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**PROGRAMME
AND ABSTRACTS**

were compared, most probably associated with specific expression profiles of individual pigment cell types predominating in a particularly coloured skin region, and also when comparing only dark regions or only light regions between the two species, possibly associated with skin pigment pattern. The expression profile of over 40 DEGs was further tested with quantitative real-time PCR on a larger number of samples. Expression of a subset of ten of these genes was analysed in differently coloured regions of skin of hybrid (marble x brown) trout individuals and compared with the complexity of their skin pigment pattern. A correlation between the phenotype and the expression profile assessed for hybrid individuals was detected for four (*gja5*, *clcn2*, *cdkn1a* and *tjp1*) of the ten candidate genes tested. The potential role of these genes in skin pigment pattern maintenance was assessed. The involvement of all four candidate genes suggests the importance of bioelectrical signalling, depolarisation, cytoskeleton rearrangement and cellular movement in skin pigment pattern maintenance in trout. Furthermore, a subset of candidate genes, overexpressed specifically in the red spot of brown trout compared to other skin regions was analysed in differently coloured skin regions of brown trout. Recently, using electron microscopy, a novel erythrophore type 2 with a unique ultrastructure, located only in red spot skin sections was described. Differential gene expression profile of red spot might indicate that there are specific pathways involved in either carotenoid metabolism or communication between these specific pigment cells and their surrounding cells, or both, resulting in the formation of a red spot in brown trout. Our results indicate an important role of homotypic and/or heterotypic intercellular interactions between pigment cells, involving gap junctions, tight junctions and ion channels, in the maintenance of different pigment patterns in trout as a consequence of differential gene expression.

Fish biodiversity dynamics in the Western part of Lake Balkash (Central Asia) (ThrP9)

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Lake Balkash is one of the biggest lakes of Central Asia and belongs to the Republic of Kazakhstan. The Ili River is the main water source of the lake. The delta of the river is the biggest wetlands of Central Asia. Indigenous fish fauna of the lake

consisted of 9 resident fish species, and 2 more species were observed occasionally. More than 20 alien fish species had been introduced there during 1930-1960. It led to the total extirpate of indigenous fish species. Since 1970th the delta of the Ili was considered as the main place of commercial fish reproduction. Soviet effective system of commercial fish protection was destroyed with crash of Soviet Union. At the same time, the number of people in the region increased significantly after migration from other regions of the country. It led to the illegal fishery and high pollution of water resources. Investigation of fish community dynamics and an evaluation of the modern state of their diversity and population were the aims of our investigation. Fish sampling was provided according to special permission of local fishery authority with allowed gears (gill nets and drug nets, because electrofishing is strongly prohibited in the Republic of Kazakhstan). Biological and morphological analyzes of fish were performed by the routine method.

Sixteen alien fish species were found in the western part of Lake Balkash and the delta of the Ili River during 2017-2019 surveys. Asp *Aspius aspius*, Bream *Abramis brama*, Prussian carp *Carassius gibelio*, Common carp *Cyprinus carpio*, Grass carp *Ctenopharyngodon idella*, Silver carp *Hypophthalmichthys molitrix*, Roach *Rutilus rutilus*, Wels catfish *Silurus glanis*, Pikeperch *Sander lucioperca*, Volga perch *Sander volgensis*, and Amur snakehead *Channa argus* were commercial fish species. Non-commercial fish species were diverse and numerous and were presented by Amur false gudgeon *Abbottina rivularis*, Common sawbelly *Hemiculter leucisculus*, topmouth gudgeon *Pseudorasbora parva*, bitterling *Rhodeus ocellatus*, medaka *Oryzias sinensis*, beautiful sleeper *Micropercops cinctus*, and Amur goby *Rhinogobius similis*. Probably, Fringebarbel sturgeon *Acipenser nudiventris* and Aral barbel *Luciobarbus brachycephalus* still inhabited the delta. In addition, only a single specimen of indigenous Balkash perch *Perca schrenkii* were observed there. Many of commercial fish species were presented by adult specimens only. Compared to data obtained 40 years ago, drastic changes occurred in the structure of young fish community. At the end of the last century, Carp and Barbel juveniles dominated in the delta of the Ili River; juveniles of other commercial fish species were also numerous, juvenile Fringebarbel sturgeons were reported too. Currently, the non-commercial small fishes dominate in the delta. The growth rate of juveniles of commercial fish species is currently not significantly different from the growth rate in the last century. Large values of the asymmetry coefficient of bilateral signs indicate impaired homeostasis in the development of juvenile fish.