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Clown knifefish (*Chitala ornata*) oxygen uptake and its partitioning in present and future temperature environments

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Abstract

It has been argued that tropical ectotherms are more vulnerable to the projected temperature increases than their temperate relatives, because they already live closer to their upper temperature limit. Here we examine the effects of a temperature increase in environmental temperature to 6°C above the present day median temperature (27°C) in the freshwater air-breathing fish *Chitala ornata,* on aspects of its respiratory physiology in both normoxia and in hypoxia. We found no evidence of respiratory impairment with elevated temperature. The standard metabolic rate (SMR) and routine metabolic rate (RMR) in the two temperatures in normoxia and hypoxia increased with Q_{10} values between 2.3 and 2.9, while the specific dynamic action (SDA) and its coefficient increased from 7.8 to 14.7 % in 27°C and 33°C, respectively. In addition, *Chitala ornata* exhibited significantly improved growth at the elevated temperature in both hypoxic and normoxic water. While projected temperature increases may negatively impact other essential aspects in this animal's environment, we see no evidence of a negative impact on this species itself.

Introduction

Fry (1971) considered temperature to be a controlling physical factor because of its pervasive effects on all levels of ecosystem function and its role as a major determinant in animal distribution. It has