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LOW ENERGY OUTPUT AND FATNESS RING-TAILED LEMURS AND BROWN LEMURS

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Evolutionary theories that account for the unusual socio-ecological traits and life history features of group-living prosimians, compared with other primates, predict behavioral and physiological mechanisms to conserve energy. Low energy output and possible fattening mechanisms are expected, as either an adaptive response to drastic seasonal fluctuations of food supplies in Madagascar, or persisting traits from previously nocturnal hypometabolic ancestors. Daily total energy expenditure and body composition were measured in free ranging ring-tailed lemurs (*Lemur catta*) and brown lemurs (*Eulemur* sp.) of southern Madagascar with the doubly labeled water procedure. High body fat content was observed at the end of the rainy season, which supports the notion that individuals need to attain a sufficient physical condition prior to the long dry season. Ring-tailed lemurs exhibited lower water flux rates and energy expenditure than brown lemurs after controlling for body mass differences. The difference was interpreted to reflect higher efficiency for coping with seasonally low quality foods and water scarcity. Daily energy expenditure of both species was much less than the field metabolic rates predicted by various scaling relationships found across mammals. We discuss whether low energy output in these species is accounted for by low basal metabolic rate and reflects adaptation to unpredictable environments.

Keywords: Body composition, field metabolic rate, doubly labeled water