

# Structure of a diverse tropical forest insect–parasitoid community

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## Summary

1. Quantitative host–parasitoid food webs are descriptions of community structure that include data on the abundance of hosts and parasitoids, and the frequency of links between them, all expressed in the same units.
2. Quantitative host–parasitoid food webs were constructed describing the community of leaf-mining insects (Diptera, Coleoptera and Lepidoptera) and their parasitoids (Hymenoptera) in an 8500-m<sup>2</sup> area of moist tropical forest in Belize, Central America, over a 1-year period.
3. The summary food web, containing data for the whole year, is we believe the most diverse quantitative host–parasitoid web yet described. It contains 93 species of leaf-miner, 84 species of parasitoid and 196 links between hosts and parasitoids.
4. Most parasitoids were generalists, with individual parasitoid species recorded as parasitizing up to 21 host species. In contrast, most leaf-miners were specialists, with 114 links documented between leaf-miners and their host plants.
5. A robustness analysis was used to reveal the effects of different sampling intensities on food web statistics. The results suggest that the sampling had revealed most of the species of host and parasitoid in the community, but further interactions among species would continue to be detected with additional sampling. Measures of the ratio of hosts to parasitoids and of realized connectance were relatively insensitive to sampling intensity.
6. Three seasonal webs were constructed, revealing temporal changes in the structure of the community. There was greater turnover in host species composition than parasitoid species composition among seasons, but most web statistics remained relatively constant across seasons.
7. Both the summary web and the seasonal webs show low levels of compartmentalization, suggesting that the host–parasitoid community is not divided into relatively discrete subwebs with largely independent dynamics.
8. The extent of potential indirect interactions between pairs of hosts was assessed by constructing quantitative parasitoid overlap graphs. These suggest that abundant species are likely to have greater indirect effects on less abundant species than *vice versa*, and that species in the same taxonomic order are more likely to interact indirectly. The graphs do not support the hypothesis that species sharing the same host plant are more likely to interact via shared parasitoids.

*Key-words:* apparent competition, biodiversity, food web, rain forest, leaf miner.

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