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PHYSIOLOGO-BIOLOGICAL CHARACTERISTICS OF PLANTS' SEED MASSES OF WILD AND NATURAL FLORA

Стаття присвячена проблемам пророщування насіння за різних концентрацій солей як представників культурної, так і природної флори. Вивчення особливостей насіннєвих мас рослин дикої і культурної флори показало, що за сім днів проросло 56 % насінин, за 10 днів – 44 % , за 12 днів – 11 %. У *Beta vulgaris*, *Avena sativa* та *Valerian officinalis* найбільше насіння проросло у воді – 38 %. У *Secale cereale*, *Triticum durum*, *Hordeum vulgare*, *Phaseolus vulgaris* найбільша кількість насінин проросла у 0,1 % розчині (*NaCl*) – 62 %, і у жодної рослини, насіння якої пророщувалося у 0,2 % розчині солі (*NaCl*), показник не був вищим, ніж показники у зразках з водою та 0,1 % розчині (*NaCl*). За результатами можна констатувати, що 0,1 % розчин солі (*NaCl*) та вода впливає на швидкість проростання насіння, але не впливає на кількість і якість насіння.

Ключові слова: насіння, дика і культурна флора, засолення.

Problem statement. Seeds are the basic reproductive material both in the wild and cultural flora, characterized by a number of morphological, physiological, biological features, among which its physiological heterogeneity stands out [1-4]. A wide range of conditions, which are necessary for germination, promote the efficient use of the territory, survival and different species coexistence [5-8]. Lack of seeds makes it impossible to obtain agricultural products: grains, fruits, vegetative mass - even under fertilizers, land and machinery availavility along with appropriate technology of manufacturing processes performance as agro ecosystems formation is always initiated with seed provision. But seed material availability does not always guarantee the realization of this aim, i.e. obtaining high yields.

Research aim - to determine the physiological characteristics of plants seed masses of cultural and wild flora. It is necessary to fulfill the following objectives for address this goal: to determine seed vigor test plants, find their similarities.

Material and methods. The research object is seeds of the following plants species: *Beta vulgaris, Secale cereale, Triticum durum., Avena sativa, Phaseolus vulgaris, Hordeum vulgare, Helianthus annuus, Valerian officinalis, Chamomilla recutita.* Physiological aspects of determining vigor test plants and their similarities were conducted by standard methods [4]. Laboratory experiments were conducted at the Melitopol state pedagogical university named by Bogdan Khmelnitsky and field - based on Novotroitsk farm "Niva".

Results and discussion. Our study showed that during germination of *Beta vulgaris* (fig. 1): for the third day in three cases, it is not growing a single seeds, for the fifth day in the water - to thirty seeds; in 0,1% solution (*NaCl*) - up to 20 and the smallest number - in a 0,2% solution (*NaCl*). On the seventh day the largest number of seeds is growing in water, and the lowest - in 0,2% solution (*NaCl*). On the tenth day the most seeds grows in water and forms 80%, in 0,2% solution - 35%. So, *Beta vulgaris* best germination occurs in water and in 0,2% solution (*NaCl*) is worse.

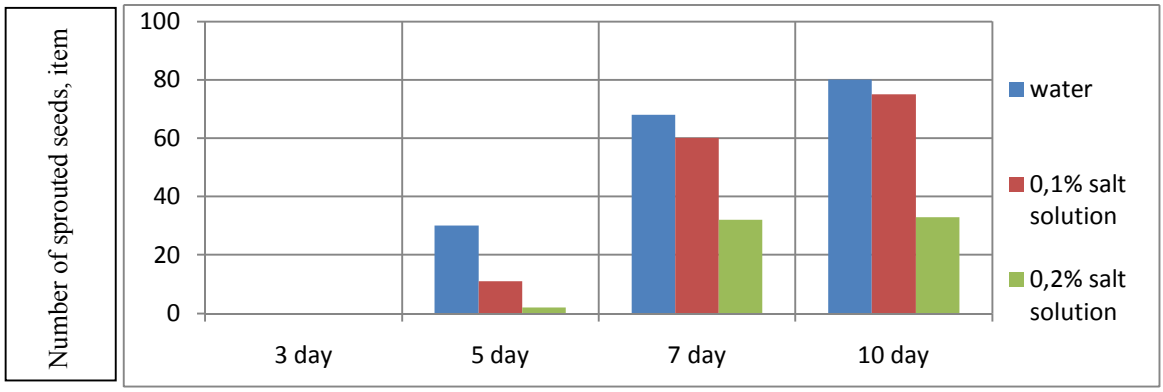

Figure 1. **Germination of *Beta vulgaris* by ten-daily period** (item).

The data showed that *Secale cereale* are growing on the third day (fig. 2). The largest number is grown in 0,2% solution (*NaCl*), the number is - more than 95 seeds, at least - at 0,1% solution (*NaCl*). On the fifth day in a 0,2% solution (*NaCl*) increased to 100 seeds. On the seventh day the growing seeds quantity is not changed. So, during the germination at grasses is a classic effect of gibberellins action which is associated with the release of seeds from dormancy. Gibberellins' "start" of amylase formation is essential condition for seed germination.

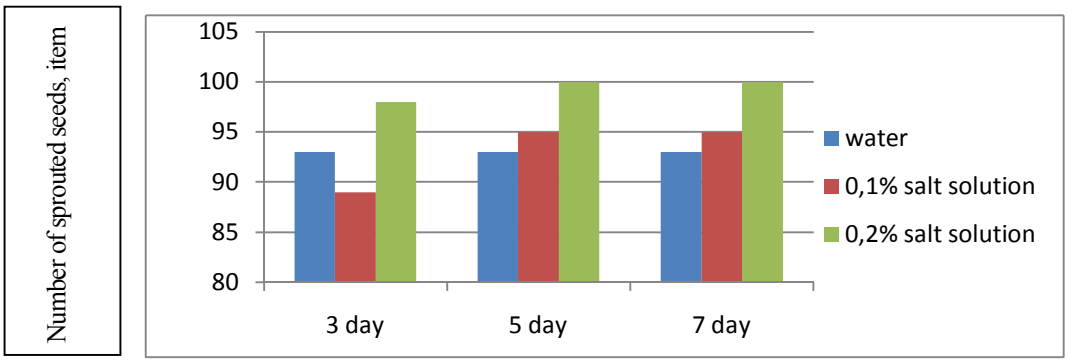

Figure 2. **Germination *Secale cereale* by seven-day period** (items).

Experimental data (fig. 3) showed that *Triticum durum* seeds growled well in 0,1% solution (*NaCl*) and 0,2% solution (*NaCl*). Caryopses are grown on the third day and are grown seven days. It is shown that in the water on the third day are grown 98 caryopsides, the fifth and seventh day the quantity is unchanged - 98 items. In 0,1% solution (*NaCl*) and 0,2% solution (*NaCl*) - 100 caryopsides have grown on the third day, which may be due to the activation of defense reactions under the lections action.

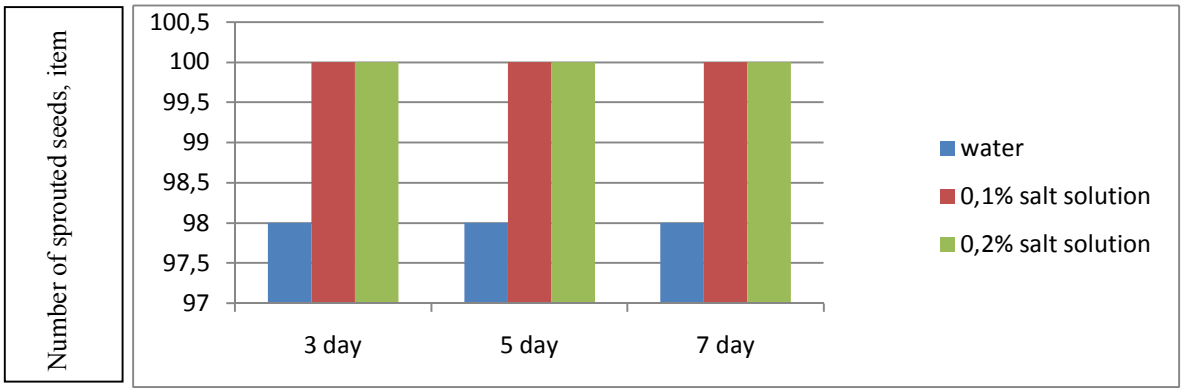

Figure 3. **Germination of wheat for a seven-day period of *Triticum durum*** (items).

Grain germination of *Avena sativa* (fig. 4) showed that on the third day the quantity of growing seeds in water was - 50 items, the fifth and seventh - is increased to 99 items. In 0,1% solution (*NaCl*)

on the third day it is grown - 83 items, fifth and seventh - 90 items, and in 0,2% solution (*NaCl*) on the third day - 11 seeds, fifth and seventh - 95 items. Over the seven-day period, the largest number of seeds is grown in water, but on the third day the best conditions for caryopsides was in 0,1% solution (*NaCl*). More stable germination was conducted in 0,2% solution (*NaCl*).

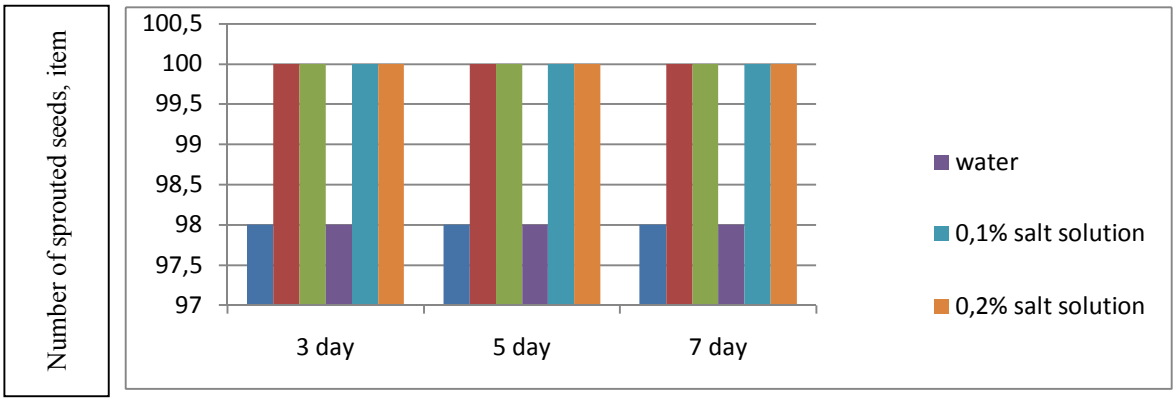

Figure 4. **Germination of *Avena sativa* by seven-day period** (items).

Our results showed that seeds of *Phaseolus vulgaris* are grown 10 days (fig. 5), seedlings began to appear on the third day in a sample of water and in 0,1% solution (*NaCl*). On the fifth day in water are grown to 50 seeds, in 0,1% solution (NaCl) - at least 40 seeds, in 0,2% solution (*NaCl*) - 20 seeds. On the seventh day, in all the samples, the number of germinated seeds increased: 60 seeds - in water, 65 items - in 0,1% solution (*NaCl*), 45 items – in 0,2% solution (*NaCl*). The best results for the number of germinate seeds beans were in the sample with 0,1% solution (*NaCl*).

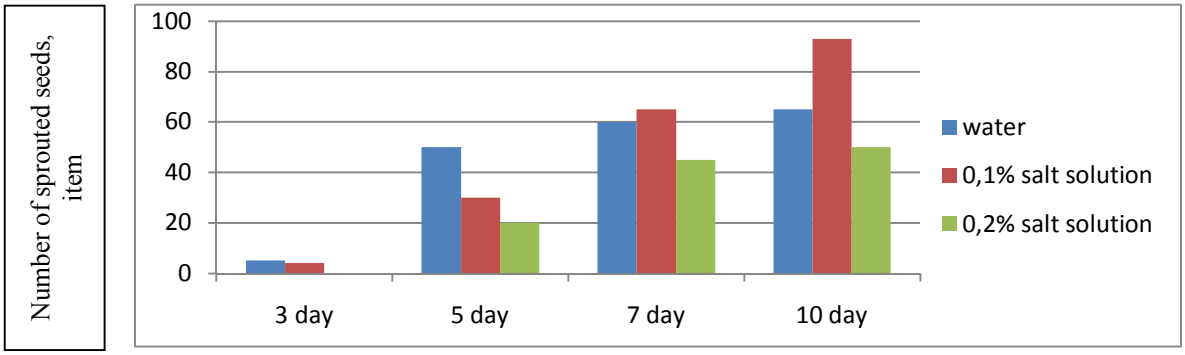

Figure 5. **Germination of *Phaseolus vulgaris* by ten-daily** (items).

The results showed that on the third day of *Hordeum vulgare* germination (fig. 6) are best grown seeds in 0,1% solution (*NaCl*) - 95 seeds. In water on the third day are grown 93 seeds, the same number was on the fifth and seventh day of the experiment. In 0,2% solution (*NaCl*) are grown the least caryopsides quantity: 23 items - on the third day, 88 items – on the fifth, 88 items – on the seventh. The salt solution on seeds germination is not significantly affected, but in 0,1% solution (*NaCl*) is acted positively. A fastest process of seeds germination h took place with the seeds, which are growing in the water, the longest germination took place in solutions. The largest quantity of germinated seeds was in the sample with 0,1% solution (*NaCl*).

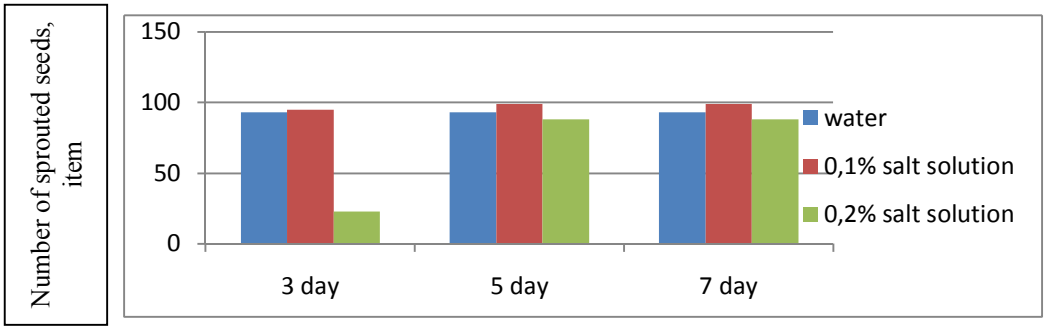

Figure 6. **Germination of *Hordeum vulgare* by the seven-day period** (items).

The results of *Helianthus annuus* germination: on the third day the most of seeds is grown in a sample with water, almost 100% (fig. 7), in 0,1% solution (*NaCl*) - 60%, 0,2% solution (*NaCl*) - over 20 %. On the fifth and seventh day in all samples are grown the 100% seeds. Salt solutions only in the early stages of germination influenced the physiological, biochemical processes in seeds. The fastest germination of sunflower was observed in seeds, germination which took place in the water. Speed of germination is reversed- proportional salt concentration.

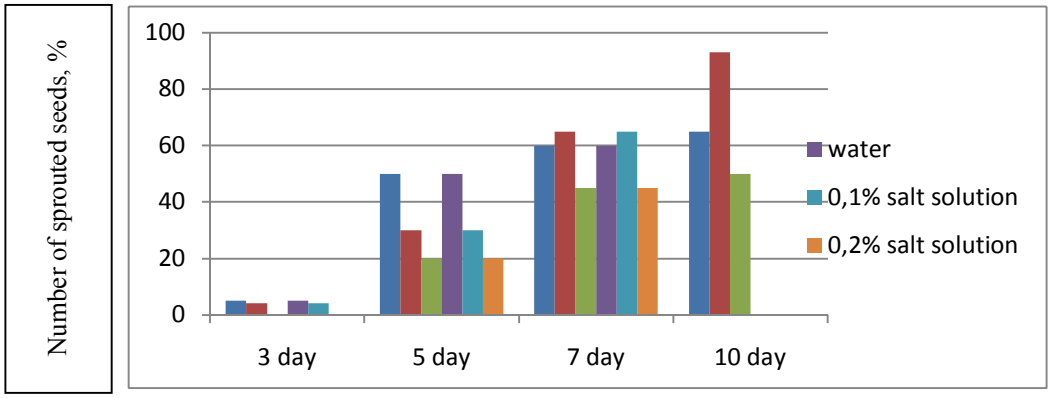

Figure 7. **Germination of *Helianthus annuus* by seven-day period** (%).

Analysis of the results of *Valerian officinalis* germination (fig. 8) showed that on the third day the largest number of seeds is grown in 0,2% salt solution (*NaCl*), the lowest - in water and 0,1% salt solution (*NaCl*), on the fifth day the seeds, which is soaked with water, left in the same condition, and in 0,1% salt solution began to grow rapidly, after which the quantity of germinated seeds did not change. For all twelve days of *Valerian officinalis* germination, growing is occurred rapidly in water, and worse - in 0,1% and 0,2% salt solution.

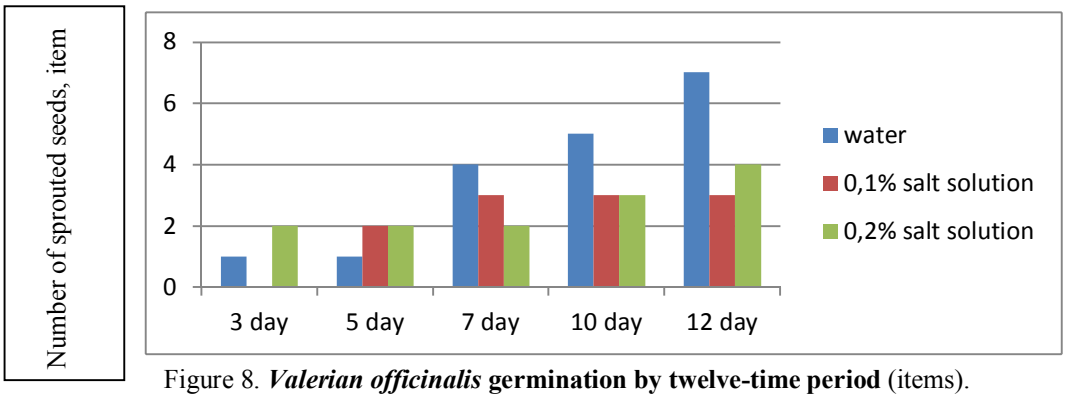

Figure 8. ***Valerian officinalis* germination by twelve-time period** (items).

