

FEATURE ARTICLES

BODY TEMPERATURE AND ACTIVITY PATTERNS OF FREE-LIVING LAUGHING KOOKABURRAS: THE LARGEST KINGFISHER IS HETEROOTHERMIC

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Abstract. We show that free-ranging Laughing Kookaburras (*Dacelo novaeguineae*), the largest kingfishers, are heterothermic. Their minimum recorded body temperature (T_b) was 28.6°C, and the maximum daily T_b range was 9.1°C, which makes kookaburras only the second coraciiform species and the only member of the Alcedinidae known to be heterothermic. The amplitude of nocturnal body temperature variation for wild, free-living kookaburras during winter was substantially greater than the mean of 2.6°C measured previously for captive kookaburras. Calculated metabolic savings from nocturnal heterothermia were up to 5.6 ± 0.9 kJ per night. There was little effect of ambient temperature on any of the calculated T_b -dependent variables for the kookaburras, although ambient temperature did influence the time that activity commenced for these diurnal birds. Kookaburras used endogenous metabolic heat production to rewarm from low T_b , rather than relying on passive rewarming. Rewarming rates ($0.05 \pm 0.01^\circ\text{C min}^{-1}$) were consistent with those of other avian species. Captivity can have major effects on thermoregulation for birds, and therefore the importance of field studies of wild, free-living individuals is paramount for understanding the biology of avian temperature regulation.

Key Words: Alcedinidae, Coraciiformes, heterothermia, temperature telemetry, torpor.