ABSTRACT&REFERENCES

DOI: 10.15587/2519-8025.2020.191972

CHARACTERISTIC OF URETHRAL MICROBIOTA OF MEN WITH IDIOPATHIC URETHRITIS

p. 4-9

Yelizaveta Vorobiei, Doctor of Philosophy, Department of Microbiology, Virology and Biotechnology, Oles Honchar Dnipro National University, Gagarina ave., 72, Dnipro, Ukraine, 49010
E-mail: elizaveta.vorobey89@gmail.com
ORCID: *http://orcid.org/0000-0002-1151-8978*

Tetyana Skliar, PhD, Associate Professor, Department of Microbiology, Virology and Biotechnology, Oles Honchar Dnipro National University, Gagarina ave., 72, Dnipro, Ukraine, 49010
E-mail: microviro@ukr.net
ORCID: *http://orcid.org/0000-0003-2707-5240*

Inna Zubareva, PhD, Associate Professor, Department of Microbiology, Virology and Biotechnology, Oles Honchar Dnipro National University, Gagarina ave., 72, Dnipro, Ukraine, 49010
E-mail: microviro@ukr.net
ORCID: *http://orcid.org/0000-0001-6433-5764*

Aim: *to study the urethral microbiota composition in urogenital infections in men and to determine the sensitivity of isolated microorganisms to antibacterial drugs.*

Materials and Methods. *957 samples of biological material from the urethra of men were examined. The identification of the microorganisms was carried out according to the Bergey's Manual of Systematic Bacteriology. Sensitivity to antibiotics was determined by the disco-diffusion method, using standard disks of industrial production in accordance with the order of the Ministry of Health of Ukraine No. 167 of 05.04.2007. The mathematical processing of the results was performed, using the computer program « Origin Pro 7.0».*

Results of the research. *According to the study, the presence of conditionally pathogenic microorganisms was found in 716 people (74.82 % of the total number of the surveyed contingent). Of the subjects studied, 1574 strains were isolated, of which the vast majority consisted of bacteria of the intestinal group (43.52 %) and staphylococci (32.46 %). The incidence of streptococci was 18.61 %, corynebacteria – 3.81 %, pseudomonads – 1.14 %, candida – 0.44 %. When studying the species composition of urethral microbiota, the presence of monoinfection was found in 267 people, in the other 449 persons different associations of representatives of conditionally pathogenic microbiota were detected. The analysis of the level of sensitivity of the studied strains to antibiotics showed that the isolated staphylococci showed the highest sensitivity to ampicillin / sulbactam (81.60 % sensitive strains), most cephalosporins (79.26±4.49 %), carbapenems (93,35±1,38 %), vancomycin (100 %), rifampicin (92.56 %), most fluoroquinolones (82.68±3.31 %) and linezolid (98.63). Whereas the highest number of susceptible strains of bacteria of the intestinal group was determined for carbapenems (89.64±2.68 %) and Co-trimoxazole (82.19 %).*

Conclusions. *Isolated bacterial strains of the intestinal group and staphylococci are most commonly found in association with other microorganisms. The analysis of the level of antibiotic sensitivity indicates that staphylococci showed the highest sensitivity to ampicillin/sulbactam, most cephalosporins, carbapenems, vancomycin, rifampicin, most aminoglycosides and linezolid. Whereas the highest number of susceptible strains of bacteria of the intestinal group was determined for carbapenems and Co-trimoxazole. Which makes the use of these antibiotics appropriate for the treatment of diseases of the men's genitourinary system*

Keywords: *bacterial urethritis, urogenital infections, opportunistic microorganisms, Staphylococcus, Enterobacteriaceae*

References

1. Baker, P., Shand, T. (2017). Men's health: time for a new approach to policy and practice? Journal of Global Health, 7 (1). doi: http://doi.org/10.7189/jogh.07.010306

2. Tsiporenko, S. Yu., Matiukha, L. F. (2018). Vplyv lizatu bakterii na morfohenez spermatozoidiv infertylnykh cholovikiv z khronichnym zapalenniam urohenitalnoho traktu. Semeinaia medytsyna, 2 (76), 58–63.

3. Fraczek, M., Kurpisz, M. (2015). Mechanisms of the harmful effects of bacterial semen infection on ejaculated human spermatozoa: potential inflammatory markers in semen. Folia Histochemica et Cytobiologica, 53 (3), 201–217. doi: http://doi.org/10.5603/fhc.a2015.0019

4. Faniev, M. V., Shevchenko, N. P., Kadyrov, Z. A. (2017). Modern strategies of infertile male's treatment with chronical bacterial prostatitis on the stage of preconception predation in protocols of auxiliary reproductive technologies. Andrology and Genital Surgery, 18 (3), 44–53. doi: http://doi.org/10.17650/2070-9781-2017-18-3-44-53

5. Schuppe, H. C., Pilatz, A., Hossain, H., Diemer, T., Wagenlehner, F., Weidner, W. (2017). Urogenital Infection as a Risk Factor for Male Infertility. Deutsches Aerzteblatt International, 114 (19), 339–346. doi: http://doi.org/10.3238/arztebl.2017.0339

6. Kungurov, N. V., Gerasimova, N. M., Gorbunov, A. P., Skidan, N. I., Scherbakova, N. V., Evstigneeva, N. P. et. al. (2010). Uslovno-patogennaia mikroflora urogenitalnogo trakta u muzhchin s vospalitelnymi zabolevaniiami mocheispuskatelnogo kanala. Vestnik poslediplomnogo medicinskogo obrazovaniia, 2, 26–32.

7. Mavrov, H. Y., Nykytenko, Y. N., Chynov, H. P. (2004). Osobennosty mykroflori urohenytalnoho trakta pry vospalytelnikh zabolevanyiakh mochepolovikh orhanov. Ukrainskyi zhurnal dermatolohii, venerolohii, kosmetolohii, 2, 64–68.

8. Sokolov, V. V., Dzhoraeva, S. K., Kochetova, N. V., Ivancova, E. K., Schegoleva, E. V., Kovalik, A. I. (2011). Oso-

bennosti sostava mikroflory urogenitalnogo trakta u pacientov s vospalitelnymi zabolevaniiami mochepolovykh organov. Dermatologiia ta venerologiia, 1 (51), 37–41.

9. Onopko, V. F., Argunov, A. V., Chemezov, A. P. (2013). Osobennosti techeniia vospalitelnykh zabolevanii urogenitalnogo trakta u muzhchin pri uslovno-patogennoi mikroflore. Sibirskii medicinskii zhurnal, 4, 115–116.

10. Naber, K. G., Schaeffer, A. J., Heyns, C. H., Matsumoto, T., Shoskes, D. A., Bjerklund Johanses, T. E, (Eds.) (2010). Urogenital infections. European Association of Urology. International Consultation on Urological Diseases, 714–727.

11. Shcherbakova, Yu. V., Mavrov, H. I., Dzhoraieva, S. K., Honcharenko, V. V. (2016). Chutlyvist zbudnykiv zakhvoriuvan urohenitalnoho traktu do antybakterialnykh preparativ ta sklad biotopu u patsiientiv z infektsiiamy, shcho peredaiutsia statevym shliakhom. Dermatolohiia ta venerolohiia, 1 (71), 49–56.

12. Zeyad, A., Amor, H., Eid Hammadeh, M. (2017). The Impact of Bacterial Infections on Human Spermatozoa. International Journal of Women's Health and Reproduction Sciences, 5 (4), 243–252. doi: http://doi.org/10.15296/ijwhr.2017.43

13. De Vos, P., Garrity. G. M., Jones, D., Krieg, N. R., Ludwig, W., Rainey, F. A. et. al. (Eds.) (2009). Bergey's Manual of Systematic Bacteriology. New York: Springer-Verlag, 1450.

14. Pro zatverdzhennia metodychnykh vkazivok «Vyznachennia chutlyvosti mikroorhanizmiv do antybakterialnykh preparativ» (2007). Nakaz Ministerstva okhorony zdorovia Ukrainy 05.04.2007. No. 167. Available at: http://search.ligazakon.ua/l_doc2.nsf/link1/MOZ6809.html

15. Frølund, M., Wikström, A., Lidbrink, P., AbuAl-Soud, W., Larsen, N., Harder, C. B. et. al. (2018). The bacterial microbiota in first-void urine from men with and without idiopathic urethritis. PLoSONE 13 (7), e0201380. doi: http://doi.org/10.1371/journal.pone.0201380

16. Dmitriev, G. A. (2003). Laboratornaia diagnostika bakterialnykh urogenitalnykh infekcii. Moscow: Medicinskaia Kniga; Nizhnii Novgorod: Izdatelstvo NGMA, 336.

