Ecology, physiology and behaviour

Range expansion during re-colonization: the advantage of being shy

Jánošíková, Radoslava[1*]; Tulis, Filip[1]; Baláž, Ivan[1]; Eccard, Jana A.[2]; Mazza, Valeria[2,3]

[1] Constantine the Philosopher University, Department of Environmental Sciences, Nitra, Slovak Republic
[2] University of Potsdam, Institute for Biochemistry and Biology, Animal Ecology, Potsdam, Germany
[3] University of Tuscia, Department of Ecological and Biological Sciences, Viterbo, Italy
* r.janosikova@gmail.com

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Pioneer individuals at the edge of an ongoing expansion face unique ecological and evolutionary challenges. It shapes their behaviour to be different from stable, long-established populations. This study investigated behavioural responses associated with risk-taking and exploratory tendencies. It was conducted on small mammals across different colonization stages using a standardized behavioural test in the field. We quantified exploration and boldness of striped field mice (*Apodemus agrarius*, n=95) from six subpopulations. The population is already established in Germany, and it is re-colonizing Slovakia. The study also included bank voles (*Myodes glareolus*, n=76) that shared the same habitats but were long-established at all sites. We hypothesized that behavioural traits, such as exploration and risk-taking, would differ. This would be highly expressed in the population at the expansion edge compared to conspecifics in long-established populations. Individuals facing novel environments could benefit from adaptive strategies that enhance their survival and dispersal.

Our findings revealed no significant difference in the measured behaviour between two populations of established bank voles. Striped field mice in the expanding populations were slower in exploring the test arena but showing comparable levels of risk taking as established populations. A slow and thorough exploration strategy might play an advantageous role in the expansion processes of small mammal populations. This could compensate for their reduced speed in resource discovery and acquisition compared to individuals in established populations.