the least coefficient of water consumption of onion and most coefficient of the productivity of irrigation.

Key words: onion, water consumption, dark-brown soil, irrigation, phosphogypsum, fertilizer.

Shcherbakov V.Ya., Domaratsky E.A., Kozlova O.P., Dobrovolsky A.V. Formation of optimal winter wheat stem under irrigable conditions of the southern steppe of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 131-137.

Purpose. The article is devoted to the formation of the optimal winter wheat stem, which is aimed at the maximum disclosure of the genetic potential of the crop in the conditions of rigid GTK of the southern Steppe of Ukraine. More than a third of the country's annual grain production is in the southern steppe of Ukraine, the main region of cultivation of the main grain crop − winter wheat. **Methods**: field, analytical, calculation and comparative, mathematical statistics. **Results.** The research program envisaged the study of the influence of different seeding rates and row spacing on the formation of optimal winter wheat stalks and crop productivity. For the implementation of the research program, a two-factor field experiment was included, which included 7 options: Factor A (seeding rates): from 1.5 to 4.5 million seeds per 1 ha with an interval of 0.5 million, control − 4.0 m./ha; factor B: row width: 15 cm, 23 cm, 30 cm. The winter wheat of the Smuglyanka variety (the originator − Odessa SSI) was sown in the last decade of September according to the predecessor of winter rape. The studies were conducted according to the method of field experiment B.A Dospekhov, "State Commission of Ukraine for Testing and Protection of Plant Variety Rights". Chlorophyll content was determined by the colorimetric method in alcohol extract according to M.I. Bulatov. To determine the fractional composition of the chlorophyll was colorimetric at different wavelengths. All necessary assessments, records and observations were carried out according to generally accepted methods of state variety testing. Statistical and variance analysis of these research results was performed according to the technique of Ushkarenko VA. etc. and using Statistica, Microsoft Excel, and Agrostat. **Conclusions.** Studies have shown that the highest stalk density is not formed at the highest seeding rate. For any row spacing, the maximum stem density is marked by a seeding rate of 2.5−3.0 million seeds per 1 ha. The maximum winter wheat crop was formed during winter wheat sowing rate of 2.5−3.0 million seeds per 1 ha and was in the range of 3.95−4.35 t/ha. A further increase in the seeding rate of up to 4.5 million / ha led to a decrease in winter wheat yield. With respect to row spacing, it had no significant effect on crop yield formation.

Key words: winter wheat, seeding rate, row width, tillage, productive stem, photosynthesis, chlorophyll, yield.

Bazaliy V.V., Bazaliy G.G., Boychuk I.V., Kozlova O.P., Teteruk O.V. Influence of environment and coenotic conditions on detection of genotypes of winter wheat with complex of management of valuable signs. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 138-142.

Depending on soil and climatic conditions and biological environmental factors, the action of natural selection not only significantly limits the range of available adaptive phenotypic variability but also determines the elimination of economically valuable

forms. Therefore, one of the important tasks of selection is to develop methods for selecting recombinant biotypes that can reduce this negative phenomenon. Improving the ecological sustainability of plants should be considered as the most important condition for the realization of potential productivity. This is due to the fact that in recent years there has been a tendency to increase the gap between record and average yields of winter wheat. **Purpose.** Determining the relationships between economically valuable traits and the extent to which they respond to selection in different generations of hybrids under different growing conditions. **Methods**. Genetic-statistical, analytical, computational and comparative. **Results.** The effectiveness of quantitative selection, when considered autonomously without reference to others, was quite high. Selected in F3, biotypes were reproduced with effective frequency under different growing conditions. Selections by weight of 1 000 grains and ear productivity which were carried out in non-irrigated conditions, differed in high frequency of manifestation, similar selection at irrigation was not absolutely effective, frequency of reproduction of such intentions about 50%. **Conclusions**. Creating different growing conditions (irrigation, without irrigation, different coenotic ratios) in the selection of breeding forms from hybrid populations of winter wheat, has the opportunity to identify which winters grown to increase potential productivity, can simultaneously reduce the resistance of genotypes to biotic and abiotic factors or can to compensate for the insufficient contribution of the second quantitative features to the real yield.

Key words: correlation coefficients, regressions, selection, irrigation, no irrigation, biotypes, soft winter wheat.

Balashova G.S., Yuzyuk S.N., Kotova E.I., Yuzyuk O.A., Kotov B.S. Productivity of the leaf apparatus and the accumulation of dry matter by potato plants during reproducing basic seed material. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 143-147.

Purpose: to determine the dynamics of leaf surface area formation and accumulation of total dry matter depending on the variety, fertilizer dose and growth regulator during reproduction of the basic seed material. **Methods:** field, laboratory, mathematical and statistical, calculation and comparative methods and system analysis. **Results.** Experimental data on the effect of mineral fertilizers and growth regulators on leaf surface formation and dry matter accumulation of potato varieties on phenological phases are presented. Conclusions: At the initial stages of potato leaf surface formation were significant varietal differences (up to 32% difference), by the end of flowering varieties Skarbnitsa and Levada almost equaled each other, while Yavir had a 14% smaller leaf area. The application of mineral fertilizers at a dose of $N_{45}P_{45}K_{45}$, averaged over phases, increased the leaf area by 55,3%; $N_{90}P_{90}K_{90}$ – by 74,2%. Against the background of the $N_{45}P_{45}K_{45}$, regulators increased leaf area by 8,6% (Emistim C), 9,9 (Stimpo) and 16,2% (Regoplant), averaged over phases. Potato varieties accumulated the dry matter of tops and tubers almost in the same way as they formed the area of the leaf surface – a significant difference between early, mid-early and mid-ripening varieties decreased as they grew and developed, and in the last two dimensions Yavir equaled and slightly exceeded. The application of mineral fertilizers at a dose of $N_{45}P_{45}K_{45}$ provided in phases from 115 to 63% of dry matter increase compared with the untreated control, $N_{90}P_{90}K_{90}$ – from 117 to 81% (the relative effect of fertilizers decreased slightly with each subsequent measurement). Emistim C promoted the accumulation of additional dry matter in potatoes from 9 to 13%; Stimpo – from 11 to 16%; Regoplant – from 18 to 27%.

