

**MODELING CHANGES IN RELATIONSHIPS
OF SYSTEM COLOROMETRIC PARAMETERS
IN SALMO SALAR NUPTIAL COLORATION**

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In the context of global climate change, expanding the arsenal of means for recording various aspects of ecological balance, including those related to fluctuations in numbers and migrations of animals, becomes important. In the case of fish, this is important due to their importance as organisms whose harvesting is important for food security. We can also talk about animals that are carriers of dangerous infections and agricultural pests, as well as animals that are their natural enemies, which stabilize their populations. The nuptial coloration of fish, in contrast to the protective coloration of animals, has the function of transmitting information to the sexual partner about the location of the other sexual partner. At the same time, coloration retains a certain meaning to protect the individual from detection by a predator.

The subject of this work is to model the relationship between diversity and evenness of fish coloration that occurs during the mating season. The modeling was carried out on the basis of factual information about the components of the RGB-model of freely available digital photos of noble salmon (*Salmo salar*) using Python. The values of the following system colorometric parameters (SCP) were determined for each pixel: $G/(R+G+B)$, $R/(R+G+B)$, $(R+G)/(R+G+B)$, R/G . It was assumed that these SCP correspond in the margalef model of succession, respectively: the amount of green chlorophyll phytopigments that determines photosynthetic productivity, the amount of yellow, orange and red phytopigments, the total amount of phytopigments, the indicator of pigment diversity. It was also assumed that in the coloration of fish, a high diversity of combinations of values of the indicated SPCs corresponds to a high absolute negative sign value of the Pearson correlation coefficients between the values of two such SPCs. Evenness corresponds to a high, positive value. To achieve the goal of this study, a comparison was made of the type of correlation galaxies built on the material of digital photos of the normal and breeding coloration of the back of *Salmo salar*. In normal coloring there are statistically significant ($p<0.05$) positive correlations between the values of $G/(R+G+B)$ and $R/(R+G+B)$, as well as $G/(R+G+B)$ and $(R+G)/(R+G+B)$. This can be interpreted as a sign of the significant role of the evenness of these SPCs in camouflaging fish. In nuptial coloration these correlations change their sign to negative ($p<0.05$). This indicates that the masking role of color gives way to the first place to the function of detecting sexual partners by bright contrasting spots on the body. However, in both normal and nuptial coloration there is a negative correlation ($p<0.05$) between the values $G/(R+G+B)$ and R/G . Moreover, in the nuptial coloration its absolute value is much higher than in the usual one, that is, in the nuptial coloration diversity also retains its masking role.

The obtained results may have a certain theoretical significance for studying the adaptive mechanisms of the functioning of animal coloration. At the same time, they can have practical importance for the development of automatic and automated technologies for remote recording of the state of ichthyofauna.