

Understanding Urbanization Trends through Arthropod Bioindicators

Hector Ibarra

Texas A&M International University

Hectoribarra@dusty.tamui.edu

Keywords: Arthropods, Pitfall Trapping, Urbanization, Agriculture, Biodiversity, USDA Science Influencers

Introduction

The rapid expansion of urban areas has led to significant deforestation, creating “hybrid environments” where wildlife is increasingly compressed into smaller, fragmented habitats. This urbanization forces frequent interactions between humans and local fauna as animals are pushed into city grounds (Mahadeo, 2024). Arthropods serve as critical bio-indicators; their presence or population shifts can signal profound changes in regional environmental health. For the USDA Science Influencers program, understanding these shifts is vital, as arthropods are essential for ecosystem services acting as both pollinators and potential agricultural pests (Kaiser & Resasco, 2024).

Procedures

Under the mentorship of Dr. Sundararaj Vijayan, this study utilized pitfall traps to sample ground-dwelling arthropod communities across a gradient of forested and deforested locations.

- **Field Collection:** Pitfall traps were strategically placed to capture specimens in both undisturbed wildlands and urban-adjacent regions
- **Classification:** Collected specimens were transported to the laboratory and separated into distinct sections based on their collection site and habitat type.
- **Microscopic Analysis:** Using high-powered microscopy, specimens were analyzed to identify their Species and Familia to document the specific biodiversity of each location.

Findings

Preliminary data indicates a significant shift in species composition within deforested regions, where generalist insects often become more frequent in urbanized areas than in natural ones (Raupp et al., 2010). This research characterizes the impacts of land-use change, illustrating how habitat compression pushes specific families into city grounds and alters the baseline of local arthropod populations. By identifying these specific families, the study provides a vital baseline for understanding how landscape drivers impact the abundance and richness of species that provide essential ecosystem services. Ultimately, the consolidation of this taxonomic inventory maps how human-induced land changes threaten long-term biodiversity, providing an evidence-based look at the health of these hybrid environmental zones.

Summary

This project highlights the ecological consequences of continuous urbanization and habitat disruption. By studying these “hybrid environments,” we gain a granular view of how human-wildlife overlap affects local ecosystems. These findings are crucial for developing sustainable agricultural practices and urban planning strategies. This internship has provided

hands-on experience in field methodology and taxonomic research, directly preparing me for a career in Environmental Technology or Data Science

References

- Raupp, M. J., Shrewsbury, P. M., & Herms, D. A. (2010). Ecology of herbivorous arthropods in urban landscapes. *Annual Review of Entomology*, 55, 19–38.
<https://doi.org/10.1146/annurev-ento-112408-085351>
- The impact of impervious surface and neighborhood wealth on arthropod biodiversity and ecosystem services in Community Gardens | Request PDF. (n.d).
https://www.researchgate.net/publication/380788542_The_impact_of_impervious_surface_and_neighborhood_wealth_on_arthropod_biodiversity_and_ecosystem_services_in_community_gardens
- Mahadeo, V. D. B., Colucci, D. J., & Zhu, W. (2025, June 21). *Anthropogenic subsidies affect arthropod communities and native litter decomposition in an urban riparian forest - urban ecosystems*. SpringerLink. <https://link.springer.com/article/10.1007/s11252-025-01754-y>