



Characterizing insect communities in thin-soil environments

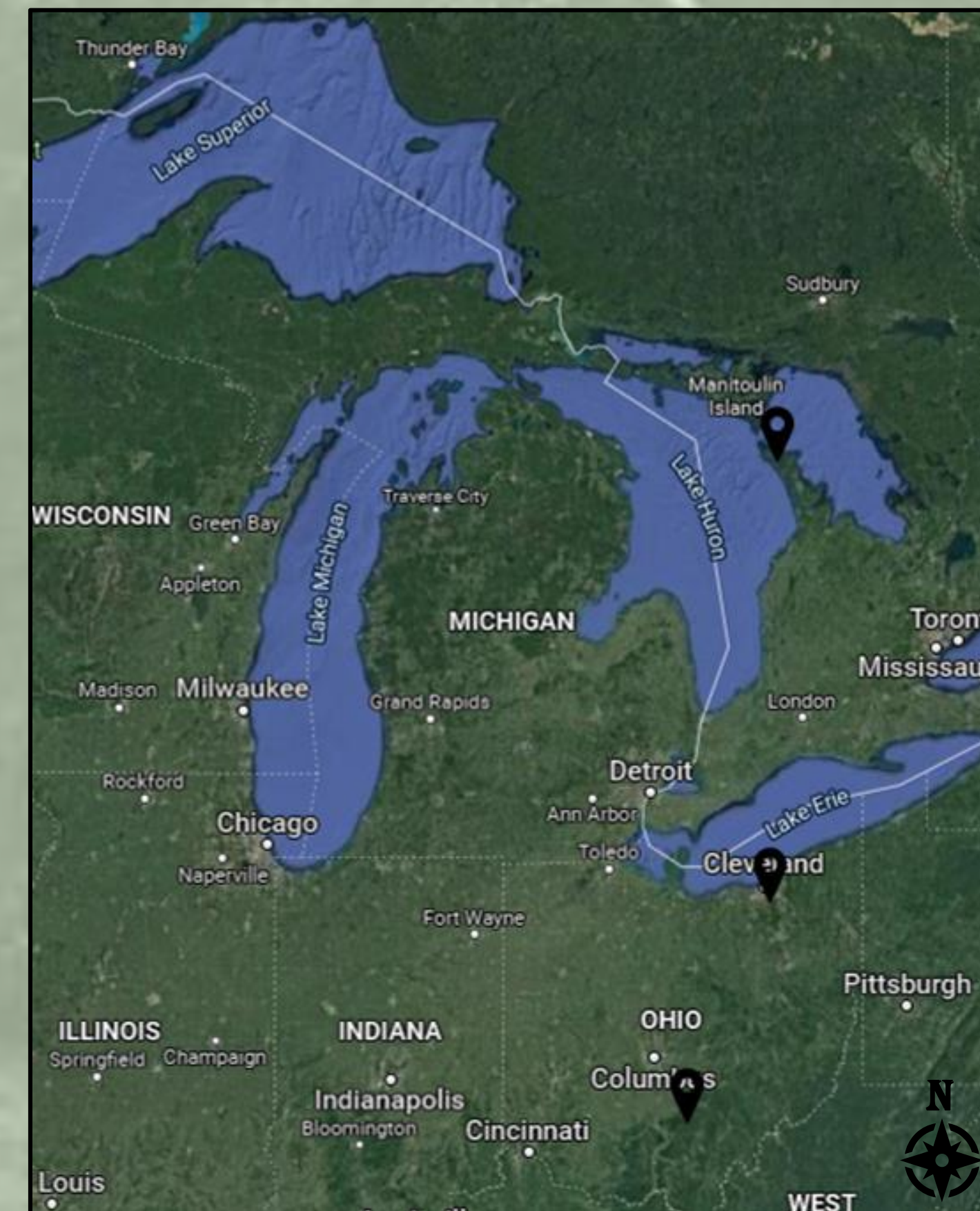
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Abstract

Natural thin-soil ecosystems are areas in which bedrock has thin, or sometimes absent, soil on top of its surface. These are open environments with few primary producers that can survive, given the shallow growing medium, as well as high winds, lack of cover from solar radiation, and sometimes extreme precipitation conditions. These sensitive and unique habitats can be home to rare plant and invertebrate species. In the Great Lakes Region thin-soil ecosystems are typically in the form of alvars, rocky lakeshores, cliff edges, and barrens. This project characterizes the community composition of insect communities in thin-soil ecosystems in northern, central, and southern regions of the Southeastern Great Lakes region of North America. We predicted that individual insects would vary across the regions, but they would be functionally similar. In June – August of 2019 yellow sticky cards, bee bowl traps, and yellow ramp traps were used to capture insects for 48 hours once per month. We collected over 22,400 insects in total. We compared biodiversity metrics between regions, finding no difference in insect community.

