13th International Symposium on Syrphidae (ISS13), Fiera di Primiero (Italy)

Pollinator diversity along an altitudinal gradient in Costa Rica

Somà Federico[1], Maletti Sara[2], Jansen-González Sergio[3], Mauricio Fernández Otárola[3], Sommaggio Daniele[2, 4], Maistrello Lara[2, 4] and Toselli Gioele[2]

[1] Department of Life Sciences and Systems Biology (DBIOS), University of Turin, federico.soma@edu.unito.it
[2] Department of Life Sciences, Università of Modena and Reggio Emilia
[3] University of Costa Rica, San José, Costa Rica
[4] National Biodiversity Future Center

INTRODUCTION

The change in abiotic factors and land use along an altitudinal gradient may influence the composition of pollinator communities. We investigated this effect along the high-intensity agricultural slopes of the Irazú Volcano in Costa Rica (Fig.1).

KEY QUESTIONS:

- How does the pollinator community change?
- Which factors explain these changes?

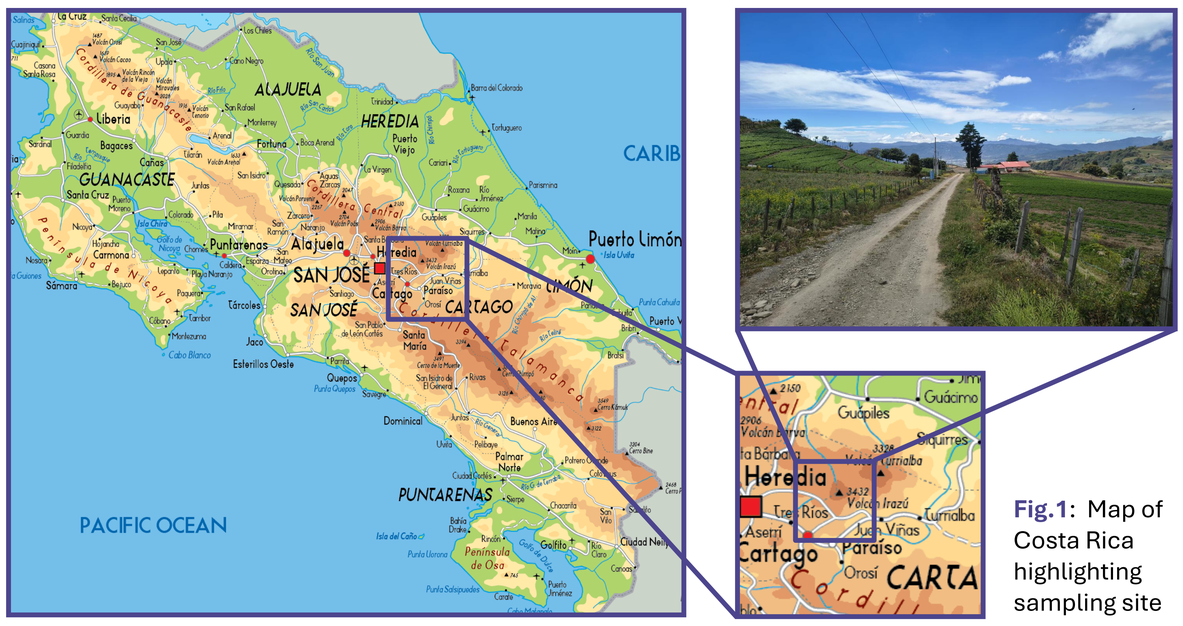


Fig.1: Map of Costa Rica highlighting sampling site

Survey period: Dry season (December 2025–February 2026).
Elevation range: 1.600–2.650 m a.s.l.
Survey sites: 8 Transects (250 × 4 m), arranged in 4 pairs distributed in 350 m elevational intervals.
Sampling effort: in total 1 h 45 per transect, across 6 visits.
Data collection: all insect-flower interactions were recorded (Fig.2). Only Diptera and Hymenoptera have been identified at species level.
Land use analysis: a 500 m buffer around the midpoint of each transect was used to evaluate the surface percentage of: pasture, annual crops, forest and infrastructures (Fig.3).

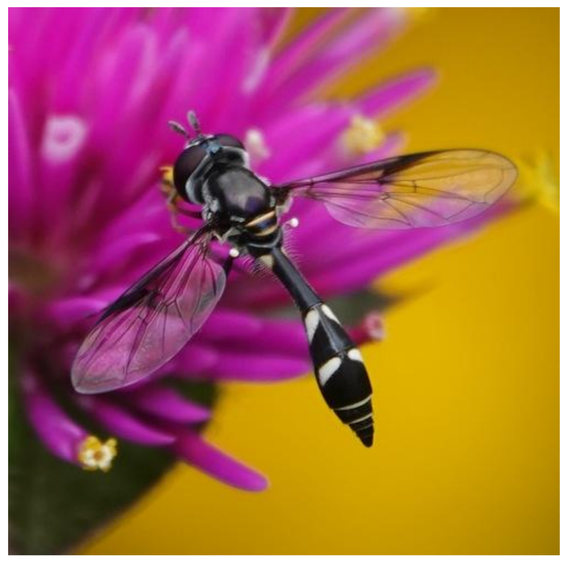


Fig.2: *Dioprosopa clavata*, @Filipe J Ribeiro, iNaturalist observation 50782963, CC BY-NC 4.0

