INFORMATION TECHNOLOGY FOR DETERMINING THE POPULATION SIZE OF NATURAL FISH POPULATIONS

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The manifestations of global climate change are currently capable of leading to a range of extreme situations. Such changes have occurred repeatedly in the geological history of our planet, often creating extreme or even catastrophic conditions. Today, we are witnessing an exceptionally rapid development of global climate change, which also poses serious biosafety risks. This necessitates a significant shift in perspective on the so-called «Commoner's Law».

Resource management strategies based on this «law» should now be replaced by others that involve the development of modern methods for monitoring and adjusting the dynamic balance of natural, particularly biological, systems. These methods must enable the collection of factual data across large areas under time constraints for decision-making. This also applies to the study of ichthyofauna. In this context, the role of remote (aerospace) methods for collecting ecological information is increasing.

An information technology (IT) system was developed to determine fish population size, based on a combination of logical inference methods and Altshuller's invention algorithm. At the first stage, the IT system uses natural language programming tools combined with artificial intelligence capabilities and Altshuller's algorithm.

At the next stage, logical inferences are verified through multifactor analysis of RGB models of digital photographs of *Salmo salar* coloration, obtained remotely.

A comparative analysis of the correlation structure of colorimetric parameters across different parts of the fish body is then performed. These parameters reflect the ratio between the red and green components of fish coloration, as well as systemic colorimetric indicators that have analogies with patterns observed in the Margalef model of ecological succession dynamics.

At the following stage, using Altshuller's invention algorithm in combination with AI tools, contradictions are formulated between the demands for variability and uniformity of the above-mentioned colorimetric parameters within the adaptive coloration strategies of different fish species. These identified contradictions are then verified, and based on a comparative analysis of the correlation structures of RGB parameters, a numerical ratio between male and female individuals is determined.

Thus, the integration of AI methods with Altshuller's invention algorithm in the IT framework enables the application of the developed technology to address fundamental problems in biology, particularly those related to monitoring the population size of commercially important fish species.