Activity patterns and thermoregulatory behavior of the invasive burmese python, *Python molurus bivittatus*, in the Florida Everglades, USA C. F. White^{12*}, K. M. Hart³, M. Cherkiss^{3,4}, M. Rochford⁴, F. Mazzotti⁴, N.M. Whitney¹ ¹ Mote Marine Lab Sarasota, FL, USA ² California State University, Long Beach, USA

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Abstract

A population of Burmese pythons has become established in the Everglades National Park (ENP), Florida, USA, and has been connected to a 90 percent decline in the small mammal population inside the park, as well as threatening the native reptile and bird populations. Efforts to extirpate this invasive species are ongoing, but are hampered by a lack of information about the python's activity cycles, and thermal biology. Using a combination of field and captive trials we fit acceleration data loggers to pythons in ENP to measure body movement and temperature. Short captive trials (N=2, 28h total) indicated that different types of locomotion (concertina, rectilinear) could be identified from acceleration data. Field trials (N=4, TL=457.4 \pm 63.1cm) lasted from 10 to 95 days, with two activity patterns emerging: one individual spent up to 30 percent of its time active during the day compared to < 10percent time active at night. The remaining individuals (N=3) showed the opposite of this pattern, with significantly higher activity at night than during the day. Activity bouts were short (mean= 1.3 ± 4.8 min), but reached a maximum of 9.7 hours. Body temperatures were found to fluctuate as much as 15C within a day.

Introduction

Methods

•Burmese pythons have been established in southern Florida since 2001

 Individuals can reach sizes of 5 meters and weigh 80 kilograms

•Burmese pythons are negatively impacting native birds, mammals and reptiles in

Acceleration data loggers and VHF transmitters were surgically implanted into individuals(n=4)
Individuals were released into the wild

for 10-95 days before recapture



Everglades National Park, FL

 Efforts to control the population are underway, yet lack basic information on the movements and behaviors of individuals
 How much time do individuals spend moving?

Fig 1A. A CEFAS G6A accelerometer (B) and VHF transmitter bring surgically implanted into a Burmese python

Results

Diel activity patterns appear to switch with time of year



Putative Feeding Event



Individuals are unlikely to transition



Fig 2. A shows the ... B. This study took place in the everglades (B), a wetland in southern Florida. When acceleration data was summarized by minute, individuals either did not move or spend the majority of the minute moving, with infrequent intermediate activity levels(B). The Y axis has been expanded to show the relative differences between 95-100 percent moving and intermediate levels. We determined the probability of shifting between these two behavioral states, resting (<30 secmin⁻¹ active) and active (>30 secmin⁻¹) and the probabilities are displayed in D

Conclusions

Individuals spent <10 % of their time moving
Individuals occasionally underwent movements that lasted >5 hours

Movement bout duration has a tail heavy distribution

- •The majority of time moving came from periods in which the animal moved consistently
- Individuals may shift diel activity based on season

Figure 3. Graphs(A,C,E,G) of predicted values from generalized additive models in which temperature (red), and seconds moving per minute(green) were compared for each hour of the day. Separate GAMs were run for each individual. B, D, F, H display data obtained from each of the 4 tagged individuals. Each day throughout the deployment is represented by a line, which is color coded by the body temperature of the individual. Black dots represent when the animal spent over 10 seconds per minute moving(I). Moving was determined using a classification regime based on k means clustering of the overall dynamic body acceleration. Grey lines represent the sunrise sunset.

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25

20

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mperature

•Understanding the shift in activity levels can be used to help determine population size and possible range expansion

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Literature

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