DOI: 10.15587/2519-8025.2020.201416

INFLUENCE OF DIFFERENT PHOTOPERIODIC CONDITIONS ON THE PROTEIN AND OIL CONTENT IN SOYBEAN SEEDS (*GLYCINE MAX* (L.) MERR.)

p. 10-15

Hider Nabil Hussein Al-Hamadeni, Postgraduate Student, Department of Physiology and Biochemistry of Plants and Microorganisms, V. N. Karazin Kharkiv National University, Svobody sq., 4, Kharkiv, Ukraina, 61022
E-mail: agroch1984@hotmail.com

Vasily Zhmurko, Doctor of Biological Sciences, Professor, Department Physiology and Biochemistry of Plants and Microorganisms, V. N. Karazin Kharkiv National University, Svobody sq., 4, Kharkiv, Ukraina, 61022
E-mail: zhmurko@karazin.ua
ORCID: *http://orcid.org/0000-0002-3898-3087*

***Aim**. Find out the effect of different durations of the photoperiod on the protein and oil content in the seeds of soybean varieties, which differ in response to the photoperiod.*

***Materials and methods.** The experiments used photoperiodically neutral soybean varieties Annushka, Yatran, Ustya, as well as a short-day variety Khadzhibey. Plants were grown in the field 2016–2018 year at the experimental site of the Department of Physiology and Biochemistry of Plants and Microorganisms of V. N. Karazin Kharkiv National University on plots of 1 m^2 in triplicate. From seedlings to the third true leaf, the plants grew with a natural long day (about 16 hours at the latitude of Kharkov – 50° N). In this phase, half of the plants were exposed to a short photoperiod for 14 days, darkening the plants with light-tight booths from 17 to 9 hours. After which the plants were grown again under long day conditions until the end of the growing season. The second part of the plants (control) during the entire growing season was grown under natural day conditions. The protein content in the seeds was determined on an infrared analyzer Infralum FT-10 (manufacturer Lumex, RF), according to the manufacturer's method, and oil – according to Rushkovsky. Analyzes were performed in two triplicate. The tables show the mean and standard deviations.*

***Results.** The protein content in seeds under the influence of a short photoperiod increased, decreased or did not change, compared with the content on a long day, regardless of the type of photoperiodic reaction of the studied varieties. The oil content in the seeds of all varieties, regardless of their photoperiodic reaction, exposed to a short photoperiod, as a rule, was lower than in the seeds of plants that were grown on a long day. Changes in the protein and oil content in the seeds of soybean varieties with different day lengths did not depend on the type of photoperiodic reaction.*

The content of both protein and oil in seeds varied in different varieties and in different years of research. The degree of variation in different varieties was different.

***Conclusions.** Different photoperiodic conditions ambiguously influenced the protein content in the seeds of soybean varieties with different photoperiodic reactions, although in some years there was a tendency to increase it under the influence of a short photoperiod. Apparently, it is determined by the genotype of the variety and the meteorological conditions of the growing season.*

The oil content in the seeds of the studied varieties, which differ in the type of photoperiodic reaction, decreased under the influence of a short day, compared with the content under long day conditions.

Apparently, the process of accumulation of protein and, especially, oil in soybean seeds is subject to photoperiodic control. Its mechanisms need in-depth studies at the level of physiological and biochemical processes.

***Keywords:** soybean (Glycine max (L.) Merr.), Photoperiod, development rate, protein, oil*

References

1. Petibskaia, V. S.; Lukomets, V. M. (Ed.) (2012). Soia: khimicheskii sostav i ispolzovanie. Maikop: OAO «Poligraf-IUG», 432.

2. Vishniakova, M. A., Seferova, I. V., Samsonova, M. G. (2017). Trebovanie k iskhodnomu materialu dlia selektsii soi v kontekste sovremennykh biotekhnologii. Selskokhoziaistvennaia biologiia, 52 (5), 906–916.

3. Song, W., Yang, R., Wu, T., Wu, C., Sun, S., Zhang, S. et. al. (2016). Analyzing the Effects of Climate Factors on Soybean Protein, Oil Contents, and Composition by Extensive and High-Density Sampling in China. Journal of Agricultural and Food Chemistry, 64 (20), 4121–4130. doi: http://doi.org/10.1021/acs.jafc.6b00008

4. United States Department of Agriculture, World Agricultural Production (2020). Circular Series February 2–20. USDA. Foraing Agr. Servise. Available at: https://apps.fas.usda.gov/psdonline/circulars/production.pdf

5. Zhmurko, V. V., Avksentieva, O. O., Yukhno, Yu. Yu., Popova, Yu. V., Samoilov, A. M. Tymoshenko, V. F. et. al. (2017). Efekty heniv fotoperiodychnoi chutlyvosti i potreby v yarovyzatsii u roslyn pshenytsi miakoi ta soi kulturnoi. Fiziolohiia roslyn: dosiahnennia ta novi napriamy rozvytku. Kyiv: Lohos, 187–197.

6. Zhmurko, V. V. (2009). Fizioloho-biokhimichni aspekty fotoperiodychnoho i yarovyzatsiinoho kontroliu rozvytku roslyn. Kyiv, 43.

7. Davydenko, O. H., Zhmurko, V. V., Holoienko, D. V., Rozentsveih, V. E., Shablinska, O. V. (2004). Proiav fotoperiodychnoi reaktsii u rannostyhlykh sortiv soi. Selektsiia i nasinnytstvo, 88, 151–162.

8. Jiang, B., Nan, H., Gao, Y., Tang, L., Yue, Y., Lu, S. et. al. (2014). Allelic Combinations of Soybean Maturity Loci E1, E2, E3 and E4 Result in Diversity of Maturity and Adaptation to Different Latitudes. PLoS ONE, 9 (8), e106042. doi: http://doi.org/10.1371/journal.pone.0106042

9. Xia, Z., Watanabe, S., Yamada, T., Tsubokura, Y., Nakashima, H., Zhai, H. et. al. (2012). Positional cloning and characterization reveal the molecular basis for soybean maturity locus E1 that regulates photoperiodic flowering. Proceedings of the National Academy of Sciences, 109 (32), E2155–E2164. doi: http://doi.org/10.1073/pnas.1117982109

10. Kobyzieva, L. N. (2015). Skryninh kolektsii soi NTsHRRU za vmistom v nasinni bilka ta zhyru. Selektsiia i nasinnytstvo, 108, 53–59.

11. Novikova, L. Y., Seferova, I. V., Nekrasov, A. Y., Perchuk, I. N., Shelenga, T. V., Samsonova, M. G., Vishnyakova, M. A. (2018). Impact of weather and climate on seed protein and oil content of soybean in the North Caucasus. Vavilov Journal of Genetics and Breeding, 22 (6), 708–715. doi: http://doi.org/10.18699/vj18.414

12. Abugaliyeva, A. I., Didorenko, S. V. (2016). Genetic diversity of soybean cultivars belonging to different ripeness groups with regard to performance and quality. Vavilov Journal of Genetics and Breeding, 20 (3), 303–310. doi: http://doi.org/10.18699/vj16.168

13. Ojo, D. K., Adebisi, M. A., Tijani, B. O. (2002). Influence of environment on protein and oil contents of soybeans seed (Glycine Max (L.) Merril). Global Journal of Agricultural Sciences, 1 (1), 27–32. doi: http://doi.org/10.4314/gjass.v1i1.2199

14. Bellaloui, N., Bruns, H. A., Abbas, H. K., Mengistu, A., Fisher, D. K., Reddy, K. N. (2015). Agricultural practices altered soybean seed protein, oil, fatty acids, sugars, and minerals in the Midsouth USA. Frontiers in Plant Science, 6 (31), 1–14. doi: http://doi.org/10.3389/fpls.2015.00031

15. Sudaric, A., Simic, D., Vrataric, M. (2006). Characterization of genotype by environment interactions in soybean breeding programmes of southeast Europe. Plant Breeding, 125 (2), 191–194. doi: http://doi.org/10.1111/j.1439-0523.2006.01185.x

16. Song, W., Yang, R., Yang, X., Sun, S., Mentreddy, S. R., Jiang, B. et. al. (2018). Spatial differences in soybean bioactive components across China and their influence by weather factors. The Crop Journal, 6 (6), 659–668. doi: http://doi.org/10.1016/j.cj.2018.05.001

17. Mysak, E. V., Selikhova, O. A. (2017). Izmenenie biokhimicheskogo sostava zerna soi v zavisimosti ot prodolzhitelnosti dnia. Prioritetnye napravleniia otraslevogo nauchnogo obespecheniia, tekhnologii proizvodstva, khraneniia i pererabotki selskokhoziaistvennoi produktsii. Krasnodar: FGBNU SKFNTSSVV, 245.

18. Zhmurko, V. V., Khaider, Nabil Khusein Al-Khamadeni (2018). Vliianie prodolzhitelnosti fotoperioda na formirovanie plodov u sortov soi (Glycine max (L.) Merr.). Faktori eksperimentalnoi evoliutsii organizmiv, 23, 57–63.

