Habitat suitability-based effective number as a tool for assessing fish species diversity

Akihiro Tanaka

Tokyo University of Agriculture and Technology

Tokyo, Japan

Shinji Fukuda

Tokyo University of Agriculture and Technology

Tokyo, Japan

Instream habitat suitability is a key to understand species’ ecology and their responses to a given physical habitat condition. Habitat suitability of a species may explain a large part of species-habitat relationships, whereas the relationships differ among species. This may be one of the reasons why habitat heterogeneity has been considered important for species diversity. Importantly, species diversity is a complex concept and difficult to quantify in a single metrics. It is therefore recommended to use the effective number of species instead of species richness or other metrics with differing units. However, applications of the effective number in ecology and related research fields are limited. This study therefore presents a preliminary report on how to apply the effective number of species in instream fish habitat assessment. For this purpose we employed random forests as a tool of habitat suitability assessment for 11 fish species in Fuchu Yosui Irrigation System in Tokyo, Japan. Results on the comparison of species richness and the effective number of species supported the use of effective number of species when relating habitat conditions with species diversity. Further study is needed to apply the proposed approaches for analyzing the species-habitat relationships in a wide range of rivers and streams.