

ABSTRACT&REFERENCES

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CHANGE OF SPATIAL DISTRIBUTION IN THE ICHTHOCENOSIS OF THE SHABOLAT ESTUARY IN THE PROCESS OF ITS ANTHROPOGENIC TRANSFORMATION

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Consequences of Shabolat estuary natural ecosystems transformation under the influence of anthropogenic factors are reflected in the composition of ichthyocenosis, changes in the basic population characteristics of the most mass species.

The purpose of the work was to find out the spatial distribution of the Shabolat estuary most massive representatives of the ichthyocenosis in terms of its anthropogenic transformation.

Material and methods. The material for the study was selected from industrial fishing gear in the spring, summer and autumn periods of 2009–2012. A complete biological analysis of fish (goby round, goby grass, flounder, flounder, mullet pilengas, etc.) was carried out according to the conventional method.

Result. The regularities of formation of ichthyocenosis largest masses populations were studied depending on: water salinity, connection with adjacent water areas, fish acclimatization and introduction, anthropogenic loading and peculiarities of spatial distribution of ichthyocenosis largest masses populations in aquatics.

The most important Shabolat estuary ichthyocomplex components include representatives of the Gobiidae family, the *Platichthys luscus* population and the mullet family representatives.

Of particular interest to the members of the goby family are the mass species of gobies: the round goby *Neogobius melanostomus* and the grass goby *Zosterisessor ophiocephalus*, which are able to hibernate and reproduce in the estuary. This is an important link in the food chains of the reservoir. By entering into competition with other representatives of ichthyocenosis, they significantly affect the state of the forage base and production capacity of the estuary.

Representatives of the mullet family and gloss flounder are distributed in the estuary deep water areas and in areas with maximum salinity.

Conclusions. It has been established, that in the conditions of anthropogenic transformation of the estuary, in the last 35–40 years, the round goby and grass goby numbers and distribution range have decreased. In bulk, they have survived only in reservoir small, local areas, due to the deterioration of reproduction conditions and the degradation of the zoster and reddest associations. The main reasons for the decline in the size and distribution range of gobies in the Shabolatsky estuary was their mass death as a result of a large-scale environmental catastrophe and reproduction conditions deterioration. The reason for the significant decrease in the flounder and mullet number and distribution range was the mass death in 1992, as well as changes in the salinity of the Shabolat estuary

Keywords: Shabolatsky estuary, formation of ichthyocenosis, gobies, mullets, flounder, population, water area, spatial distribution, anthropogenic transformation, bay

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INFLUENCE OF ARTIFICIAL INOCULATION BY STRAINS OF PHYTOPATHOGENIC MICROORGANISMS ISOLATED FROM DIFFERENT SOURCES ON PHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS OF *GALEGA ORIENTALIS* PLANTS

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Aim. To evaluate changes in the physiological and bio-

chemical parameters of *Galega orientalis* plants by the influence of artificial inoculation by phytopathogenic microorganisms, that have been isolated from various sources: strains of phytoplasmas – *Acholeplasma laidlawii* var *granulum* 118, isolated from wheat and *Acholeplasma laidlawii* 101 and 178, isolated from tomato and bacterial strain – *P. syringae* pv. *atrofaciens* D13, which have been isolated from wheat.

Methods. Microbiological methods – cultivation in the liquid nutrient medium, isolation of phytopathogenic microorganisms from plant material and artificial inoculation of experimental plants (subepidermal injection); biochemical – for the purpose of determination of photosynthetic pigments – chlorophylls a and b and carotenoids and activity of antioxidant enzymes catalase and peroxidase; photochemical – method of chlorophyll a fluorescence inducing to determine the photochemical activity of leaves; biometric – to determine the area of the root system and the number of nodules on the roots; statistical.

