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Fecal Temperature of Wild and Captive Bornean Orangutans (*Pongo pygmaeus wurmbii*) as a Proxy for Body Temperature

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Primate health status affects individual fitness and survival, yet is difficult to noninvasively investigate in the wild. Using a method tested on chimpanzees and humans, we estimated temperature of fecal samples of Bornean orangutans as a proxy for body temperature. Upon defecation, we recorded peak internal temperature of the samples. Estimated body temperature was influenced by height of defecation ($r = -0.23$, $N = 95$, $P = 0.0004$) and sample weight ($r = 0.23$, $N = 75$, $P = 0.0475$). These estimates were not affected by sex ($F(2,92) = 0.431$, $P = 0.651$) or weather ($F(2,92) = 1.175$, $P = 0.313$). Our method allowed for fast, consistent sampling, such that time from defecation to collection did not affect the results ($r = -0.074$, $N = 95$, $P = 0.468$), confirming reliable fecal temperatures can be collected from orangutans. We compare our results from the field to captive fecal samples, finding higher body temperatures in captivity. From our samples ($N = 95$), orangutans appear to have a lower internal body temperature (33.44 ± 1.74 °C) on average than either chimpanzees or humans. Previous studies have demonstrated that orangutans have a lower metabolic rate than other great apes. Lower body temperature may serve as a metabolic adaptation of orangutans to survive extended periods of low food availability when energy must be conserved.

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