

Turning over a New Leaf: A Survey of Neotropical Parasitoid Hymenoptera in Leaf Litter

NATIONAL
MUSEUM of
NATURAL
HISTORY
Smithsonian



Robin P. Marquez¹, Diler Haji², Elijah Talamas³, Michael W. Gates⁴, Robert Kula⁴,
Ted R. Schultz⁵, Matthew L. Buffington⁴, Jeffrey Sosa-Calvo⁵, and Robert L. Kresslein⁴

¹College of Sciences, University of Central Florida; ²Department of Integrative Biology, University of California, Berkeley;
³FSCA, Gainesville, Florida; ⁴USDA Systematic Entomology Lab; ⁵Department of Entomology, Smithsonian Institution



Introduction

- Knowledge of global insect biodiversity can reveal areas of concern for conservation planning or beneficial insects that can be applied to agriculture
- The biodiversity of insects in South America has yet to be fully explored, especially in leaf litter ecosystems, which are uniquely positioned to affect both above- and below-ground ecological interactions
- Some of the least known insects belong to the micro-parasitoid fauna of the order Hymenoptera, which have rarely been studied in the context of leaf litter.

Objective

Explore species richness, turnover and biodiversity of Neotropical micro-parasitoid Hymenoptera in leaf litter ecosystems

Methods

- Leaf litter samples were collected from 102 collection events across three Neotropical sites (Brazil, Guyana, and Colombia) in South America from 2005 to 2011, using Winkler collectors



Figs 1-5: Demonstration of Winkler sampling collection methods¹ from left to right: loading leaf sifter with leaf litter, sifting the leaves, placing siftate in mesh bag, transferring mesh bag to Winkler and allowing specimens to fall to collection cup