19. Ermakova, A. I. (Ed.) (1987). Metody biokhimicheskogo issledovaniia rastenii. Leningrad: Agropromizdat, 430.

20. Dospekhov, B. A. (1985). Metodika polevogo opyta (s osnovami statisticheskoi obrabotki rezultatov issledovanii). Moscow: Agropromizdat, 351.

DOI: 10.15587/2519-8025.2020.198226

DIVERSITY OF SOILS, VEGETATION AND BIOTOPES OF THE REGIONAL LANDSCAPE PARK "BALKA KOBYLNA"

p. 16-24

Olha Krasova, PhD, Department of Optimization of Technogenic Landscapes, Kryviy Rih Botanical Garden of the National Academy of Sciences of Ukraine, Marshaka str., 50, Kryvyi Rig, Ukraine, 50089
E-mail: kras.kbs.17@gmail.com
ORCID: *http://orcid.org/0000-0003-3035-5614*

Oleksandr Dolyna, PhD, Department of Ecology, Kryvyi Rih National University, Vitaliia Matusevycha str., 11, Kryvyi Rih, Ukraine, 50027
E-mail: dolinaalexandr@gmail.com
ORCID: *http://orcid.org/0000-0002-4175-746X*

Oleksiy Smetana, PhD, Agrargenossenschaft Kirchheilingen e.G., Gutenbergstraße, 26, Bad Langensalza, Germany, 99947
E-mail: sekr.kbs@gmail.com
ORCID: *http://orcid.org/0000-0002-0330-4953*

Liudmyla Lysohor, PhD, Department of primary education, Kryvyi Rih State Pedagogical University, Gagarin av., 54, Kryvyi Rih, Ukraine, 50086
E-mail: lisogor.1981@gmail.com
ORCID: *http://orcid.org/0000-0002-1949-1394*

The article considers the patterns of spatial organization of vegetation and soil cover and the biotopic diversity of the regional landscape park, the territory of which has recently become part of the Emerald Network.

***The aim of the study** is to find out the current state of the diversity of soils, plant communities and biotopes of the territory of the regional landscape park "Balka Kobylna".*

***Materials and methods.** When conducting the geobotanical work, generally accepted methods were used. The soil diagnostics was carried out using soil genetic, morphological and laboratory experimental methods. Biotopes are identified in accordance with the developments, presented in the National Habitat Catalogue of Ukraine; the lower levels of the biotopic hierarchy correspond to the syntaxa of the latest "Prodrome of the vegetation of Ukraine".*

***Results.** The composition of the typological units of the soil cover and the features of their spatial differentiation were ascertained, the diversity of plant communities was evaluated, and the patterns of the mutual arrangement of soil and plant territorial units were revealed. It was shown, that the communities of the true steppes are confined to southern chernozems with different degrees of development; on sod-steppe soils, the vegetation of the true steppes is replaced by petrophytogenic one. A classification scheme of biotopes of the territory of the RLP was compiled, represented by six types of the highest classification units; lower levels of the biotopic hierarchy represent the syntaxonomical division of vegetation.*

***Conclusions.** As a result of studying the soil cover of RLP "Balka Kobylna", 23 soil varieties, included in eight soil types, were identified. 30 formations and 8 cenostructures of communities with the dominance of a certain species that did not receive the status of formations in the dominant classification were identified. In addition to the six natural types, we noted some synanthropic phytocoenoses in RLP. The typological scheme of biotopes of RLP "Balka Kobylna", compiled on the basis of the "National Habitat Catalogue of Ukraine", includes 6 types of the highest hierarchical level, 8 units of biotopes of the second level, 11 – of the third one, 6 – of the fourth one (including three more subtypes). The results of the studies indicate the high sozological value of the investigated territory and are the basis for the management activity on the lands of the protected object and the development of measures for the biodiversity restoration*

***Keywords:** soils, plant communities, biotopes, diversity, regional landscape park, spatial differentiation*

References

1. Pryrodno-zapovidnyi fond Dnipropetrovskoi oblasti (2017). Dnipro, 118.

2. Kravchenko, O. (Ed.) (2017). Pravovyi rezhym pryrodno-zapovidnoho fondu Ukrainy: istoriia formuvannia, yurydychni aspekty ta zakordonnyi dosvid. Lviv: Vydavnytstvo «Kompaniia "Manuskrypt"», 92.

3. Smetana, O. M., Dolina, O. O., Yaroshchuk, Y. V., Krasova, O. O., Rudiuk D. O. (2013). Development of the Ingulets Regional ecocorridor: problems and perspectives. Ukrainian Botanical Journal, 70 (4), 457–466.

4. Convention on the Conservation of European Wildlife and Natural Habitats. (1979). Bern.

5. Polianska, K. V., Borysenko, K. A., Pavlachyk, P., Vasyliuk, O. V., Marushchak, O. Yu., Shyriaieva, D. V. et. al.; Kuzemko, A. (Ed.) (2017). Zaluchennia hromadskosti ta naukovtsiv do proektuvannia merezhi Emerald (Smarahdovoi merezhi) v Ukraini. Kyiv, 304.

6. Updated list of officially adopted Emerald sites (2019). Available at: https://rm.coe.int/updated-list-of-officially-adopted-emerald-sites-december-2019-/168098ef51?fbclid=IwAR3Sfh-F_w0fpHBkCggkU1Xc1bUbo57vMgDhu1Fcgq-gFvM5QaceWsnOlt4

7. Evans, D. (2012). Building the European Union's Natura 2000 network. Nature Conservation, 1, 11–26. doi: http://doi.org/10.3897/natureconservation.1.1808

8. Fredshavn, J., Bak, J. (2018). Scientific analysis on the designation of Natura 2000 sites and the status of nature and effort. A comparison of The Netherlands, Schleswig-Holstein and Denmark. Aarhus University, DCE – Danish Centre for Environment and Energy, 15.

9. Niedziałkowski, K., Blicharska, M., Mikusiński, G., Jędrzejewska, B. (2014). Why is it difficult to enlarge a protected area? Ecosystem services perspective on the conflict around the extension of the Białowieża National Park in Poland. Land Use Policy, 38, 314–329. doi: http://doi.org/10.1016/j.landusepol.2013.12.002

10. Wojdan, D., Żeber-Dzikowska, I., Gworek, B., Mickiewicz, K., Chmielewski, J. (2019). Protected areas of the Świętokrzyskie Voivodeship. Environmental Protection and Natural Resources, 30 (3 (81)), 35–46.

11. Perzanowska, J., Korzeniak, J., Chmura, D. (2019). Alien species as a potential threat for Natura 2000 habitats: a national survey. PeerJ, 7, e8032. doi: http://doi.org/10.7717/peerj.8032

12. Manolache, S., Ciocanea, C. M., Rozylowicz, L., Nita, A. (2017). Natura 2000 in Romania – a decade of governance challenges. European Journal of Geography, 8 (2), 24–34.

13. Manolache, S., Nita, A., Ciocanea, C. M., Popescu, V. D., Rozylowicz, L. (2018). Power, influence and structure in Natura 2000 governance networks. A comparative analysis of two protected areas in Romania. Journal of Environmental Management, 212, 54–64. doi: http://doi.org/10.1016/j.jenvman.2018.01.076

14. Feilhauer, H., Dahlke, C., Doktor, D., Lausch, A., Schmidtlein, S., Schulz, G., Stenzel, S. (2014). Mapping the local variability of Natura 2000 habitats with remote sensing. Applied Vegetation Science, 17 (4), 765–779. doi: http://doi.org/10.1111/avsc.12115

15. Hošek, M., Kešner, M., Bogdan V., Lakušić D., Kuzmanović N., Lazarević P. et. al. (2019). Natura 2000 habitat mapping of the Skadar Lake National Park in Montenegro. Technical report, 15.

16. Abduloieva, O. S., Kovalenko, O. A. (2017). Metodychni aspekty kartuvannia oselyshch v Natsionalnomu pryrodnomu parku «Pyriatynskyi» (Poltavska obl.). Merezha NATURA 2000 yak innovatsiina systema okhorony ridkisnykh vydiv ta oselyshch v Ukraini. Conservation Biologyin Ukraine. Kyiv, 1, 9–14.

17. Yakubenko, B. Ye., Popovych, S. Yu., Ustymenko, P. M., Dubyna, D. V., Churilov, A. M. (2018). Heobotanika: metodychni aspekty doslidzhen. Kyiv: Lira K, 316.

18. Polovyi, A. M., Hutsal, A. I., Dronova, O. O. (2013). Gruntoznavstvo. Odesa, 668.

19. Dolyna, O. O., Smetana, O. M. (2014). Terytorialna struktura ta klasyfikatsiia gruntiv Kryvorizkoho zalizorudnoho baseinu. Visnyk Dnipropetrovskoho universytetu. Seriia: Biolohiia. Ekolohiia, 22 (2), 161–168.