Results from *Chamomilla recutita* germination in water, 0,1% salt solution (*NaCl*) and 0,2% salt solution (*NaCl*) at room temperature and with sufficient lighting are: on the third day seeds are intensive grown in water and was more than 90% of all seeds, are less intense growing is occurred in 0,1% salt solution - more than 80% of the germinated seed, the smallest number of germinated seeds was in 0,2% salt solution (*NaCl*) (fig. 9). On the fifth day in the water the percentage was over 95%; in 0,1% salt solution (*NaCl*) - over 85%, in 0,2% salt solution (*NaCl*) number of seeds increased by several percent. On the seventh day the quantity of growing seeds in water with 0,1% salt solution (*NaCl*) and water with 0,2% salt solution (*NaCl*) did not change. During the whole period of germination, which was the seven days, the best germination is occurred in water, less intense - in the 0,2% salt solution (*NaCl*) and the worst - in 0,1% salt solution (*NaCl)*. It is explanted this, that during seeds germination in water and different solutions with varying concentrations, phytohormones gibberellins are not equally activated, it stimulate seed which is dormant and participate in the growth of different activity.

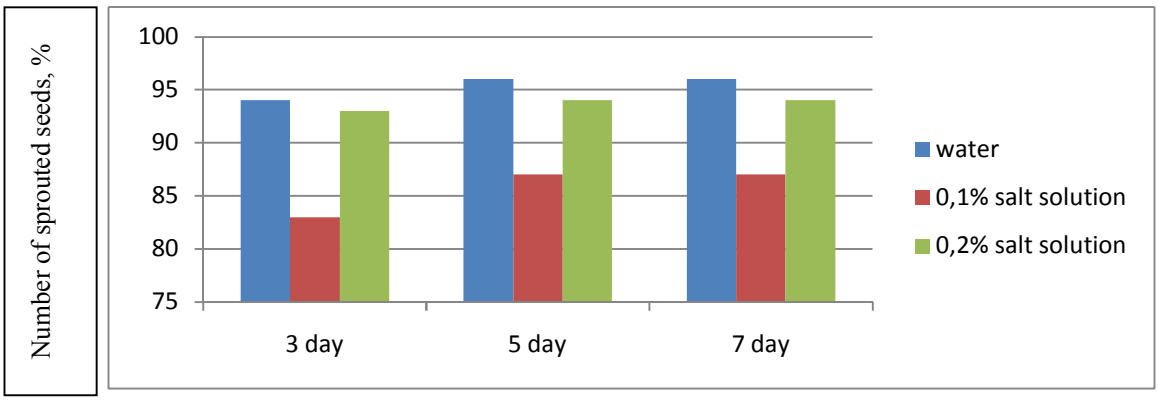

Figure 9. **Germination of *Chamomilla recutita* for the seven-day period** (%).

Conclusions. Study of seed masses of wild and cultural flora showed that seven days are grown seeds 56%, for 10 days - 44%, in 12 days - 11%. In *Beta vulgaris, Avena sativa* and *Valerian officinalis* the most seeds are grown in water - 38%. In *Secale cereale, Triticum durum, Hordeum vulgare, Phaseolus vulgaris* the largest number of seeds is grown in 0,1% solution (*NaCl*) - 62%, and in any plant seeds, which are growing in a 0,2% salt solution (*NaCl*), the index was not higher than rates in samples of water and 0,1% solution (*NaCl*). As a result we can say that the 0,1% salt solution (*NaCl*) and water influence on the rate of seed germination, but does not affect the quantity and quality of seed. Seeds of common bean, beet and grasses are grown well in all samples. Poor germination was observed in *Valerian*. So, cultivated plants better adapted to artificial germination than wild species.

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Физиолого-биологические особенности семенных масс растений дикой и природной флоры

О.Е. Пюрко, Л.Н. Намлиева, З.Г. Писанец

Статья посвящена проблемам проращивания семян при различных концентрациях солей как представителей культурной, так и природной флоры. Изучение особенностей семенных масс растений дикой и культурной флоры показало, что за семь дней проросло 56 % семян, за 10 дней – 44 %, за 12 дней – 11 %. У *Beta vulgaris, Avena sativa и Valerian officinalis* больше всего семена проросли в воде – 38 %. У *Secale cereale, Triticum durum, Hordeum vulgare,*

Phaseolus vulgaris наибольшее количество семян проросло в 0,1 % растворе *(NaCl)* – 62 %, и ни у одного растения, семена которых проращивались в 0,2 % растворе соли *(NaCl)*, показатель не был выше, чем показатели в образцах с водой и 0,1 % растворе *(NaCl)*. По результатам можно констатировать, что 0,1 % раствор соли *(NaCl)* и вода влияет на скорость прорастания семян, но не влияет на количество и качество семян.

Ключевые слова: семена, дикая и культурная флора, засоление.

Надійшла 21.11.2014 р.

SUMMARIES

The agriculture soil and system fertility in the steady development context, new biosphere paradigm natural usage in the noosphere law after V.I. Vernadskiy

I. Primak, M. Voytovik

The modern scientific comprehension of fertility maintenance is lighted up and agriculture systems in the context of humanity steady development, new biosphere paradigm natural usage in the noosphere law after V.I. Vernadskiy. The development and introduction necessity of the agriculture adaptive-landscape systems, non-competitive intensification and economy agrarian sector ecologization, is grounded for Ukraine.

The attention is concentrated on the economic and ecological aspects of agricultural industry development. It is indicated on the necessity of observance of rational natural usage principles, ecological laws and rules, harmony achievement between the production and ecological agro landscape functions.

New natural usage ideology requires the revision of many concepts, presentations which consisted of cleanly consumer positions. For agricultural science and practice such pictures means metamorphosis of natural usage, foremost, agriculture object rethink. According to new paradigm positions, the concept «earth» is necessary to examine not only as an object and tools and sphere of production but also as a social-and-ecological category, and soil – as a biosphere base component. Moreover, for developments and exploitations of any production systems the soil ecological functions maintenance, related to adjusting of moisture must dart out on the first plan, to the gases interchange and heat exchange in a biosphere, by biogeochemical processes intensity, biovariety maintenance, and in an eventual result is providing with life on Earth.

According to the new paradigm positions all aspects of concept «earth» (production resource; labor article; tools; a spatial base is for placing and all economy industries development; land; the earth bowels; plants dwelling environment, zoos and man; social infrastructure) must be computer-integrated on biosphere basis, the Earth must be examined as naturally territorial complex at all plenitude landscape ecological connections, fully overcoming narrow, consumer approach, irrespective of this «spatial base here» structure and functioning. Any anthropogenic interference must accede to law natural conformities of naturally functioning territorial complex as area of the Earth geographical shell. Consequently, the Earth is naturally territorial complex which is characterized by certain ecological and socio-economic terms (geological, climatic, litho logic, biogenetic, social infrastructural) and executes different functions: ecological, economic, socio-economic, resource, recreation and others like that.

If the Earth is a biosphere area, soil is its base component, which is necessary for ecosystems functioning. Thus, soil is a natural history body, which arose up on the Earth spot as a result of mountain breeds change under the climate act, man activity, and was characterized according to ecological and production functions in certain heobiotsenosiss and agrocenoses.

According to the new natural usage paradigm positions the landscapes and soils degradations concept is substantially correct which was traditionally examined as their properties and production functions worsening. During new interpretation the ecological functions maintenance degree goes out on the first estimation plan.

Key words: soil fertility, agriculture systems, biosphere, natural usage paradigm, noosphere law, intensification, ecology, agro landscape.

Resistance of winter wheat varieties of domestic breeding to brown rust in the conditions of North-eastern Forest-steppe of Ukraine

V. Vlasenko, O. Osmachko, O. Bakumenko

Goal of the research was to study the genetic diversity of bread winter wheat cultivars resistance to brown rust in the conditions of natural infection background north-eastern Forest-steppe of Ukraine and the formation of a working genotypes collection to create a new breeding material.

The material for research was the varieties of bread winter wheat, listed in the StateRegister of Plant Varieties suitable for dissemination in Ukraine in 2012. The field experiments were conducted on the experimental field of Sumy National Agrarian University during 2012-2014. The experience was carried out on the plots of 1 m^2 area by SH-1 manual seeder in three-dimensional repetition. Plots were located in the repetitions by systematic method. Testing the varieties resistance to brown rust was fulfilled by the common methods on the natural infection background. The degree of pathogen resistance was determined visually on flag leaf by 9-rating immunological scale adopted in the COMECON countries.

According to the results of our study, the varieties were divided by the degree of resistance into 5 groups according to the scale. Analyzing the obtained results it had been revealed that the minimum index was in the group of varieties which were amenable to pathogens and amounted to 3,1 points, and the maximum index was in the group with a very high resistance – 8,6points.

The coefficient of variation in all groups did not exceed 10%, that indicated insignificant variability of the index. Relatively low coefficient of variation (of 1,1%) was seen in the first group, where the varieties had a very high resistance. That index was the highest (4,7%) one in the five groups.

Having considered the error band, significant deviation was revealed between the third, the fourth and the fifthgroups with the first and the second ones, and between the first, the second and the third groups with the fourth one, because they did not overlap each other. The varieties of the first group had the highest average arithmetical value of the resistance index (8,4 points). The lowest index was observed in the fifth group, where the degree of resistance was favorable (3,4 points). Such varieties as Smuglyanka, Kalynova, Er 24220 were extremely resistant, Kryzhynka, Remeslivna, Myronivska 65, Zolotokolosa, Vesnyanka and Er 24210 varieties were of high resistance. They can be used for creating a new breeding material as a source of resistance to the brown rust pathogen.

Analyzing the indicators of resistance to brown rust, it had been revealed that the maximum pathogen indexes were observed in the varieties with 1AL/1RS translocation, and minimum – in the varieties that did not contain translocations.

The coefficient of variation in the varieties with wheat-rye translocation was less than 10%, that indicated insignificant variability, and in the varieties that did not contain translocations was greater than 20%. Therefore, variability was significant.The error band revealed significant deviations of the varieties, that did not contain translocations and the varieties with wheat-rye translocation, as they did not overlap each other. The analyzed data had shown that the varieties with wheat-rye translocation were more resistant to brown rust, because they contained introgressive genes from rye.

In 2012-2014 growing years weather conditions contributed to the development of the brown rust pathogen, which suggested the possibility of evaluating the resistance of varieties on the natural infection background.

Such varieties as Smuglyanka, Kalynova, Er 24220 were extremely resistant. Kryzhynka, Remeslivna, Myronivska 65, Zolotokolosa, Vesnyanka and Er 24210 ones were of high resistance. They can be used for creating a new breeding material as a source of resistance to the brown rust pathogen.

The varieties with wheat-rye translocation were more resistant to brown rust, because they contained introgressive genes from rye.

Key words: winter wheat, immunity, cultivars, resistance genes, brown rust.

Intraspecific diversity of barley *Hordeum vulgare* L. for its resistance to chloride salinity
N. Bome

Barley is one of the major crops in the agricultural zone of the Tyumen region. Over the past five years (2009-2013) barley yields amounted 2,1-2.9 t/ha, the area under the crop varied from 125.1 to 145.6 thousands hectares. The problem of barley varieties selection for cultivation in saline soils has been worked out.

The paper presents evaluation of 53 world collection samples of barley of N.I.Vavilov Research Institute of Plant Industry to chloride salinity in a simulated environment. The research was carried at the Department of Botany, Biotechnology and Landscape Architecture of the Tyumen State University and Tyumen branch of N.I. Vavilov Research Institute of Plant Industry.

Germination was carried out in Petri dishes, preheated at 175°C for one hour in a hot air oven, on a filter paper in 0.98% saline solution NaCl (7atm) for experience and distilled water for control. Before layout seeds were disinfected for 10 minutes with a 1% solution of $KMnO_4$.

The sample had size of 50 seeds per plate, repeated experiment 4-x for each sample of barley. Germination was carried out in an incubator TPC-2 at a constant temperature of 22°C.

The efficiency of selection forms of barley for resistance to salt stressor on the complex features that characterize the ability of seeds to germinate and seedlings biomass formation of the provocative background. The advantage of laboratory tests over the field ones is the ability to explore a large number of collection materials for a relatively short time. When creating a provocative background use 0.98% solution of NaCl (chloride salinity is considered as the most toxic).

The most severe reaction to the effects of salinity on laboratory germination was observed for a length of roots and shoots. In identifying the general pattern, manifested in the reduction in seed germination and seedling morphological traits, there was a mixed reaction to the estimated samples of barley to salinity. One part of the samples was significantly higher than controls on the expression of the studied traits; the other part was characterized by values of features at the level of control and identified samples that are below the control. The majority of the samples studied was signs at the control level or were significantly lower.

In the structure of wet and dry biomass of seedlings under standard conditions and the provocative background marked predominance of roots. However, the proportion of the roots under salinity as compared to the control was reduced in the raw biomass and increased dry seedlings. Perhaps this is due to the large accumulation of moisture roots under salinity and its active loss on drying.

It was established that for the detection of salt-tolerant forms appropriate to use the ratio of the length of roots and shoots in the control and experimental variants. This indicator is more stable in the group of salt-tolerant designs and varied considerably in samples with less stability.

On the basis of analysis and generalization of experimental data on a set of characteristics (laboratory germination, length and weight of roots and shoots, the number of embryonic roots) collection of barley is divided into three groups: salt tolerant (30,2%), sensitive to salinity (47,2%) and salt-resistant samples (22,6%).

The 16 barley samples that are resistant to salinity were from 5 regions of the Russian Federation (Chelyabinsk, Samara, Rostov, Kirov, Saint-Petersburg area) and 6 foreign countries (Germany, Denmark, Sweden, Turkey, Ethiopia, Ukraine). Samples were treated to 2 subspecies (*Hordeum distichon* L., *Hordeum vulgare* L.) and 8 botanical species (*nutans, triceros, medicim, ibericum, ricotense, pallidum, grseinigrum, horsfordianum*).

Key words: salinity, resistance, barley, morphometric parameters, seedling, sample.

Fagopyrum tataricum Gaertn collection phitophatological research
O. Demchenko, L. Yuzvenko, V. Radchenko, V. Shevchuk A. Boyko

The study of Fagopyrum tataricum Gaertn collection in terms of complex diseases for further breeding work to create high-yield and resistant varieties shows that the most resistant to the disease

were complex samples originating from the Netherlands (5162) and were 3.6% and Italy (5134) – 4.3 %. There has been determined Phytopathological score of Fagopyrum tataricum Gaertn collection, which can serve as a basis for breeding to create high yield and resistant varieties of Tatar buckwheat disease.

Among the cereal crops that are grown in our country buckwheat occupies an important place. Buckwheat production currently does not ensure the needs of the population, and its yield due to diseases remain relatively high and not stable. Phytopathological research on buckwheat discovered various diseases that cause bacterial, fungi and viral infections. Common buckwheat has a number of features that hampers significantly its cultivation due to low fruit formed under intense colors, while passing several phases of ontogeny (growth, flowering, fruit formation), relatively poor development and the rapid growth of the root system and susceptibility to diseases and pests.

Selection work is often associated with attempts to combine valuable features of cultivated plants and their wild relatives in one organism. However, the most desirable results in the selection are obtained using wild relatives as donors of resistance to the most harmful diseases.

According to some authors, the nature of buckwheat plants can be improved by its crossing with wild relatives.

Fagopyrum tataricum Gaertn closest species in the genus Fagopyrum Mill is Fagopyrum esculentum Moench. It is used in the selection process in order to improve existing varieties of buckwheat biology course as biological sources of flavonoids and protein. Buckwheat Tatar self-pollinating annual plant of Polygonaceae family, which is widely cultivated in many countries as food cereals and flour of medical purposes.

To create high-yielding varieties of buckwheat is important to know the stability of the complex disease during ontogenesis. Therefore, the aim of our study is to identify promising Fagopyrum tataricum Gaertn resistant to pathogens.

As a result of the research the following pathogens were identifyied in the field: viral infection (viral burn buckwheat), gray mold (Botrytis cinerea Fr.), Fusarium (Fusarium heterosporum), bacteriosis (Pseudomonas syringae), kladosporioz (Cladosporium herbarum Lr.). Resistant to complex diseases appeared to samples originating from the Netherlands (5162) infestation was 3.6% and Italy (5134) – 4.3%.

Sample virus originating from India (5137) and Latvia (5138) in the field did not buckwheat affect. The sample originating from China was most affected by the virus (5105) and amounted to 53.5%.

Tatar buckwheat plants originating from the Netherlands (5162) showed the largest field resistance to gray rot. The highest infestation with gray rot was observed in Tatar buckwheat plants originating in Latvia (5138) and reached 37.5%.

Fusarium affection reached 30.9% in the samples originating from France (5128). Bacteriosis most affected plants appeared Fagopyrum tataricum Gaertn originating in Latvia (5138) and was 60%. Plants originating in Canada (5119, 5120), does not urazhuvalys bacteriosis. Kladosporiozom plants studied collection urazhuvalys slightly.

