Impacts of invasive mice on invertebrate orders on Midway Atoll National Wildlife Refuge

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Introduction

• *Mus musculus* was introduced to Midway Atoll National Wildlife Refuge (NWR) during World War II
• The ecological impacts of invasive mice are largely unknown
• The presence of mice on Sand Island and the absence of them on Eastern Island makes for a unique and convenient situation for research
• The responses of invertebrate and arthropod orders to invasive species is frequently overlooked in conservation work
• Specifically, we focus on the responses of two orders: Hymenoptera and Coleoptera

Methods

1. Obtain invertebrate and arthropod samples maintained through USFWS pitfall traps
2. Sort samples to order and count abundances
   - 80 samples total: 40 from each island, 10 from each of the four habitat types within those islands
3. Data standardization, statistical analysis, and interpretation in R
   - Focusing specifically on Hymenoptera and Coleoptera

Preliminary Results

1. No significant correlation between Hymenoptera and Coleoptera
2. Both orders are more abundant on Eastern Island, where there are no mice
3. Hymenoptera and Coleoptera are abundant in different habitat types

Discussion

• While both orders are more abundant where mice are absent, they have no apparent correlation
• Orders Hymenoptera and Coleoptera may not be correlated due to the differences in preferred habitat types
• Hymenoptera prefer the bunchgrass habitat type; if mice prey on the seeds of that plant, it would explain why Hymenoptera are not as abundant on Sand Island

Future Work

• Complete a diet analysis of mice through DNA metabarcoding to better assess their ecological impacts through predation
• Identify any other potential mutualisms in the arthropod/invertebrate orders and in plant species found on Midway Atoll NWR
• Plans to continue this project extend to summer 2019 and beyond

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