# Can Disruption of an Ant–Plant Mutualism Explain a Lack of Recovery of Forest Herbs in Post-agricultural Forests of New York?

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**Abstract** - A substantial proportion New York's forests regenerated following agricultural abandonment around the turn of the 20th century. Many myrmecochorous (ant-dispersed) plant species are lacking in these forests decades after land abandonment despite being present in residual stands. To determine if disruption to this ant–plant mutualism can partially explain the current distribution patterns of myrmecochorous plants, we quantified the proportion of seeds removed by ants while accounting for predation by rodents in residual and post-agricultural forests. We experimentally manipulated ant access and controlled for rodent access to seeds of 3 myrmecochorous understory herbs in 3 paired residual and post-agricultural forests in central New York. We identified *Aphaenogaster rudis* as the primary seed disperser. We found no difference in mean (± 1 SE) proportion of seeds removed by ants between residual stands (73.7% ± 7.7%) and post-agricultural stands (75.8% ± 7.9%). Rodents removed few to no seeds (5.3% ± 1.5%), but an invasive slug, *Arion subfuscus* (Dusky Arion), was observed removing elaiosomes from seeds in both stand types. Our data indicated neither a lack of ant-dispersal activity nor excessive rodent predation would be limiting to dispersal of myrmecochorous seeds in post-agricultural forests during the period of our study. Given the presence of *A. rudis* in post-agricultural stands, programs to assist plant migration will likely be sufficient to reestablish this ant–plant mutualism in degraded sites.

## Introduction

Mutualisms provide a framework on which the complexity of a community unfolds. Animal pollinators ensure plant reproductive success and animal seed-dispersers enhance plant germination success (Bond 1994). Mutualistic systems provide necessary ecosystem services, though the resiliency of these interactions in the face of change requires continued investigation (Kearns et al. 1998). For example, large-scale habitat fragmentation and land-use legacies can disrupt plant–animal mutualisms, e.g., pollination in dry subtropical forests (Aizen and Feinsinger 1994) and distribution patterns of native understory forbs in temperate mesic deciduous forests (Mitchell et al. 2002) appear to be consistent with dispersal limitations by biological agents. These disruptions may result in regional extirpation of species (Harris and Johnson 2004). In northeastern North America, disruption of a key seed-dispersal mutualism, myrmecochory (the dispersal of plant diaspores by ants), may be limiting reestablishment of understory flowering plants (Beattie et al.1979).

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