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Abstracts

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AVIAN FACULTATIVE HYPOTHERMIC RESPONSES: A REVIEW

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Abstract. Recent evidence suggests that avian facultative hypothermic responses are more common, and occur in a wider variety of ecological contexts, than previously thought. The capacity for shallow hypothermia (rest-phase hypothermia) occurs throughout the avian phylogeny, but the capacity for pronounced hypothermia (torpor) appears to be restricted to certain taxa. Families in which torpor has been reported include the Todidae, Coliidae, Trochilidae, Apodidae, Caprimulgidae and Columbidae. Facultative hypothermia occurs in species ranging in body mass (M_b) from <3 g to ca. 6500 g. Minimum body temperature (T_b) during hypothermia is continuously distributed from 4.3°C to ca. 38°C. The physiological distinction between torpor and rest-phase hypothermia is unclear. Whereas these two responses have traditionally been distinguished on the basis of T_b , we find little support for the biological reality of specific T_b limits. Instead, we argue that emphasis should be placed on understanding the relationship between metabolic and T_b reduction and the capacity to respond to external stimuli. Patterns of thermoregulation during avian hypothermic responses are relatively variable, and do not necessarily follow the entry–maintenance–arousal patterns that characterize mammalian responses. Avian hypothermic responses are determined by a suite of ecological and physiological determinants including food availability, ambient temperature, hormone levels, and breeding cycle.

Key words: body temperature, body size, ecological determinants, hypothermia, phylogeny, torpor.