Density and context dependence of seed mortality in a tropical forest: indirect interactions among trees mediated by shared predators

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The Janzen-Connell hypothesis is one of the leading explanations for tree species coexistence in tropical forests. Janzen-Connell propose a disproportional high offspring mortality due to high density of specialized predators and pathogens near adult trees, preventing long-term local dominance of the same species. However, offspring mortality is partly caused by generalist seed predators, and may thus be indirectly affected by the abundance of heterospecific seed sources.

In this study, we examined how density dependence of seed mortality is influenced by heterospecific seed densities, via shared seed predators, at a series of 54 plots (1-ha) across Barro Colorado Island (Panama).

We evaluated how conspecific and heterospecific tree densities could affect seed predation patterns. We found that seed predation patterns were explained by conspecific and heterospecific densities combined, and the strength and direction of the effect (negative or positive) depended on species identity and local density. We conclude that seed mortality in tropical trees, contrary to Janzen-Connell expectations, is affected by the spatial arrangement of both heterospecific and conspecific adult tree densities and the response of shared enemies to it.