Results of research. In field experiments on the crops of the Fodder *Galega* under the conditions of artificial infection with strains of phytopathogenic microorganisms of different taxonomic groups – *A. laidlawii* var. *granulum* 118 and *P. syringae* pv. *atrofaciens* D13 (both isolated from wheat) and strains – *A. laidlawii* 101 and 178, isolated from tomatoes, the following changes were observed in the physiological and biochemical parameters of *Galega orientalis* plants: reduction of chlorophyll a and b content with increasing carotenoid content and inhibition of quantitative efficiency of PSII, especially in mixed *A. laidlawii* var. *granulum* 118 and *P. syringae* pv. *atrofaciens* D13, which was accompanied by a decrease in the area of the root system and the number of nodules on the roots of the plants. It was found, that the highest total activity of tissue *Galega orientalis* oxidase reductases – catalase and peroxidase was observed at inoculation with strains, isolated from wheat. The crude protein content of goat leaves was found to be lower at inoculation with strains, isolated from wheat than at inoculation with strains, isolated from tomatoes.

Conclusions. 1. By artificial inoculation, all investigated strains of pathogens revealed a decrease in the content of chlorophyll a and b, but most significantly – phytoplasma content of chlorophyll a has been decreased. The carotenoid content increased with respect to intact plants at inoculation of plants with phytopathogenic strains in the following consistency: 101+118>118>118+D13>178.

2. It was found, that at inoculation of *Galega orientalis* with phytopathogenic strains, isolated from wheat: inoculation with phytoplasma (monoinoculation) and especially – mix of strains: phytoplasma and bacterial, along with a decrease in the quantitative efficiency of PSII, an induction coefficient increased, which is probably caused by an increase in photorespiration or the acceptor action of phytopathogens.

3. It was found, that the highest total activity of *Galega*

orientalis leaf catalase and peroxidase was observed at inoculation with strains, isolated from wheat – phytoplasma (monoinoculation) and mix of inoculation – phytoplasma and bacterial strains.

4. *Suppression of the functional activity of the leaves for the destruction of the pigment-protein complexes of PS II at inoculation of phytopathogenic strains led to morphological changes – significant decrease in the area of the root system and the number of nodules: phytoplasma (monoinoculation) and mix phytoplasma and bacterial strains.*

5. *It was shown, that at inoculation with phytopathogenic strains, isolated from wheat: phytoplasma and bacterial inoculation mix and especially – the mono-inoculation of phytoplasma, the crude protein content in the leaves was less than the monoinoculation phytoplasma strain, isolated from tomatoes (178) and at mix inoculation phytoplasma strain, isolated from tomatoes and wheat (101+118)*

Keywords: *Triticum aestivum, spring wheat, catalase, peroxidase, nodules, chlorophyll, carotenoids, A. laidlawii, P. syringae pv. atrofaciens, chlorophyll a fluorescence induction*

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COMPARATIVE ASSESSMENT OF METHODS FOR EVALUATION OF DROUGHT TOLERANCE IN WINTER BREAD WHEAT VARIETIES

p. 17-21

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The aim of the work was to estimate the drought tolerance of winter bread wheat varieties by the laboratory method and in vitro culture and to compare the obtained results.

Materials and methods. The object of research was winter bread wheat varieties of various ecological and geographical origins. In the work methods of tissue and organ in vitro culture, in vitro selection, laboratory and statistical data analysis were applied. The resistance to water deficit of 15 wheat varieties was studied by seed germination in the osmotic solution and the proportion of living calli on a selective medium with mannitol.

Results. The winter bread wheat varieties, created in various ecological zones, were screened for drought tolerance and sources of tolerance to water deficit were identified. The genotypic reaction to osmotic stress of the varieties was manifested by different proportions of viable calli and different percentage of germinated seeds under the action of the stress factor. It was established, that the Balada Myronivska and Gorlytsya Myronivska varieties were characterized by the highest tolerance to water deficit, in which the percentage of seed germination and callus survival on media with osmotic was the highest. The Ovidii and Wenzell varieties turned out to be the most sensitive to the action of water deficit, because under selective conditions they had the lowest tolerance to the osmotic stress. A reliable correlation was revealed ($r=0.86$) between the drought tolerance indices, obtained by the laboratory method and in vitro. A method for assessing the drought tolerance of wheat genotypes has been developed and patented, which will contribute to the creation of new varieties with valuable practical properties.

