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**The title of dissertation:** Factors shaping population genetic structure of common roach (*Rutilus rutilus*) and duckweed (*Lemna minor*)

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**Summary EN**

The common roach (*Rutilus rutilus*, Linnaeus 1758) is a widespread fish belonging to the *Cyprinidae* family, capable of adapting to various types of water bodies, therefore fish populations are found in various freshwater bodies in Europe and most of the Asian continent. The duckweed (*Lemna minor*) is one of the most widespread species of free-floating plants in Lithuania and throughout the world, and usually reproduces vegetatively by budding, forming genetically identical clones. Using the sequences of the mitochondrial DNA (mtDNA) adenosine triphosphate 6 (ATP6) gene and the D-loop region of the common roach, as well as the nuclear ascorbate peroxidase (APx) and chloroplast microsatellite markers of duckweed, population studies were conducted in the Lithuanian and Latvian regions. The impact of anthropogenic factors such as thermal pollution or electromagnetic radiation and environmental conditions on the genetic variability of the populations of the common roach and duckweed was also assessed. The high genetic similarity between geographically distant roach populations revealed specific relationships depending on different characteristics. Also, high genetic similarity was found between geographically distant clones of small floating plants collected in stagnant water bodies. Comparing roach samples collected in 2017 and 2022 in the former Ignalina NPP cooler - Lake Drūkšiai, using molecular markers of the mtDNA ATP6 gene and D-loop region sequences, a significant decrease in genetic diversity was found in the roach population of this lake. Exposure of duckweed clones grown inside a Helmholtz coil to low-frequency (50 Hz) electromagnetic radiation, when the electromagnetic field density reaches 2 µT (0-11 weeks) and 300 µT (12-48 weeks), initiates changes in genetic variability in the sequences of the (ascorbate peroxidase) APx, (glutathione peroxidase) GPx and (catalase) Cat genes due to an increasing number of point mutations mainly in the promoter and intron regions.

**LIST OF PUBLICATIONS OF THE DISSERTATION TOPIC**

1. **Ignatavičienė I.,** Vyšniauskienė R., Rančelienė V., Petrošius R., Grauda D., Butkauskas D. The effects of electromagnetic field radiation of extremely low frequency on growth parameters and nucleotide substitutions in Lemna minor clones. Acta Physiologiae Plantarum, (2024), https://doi.org/10.1007/s11738-024-03675-3
2. **Ignatavičienė I.,** Ragauskas A., Rakauskas V., Butkauskas D. Quality of DNA extracted from freshwater fish scales and mucus and its application in genetic diversity studies of Perca fluviatilis and Rutilus rutilus. Biology Methods & Protocols, 8(1), (2023). https://doi.org/10.1093/biomethods/bpad022
3. Butkauskas D. **Ignatavičienė I.,** Ragauskas A., Rakauskas V. Temporal Variation of Genetic Diversity in Rutilus rutilus Populations from Lithuania Using mtDNA Markers in the Context of Anthropogenic Activities. Diversity, 15(11), (2023) https://doi.org/10.3390/d15111113
4. Ragauskas A., **Ignatavičienė I.,** Rakauskas V., Grauda D., Prakas P., Butkauskas D. Trends of Eurasian Perch (Perca fluviatilis) mtDNA ATP6 Genetic Diversity within the Eastern Part of the Baltic Sea Region in the Anthropocene. Animals, 13(19), (2023). https://doi.org/10.3390/ani13193057
5. **Ignatavičienė I.,** Vyšniauskienė, R., Rančelienė V., Petrošius R., Grauda D., Butkauskas D. Effects of Low Frequency Electromagnetic Radiation on Lemna minor growth parameters and generation of point mutations at GPx, CAT and APx genes. 180th International Scientific Conference of the University of Latvia Innovative and applied research in Biology, Proceedings, Volume 4, Riga, 2022, 45. https://doi.org/10.22364/iarb.2022.07
6. Žagata K., Butkauskas D., Vyšniauskienė R., Rančelienė V., **Ignatavičienė I.,** Selga T., Miķelsone A., Rashal I., Grauda D. Establishing of an axenic lemna minor line as a model organism for wide spectre of biological and environmental investigations. Proceedings of the Latvian academy of sciences. Section B, vol. 77 (2023), No. 3/4 (744/745), pp. 20–30. https://doi.org/10.2478/prolas-2023-0025