Of special note on sources of resistance to the virus burn buckwheat deserve phylogenetically related species: Fagopyrum tataricum ssp. Potanini Batalin, Fagopyrum cymosum Meisn, Fagopyrum giganteum Krot, Fagopyrum Ohnishi, Fagopyrum galiantum Ohnishi, Fagopyrum esculentum Moench ssp. ancestrale Ohnishi, Fagopyrum homotropicum Ohnishi, Fagopyrum statice H. Gross., Fagopyrum gracilipes, Fagopyrum pleoramosum Ohnishi, Fagopyrum sapillatum Ohnishi. It is noted that in the field they do not cause buckwheat affection.

Thus, there has been defined Fagopyrum tataricum Gaertn Phytopathological score collection, which can serve as a basis for breeding to create high yield and disease resistant varieties Tatar buckwheat.

Key words: buckwheat, diseases, phytopatological research, *Fagopyrum tataricum Gaertn*.

Modeling the processes of sugar beet growth and development depending on comprehensive influence of climate factors

L. Karpuk, O. Krykunova, O. Prisyazhnyuk, V. Polischuk

A large number of abiotic and biotic factors which are characterized by complicated functional relationships generally influence agrocenosis. Ultimately, the technology of sugar beet growing, as well as other agricultural crops is aimed at high-quality products obtaining. However, the full realization of this task can only take place under condition of totality tasks decision by certain elements of system process which are important for achieving this goal and are impossible fully exploring without the use of mathematical modeling.

In plant systems modeling perspective, the main data matrix is constructing computational algorithms mechanisms and patterns of functioning the beet crop rotation is a numerical expression of indicators of biological processes, which is a function of abiotic, biotic and anthropogenic factors additive action.

Recently, works of many domestic and foreign scientists are devoted to the mathematical models creation, however, they worth noting as many models are created indirectly bind to environmental conditions and in most cases just simulate some relationship between the productivity and the number of chemical fertilizers or different structural elements of plants, and so on. In our opinion, such approaches to the creation of plant growth and development of mathematical models is wrong and need further improvement. Particularly, it is necessary to pay more attention to the study of climatic conditions influencing s the amount of active temperatures, rainfall amount, GTC on plant growth and development, with complex mathematical models, and to inspect the accuracy of the results.

The obtained mathematical models can be used not only to simulate and forecast sugar beet processes of plants growth and development, but also for database management of sugar beet growing process productivity working.

Experimental researches were conducted on the experimental field of Bila Tserkva National Agrarian University during 2011-2014. Technology of sugar beet growing on test plots was common for the forest-steppes of Ukraine, except for the elements that were studied.

On the basis of research and study the influence of rainfall and the amount of active air temperatures on the mass of sugar beet root crops is established that coefficient of multiple regression is high (0.97), and a coefficient of determination is high (0.93), which shows how well the experimental data are described of real equation.

According to the results of previous studies on the analysis of complex agroecological factors on sugar beet root crop the mass, on 01.07, foliar feeding is providing the similar reaction of plants on weather and climate conditions changing in the later periods (on 01.09).

So, we have received the following regression equation that determines the dependence of the mass of roots of sugar beet (MR) from the amount of precipitation in the previous month (P) and the sum of active temperatures (T): MR = - 8519.83 + 263.76 T – 15.33 P. All coefficients of the equation are significant on the 5% level (p-level <0,05). This equation explains 93% (R^2 = 0,93) variation of the dependent variable.

There has been developed the mathematical models of culture growth and development on the basis of studies on the influence of weather conditions on sugar beet plant growth, development and productivity with the use foliar feeding of micronutrients and hybrids growing of the longest growing season by the optimum planting density - 100 thousand/ha.

During the analysis high coefficients of multiple regression (0,85-0,97) and coefficients of determination (0,73-0,93) were received, which indicates not only the link between the studied traits, but also stating that experimental data is quite accurately describes of the real equation. These models show that the relationship between the mass of roots and leaves, depending on the amount of active temperatures and precipitation during the growing season, and allows a high degree of accuracy to predict the parameters of these indicators of sugar beet plants.

Key words: sugar beet, processes of growth and development, mathematical modeling, climatic factors.

Breeding of winter barley collection accessions under environmental conditions of the Forest-steppe of Ukraine

V. Gudzenko

It is noted that due to the significant expansion of crop areas for winter barley in Ukraine, including in the central, western and northern regions an issue of the modern domestic varieties adapted to these conditions, especially with regard to global climate change is urgent.

Based on analysis of literature it has been found insufficient number of papers devoted to the study of winter barley in Ukraine, especially in the forest-steppe. Therefore, the aim of our study was to assess the global genetic diversity of winter barley under environmental conditions of the forest-steppe and to identify sources of valuable traits for breeding. Experiments were conducted at the laboratory of breeding barley of the V.M. Remeslo Myronivka Institute of Wheat of NAAS of Ukraine in 2009-2014. Research object included over 1000 winter barley collection accessions of different eco-geographical origin.

It has been identified new genetic sources of valuable traits being recommended for use in breeding process for increase the adaptive capacity of winter barley under environmental conditions of the forest-steppe of Ukraine: *winter hardiness* – Seim, Borysfen, Zherar, Selena star (UKR), Larets, Sanson, Skorokhod, Meteor (RUS); Novosadski 737 (SRB), some accessions in nurseries IBCB-W, IBYT-W, IBSP-W etc.; resistance and moderate resistance to *powdery mildew* (mark 8) – Existenz (DEU), Aivenho (UKR); Cinderella, Aktion, Maybrit (DEU); Cartel, Fallon (FRA); Fighter, Nevada (GBR), Wysor (USA), miss.162-420-32/4 (SYR) etc.; moderate resistance to *net blotch* – Myronivs'kyi 87, Borysfen, Synel'nykivs'kyi 5, Manas (UKR); Larets, F'odor, Mukhailo, Kozyr, Rostovskyi 55 (RUS); Galeb (BGR); Pepite, Montana (FRA); Mattina (ITA); Novosadski 295 (SRB); Turkey, Radical//Cyclone/ICB-100002, Michailo/Dobrinya, Robur/ICB-101332 (SYR); Wysor (USA) etc.; moderate resistance to *spot blotch* – Pallidum 77, Seim, Borysfen, Kovcheh, Tutankhamon, Synel'nykivs'kyi 5 (UKR); Mukhailo, F'odor, Larets, Kozyr, Rostovskyi 55, Kuban-19 (RUS); KM-914, KM-906 (CZE); Novosadski 557 (SRB); Alpha/Cum//CWB117-77-9-7/3/Sonata/305-44//Sararood-1, Radical/Birgit//K-304 (SYR) etc.; resistance to *barley stripe leaf* – Tutankhamon, Selena star (UKR); F'odor, Master, Kozyr (RUS); Sympa, Mallard (FRA); Sonora (ITA); Vlaminis, Tamara (KGT); Tilek (KAZ); Novosadski 295, Novosadski 313 (SRB); Gob/Humai10/3/Claudia-Bar/Ds4886//Shyri/4/Msel, Victoria/Sonata, 3896/1-3/4/1246/1-3/3/3887/28//3892/1-3/5/Grivita/6/YEA389-3/YEA475-4, Roho//Alger/Ceres362-1-1/3/CWB117-77-9-7/4/GkOmega, MullersHeydla//Sls/3/GkOmega, Coss/OWB71080-44-1H/3/Alpha//Sul/Nacta, K-305-2/Narcis, Grivita/CWB117-5-9-5, Plaisant/Radical, 24569/5/F2//Radical/Karat/3/Radical/4/Xemus, Pamir-065/Pamir-149, K-304/Wysor, Dobrinya/K-015, Michailo/Dobrinya, Alpha/Gumhuriyet//Sonate/3/Sararood, Mal1-4-3094-2//Alpha/Cum/3/Victoria/Mal1-4-3094-2, Roho/Mazurka//ICB-103020/3/YEA389-3/YEA475-4, (SYR) etc.; resistance and moderate resistance to *barley leaf rust* – Strimkyi, Ihor, Aivenho, Radon (UKR); Maybrit, Aktion (DEU); Monarque (FRA); KM – 914 (CZE); Wysor (USA); YEA389-3/YEA475-4//Victoria (SYR); high resistance to lodging – Ihor, Aivenho, Strimkyi (UKR); Nektaria, Salamandra, Cartel, (FRA); Maskara, Wintmalt, Maybrit, Existenz (DEU); Grecale (ITA); Vixen (GBR); *increased productive and adaptive potential* – Selena star, Strimkyti, Aivenho, Ihor (UKR); Cartel, Salamandra, Nektaria (FRA); Wintmalt, Maskara (DEU); Michailo/Dobrinya, Grivita/CWB117-5-9-5 (SYR).

Key words: winter barley, genetic sources, productivity, adaptability, disease resistance, lodging resistance.

Productivity of root crops of hybrids of sugar beet of domestic, foreign and joint selection

V. Glevaskiy

On forming of root crops of sugar beets a number of factors influences with high technological quality, one of major is him of high quality features.

In a middle 90 of the last century Ukraine the seed of sugar beets of different foreign firms began elementally to enter without technological quality of root crops control in production terms. The wide applying in sugar-beet industry of highly productive foreign hybrids the selection of which was carried out in different from domestic ground-climatic terms and also technologies of growing, did not give the real increase a rendement.

In connection with the considerable increase of part of hybrids of foreign selection in an industrial beet grower by us comparative researches of the productivity of hybrids of sugar beets of different selections, which has most part in the production sowing of Ukraine, were conducted.

Modern technologies of production of sugar beets are impossible without the use of highly productive odnonasinnikh hybrids. To the state register of sorts of plants of Ukraine on 2013 year 137 hybrids of sugar beets of domestic and foreign selection are brought.

On January, 1, 2014 Register of sorts of plants of Ukraine contains 151 sorts and hybrids of sugar beets, in a that number 29 Ukrainian or 20% and 122 foreign (Germany of a 45 hybrid or 30%; Belgium is 19 hybrids - 13%; France – 18 hybrids - 12%, Sweden of a 6 hybrid - 4%; Italy of a 5 hybrid - 3%).

Domestic geterozisni hybrids (HS is hybrids) are brought to Register of sorts of plants of Ukraine after the productivity does not yield to the hybrids of foreign selection, which also as a result of sortoviprobuvan' are brought to Register of sorts of plants of Ukraine.

It is marked in works of domestic scientists, that potential of the productivity of root crops has the productivity of new CHS hybrids of ukrainskoy selection at the level of 60 t/ga and anymore, to collection of sugar – 10-12 t/ga.

The purpose of researches is a complex estimation of the productivity of modern hybrids of domestic, foreign and general selections on sowing during a vegetation and in the period of technical ripeness.

Experiments from determination of complex estimation of the productivity of hybrids of sugar beets of domestic, foreign and general selections conducted in 2013-2014 on NNDC BNAU. In the field experiments a registration plottage was 25 apt. m., the repeated is fourfold.

For researches were selected followings hybrids of sugar beets: hybrids of the Ukrainian selection (Ramzes, Prize, Uman CHs90), hybrid of general selection (Vorsar), hybrids of the German selection (firm KVS) (Olesya KVS, Nastya KVS), hybrids of the Swedish selection (firm Sengenta) (Newspaper, Attak).

By the conducted research the complex estimation of the productivity of hybrids of domestic, foreign and joint selections was studied on sowing during a vegetation and in the period of technical ripeness.

Information is got by us show potential of analysable materials in the conditions of central part Forest-steppes of Ukraine, which are in a position to provide implementation of all technology of growing of this industrial crop in full.

It is set that the increase of efficiency of sugar-beet production in the area of svekloseyaniya of every factory also depends on growing of hybrids rannespelykh and such, which arrive at a technical ripeness in a more late period.

Researches are executed by us confirm that as a result of pereduborochnogo inspection a sugar beet which already technically spelae can be selected. From our data at the beginning of harvest

season it is possible to collect the hybrids of the Ukrainian selection (Umanskiy HS 90) and separate hybrids of foreign selections (Olesya, Newspaper).

Key words: sugar beet, hybrid, root crop, technical ripeness, density of planting.

The yield of buckweat by the influence of biological agents

Z. Grytsaenko, **A. Datsenko**

The results of the studies of the effects of various microbiological standards of Diazobakteryn drug (150, 175, 200 ml) and methods of application of plant's growth' regulators (seed treatment before sowing – 250ml / t, spraying – 50 ml / ha) on the yield of buckwheat. It is established that microbiological agent submitted separately and in mixtures with plant growth regulators impose a significant imprint on the formation of buckwheat's yield.

In a further development of the country the agriculture producers' priority is to increase economic efficiency, increasing the gross yield and improving the quality of grain crops. However, the creation of high-yielding crops is possible only under the rational use of drugs, creating an optimal environment for the operation of agro phytocoenosis.

We know now that increasing of crops productivity can be achieved not only by means of selection, making the necessary doses of fertilizers and pesticides, but also by the inclusion of biological products to complex sequential process operations cultivation.

The published data confirm the positive impact of microbiological agents and plant's growth regulators on the formation of grain yields. In particular, the action of biologics is growing strong root system, which serves as a medium for the development of beneficial microorganisms that, on the one hand, offers greater water exchange and mineral nutrition, and on the other – activates physiological and biochemical processes (photosynthesis, respiration, etc.) in plants displayed on the yield of crops.

Most scientists confirm the positive influence of biopreparations on yield formation of cereals. However, the effect of integrated use of biological agents on the formation yield of buckwheat is virtually unknown. In this regard, it seems reasonable to set different rules how microbiological agents and methods of application of growth regulator affect the formation yield of buckwheat.

The purpose and tasks of the research were to ascertain the influence of pre-inoculated seed Diazobakteryn microbiological agents and different rules and ways of introduction of plant growth' regulators (PPP) on yield of buckwheat.

The research has found out that the yield of buckwheat formed depending on weather conditions, which evolved during the research, different rules of Diazobakteryn microbiological agents and methods of application of plant' growth' regulators joy. Thus, the use of microbiological agents of Diazobakteryn in rules 150, 175, 200 ml for seed treatment before sowing alone and in combination with PPP Joy highest yields in variants of the experiment was formed in 2011, and the lowest - in 2012, that is agreed with meteorological data this year. For seed treatment before sowing microbiological agents by Diazobakteryn in rules 150, 175, 200 ml of excess yield of buckwheat in relation to the control in 2010 was 7 – 12% according to the rules of the drug. Significantly higher yield was observed in the experiment with the options of seed treatment before sowing mix drugs Diazobakteryn normally 150, 175, and 200 ml of joy normally 250 ml / t. Thus, the yield of buckwheat in these versions of the experiment was 0.27 – 0.35 t / ha higher than the rate in the control. However, the highest yield of buckwheat formed in crops by the use of Diazobakteryn normally 200 ml and of Radostym normally 250ml / t seed for treatment before sowing, followed by spraying by Radostym normally 50 ml / ha, which is 42% higher than in controls.

This shows the impact of different ways of using Radostym (seed treatment + processing crops) on the growth processes of plant buckwheat, which together with microbiological components of Diazobakteryn, which creates a larger surface colonization of the root system, ensures the activation of physiological processes in plants, aimed at the formation of high yields of crops.

Key words: productivity, buckwheat, plant growth regulator, microbiological agent.

Change of agrophysical indicators of soil fertility, and performance of buckwheat depending on tillage and fertilization

V. Karpenko, O. Panchenko

The influence of different tillage systems (systematic plow, plowless, combined and extended shallow), different levels of fertilization aimed at replacing agrophysical fertility indicators (structure, and construction) of the soil and the performance of buckwheat fields was researched. It was established that replacement of extended plow with plowless cultivation led to an increase in the bulk density of arable (0-30 cm) soil during the buckwheat sowing, at unfertilized sections by 0.02 g/cm3 and when adding fertilizer by 0.02- 0.03 g/cm3; if combined system of cultivation was used no substantial increase in density was observed during this period. Buckwheat field performance was the highest when the combined system of tillage was employed. In the case of plowless cultivation, a significant reduction in yield of buckwheat was observed. In case of extended shallow cultivation, no significant reduction in buckwheat yield was observed.

Proper use of tillage, fertilization and their combination (interaction) plays an important role in the increase of crops productivity. Indeed, under conditions of global warming, reducing rainfall, traditional systems of primary tillage are not always justified. Therefore, the development and research of new primary tillage systems and their combination with the fertilization systems is important.

Scientific and technological progress in modern agriculture has reached unprecedented scale. Potential opportunities to increase the productivity of agricultural land are extremely large. In Ukraine, using only 2% of photosynthetic active radiation (PAR) during the growing season can annually bring more than 125 kg of dry weight of organic matter per hectare. Farming systems in addressing this important issue are crucial. Favorable physical properties and soil types – are prerequisites for soil fertility, getting high and stable yields of crops.

The importance of physical properties of the soil for its fertility was never doubted. Today, under conditions of protracted economic and environmental crisis, their value has increased even more. One reason for this – wider acknowledgment of the facts of deterioration of the physical properties of the soil as a result of a sharp reduction of organic, mineral and bacterial fertilizers, meliorants, simplifying technologies, violation of terms and quality of agricultural activities together with violation of scientifically based crop rotation plans, use of heavy agricultural machinery and so on.

The second reason is that maintaining physical properties in a favorable range of values is a necessary condition to obtain the planned output from fertilizers and water meliorants which price is very high currently.

Both of these reasons explain the constant necessity for plants in maintaining optimal physical condition of the soil. This is especially true for black soil where the intensification level of agriculture is the highest.

The issue of tillage systems and fertilization used for grain crops, including those used for buckwheat cultivation, is not studied well enough. Indeed, in some cases, weediness of crops increases, the other cases – agrophysical indicators of soil fertility worsen, or crop yields reduce. This depends on many factors that must be considered – weather conditions and pre-predecessors in the rotation, as well as on biological features of crops, soils, fertilizers, pollution of soil with weed seeds and other factors.

The aim of the research is to study and experimentally establish the most effective interaction of mechanical soil tillage and fertilization in order to change:

a) agrophysical properties (structure, and construction) of the soil;

b) performance of the buckwheat.