Materials and methods



General location of the three sites for each region.
Figure adapted from Google Maps.



Insect traps deployed at various sites in 2019. From left to right: yellow sticky card, bee bowls, and yellow ramp trap.

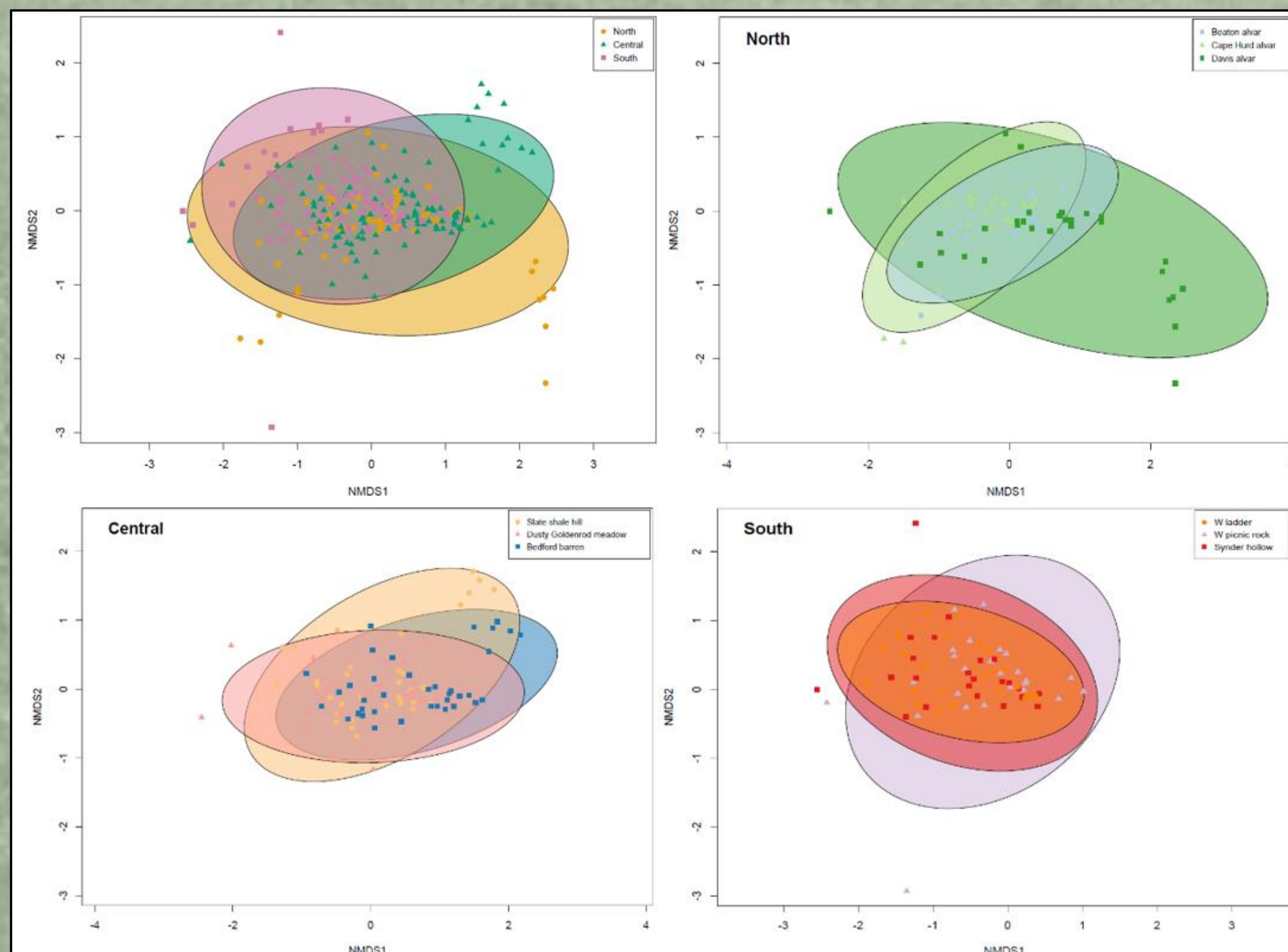


Quadrats were used to randomly sample plant communities at each site.

