

Publication**An approach to incorporate individual personality in modelling fish dispersal across in-stream barriers****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 3707593**Author(s)** Hirsch, Philip Emmanuel; Thorlacius, Magnus; Brodin, Tomas; Burkhardt-Holm, Patricia**Author(s) at UniBasel** [Holm, Patricia](#) ;**Year** 2017**Title** An approach to incorporate individual personality in modelling fish dispersal across in-stream barriers**Journal** Ecology and Evolution**Volume** 7**Number** 2**Pages / Article-Number** 720-732

Animal personalities are an important factor that affects the dispersal of animals. In the context of aquatic species, dispersal modeling needs to consider that most freshwater ecosystems are highly fragmented by barriers reducing longitudinal connectivity. Previous research has incorporated such barriers into dispersal models under the neutral assumption that all migrating animals attempt to ascend at all times. Modeling dispersal of animals that do not perform trophic or reproductive migrations will be more realistic if it includes assumptions of which individuals attempt to overcome a barrier. We aimed to introduce personality into predictive modeling of whether a nonmigratory invasive freshwater fish (the round goby, *Neogobius melanostomus*) will disperse across an in-stream barrier. To that end, we experimentally assayed the personalities of 259 individuals from invasion fronts and established round goby populations. Based on the population differences in boldness, sociability, and activity, we defined a priori thresholds with bolder, more social, and more active individuals having a higher likelihood of ascent. We then combined the personality thresholds with swimming speed data from the literature and in situ measurements of flow velocities in the barrier. The resulting binary logistic regression model revealed probabilities of crossing a barrier which depended not only on water flow and fish swimming speed but also on animal personalities. We conclude that risk assessment through predictive dispersal modeling across fragmented landscapes can be advanced by including personality traits as parameters. The inclusion of behavior into modeling the spread of invasive species can help to improve the accuracy of risk assessments.

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