Methodology of the research. The study of these issues was carried out under conditions of experimental field at Bila Tserkva National Agricultural University.

Field research was founded in 2012 under crop rotation, carried in time and space as follows: 1) peas; 2) winter wheat; 3) buckwheat; 4) maize for grain; 5) barley. Repeated experiments – three times, placing repeats on the square was continuous: parcels of the first order (level of fertilizers) placed in one tier, consistently, systematically.

Experimental evidence proves that the optimal density for most field crops are mostly in the range of 1.1 to 1.3 g / cm³. In some cases the upper limit may reach 1.4 g / cm³.

Research has shown that replacement of extended plow cultivation with the plowless one has led to an increase in bulk density of arable (0-30 cm) soil when sowing buckwheat at unfertilized sections by 0.02 g/cm³ and when fertilizers applied by 0.02-0.03 g/cm³, the combined system of cultivation did not lead to a substantial increase in density.

It was revealed that the highest performance of buckwheat field was observed when combined tillage system was employed. A significant decrease of performance was observed under plowless cultivation. With the increasing levels of fertilization productivity of buckwheat significantly increased for all tillage systems.

Key words: buckwheat, agrophysical performance, fertility, structure, density, performance, productivity, systems of cultivation, fertilization.

Economic efficiency of cultivation of white mustard in the conditions of Western Forest-steppe region

T. Kozina

Presents the results of studies on the impact of growth, development and formation of seed productivity of white mustard depending on a composition of the seeds, timing of sowing, seed rate and seed treatment by crop growth regulator "Vermybiomah" in a dose of 8 l/ha. On the basis of the results gained from the calculation of economic efficiency of the white mustard cultivation, we found that seeding rates have a significant effect on the yield of white mustard, we also found economic indicators, such as the cost of one ton of seeds, in order to obtain income and profitability. So, on the variant, where they made the sowing of white mustard of Pidpecheretska variety with a seeding rate of 1,5 million/ha, conditionally net income was 7530 uah., that was 1370 uah./ha more than when sowing 1,0 million/ha and 3120 uah. options above indicate with a seeding rate of 2,5 million/ha. Level of profitability in this case counted to 194,6 %, that 58,5 % more than when sowing 1,0 million/ha and a 75,7 % increase in planting 2,5 million/ha of viable seeds. The cost of one ton of seeds of white mustard was 1697 uah., that 420,0 uah. less in comparison with variant 1,0 million/ha and spent 1646 uah. less than when planting 2,5 million/ha.

On the variant, where was made the sowing of white mustard 2,0 million/ha, conditionally net income was 6275 uah./ha, that was 1115 uah./ha more in comparison with a seeding rate of 1,0 million/ha and at 2765 uah./ha more than with the seeding rate of 2,5 million/ha. Level of profitability was 164 %, which is 27,9 % higher than with the seeding rate of 1,0 million/ha and 45,1 uah./ha more (with planting 2,5 million/ha), respectively.

The cost was decreased in comparison with the variant where were calculated 1,0 million/ha 223 uah./t and 439 uah./t when planting 2,5 million/ha.

The best economic indicators were on the variant, where was made the sowing of white mustard Podolyanka variety with a seeding rate of 1,5 and 2,0 million/ha. Conventionally pure income when planting 1,5 million/ha was at 1700 uah./ha higher, with the norm 1,0 million/ha and 3506 uah./ha, compared with a seeding rate of 2,5 million/ha with sowing 2,0 million/ha when it was at 1334 uah/ha with a seeding rate of 1,0 million/ha and 3426 uah/ha compared with a previous seeding rate of 2,5 million/ha.

The cost of white mustard with the seeding rate of 1,5 million/ha decreased in 496 uah./ha, compared with a seeding rate of 1,0 million/ha decreased 436 uah./ha, compared with a seeding rate of white mustard 2,5 million/ha. With the seeding rate of 2,0 million/ha cost decreased in 223 uah./ha, compared with a seeding rate of 1,0 million/ha and 369 uah./ha, compared with a seeding rate of white mustard 2,5 million/ha.

Economic performance was significantly influenced by time of sowing, and processing of the studied varieties of white mustard by crops growth regulator "Vermybiomah".

Data suggests that the economic efficiency of cultivation of white mustard seeds largely depended on the level of productivity, which was formed at the studied varieties depending on sowing time and processing the plant by growth regulator "Vermybiomah" during the growing season.

The best indicators are pure income and profitability of seed production were in early spring sowing (first term) of white mustard and processing of crops by growth regulator "Vermybiomah" in a dose of 8 l/ha. So, during the first term of sowing white mustard and processing of crops by growth regulator "Vermybiomah" in a dose of 8 l/ha pure income from variety Podolyanka was 9124 uah./ha, that was 4319 uah./ha more than in the third term and 2491 uah./ha more than in the second term of sowing. The level of profitability during the first term of sowing and processing of crops by growth regulator "Vermybiomah" in a dose of 8 l/ha was 235,4 %, and 61,6 % more than in the second term of sowing and 108,8 % more than in the third term of sowing.

Key words: white mustard, variety, sowing time, seed rate, plant growth regulator, seed productivity, economic efficiency.

Changes of the chemical constituents of the strawberries, grown with help of mulching in the process of their storage

I. Zamorska

The results of the storage life of the strawberries grown under various types of soil management were presented in the paper.

The purpose of our research was to evaluate the effect of mulching types on the change of quality indicators of the strawberries during the storage.

According to the methodical recommendation as to the storage of fruits, vegetables and grapes the experiments were carried out in the refrigerator of the department of the technology of storing and processing of fruits and vegetables at Uman national university of horticulture (Ukraine) in 2011-2013; the berries of such varieties as Festivalnaiaromashka (control), Ducat, Honey, grown on various types of soil management – without mulching (control), mulching of the rows with black polyethylene and black agro-cloth, were used in the experiment.

As the result of the experiments made, it was found out that strawberries accumulated: 9.5 - 10.6 of dry soluble substances, 5.6 – 9.5% of sugars, 0.75 – 1.1% of organic acids, 55.1 – 99.8 mg/100g of ascorbic acid; it depended on the variety and cultivation condition.

High content of dry soluble substances was typical for the strawberries grown without mulching – 10-10.6%; this indicator for the strawberries grown on the mulched soil (black film) was lower by 0.5-1.6%.

The content of organic acids in strawberries ranged from 0.75 to 1.06%. Their higher content was recorded in the strawberries grown on soil mulch in the rows with black polyethylene – 0.89-1.06%.

The strawberries grown without mulching had high vitamin value - 57.1–99.8 mg/100g, whereas the use of agro cloth resulted in its decrease by 2-27.1%.

During the storage as a result of berry respiration and selective gas permeability of polyethylene, a modified gas atmosphere with higher carbon dioxide content and lower oxygen content is formed.

When strawberries were stored in this atmosphere, we observed natural mass loss – from 0.9 to 2.2%. The highest mass loss was typical for the berries grown on row mulching with black polyethylene – 2.0–2.2%, depending on the variety; the lowest one - from 0.9 to 1.6 – for control. Strawberries of Festivalnaiaromashka variety were characterized with higher mass loss compared with others – from 1.6 to 2.1%.

The loss of organic substances occurs together with mass loss in the process of storage. Within 11 days the content of dry soluble substances in the berries decreased by 4.5-11.3% as compared with their content before the storage. The lowest losses of dry soluble substances were recorded for the strawberries grown without mulching – 0.2-1.6%, the losses were higher by 1-3% in the berries grown with the use of mulching.

Within 11 days of the storage sugar content in the berries decreased by 2.3-35.5%. Among the varieties studied, strawberries of Honey variety showed the highest losses of sugars – 2.3-35.5%, those of Festivalnaiaromaska variety were 2.5-25.3%.

In the process of the storage the decrease of organic acid content in the strawberries by 1.3 – 35.8% was observed.

The ascorbic acid content was decreased by 16.7-42.1% during the storage. The trials proved that the use of mulching during strawberry cultivation enhanced ascorbic acid losses during the storage by 9.2-20.5%.

The use of mulching while growing strawberries enhances the accumulation of smaller amount of dry soluble substances, sugars and ascorbic acid, but berries have higher acidity. The strawberries, grown with soil mulching, had the increased loss of mass and organic substances and lower output of marketable produce during the storage.

Key words: strawberry, mulching, storage, chemical constituents.

The maintenance of hygroscopic water for phytomeliorator *Carex hirta* L. plant inoil contaminated soil

L. Bunio, O. Tsvilynjuk, O. Terek

It was defined one of the most important questions of the study – the maintenance of hygroscopic waterfor *Carex hirta L.*plant (Hairy sedge) grownin oilpolluted soil.

Boryslav is an unique city where oil extraction is conducted directly on the city territory. This fact leads to a total contamination of soil by oil and its products that are highly toxic to plants and constitute a potential risk to human health. Just as recultivation of soil should be safe for the health of city population, so the most ecologic way of soil restoration is phytoremediation. It's an effective technology which uses plants for cleaning up contaminated soil. *C. hirta* plants are resistant to oil contamination, and thus can be used for phytoremediation of oilpolluted soil.

For definitinon of nonavailablehygroscopic water contentit had been determinedthe field and laboratory researches. The experimental studies were conducted on the territory of Boryslav city.

Oil was added in soil in concentration 5%. *C. hirta* was planted in 20 days after the oil had spilt. In 30, 395 and 760 days of plant growth we selected soil samples from the rhizosphere and edaphosphere, that corresponded to 50, 415 and 780 daysof oildestruction. Hygroscopic water content was defined from the indicators of hygroscopicity, a hygroscopic coefficient and quantity of water in which the fading of plants began.

Sod-podzolic soil polluted by oil (5 %) had led to reduction of hygroscopicityindicators as well as hygroscopic coefficient.Especially these indicators were low in row-spacing. *C. hirta* growth in oil contaminated soil improved these indicators.

Calculation of plant nonavailable water content in oil polluted sod-podzolic soil has shown that in 50 days quantity of water in which the fading of plants began had incremented in the rhizosphere zone and rowspacing compared to background one. These indicators have a little decreased for 415

days of oil destruction. During the third year (780 day) quantity of water in which the fading of plants began had been less for background one.

The laboratory research with *C. hirta* plants has shown that they are capable to grow in drier soil. Practical indicators of permanent wilting point (PWP) were less both for background and oil polluted soil. However, the tendency of plant nonavailable water content remained: nonavailable water to *C. hirta* plants in oil-polluted soil had been more for background as well as in calculating. However, the difference in nonavailable water content between background and oil-polluted soil had been more than in calculating.

At the initial stage of oil destruction when quantity of oil in soil had still been high, water availability to *C. hirta* plants was very small. With increasing of oil destructionprocess the quantity of inaccessible water decreased. Most of nonavailable water has been for 415 days, when the plants were in the flowering phase**.**

Humidity range in conditions of *C. hirta* plants stasis has become higher in rhisosphere region and row-spacingcompared tothe background one in 50 days. In 415 days of oil destruction when *C. hirta* plants were in a phase of floweringthe indicator of late growth has increased much more compared to background one in rhisosphere region and row-spacing.

For the third year (780 days) in row-spacing where oil destruction happened more slowly than in rhisosphere region, the quantity of water inplant stasis has been higher compared to other years and rhisosphere region. For this period in soil there were heavy hydrocarbons of oil which were the most hydrophobic.

Thus, presence of oil in the soil leads to increasingplant nonavailable water content in which the plants are withering. *C. hirta* plant may be a good candidate for phytoremediation as itis capable to maintain lower indicators of humidity shortage than theoretically calculated one for the given type of soils. Growth of *C. hirta* plant improves soil hydraulic properties.

Key words: oil destruction,plant nonavailable water, hygroscopic water, permanent wilting point, oilpolluted soil, *Carex hirta* L.

The influence of cultivar characteristics Beet feed on the crop structure in the conditions of Forest-steppe of Western

E. Ovcharuk

The production of forage root crops is important in ensuring the livestock with succulent fodder. The feeding of animals with root vegetables in winter most closely approximates their diet to summer pasture. The nutritive value of the fodder beet occupies the main place among the fodder root crops because of providing the diet of animals with large amounts of easily digestible food, significantly affecting cow milk yield, and readily eaten by all kinds of animals. From the agronomy point of view it drains less the upper soil layers and sets it free from weeds.

The experimental studies were conducted during 2010-2013 years on the experimental field of Podilsky State Agrarian Technical University.

Beet fodder sowing was held on April 15-18, wide-row method with aisle 45 with the investigated varieties: Kievskiy (control), Galickiy, Dniester, Adra, and hybrids Krakus, Solidar, Kasper. The total area of the plot was 45,0 m^2, accounting 25,2 m^2.

Morphological features of plants with economic quality products are characterized by the efficiency of cultivation and evaluation of varieties and hybrids of sugar beet fodder. Morphological features of beet fodder are determined by the shape, mass, depth of the roots in the soil. Most of these root indicators are important for mechanized cultivation and harvesting process.

Analyzing morphological features of beet fodder in technical ripeness it can be concluded that the investigated varieties and hybrids had different roots. So, the Kiev variety (controlled) roots was characterized by a cylindrical-oval shape, the Galician variety – oval-cylindrical, the Dniester

variety– cylindrical-conical, the Adra variety and hybrids Krakus – cylindrical, Solidarity – cylindrical-conical and Casper – accepted.

An important indicator, which will further affect the yield is the average weight of roots, which in varieties and hybrids varies in spite of the form of root. The varieties of Adra – 718 g, Kievskiy – 706 g, and hybrids Kasper – 699 g, Krakus – 694g are with high root mass. The lowest root weight was typical for the variety of Dniester – 639 g and hybrid Solidar – 658 g.

One of the elements of plant productivity is the number of leaves that depends on the elements of cultivation technology, especially of the variety, hybrid. The average number of leaves in the phase of closing rows with different cultivars were in the range from 14,1 to 16,3 pieces, hybrids - from 13,5 to 16,9 pieces and they could vary depending on climatic conditions in the years of research.

The important element in the structure of crop fodder beet is a root weight in the phase of technical maturity, which was different depending on the varieties and hybrids. The study found the given varieties had the following indicators: Kievskiy – 706 g and Adra – 718 g and hybrids Kasper – 699 g and Kraku – 694 g. The root weight in the phase of technical maturity affects the yield of beet fodder.

So, investigated varieties of fodder beet were characterized by high yield of root crops. On average over four years of research the highest indicator was in the variety Adra – 64,6 t/ha and the hybrid Krakus – 62,4 t/ha whereas the Galickiy variety yield 58,2 t/ha, Dniester – 57,4 t/ha, in comparison with lower indicator of the controlled variant, the variety Kiev – 5,5 t/ha and 6,3 t/ha. Among the hybrids of sugar beet fodder the highest yield was obtained from the hybrid Krakus – 62,4 t/ha, in comparison with the controlled variant (sort of Kiev) 1,4 t/ha below. The hybrids Solidarity and Kasper yield 59,2 t/ha and 60,2 t/ha, which is also lower than the controlled version 4,5 t/ha to 3,5 t/ha, respectively.

Key words: beet, variety, hybrid, morphological characteristics, root, yield.

The evaluation mutant forms of the spring rape origin by the main structural elements productivity

Y. Ivko

The results of studies comparing forms of mutant origin spring rape stem height, number of pods on the main inflorescence, pod length and number of seeds in a pod. The height of the stem does not directly belong to the structural elements of the crop. However, in modern breeding this indicator gives importance. The height of the stem is connected with rape resistance and lodging. The problem of short stem is present in both: theoretical and practical terms, and is studied in many countries. Creating dwarf varieties with short stem facilitate harvesting spring rape and leads to reducing economic costs.

Reducing the height of the plants stems mutant origin compared with controls of the original seed varieties Magnat and grade standard Maria observed in all variants. Highlight height stems stunted form – ISP 11-1/7, ISP 11-2/9, ISP 10-3/2, ISP 10-1/4, ISP 11-1/5, which are of practical interest for breeding, as a starting material for dwarf varieties.

Reducing the stem height forms of a mutant origin, compared to grade standard Maria held within 8,6-26,3 cm, and in relation to the initial variety Magnat – 8,0-25,7 cm, depending on the sample.

The greatest reduction in stem height within two years of the study was observed in the number of mutant origin ISP 11-1/7 (82,0 ± 2,1 and 91,3 ± 2,2 cm), which on average amounted to 86.7 cm, 26.3 cm below the grade standard Maria and 25.7 cm - to the initial variety Magnat. The coefficient of variation of this form (V = 7,3 and 8.5%) also indicates a weak variation on this basis during the years under review.

Significant reduction of the height of the stem, as seen in mutant forms of ISP 11-2/9, ISP 10-

3/2, ISP 10-1/4, ISP 11-1/5, the average of the two years which ranged from 91.6 to 94.0 cm, compared with grade standard – 113.0 cm and the initial variety – 112.4 cm.

As the number of pods on the main inflorescence numbers found ISP 10-1/4 (37.0 pc)., ISP 11-2/9 (36.6 pc)., ISP 10-1/2 (35.6 pc.) ISP 11-2/8 (35.5 pc)., ISP 11-3/1 (34.8 pc.), which is significantly higher than the initial variety Magnat (25.9 pc.). Our results showed that all sample mutant origin by the number of pods on the main inflorescence exceeded the initial variety Magnat (25.9 pc.) and grade standard Maria (30,4 pcs.), except for form ISP 10-3/2 (29.5 pc.).

Length pods are not a direct part of the structure of seed productivity. Plants with long pods may have larger seeds, but the number of seeds in the pod can be reduced, so the length of the pod does not play a decisive importance in breeding for increased seed yield. However, there are several studies that indicate that an increase in pod length increases and the number of seeds in it. Stability signs pod length, within two years of research found in the form of mutant origin ISP 10-1/2.