20. Mosyakin S., Fedoronchuk M. (1999). Vascular plants of Ukraine. A nomenclatural checklist. Kiev, 346.

21. Krasova, O. O., Korshykov, I. I. (2016). Community dominants and coenotaxonomic richness of vegetation on slopes of the Black Sea part of the Ingulets River basin. Ukrainian Botanical Journal, 73 (6), 557–567. doi: http://doi.org/10.15407/ukrbotj73.06.557

22. Kuzemko, A. A., Didukh, Ya. P., Onyshchenko, V. A., Sheffer, Ya. (Eds.) (2018). Natsionalnyi kataloh biotopiv Ukrainy. Kyiv: FOP Klymenko Yu.Ya., 442.

23. Dubyna, D. V., Dziuba, T. P., Yemelianova, S. M. ta in. (2019). Prodromus roslynnosti Ukrainy. Kyiv: Naukova dumka, 783.

24. Didukh, Ya. P. (Ed.) (2009). Chervona knyha Ukrainy. Roslynnyi svit. Kyiv: Hlobalkonsaltynh, 912.

25. Didukh, Ya. P. (Ed.) (2009). Zelena knyha Ukrainy. Ridkisni i taki, shcho perebuvaiut pid zahrozoiu znyknennia ta typovi pryrodni roslynni uhrupovannia, yaki pidliahaiut okhoroni. Kyiv: Alterpres, 448.

26. Kucherevskyi, V. V., Provozhenko, T. A. (2012). Shamaecytiseta granitici– nova formatsiia chaharnykovoi roslynnosti Pravoberezhnoho Zlakovoho Stepu Ukrainy. Ukrainskyi botanichnyi zhurnal, 69 (5), 644–651.

27. Revised Annex I of Resolution 4 (1996) of the Bern Convention on endangered natural habitats types using the EUNIS habitat classification (year of revision 2010). Available at: http://eunis.eea.europa.eu/references/2442

28. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, O.J. L206, 22.07.92

DOI: 10.15587/2519-8025.2020.202216

METHODICAL APPROACHES OF ESTIMATION OF PROBIOTICS` QUALITY AND RATIONAL PRINCIPLES OF THEIR USAGE IN CLINICAL PRACTICE

p. 25-30

Liudmyla Lazarenko, Doctor of Biological Sciences, Senior Researcher, Leading Researcher, Department of Interferon and Immunomodulators, D. K. Zabolotny Institute of Microbiology and Virology of National Academy of Sciences of Ukraine, Akademika Zabolotnoho str., 154, Kyiv, Ukraine, 03143
E-mail: LazarenkoLM@gmail.com
ORCID: *http://orcid.org/0000-0002-2341-5677*

Rostyslav Bubnov, PhD, Senior Researcher, Department of Interferon and Immunomodulators, D. K. Zabolotny Institute of Microbiology and Virology of National Academy of Sciences of Ukraine, Akademika Zabolotnoho str., 154, Kyiv, Ukraine, 03143
E-mail: dr.rbubnov@gmail.com
ORCID: *http://orcid.org/0000-0003-3148-9884*

Lidiia Babenko, PhD, Researcher, Department of Interferon and Immunomodulators, D. K. Zabolotny Institute of Microbiology and Virology of National Academy of Sciences of Ukraine, Akademika Zabolotnoho str., 154, Kyiv, Ukraine, 03143
E-mail: babenkolidiia@gmail.com
ORCID: *http://orcid.org/0000-0003-1608-3990*

Olexandra Melnykova, Department of Microbiology and Immunology, Educational and Research Center «Institute of Biology and Medicine» Taras Shevchenko National University of Kyiv, Volodymyrska str., 64/13, Kyiv, Ukraine, 01601
E-mail: alex190697@ukr.net
ORCID: *http://orcid.org/0000-0002-5605-0782*

Mykola Spivak, Doctor of Biological Sciences, Professor, Corresponding Member of National Academy of Sciences of Ukraine, Head of Department, Department of Interferon and Immunomodulators, D. K. Zabolotny Institute of Microbiology and Virology of National Academy of Sciences of Ukraine, Akademika Zabolotnoho str., 154, Kyiv, Ukraine, 03143
E-mail: n.spivak@ukr.net
ORCID: *http://orcid.org/0000-0002-4394-7275*

Recently probiotics have been started to be commonly used as a subsidiary therapy during many illnesses, such as intestinal and urogenital infections, diseases of the gastrointestinal and respiratory tract, also joints and connective tissue lesions, some cancers, allergies, dermatological and dental diseases. However, there are still no summary guidelines for selection and estimation of probiotic strains for different clinical cases. Thus, we have made a general conclusion of estimation of probiotics` quality and development of rational principles of probiotic therapy usage in clinical practice during the treatment of patients with the most common diseases and for their prevention. There are described key principles of implementation of step-by-step estimation of probiotic culture quality in foodstuff according to regulations of World Health Organization, European Union, Ukraine and other countries. The requirements are presented for the evaluation of safety of probiotic cultures, which include testing of their in vitro and in vivo activity in different experimental models, as well as a study of their therapeutic efficacy in clinical practice in the treatment of patients and in long periods after probiotic therapy. Also there are some evidences of possible side effects, risks or low efficiency that depends on individual characteristics of the gut microbiota quantitative and qualitative composition of each patient and stage, heaviness of clinical course of each specific disease. That`s why it is very important to take all circumstances of patients` status into account and collect all previous stored knowledge of probiotics` usage

Keywords: *probiotics, disease, estimation, safety, clinical practice, therapy*

References

1. Shirobokov, V. P., Shirobokov, V. P., Iankovskii, D. S., Dyment, G. S. (2010). Mikrobnaia ekologiia cheloveka s tsvetnym atlasom. Kyiv: Chervona Ruta-Turs, 340.

2. Williams, N. T. (2010). Probiotics. American Journal of Health-System Pharmacy, 67 (6), 449–458. doi: http://doi.org/10.2146/ajhp090168

3. Halloran, K., Underwood, M. A. (2019). Probiotic mechanisms of action. Early Human Development, 135, 58–65. doi: http://doi.org/10.1016/j.earlhumdev.2019.05.010

4. Nichols, R. G., Peters, J. M., Patterson, A. D. (2019). Interplay Between the Host, the Human Microbiome, and Drug Metabolism. Human Genomics, 13 (1). doi: http://doi.org/10.1186/s40246-019-0211-9

5. Azad, M. A. K., Sarker, M., Wan, D. (2018). Immunomodulatory Effects of Probiotics on Cytokine Profiles. BioMed Research International, 2018, 1–10. doi: http://doi.org/10.1155/2018/8063647

6. Falagas, M. E., Betsi, G. I., Tokas, T., Athanasiou, S. (2006). Probiotics for prevention of recurrent urinary tract infections in women: a review of the evidence from microbiological and clinical studies. Drugs, 66 (9), 1253–1261. doi: http://doi.org/10.2165/00003495-200666090-00007

7. Di Cerbo, A., Palmieri, B., Aponte, M., Morales-Medina, J. C., Iannitti, T. (2015). Mechanisms and therapeutic effectiveness of lactobacilli. Journal of Clinical Pathology, 69 (3), 187–203. doi: http://doi.org/10.1136/jclinpath-2015-202976

8. Kasińska, M. A., Drzewoski, J. (2015). Effectiveness of probiotics in type 2 diabetes: a meta-analysis. Polish Archives of Internal Medicine, 125 (11), 803–813. doi: http://doi.org/10.20452/pamw.3156

9. Hendijani, F., Akbari, V. (2018). Probiotic supplementation for management of cardiovascular risk factors in adults with type II diabetes: A systematic review and meta-analysis. Clinical Nutrition, 37 (2), 532–541. doi: http://doi.org/10.1016/j.clnu.2017.02.015

10. Didari, T., Mozaffari, S., Nikfar, S., Abdollahi, M. (2015). Effectiveness of probiotics in irritable bowel syndrome: Updated systematic review with meta-analysis. World Journal of Gastroenterology, 21 (10), 3072–3084. doi: http://doi.org/10.3748/wjg.v21.i10.3072

11. Wang, F., Feng, J., Chen, P., Liu, X., Ma, M., Zhou, R. et. al. (2017). Probiotics in Helicobacter pylori eradication therapy: Systematic review and network meta-analysis. Clinics and Research in Hepatology and Gastroenterology, 41 (4), 466–475. doi: http://doi.org/10.1016/j.clinre.2017.04.004

12. Huang, R., Wang, K., Hu, J. (2016). Effect of Probiotics on Depression: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Nutrients, 8 (8), 483. doi: http://doi.org/10.3390/nu8080483

13. Chang, Y.-S., Trivedi, M. K., Jha, A., Lin, Y.-F., Dimaano, L., García-Romero, M. T. (2016). Synbiotics for Prevention and Treatment of Atopic Dermatitis: A Meta-analysis of Randomized Clinical Trials. JAMA Pediatrics, 170 (3), 236–242. doi: http://doi.org/10.1001/jamapediatrics.2015.3943