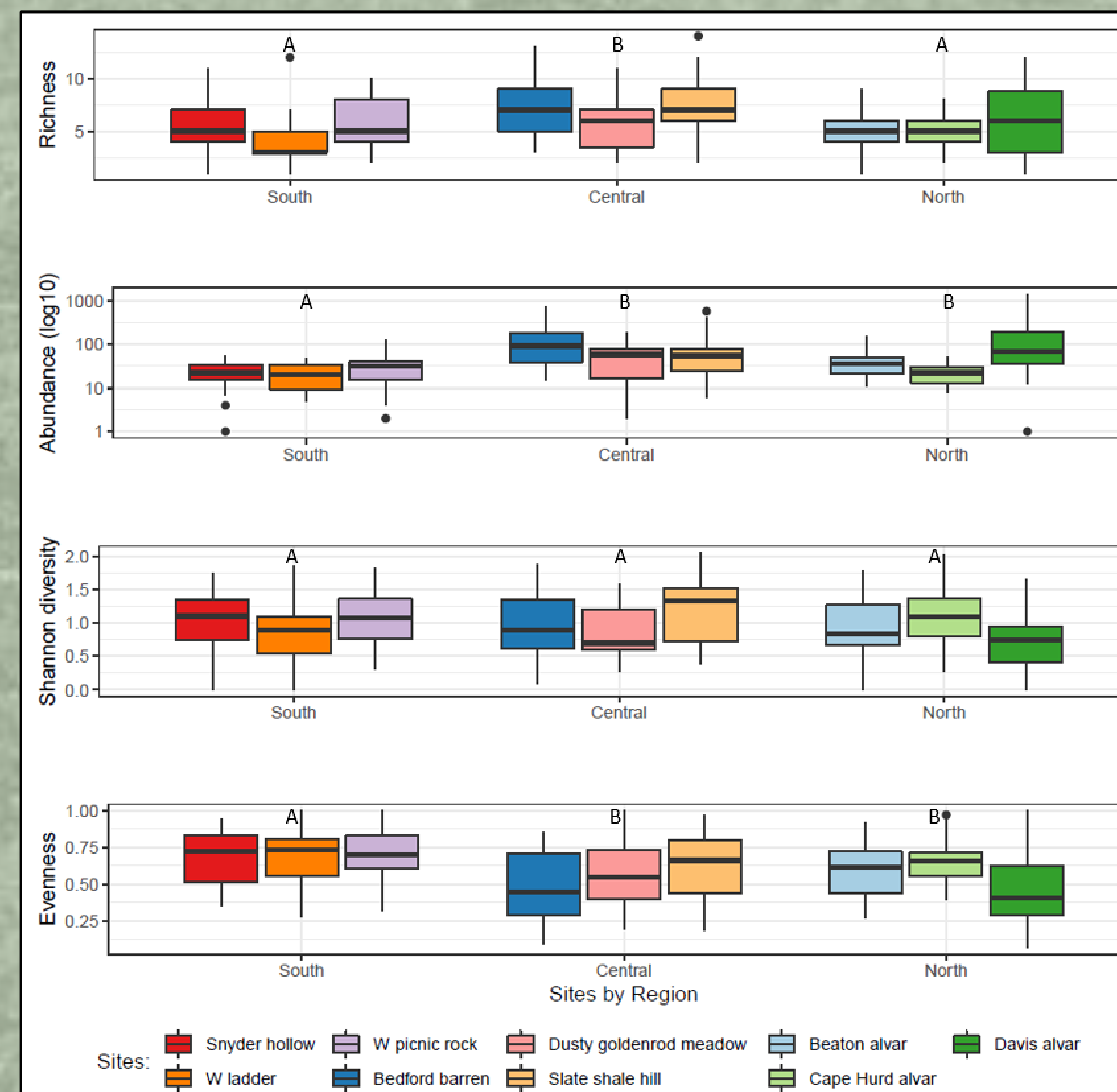


During plant surveys, in July of 2019, species were identified and percent abundance within each quadrat was determined. Dominant species outside of the quadrat were also noted. Photos to the left display some of the plant species at the sites.

Results



Non-metric multidimensional scaling figures. Clockwise starting at top left: Insect communities by region, Northern sites, Southern Sites, Central sites.



Box plots displaying biodiversity metrics of insects, comparing sites by region. Matching letters denote similarities between regions for each response variable. Note that abundance is transformed by log10.

Conclusions

- There is **similarity between the insect communities** of thin-soil sites sampled in the Southeastern Great Lakes Region of NA, most likely due to their similar physical attributes.
- Though these sites had various levels of human disturbance, that did not appear to impact insect communities.
- An emergence of parasitoid wasps at the Davis alvar site (North) can account for its differences.

Next steps

- Analysis of bee and plant species.
- Companion study examining insects and plants in structurally similar urban environments.

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