In the experiment, we determined only the basic elements of the structure of the harvest that by a great variety models are widely used in breeding programs for enhanced seed performance.

In particular, the number of seeds in the pod is the main breeding grounds of rape, which has a high degree of inheritance.

The seeds degree formation, in the number of seeds in pods, to some extent determined by the genotype and much depends on the type of weather and growing conditions.

The biggest formation seed number was recorded in ISP 10-4/2, the average of the two years of studies was 29.0 seeds units. Mutant form of ISP 10-4/2 exceed grade standard Maria 5.5 seeds in the initial variety Magnat – 6.9 pc.

Key words: spring rape, the form of mutant origin, induced mutagenesis, selection.

Indicators of the photosynthetic capacity of spring wheat depending on influence of sowing methods and seeding rates

A. Rozhkov

Increasing the rate of photosynthesis is a considerable reserve for crop production. The rate of photosynthesis is a crucial factor in the formation yields in cases where the action is limited eliminated most of the other factors (lack of mineral nutrients and moisture are not aligned structure of crops, etc.).

The purpose of research was to determine the combined effect of sowing methods and rates of seeding on the formation parameters of photosynthetic potential productivity of crops of spring wheat varieties Kharkivska 41.

During the researches we found significant parametric changes of the upper leaf spring durum wheat depending on influence of the studied factors. In all phases of an accounting effect of optimization the distribution of plant area was tantamount to stuffs. In particular, the band pass method of sowing area in the upper leaf stage heading, flowering and early MIA was on average 9,0 % higher than the string method.

The band-pass seeding method, compared to a string, the change of the upper leaves was significantly higher in the variants with higher seeding rate. In particular, the phase of earing increase in the area of upper leaves on a variant band pass method compared to string crops by seeding norms 450, 500, 550, 600 of us./m^2 accounted for 5,5 %; 8,1; 11,8 and 16,8 %.

Optimization of feeding area decreased variance across the upper leaf area with increasing seeding rate. In particular, the area of the upper leaf of the phase of earing, depending on seeding rate on string crops varied in the range from 9,14 to 11,07 cm^2, the band pass – from 11,37 to 10,72 cm^2. A similar pattern was a phase of flowering and early MIA.

The maximum net productivity of photosynthesis for row method of sowing was a phase out of the tube (11,4 g/m^2 per day), with the band pass – in the phase of earing (12,3 g/m^2 per day). The

greatest decrease in net photosynthesis productivity for string crops on the phase of tube was heading to the greater seeding rate (from 11,7 to 8,1 g/m^2 per day).

Under sowing band pass net photosynthesis productivity was 5,3 % higher than a string. The difference between the net photosynthetic performances under different planting methods with increasing seeding rate gradually increased. In particular, the seeding rate of 450 us./m^2 it was 0,1 g/m^2 per day; 500 us./m^2 – 0,3 g/m^2; 600 us./m^2 – 0,5 g/m^2 per day.

Regression analysis found different strengths relationship between total FPP during the growing season of plants and a number of the studied parameters. The closest direct link FPP was heading into a phase with raw vegetative plant weight per unit of cultivated area (r = 0,902), and average net photosynthetic productivity of plants during the growing season (r = 0,935).

Middle forces direct relationship (r = 0,654) was between total FPP and net photosynthetic productivity in the earing phase, as well as FPP in this phase of development (r = 0,720). Middle force feedback between total FPP and raw biomass per plant is logical due to the increased seeding rate, which causes an increase in the mass of plants per unit area of crop, however, due to increased competition between plants in crops leads to a decrease in the mass of a single plant.

Indicators of net photosynthetic productivity of plants during the growing season had a strong direct relationship with vegetative plant weight per unit of cultivated area (r = 0,991) and ILP and FPP in the earing phase (r = 0,989 and r = 0,891, respectively).

Research has established the ability to manage the formation of photosynthetic potential indicators of hard spring wheat crops. Optimizing the distribution of plants feeding area contributes to a significant increase in indicators of FPP and net productivity of photosynthesis.

Proved high efficiency of interaction investigated elements of technology on the variability of parameters that determine the photosynthetic capacity of crops. The higher rates ILP, the area the upper leaf, FPP and net photosynthesis productivity were formed on the band pass crops for seed rate of 550 pieces. us./m^2.

Key words: leaf area, leaf upper, seeding rate, method of sowing, spring durum wheat, photosynthetic potential, net photosynthetic productivity.

Modern technologies efficiency in growing strawberries

A. Hamor, N. Sadovska, L. Cip

Strawberries are valuable berry crops because of their chemical composition and medicinal properties. High yields of valuable plants can be obtained in the next year after loading spaces. In Ukraine in recent years, the area under this crop increased to 8,6 thousand hectares. While gross annual meeting is 50-60 thousand tons. This is 20-30% higher than other fruits, but at the same time, the annual consumption of strawberries in Ukraine per capita is only 1,24 kg. To a large extent, this situation is due to the old traditional technologies of growing strawberries, which does not ensure an early, high yield and quality.

At the present stage of the crop is extremely important the development and introduction of innovative technologies of fruits and berries, minimizing the use of resources, non-renewable, the acute need for compliance with environmental safety in production and so on.

The simplest technology of growing strawberries in greenhouses is use ridges using prepared, fertilized soil substrate. But a permanent culture substrate loses its water-physical properties, piles pathogens, pathogens and pests struggle which requires more resources and is time consuming. In this context, a promising use hydroponic method that has many advantages and offers great opportunities for automation of production processes.

The aim of the study was to compare the efficacy of two growing technologies strawberries (traditional open soil and hydroponic method using coconut substrate in greenhouses) by determining the performance space, study morphological and biological characteristics of plants and establish the level of economic performance.

The study was conducted in 2012-2013. The object of the research served as a sort of strawberry Claire. We used the hydroponic method of growing as a substrate using coconut. Bookmark plants used for planting material - seedlings in phase three leaves that have landed in coconut (5 plants per 1 m / running.).

Mode power supply provided with daily morning water nutrient solution of complex fertilizer of Plantafol series, and in the evening in the system fed only water. Value formula N: P: K for vegetation changed 4 times according to the phases of growth and development. In open ground strawberries planted on beds. The scheme of planting was 20x25 cm. The greenhouses' strawberries were planted on mats under the same scheme. Area accounting area was 10 m / running. in the greenhouse, in open ground – 5 m^2. Number of Accounts plants in the greenhouse and in open field was 50 Repeated experiments – 3-fold.

A study of characteristics of growth and development in the technology of strawberry cultivation of different methods found that the timing of onset and duration growth differ depending on production technologies.

There were used technologically different ways of strawberries growing and impact on plant morph metric parameters and their variability. Thus, when the method of hydroponic growing, the average number of shoots per plant was 16 pieces against 17,5 pieces. in open ground.

The strawberries shoots length in greenhouses also were characterized by lower values compared to the open field and were 13,5 cm vs. 17,0 cm.

As for features such as the number of outlets per plant, this figure was almost the same regardless of the technology and the growing conditions of plants, and their number ranged from 2 to 3 units per plant with average values of 2,7 pieces. (greenhouses) and 3,0 pieces. (open ground).

The signs were stable enough to the cones number and the number of stems per plant. Average values of these features during the years of study were 1,7 pieces. and 3,5 pieces respectively, regardless of the growing technology.

Finally, the value of such features as the number of antennae was almost unchanged and reached respectively 3,5 and 3 pcs. of the plant under different technologies conditions.

Our studies have shown that sort of strawberry Claire creates quite a large vegetative mass and volume during the growing season.

The difference between the morph metric parameters of strawberry plants under different conditions and growing technologies and their impact yield influences the fruit quality and marketability.

In particular, the average weight of berries grown by traditional technology was 27,5 g. which is 5,0 grams. more than the cultivation of coconut substrate.

At the same time, the overall level of productivity in terms of square meter was higher for growing strawberries in greenhouses (3,0 kg/m^2) versus 2.9 kg/m^2 in the open ground. It was significantly higher marketability and berries for strawberry cultivation on coco substrate. In this case, it reached 99% against 95% in the open ground.

When defined economic efficiency in greenhouses using hydroponic method for cost years of research in terms of per hectare was 68383,3 UAH., and the profitability of 284,0%., and in the open ground, according 50278,3 UAH., and 110,1%.

So the efficiency study of growing strawberries in greenhouses by hydroponic coconut substrate made it possible to establish a number of advantages of this technology compared to traditional cultivation in the open ground, namely:

- crop maturation occurred three weeks earlier;
- marketable berries was very high – 99%;
- profitability reached 284,0%, which is more than 2,5 times higher than the rate in open ground.

Key words: strawberries, sort, open ground, protected ground, coconut substrate, productivity, economic efficiency.

Investigations on Alternaria solani attack on tomato fruits in Kiev region

N. Shotyk, S. Kubrak, S. Yaremenko

Presented investigations results obtained during the 2010-2014, it was estimates more than 10 thousand varieties and hybrids resistant tomato breeding samples relative to the pathogen Alternaria. It was highlighted a special line, peculiar field relative stability in the conditions of Kiev region, which will be used in the selection process creating hybrids and varieties. In recent years in Ukraine abrupt climate changes are observed, which promote intensification and increased harmfulness of Alternaria on tomatoes. This disease is known as macrosporiosis, early blight, early blight, dry, dry concentric spot. The causative agent on tomatoes is a fungal pathogen Alternaria solani (Ell. Et Mart) Neerg. It is the most common form of Alternaria on tomato leaves but also causes disease on other plant organs: cotyledon and true leaves, petioles, stems, fruits. Yield losses from this disease are 20-30%, and 40-50%. Weather conditions affected significantly the development of this pathogen. The optimal conditions for its development is temperature of 24-28 ° C and humidity within 70-100%. During the growing season the agent reproduces asexually by means of conidia, that contributes to the rapid spread of the disease. According to source ecological classification of infectious diseases Alternaria referred to aerogenic infection (Chulkin, 1991). According to E.Vlasov and other scientists (1979) the agent affects weakly low capacity, sterile, medium and late samples with indeterminate bush type. In Ukraine genetic resistance of tomato to Alternaria studied poorly. This is due to the fact that in Ukraine the disease, though, was common, but it did not cause significant damage to tomato producers and had attracted the attention of plant pathologists to resistance factor to Alternaria controlled by one pair of genes with partial dominance susceptibility. Varietal resistance to this pathogen has not been reported. During the period of 2010-2014 years in the field it was evaluated more than ten thousand tomato varieties and hybrids of different eco-geographical origin in order to create a collection of sources for resistance to Alternaria solani (Ell. EtMart) Neerg. During the period of research for seven years weather conditions for plant growth and development and yield formation tomato fruits were quite colorful. As a result of research material selection on the basis of resistance to Alternaria was distributed in the following groups of samples: relatively stable (with the degree of development of the disease to 25%) – accounted for 0.1% of the number of analyzed; weakly sensitive (degree of disease from 25.1% to 37.5%) – 0.2%; medium sensitive (from 37.6 to 50.0%) – 2.2%; sensitive (from 50.1 to 75%) – 22.0%; highly sensitive (by 75.1% or more) – 75.4%. As seen from the above data evaluation of plant susceptibility to pathogen Alternaria resistant specimens were found. According to the results of phenological observations it was revealed that selected varieties and hybrids were relatively stable and slightly susceptible to Alternaria. They belong to the early and medium varieties of ripe, during their growing season range from 99-113 days and the yield of 50,2-82,0 t / ha (See the table). To study the nature of inheritance for resistance to pathogen Alternaria solani (Ell.Et Mart) Neerg and selection of resistant forms it was performed a series of crosses. Featured in nursery-field, relatively resistant varieties crossed with varieties evolving complex agronomic traits. In the studied combinations of resistance to the pathogen it was inherited dominant, intermediate or recessive traits. Obtained a new source, material was relatively stable and slightly susceptible to Alternaria, that is important for breeding nursery studyings. After analyzing the material studied during the last five years it has been noticed that the fruit tomato yield reached a fairly strong performance. So, the best examples of hybrid combinations reached 8.0 t / ha (Fastovskii, Oberig. Zakaznyy samples), slightly lower – the Golden Fleece's line 10, Bojan's Dawn (7,9t / ha) and the lowest – Myrolyubivsky sample (7.6) (See the table).

In conclusion, the value of marketable tomato fruits, its recent presentation as well as its selection process was at 20-25 % respectively. Early samples were improved by more precocious forms (Zoren, Fastovskii, Zakaznyy 280x Zoren, Myrolyubivskyy). Biochemical composition of the samples also had the best essence with smaller percentage of 10-15 (in prototypes Hurricane's L.pimpenefolium, customized 280 x Dolya,) in which the dry matter content was 5.8 mg%, sugar 3 3 % ascorbic acid 28.9 %. Accordingly it had been obtained good results in the evaluation of prototypes of new pathogenic races of blight T0 and T1 Alternaria.

Key words: tomato, pathogen Alternaria, variety, branch, crossbreeding.

Productivity of corn hybrids of different maturity groups under the influence of sowing time

M. Grabovskiy, T. Grabovskay, S. Obrazhiy

Creation of optimal conditions for growth and development of maize is the basis for increasement the crop produtivity. One of the key elements in the technology of corn growing is a proper selection of hybrids concerning soil-climatic zones and the determination of the optimum sowing terms.

Optimization of maize sowing was given a lot of attention, but mostly all researchers focused on hybrids of grain-growing direction, at the same time it is practically not studied the question of growing this crop for silage production. With appearance of new maize hybrids with different maturity and morphological structure, biological characteristics and properties, there is a need to further improvement and development of optimal conditions of high quality technology, in particular the sowing dates.

The purpose of thivs study is to determine the optimum sowing terms of maize hybrids of different maturity groups that increase the productivity and nutritive value of silage materials.

Field experiments were conducted during 2011-2013 in the experimental field of BNAU, located in the Central forest-steppe zone of Ukraine.

In the scheme of the experiment it were included hybrids of different maturity groups of the Institute of agriculture in the steppe zone of NAAS of Ukraine: the early-maturing Tovtryanskiy 188 SV, middle-early Bilozirskiy 295 SV, middle-maturing Monica 350 MV and medium Bystriza 400 MV, which were sown in three terms: the first – when the soil temperature at seeding depth was 6-8°C, the second – 8-10°C (control), the third – 10-12°C.

Weather conditions of vegetation period of maize in 2011-2013 years were favorable for moisture and temperature. In 2012 under the influence of high temperature and water deficit it was observed the soil and air drought that adversely affected the productivity of studied hybrids.

According to our research during the first term, the period from sowing to the appearance of significantly lengthened shoots was caused by the temperature conditions of soil during seed germination and biological properties of the investigated forms.

On average, over a three-year period from sowing to germination during the first term of sowing was 16-19 days, the second 14-16 days, the third – 11-12 days. In the variant with corn planting when the soil temperature was 10-12 ° C, the vegetation period in all studied hybrids was short: in Tovtryanskiy 188 SV – 97 days, Bilozirskiy 295 SV – 102 days, Monica 350 MV – 105 days, Bystriza 400 MV – 112 days. Vegetation period of hybrids has grown with the increased FAO indicators.

The maximum area of leaf surface per plant was formed in the flowering phase of panicles and depending on the hybrid it ranged 34,7-50,1 thousand m^2/ha. The indicators were high during the second and third planting dates, and advantage of this indicator among hybrids was on medium hybrid Bystriza 400 MV (48,2-50,1 thousand $м^2$/ha).

In the phase of milky-wax ripeness the leaf surface of studied hybrids decreased in comparison with the phase of flowering panicles in hybrid Tovtryanskiy 188 SV 7,1-8,1%, Bilozirskiy 295 SV - 5,0-5,8%, Monica 350 MV – 6,0-6,9% and Bystriza 400 MV - 4,7-6,3%.

Our research found out that the growth of vegetative mass in corn hybrids ended in the milk phase of grain, the accumulation of dry matter continued until wax ripeness and it was due to nutrient movement from the vegetative organs to the reproductive ones.

The highest dry matter content of maize plants during all phases of growth and development was in the variant of sowing when the soil temperature at seeding depth 8-10 °C, at 0.2-1.4 % more than other options.

On average during three years, the highest yield of green mass of the studied hybrids observed in the variation of sowing at the soil temperature 10-12 °C: the hybrid Tovtryanskiy 188 SV – 43.6 t/ha, Bilozirskiy 295 SV – 46.0 t/ha, Monica 350 MV – 49.8 t/ha, Bystriza 400 MV – 51.0 t/ha. But mid-early, middle and medium late hybrids difference between the second and third sowing was negligible and in adverse conditions higher yields are provided by crops sown at the soil temperature 8-10°C.

Among the given hybrids, the maximum productivity was characterized by medium Bystriza 400 MV – 46,2-51,0 t/ha.

Key words: corn, hybrids, sowing terms, productivity, green mass, interphase periods, leaf surface area, dry matter.

Early potato harvest due to the method of pre-planting preparation and varietal features in Right-Bank forest-steppe zone of Ukraine

O. Gorodetsky, M. Gubar, N. Gubar

The article deals with the results of study early-maturing potato varieties according to the method of tuber pre-planting preparation. The essential influence was pre-plant germination of potato tubers of early varieties at harvest. Determined way of pre-plant sprouting tubers allows 60 days from planting to obtain highest marketable yield of early potato. Pre-plant germination improves the yield of early potato. Sprouting tubers in pallets allow 60 days from planting to get the highest yield of early potato varieties Naghoroda – 15.4 t/ha Tiras – 15.2 t/ha Santarka - 13.9 t/ha.

Potato – one of the most common crops in the world. In Ukraine potato is a product of daily food and raw materials for the processing industry. For the majority of population it is a basis of food security. Therefore, today the urgent task is the yield gain and enlargement of consumption period. To obtain high yields of early potato is of great importance to chose properly a potato variety. Recently, the State Register of Plant Varieties of Ukraine includes over 60 different potato varieties with its economic ripening process. It is known that the degree of viability of each class is determined by the set of its bio-tech features and relations with growth conditions. Along with the impact of modern technology, soil and climatic factors (weather condition zones) are the most accurate assessment of varieties given by the practiced farmers from different zones. For the collective farms, gardeners and farmers are considerably interested in grouping of early ripening potato varieties to obtain new ones in the early periods.