14. Miller, L. E., Lehtoranta, L., Lehtinen, M. J. (2019). Short-term probiotic supplementation enhances cellular immune function in healthy elderly: systematic review and meta-analysis of controlled studies. Nutrition Research, 64, 1–8. doi: http://doi.org/10.1016/j.nutres.2018.12.011

15. Kasatpibal, N., Whitney, J. D., Saokaew, S., Kengkla, K., Heitkemper, M. M., Apisarnthanarak, A. (2017). Effectiveness of Probiotic, Prebiotic, and Synbiotic Therapies in Reducing Postoperative Complications: A Systematic Review and Network Meta-analysis. Clinical Infectious Diseases, 64 (suppl_2), S153–S160. doi: http://doi.org/10.1093/cid/cix114

16. Singhi, S. C., Kumar, S. (2016). Probiotics in critically ill children. F1000Research, 5, 407. doi: http://doi.org/10.12688/f1000research.7630.1

17. Mantegazza, C., Molinari, P., D'Auria, E., Sonnino, M., Morelli, L., Zuccotti, G. V. (2018). Probiotics and antibiotic-associated diarrhea in children: A review and new evidence on Lactobacillus rhamnosus GG during and after antibiotic treatment. Pharmacological Research, 128, 63–72. doi: http://doi.org/10.1016/j.phrs.2017.08.001

18. Hooijmans, C. R., de Vries, R. B. M., Rovers, M. M., Gooszen, H. G., Ritskes-Hoitinga, M. (2012). The Effects of Probiotic Supplementation on Experimental Acute Pancreatitis: A Systematic Review and Meta-Analysis. PLoS ONE, 7 (11), e48811. doi: http://doi.org/10.1371/journal.pone.0048811

19. Athalye-Jape, G., Rao, S., Patole, S. (2017). Effects of probiotics on experimental necrotizing enterocolitis: a systematic review and meta-analysis. Pediatric Research, 83 (1), 16–22. doi: http://doi.org/10.1038/pr.2017.218

20. Million, M., Angelakis, E., Paul, M., Armougom, F., Leibovici, L., Raoult, D. (2012). Comparative meta-analysis of the effect of Lactobacillus species on weight gain in humans and animals. Microbial Pathogenesis, 53 (2), 100–108. doi: http://doi.org/10.1016/j.micpath.2012.05.007

21. Mokrozub, V. V., Lazarenko, L. M., Babenko, L. P. (2013). Antistaphylococcal action of lacto- and bifidobacteria and interleukine-2. Mikrobiological Journal, 75 (6), 17–21.

22. Suez, J., Zmora, N., Zilberman-Schapira, G., Mor, U., Dori-Bachash, M., Bashiardes, S. et. al. (2018). Post-Antibiotic Gut Mucosal Microbiome Reconstitution Is Impaired by Probiotics and Improved by Autologous FMT. Cell, 174 (6), 1406–1423. doi: http://doi.org/10.1016/j.cell.2018.08.047

23. Zhong, C., Qu, C., Wang, B., Liang, S., Zeng, B. (2017). Probiotics for Preventing and Treating Small Intestinal Bacterial Overgrowth: A Meta-Analysis and Systematic Review of Current Evidence. Journal of Clinical Gastroenterology, 51 (4), 300–311. doi: http://doi.org/10.1097/mcg.0000000000000814

24. Wojtyniak, K., Szajewska, H. (2017). Systematic review: probiotics for functional constipation in children. European Journal of Pediatrics, 176 (9), 1155–1162. doi: http://doi.org/10.1007/s00431-017-2972-2

25. Ng, Q. X., Soh, A. Y. S., Venkatanarayanan, N., Ho, C. Y. X., Lim, D. Y., Yeo, W.-S. (2019). A Systematic Review of the Effect of Probiotic Supplementation on Schizophrenia Symptoms. Neuropsychobiology, 78 (1), 1–6. doi: http://doi.org/10.1159/000498862

26. Bo, L., Li, J., Tao, T., Bai, Y., Ye, X., Hotchkiss, R. S. et. al. (2014). Probiotics for preventing ventilator-associated

pneumonia. Cochrane database of systematic reviews, 10 (10), 1465–1858. doi: http://doi.org/10.1002/14651858.cd009066.pub2

27. Oliveira, L. V. N. de, Bastos, R. W., Ribeiro, N. de Q., Costa, M. C., Acurcio, L. B., Rocha, K. M. et. al. (2017). In vivo probiotic and antimicrobial photodynamic therapy as alternative therapies against cryptococcosis are ineffective. Veterinary Microbiology, 211, 169–173. doi: http://doi.org/10.1016/j.vetmic.2017.08.015

28. Shentsova, M. A., Surmasheva, O. V. (2014). Probiotic preparations, their quality and safety: current state (part II). Dovkillia i zdorovia, 1, 64–69.

29. Timmerman, H. M., Niers, L. E. M., Ridwan, B. U., Koning, C. J. M., Mulder, L., Akkermans, L. M. A. et. al. (2007). Design of a multispecies probiotic mixture to prevent infectious complications in critically ill patients. Clinical Nutrition, 26 (4), 450–459. doi: http://doi.org/10.1016/j.clnu.2007.04.008

30. Zmora, N., Zilberman-Schapira, G., Suez, J., Mor, U., Dori-Bachash, M., Bashiardes, S. et. al. (2018). Personalized Gut Mucosal Colonization Resistance to Empiric Probiotics Is Associated with Unique Host and Microbiome Features. Cell, 174 (6), 1388–1405. doi: http://doi.org/10.1016/j.cell.2018.08.041

31. Salminen, S., von Wright, A., Morelli, L., Marteau, P., Brassart, D., de Vos, W. M. (1998). Demonstration of safety of probiotics – a review. International Journal of Food Microbiology, 44 (1-2), 93–106. doi: http://doi.org/10.1016/s0168-1605(98)00128-7

32. Marteau, P., Seksik, P., Jian, R. (2002). Probiotics and health: new facts and ideas. Current Opinion in Biotechnology, 13 (5), 486–489. doi: http://doi.org/10.1016/s0958-1669(02)00368-3

33. Snydman, D. R. (2008). The Safety of Probiotics. Clinical Infectious Diseases, 46 (s2), S104–S111. doi: http://doi.org/10.1086/523331

34. Mayes, T., Gottschlich, M. M., James, L. E., Allgeier, C., Weitz, J., Kagan, R. J. (2015). Clinical Safety and Efficacy of Probiotic Administration Following Burn Injury. Journal of Burn Care & Research, 36 (1), 92–99. doi: http://doi.org/10.1097/bcr.0000000000000139

35. Marteau, P. R. (2002). Probiotics in clinical conditions. Clinical Reviews in Allergy & Immunology, 22 (3), 255–273. doi: http://doi.org/10.1007/s12016-002-0011-0

36. Shanahan, F. (2012). A Commentary on the Safety of Probiotics. Gastroenterology Clinics of North America, 41 (4), 869–876. doi: http://doi.org/10.1016/j.gtc.2012.08.006

37. Doron, S., Snydman, D. R. (2015). Risk and Safety of Probiotics. Clinical Infectious Diseases, 60 (suppl_2), S129–S134. doi: http://doi.org/10.1093/cid/civ085

38. Gasser, F. (1994). Safety of lactic-acid bacteria and their occurrence in human clinical infections. Bulletin de L'Institut Pasteur, 92, 45–67.

39. Saxelin, M., Chuang, N.-H., Chassy, B., Rautelin, H., Makela, P. H., Salminen, S., Gorbach, S. L. (1996). Lactobacilli and Bacteremia in Southern Finland, 1989-1992. Clinical Infectious Diseases, 22 (3), 564–566. doi: http://doi.org/10.1093/clinids/22.3.564

40. Borriello, S. P., Hammes, W. P., Holzapfel, W., Marteau, P., Schrezenmeir, J., Vaara, M., Valtonen, V. (2003). Safety of Probiotics That Contain Lactobacilli or Bifidobacteria. Clinical Infectious Diseases, 36 (6), 775–780. doi: http://doi.org/10.1086/368080

41. Bernardeau, M., Vernoux, J. P., Henri-Dubernet, S., Guéguena, M. (2008). Safety assessment of dairy microorganisms: the Lactobacillus genus. International Journal of Food Microbiology, 126 (3), 278–285. doi: http://doi.org/10.1016/j.ijfoodmicro.2007.08.015

42. Guidelines for the Evaluation of Probiotics (2002). Food Report of a Joint FAO/WHO Working Group on Drafting Guidelines for the Evaluation of Probiotics in Food London Ontario. Canada. Available at: https://www.who.int/foodsafety/fs_management/en/probiotic_guidelines.pdf

43. Saarela, M., Mogensen, G., Fondén, R., Mättö, J., Mattila-Sandholm, T. (2000). Probiotic bacteria: safety, functional and technological properties. Journal of Biotechnology, 84 (3), 197–215. doi: http://doi.org/10.1016/s0168-1656(00)00375-8

