Introduction

- During the 1960s and 1970s, social dynamics in population regulation was studied using Uinta ground squirrels (UGS). (Figure 1)
- Uinta Ground Squirrels are used as a model organism to understand effects of climate change, parasite loads, and infectious diseases.
- As average temperatures increase it is predicted that parasites and infectious diseases will increase in prevalence in response to the warming.
- Infectious diseases can be transmitted by ectoparasites such as fleas and ticks.
- UGS are primarily burdened with ectoparasites in which are well-known vectors of parasites and will be used to test for Bartonella (a gram negative bacteria).
- Our objective is to conduct population genetics analysis of Bartonella spp. recovered from numerous field flea specimens from UGS in Logan, UT. Data will be used to find relationships with climate change and the disease prevalence.

Methods

- Uinta Ground Squirrels were trapped in Logan Canyon, Utah in May and August 2014. (Figure 2, 3, and 4)
- Fleas were collected from each squirrel and placed in 70% ethanol.
- Using conventional PCR, each flea specimen was analyzed for presence of ground squirrel DNA and presence of Bartonella spp.

  Forward Bart. primer-GCTATCTCTGCATTCTATCA
  Reverse Bart. primer-GATCYTCAATCATTTCTTTCCA

- Each flea was cleared and mounted for identification. Fleas will be identified using Furham and Katts flea identification keys.

Preliminary Results

- 47 squirrels were live trapped. (Figure 5)
- Fleas were collected and pooled based on squirrel. (Figure 7)
- Flea DNA was extracted using Quigen DNeasy Blood & Tissue Kit.
- None of the fleas that have been tested to date are positive for Bartonella. (Figure 8)
- Uinta Ground squirrel specific primers (SARM) were used to confirm quality of DNA. (Figure 9)
- Furham and Katts flea identification keys will be used to distinguish flea species.
- Images of cleared and mounted fleas ready for identification are seen in Figures 10, 11, 12, and 13.

Future Research

- DNA extractions for remaining fleas needs to be completed for Bartonella confirmation.
- Remaining fleas need to be mounted and identified to species.
- DNA Sequence analysis needs to be completed for both Uinta Ground Squirrel and any positive Bartonella specimens.

Acknowledgments

- Funding to complete this study was provided by USU’s Research Catalyst grant program and the National Geographic Foundation.
- Dave Denlinger, Sam May, and Ryan Keweshan for their techniques and assistance in running PCRs and mounting fleas.