Conclusions. The tolerance indices, obtained at various levels of organization (cells, seedlings), basically coincided for the majority of the studied varieties; therefore, in vitro and laboratory assessment methods can be used to evaluate breeding material. The possibility of using selective systems with mannitol for screening wheat genotypes for tolerance to water deficit is shown. The Balada Myronivska and Gorlytsya Myronivska varieties can be a valuable source material for further selection of wheat

Keywords: winter bread wheat, water deficit, callus culture, seeds, mannitol, tolerance

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ANALYSIS OF FREQUENCIES OF 21 AUTOSOMIC MICROSATELLITE LOCI IN POPULATIONS OF THE CITIES OF KIEV, ODESSA, KHARKOV, DNIPRO AND WESTERN UKRAINE

p. 22-34

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Autosomal STR-loci are currently the most used tool in forensic genetics. The allele frequencies of STR loci are used to calculate the probability of random coincidence of DNA profiles for identifying individuals and to calculate likelihood of kinship.

The aim of the research was to investigate the polymorphism of 21 criminally significant STR-loci in mixed populations of Kiev, Odessa, Kharkov, Dnipro and Western Ukraine.

Materials and methods. The reference sample consists of 1200 unrelated persons. Genomic DNA was isolated from buccal epithelial cells using a Chelex[®]100 ion exchange resin. The isolated DNA was typed using the polymerase chain reaction method at the 21 autosomal loci that make up the GlobalFiler[™] Express PCR Amplification Kit. PCR products were electrophoretically fractionated using the SeqStudio[™] Genetic Analyzer System. Allele sizes were analyzed using GeneMapper 6 software. The allele frequencies were compared between populations.

Results. Population genetic data for 21 STR loci were included in the GlobalFiler[™] Express system (D8S1179, D21S11, D7S820, CSF1PO, D3S1358, TH01, D13S317, D16S539, vWA, TPOX, D18S51, D5S818, FGA, D2S4433, D19S4231, 1919, D10S1248, D1S1656, D2S1338, D12S391). The expected and observed heterozygosity, matching probability, power or discrimination, power of exclusion, polymorphic information content were calculated. The correspondence of the observed distribution of genotypes of Hardy-Weinberg equilibrium was determined.

Findings. High informativeness of the studied individualizing system of 21 autosomal STR loci was shown. SE33 locus was first analyzed, which turned out to be the most hypervariable. Differences in the frequencies of alleles of STR loci between populations were noted

Keywords: autosomal STR loci, microsatellites, genetic diversity, DNA personal identification, allele frequencies

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PECULIARITIES OF THE ANATOMIC STRUCTURE OF VEGETABLE ORGANS AND PRODUCTIVITY OF LINSEED PLANTS (*Linum usitatissimum* L.) UNDER THE APPLICATION OF THE GROWTH STIMULANT

p. 35-40

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The activity of growth processes in a plant organism is determined not only by the content of individual groups of phytohormones, but is predominantly determined by the balance of biologically active substances. Exogenous applying of compositions with phytohormone analogues or activity regulators influences on the metabolism processes and leads to changes in growth processes.

The purpose of the research was to investigate the peculiarities of the anatomical structure of vegetative organs and the formation of the linseed yield under the influence of a complex stimulating drug treptolem.

Materials and methods. Oil flax plants of 'Debut' variety were once treated with 0.03 ml/l water solution treptolem in the budding phase. Morphological parameters of flax plants were studied every 10 days. The anatomical structure of the vegetative organs of flax was studied on leaves of the same age and fragments of the stem in the middle part.

Results. There has been established the effect of the growth stimulator with auxin, gibberellin, cytokinin compounds complex on the features of growth processes, anatomical organization of vegetative organs, productivity of linseed oil plants (*Linum usitatissimum* L.). The using of treptolem during the budding period leads to an increase in the productivity of linseed oil by the increasing of morphogenesis process of vegetative organs with simultaneous restructuring of anatomical structure of stems and leaves. The increase in the stem diameter due to the better development of bark, xylem, thickening of bast fibres enhances the resistance of linseed oil plants to lodging. Stimulator induces enhanced the development of the photosynthetic apparatus: formation of a larger number of leaves, prolongation of their active functioning, increasing of chlorenchyma cells size and improving of chloroplastogenesis. The enhancement of photosynthetic productivity of oil flax plants leads to an intensification of carpogenesis, an increase in yield and an improvement in the crop structure. The content of the residual amount of morphoregulators in the seeds is much lower, at acceptable concentrations.

