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Conference Abstract

Locomotion of *Niphargus* amphipods from cave lakes and streams

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Abstract

Locomotion is a complex trait directly linked to different fitness components such as foraging, mate-finding, and escaping from predators. In a food-limited subterranean environment a strong selection for an energetically optimal strategy of locomotion is expected and should lead to different strategies among closely related species adapted to different microhabitats. Due to its taxonomic and ecological diversity, the amphipod genus *Niphargus* is an ideal model system for studying locomotion strategies of species affiliated with different subterranean aquatic microhabitats. Such species differ from each other morphologically, and we predicted that they also evolved alternative strategies of locomotion. In this study, we examined three species from cave lakes and five species from cave streams or springs. After collection all species were first acclimated in a cave laboratory. Then, we video-recorded behaviour in a rectangular open-field arena of approximately 10 individuals per species. A single individual at a time was recorded under red light for 20 minutes. Videos were used to construct ethograms of distinct locomotor behaviours such as swimming, crawling, and walking. A video-tracking analysis was performed to extract variables like total path covered, time spent moving, average and maximal speed. Individuals were euthanized and measured for several morphological traits likely related to locomotion. Additionally, we measured activities of enzymes acetylcholinesterase and glutathione S-transferase, which are likely related to animals'

locomotor and metabolic activity, respectively. Preliminary analyses suggest that species from lakes and streams differ in locomotor behaviour. Interestingly, variation in locomotor behaviour was larger among lake species, possibly implying that selection for the optimal locomotion strategy is stronger and more uniform in streams than in lakes.

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