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Friend or foe? Fitness effects of cheaters on the alpine wildflower Polemonium viscosum

Studies of floral ecology traditionally encapsulate interactions between flowering plants and animal pollinators. However, these relationships become more complex in the presence of cheater species that visit flowers for nectar without assisting in pollination. When cheaters and pollinators collect the same rewards from flowers, their floral preferences often converge. The interactions among pollinators, plants, and cheaters determine fitness benefits of pollinator attraction and cheater avoidance. We tested whether the nectar-robbing ant Formica neorufibarbus gelida enhances or reduces pollination success in a natural population of Polemonium viscosum. Bumblebee pollinators and nectar-foraging ants both prefer large highly rewarding flowers of Polemonium viscosum. Plants were assigned to four treatments: natural ant damage (AD), plants with flowers matching those of AD individuals in size that were either experimentally protected from ants (MP) or subjected to ant addition (MA), and randomly chosen plants that were protected from ant visits (RP). Average pollen receipt per pistil was significantly higher in intact flowers of plants that ants visited naturally (AD) than in flowers of plants selected at random and protected from ants (RP). However, pollen receipt did not increase significantly under experimental ant addition or decrease with ant exclusion from flowers matched in size (MP). Together these results suggest that enhanced pollination of plants visited by naturally foraging ants reflects convergence between ant and bumblebee floral preferences rather than indirect effects of ants on pollinator behavior. Ant damage reduced seed set of AD plants sharply in comparison with MP controls, verifying a substantial fitness cost of exploitation. Overall, the relative fitness of AD plants depended on both the proportion of flowers damage by ants and the pollination success of plants in the population at large (RP). When randomly selected plants achieved low pollination success, more attractive AD plants were favored, despite the cost of ant exploitation.