Conclusions. The use of treptolem on flaxseed plants leads to changes in the formation of the stem and the development of the leaf apparatus that increases the yield of the crop

Keywords: *Linum usitatissimum* L.; growth stimulators; morphogenesis; productivity, crop structure

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THE INFLUENCE OF ANTIGIBBERELLIN PREPARATIONS ON THE ACCUMULATION AND REDISTRIBUTION OF DIFFERENT FORMS OF CARBOHYDRATES IN POTATO PLANTS

p. 41-47

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The aim of the study was to determine the effects of antigibberellin preparations with different mechanisms of action on growth processes, leaf apparatus, accumulation and redistribution of different forms of carbohydrates in potato plants and to find out changes in the productivity of crops under their influence.

Materials and methods. Field small-scale experiments were laid in the vegetation periods of 2013-2015. Potato (*Solanum tuberosum* L.) of cv. Sante was treated in the budding phase with aqueous solutions of tebuconazole (EW-250) (0.025 %), chlormequat chloride (CCC-750) (0.25 %) and esfon (2-CEPA) (0.15 %) with the Marolex CO-12 backpack sprayer. The effect of preparations on plant height, leaf apparatus, concentration of the amount of chlorophylls in leaves, specific surface density of leaves, leaf area and the content of various forms of carbohydrates in the vegetative organs were investigated. Sampling of the dry material for biochemical studies and determination of phytometric parameters and chlorophyll content were performed every 10 days. The content of various forms of carbohydrates in plant organs was determined by the iodometric method in a fixed dry material. The study results were statistically processed using the Statistica 6.0 computer program.

Results. It was found, that all preparations reduced the linear size of potato plants, increased the content of the amount of chlorophylls in the leaves and the specific

surface density of lamines. Due to the action of ethylene-producer 2-CEPA, the growth processes were most significantly inhibited and the leaf blades in potato plants were most thickened. Under the influence of retardants the number of leaves on the plant and the mass of their dry matter increased. EW-250 increased leaf area and maximized chlorophyll content.

The use of EW-250 and CCC-750 increased the outflow of sugars and the redistribution of starch from roots, stems and leaves in the second half of the growing season. The preparations increased starch accumulation in potato tubers.

The use of ethyleneproducer 2-CEPA was ineffective, despite a number of positive changes in physiological and biochemical parameters.

Conclusions. Retardants EW-250 and CCC-750, inhibiting growth processes in potato plants, optimized the leaf apparatus, altered the nature of donor-acceptor relationships in them by enhancing the flow of plastic substances from the above-ground vegetative organs to the roots and tubers, which increased the productivity of the crop. The most effective was the use of the EW-250

Keywords: *Solanum tuberosum* L., antigibberellin preparations, chlorophyll, leaf apparatus, sugars, starch, growth, productivity

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OPTIMIZATION OF THE RELATION OF ω -6 / ω -3 FATTY ACIDS IN SUNFLOWER OIL

p. 48-52

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According to the modern theory of nutrition, food must not only meet the physiological needs of man, but also have therapeutic and prophylactic properties. The disadvantage of sunflower oil is the practical absence of linolenic acid, which is attributed to the group of polyunsaturated fatty acids ω -3 (vitamin F), in its fatty acid composition The enrichment of sunflower oil with linolenic acid transforms it into a product of prophylactic and therapeutic purpose, increasing the number of its functional properties.

Purpose of the study: to obtain model mixtures with the optimum ratio of unsaturated fatty acids.

Materials and methods: blending method, high-performance gas chromatography method.

Results: The fatty acid composition of the obtained fat mixtures was investigated and the ratio of ω -3/ ω -6 polyunsaturated higher carboxylic acids was established, which justifies the use of 90:10 sunflower oil flax blends for daily nutrition and 70:30 for prophylaxis.

Conclusions: The results obtained can be used to improve the ratio of higher carboxylic acids ω -3 and ω -6 in the diet, which can have a positive effect on the dynamics of cardiovascular disease. Oil mixtures with a balanced fatty acid composition can become an effective tool for the prevention of cardiovascular diseases and increase the functionality of products of the oil and fat industry

Keywords: fatty acids, blend, gas chromatography, polyunsaturated fatty acids ω -3 and ω -6, linoleic and linolenic acid

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