44. Ishibashi, N., Yamazaki, S. (2001). Probiotics and safety. The American Journal of Clinical Nutrition, 73 (2), 465s–470s. doi: http://doi.org/10.1093/ajcn/73.2.465s

45. Doron, S., Hibberd, P. L., Goldin, B., Thorpe, C., McDermott, L., Snydman, D. R. (2015). Effect of Lactobacillus rhamnosus GG Administration on Vancomycin-Resistant Enterococcus Colonization in Adults with Comorbidities. Antimicrobial Agents and Chemotherapy, 59 (8), 4593–4599. doi: http://doi.org/10.1128/aac.00300-15

46. Holzapfel, W. H., Haberer, P., Geisen, R., Björkroth, J., Schillinger, U. (2001). Taxonomy and important features of probiotic microorganisms in food and nutrition. The American Journal of Clinical Nutrition, 73 (2), 365s–373s. doi: http://doi.org/10.1093/ajcn/73.2.365s

47. Klein, G. (2011). Antibiotic Resistance and Molecular Characterization of Probiotic and ClinicalLactobacillusStrains in Relation to Safety Aspects of Probiotics. Foodborne Pathogens and Disease, 8 (2), 267–281. doi: http://doi.org/10.1089/fpd.2010.0672

48. Stefanov, A. V. (Ed.) (2002). Doklinicheskie issledovaniia lekarstvennykh sredstv. Metodicheskie rekomendatsii. Kyiv: Avitsena, 568.

49. Liaskovskii, T. M., Podgorskii, V. S. (2005). Otsenka probiotikov soglasno rekomendatsii mezhdunarodnykh organizatsii (FAO/WHO). Mikrobiologicheskii zhurnal, 67 (6), 104–112.

DOI: 10.15587/2519-8025.2020.202153

SPECIES STRUCTURE OF THE BIRD COMMUNITIES OF THE MIDDLE UZH RIVER FLOW IN ZAKARPATTIA PROVINCE OF UKRAINE IN THE NESTING PERIOD

p. 31-38

Oksana Stankiewicz-Volosianchuk, PhD, Department of Zoology, Uzhhorod National University, Narodna sq., 3, Uzhhorod, Ukraine, 88000
E-mail: oksana.stankiewicz-volosianchuk@uzhnu.edu.ua
ORCID: *http://orcid.org/0000-0002-8150-7465*

The article analyzes characteristics of the species structure of the bird communities in the middle Uzh river valley in the

breeding period by the ratio of the number of species and their abundance, the shares of dominant, background and rare species, the types of nesting and feeding, landscape and ornitho-geographic aspects. The main factors for the formation of the species diversity and the peculiarities of the species structure of bird communities have been identified.

The goal of the study *was to investigate and analyze the species structure of bird communities to determine the intensity of the urbanization impact onto the natural ecosystems in this segment of the Uzh valley.*

Material and Methods. *Data were collected during the 2016–2018 years during nesting periods. The bird censuses were conducted by the route method, followed by processing of the collected data.*

Results and discussion. *Within the study period, 71 bird species have been identified here. The bird population density is 839.64 ind./km2. Birds of forest landscapes (47.9 %) are dominant. Tree-nesting (in crowns, hollows, and shrubs) birds composed in total 60.6 %. The share of zoophagous birds is 57.7 %. By the fauna type, trans-Palearctic species are dominant: 42.3 %.*

By the fauna type, transpalearctic species are dominant (42.3). The urbanization of the Uzh valley is evidenced by the presence of a group of synanthropic bird species, which are inseparably linked to rural settlements, located along the river (share of all species – 12.7 %, share of total bird population – 17.15 %).

Conclusions. *The species structure of birds communities during the nesting season in the middle Uzh river flow evidences that the impact of urbanization on natural ecosystems of the river valley is low despite the close location of villages*

Keywords: *river Uzh valley, bird community structure, dominant and subdominant species, synanthropes, Zakarpattia region*

References

1. Odum, E. P. (1968). Energy Flow in Ecosystems: A Historical Review. American Zoologist, 8 (1), 11–18. doi: http://doi.org/10.1093/icb/8.1.11

2. Portenko, L. A. (1950). Ocherk fauny ptits Zapadnogo Zakarpatia. Pamiati akademika P. P. Sushkina. Moscow-Leningrad, 301–359.

3. Strautman, F. I. (1963). Ptitsy Zapadnykh oblastei USSR. Vol. 1. Lviv: Izdatelstvo Lvov. un-ta, 199.

4. Hrabár, A. (1932). Ptactvo na Podkarpatské Rusi. Sbornik Zemské muzejní společnosti v Užhorod, 59–86.

5. Lugovoi, A. E., Bodnar, V. V., Gerevich, A. V., Kuzma, V. Iu., Mateleshko, A. Iu., Mateleshko, Iu. I. et. al. (1993). Gnezdovaia fauna techeniia r. Uzh. Fauna Skhidnikh Karpat: suchasnii stan i okhorona. Uzhgorod, 133–135.

6. Lugovoi, A. E., Potish, L. A. (1998). Materialy inventarizatsii ornitofauny regionalnogo landshaftnogo parka «Stuzhitsa». Zapovidna sprava v Ukraini, 4 (2), 24–32.

7. Potiš, L., Stankevič, O. (1997). Zimní sčítaní ptáků na řece Už v Užhorodě (Ukrajina) v roce 1994/95. Zprávy ČSO, 44, 15–16.

8. Stankevich, O. I. (2000). Zimovki vodoplavaiushchikh i okolovodnykh ptits na reke Uzh v predelakh goroda Uzhgoroda. Ptitsy Azovo-CHernomorskogo regiona na rubezhe tysiacheletii. Odessa, 14–15.

9. Stankevych-Volosianchuk, O. I. (2012). Vydovyi sklad ta dynamika chyselnosti vodno-bolotianykh ptakhiv u misti Uzhhorodi protiahom 1993–2012 rokiv. Troglodytes. Pratsi ZUOT, 3, 39–45.

10. Blair, R. B., Johnson, E. M. (2008). Suburban habitats and their role for birds in the urban–rural habitat network: points of local invasion and extinction? Landscape Ecology, 23 (10), 1157–1169. doi: http://doi.org/10.1007/s10980-008-9267-y

11. Naithani, A., Bhatt, D. (2012). Bird community structure in natural and urbanized habitats along an altitudinal gradient in Pauri district (Garhwal Himalaya) of Uttarakhand state, India. Biologia, 67 (4), 800–808. doi: http://doi.org/10.2478/s11756-012-0068-z

12. Styring, A. R., Unggang, J., Jukie, A., Tateh, O., Megom, N., Sheldon, F. H. (2018). Bird community structure in native forest fragments and Acacia mangium plantations in Borneo. The Wilson Journal of Ornithology, 130 (1), 112–130. doi: http://doi.org/10.1676/16-125.1

13. Mengesha, G., Mamo, Y., Bekele, A. (2011). A comparison of terrestrial bird community structure in the undisturbed and disturbed areas of the Abijata Shalla lakes national park, Ethiopia. International Journal of Biodiversity and Conservation, 3 (9), 389–404.

14. Ravkin, E. S., Chelintsev, N. G. (1990). Metodicheskie rekomendatsii po kompleksnomu marshrutnomu uchetu ptits. Moscow: Izd. VNII Priroda, 33.

15. Fesenko, H. V., Bokotei, A. A. (2007). Anotovanyi spysok ukrainskykh naukovykh nazv ptakhiv Ukrainy (z kharakterystykoiu statusu vydu) Kyiv-Lviv, 112.

16. Kuziakin, A. P. (1962). Zoogeografiia SSSR. Uchenye zapiski MOPI im. Krupskoi, 109, 3–182.

17. Shtegman, B. K. (1938). Osnovy ornitogeograficheskogo deleniia palearktiki. Fauna SSSR, ptitsy. Vol. 1 (2). Moscow-Leningrad, 156.

18. Sazonov, V. S. (2012). Onovlennaia klassifikatsiia tipov fauny i faunisticheskikh grupp ptits dlia zapada Evraziiskoi taigi. Trudy Karelskogo nauchnogo tsentra RAN, 1, 70–85.

19. Uitteker, R. (1980). Soobshchestva i ekosistemy. Moscow: Progress, 328.

20. Lugovoi, A. E., Potish, L. A., Kuzma, V. Iu., Gerevich, A. V. (2001). Izmeneniia v faune ptits doliny r. Uzh (Zakarpate) vo vtoroi polovine XX stoletiia. Berkut, 10 (1), 26–30.

21. Stankevych-Volosianchuk, O. I. (2012). Urbolandshafty yak ekokorydory pronyknennia invaziinykh vydiv u sklad rehionalnoi bioty. Dynamika riznomanittia. Luhansk, 170–176.