Key words: leaf area, dry matter, seed potatoes, fertilizers, growth regulators.

Vozhehova R.A., Balashova H.S., Boiarkina L.V. The influence of the aftereffect of treatment with exogenous phytohormones on the productivity of seed potatoes of summer planting in the South of Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 147-151.

The purpose of the study was to determine the influence of the aftereffect of phytohormonal preparations on the growth, development and productivity of potato offspring plants in summer planting with freshly harvested tubers under irrigation in the South of Ukraine. **Materials and research methods.** Field studies were carried out in accordance with the requirements of research methods and methodological recommendations for conducting research with potatoes; mathematical processing of experimental data was carried out according to generally accepted methods. The tubers of the spring planting period were treated with gibberellic acid, plants at a height of 10–15 cm were sprayed with a solution of indolylacetic acid and at the beginning of flowering with a kinetin solution, and the complex effect of these drugs was studied. In summer planting with freshly harvested tubers, the effect of the aftereffect of phytohormonal preparations on the plant productivity of each of the potato progeny variants was determined. **Research results.** The aftereffect of complex treatment of tubers with gibberellin and plants during the growing season with kinetin or indolylacetic acid contributed to an increase in yield by 8.4–15.2%. The aftereffect from the use of each of the studied drugs separately was not significant at the control level, and the result of the aftereffect of treating plants with indolylacetic acid was a decrease in yield by 4.3%. **Conclusion.** The study of the influence of the aftereffect of exogenous phytohormonal preparations: gibberellic acid, kinetin, indolylacetic acid on the growth, development and productivity of potato offspring plants during summer planting with freshly picked tubers showed that, in terms of the totality of indicators, the maximum effect of the aftereffect of processing potatoes with phytohormonal preparations only appears during complex treatment of seed tubers with gibberellin, plants before budding at a height of 15-20 cm with indolylacetic acid and at the beginning of flowering with kinetin. This contributes the germination capacity of freshly harvested tubers and increase the yield by 1.73 t/ha, reduce production costs by 15% and increase profitability by 69%. In this case, additional costs for the implementation of reception amounted to 161.00 UAH/ha.

Key words: potato, aftereffect of phytohormones, gibberellin, kinetin, indolylacetic acid, seed material, summer planting, freshly harvested tu- bers, productivity.

Vozhehova R.A., Biliy V.M. Economic and energy rationale for the technology of growing winter wheat seeds in southern Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 151-156.

Purpose. The goal is to determine the economic and energy efficiency of agricultural techniques for growing winter wheat seeds, depending on the varie-

tal composition, the timing of sowing and fertilizer when grown in non-irrigated conditions in the South of Ukraine. **Methods.** Field, laboratory, dispersion. **Results.** It was established that the highest cost of gross production was formed on the variant with the Antonovka cultivar with a late sowing period and the background application of nitrogen-phosphorus fertilizers together with the use of micronutrient fertilizers "5 element". The highest cost of 1 ton of winter wheat seeds in the range of 5.14–5.70 thousand UAH/t was on the variant with the Blago variety with an early sowing period and fertilizer application. The maximum level of profitability – 86.6–115.0% provides a late sowing period - in the first decade of October. The energy efficiency of growing winter wheat seeds changed to the greatest extent depending on the background of nutrition and to a lesser extent on varietal composition and fertilizer. Energy costs were minimal – at the level of 22 GJ/ha in an unfertilized version when sowing Antonovka and Maria varieties in the second decade of September. The application of the first sowing period led to the receipt of the minimum value of energy gain on all varieties. In the second variant of fertilizer, a minimal increase in energy was formed (13.0 GJ/ha), which is 21.5–70.1% less than the other variant. From the energy point of view, the advantages were: the Antonovka variety, sowing in the 3rd decade of September – the first decade of October and the integrated use of mineral fertilizers and microfertilizer "5 element", which ensured an increase in the energy efficiency coefficient by 6.8–21.6%. **Conclusions.** According to the results of the economic analysis, it was determined that the maximum: conditional net profit at the level of 18.4 thousand UAH/ha and a profitability of 133% were formed on the variant with the Antonovka variety when planted in the first ten days of October and the background application of mineral supplements and the "5 element" preparation which was used for seed treatment and top dressing. The energy efficiency of growing winter wheat seeds changed to the greatest extent depending on the background of nutrition and to a lesser extent on varietal composition and fertilizer. The highest energy efficiency coefficient in the experiment (2.12–2.20) was formed during the joint use of fertilizers in the main application and in top dressing.

Key words: winter wheat, seeds, variety, sowing period, fertilizers, economic efficiency, energy assessment.

Vozhegova R.A., Borovik V.O., Bidnyna I.O., Skoda O.A., Rubtsov D.K. Sowing quality of soybean seeds with different technological support. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 157-161.

