The Effects of Human Disturbance on Coastal Insect Biodiversity

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Introduction

Coastal insects are important to beach, dune, and riverbank ecosystems. Their populations can decline because of human activities. Habitat loss, pollution, recreation, and invasive species can reduce insect biodiversity. Coastal insects are especially sensitive to changes in their environment. This study compares protected and human-disturbed areas to see how human activity affects insect biodiversity.

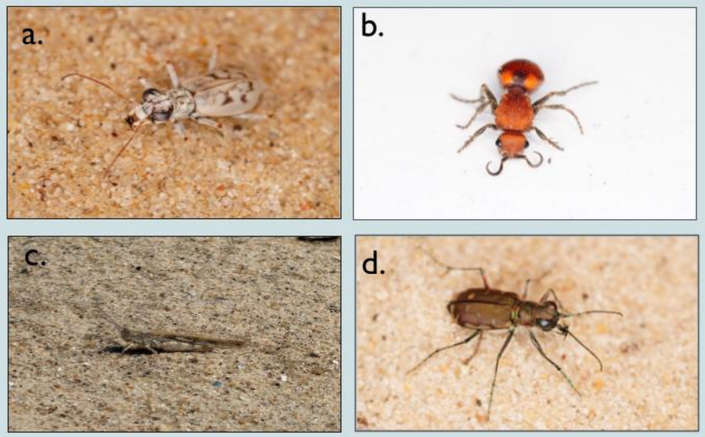


Figure 1. Coastal insects discovered during our study.
(a) Native Tiger beetle *(Cicindelidae)* (b) Velvet ant *(Mutillidae)*
(c) Grasshopper (Acrididae) (d) Cliff Tiger Beetle (Cylindera germanica)

Objective & Hypothesis

The objective of this study is to compare coastal biodiversity between protected areas and areas affected by human interference. By examining the abundance and variety of insect species in each environment, we aim to determine how human activity may influence coastal biodiversity.

We hypothesize that protected coastal areas will have greater amounts of native species than areas affected by human interference because human disturbance increases and provides more suitable habitats and environments for invasive species.

Methods

Field studies were conducted at both a restored coastal habitat and a human-disturbed coastal habitat. Pitfall traps containing ethylene glycol were used to collect and preserve ground-dwelling insects, while sweep nets were used to capture insects from surrounding vegetation. Samples were collected during several field visits. During this, insects were identified to the family level using iNaturalist and field guides. The abundance and diversity of insect families were then compared between the two habitats to assess the effects of human disturbance on coastal biodiversity.

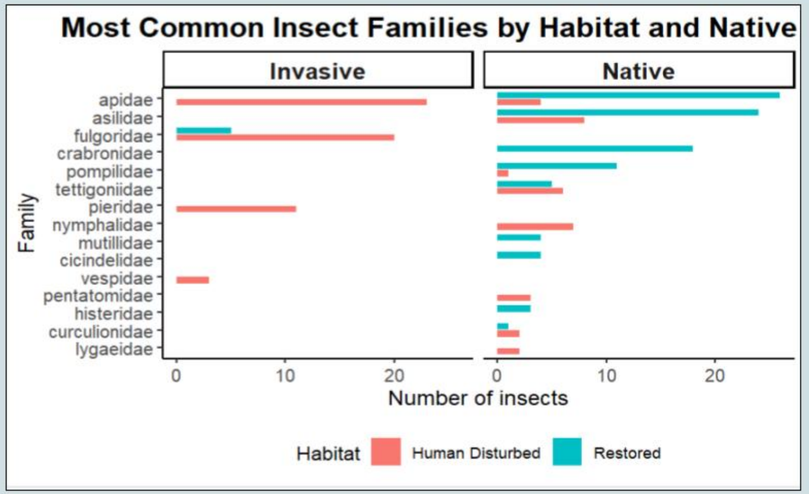
Figure 2. Map of survey locations. The transect started on Beach 41st Street and moved west to Beach 56th Street. Habitat consisted of coastal back dune.

- Used **pitfall traps** to collect ground-dwelling insects.
- Used **sweep nets** to capture smaller/mobile insects
- Checked traps regularly and recorded specimens.

- Preserved specimens using ethylene glycol.
- Prepared specimens with pins.
- Identified specimens to Family level.

Figure 3. Example of sweep nets and pitfall traps. Example of prepared specimen.

Results



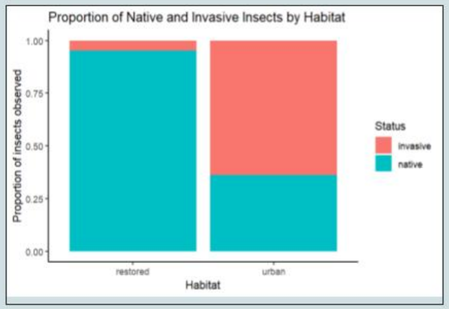


Figure 4. Abundance of insect families at the natural and human-disturbed coastal sites, showing differences in the number of individuals collected at each location.

Figure 5. Comparison of native and invasive insect proportions between restored and urban coastal habitats. The restored habitat contained a higher proportion of native insects.

Discussion

Our results suggest that human disturbance affects coastal insect biodiversity by reducing native species and increasing invasive species, supporting our hypothesis. Protected areas had a higher proportion of native insects, while disturbed habitats contained more invasive species. This is likely due to habitat loss, urbanization, and increased human activity, which make it more difficult for native insects to survive. A limitation of this study is the small sample size. Future research should include more sampling locations over multiple seasons to better understand the long-term effects of human disturbance on coastal insect biodiversity.

References

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