22. Stankevych, O. I. (2004). Fauna ta naselennia ptakhiv mista Uzhhroda u hnizdovyi period. Naukovyi visnyk Uzhhorodskoho universytetu. Seriia biolohiia, 15, 123–128.

23. Bulakhov, V. L., Emelianov, Y. H., Pakhomov, A. E. (2003). Znachenye byoraznoobrazyia v stanovlenyy ekolohycheskoi ustoichyvosty y funktsyonyrovanyy ekosystem. Bioriznomanittia ta rol zootsenozu v pryrodnykh i antropohennykh ekosystemakh. Dnepropetrovsk, 6–7.

DOI: 10.15587/2519-8025.2020.198951

SPECIES STRUCTURE OF THE EPHEMEROIDS OF THE REGIONAL PARK OF LOCAL IMPORTANCE «NEMYRIV POBUZHIA» NEAR THE VILLAGE OF HVOZDIV

p. 39-43

Oksana Shevchuk, PhD, Associate Professor, Department of Biology, Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University, Ostrozhskogo str., 32, Vinnytsa, Ukraine, 21100
E-mail: shevchukoksana8@gmail.com
ORCID: *http://orcid.org/0000-0003-3727-9239*

Svetlana Kryklyva, PhD, Assistant Professor, Department of Pharmacy, National Pirogov Memorial Medical University, Pirogova str., 56. Vinnitsya, Ukraine, 21018
ORCID: *http://orcid.org/0000-0002-6071-7957*

Victoria Shevchuk, Postgraduate Student, Department of Agriculture, Soil Science and Agrochemistry, Vinnytsia National Agrarian University, Soniachna str., 3, Vinnytsia, Ukraine, 21008
ORCID: *http://orcid.org/0000-0002-4525-2426*

Olena Khodanitska, PhD, Senior Lecturer, Department of Biology, Mykhailo Kotsyubynsky Vinnytsya State Pedagogical University, Ostrozhskogo Str., 32, Vinnytsya, 21000, Ukraine
ORCID: *http://orcid.org/0000-0001-5887-1755*

Olesya Tkachuk, PhD, Assistant Professor, Department of Biology, Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University, Ostrozhskogo str., 32, Vinnytsa, Ukraine, 21100
ORCID: *http://orcid.org/0000-0002-6649-7975*

Victoria Vergelis, Assistant, Department of Ecology and Environmental Protection, Vinnytsia National Agrarian University, Soniachna str., 3, Vinnytsia, Ukraine, 21008
ORCID: *http://orcid.org/0000-0003-1699-0064*

Analyzing the literature data, it was found, that the majority of ephemeroids that grown in the territory of Ukraine are directly or indirectly influenced by humans, which leads to accelerated rates of decrease in their number. Urban factors influence not only the species structure of populations, but also their absolute quantitative indicators.

***The purpose of the research** was to study the floristic composition of ephemeroid plants in the territory of a landscape park of local importance «Nemyrivske Pobuzhya» near the village of Gvozdiv, Nemyriv, district of Vinnytsia region.*

***Materials and methods.** The study of the floristic composition of ephemeroid plants in the territory of the landscape park of local importance «Nemyrivske Pobuzhzhya» was carried out by the expedition-route method, as well as by the accidental-regulatory method - laying of accounting sites with an area of 1 m2. The systematic identification of plants was determined using a designator. The abundance of species was determined by the Gult-Drude scale (with the addition of A. Uranov and P. Yaroshenko). The meeting coefficient (%) was determined by the formula: R=a×100/n.*

***Results.** It was revealed, that on the territory of Nemyrivske Pobuzhya the structure of the ephemeroid plants includes 27 species of plants, belonging to 19 genus, 14 families, 12 orders and 2 classes. Such orders as Ranunculales (7 species or 25.9 % of the total ephemeroid species), Papaverales (4 species or 14.8 %), Liliales (4 species or 14.8 %), Amaryllidales (3 species or 11.1 %), Capparales (2 species or 7.4 %) are represented by the largest number Anemone sylvestris L., Ficaria verna L., Viola odorata L., Galanthus nivalis L. were dominant among the species.*

***Conclusions.** It was established, that Galanthus nivalis L. is one species that is growing at the researched area and registered in the IUCN Red List of Threatened Species; and two species (Allium ursinum L. and Galanthus nivalis L.), included in the «European Red List». 6 species of ephemeroids are included in the Red Book of Ukraine: Leucojum vernum L., Allium ursinum L., Galanthus nivalis L., Crocus reticulatus Stev. ex Adams., Pulsatilla grandis Rupr. and Pulsatilla pratensis L. (Mill). 4 species of plants have the status of rare plants of regional importance: Anemone sylvestris L., Dentaria bulbifera L., Dentaria quinquefolia M. Bieb. and Primula veris L.*

***Keywords:** ephemeroid plants, species structure, density, coefficient of occurrence, rare plants*

References

1. Shevchuk, O. A., Kryshtal, O. O. (2013). Ridkisni ta znykaiuchi vydy likarskykh roslyn Vinnychchyny. Obrazovanyeto y nauka te na XXI vek – 2013. Materyaly za IKh Mezhdunarodna nauchna praktychna konferentsyia, 12, 17–19.

2. Kryklyva, S. D., Shevchuk, O. A., Klimas, L. A., Holunova, L. A. (2015). Vydovyi sklad likarskykh roslyn luchnoho fitotsenozu Nemyrivskoho Pobuzhzhia. Visnyk Vinnytskoho natsionalnoho medychnoho universytetu im. M. I. Pyrohova, 2 (19), 328–330.

3. Tkachuk, O. O. (2015). Vyvchennia otruinykh roslyn pid chas prokhodzhennia polovoi praktyky z botaniky. Biomedical and biosocial anthropology, 25, 169–172.

4. Shevchuk, O. A., Tkachuk, O. O. (2018). Oznaiomlennia z likarskymy roslynamy pid chas provedennia praktyk z biolohichnykh dystsyplin. Aktualni problemy heohrafichnykh, biolohichnykh i khimichnykh nauk: osnovni naukovi problemy ta perspektyvy doslidzhennia, 16 (21), 64–66.

5. Bilz, M., Kell, S. P., Maxted, N., Lansdown, R. V. (2011). European Red List of Vascular Plants. Luxembourg: Publications Office of the European Union, 132.

6. Pavliuk, N. V., Pavliuk, H. M. (2013). Rezultaty okulturennia roslyn efemeroidiv pryrodnoi flory Ukrainskoho Roztochchia. Naukovyi visnyk NLTU Ukrainy, 23 (4), 51–55.

7. Kondratiuk, O. O., Skavronska, V. O., Poliak, A. V., Shevchuk, O. A., Tkachuk, O. O. (2018). Doslidzhennia ridkisnykh ta znykaiuchykh efemeroidii Ukrainy. Science and civilization – 2018, 12, 13–16.

8. IUCN Red List of Threatened Species. (2011). Version 2. Available at: www.iucnredlist.org

9. Shevchuk, O. A., Holunova, L. A., Tkachuk, O. O., Kryklyva, S. D. (2017). Florystychna kharakterystyka zaplavnykh luk rehionalnoho landshaftnoho parku mistsevoho znachennia «Nemyrivske Pobuzhzhia» poblyzu s. Hvozdiv. Naukovi zapysky. Seriia: Heohrafiia, 29 (3-4), 32–37.

10. Shevchuk, O. A., Tkachuk, O. O., Khodanitska, O. O. (2019). Efemeroidy Vinnychchyny. Aktualni pytannia heohrafichnykh i biolohichnykh nauk: osnovni naukovi problemy ta perspektyvy doslidzhen. Zbirnyk naukovykh prats VDPU, 17 (22), 58–59.

11. Holunova, L. A., Shevchuk, O. A. (2019). Pryroda Vinnychchyny. Roslyny. Vinnytsia: PrAT«Vinnytska oblasna drukarnia», 354.

12. Tikhodeeva, B. IU., Lebedeva, V. KH. (2015). Prakticheskaia geobotanika (analiz sostava rastitelnykh soobschestv). Saint-Peterburg: Izd-vo S.-Peterb. un-ta, 166.

13. Yakubenko, B. Ye., Popovych, S. Yu., Hryhoriuk, I. P., Melnychuk, M. D. (2011). Heobotanika: tlumachnyi slovnyk. Kyiv: Fitosotsiotsentr, 420.