Purpose. To determine regularities of formation of conditioning seeds of a new middle-ripe Svyatogor soybean in the conditions of Southern Ukraine depending on optimization of plant density and doses of nitrogen fertilizer, that is, factors that are basic components in modern models of technology in irrigated lands of Southern Ukraine. **Methods** – field, calculation, measuring and weighting. **Results.** The main criteria for the evaluation of soybean seed material are the yield of conditioned seeds and such sowing qualities as the mass of 1 000 seeds, germination energy and germination. With increasing dose – the yield of conditioned seeds increases, regardless of the density of standing plants. Thus, in the control variant (without fertilizers) these figures were in the range of 70.2–68.4%, against the background N_{30} – 70.5–68.8%, and for the introduction of N_{60} – 70.6–68.0%. At the same time, yields of conditioned seeds were higher than the sowing density of soybeans, which ranged from 300 to 600 thousand pieces/ha, than for 700 thousand pieces/ha – 1 million pieces/ha. On average, on a background of N_{30} and N_{60}, areas with a sowing density of 600 thousand units/ha provided the highest yield of conditioned seeds – 71.3–71.5%, compared to other densities. The highest mass values were 1 000 seeds by plant density of 300 thousand units/ha, which decreased with the increase in the number of plants/ha: on a non-cultivated background from 231,7 to 222,7 g, on a background N_{30} – from 234,2 to 226,6 g and for application N_{60} from 236,8 to 229,6 g, the correlation coefficient r = –0,92. The seed germination energy was high 90.1–90.3% in areas with a larger mass of 1 000 seeds, in variants with densities from 300 to 600 thousand plants/ha, correlation coefficient r = -0.90. Seed germination of the middle-ripe soybean Svyatogor was 85.2–85.7% against the N_{30} against a density of 300–600 thousand plants/ha and 85.4–85.8% against the N_{60}, which meets the standards for sowing quality of seeds soybeans. The areas where seeds with a high mass of 1000 seeds were sown were the best indicators of seed germination. **Conclusions.** Thus, the sowing properties of seeds of the middle-ripe soybean Svyatogor were significantly influenced by both the sowing density and the use of nitrogen fertilizers. The best sowing qualities of the seeds were possessed by soybean plants, which was formed in areas with an optimal plant density of not more than 600 thousand units / ha against the background of nitrogen fertilizer application.

Key words: soybean, middle-ripening variety, nutrition background, plant density, yield.

Zayets S.A., Fundirat K.S., Netis I.N., Onufran L.I. Ele-ments of the structure of productivity of winter triticale varieties and their effect on the yield of conditioned seeds. Irrigated agriculture: inter-agency thematic scientific collection. 2020. Is-sue 73. P. 161-167.

Purpose. To determine the effect of microfertilizers Humifield, Nanomix and Nanovit micro on the basic elements of the crop structure of modern winter triticale varieties under irrigation conditions in southern Ukraine. **Methods.** Researches were conducted in 2014–2016 on the irrigated earths on the methods of the field and laboratory researches of the Institute of Irrigated Agriculture NAAS and generally accepted technology of growing of winter triticale in South Steppe of Ukraine. **Results.** The number of productive stems was found to increase by 13,4–30,2 pc./m^2, or 2–4% from the use of microfertilizers, the mass of grain from one ear to 0,02–0,03 g and the length of the ear to 0,4–0,6 cm. The greatest effect on winter triticale plants was made by microfertilizer (2 l/ha). The best combination of all elements of the structure of the crop was formed in the variety Bogodarskoe, which, when fed with the drug Nanovit micro (2 l/ha) plants formed the highest productive stem – 481 pc./m^2, 31 grains in the ear with a grain weight of 1,57 g and the length of the ear 9,0 cm. When applying the microfertilizer Nanovit micro on the varieties Rarity and Bouquet, these indicators of yield structure, respectively, amounted to 452 pcs./m^2, 32 pcs., 1,57 g and 9,5 cm and 477 pcs./m^2, 31 pcs., 1,60 g and 9.5 cm. It was found that in the conditions of irrigation of the Southern Steppe of Ukraine yields of the conventional seeds of winter triticale varieties Bogodarskoe, Rarity and Bouquet had a stable strong

positive correlation with the number of productive stems (r = 0,95…0.,7), spike length (r = 0,69…0,90) and more diverse unstable correlation relationships of different strength with the number of grains in the ear (r = −0,79…0,18) and the mass of grains per ear (r = −0,09…0,99). **Conclusions.** The greatest effect on winter triticale plants was made by microfertilizer Nanovit micro (2 l/ha). The best combination of all elements of the structure of the crop was formed in the variety Bogodarskoe. In different varieties, each structural element of productivity has a specific effect on the formation of the yield of the conditioned seed, and for each variety has individual values.

Key words: winter triticale, variety, microfertilizers, structure of harvest, irrigation.

Ivaniv N.O., Averchev O.V., Mikhalenko I.V., Lavrynenko Yu.O. Variability of cob structure elements in maize hybrids of different FAO groups and their relationship with grain yield under different irrigation and moisture supply methods in the Arid Steppe Ukraine. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 168-174.

Purpose. To establish the manifestation of morphometric features of the corn cob (cob length, cob length, cob share, number of grains) and their effect on grain productivity in modern domestic corn hybrids with various irrigation and water supply methods in the Arid Steppe of Ukraine. **Methods –** field, laboratory, statistical. **Results.** The adaptability of hybrids to the soil and climatic conditions of the Arid Steppe zone and artificial moisture supply is displayed by the parameters of the elements of the productivity structure, the main of which are the length of the cob, the length of the ears of corn and the number of grain rows of ears. The length of the corncob and the grain yield of the hybrids showed a high degree of positive relationship. The maximum yield level is achieved with a cob length of more than 21 cm. However, without irrigation, the relationship between ear length and yield was in the opposite direction. The correlation coefficient was −0,884, which indicates a significant loss in the realized productivity potential of intensive maize hybrids. The results of the correlation analysis showed that in the arid steppe without irrigation, the potential high yield of intensive hybrids can be harmful to the actual grain yield, so it is necessary to select hybrids for production on the basis of adaptability to agroecological conditions. The index of the realization of the potential of corn hybrids can be the ratio of the grain part of the corncob to the total length of the stem. Irrigation conditions under optimal conditions allow the potential yield to be realized almost completely. So for the Rostock and Skadovsky hybrids, the realization of potential productivity reached 99,5–100% with drip irrigation. Drip irrigation ensured the realization of potential productivity by 99,5%. A slightly lower percentage of potential realization was provided by irrigation irrigation and subsoil irrigation (96,4 and 98,9%, respectively). Without watering, the percentage of realization of the potential capabilities of hybrids was significantly less (44,2 ... 74,2%) and, importantly, decreased with increasing potential of the hybrid. This indicates the need to take into account an important technological indicator of hybrids – the direction and level of the genotype-environment reaction, which is embedded in the hybrid according to special breeding programs. An important indicator of the potential productivity of maize hybrids is the number of ears of corn. This indicator has a fairly high level of stability of manifestation in various agroecological conditions. Since the ear has an even number of grain rows, the variation in their number in the hybrid can be within 2 rows. Growing conditions have almost no effect on the number of grain rows. Findings. Morphometric indicators of the corn cob (cob length, grain length, grain size, number of grain rows) have a significant, but multidirectional effect on grain yield in modern domestic corn hybrids with different methods of irrigation and water supply in the Arid Steppe of Ukraine. In the Arid Steppe without irrigation, the potential high yield of intensive-type hybrids can be harmful to real productivity, so it is necessary to select hybrids for production according to the principle of adaptability to agroecological conditions. The length of the ears of corn is the main indicator of productivity, both under irrigation and without watering. This is confirmed by high correlation coefficients between the length of the ears of corn and grain yield (r = 0.907 ... 0.931).

