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ERYTHROCYTE MORPHOMETRY IN PONTIC SHAD (*ALOSA IMMACULATA*)



Srdan SUBOTIĆ *, Željka VIŠNJIĆ JEFTIĆ ** and Mirjana LENHARDT ***

* Faculty of Biology, University of Belgrade, Serbia, ssubotic@bio.bg.ac.rs,

** Institute for Multidisciplinary Research, University of Belgrade, Serbia, zvisnjic@imsi.rs

*** Institute for Biological Research "Siniša Stanković", lenhardt@ibiss.bg.ac.rs

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Abstract

Pontic shad (*Alosa immaculata*) is a migratory fish species, which undergoes long (863 km) migrations along the Danube River, from the Black Sea to the first obstacle that stops the migration, the Iron Gate II dam.

Individuals used in this study were caught using drift nets, in 2018 (n=11) and 2019 (n=11), few kilometres downstream of the Iron Gate II Dam, near the village of Prahovo, Serbia. Total length (to the nearest cm) and weight (to the nearest g) were measured. Blood samples were taken from the live individuals and two blood smears were prepared, on microscopic slides, for each individual.

Slides were stained with Bio-Diff kit (Bio Optica, Milano, Italy) and observed and photographed under DM RB photomicroscope (Leica, Wetzlar, Germany). Pictures were analysed using the Digimizer image analysis software which automatically calculated cellular and nuclear parameters of red blood cells.

The proportion of immature, intermediate, and mature erythrocytes were calculated and the differences in cellular and nuclear parameters were tested using the Mann-Whitney U test. Average length of the fish caught at 2018 was 31.9 ± 3.9 cm, with the average weight of 188.9 ± 48.9 g. Individuals from 2019 sampling had an average length of 29.6 ± 2.7 cm, and the average weight of 147.2 ± 57.5 g. Average value of Fulton's condition factor did not differ between sampling seasons ($K=0.57$). Overall, in both years, immature erythrocytes constitute the majority (>57%) of analysed red blood cells. Individuals caught at 2018 had higher proportion of immature and intermediate cells, while fish caught at 2019 had higher proportion of mature cells. Mann-Whitney U test showed no statistically significant differences in cell area, parameter and length between fish caught at different years.

The same morphometric parameters, observed for nucleus, showed statistically significant differences. Our study shows that anadromous fish, such as pontic shad, which undergoes long migrations, have 2-2.5 times higher proportion of immature erythrocytes than potamodromous vimba bream (*Vimba vimba*), a medium distance migratory fish species.