In terms of Right-Bank forest-steppe in dark gray podzolic soils the studied varieties were uneven developed and grown during the growing season. Phenological observations showed the duration of the shoot planting due to varietal features and methods of sprouted tubers. Preplanting germination of potato tubers affected the appearance of shoots on all tested cultivars. Thus, in conducted germination test of tubers, shoots emerged on 5-10 days earlier than the control ones. The shortest period of "shoot planting" - 19-20 days for marked varieties Award, Melody, in the variant where tubers germinated in pallets. The longest period of "shoot planting" (31-32 days) was observed in Vedruska and Karlyk varieties where tubers did not germinate. This pattern was observed at the origin of varieties of the budding and flowering phases.

Biometric measurement results indicate the presence of varied intensity growth and development of potato plants, depending on the type and methods of germination. The study found out that more intensive vegetative mass index was observed in variants where tubers germinated on the techniques and pallets. Among all tested cultivars after 60 days from planting it was Naghoroda variety that involved 65-68sm highest plant height and leaf surface area of the largest bush 0,68-0,70m2. Results of dynamic undermining after 60 days from planting confirmed that early potato yield significantly depends on preplant germination of tubers and varietal features. More intense accumulation of early potato crop occurred in the germinated varieties Naghoroda, Tiras. After 60 days of planting, the most marketable yield was obtained in the following grades: Naghoroda-15,4 t/ha, Tiras-15,2 t/ha and Santarka-13,9 t/h. The similar varieties Vumir-12,5 t/ha, Melodya-12,7 t/ha Skarbnutsya-13,5 t/ha had slightly smaller values. Analyzing the results of the research it should be noted a pattern of productivity of the sprouting tuber harvest methods. Thus, light germination of tubers increased yield-producing power in all tested cultivars -3,0 to 2,0 t/ha compared with the control ones. In this case, the highest early harvest was 4,3-5,9 t/ha in the form where the tubers germinated in pallets.

Structural analysis of early variety studies indicates that the potato variants participating in the pre-plant germination had more product tubers under a bush. The given results revealed that the increase of commercial harvest was put into effect not only by increasing the number of tubers under a bush, but also due to their mass.

In the second undermining (after 70 days from planting) yield gain for ten days in the tested cultivars reached 3,4-7,3 t/ha. The highest marketable yield for this period formed such varieties as Tiras-1,98 t/ha, Naghoroda-20,1 t / ha, Santarka – 20,5 t/ha where tubers germinated in pallets. During potato harvest season in biological maturity of the tested cultivars Tiras-26,3 t/ha, Naghoroda-28,9 t/ha, Skarbnutsya-30,4 t/ha provided the highest yield grade.

To obtain early production of potato in the Right-bank Forest-steppe zone of Ukraine the most suitable varieties are Naghoroda, Tiras, Santarka. Pre-plant germination improves the yield of early potato. Sprouting tubers in pallets allow 60 days from planting to get the highest product yield of early-maturing potato varieties Naghoroda – 15.4 t/ha Tiras – 15.2 t/ha Santarka - 13.9 t/ha.

Key words: potato, sprouting potato, early maturing varieties, productivity.

The yield capacity of beetroot in the Right-Bank Forest-steppe of Ukraine

V. Keckalo

The results of the research on the applicability of the varieties and hybrids of beetroot of the foreign selection to cultivation in the conditions of the Right-Bank forest-steppe of Ukraine were presented. The features of phenological phases of the plant development, their biometric indicators depending on the characteristics of the variety were established. The level of the yield capacity, its structure and marketability of the received products were determined.

The aim of the given research included the yield gain of beetroot in the Right-Bank forest-steppe of Ukraine by selection of high-yielding varieties and hybrids of foreign selection. The experimental part of the research was conducted in 2011–2013 on the experimental field of the Department of Vegetable growing of Uman National University of Horticulture. The varieties Harold (USA) and Detroit (France) were investigated. The variety Hopak (Ukraine) served as a controlled one. The variety Zeppo F_1 (the Netherlands) was a controlled one for hybrids Boro F_1 and Pablo F_1 (Holland). The sowing was performed during the second decade of April according to the scheme 45×10 sm (222,2 thousand pcs./ha).Technological works were carried out according to the requirements of the growth and development of beetroot. The yield was gathered in a solid way in the first decade of October and sorted according to the requirements of the State Standard of Ukraine 7033:2009 «Beetroot fresh. Technical conditions».

According to the phenological observations and characteristic of varieties and hybrids the early ripen varieties include Boro F_1, Pablo F_1, Zeppo F_1 and Harold. During the phase of beam ripeness a domestic variety Hopak (a controlled one) had larger number of leaves. The plants of the Detroit variety formed 10 leaves less. The number of leaves of hybrids was 22–28 pieces. Zeppo F_1 (a controlled variety) had higher number of leaves, and Boro F_1 – lower. In the phase of technical ripeness the plants of the Hopak variety and hybrid Zeppo F_1 formed more leaves – 16 and 14 pieces accordingly.

The length of the leaf plate in the phase of beam ripeness was longer in varieties and amounted to 19,5–20,7 sm, whereas in hybrids the length was 15,3–16,8 sm. A similar trend was determined in the phase of technical ripeness of the roots. The weight of leaves in the total weight of the plant in average experience in the phase of beam ripeness was at the level of 22,0–28,7 % and in technical – 10,3–16,0 %.

The total yield capacity in the experience was within 39,0–62,5 tons/ha. The cultivation of the varieties allowed to get 46,8–51,8 tons/ha of production. The variety Harold was more yielding. Hybrids provided 39,0–62,5 tons/ha of roots and Boro F_1 was the best one. The total yield capacity was divided into the product and non-product. Among the varieties Hopak (the controlled variety) formed less marketable roots – 40,8 tons/ha with marketability 87 %. More marketable products output were observed in the Harold variety – 47,5 tons/ha with marketability of the roots 92 %. During the cultivation of hybrids Zeppo F_1 (the controlled hybrid) had lower indicators – 36,7 tons/ha, however, the marketability of the roots was at the level of 94 %. Boro F_1 had higher yield – 55,7 tons/ha with the marketability of the roots 89 %.

According to the average data of 2011–2013 the Harold variety formed larger in weight roots – 242 g, and the controlled variety had lower indicators – 217 g. The diameter of the roots was 8,6–9,2 sm and the Harold variety (the controlled one) had the higher indicator. This indicator in the varieties Detroit and Harold was at the same level and was 8,7 and 8,6 sm accordingly. During the cultivation of the hybrids Boro F_1 formed the roots of higher weight – 297 g, and Zeppo F_1 (the controlled hybrid) had lower weight – 183 g. The diameter of the roots of the beetroots of the hybrids in average experience was of 8,8–9,4 sm.

So, the investigated varieties and hybrids of the beetroot of foreign selection are applicable for cultivation in the Right-Bank forest-steppe of Ukraine. The processes of coming and passage of phenological phases of plants in hybrids were faster compared with the varieties. On biometric indicators in phase of beam and technical ripeness larger indicators were determined in varieties. During cultivation of the varieties the marketable yield capacity of beetroot increased in comparison with the controlled one by 5–16 %, which corresponds to 2,2–6,7 tons/ha. In hybrids this indicator was 40–52 % and 14,8–19,0 tons/ha, accordingly. Harold and Boro F_1 had the best weight indicators.

Key words: beetroot, variety, hybrid, root, yield capacity.

Beetroot plants foliar feeding efficiency in the Western forest-Steppe of Ukraine

P. Bezvikonnyu

The article highlights the results of the influence of foliar beetroot trace elements on the productivity of root crops. According to the results of the research, foliar application of micronutrients influenced the yield of root crops beetroot positively in the studied varieties.

During the studies years there have been observed differences in the yield depending on the rate of trace elements in foliar feeding. So, in 2011, the highest yield was characterized choices where made of boron minerals with application rate (5,00 kg/ha and 5,50 kg/ha), respectively, the variety Harold, the figure was – 41,1 t/ha and 40,6 t/ha depending on the biological characteristics of the varieties Kestrel this index had the highest value, respectively 53,2 t/ha and 53,3 t/ha, a Similar trend was noted in the subsequent years of research. In 2012-2013 introduction boron

micronutrients resulted in more significant effect than the introduction of copper and molybdenum minerals. So, in 2012, in versions where made of boron minerals with application rate (5,00 kg/ha and 5,50 kg/ha) yield of roots was 42,3 t/ha and 42,8 t/ha cultivar Harold, and – 58,7 t/ha and 58,0 t/ha at varieties Kestrel, respectively.

2013 has been a reduction in yield compared to 2012 and the yield of roots was 41,3 t/ha and 41,4 t/ha and 56,8 t/ha and 56,7 t/ha, respectively. Slightly lower yield was observed when depositing molybdenum and copper minerals with different rate throughout the study period.

The lowest yield of roots was observed in 2011, the highest in 2012 and 2013 Comparing moisture conditions over the years, it should be noted that the most favourable for the growth and development of plants beetroot and formation of a high yield was 2012.

The obtained results confirm that the yield of root crops beetroot, depends on the individual productivity of plants, varieties, and also the rate of trace elements in foliar feeding.

Average years of research from foliar boron highest yield of root crops varieties Harold received from the rate of 5,00 kg/ha of 41,6 t/ha, which is 2,7 t/ha higher than the control variant. Similar figures and varieties Kestrel, on average, for three years, received a yield of 56,2 t/ha, on this very variant (5,00 kg/ha), higher than control 2,9 t/ha.

From processing plants in trace elements (molybdenum) have also increased yields. The most effective rate was 0,200 kg/ha, the variety Harold average for three years received a yield of 40,3 t/ha, which exceeds the control 1,6 t/ha, sort Kestrel – 54,7 t/ha – 1,8 t/ha, respectively.

High yields of roots obtained from foliar micronutrients (copper) of the investigated variants of the most effective provision is 2,00 kg/ha.

Thus, varieties of Harold average for 2011-2013 experimental studies yield of root crops amounted to 38,8 t/ha, which is higher than 2,0 t/ha in control variants. The yields of root crops varieties Kestrel were similar and amounted to – 53,7 t/ha, higher than control 2,2 t/ha.

Experimental research has shown that foliar application of plant beetroot trace elements boron, molybdenum and copper affect the value of the crop roots and give the opportunity to receive quality products. The most effective norms for foliar feeding is: boron (boric acid) – 5,00 kg/ha of molybdenum (molybdenum acid ammonium) – 0,200 kg/ha, copper (copper sulphate) – 2.00 kg/ha. Obtained a higher yield varieties Harold – 41,6 t/ha 40,3; 38,8 t/ha, sort Kestrel – 56,2 t/ha 54,7; 53,7 t/ha , respectively.

Key words: red beet, roots, foliar nutrition, productivity, fertilizer, sort (varieties).

Creation of parent material of sweet pepper by the method of gametophytic selection

Y. Kulikov, G. Danyluk, N. Kulikova

The efficiency of selection micro gametophyte proved by numerous experiments on different crops: tomatoes, cotton, cabbage, corn. One of the tasks of plant breeding at this stage is to obtain the variety of sweet pepper, gain resistance to extreme environmental conditions. It is important to study the possibility of selection to gain genotype of haploid level, resistance to low temperatures.

The aim of this work is to study the effect of selection in micro gametophyte F1, resistance to low and high temperatures, the structure and quality of sporophyte generation formed in sweet pepper.

As a result of multi-selection as a transitional material were dedicated lines with combined resistance to cold stress for both sporophyte and gametophyte. It is important to note that most of the samples examined had a high and early yield in protected soil conditions.

Assessment of cold-tolerance sporophyte stage on seed germination was determined according to the method VIR (1990) on the rate of seed germination at temperature 10–12 ^{0}C. At the stage of gametophyte cold resistance the ability of pollen germination was measured in conditions in vitro at the temperature 10–12 ^{0}C.

Due to the fact that when planting seedlings of pepper culture in film greenhouses, climate characterized by rapid changes in day and night temperatures, and the amount of average positive temperatures during the growing season in a northern forest-steppe, at best, is 20000 ^{0}C 30000 ^{0}C when necessary. Therefore, the use of cold-tolerance forms is especially important when creating varieties for greenhouses in this area. The evaluation of the resulting cold-resistant material showed that in a closed ground in most samples tends to increase productivity and reduce the length of the growing season compared with the original population. It should be noted the highest productivity of different samples HPPT (0,99kg / plant) Nejnost x HPPT (0,78kg / plant), Line Jemenia F7 (0.93 kg / plant) HPPT x Jemenia (0.90 kg / plant). On cold resistance lines judged in terms of relative cold resistance (CR), under which the samples were divided into 3 groups of resistance on a scale VIR (1990): group I – cold, CR = 100-75 %; group II – medium cold, CR = 31-74 %; group III – not cold, CR = 0-30 %.

The earliest in terms (98-100 days) in greenhouses were samples with conical shape of the fetus: Zr-5, KDO-16, KDO-35 and tied fruit average weight 52-100h. Characterized by high performance are line XIITT, Line Jemenia F7- 0.91 - 0,75kh / plants. Thus, the most promising lines for greenhouses are: Nejnost x HPPT (0.78 kg / plant, 103 days), HPPT x Dovirchivij (0,90 kg / plant, 116 days), Line Jemenia F7 (0,93 kg / plant, 95 days), Zr-5 (0,25 kg / plant, 98 days), KDO-16 (0,46 kg / plant, 100 days), KDO-35 (0,77 kg / plant, 110 days), which have a good performance capacity for fruit in adverse environmental conditions. It should be noted that the line Sp-5 has a marked signs – yellow color of the growing point, which is of great importance in the industrial production of hybrid seeds. Low stress on seed germination stage does not affect the functional performance of pollen (viability) of the samples in the evaluation of cold resistance.

As a result of multi-selection as a transitional material were dedicated lines with combined resistance to cold stress for both the sporophyte and gametophyte. Thus, the two-time selection by sporophytes and gametophytes can provide valuable source of material with combined resistance to low temperature factor for further breeding work and speed up the selection process when creating adaptive varieties and hybrids of sweet pepper in extreme environmental factors. In crossing to create hybrids with combined resistance, it is advisable to include samples with different levels of resistance to the sporophyte and gametophyte.

Key words: sweet pepper, sporophyte, gametophyte, selection, temperature stress, the line, parent material.

The effect of growth stimulators on yield and biochemical consist of carrots

J. Potapsky

Presents the results of studies on the effect of growth promoters on yield and biochemical cosist of carrots. The obtained results show that the change in the value of crop roots were of a different character. In the years studies have observed differences in yield depending on the rate of growth stimulants. The analysis of marketable carrots yields in 2006-2008 shows that the highest rate recorded in 2007, while in the variant with processing growth stimulator Ivin with standard of 2,0 mg/l of water for yield was 62,3 t/ha, and processing growth stimulator of Emistim C with a rate of 0,5 ml/l of water – 62,0 t/ha, respectively.

The lowest yield recorded in 2006. So, in 2006, in variants, where a growth stimulant Ivin was used in proportion 2,5 mg/l of water, the yield of roots was 58,4 tons/ha, and at the proportion of 1,5 mg/l of water the harvest was 59,9 t/ha the Best option was using a growth stimulant Ivin in the standard of 2,0 mg/l of water at the same time the yield of carrots was 60,7 t/ha.

This primarily depends on climatic conditions, namely with rainfall during the vegetation period. The yield of carrots in 2008 was at the level of 2007.

The average for 2006-2008 years the lowest yield on norms carrot processing was when growth stimulator Ivin used in the proportion of 2,5 mg/l of water with soaking in the water one day, the

yield was 58,9 t/ha and in the proportion of 1,5 mg/l – the yield was 59,3 t/ha. Although compared with controlled ones these yields of 1,5 t/ha and 1,9 t/ha were higher. Then, as in the variant with normal use of growth stimulator Ivin in proportion 2,0 mg/l of water, with soaking in the water one day, the yield of root crops is 61,4 t/ha, which is higher than the controlled rate at 4.0 t/ha.

Similar performance was observed from the processing of carrot seeds with Emistim C. The highest yield of roots observed in the variant of seeds treatment with Emistim C according the rate of 0,5 ml/l of water with soaking in the water during eight hours, on average for three years is 61,7 t/ha, which exceeds the controlled rate 4,3 t/ha.

While researching growth stimulators in the processing carrot seeds, was found that the compaund of the main biochemical parameters of commercial carrots products differs over years, and depends on the norms of seed treatment with stimulants.

We established certain trends in the formation of carotene consist in the roots, which depends on seeds treatment with growth stimulators, weather conditions during the year of cultivation and the impact of various factors that have been studied.

In different years of growing plants, we have not noticed significant changes in the consist of biochemical parameters in carrot, but the seed treatment with growth stimulants was different. So, from seed treatment with growth stimulator Ivin in the standard of 2,0 mg/l. of water by soaking in the water during the day, the consist of the dry material of the average for three years is 14,9 percent, compared with the controlled rate 0,7% was higher. In this variant, the high content of carotene is 17,2 mg/100 g of wet weight and sugar to 8,0%, respectively, which exceeds the controlled variant rate. From seed treatment with growth stimulator Emistim C in the variant with normal seed treatment with 0,5 ml/l of water by soaking in the within 8 hours the highest consist of dry material was over three years on average 14,7%, carotene 16,8 mg/100g wet weight and mass fraction of sugar fluctuated in the range of 7,8 to 8,1%.

