



## Otolith shape analysis to discriminate among morpho-ecological groups of Baikal omul (*Coregonus migratorius* Georgi)

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with 5 figures and 2 tables

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**Abstract:** Baikal omul (*Coregonus migratorius* Georgi) is a typical representative of the coregonid fishes with a complicated intraspecific structure consisting of several large and many small populations and three eco-morphotypes. Therefore, it is difficult to identify intraspecific groups from a mixed catch. Despite basic identification characteristics being well-studied, it is still necessary to identify diagnostic characters for the different intraspecific groups. Therefore, we studied differences in the contour shapes of otoliths of omul in specimens from large spawning rivers such as the Verkhnyaya Angara (Upper Angara), Selenga and Bolshaya Rechka. Digitised contour shapes of individual otoliths were analysed based on measurements of a large number of otolith radii, starting from the geometrical centre and measuring 60 equally-spaced radii. Discriminant analysis with step-by-step inclusion of variables (i.e. additional radii) was performed to detect the most informative combination of measurements. Total classification success was 87%. We succeeded in finding radii for discrimination of the contour shape in the rostrum, anterostrum, ventral and postrostrum areas. The following areas of sagittae are recommended for diagnostics of morpho-ecological groups of omul: a contour shape of rostrum in the deep-pelagic omul and a contour shape of postrostrum in pelagic and coast-pelagic omul. These studies demonstrate the general usefulness of this technique and its prospects for the discrimination of intraspecific groups of coregonid fishes.

**Keywords:** Morphology, shape analysis, discriminant analysis, coregonid fishes.

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### Introduction

High intraspecific variability, as a result of adaptation to occupying vast aquatic spaces, is characteristic of fish populations with high abundances (Nikolsky 1974, Nikolsky 1980, Shmalgauzen 1969, Shatunoskiy & Ruban 2010). Adaptation mechanisms, in these cases,

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