Key words: irrigation, corn, yield structure, hybrid, grain.

Konovalova V.M., Syabruk T.A., Konovalov V.A., Tishchenko A.V. The use of microbiological preparations in the cultivation of crops, in particular flaxseed oilseed. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 175-179.

Purpose. The analysis of the studied information on the influence of microbiological preparations gives the basis for the selection of effective flax oil in southern Ukraine. **Results.** The use of Trichodermine, Ecovital, Planriz BT, which have antimicrobial and antistimulating properties. They contribute to the formation of a powerful nitrogen-fixing apparatus on the roots, the intensification of plant development, their protection against diseases, increase the yield and quality of plant products, as well as contribute to the stabilization of the agroecosystem and increase soil fertility. Use of Microbiological Fertilizer Ambionik-U can reduce the risk of seed damage by disease in the initial period of plant growth and development. Presowing seed treatment with this drug significantly increases their germination. Foliar treatments with Stimpo and Regoplant biostimulants improve the parameters and functioning of the photosynthetic apparatus of pea plants. Application of Ecophosphorin, Azophosphorin bacterial preparations on the basis of growth-stimulating nitrogen-fixing and phosphate-mobilizing soil bacteria for increasing the productivity of cereals (winter and spring wheat, barley, etc.), technical and vegetable mineral nutrition of plants, stimulate their growth and development by providing biologically active substances (vitamins, phytohormones, am by increasing the resistance of plants to phytopathogens and stress, increasing the yield and quality of the grain. **Conclusions.** The use of microbial preparations provides the formation of biota of useful microorganisms in the right amount, at the right time. Modern microbial preparations also have in their composition physiologically active substances of bacterial origin (a kind of growth promoters), actively influence the development of the root system, the formation of a larger adsorbing surface, in general, contributes to the increased use of fertilizers by plants.

Key words: oilseed flax, microbiological preparations, biofungicides, bioinsecticides, nitrogen fixing, phosphate-mobilizing, potassium-mobilizing, agroecosystems, biostimulants.

Marchenko T.Yu., Lavrynenko Yu.A., Luta Yu.O. The manifestation and variability of the mass of 1000 grains in lines – parent components and hybrids of maize when using different genetic plasmas under irrigation conditions. Irrigated agriculture: inter-

agency thematic scientific collection. 2020. Issue 73. P. 179-184.

Purpose. Determine the manifestation and variability of the mass of 1 000 grains in the lineage – parent components and hybrids of maize using different genetic plasmas and to determine the level of heterosis in the test crop again in the conditions of irrigation in the south of Ukraine. **Methods.** Field, laboratory, comparative, generalizations. The studies were conducted during 2015–2019. **Results.** The maximum weight of 1 000 seeds was again shown by hybrids for the use of the Mixed Plasma lines, where the DK 445 line of the plasma Mixed DK 445 x XH-3-16 (FAO 400) – 402,4 g; DK 445 x XH-19-16 (FAO) was used as the maternal form (FAO 400) – 393,9 g, and again the Plasma line Mixed – XH-5-16 x XH-54-16 (FAO 390) – 396,8 g. In all testcrosses created, the true and hypothetical heterosis values exceeded 100% and the highest value purchased in hybrids in which the DK 445 line of the plasma Mixed DK 445 x XH-3-16 (FAO 400) H_{true} = 146%, H_{gip} = 147%, H_{com} = 118%, again Plasma Line Mixed: XH-7-16 x XH-5-16 (FAO 300) – H_{true} = 142%, H_{gip} = 144%, H_{com} = 127%, maternal form KR 9698 Lancaster: KR 9698 x XH-58-16 (FAO 300) – H_{true} = 143%, H_{gip} = 147%, H_{com} = 130% and others, indicates the presence of a powerful potential for increasing the level of mass of 1 000 seeds using the mixed breeding material source material. **Conclusions.** The value of the genotype of variability (V_g) by mass of 1 000 grains in parental components and testcrosses exceeded the parameters of paratypical variability (V_m), which indicates the priority influence of the genotype on the realization of productivity potential and the possibility of efficient selection among parental lines and hybrids. For the synthesis of new high-yielding genotypes of maize under irrigation conditions, it is promising to use Mixed Plasma lines, created with the participation of commercial hybrids and cross lines of contrasting groups of maturity of different genetic plasmas, in crosses.

Key words: corn, parent components, again lines, heterosis, irrigation.

Omelyanova V.Yu., Kotovskaya U.S. Botanical characteristic and agrobiological features of the purple echinacea in the context of the use of the species for urban greening in the Southern Steppe of Ukraine (overview) . Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 184-188.