So, the highest compound of carotene, sugars in dry material was observed in the roots by treatment with plant growth stimulants Ivin – 2,0 mg/l of water by soaking in the water within 24 hours, Emistim C – 0,5 ml/l of water by soaking in the water within 8 hours. The maximum compound of biochemical indicators were formed in a more favorable 2007.

Experimental studies have established that growth factors affect the yield and biochemical compound of carrots.

Key words: carrot, growth stimulants, yield, quality.

The quality of winter wheat grain under various nutrition conditions in the long-term stationary experiment

O. Dubovy

The paper shows that the conditions of plant nutrition under germination and at the first stages of organogenesis affect considerably the quality of winter wheat seeds. It is noteworthy that the basis of winter wheat yield is formed under sowing.

Thus, under field conditions of the long-term stationary experiment Myronivska 65 winter wheat variety was sown after two foregoing crops-peas and corn for silage at a rate of 5.5 mln germinable seeds per 1 ha within the optimal terms with C3 – C3.6 seeder in the assembly with MT3 – 80 tractor.

The scheme of the experiment was the following: 0. Control. 1. Manure 30 t/ha. 2. Manure 30 t/ha + $N_{60}P_{40}K_{40}$; 3. $N_{60}P_{40}K_{40}$; 4. P_{40}; 5. $N_{60}P_{40}$; 6. $N_{120}P_{80}K_{80}$; 7. $P_{40}K_{40}$; 8. $N_{60}K_{40}$. Mineral fertilizers: ammonium niter, superphosphate, potassium chloride.

The phonological survey and the analysis of the yield structural elements were made in accordance with the technique of the State service of plant variety protection of Ukraine.

In autumn, after the completion of autumn vegetation, and in spring, after the restoration of vegetation, 75 plants from every variant were selected and planted in the soil hothouse of phytotron.

The vegetative research was conducted in the phytotron soil hothouse, soil bath and polyethylene cylinders.

Before seeding plant in the soil hothouse, furrows of 4 – 5 cm depth were made. Plants were distributed in the furrows at the distance of 3 – 4 cm, the root system of the plants were covered with soil. After seeding, the plants were watered.

The technological indices of grain quality were determined in a certified laboratory of Ukraine's NAAS Institute of Agroecology and nature management. The general contents of nitrogen compounds in plants were detected through the photometric method using Nessler reagent: Phosphorus was detected photometrically using the method of Deniges in the modification of A. Levitsky. Potassium was detected by means of flame photometer.

When analyzing the protein content in the grain of winter wheat witch was grown under field conditions of long-term stationary experiment depending on nutrition conditions and foregoing crops (corn for silage and peas) it has been established that on the average during 2008 – 2010 a comparatively larger content of protein was obtained from growing winter wheat with peas as a foregoing crop (9.5%), whereas with corn for silage as a foregoing crop this figure amounted to 8.7%. It is noteworthy that this index was comparatively high in 2009 due to more favorable conditions of the vegetation period.

After growing under various nutrition conditions of the long-term stationary experiment, winter wheat plants were transplanted to the soil hothouse in autumn. It should be noted that a comparatively higher content of protein was observed in the grain of plants grown after peas as a foregoing plant. On the average these indices amounted to 11.2 and 9.0% respectively.

This difference amounted to 0.5%, whereas the plant transplantation in autumn this figure was 2.2%.

As far as the variants of nutrition with respect to a definite foregoing crop are concerned, the investigation results testify that complete mineral fertilizer in combination with organic fertilizers ($N_{60}P_{40}K_{40}$ + 30 t/ha of manure), as well as complete mineral fertilizer in combination with $N_{120}P_{80}K_{80}$ provide for a comparatively higher content of protein in grain.

The plants with these nutrition variants when transplanted both in autumn and in spring have a higher content of protein content under their further transplantation in the conditions of the soil hothouse.

Key words: winter wheat, grain quality, condition of nutrition, foregoing crop, soil hothouse.

Anthropogenic and abiotic factors of fiber flax productivity formation in short-term rotation

V. Tyshkovskyy

The paper discusses the influence of alternative fertilizes on the assimilative surface.

The process of products formation in the agroecosystem is very complex with its peculiarities, and anthropogenic as well as natural factors very closely and interdependently interlace in it.

The growth, development and productivity of fiber flax depend on the active formation of photosynthetic potential.

The given investigation proves that in the light gray forest soil the formation of the assimilative surface of plants substantially depends on anthropogenic factors, namely, on fertilization process.

The application of mineral fertilizers, plowing down of straw and green manure contributed to the increase of leaf surface area in the period of quick growth; the leaf surface index exceeded 1.5 times the control variant (without fertilizers) in the five-course rotation. The corresponding index in the four-course rotation was also 1 thousand square metres higher than in the control one.

The use of non-marketed output, winter wheat straw with post-harvesting sowing, green manure plowing down and the application of mineral fertilizers especially with the addition of mineral fertilizers for straw mineralization contributed to the intensification of photosynthesis processes, which is confirmed by the increase of CO PhAR (coefficient of performance, photosynthetic active

radiation) index that according to years amounted to 1.08 – 1.21 – 1.38 percent in the five-course rotation and 1.06 – 1.1 – 1.2 percent in the four-course one. Thus, CO PhAR in the five-course rotation depending on weather conditions in the years of conducting investigations in condition of application of the above fertilizers increases by 0/02 – 0.1 – 0.18 percent respectively that contributed to the yield rise by 54 percent in the five-course rotation and 48 percent in the four-course one compared with the control variant.

During the investigation performance the variants with the combined application of fertilizers of organic and mineral origin showed the highest productivity - the compensation of active nitrogen substance per 1 ton together with green manure and moderate rates of mineral fertilizers, we obtained the increase of straw yield by 54.4 percent in the five-course rotation and 48.6 percent in the four-course one compared with the control variant.

The application of preceding crop by-products and green manure both separately and together with mineral fertilizers contributes to the development of the assimilation of fiber flax, increases the accumulation of organic mass and raises fiber flax productivity.

The clear increase of leaf surface was observed by the application of green manure and by-products both separately and together which exceeded the control variant to 0.3 units.

In the start of phase budding, leaf surface area slightly decreased compared to the period of quick growth – leaf surface index was in the range of 2.8 to 4.0 in the five-course rotation and 2.8-3.7 in the four-course respectively which is associated with withering away of lower layer of plant leaves.

It should be noted that the trend of increasing CO PhAR depending on alternative fertilizers manifested even in the extreme agroecological conditions, formed in 2007. These data show that the use of fertilizers in doses $N_{30}P_{40}K_{60}$, how in the five-course and in the four-course rotations positively influences on CP PhAR which constituted in accordance ,07 – 1,2 – 1,7 % and 0,78 – 0,82%.

Experience of domestic and foreign scholars shows the effectiveness of combined application of organic and mineral fertilizers. In the end, it is achieved improvements of the physical properties of soils, replenishment of stocks in the arable layer of humus and plant food elements, biological activity enhancement due to activation of microflora, which leads to increased productivity and crop quality. This is confirmed by to the results of our research.

Key wofds: fiber flax, fertilizers, rotation, assimilative surface, photosynthesis.

Butterflies (Lepidoptera) in biocenoses of the Central Forest-Steppe of Ukraine

N. Shushkivska

Butterflies (Lepidoptera) are of great economic importance. On the stage of adult most species feed nectar of flowers and therefore they are important pollinators of plants. The larvae (caterpillars) of many species are essential components of ground, soil, entomofauna agrocenosis. They are harmful to cultivated plants. About 2,000 species are detrimental to agriculture and forestry. Over 100 species of butterflies are on the brink of extinction and are listed as endangered.

A detailed study of Lepidoptera and the establishment of dominant species in biocenoses are relevant objectives and it is of practical importance to determine the degree of threat to agricultural crops.

Total number of Lepidoptera species associated with farmland and their harmfulness under the influence of abiotic and antrogenic factors is constantly changing. Thus, we should focus on monitoring and refinement of species composition.

The aim of the study is to determine the species composition and habitats of butterflies in the central steppes of Ukraine, including determination of the most dominant crop pests.

The experimental studies were conducted during 2006-2014 years on the experimental field of Bila Tserkva National Agrarian University and other farms of Kyiv and Cherkasy regions, which are located in the Central forest-steppe of Ukraine.

Observations and counts were performed during the route surveys of agrocenoses and adjacent zones, edges, fallow areas and other habitats.Accounted for an amount of butterflies throughout the growing season of plants,we used conventional methods and techniques in entomology and plant protection. The species composition of the identified insects were determined in the laboratory using the relevant literature.

As a result of studies in the Central Forest-Steppe of Ukraine it was revealed 157 species from 33 families of Lepidoptera. Analysis of the taxonomic structure of species composition of butterflies agrocenoses showed that predominant number is the family Noctuidae (Owlet moths) and Tortricidae (Tortrix moths), which account for almost half (48%) of all identified species. The same number of butterfly species, 6.4% of the total, are representative of the family Pyralidae (snout moth) and Nymphalidae (Nymphalidae). Family Geometridae (Geometrid moths) and Sphingidae (Sphingidae) are 10 and 7 species, representing respectively 5.8 and 4.5%.Species of other families in the list have a small proportion of Lepidoptera: Arctiidae (Arctiidae) - 4 types (2,6%), Pterophoridae (Plume moths), Pieridae (Pieridae), Satyridae (saturines), Lycaenidae (Lycaenidae) -on 3 species (to 1,9%), Tischeriidae (Tischerioidea) Depressariidae (Depressariinae), Gelechiidae (Gelechiid moths), Pyraustidae (Pyraustidae), Crambidae (Grass moths), Papilionidae (Papilioninae) 2 species (to 1,3%), Hepialidae (Swft moths) Opostegidae (Opostegidae), Adelidae (Fairy longhorn moths), Ochsenheimeridae (Ochsenheimeridae), Yponomeutidae (Ermine moths), Plutellidae (Plutellid moths), Lyonetiidae (Lyonetiidmoths), Scythrydae (Scythrydmoths), Momphidae (Mompha moths), Blastobasidae (Blastobasidae), Drepanidae (Drepanidae), Phycitidae (Phycitidae), Attacidae (Saturniidae), Lymantriidae (Lymantriidae), Ctenuchidae (Wasp moths), Hesperiidae (Skippers) - 1 of the form (to 0.64%).

Analysis of trophic caterpillar relationships showed thedominated number of species polifahy. The group amounted to 96 Lepidoptera species (61.5%). Most of them grew in meadows, appearing in the greenbelts and the perennial legumes. Among the pests of agricultural crops there were 32 species. The remaining oneshad economic importance. The vast majority of Lepidoptera species feed on plants that have no agricultural value.

In conclusion, all examined biocenoses were scoop gamma (Autographa gamma L.) and the exclamation scoop (Agrotis exclamationis L.). Agrocenoses occupancy of cabbage scoops (Mamestra brassica L.), painted lady (Vanessa cardui L.) and meadow butterfly (Margaritia sticticalis L.) was also high. For several years seeds of pea moth (Etiella zinckenella Tr.) were largely damaged. In 2012 on the experimental field of BNAU 98.3% of pea seeds, harvested from the areas (where chemical method was not applied) were damaged by moth larvae. It was identified that Papilio machaon L., Iphiclides podalirius L. and Catocala fraxini L. Callimorpha quadripunctata Poda had been listed in the Red Book of Ukraine (2009).

Key words: Lepidoptera, butterflies, biocenosis, agrocenoses, larvae.

The influence of weed infestation and fusarium wilt upon marigold sowing in the south West part of Steppe

S. Suchar

It was established that during budding, for various optical and biological structures of crops, marigold (calendula as medicinal plant) competed unequally with weeds for light, water and nourishment. Thus, the distance between plants in a row within 20 cm, was found in crops of 20 to 35 pcs. / m2 of annual weeds, their weight varied from 10,2 to 17,9 g/m^2. It was found 2-4 pcs. / m^2 of perennial weeds sand their weight was 4,3-8,6 g/m^2.

By reducing the distance between plants in the row planting of medicinal calendula had higher density, thereby reducing the number and weight of weeds. Thus, it was found from 14 to 24 pcs. /m^2 of annual weeds with weight from 7,1 to 12,2 g/m^2 when the distance between plants in a row was within 10 cm of sowing. The number and weight of perennial weeds were from 2 pcs./m^2 to 4,3 g/m^2.

The most noticeable weed infestation indicator varied depending on sowing time. Thus, by planting in the first period, the number of annual weeds per 1 m2 was 14-23 pcs., and weight – 7,11-11,7 g. At sowing culture in the second period, the number of annual weeds grew to 16-27 pcs., and weight to 8,2-13,8 g/m^2. It was observed the biggest quantity and weight of annual weeds – 21-35 pcs., and 10,7-17,9 g in the second sowing.

Consequently, it was found that in the later terms of sowing crop of marigold with annual weeds growing reached to 4-11 pcs./m^2. Weed-infested indicators of crops were decreased by 6-21 pcs./m^2 reducing the distance between plants in the row and row spacing to 30 cm.

Besides weeds, diseases caused significant damage to marigold growth. According to scientists, in Ukraine the most common diseases of this medicinal plant are mildew (Erysiphe communis), fusarium wilting (Fusarium), and tserkosporoz and peronosporoz. To prevent the development of these diseases, the authors recommend: to put into effect crop rotation and cultivation farming; to destroy the impressed remains of plants; to sow healthy seeds.

Thus, in the period of sprouts, the lowest prevalence of the disease – 6% and the degree of affect by plants – 12% was observed in the second sowing, while the first term variations of these values were on average 12 and 16%.

In the budding marigold phase for sowing in the first and second periods, the prevalence of the disease was 7 and 12%, and impressed plants – 14 and 19%. These data suggest the spread of diseases in crops. Moderately cold weather with plenty of moisture affected sprouts of medicinal calendula. As a result of field observations and records it was found that fusarium wilt can affect not only the root system of sprouts, primordial leaves and root collar of young plants, but often the disease can spread from sick to healthy plants through the transfer of infectious agents, affecting leaves and buds on later stages of growth and development.

Thus, sowing crops for the first time, the percentage of fusarium wilt infected plants of marigold in full blooming phase increased by an average of 5 points - regardless of the distance between plants. The degree of plant infestation increased by 3% compared with the corresponding figures in the previous phase of plant growth and development.

The range of fusarium wilt disease in crops of medicinal calendula continued to the end of the growing season. It was revealed the same trends.

Key words: marigold as medicinal plant, lines of sowing, methods of sowing, weeds, fusarium wilt desease.

The hydrophytic purificatoin of sewage water in Zhytomyr region biological ponds

L. Romanchuk, T. Vasylyuk, V. Pazych

The paper deals with the correlation between the quantity of indicator species in Zhytomyr oblast major rivers and their hydrochemical parameters. The water hyacints plants proved best developed in the sewage waters of Zhytoymrvodokanal municipal enterprise one can observe the improvement of all qualitative characteristics of water as concerns the biochemical indices - pH, alkalinity, total iron, phosphates, suspended substances, ChCO and BCO. Thus, the use of water hyacints in biological ponds of preliminary purification of sewage water proves efficient. The biochemical phytomass composition differs considerably in the various parts of the plants. In particular, more pollutants are observed in the plants root system which is in direct contact with sewage waters.

The work purpose was to determine the floristic and ecological features of indicator species composition of macrophytes and their ability to transform pollutants of natural and anthropogenic origin in order to phitomelioration water objects Zhytomyr region.

The research model was to built units for sewage treatment laboratory tests. These units allow the cleaning process periodically culturing organisms. In experimental units filled with water, brought to the station first ascent *of Zhytoymrvodokanal municipal enterprise* and waste water entering the treatment plant *of Zhytoymrvodokanal municipal enterprise*

Wastewater in the inlet rate was sharp putrid smell, *BCO* ranged from 300 to 400 mg O2 / l, suspended particles - 3500-4000 mg / dm³. In the samples output from all ponds *BCO* 5,*ChCO* and suspended particles decreased to 400-500 mg / dm³, 150-200 mg / dm³, 90-100 mg / dm³ respectively, in samples of all the options after week was no putrid odor, content of suspended substances was reduced to 100 mg / dm³, *BCO* 5 was 20 mg/dm³, there were traces of dissolved oxygen.

The research found that the best development in wastewaters of *Zhytoymrvodokanal municipal enterprise* received the third *biological ponds* plants, in which grow only plants of eychornya crassipes, so further research of fitomelioration functions of higher aquatic plants we conducted rehearsal of dynamics of water quality biochemical indicators.

When loading wastewater it was controlled under which conditions putrid (Dz) should be characterized with ball smell V. After one week in *biological ponds* odor decreased by two points. At the end of the month odor characterized as a weak mark II.

At the time of wastewater loading in the *biological ponds* they could be described as very muddy, till the end of the experiment the water was improved.

During the period of the experiment there was a trend to increasing pH, particularly in the early experiment pH went beyond the permissible 6,14-6,20. Within a week of cultivation of aquatic organisms in wastewater pH began to shift to the right and at the finish of experiment the challenges that exist for the composition and properties of water reservoirs of drinking water points (6,69-6,74). The concentration of nitrate tended to significant fluctuations, the general trend of mineral nitrogen reduction is generally not observed, which is typical for biological treatment plants. Throughout the study period fluctuations sulfate concentration was within 10%, indicating the reliability of the research, chloride content tended to minor fluctuations during the period of sinusoidal type research, however, significant deviations from the initial content was observed. In all studied variants decreased total iron concentration by an average of 44.36%. The concentration of suspended solids during the experiment decreased 6.3 times. During the first week of the experiment indicator *BCO* 5 dropped to 5 times. Also there was analyzed the biochemical composition of aquatic plant matter that were used in the purification of wastewater. Biochemical composition of phytomass varies considerably in different parts of plants, as monitored composition of surface and underwater plant parts. Phytomass of eychhornif is characterized by a high content of nitrogen, fat, mineral elements. It was established that the root system of plants eychhornia directly in contact with sewage, accumulates in 2-10 times more heavy metals than the ground phytomass. This indicates the intense water thanks progress to powerfully developed root system of the plant species.