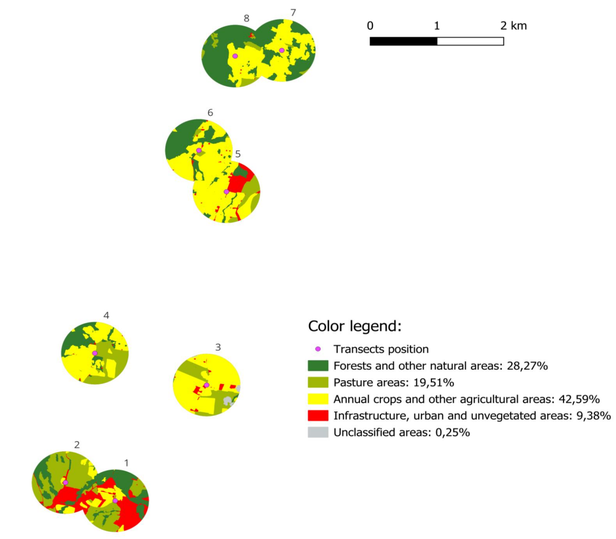
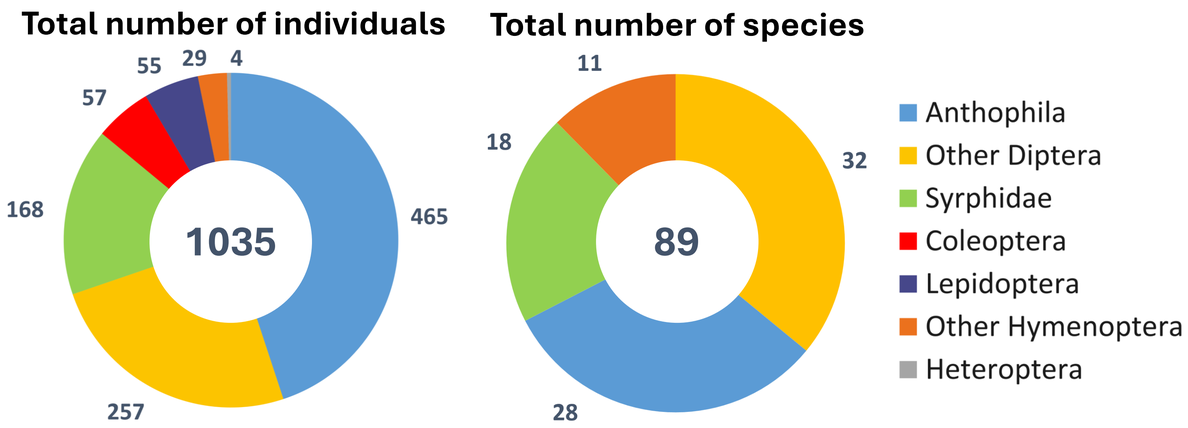
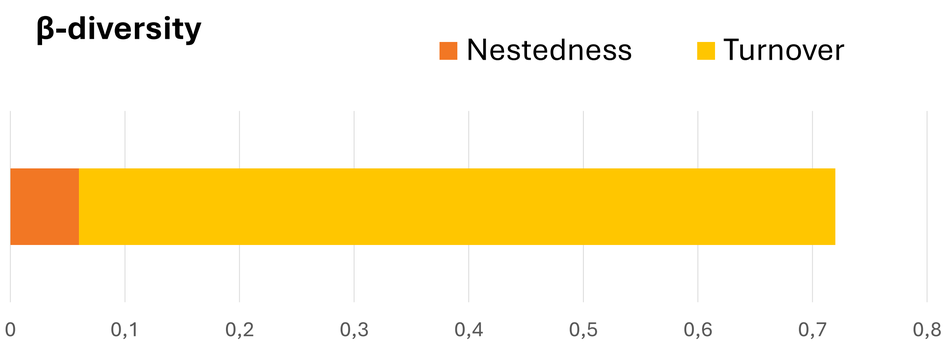
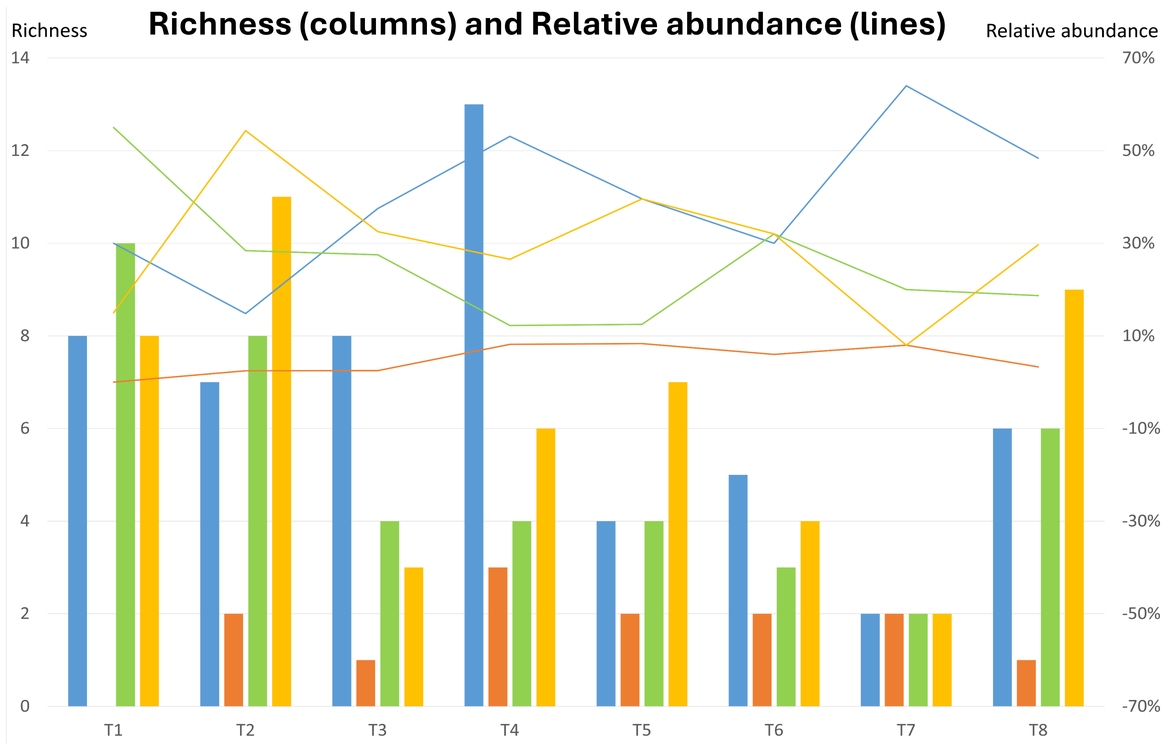


