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Behavioral sequences during courtship and territorial defense of male *Benthochromis horii* in Lake Tanganyika

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Abstract Adaptation to deeper waters is a recent topic in the ecology and evolution of cichlids endemic to ancient African lakes. However, the reproductive and social behaviors of deepwater cichlids remain poorly understood because of the lack of suitable methods and equipment for underwater observations. In this study, we used waterproof video cameras, hydrophones, and mirrors to observe the mating and territorial behavior of male *Benthochromis horii* inhabiting the deeper waters of Lake Tanganyika. Males with conspicuous body coloration and elongated fins maintained a mating site (~20 cm in diameter) by clearing sand and algae off the top of the rocks at a depth of 28–36 m. These males exhibited common and specific behaviors in response to four opponents: females, rival males, heterospecifics, and mirror reflections. Although spawning was not observed, *B. horii* males exhibited quick movements and tail waving toward females as courtship around the mating site. Lateral displays were commonly performed toward both sexes. Such behavioral responses by males resemble characteristic cross-contextual displays. Sound production was not associated with any of the observed behaviors. Our findings provide insights into the previously undocumented aspects of courtship and territorial behavior of *B. horii* in the wild.

Keywords Cichlid · Courtship · Aggressive behavior · Reproductive behavior · Ethogram

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Introduction

The morphological, ecological, and social diversification of cichlids in the African Great Lakes has garnered the attention of many evolutionary biologists (Kawanabe et al., 1997; Duponchelle et al., 2008; Koblmüller et al., 2008; Ronco et al., 2021). Within the expanse of Lake Tanganyika, one of the

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