DOI: 10.15587/2519-8025.2020.202116

THE INFLUENCE OF MONOCHROMATIC LIGHT WITH DIFFERENT WAVELENGTHS ON THE GROWTH OF AQUARIUM PLANTS

p. 44-51

Oleg Shugurov, Doctor of Biological Sciences, Senior Researcher, Department of General Biology and Aquatic Bioresources, Oles Honchar Dnipro National University, Gagarin ave., 72, Dnipro, Ukraine, 49010
E-mail: oshugurov@gmail.com
ORCID: *http://orcid.org/0000-0001-5943-2260*

The aim *of our work is to determine the growth efficiency of aquarium plants under conditions of their separate monochromatic illumination (red, yellow, green and blue waves) under continuous exposure for 60 days at 20–22 °C.*

Materials and Methods. *For the study, we selected aquatic plants, living in different layers of the water column – hornwort (Ceratophyllum demersum L., 1753), echinodorus (Echinodorus quadricostatus Fasset, 1955) and pistia (Pistia stratiotes L., 1753). All aquariums were wrapped in black paper to eliminate outside lighting. Over the water surface, 6 LEDs of the FYL-3014 SRC brand were fixed. These LEDs generated waves with a length of λ=660 nm (red), 590.2 nm (yellow), 574 nm (green) and 470 nm (blue). The total power of the waves of different colors was regulated using variable resistors. Irradiation of plants was carried out continuously. In the process of the research, we repeatedly measured the mass, length of leaves and plant roots.*

Result. *We determined that the growth of the mass, leaves, and roots of Echinodorus quadricostatus and Ceratophyllum demersum is maximum, when illuminated by blue waves (the total increase in morphometric parameters is 31 % and 37 %, respectively). Smaller growth of plants was noted for red waves (16 % and 33 %). Yellow and green waves suppressed a mild increase of their parameters by 5–6 %. For Pistia stratiotes the maximum growth was noted primarily for the plant mass for red light waves (14 %), for blue and green the parameters remained almost unchanged. The monochromatic yellow light led to the degradation of this plant. The averaged effect of the total effect of monochromatic waves in all studied parameters of various aquatic plants is estimated. According to our data, blue and red light quite effectively support the growth of all aquatic plants, when illuminating the water system with yellow and green waves, the growth of aquatic plants is minimal.*

Conclusions. *It was revealed, that the efficiency of light absorption by various aquatic plants is significantly different, while the main factor of such differences is their species composition, but not the depth of the plant in the water column. Such plants as Pistia stratiotes, Ceratophyllum demersum and Echinodorus quadricostatus exhibit the intensive growth under the influence of blue or red light. In this case the maximum growth of the mass, root length, linear size of leaves in 60 days reaches 30–35 % (for different types of plants). Influence isolated green and yellow light in aquatic plants gives a slight positive growth effect (5–8 %), or even lead to the inhibition of growth and death (Pistia stratiotes). Obviously, the monochrome illumination of aquarium systems can be used to minimize energy costs during growing industrial aquatic plants for food purposes, as well as for propagating individual decorative species. Our data show that the growing of studied aquatic plant species is most effective (energy saving, plant growth rate) under the influence of blue or red light, and possibly a combination of both. We say that the selection of aquarium plants for growing or aquarium design goals must be carried out, taking into account the specifics of their response to the selected frequency of light waves. We can recommend additional illumination of aquatic plants with green and yellow light in an aquarium only for design purposes*

Keywords: *monochromatic waves, lighting, aquarium plants, morphometric parameters, growth*

References

1. Konstantinova, A. A. (2017). Znachenie rastenii-oksigenatorov v landshaftnom dizaine. Mezhdunarodnii studencheskii nauchnii vestnik, 5. Available at: http://www.eduherald.ru/ru/article/view?id=17686

2. Kurianov, S. A. (2015). Metodika rascheta energeticheskikh kharakteristik izlucheniia svetodiodov dlia dosvechivaniia rastenii. Vestnik Michurinskogo gosudarstvennogo agrarnogo universiteta, 1, 185–194.

3. Dudina, P. S., Stavitskii, A. V. (2017). Vliianie spektra izlucheniia fitolampy i ee primenenie v rastenievodstve v domashnikh usloviiakh. Aktualnye voprosy nauki i khoziaistva: novye vyzovy i resheniia, 54–57.

4. Kreslavskii, V. D., Khristin, M. S., Shabnova, N. I., Liubimov, V. Iu. (2012). Predobluchenie otdelennykh listev shpinata krasnym svetom povyshaet ustoichivost fotosinteticheskogo apparata k UF-radiatsii. Fiziologiia rastenii, 59 (6), 723–729.

5. Petrov, A. O., Toguzov, S. A., Petrov, I. K., Vasiukov, S. V. (2016). Razrabotka intellektualnoi sistemy osveshcheniia rastenii. Informatsionnye tekhnologii v elektrotekhnike i elektroenergetike, 326–328.

6. Nakonechnaia, O. V., Gafitskaia, I. V., Burkovskaia, E. V. et. al. (2019). Vliianie intensivnosti sveta na morfogenez Stevia rebaudiana v usloviiakh in vitro. Fiziologiia rastenii, 66 (4), 304–312.

7. Mempel, Kh., Vittman, S. (2019). Potentsial i ispolzovanie iskusstvennogo osveshcheniia v rastenievodstve. Svetotekhnika, 1, 24–31.

8. Martirosian, Iu. Ts., Dilovarova, T. A., Martirosian, V. V., Kreslavskii, V. D., Kosobriukhov, A. A. (2016). Deistvie svetodiodnogo oblucheniia raznogo spektralnogo sostava na fotosinteticheskii apparat rastenii kartofelia (Solanum tuberosum l.) v kulture in vitro. Selskokhoziaistvennaia biologiia, 51 (5), 680–687. doi: http://doi.org/10.15389/agrobiology.2016.5.680rus

9. Belous, O. G., Malyarovskaya, V. I., Kolomiets, T. M. (2012). Effect of spectral composition of lighton growth of chryzantemum morifolium in vitro. Nauka i Studia: Przemyśl, 10 (55), 30–35.

10. Gerts, A. I. (2009). Osobennost rosta i razvitiia Brassica rapavar. astroplants v izmeniaiushchikhsia svetovykh poliakh raznoi intensivnosti i spektralnogo sostava. Kiiv, 20.

11. Blaszczak, U. J., Abdel Aziz, D., Gryko, L. (2017). Influence of the spectral composition of LED lighting system on plants cultivation in a darkroom. Photonics Applications in Astronomy, Communications, Industry, and High Energy Physics Experiments 2017. doi: http://doi.org/10.1117/12.2281023

12. Rubin, A. B. (2005). Biofizika fotosinteza i metody ekologicheskogo monitoringa. Tekhnologii zhivykh sistem, 2, 47–68.

13. Hou, H. J., Najafpour, M., Moore, G. F., Allakhverdiev, S. I. (2017). Photosynthesis: Structures, mechanisms, and applications. Springer International Publishing, 417. doi: http://doi.org/10.1007/978-3-319-48873-8

14. Darko, E., Heydarizadeh, P., Schoefs, B., Sabzalian, M. R. (2014). Photosynthesis under artificial light: the shift in primary and secondary metabolism. Philosophical Transactions of the Royal Society B: Biological Sciences, 369 (1640), 20130243. doi: http://doi.org/10.1098/rstb.2013.0243

15. Maliarovskaia, V. I., Kolomiets, T. M., Sokolov, R. N., Samarina, L. S. (2013). Vliianie spektralnogo sostava sveta na rost i razvitie Lilium caucasicum v usloviiakh kultury in vitro. Nauchnii zhurnal KubGAU, 94 (10), 1–11.

16. Dovlatov, I. M., Iuferev, L. Iu. (2019). Analiz spektrov pogloshcheniia elektromagnitnogo izlucheniia pigmentami rastenii. Innovatsii v selskom khoziaistve, 2 (31), 146–153.

17. Hoecker, U. (2017). The activities of the E3 ubiquitin ligase COP1/SPA, a key repressor in light signaling. Current Opinion in Plant Biology, 37, 63–69. doi: http://doi.org/10.1016/j.pbi.2017.03.015

18. Liu, B., Yang, Z., Gomez, A., Liu, B., Lin, C., Oka, Y. (2016). Signaling mechanisms of plant cryptochromes in Arabidopsis thaliana. Journal of Plant Research, 129 (2), 137–148. doi: http://doi.org/10.1007/s10265-015-0782-z

19. Voitsekhovskaia, O. V. (2019). Fitokhromy i drugie (foto)retseptory informatsii u rastenii. Fiziologiia rastenii, 66 (3), 163–177.

20. Sase, S., Ling, P. P. (1996). Quantification of lighting spectral quality effect on lettuce development using machine vision. Acta Horticulturae, 440, 434–439. doi: http://doi.org/10.17660/actahortic.1996.440.76

21. Murzak, N. A., Bryl, S. V., Murzak, I. A., Kapyrina, V. N., Zaitseva, T. A. (2016). Otsenka effektivnosti svetodiodnogo osveshcheniia s pozitsii ekologii i energosberezheniia. Ekologiia i stroitelstvo, 4, 36–42.

22. Berkovich, Iu. A., Buriak, A. A., Ochkov, O. A., Smolianina, S. O., Perevedentsev, O. V., Lapach, S. N. (2019). Nekotorye puti optimizatsii svetodiodnogo osveshcheniia v svetokulture rastenii. Svetotekhnika, S, 37–42.