THESIS INTRODUCTION

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1. Discussion

1.1. What I did.

- In this thesis I aimed to test the importance of population structure and density on pathogen diversity
- With a particular focus on bats
- Combining simulations and empirical studies.
- Identify that population structure does affect pathogen richness in wild bats.
- But found that invasision of new pathogens is probably not the mechanism.
- Clarified the relationships between population size and density, range size, colony size and population structure.
- And found that colony size is more important than density per se.
- Finally, created a method to more easily estimate bat population densities.

1.2. How I did it (Chapters).

(1)
- I tested the hypothesis that population structure predicts viral richness in wild bats.
- I used two measurements of population structure.
  (a) A novel measure, number of subspecies. Largest dataset to date.
  (b) Gene flow, dealing with issues of marker type and spatial scale
- I used multivariate regression, appraised with information theory techniques.
- I controlled for phylogeny.
- I found that in both analyses, increased population structure predicts increased pathogen richness and is in best model.

(2)
- I modelled a multi-pathogen, metapopulation based on bat populations.
- Testing the specific mechanism that population structure increases richness by enabling invasion of newly evolved pathogens.
- I found that spatial structure, either by dispersal rate or topology, did not allow invasion.

(3)
- I clarified confusion on the relationships between group size, group number, density, population size and range size.
- Using same model as Chapter 3 I tested whether it is in fact density or population size that matters.
- I tested whether the importact factor in increased density is group size or group number.
- I found that it is in fact abundance and group size that matter much more than other factors.

(4)
- I aimed to collect data on bat density as lit. says this is important.
- Discovered I needed a model.
- Started with specific model for iBats, ended up writing general model.
- I formulated a model that estimates density from acoustic sensors or camera traps.
- I tested it using simulations.

- I found it to be precise and unbiased.

1.3. **What was congruent with the literature?**

1.4. **What was surprising?**

- Don't find high R_0 leads to high richness.
- Find that colony size is more important that implying density is just proxy for group size.
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1.5. **What are the limitations to the study?**

1.6. **What are the implications for practice?**

- Global change and pop structure.
- Studies should more carefully consider density vs structure vs group size.
- Can more easily estimate bat density.

1.7. **What are the implications for research?**

1.8. **Furtherwork.**

- Examine more carefully the mechanisms for richness
- Examine multi host species more carefully
- Field test gREM