Key words: aquatic plants, sewage waters, biological ponds, purification, pollution.

Segregation features in apomictic tobacco A1

O. Savina, M. Hlyudzyk

Based on diallelic crosses we obtained 36 combinations, which highlighted the best high heterosis effect. We analyzed segregation of the best forms released from heterosis by fixing them through apomixis and by abnormality use for further breeding.

The best hybrid combinations from crosses of 4-5 *N. alata* F1 plants were subjected to apomixis and their seeds were sown for further A1 analysis and compared with the parent forms F1.

Apomictic A1 9/10 Burley / Burley 7 / *N. alata* showed apomictic segregation. We obtained 24.7% of apomictic hybrid plants with similar level of morphological feature display as in their parent form (10 plants), planted on the same plot. Other plants with different abnormality expression in excessive or decreased productivity were amphimictic. Among these plants 3.2% were regarded as mutants with high performance, especially plants that exceed maternal by abnormal color (dark green or light yellow leaf with dense venation). 15.3% of amphimictic plants were diseased or of poor quality and they were immediately removed from plot. Less productive dwarf plants accounted 56.8%. The apomictic plants were isolated and their flowers underwent castration to produce seeds to test generation A2, in which constancy of quantitative traits was observed.

The segregation in apomictic A1 Pologi Shargo/Spectr/*N. alata* was estimated. 25.6% of plants found similar to the parent form with apomixis. Amphimictes comprised 74.4%. This combination expressed only 1.8% mutants with only slightly higher rates of productivity without abnormalities in micro-features and in flower. 25% of the plants were affected by diseases (bronze of tomato, clorosis, etc.). Plants with poor productivity accounted 47.6%. This hybrid is less interesting for breeding as it manifested poor qualities.

Apomictic segregation of A1 Zhovtolysty 36/Berley 9/10/*N. alata* resulted in the findings of high percentage (73.3%) of apomictic plants. The amphimictic set comprised 26.7%. The share of mutants accounted 4.9% of plants with very distinctive micro-features of white colored leaf, high leaf matter and dense canopy with large inflorescences in contrast to the parent form, with sprawling inflorescence. This hybrid is a valuable for further multiplication and fixation through apomixis. Mutants will be in place of the parent form. This hybrid provided 23.9% of plants with maternal characteristics and 76.1% of plants were amphimictic. Deviations from the parent form towards improving of plant quality amounted to 3.8% plant without canopy or flowers abnormalities, which might be prospective for breeding.

Thus, 27.5% of the observed plants were of parent-type and 72.5% of them were amphimictic. In this case, a very interesting type was abnormal dense canopy, some plant height reached 2 m, some plants possess abnormal flowers (stamen sprouted a pink leaf and flower corolla separations, especially, in central).

We devoted special attention here to the abnormal expression of traits and some plant forms were secured through apomixis for further selection process.

Splitting in apomictic A1 Burley 9/10/Spectrum/*N. alata* resulted in expression of mutations as dense venation, white central vein, white stems, large flowers and very sprawling inflorescence. There were no abnormalities in flowers. As a result of the analysis of specific segregation in A1 forms, we noted that each hybrid combination had its specific segregation pattern and there were no correlations in feature expression pattern as it was observed in the second hybrid generation.

Thus, we obtained the best hybrid combinations (Burley 9/10 / Spectrum / *N.alata*, Spectrum / Burley 9/10 / *N.alata* and Zhovtolystnyy 36 / Burley 9/10 / *N.alata*). They contained high percentage of apomictic plants with confirmed morphological mutations. This allowed us to expand the material source for breeding of tobacco through fixing these deviations by apomixis.

Key words: tobacco, varieties, apomixis, segregation, fixation of heterosis.

Soil cultivation systems and fertilizer levels in fluence on its biological activity under winter wheat

A. Pavlichenko, O. Bondarenko, S. Vachniy

Microorganisms are of great importance in soil fertility improving. Their activity determines accumulation of humus in the soil, mineralization of organic matter and transformation in hard to

reach compounds that available for plant form. According to approximate estimates, the soil microorganisms absorb from the air about 100 million tons of nitrogen, phosphorus and potassiuma year, improve plant nutrition. They secrete various physiologically active substances - auxin, gibberellin, vitamins, plant growth and development improves.

In natural conditions, the main source of replenishment of soil nitrogen is biological fixation of molecular nitrogen atmosphere. With intensive technology of cultivation of crops fully recover the cost of nitrogen is only possible by applying fertilizers, biological nitrogen fixation but should not be overlooked. It is known that biologically fixed nitrogen meets the needs of 20-30% of the crop in easily digestible forms of this element.

Soil microorganisms as a mandatory component of agrocenosisand have powerful enzymatic apparatus which makes it possible for microflora to carry out various functions in the soil. Plants are supplied in sufficient quantity of nutrients by mineral and organic fertilizing. However fertilizers can not only enhance but also inhibit the microbiological processes, including biological nitrogen fixation.

Studies were conducted in a stationary experimental fieldof BilaTserkva State Agrarian University during 2009-2013. 5-fields crops rotation is deployed in space and time with 40% saturation of cereals. We studied four basic soil tillage systems and four levels of fertilization.

In our studies, the biological activity of the soil assessment we spent on investigating intensity of decomposition in soil of linen fabric and the number of selected carbon dioxide. It is known that carbon dioxide is the ultimate product of organic matter mineralization and therefore respiration rate (of carbon dioxide) may serve as an indicator of biological activity of the soil.

Under winter wheat the highest biological activity of soil is marked by systematic notillage soil cultivation, the lowest – in a systematic tillage. From 15 September to 15 October and from 15 April to 15 May reduce of weight of linen fabric in the plow layer of black soil was respectively: by the systematic cultivation tillage -16.7 and 15.8% -18.4 bezpolytsevoho systematic and 17.9, differentiated -17.0 and 16.3 and a long shallow -17.1 and 16.4%.

The difference in the amount of carbon dioxide that was isolated during the day, during this period amounted to: the systematic cultivation no tillage - 454.3 and 695.9 mg /m^2 differentiated - 41.5 and 99.1 and for a long shallow - 52.7 and 142.5 mg/m^2 for systematic tillage soil cultivation in crop rotation.

The obtained data are consistent with your L.M. Barsukov, K.M. Zabavskoyi, V.R.Williams, I.B. Revut conclusions that in the lower layers, even at very high structuring of soil biological processes take place at a relatively low level.

These layers of soil are biologically less active, especially by flat tillage soil cultivation which means the slower conversion of organic matter and the formation of available nutrients for plants.

Great importance in biological activity of the soil regulating is belonging to cultivation systems. Higher soil biological activity was observed in the rotation by the no tillagesystem than the combined long and shallow. This indicator was the lowest by the tillagesystematic cultivation.

Thus, for the period (from 15 September to 30 October and from 15 April to 15 May) by the control system of cultivation the maximum biological activity of the soil was observed in the 0-10 cm layer, which earned the fertilizer and stubble, and in the 10-20, 20-30 cm layers the biological activity is decreased.

For combined long and shallow cultivation is observed the similar tendency. The highest biological activity of the 0-10 cm soil layer is clamped by the no tillagesystematic cultivation.

Key words: soil tillage, fertilizationlevel, biological activity of the soil, winter wheat.

Evolution of garlic sorts resistance to the pathogen Fusarium rot (Fusarium equiseti) and grey-green mold (Penicillium expansum) at Ukrainian Polissya region

V. Polozhenets, T. Ganco

Cultural Garlic (Allium sativum L.) belongs to the family of onion (Alliaseae), onion type (Allium L.). Garlic is one of the ancient vegetable crops. The first evidence of it related to the time of ancient Egypt. Garlic, as well as other cultures in the process of growing is affected by many diseases. The research resulted in stating that grey-green mold and fusariose rot are the most common and dangerous garlic diseases. Pathogens of fusariose rot (Fusarium equiseti) and grey-green mold (Penicillium expansum) were isolated from infected garlic bulbs. They were identified and specified. Spread and harmfulness of fungal diseases of plant material researched during storage on different resistant varieties. Studied the sources and pathways of garlic diseases. Pathogens Fusarium rot and grey-green mold usually appear when storing garlic harvest. Therefore, much attention has been given to researching dissemination of fungi of the genus Fusarium and Penicillium during this period.

Fungi of the genus Penicillium are grey-green mold pathogens. The disease occurs during transportation and storage. At the beginning of the disease some garlic cloves become flabby with light yellow spots.

At the beginning brown watery stains appear on garlic, later it gets covered with blue-green coating. If you cut, the affected plants may have grey-brown spots inside. The disease comes out in two months after garlic storage. In dry conditions it mummifies.

It is known that Fusarium rot of garlic – is a disease well-known in many countries – in Japan, Egypt, Bulgaria, Korea, India, Mexico, Hungary, Spain, Argentina, Italy, Germany, USA, Poland and Georgia. Fusariose rot is caused by fungi of the genus Fusarium Link. Fusariose rot can be found on garlic vegetative plants during harvesting and storage. The disease is characterized by wilting, yellowing and dying leaves. Garlic plant material and soil are the main sources of fusariose rot infection. During storage, affected bulbs are soften, darken and get white coating. In a few days garlic rots off. In most cases fusariose rot occurs at +25 °C. Some authors believe that the most favorable temperature for the development of Fusarium is 15.5 ... 21 °C, but the disease can occur also at t + 35 °C. Nebulishvili E.O. believes that the incubation period in laboratory conditions (t + 20-25 °C) is 3-4 days, and in the soil - from 8 to 18 days.

Our results suggest that the spread of pathogens during storage of garlic occurs while healthy follicles are in direct contact with infected ones.

As a result of our research, we used two different resistant garlic varieties: relatively resistant Lyubasha and receptive Dushess. On average during the years of experimentation on the Duchess varieties susceptible to disease lesion was quite common, but most lesions in the ratio of healthy and sick follicles 1:15.

On varieties Lyubasha found the greatest degree of damage in plants with a ratio of healthy and sick 1:15 bulbs, on average, 43.3%.

As a result of research on the establishment of species belonging pathogens Fusarium rot and grey-green mold can be concluded that the disease caused by fungi of the genus Penicillium and Fusarium, Penicillium expansum and Fusarium equiseti.

Further research should focus on the study of biological and chemical measures to protect against diseases of garlic.

Key words: exciter, culture, garlic, desease, harmfulness.

^{137}Cs and ^{90}Sr content in vegetable products harvested in farm gardens in III and IV radioactive contamination zones villages of the Central Forest-Steppe of Ukraine

V. Gerasymenko, O. Rozputnyi, V. Skyba

Despite the time that has passed since the Chernobyl disaster , the problem of radioactive contamination is quite important. Now the remaining 6.7 million hectares of contaminated territories of Ukraine, including 1.2 million hectares of land contaminated with ^{137}Cs density from 37 to 555 kBq / m2 (1-15 Ci / km2). In radiation contaminated territories located 2161 settlement,

where about 3 million inhabitants. For residents of rural areas , the bulk of food accounts for products derived from farmlands, so the definition of plant products contamination by artificial radionuclides ^{137}Cs and ^{90}Sr in these areas is crucial as the internal dose will be formed due to consumption of products grown on gardens. Minimizing the transfer of radionuclides ^{137}Cs and ^{90}Sr from soil in crop production - one of the main tasks of farming in contaminated areas [4]. Since the Chernobyl disaster prominent scientists (Priester, 2011; Grodzinsky, 2011; Gudkov, 2009; Kashparov, Lazarev, 2011; Furdychko , Kuchma Chobotko, 2011; Lihtarov, 2012 , etc.) have conducted a large number of scientific studies on the migration of ^{137}Cs and ^{90}Sr in agricultural production facilities, their accumulation in food production and assessment of doses to man. The scholars focused on the Polissya are. In most cases, the migration of ^{137}Cs and ^{90}Sr was studied in separate layers and systems of the food chain. In addition, more attention is paid to ^{137}Cs. Besides, the radioactively contaminated areas forest-steppe significant proportion of pollution falls and ^{90}Sr, the intensity of migration which, according to scientists, will gradually increase. This also led to the need to study the state of migration of ^{137}Cs and ^{90}Sr trophic chain "soil - plant" farms and gardens central steppe zone. The aim of our study was to determine the contamination of ^{137}Cs and ^{90}Sr vegetable produce grown in rural areas 3-4 of radioactive contamination of the central steppe of Ukraine. The research area is Bila Tserkva area in the north- eastern part of the Right Bank Forest-Steppe of Ukraine and are mostly typical black soil humus on leash within interriver plains. To fulfill this goal there were conducted sampling of plant products and soil in the gardens of the rural farms in Yosypivka and Tarasivka of Bila Tserkva area, Kyiv region according to the conventional methods [3]. The main vegetable crops that were grown in the gardens were potatoe, cabbage, beet, carrot, onions, tomatoes, cucumbers, zucchini, pepper and radish . The results of the research activity of ^{137}Cs and ^{90}Sr in vegetable crops and their conversion ratios on private land Yosypivka village presented in Table 1, and those of the Tarasivka village – in Table 2. As it was mentioned above, the accumulation of ^{137}Cs and ^{90}Sr by plants depends on the characteristics of mineral nutrition. Yes, vegetable crops , which contain a lot of potassium , accumulate more radioactive cesium , and cultures that contain a lot of calcium, accumulating more radioactive strontium. TF values of ^{137}Cs and ^{90}Sr from soil to vegetable crops grown in home gardens with Tarasivka almost the same as that of the village Osipovka constitute ^{137}Cs – from 0.01 to 0.09 and ^{90}Sr - from 0.01 to 030 (tab. 2). This is because the soil in gardens these settlements make up the typical black with medium humus content (3.2 - 3.6 %), neutral reaction medium aqueous extract (6.80 - 7.72), density soil 1.18 - 1.25 g / sm^3, the average content of exchange potassium (82 - 120 mg/kg) and calcium (15 - 20 mg-ekv/100g). Table 2 shows that the lowest conversion factor of ^{137}Cs in potatoes, onions and cucumbers (0.01). In cabbage, zucchini and sweet pepper conversion factor twice as high (0.02) , and the carrots and tomatoes - three times as high (0.03), the beets – 5 times, radish – 6 and beans – 9 times higher. The lowest conversion factor of ^{90}Sr in onions (0.01), the tomatoes and cucumbers it twice as high (0.02), the pepper – 4 times higher (0.04), potatoes and cabbage - 9 times higher (0.09), and table beet , carrot, radish and beans – at 26 - 30 times higher. The presence of radionuclide contamination of plant products is 28 years after the Chernobyl accident shows that the problem of control and study and prediction of radionuclides in products today is important. The results show that the studied plant products not exceeding DR - 2006 and suitable for use. However, it should be noted that the results of studies indicating the presence of artificial radionuclides 137Cs and 90Sr, which naturally did not previously exist, and therefore requires monitoring their migration in agroecosystems. We have established transfer factors of 137Cs and 90Sr from soil (including typical chernozem) in vegetable production which will further help to predict contamination by these radionuclides products in radioactively contaminated areas of the Central Forest. The presence of radionuclide contamination of plant products is 28 years after the Chernobyl accident shows that the problem of control and study and prediction of radionuclides in products today is still important.

Key words: radionuclides ^{137}Cs and ^{90}Sr, contamination density, transfer factors.

The new winter wheat sorts adaptation to climate changes in different soil and climatic zones

V. Hahula

The productivity level, new-registered winter wheat genetic potential have been investigated; there have been organized their grouping by the growing conditions type requirements. A complementary sorts system implementation for different management levels has been suggested. The subdivisions, micro areas, geographic points at which it is advisable to place new-registered winter wheat sorts have been defined.

It has been established, that the creation and plant resources efficient use is one of the most important, most effective and cost-effective ways to improve productivity and to increase crop production as a crucial condition to supply Ukrainian people with food and food security.

To maximize the winter wheat productivity potential it is important not only to optimize conditions for plant growth and development, by selecting predecessors in the rotation, plant nutrition provision based on their soil content, making fractional nitrogen fertilizer during the growing season of the growth phases and organogenesis stages; integrated plant protection application from weeds, pests and diseases, but to provide science-based selection and certain varieties placement in narrow soil-climatic zones, subzones, micro areas as well.

It is known that climate change, as well as such factors as light, heat, moisture, air, soil, surrounding organisms and many others, the environment that surrounds the plant world, are able to exert a direct or indirect impact on plant organisms, have different impact on their growth, development and viability, productivity and product quality. In their turn, different varieties react differently to certain environmental factors.

The research aim – to study the impact of the impact study of the weather and climate conditions changes as the winter wheat placement adaptive factor in the agro-climatic zones, subzones and micro areas for the micro breeding and genetic potential performance implementation and adaptive properties by selecting predecessors in the rotation.

Research methods. The study was conducted during 2011-2014, in the research assistants' fields of different agro-climatic zones plant sorts' rotation examination and in Bila Tserkva National Agrarian University experimental field by state examination methodologies and grains, cereals and legumes testing.

Results and discussions. The sorts investigated in 2011-2014 were characterized by grain productivity significant differences; depending on the sort and micro area, the yield varied in the steppe zone from 26.5 in the Kherson center to 77.8 in the Nikopol sorts station, in the forest steppe zone it varied from 21.2 in Khmelnytskyy expertise center to 98.6 in the Mankivska sorts station; in the Polissya zone it varied from 29.6 in the Pryluky zone to 81.5 kg / ha in Andrushivska sorts station. At Bila Tserkva National Agrarian University experimental field it varied to 74.4 kg / ha. The studied sorts average yield for four years in the steppe zone was 51.3; in the Forest-Steppe zone it was 61.6; in the Polissya zone it was 55,1ts / ha.

Key words: variety, adaptation, soil and climatic zone, subzone, micro area, yield, productivity potential.

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