Results



Fig. 13: Map of site locations

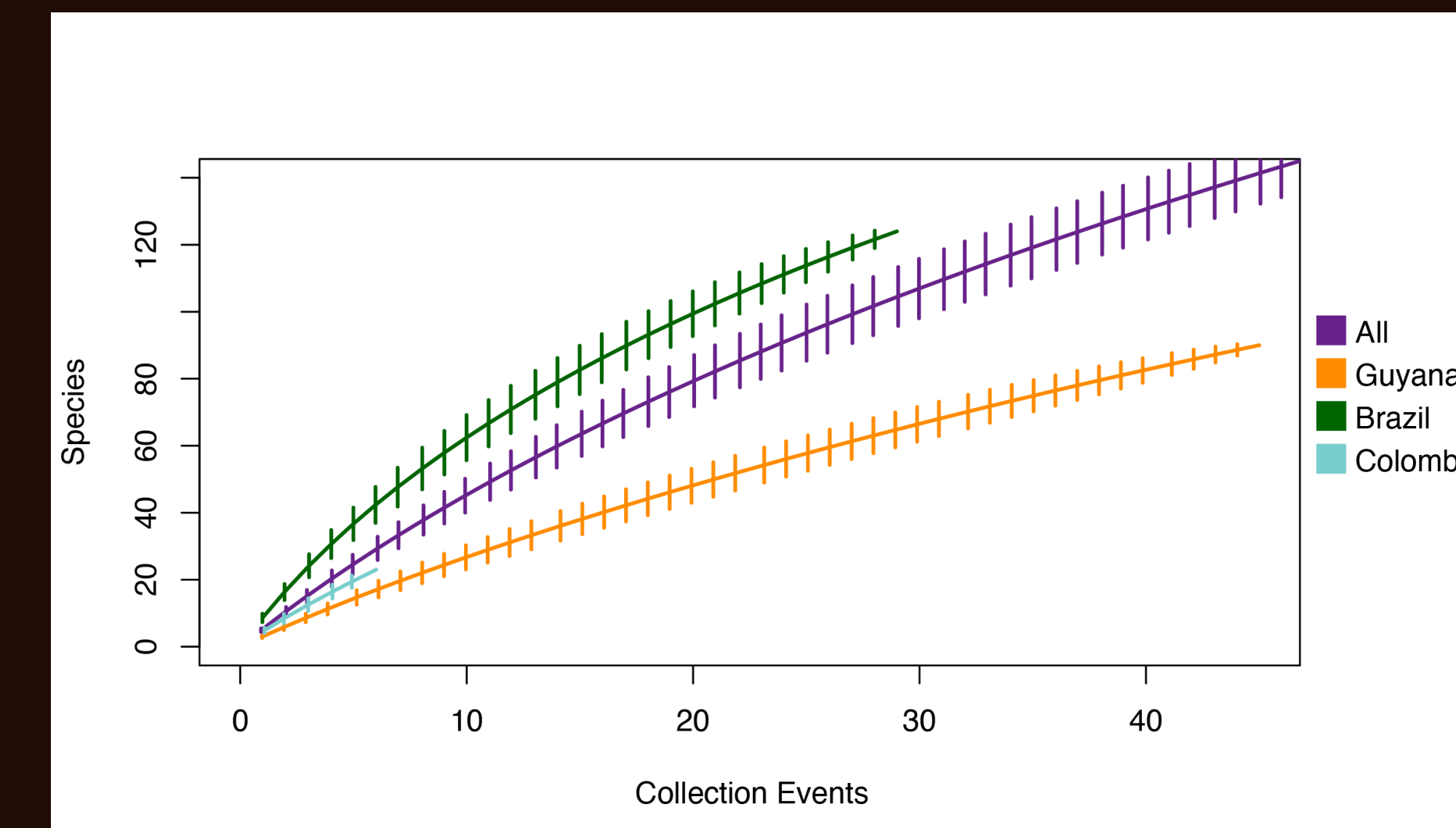


Fig. 14: Species accumulation curves for each site

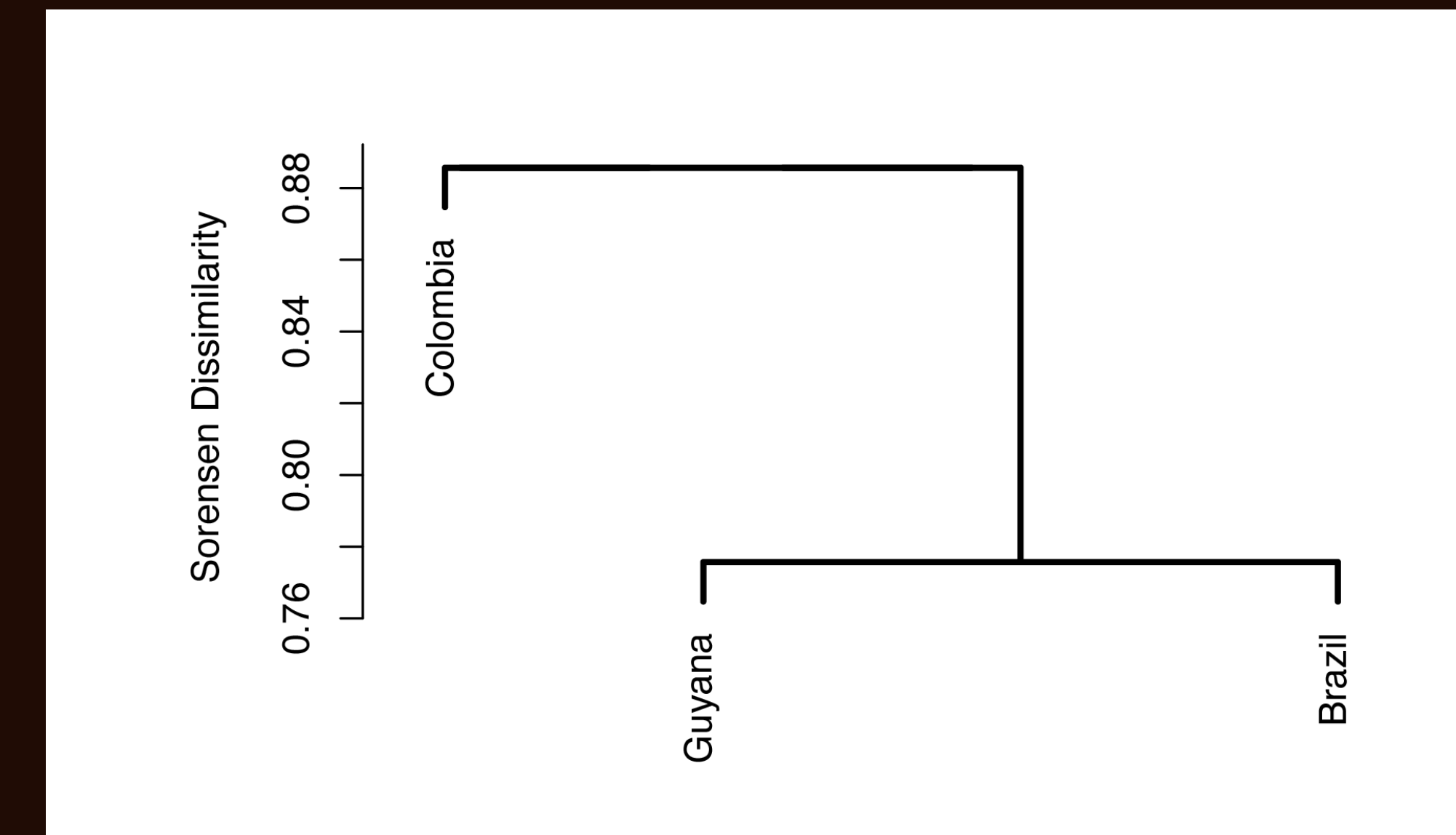


Fig. 15: Sorensen's dissimilarity indices for each site

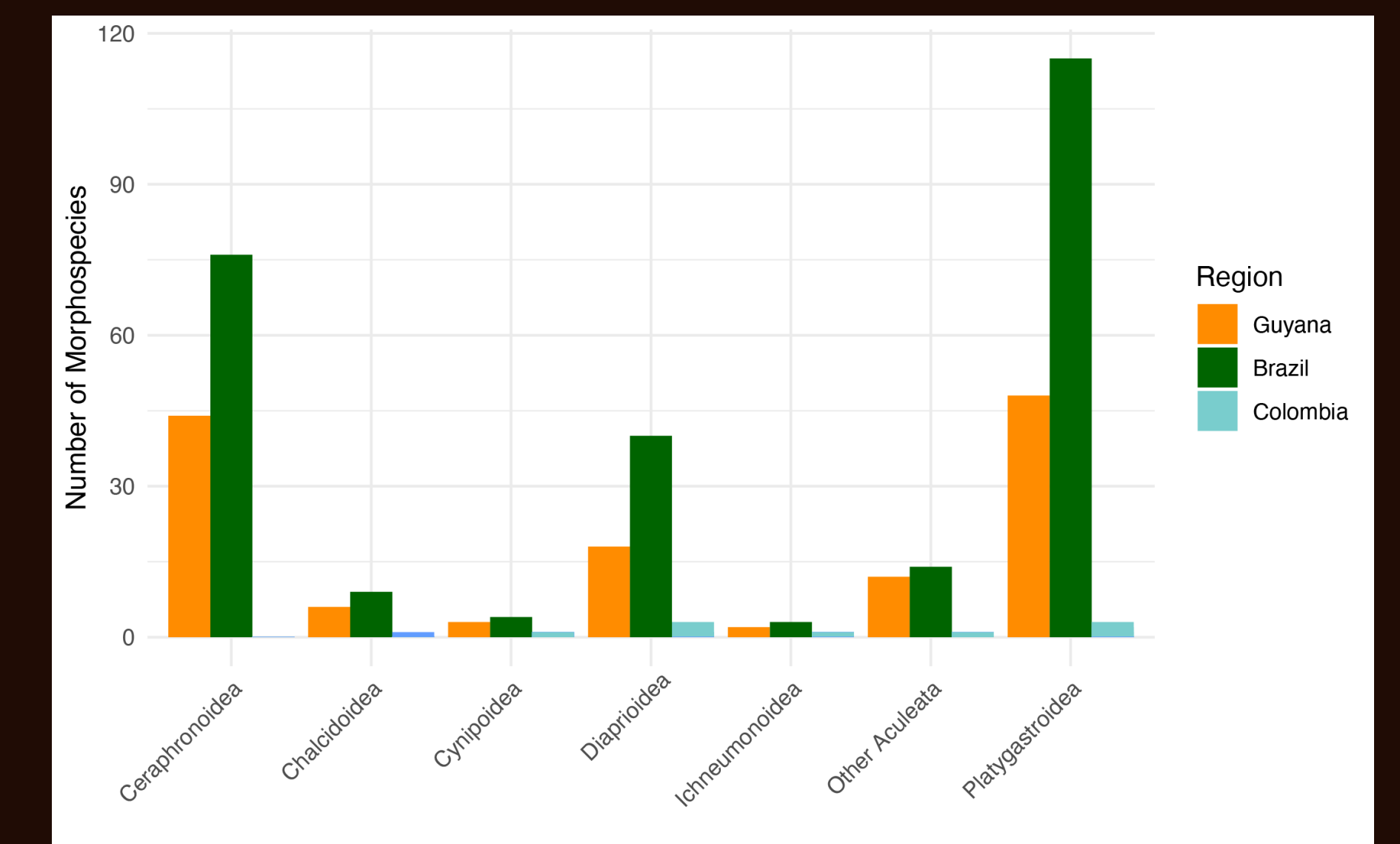


Fig. 16: Morphospecies abundance for each site

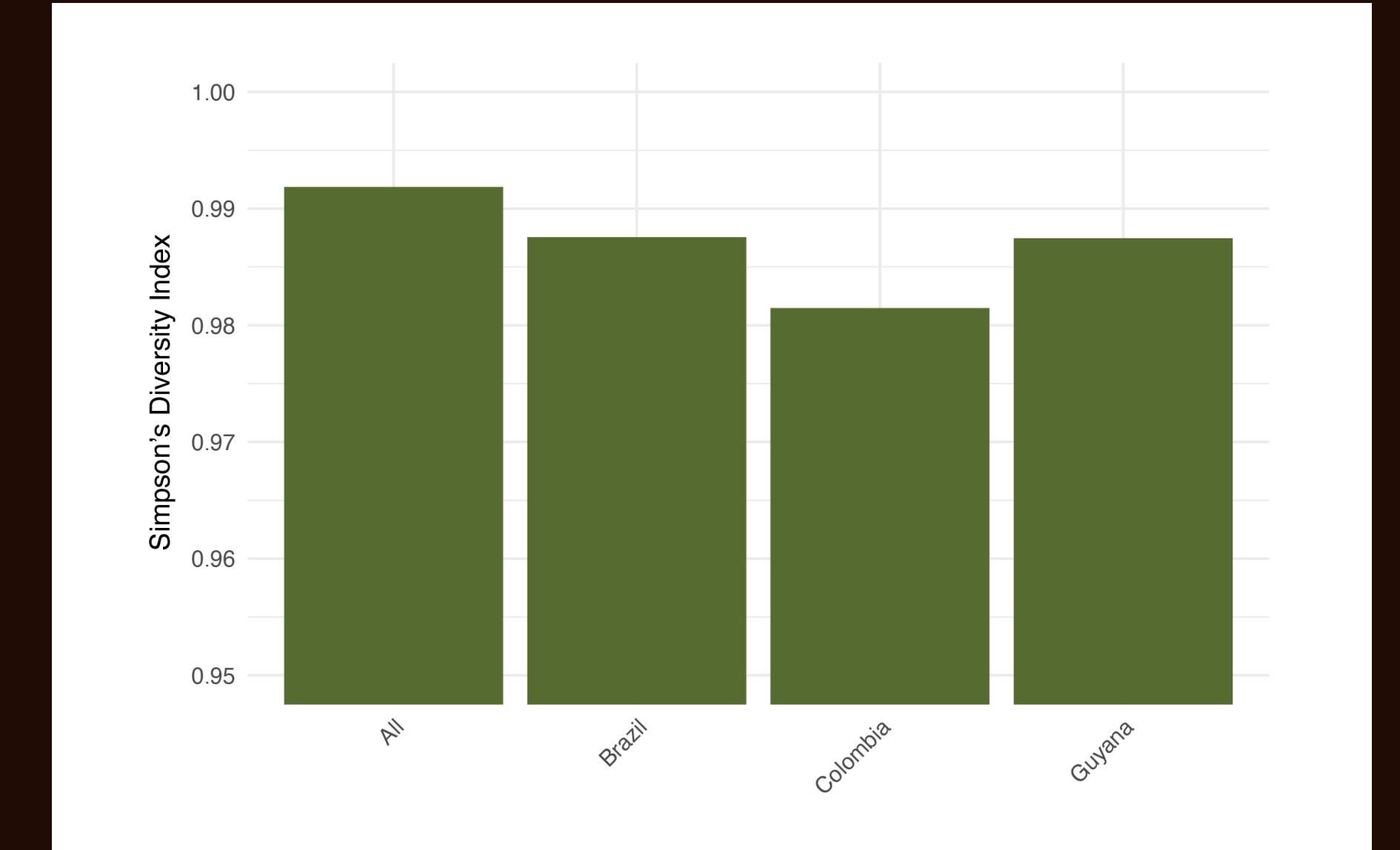


Fig. 17: Simpson's diversity indices for each site

Discussion

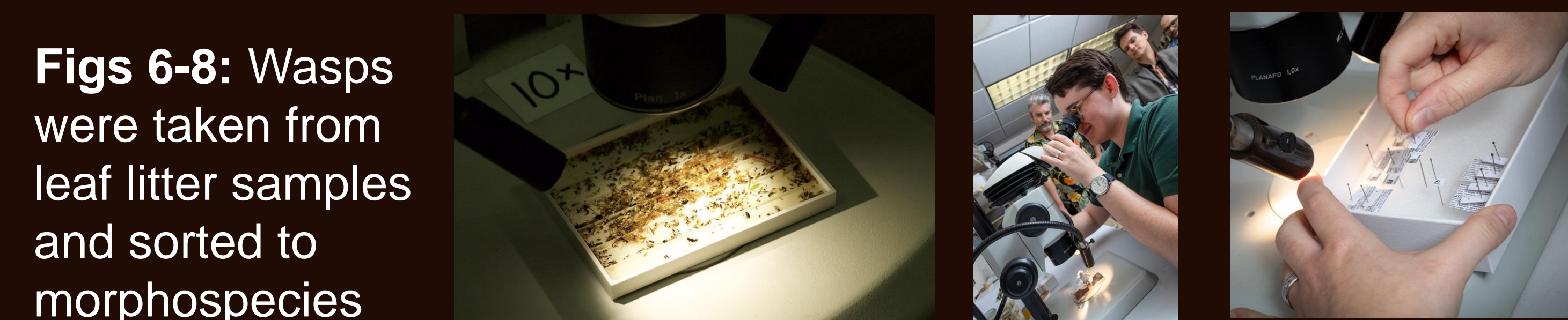