In the article we have reviewed the compliance of the Botanical characteristics, ecological and agrobiological properties of the species of Echinacea purpurea (Echinacea purpurea L. Moench.) and its varieties: woodland beauty, the Enchantress, Hughes, recorded in the Register of plant varieties of Ukraine, substantiates the ways to use its decorative qualities: color, size, and number of inflorescences, the habit of the shrub: compact and height, decorative in various phases of the growing season and duration of flowering; in landscaping home gardens, in particular, with the creation of the city flower beds. First of all, modern landscaping using varieties of Echinacea, raspberry, white, peach and yellow petals, with double flowers, Echinacea low, up to 60 cm in height, they can be grown as gordekovo culture and the huge, up to 2 m in height, Echinacea fragrant and with bicolor flowers, with spotted leaves, large inflorescences more than 15 cm in diameter. Ontogenetic and studied the anatomical structure of the species of Echinacea purpurea and its varieties, analysed modern domestic varietal composition of culture, which should be used not only as a medicinal material and a Supplement to feed livestock, namely in landscaping for its ornamental, functionality, resistance to pests and diseases, and compliance with agro-ecological conditions of southern Steppe zone, studied possible options for the creation of composite beds, mono flower beds, rabatok, curbs, tapeworms, retaining walls, terraces, Rotaru, pot culture, rock gardens, mixed borders with the use of Echinacea purpurea and its varieties also in combination with other ornamental plants, shrubs, lawns, ponds, small architectural forms and rocks in urban and suburban conditions of severe hydrothermal ratio of the area of cultivation.

Key words: purple echinacea, botanical, biological, ecological properties, grade composition, decorative function and medical qualities, growing conditions.

Tishchenko O.D., Tishchenko A.V., Piliarska O.O., Kuts G.M., Galchenko N.M., Konovalova V.M. The relationship of seed productivity with the accumulation of root mass and the nitrogen ability of first year aluminum varieties. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 189-196.

The purpose. Development and scientific substantiation of technological methods of increasing seed productivity of alfalfa, nitrogen-fixing ability and accumulation of root mass in soil in the year of sowing. **Methods**. The studies were conducted in 3-factor field experience: Factor A – moistening conditions (drip irrigation, no irrigation), Factor B – alfalfa varieties (Unitro, Zoryana), Factor C – foliar feeding with growth regulator Plantafol 30.10.10 and control**. Results.** The yield of alfalfa seeds in the conditions of natural moisture was 1.39 Cwt/ha, with drip irrigation 2.18 Cwt/ha. Along with the increase in seed yield, there are changes in the parameters of air-dry root mass accumulation and nitrogen fixation. The highest root mass was formed in the conditions of natural moistening of the Zoryana variety when using Plantafol 30.10.10 1.89–1.90 t/ha, and on control variants it was 1.63–1.68 t/ha at seed yield of 1.28–1.34 and 1.15–1.16, respectively. Under drip irrigation, the amount of dry root mass was 2.28 t/ha, versus 1.75 t/ha without irrigation, with an increase in yield from 1.39 to 2.29 t/ha. Lucerne plants during irrigation and the use of a growth regulator accumulated dry root mass up to 2.42–2.53 t/ha in the Unitro variety and 2.45–2.52 t/ha in the Zoryana variety, which exceeded the control variants by 21.0–29% and 19.5–27.9%, respectively. The greatest influence on seed yield, root mass accumulation and nitrogen fixation of alfalfa varieties had moistening conditions – 81%, 61% and 86%, respectively. It has been established that there is a close direct correlation between seed yield, root mass accumulation and nitrogen fixation of alfalfa: there is r = 0.950 between the seed yield and root mass accumulation in the Unitro variety and r = 0.874. It was high between seed yield and nitrogen fixation in Unitro r = 0.986 and r = 0.972 in Zoryana variety. Humus loss depended directly on the seed yield. The humus balance is the difference between returning and losing it. Under conditions of natural moistening, the humus balance was 0.173 Cwt /ha, while in the case of irrigation it was 0.258 Cwt/ha. **Conclusions.** The largest seed yield was obtained by drip irrigation. Root mass accumulation and nitrogen fixation process occur most intensively in irrigation conditions. The maximum positive

humus balance in both alfalfa varieties was also observed with drip irrigation.

Key words: alfalfa, varieties, root mass, nitrogen fixation, drip irrigation, natural moisture supply, growth regulator, humus balance.

Tkach M.S., Voronyuk Z.S., Lavrynenko Yu.O. Photosynthetic activity of crops of modern rice varieties depending on sowing time and doses of mineral fertilizer. Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 197-202.

The **purpose** of the article is to analyze the dynamics of leaf formation and individual indicators of photosynthetic activity of plants of rice of modern varieties depending on the doses of mineral fertilizers and sowing time and to reveal the nature of the influence of these indicators on the main stages of growth and development on the formation of the level of productivity of crop. **Methods.** Field experiments were performed in the specialized rice crop rotation of the Institute of Rice of the NAAS during 2017 2019. The applied technology of cultivation of the crop provides irrigation by a method of shortened floods during getting of seedlings and maintenance of a constant layer of water from seedlings to a phase of full ripeness of rice. The subject of our research are rice varieties with different lengths of vegetation period and different types of cereals: Lazurite, Consul, Marshall. The object of research is the processes of formation of the area of assimilation surface, photosynthetic activity of rice crops and realization of the potential of rice productivity depending on sowing time and level of mineral fertilizer. The soil cover of the study area is represented by dark chestnut medium loamy saline soils in combination with deep-sea salmon. **Results.** Sowing of rice was carried out in three terms − starting from the date of steady warming of the soil at a depth of 0−5 cm to 10−12 °C; the following terms − with the interval of 10 days (26−28.04; 6−8.05; 16−18.05). Two mineral nutrition backgrounds, moderate $N_{120}P_{30}$ and elevated N180P60, were studied in the experiment. Seeding rate is 9 million/ha of similar seeds. The article presents the results of studies on the effect of sowing periods and doses of mineral fertilizers on the photosynthetic potential of the investigated rice varieties. The highest rice grain yields of modern varieties can be obtained by forming the optimal plant assimilation area and creating the conditions for dry substance accumulation; provided conditions for the realization of photosynthetic activity of rice plants, including high productivity of leaf cover and high net productivity of photosynthesis. **Conclusions.** The best results are provided by Consul and Marshall varieties, when sowing rice of these varieties in the third decade of May with the application of mineral fertilizer at a dose of $N_{180}P_{60}$.

