Dear Editor,

Please find attached the manuscript entitled “Resource overlap and dilution effects shape host plant use in a myrmecophilous butterfly” to be considered for publication in Proceedings of the Royal Society B.

Variation in the intensity of species interactions is widespread over time and space, and has important effects on the ecological and evolutionary dynamics of natural populations. Despite these facts, we still know little about the factors and processes driving variation in interaction intensities. As species interactions are a major selective agent in natural populations, this knowledge would improve our understanding of the causes of variation in natural selection in the wild.

In this study, we focus on a consumer-resource interaction to examine how variation in interaction intensity is related to resource traits, resource density and abundance of other resources. Using the interaction between a myrmecophilous butterfly and its host plant as a model system, we examine how within-population variation in interaction intensity is simultaneously determined by individual host plant traits, density and trait distributions of neighbors, and abundance of ant species serving as the second hosts of butterfly larvae. We show that butterflies prefer host plant individuals with an early flowering phenology and host plants that have a high abundance of host ants in their immediate neighborhood. These effects are interactive, i.e. butterfly preference for plant flowering phenology is stronger at higher ant abundance, meaning that the intensity of the consumer-resource interaction is dependent on the overlap of two important resources. We also show that the intensity of the plant-butterfly interaction decreases with an increasing resource density (i.e. an increased density of host plants in the neighborhood), and that this dilution effect is stronger when neighbors have a suitable phenology.

Our results are exciting and novel because they illustrate how processes acting at the levels of individuals, populations and communities interactively determine the intensity of consumer-resource interactions. A broader implication of these results is that small-scale spatial variation in natural selection and population dynamics driven by species interactions can sometimes only be understood as the net outcome of simultaneous and interactive processes acting at the levels of individuals, populations and communities.

The attached work has not been published or accepted for publication elsewhere, and is not under consideration for publication in any other journal or book. Its submission for publication has been approved by both authors, and all persons entitled to authorship have been so named.

We thank you in advance for your consideration of our manuscript.

Yours sincerely,

Alicia Valdés, on behalf of both authors