- Results suggest a high species diversity of micro-Hymenoptera that could be further understood through continued sampling and data collection
- Data will be harmonized with previous morphospecies data collection from similar collection events
- Further analyses of specimens may indicate undescribed genera and species and strengthen taxonomic knowledge

Acknowledgements

- NSF REU Site: Natural History Research Experiences
- Lane Endowment

References

- Agosti D., Majer J., Alonso L.E. and Schultz T.R. (eds) 2000. *Ants, Standard Methods for Measuring and Monitoring Biodiversity*. Smithsonian Institution Press, Washington, DC, 280 p
- Jari Oksanen, F. Guillaume Blanchet, Michael Friendly, Roeland Kindt, Pierre Legendre, Dan McGlinn, Peter R. Minchin, R. B. O'Hara, Gavin L. Simpson, Peter Solymos, M. Henry H. Stevens, Eduard Szoecs and Helene Wagner (2016). *vegan: Community Ecology Package*. R package version 2.4-0. <https://CRAN.R-project.org/package=vegan>



Figs 6-8: Wasps were taken from leaf litter samples and sorted to morphospecies



Figs 9-12: Example morphospecies, from left to right: *Ceraphronoidea* sp., *Baeus* sp., *Podagrion* sp., and *Diapriidae* sp.

- Species accumulation curves, Sorensen's dissimilarity, morphospecies abundance, and Simpson's diversity for each site were generated using the R package *Vegan*²