ABSTRACT

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Title: Exploring Torpor in New World Bat Species

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Torpor is a well-known energy-saving technique some endotherms use to survive in cold, food-scarce environments. However, recent studies show that torpor is also used by some bats in warm, tropical, and subtropical climates. Compared to other warm climate areas in the world, bats in the Neotropics have received less research attention, yet they are great models for studying thermoregulation because they are diverse and abundant, and many families of bats there are known to have representative species that use torpor. My aim was to explore torpor in under- and unstudied Neotropical bats and determine how torpor may be influenced by diet. I captured bats in Belize and sampled adult, nonreproductive insect-, fruit-, and blood-feeding species. Bats were housed individually and allowed to acclimate overnight in ambient temperature (28 - 30˚C) to ensure they were post-absorptive and in the resting phase of their circadian rhythm prior to experimental trials. I measured rectal temperatures before and after inducing torpor by placing bats in an environmental chamber for up to 2 hours at 12˚C. All bats were released at the site of capture after experimental trials. My data show all captured Neotropical bats went into torpor ($p > 0.001$); insectivorous species had intermediate resting body temperatures and went deepest into torpor, sanguivorous species high resting body temperatures and only shallow bouts of torpor, and frugivorous species had the lowest resting body temperatures and greatest variety in torpor expression. My project shows heterothermy is widespread and variable in expression and suggests that torpor is not just a cold weather adaptation but, may be better described as an energy-conserving adaptation.