Key words: rice, sowing time, nutrition background, variety, weather conditions, net photosynthesis productivity, leaf productivity.

Karpovich M.S., Drozda V.F. Biological and ecological basis of integrated protection of phytophagous Lepidoptera and related species of pine (*Pinus sylvestris* L.) . Irrigated agriculture: interagency thematic scientific collection. 2020. Issue 73. P. 203-207.

Purpose. The aim of the research was to investigate on the basis of sampling of phytophagous, predatory and parasitic species of insects, inhabiting ecologically associated with *Pinus sylvestris*. To conduct species identification, to determine the level of dominance. To determine the dominant species of predatory arthropods. To implement significant elements of the original technology and biological protection of pine-trees from Lepidoptera and related species of phytophagous arthropods of Scots pine. **Methods.** Field research was carried out for 2016–2018 in pine plantations woodland. For this allocated areas the stationary part of the forest with the highest density of phytophagous Lepidoptera, for dominance of the pine moth. Monitoring included visual and instrumental techniques with the collection of samples of plant remains, soil, branches and bark of trees infected departure time stages of phytophagous. When conducting studies using conventional in industries entomology, parasitology and biotechnology methods. **Results.** The process of detecting predators of caterpillars is mostly random. While biologically infectious caterpillars of the pine moth are characterized by a fairly reliable protection in the form of hard and long hair. They are deterred and often make impossible the process of predation. Found that of the thirty contacts of the larvae of ground beetles and stand, only 8 ended with the eating. Better eating caterpillars adult predators. Out of thirty contacts were destroyed on average 18–20 caterpillars of the pine moth. Thus it is established that 63,7% of this Fund darius music populations of caterpillars of the pine moth, which are eaten by predators, concentrated mainly in the litter and on the soil surface. It is here were going physiologically weakened caterpillars with less dense and stiff pubescence. Shown much larger motor, search and trophic activity of ground beetles compared to stafillani. The predation efficiency was significantly increased with high number darius music caterpillars. From the above it is obvious that this is an important natural regulatory mechanism for the abundance of pine moth and related phytophagous whose ontogeny is associated with the soil. Predators, pathogens, parasites collectively support the number of phytophagous level, counteracts the massive epizootics. It is obvious also that there should be a set of measures aimed at the preservation, accumulation and resettlement of entomophages. **Conclusions.** Studies have shown that pine plantations of Polissia are dominated by pine silkworms, caterpillars of which cause defoliation of needles, which is the cause of various physiological anomalies and is accompanied by a lag in the growth and development of trees. Principal possibility of protection of common pine from scaly phytophagous species has been established by settling on the trees of laboratory cultures of trichogramma and telenome.

Key words: common pine, silkworm, predatory arthropods, entomophages, biological protection, parasitic level.

Vozhegova R.A., Malyarchuk A.S., Kotelnikov D.I., Reznichenko N.D. Influence of systems of the main tillage and fertilizer on productivity of winter barley in crop rotation on irrigation of the south of Ukraine

The article presents the results of research on weeds and productivity of winter barley depending on different methods and depth of basic tillage, fertilization and greening and further impact on crop productivity in crop rotations in irrigated conditions in southern Ukraine. The **aim** of the research was to determine the influence of the main tillage, various fertilization and greening systems on the weediness of winter barley crops and the subsequent impact on its productivity. **Methods.** During the experiment, field, quantitative-weight, visual, laboratory, calculation-comparative, mathematical-statistical methods and generally accepted in Ukraine methods and methodical recommendations were used. The research was conducted during 2016-2019 in the research fields of the Askani DSDS IZZ NAAS of Ukraine. The **results** of the research allow to show that with a disc cultivation of 12-14 cm in the system of differentiated tillage in the system of shallow single-depth loosening led to an increase in the number of weeds by 2.9 times. At chisel loosening to a depth of 23-25 cm in the system of different depth loosening led to an increase in the number of 2.1 times, but reduced the vegetative mass by 4.2 times compared to the control, and the largest number of weeds 33 pcs/m^2 from 15.9 g/m^2 vegetative mass was obtained at zero tillage. Productivity has developed in line with weeds. On average, by factor A for disk cultivation of 12-14 cm in the system of differentiated, shallow single-depth and chisel cultivation for 23-25 cm, the yield was 6.29; 6.41 and 6.18 t/ha, respectively, and at zero tillage productivity decreased by 18.9% compared to the control. At the same time, the use of green manure increased the yield on average by factor B by 14.4%. **Conclusions.** The results of research show that the use of green manure in fertilizer systems in crop rotation helps to increase the yield of winter barley. Thus, on average by factor B against the background of N_{120} P_{40} + green manure + post-harvest residues, the use of green manure contributed to the formation of grain yield at 6.20 t / ha, against 5.68 t / ha in the version without green manure (N_{120} P_{40} + post-harvest residues), ie more by 0.52 t / ha or 9.1% compared to the control.

Key words: barley, littering, yield, sidereal culture, productivity

Vozhegova R.A., Melnichenko A.V. The efficiency of collection samples of sowing rice in the creation of new promising lines

Goal: to create a highly productive and resistant to lodging raw rice seed material for rice crop rotations in Ukraine. **Research methodology.** The research was conducted in the research field of the Rice Institute of NAAS of Ukraine. The technology of cultivation is generally accepted for the conditions of the south of Ukraine. The intensity of lodging of the rice collection was recorded visually on a five-point scale. The pneumatic method was used for castration, and the fuel method was used for artificial pollination. In the laboratory, a complete structural analysis of the productivity of F1 hybrids was performed. Harvesting and accounting were performed in the phase of full ripeness of grain by hand from each part of the experiment by weight. **Results.** To accomplish the task of creating new varieties, it is necessary to mobilize and rationally use the genetic resources of sowing rice, to select the necessary donors and sources of the desired traits from them, and to put genetic regularities in the selection of source material for breeding as the basis for breeding work. Plant breeding, including rice, is a very important component of crop production, but is currently being filled with the content of adaptability. Therefore, the task of breeding is to form a strategy for adaptive intensification of crop production, which should be based on the achievements of ecological genetics of cultivated plants. **Conclusions.** Resistance to lodging is most correlated with plant length, therefore, plant selection based on the "plant height" in order to increase lodging resistance is effective. Plant height significantly influenced not only lodging resistance, but also crop productivity. It is important to note that higher yields are obtained not by plant height, but by genetically determined ones. The use of the newly created source material in practical conditions will allow the formation of highly productive planting material, thereby increasing the yield and quality of this crop.

