



Internship funded by the Spalding Family

RECAPTURE LARIMER COUNTY, CO

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PROJECT INTRODUCTION

Despite their ecological importance as pollinators, significant knowledge gaps persist in our understanding of bumble bee life history traits and population dynamics. Laura Lukens' project addressed these gaps by gathering data on nest density patterns and population genetic health in native bumble bee populations. Using genetic mark-recapture techniques with DNA samples from individual bees, we are estimating population sizes and assessing levels of inbreeding.

Additionally, we are examining how bumble bee nest density varies across urban-to-rural gradients, comparing urban environments characterized by city plantings and yards with rural areas consisting of natural grasslands and prairie habitats, while also recording floral resources and how they vary between these sites temporally. This research will provide data for evidence-based conservation planning for these pollinators in human dominated landscapes.

IMPORTANCE

Bumble bees are essential pollinators for wild plant communities and agricultural crops, yet many native species are experiencing significant population declines due to habitat loss, interspecific species competition, environmental pressures, disease, and pathogens. Understanding nest density patterns, genetic health, and floral resource use patterns is key to identifying viable populations and preventing local extinctions caused by inbreeding depressions or habitat fragmentation. This research will provide baseline data needed to develop targeted conservation strategies and inform land management decisions that support bumble bee populations across both urban and rural landscapes.



MY ROLE

As a field research technician, I conducted field surveys of bumble bee communities by netting and recording bee species, caste, location, and floral host. Each bee was assigned a unique identification code based on these characteristics, and I collected genetic samples by removing the lower portion of their middle right legs to support genetic mark-recapture analysis. At each survey location, I documented and quantified all available floral resources to assess habitat quality.

The project evolved during my internship. I initially assisted with laboratory operations including collecting bumble bee queens and rearing colonies providing daily care through feeding, cleaning, and monitoring activities. I also contributed to community engagement efforts by participating in outreach events such as the Big Day of Bugs at the Denver Botanical Gardens and developing educational materials to support our lab's public-facing initiatives.



Image 1 & 2. A western bumble bee (*Bombus occidentalis*) gyne on showy milkweed (*Asclepias speciosa*) at Tanglewood natural area.

KEY TAKEAWAYS

Technical Research Skills: field sampling protocols, data collection techniques, species identification (bee and plant), ethics of handling live specimens.

Professional Development: following established protocols, independent work, communication and collaboration with different audiences, and further understanding of academia.

Personal Growth: building confidence in fieldwork and problem solving, learning to adapt when projects shift, gaining appreciation for entomology.

PRELIMINARY RESULTS

Top 10 Floral Hosts of Collected Bumble Bees

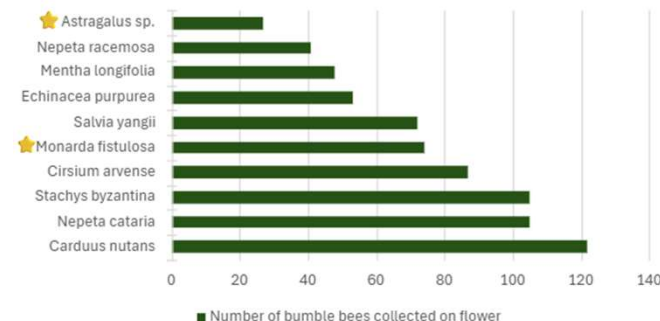


Figure 1. Top 10 floral hosts of bumble bees in both urban and rural areas collected for this project during the first round of surveys. The total number of floral host species is 83. Native plants are represented by stars.

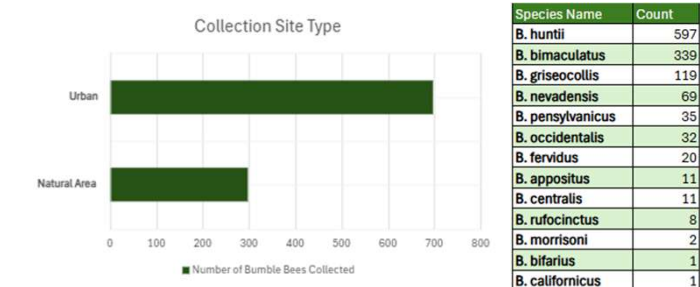


Figure 2. (left), The overall number of individuals documented through out our surveys thus far, comparing where they were found (urban or natural areas). Figure 3. (right) displays the overall count of bumble bees observed by species.



Image 3. Keirs and I collecting genetic sample from *B. huntii* in the field.