Fig.3: Results of land use analysis on QGIS

RESULTS

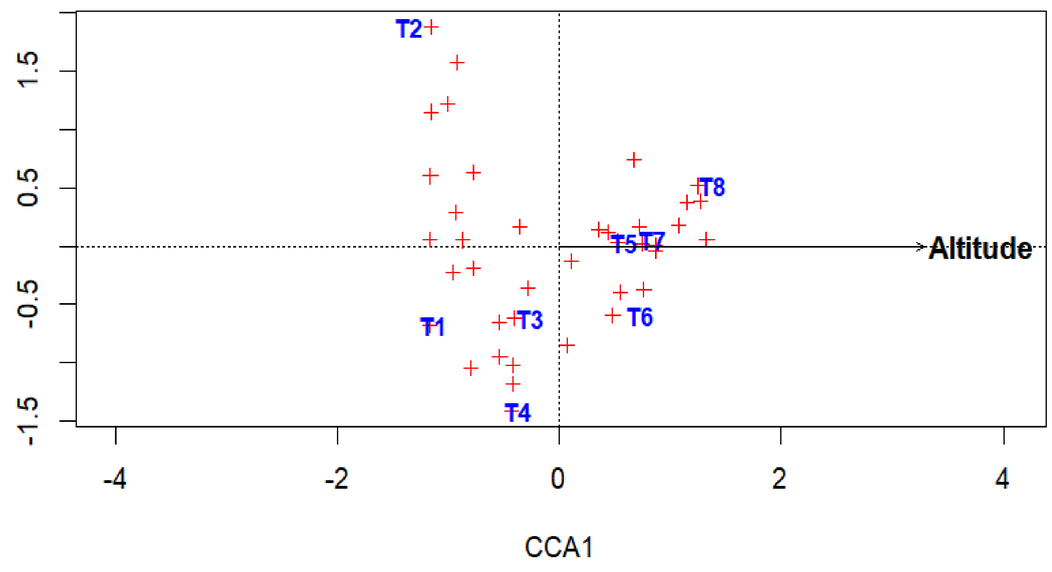






CCA analysis: best combination evaluated with Akaike's Information Criterion (AIC), adjusted R^2, and ANOVA like permutation test

CCA-Altitude effect AIC: 43,84 R^2 : 0,087 p-value: 0,003



DISCUSSION

Pollinator species richness declined with increasing altitude across all taxa, but their relative abundance remained unaffected. Both altitude and pasture significantly influenced the pollinator community composition, while forest, infrastructure and annual crops showed no significant effects. However, the strong negative correlation between altitude and pasture (R = −0.84) prevents their independent effects from being disentangled.

Acknowledgements: Williston Diptera Research Fund