

Different Spaces, One Community: A survey of the insect population in subalpine forest and meadows



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Introduction

The subalpine meadows of Mount Rainier are a hallmark of the national park, but are also extremely fragile and unique ecosystems. Insects here are understudied, with almost no published research available on this important ecological group. As climate change slowly allows trees to encroach into the meadows, we sought to know how or if the insect community changes between the woody and open habitat. Will there be insect biodiversity loss if subalpine meadows become smaller?

In developing the most essential data set, we wanted to answer two questions primarily:

- **What insects reside in the subalpine meadows and the proximal forest at varying altitudes?**
- **Does the composition of the insect community change between the forested areas and the meadows? How?**

Study Sites

We surveyed 6 sites in Mount Rainier at varying elevations between 1490 m and 1980 m. Three are located on the Southeastern side of the mountain (Glacier Basin) and the other three are on the Southern side of the mountain (Paradise). At each site, there are three plots: forest, meadow and a transitional zone that had elements of both habitat types where insects were collected.

Pertinent information about the weather conditions, such as wind speed and temperature were recorded. No data was collected in conditions below 60 degrees Fahrenheit or at wind speeds above 3 mph.

| Type of Plot | Trees per m ² | General Types of Vegetation |
|--------------|--------------------------|--|
| MEADOW | 0 | Herbaceous plants, grasses, wildflowers, mosses |
| TRANSITION | >2 | Herbaceous plants, grasses, wildflowers, <i>vaccinium</i> and other woody bushes or shrubs, small to midsize trees |
| FOREST | <2 | Adult and midsize trees, occasional saplings, understory herbaceous plants, grasses |

Site protocol

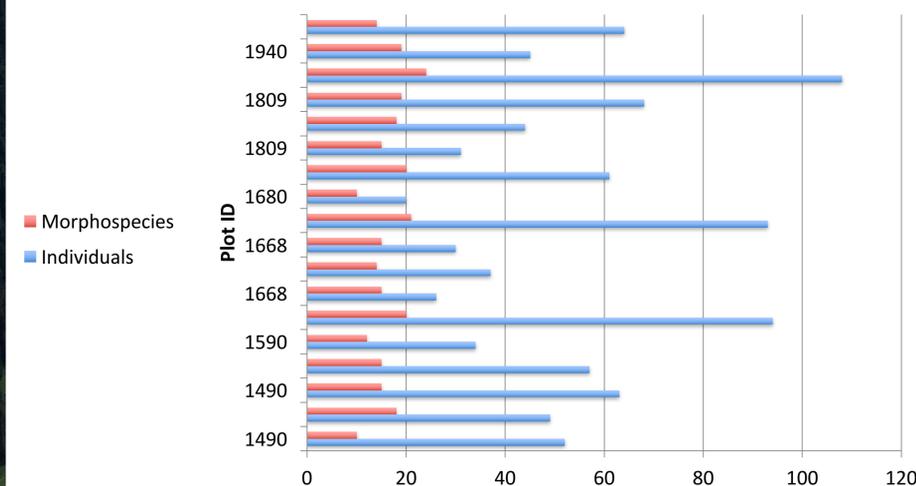


Using a bug net, the collector sweeps for ten steps, or approximately 20 sweeps, brushing the vegetation present on the transect with the net. The collection process was repeated for each plot type three times. After sweeping, the collector traps the insects in a kill jar and stores them in alcohol for later processing. After collection, we count the number of individuals caught at each site, the number of morphospecies and attempt to identify individuals down to family and functional group within the ecosystem, using dichotomous keys and a microscope.

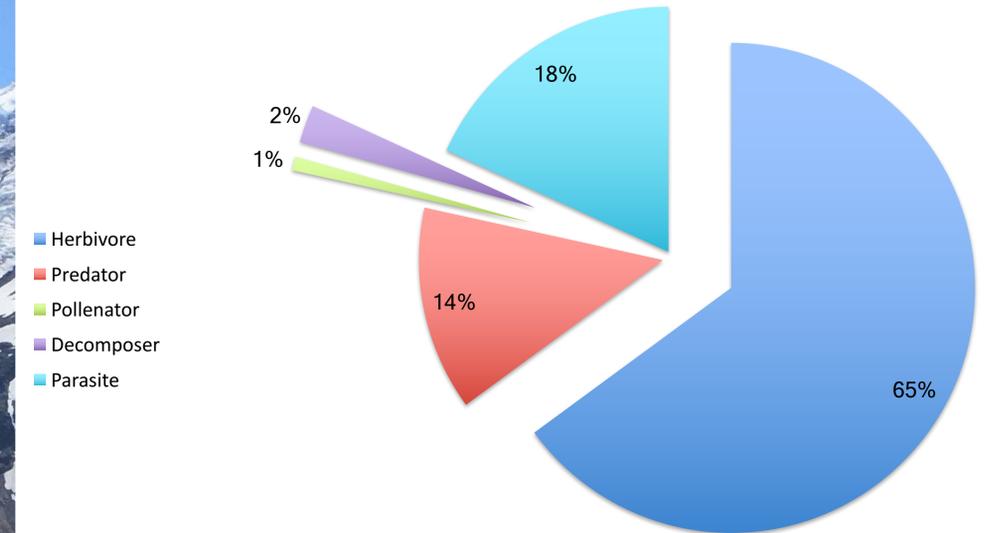
Data & Analysis

From 18 field samples I gathered the following data:

Number of Individuals Compared to Relative Diversity



Relative Abundance of Insect Functional Groups



We found no significant difference found between the diversity of morphospecies in subalpine forests and subalpine meadows. We collected an average of 54 individuals in each plot, and averaged 16 morphospecies per site. Forested areas had the highest mean of individuals (avg 59), and the lowest mean of morphospecies caught. Transition areas largely mimicked meadows, and observationally were often more similar habitat to meadows. Both habitats displayed lower average number of individuals per sweep, but higher relative diversity.

Further Study

This data can be further analyzed to get each individual identified to family, to more accurately assess the functional groups. Additionally it would be useful to do a phenological study, as many insects emerge at different times to take advantage of various food sources. More extensive study of insect communities would help inform plant and animal community dynamics and how they relate to climate change. Observationally, there was a difference in the composition of species found, however the type of data show here cannot illustrate this fact.