

Are insects drivers or passengers of tropical rainforest detrital nutrient cycles?

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Patterns and manipulations

The bulk of the energy captured by tropical rainforests falls to the floor as part of the detrital food web. This environment is replete with organisms whose densities and community composition track the carbon and micronutrient composition of the litter. I conducted a series of observational and manipulative experiments at La Selva Biological Station in northeastern Costa Rica, to document mesoscale relationships between the arthropod community and nutrient concentrations, and to test how the ants of the detrital food web may alter the decomposition of leaf litter [1-4]. I additionally used C and N stable isotopes to evaluate how the trophic structure of the litter food web responds to gradients in nutrient concentrations [5].

Findings

The availability of nutrients is highly predictive of the community structure of litter-dwelling arthropods, though the mechanisms by which micronutrients are predictive of community structure remain enigmatic. To a limited extent, arthropods alter the rate of energy and nutrient liberation from leaf litter, but it remains unlikely or unclear whether the activity of this guild of animals plays a substantial role in altering the movement of energy and nutrients throughout the ecosystem.

Student training and outreach

All investigations were conducted as undergraduate research projects by students from a minority-serving institution, with the participation of K-12 science teachers in the field. The mentorship of undergraduates in an immersive research environment, in this case La Selva Biological Station, has been critical in developing independent research identities for students from underrepresented groups.

[1] McGlynn & Poirson (2012) *J.Trop.Ecol.* **28**, 437-443 [2] McGlynn *et al* (2009) *BMC Ecology* **9**, 23 [3] McGlynn *et al* (2009) *Biotropica* **41**, 234-240 [4] McGlynn *et al* (2007) *Biotropica* **39**, 50-53 [5] Huang *et al* (2012) *J. Trop.Ecol.* **28**, 395-403