Key words: rice, hybrids, variety, breeding, collection, parent components, stability, performance.

Kovalenko O. A., Steblichenko O. I. Photosynthetic productivity of crops of summer savory (*Satureja hortensis* L.) depending on agrotechnical methods of cultivation.

Goal. Determination of the most optimal agrotechnical methods of growing culture plant, which provide the highest results of photosynthetic potential of summer savory crops in the conditions of the Southern Steppe of Ukraine. **Method.** The net productivity of photosynthesis was determined by the method described by A. O. Nichiporovich, according to the Kidd-West-Briggs formula. **Results.** The formation of the leaf surface area of summer savory was least influenced by the method of sowing – in the range of 3.2–20.5%. The sowing dates caused fluctuations in the range of 20.4–30.5%. Humidification conditions had the most significant influence on the formation of the leaf area of summer savory plants – 27.8–42.4%. The photosynthetic potential of summer savory crops averaged 147.8-557.1 thous. m^2/ha per day. The maximum was on the option of drip irrigation and for sowing in the third decade of April in a wide row with a row spacing of 45 cm. Minimal – in experiments with natural moisture for sowing in the second decade of May in a wide row with a row spacing of 30 cm. **Conclusion.** The maximum mantle of the leaf surface of summer savory plants (38.2 thous. m^2/ha) was formed on the option of drip irrigation when sowing in the third decade of April in a wide row with a row spacing of 45 cm, with a leaf index of 3.82, photosynthetic potential in flowering phase 557.1 thous. m^2/ha×days.

Key words: summer savory, leaf area, leaf index, photosynthetic potential, humidification conditions.

Koloyanidi N. A. Leaf area and photosynthetic potential of the chickpea crops for cultivation in South of Ukraine

The main **purpose** of this work was to study features of formation of leaf area of various varieties of chickpea, depending on agrotechnical methods of cultivation, as well as photosynthetic potential, which ensures an increase in productivity and an improvement in quality indicators of obtained products. **Method.** 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 m^2, accounting – 50 m^2. **Results.** It was found that the photosynthetic surface of chickpea plants reaches its maximum value during the formation of beans – 22.3-25.0 thousand square meters per hectare, depending on sowing method, on average for varieties and herbicide backgrounds. The maximum leaf area on average during growing season was observed with wide-row sowing by 45 cm – 14.6-18.4 thousand square meters per hectare, depending on variety and herbicide background, with sowing by 15 cm this indicator decreased by 1.4-2.5 thousand square meters per hectare. The most powerful leaf apparatus was formed in plants of varieties Triumph and Budzhak in wide-row crops with combined use of Pulsar and Bazagran preparations – 26.2-27.9 thousand square meters per hectare during period of beans formation. **Conclusion.** The highest rate of photosynthetic potential is observed during flowering-formation of beans – 0.331-0.508 mln. square meters/hectare days (depending on the variant of the experiment). Sowing chickpea in a continuous way led to its decrease by 15-19% in comparison with wide-row sowing. The maximum value of photosynthetic potential during growing season was observed precisely with wide-row sowing in variant with the introduction of a combination of Pulsar and Bazagran preparations: in crops of Rosanna variety – 0.793 mln. square meters/hectare days, Pam'yat` – 0.766, Triumph – 0.843, in the crops of the Budzhak variety – 0.913 mln. square meters/hectare days.

Key words: chickpeas, variety, seeding methods, herbicidal background, leaf area, photosynthetic potential.

Konovalov V.A., Konovalova V.N., Usik L.A. Influence of moisture supply and mineral nutrition on the sowing qualities of dyeing safflower varieties

The **aim** of the research was to establish the conditions of moisture supply (artificial and natural) and mineral nutrition for sowing qualities of safflower seeds. Based on the **results** of studies carried out during 2016-2018. At the Askania State Agricultural Experimental Station of the Institute of Irrigated Agriculture of the NAAS, it was found that the highest yield of conditioned seeds on all varieties of safflower, both with irrigation and under conditions of natural moisture, a high reproductive rate and the best sowing qualities were obtained for the introduction of $N_{90}P_{60}$. According to the results of the research, it was found that among the studied variants the highest seed yield was obtained in the variety Zhyvchyk - 1.87 t / ha with a reproduction rate of 228.8 with the introduction of N90P60 and cultivation under irrigation. The average reproduction rate under irrigation was 218.5%, while with natural moisture only 150.3%. Increasing the application of fertilizer gave a positive effect on the reproduction rate of safflower seeds. **Conclusions.** The largest yield of conditioned dyeing safflower seeds is provided by the cultivation of the Zhivchik variety. So under conditions of irrigation and application of $N_{90}P_{60}$, the yield is at the level of 1.87 t / ha with a multiplication factor of 246.8%, in conditions of natural moisture supply - 1.39 t / ha, the multiplication factor is 169.7. But the mass of 1000 seeds of dyeing safflower for growing not in irrigated conditions is 3.05 g more than in irrigated conditions. Thus, the highest indicator of the mass of 1000 seeds obtained in the Lagidny variety under conditions of natural moisture is 38.04 g, while under irrigation conditions this indicator is at the level of 34.14 g. The highest germination energy is 83.8% and the germination rate is 87.3%. under conditions of natural moisture in the Lagidny variety and for the application of $N_{90}P_{60}$, the germination of seeds of this variety is 89.0%. Thus, in order to obtain the best sowing qualities of dyeing safflower seeds, it is more expedient to grow in conditions of natural moisture supply, introduce $N_{90}P_{60}$ and sow safflower variety Lagidny.

