

Project Proposal: Influence of Epiphyte Height Differentiation on Pollination Dispersal

1. Introduction

Epiphytes are organisms that grow upon other plants for support without drawing nutrients from their hosts, and they contribute significantly to forest structure, microhabitat complexity, and biodiversity by providing water, nutrients, and physical space to many taxa.

They contribute significantly to vertical habitat and structure complexity. Many epiphytes produce flowers that attract insect pollinators such as bees, butterflies, flies, and beetles. Because epiphytes occur at different heights along a tree, they may influence how pollinators move vertically through the forest. Height differentiation may affect pollination dispersal by altering pollinator accessibility, visibility of flowers, and flight behavior.

2. Research Question

Does height differentiation of flowering epiphytes affect insect pollination dispersal and visitation frequency?

3. Hypothesis

Flowering epiphytes located at mid-height on trees will receive greater insect pollinator visitation than those at lower or higher heights because they are more accessible and visible to a wider range of pollinators moving through the forest.

4. Study Area

This study will be conducted at Las Cruces Biological Station, Costa Rica, in intact forests and open cultivated landscapes located around 3000m.

5. Methods

5.1 Tree and Epiphyte Selection

- Select 15 trees with visible flowering epiphytes (5 trees for each height category?).
- On each tree, identify flowering epiphytes at different height categories: Low height: 0–2 meters, Mid height: 2–5 meters, High height: 5+ meters.

5.2 Pollinator Observation

- Observe each flowering epiphyte patch for 10–15 minutes.
- Observe between 8:00 AM–2:00 PM.

- Record: Number of pollinator visits, type of pollinator (bee, butterfly, fly, beetle, unknown insect), height category of the epiphyte visited, Whether the insect contacts the flower or nearby area (indicating potential pollination).
- Take photos.

5.3 Epiphyte Assessment

- For each observed epiphyte patch, record: Height category (low, mid, high), epiphyte type (orchid, bromeliad, fern, moss, unknown), flower presence and abundance (few, moderate, many), tree ID if possible?
- Take photos.

6. Data Interpretation

For each height category, calculate: Total number of pollinator visits, number of pollinator types observed, and average visits per observation period. Compare pollinator visitation across low, mid, and high epiphyte height categories. Results will be displayed using bar graphs showing visitation frequency by height; and tables summarizing pollinator diversity per height category.

7. Equipment Needed

- Notebook
- Phone or camera
- Hand lens, binoculars
- Species identification app

8. Anticipated Project Difficulties

1. Limited visibility of high canopy epiphytes from ground level will need access to canopy structure.
2. Difficulty identifying insect species precisely, most likely going to be estimated but will have taxonomic groups as differentiation. Will also be collaborating with colleagues.
3. weather or time of day
4. Short observation window may limit total observations.

9. References

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