Ana Miller-ter Kuile

E-mail: ana.miller-ter.kuile@lifesci.ucsb.edu

May \_\_, 2021

To the editors of *Ecology*:

Enclosed, please find a manuscript my co-authors and I believe would be ideally suited for the *Ecology*. In this article, entitled, “Predator-prey interactions of terrestrial invertebrates are determined by predator body size and species identity”, we present results of a study examining how predator body size and species identity shape predator-prey interactions in invertebrate communities. We believe this study is directly in the scope of *Ecology* by providing empirical data using a novel method (diet DNA metabarcoding) that tests and explores the patterns of community predator-prey interactions, linking interaction outcomes to predator identity and traits in a model system with broader implications across terrestrial invertebrate taxa globally.

Our findings suggest both general patterns and species-specific roles shape predator-prey interactions for terrestrial invertebrates, predicting the body size of prey that predators can consume. Interestingly, while these predators (including spiders, insects, and centipedes) use hunting traits such as venom and webs, we did not find consistent benefits of these hunting strategies in increasing the size of prey that predators could consume. Instead, these relationships were driven by predator species identity. By using diet DNA metabarcoding data, our study provides novel and highly valuable interaction data for a set of organisms (terrestrial invertebrates including spiders, insects, and centipedes) for which we have limited observed knowledge. This study comes at a key time, as recent synthetic work in this field (see Brose et al. 2019 *Nature Ecology & Evolution*) aims to build predictions using similar datasets. However, this synthesis relies on data for which a minority (~2 – 13%) of the predator-prey interactions among invertebrate taxa are observed (visualized in our study, SI Figure 12), so our study comes at an ideal time to provide empirical data for a key ecological theory (predator-prey size scaling). Terrestrial invertebrates are one of the most abundant and diverse groups on earth, so their functional roles in ecosystems are likely to strongly impact community structure and ecosystem dynamics.

The work in this manuscript is all original research carried out by the authors and all authors agree to its content. We have no conflicts of interest to report and have received appropriate research approvals. The results in this manuscript have not been submitted for publication elsewhere, nor are they previously published. We look forward to hearing your thoughts on this work. On behalf of my co-authors, I thank you for your consideration of our submission.

Sincerely,

Ana Miller-ter Kuile