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Synergy of multiple partners, including freeloaders, increases host fitness in a multispecies mutualism.

Palmer TM, Doak DF, Stanton ML, Bronstein JL, Kiers ET, Young TP, Goheen JR, Pringle RM
Proc Natl Acad Sci U S A. 2010 Oct 5; 107(40):17234-9[Abstract on PubMed](#) | [Full Text](#) | [Related Articles](#) |[Citations on Google Scholar](#) | [Order Article](#)

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Evaluations

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Evaluated by [Luke Barrett](#) and [Peter Thrall](#) NEW 20 Jun 2011**This study presents a thorough, thought-provoking and fascinating analysis of interactions between mutualistic ant communities and an acacia host species.**

Tightly coupled, specific interactions between species pairs represent only a fraction of the diversity encountered in interactions between hosts and symbiotic organisms. Rather, symbiotic interactions are often embedded in complex, species-rich networks, so that most host and symbiotic species interact with multiple partners during their lifetimes.

Despite the importance of such multispecies symbioses in both applied and basic biology, and the considerable theoretical and empirical effort that has focused on the prevalence of cheating in such systems, there exists a broad deficiency in our understanding of the costs and benefits involved in symbiotic interactions between multiple partner species, and how more diffuse interactions are maintained across ecological and evolutionary time.

Using data collected over 8 years, Palmer et al. explicitly evaluate how shifting ant associations impact on lifetime host fitness and demonstrate that this is enhanced by consecutive partnering with different sets of ant species over the lifespan of a tree. This is despite the fact that these ants vary broadly in their effectiveness as mutualists ranging from highly beneficial herbivore deterrents to seemingly parasitic sterilizers. In essence, the fitness benefits arising from associating with consecutive sets of all ant species, including seeming parasites, can be explained by the timing of the association of different ant species throughout the lifespan of the plant, and resultant trade-offs between survival and reproduction at different host life-history stages. Palmer et al. demonstrate that the dynamics of ant-plant mutualisms cannot be fully understood by comparing the effectiveness of pairwise associations at a single point in time. Instead, it is necessary to consider the broader community and temporal contexts within which interactions occur. This study should inspire the development of new theoretical and empirical work on the ecology and evolution of multispecific host-symbiont interactions.

Competing interests: None declared

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