Relationships between foraging strategy and ectoparasite load of Neotropical bats

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Abstract

Ectoparasites are an important factor in bat health. External parasites in bats usually consist of mites, ticks, and bat flies. This experiment was conducted to evaluate the hypothesis that foraging strategy will affect ectoparasite load. Bats were caught at Las Cruces Biological Station in Costa Rica. Ectoparasites were collected using forceps at the time of capture. Bat species were grouped based on the following foraging strategies: frugivore, piper-specialist, nectarivore, insectivore, omnivore, and sanguivore. The ectoparasite loads of the different foraging strategies were significantly different in several respects. Omnivores had the highest total ectoparasite load and highest arachnid loads. Nectarivores had the highest bat fly load. Frugivores had the lowest total ectoparasite load. These results suggest that ectoparasite load is related to foraging strategy in Neotropical bats.

Introduction

- Ectoparasites are an important factor in bat health, due to emergent diseases.
- The common types of external parasites found on Neotropical bats are mites, ticks, and bat flies.
    - Mites transfer by physical contact between hosts.
    - Ticks are transmitted by contact with foliage.
    - Bat flies are transferred by roost interactions.
- Recent studies have found connections between ectoparasite load and host characteristics. These relationships include:
    -Host body size (Presley and Willig 2008)
    -Sex (Christe *et al*. 2007)
    -Roosting behavior (Hofstede and Fenton 2005)
- Foraging strategy is often overlooked when observing ectoparasite load.
- Different foraging strategies put bats into contact with different types of foliage, animals, and numbers of conspecifics.
- The purpose of this study is to see if foraging behaviors of Neotropical bats affect ectoparasite load.

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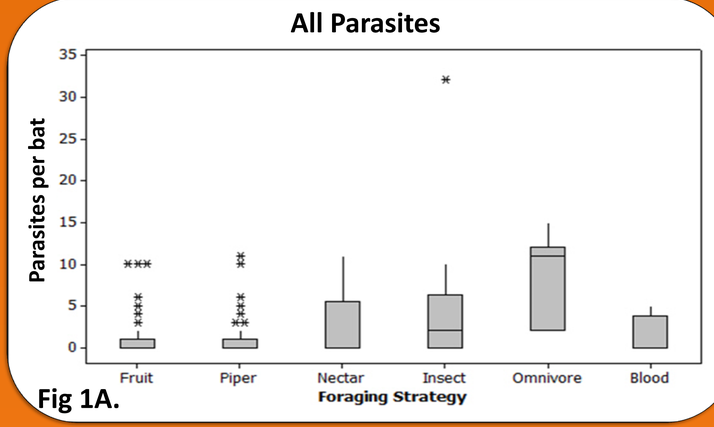

Fig 1A.

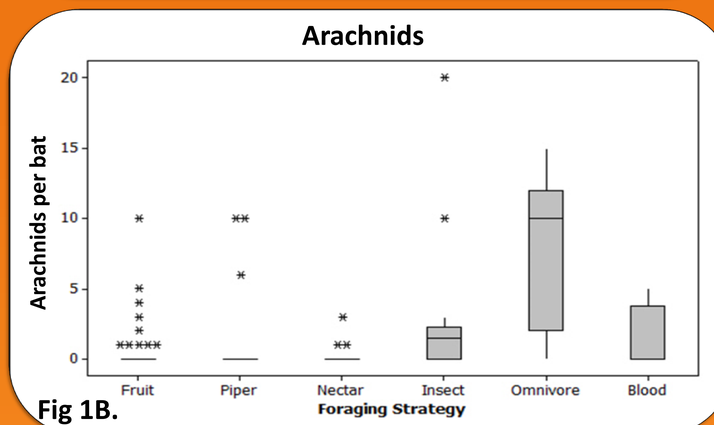

Fig 1B.

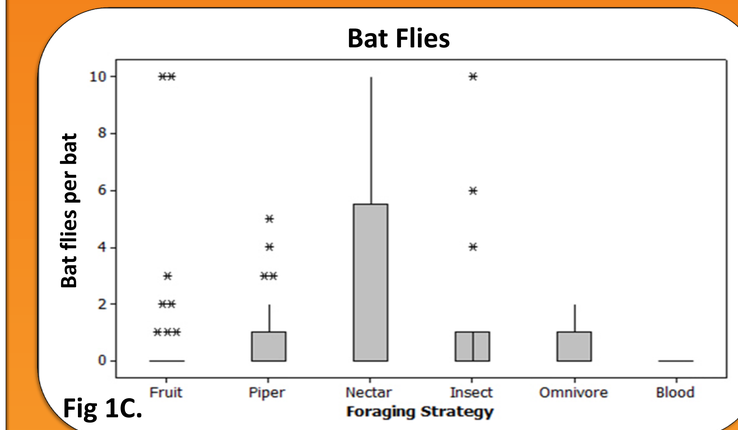

Fig 1C.

Figure 1: Ectoparasite loads and foraging strategy. **A.** Total ectoparasite load for six foraging strategies of bats captured at Las Cruces Biological Station. **B.** Arachnid load (tick load + mite load) for six foraging strategies of bats captured at Las Cruces Biological Station. **C.** Bat fly load for six foraging strategies of bats captured at Las Cruces Biological Station.

Methods

- Data were collected from 29 June to 26 July 2013 at Las Cruces Biological Station in Costa Rica, Central America.
- Bats were captured in mist-nets set at ground level.
- Mist-nets were opened at17:00 and closed around 22:00.
- Ectoparasites were preserved in vials of 70% ethanol.
- Ectoparasites were broadly grouped as: bat flies, mites, and ticks.
- Bats were classified as: frugivore, insectivore, nectarivore, piper eater, sanguivore and omnivore.

Fig 2A.

Fig 2B.

Fig 2C.

Fig 2D.

Figure 2: Foraging strategies of Neotropical bats. **A.** Omnivore (*Platyrrhinus vittatus*). **B.** Sanguivore (*Desmodus rotundus*). **C.** Frugivore (*Artibeus lituratus*). **D.** Insectivore (*Myotis keasyi*).

Results

- Omnivores had the highest load of total parasites with arachnid load driving this difference.
- Fruit bats had the lowest load of total parasites.
- Piper-specialists had a low total ectoparasite load.
- Mite levels were higher in omnivores, sanguivores, and insectivores.
- Bat fly load was highest on nectarivores.

Conclusions

- Foraging strategy appeared to have a significant effect on ectoparasite load.
- Omnivores had high arachnid load due to utilizing multiple foraging strategies.
- Insectivores had high arachnid load due to contact with foliage.
- Differences within feeding strategies were unclear.
- Roosting behavior is the most likely cause of the pattern seen in nectarivore and frugivore ectoparasite loads.
- Food availability may also change the rate of encountering conspecifics.

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