Key words: dyeing safflower, irrigation, fertilizers, variety, productivity, energy, germination.

Chernova A.V., Gamayunova V.V., Kovalenko O.A., Korkhova M.M. The dry matter content in the green mass of sweet sorghum depending on varietal characteristics, seeding rates, biological product and microfertilizers.

Main purpose. To establish the dependence of dry matter content in sweet sorghum plants on varietal characteristics, seeding rates, biological products and microfertilizers for cultivation in the Southern Steppe of Ukraine. **Research methodology**. The research was conducted in the zone of insufficient moisture in the conditions of the Educational-scientific-practical center of Mykolayiv National Agrarian University during 2013-2015 years. Varieties and hybrids of sweet sorghum are recommended for cultivation in the Steppe of Ukraine. Accounting and observation of plant development (phenological observations, tillering, stem height, stem diameter, yield, etc.) were performed according to general methods. The dry matter content in the green mass of sweet sorghum was determined at different stages of organogenesis by thermostatic-weight method according to Moiseychenko V.F. Statistical processing of experimental results was performed by the dispersion method, using application packages Agrostat, Microsoft Excel. **Research results**. The highest content of dry matter in the green mass (35,73%) was determined in the hybrid Medoviy by sowing rates of 160 thousand similar seeds per 1 ha and foliar feeding with a mixture of Biocomplex-BTU and Quantum. The lowest on average (20,0%) until three years was in the the control variant (water treatment) of hybrid Troisty with a sowing rate of 70 thousand seeds per 1 ha. The maximum yield of dry matter per hectare (25,11 t/ha) was provided by the Medoviy hybrid with a sowing rate of 130 thousand seeds per 1 ha. Co-application of the biological product with microfertilizer increased the average dry matter yield by 3,58 t/ha. **Conclusions**. In the conditions of the Southern Steppe of Ukraine to obtain the maximum yield of dry matter (35,73 t/ha) it is necessary to sow the hybrid Medoviy at the sowing rate of 160 thousand seeds /ha and to carry out foliar fertilization with a mixture of biological preparation Biocomplex-BTU and a complex of microfertilizers “Quantum-Bor Active” (0,3 l/ha), “Quantum-AquaSil” (1 l/ha), “Quantum-Chelate Zinc” (1 l/ha), “Quantum-AminoMax” (0,5 l/ha) with the biological preparation “Biocomplex-BTU” (2 l/ha).

Key words: sweet sorghum, dry matter, hybrids, microfertilizers, seeding rate, biological product.

Tishchenko A.V., Tishchenko O.D., Piliarska O.O. Manifestation of resistance of alfalfa plants in conditions of different ecological gradient for fodder use

The goal of the work. Study of adaptive traits: plasticity, stability, genetic flexibility, general and specific adaptability in breeding populations of alfalfa in feed use, selection of promising material for further use in the breeding process. **Methods.** The object of study were varieties Unitro, Elegy, selections from selection samples for the strength of the root system, selected in the reserve Askania-Nova, varieties Rambler, Abay multicolored, Siberian 8 and hybrid populations F3-F5, which were created earlier. The evaluation was performed for feed use under irrigation and in conditions of natural moisture. **Research results.** The level of manifestation of adaptive traits depended on the value of the environment index. Its positive values contribute to more acceptable conditions for the growth and development of alfalfa. When irrigated, they developed favorably in 2017 and 2019 and were (Ij) +3.54 and +3.68, worse - in 2018, it was +1.90. At the same time, in conditions of natural moisture, the environmental index (Ij) fluctuated over the years: in 2017 – -2.97, 2018 - -3.55 and - -2.59 in 2019, ie 2018 was the worst for growing alfalfa on green mass. In terms of stress resistance among the studied genotypes of alfalfa, the smallest difference (Ymin-Ymax) was observed in populations: A.r.d. – - 6.58 kg/m^2, Primorka/Sin (s) – - 6.61 kg/m^2, M.g./M.agr. – - 6.68 kg/m^2 and in the Unitro standard – -7.44 kg/m^2. The largest indicator of genetic flexibility in contrast conditions was characterized by the studied populations of alfalfa: FHNV^2 - 4.72 kg/m^2, B.11 / P. d. - 4.64 kg / m^2 and - 4.48 kg / m^2 in two populations J. / CP-11 and M.agr / C. The genetic flexibility of the standard Unitro variety was 4.42 kg / m^2. The best populations of the intensive type were Sin (c)./Primorka by regression coefficient: bi = 1.20, A.-N. d. № 114 and T. / Emeraude - bi = 1.12 and A.-N.d. № 15 - bi = 1.08. If bi <1, then this genotype is less responsive to change than the average population of the studied population. According to the parameters of adaptability, the best populations were selected: FHNV^2, B.11/P.d. and A.r.d., but only the first two significantly exceeded the yield standard. Population A.r.d. although it did not significantly exceed the yield standard, but had the maximum variance of specific adaptive capacity (σ2CASi = 7.974), relative genotype stability (sgi = 61.86) and selection value (SCGi = 2.88), so it was identified as stable and promising population. According to the parameters of adaptability and biplot analysis, the studied populations of alfalfa can be divided into three groups: intensive type, stable and adapted to different conditions. Stable populations were A.r. d., J. / CP-11 and FHNV^2, intensive type - A.-N. d. № 114 and (Emeraude/T.)^2, which are adapted to different conditions. **Conclusions.** The obtained experimental data allowed us to identify stable populations: A.r.d., J./ CP-11 and FHNV^2, which respond less to the deterioration of growing conditions, in particular drought and intensive type, A.-N.d. № 114 and “Emeraude/T.)^2 are adapted to different conditions.

Key words: adaptive traits, biplot - analysis, forage productivity, genotype.