© 2024 The Author(s). *The Bulletin of the Ecological Society of America* published by Wiley Periodicals LLC on behalf of The Ecological Society of America. This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

# ANTS AND CAMEL CRICKETS: DUAL PARTNERS IN POLLINATION AND SEED DISPERSAL

Kenji Suetsugu and Hiromu Hashiwaki

Study description

This study investigates whether *Balanophora subcupularis*, which relies on ants and camel crickets for pollination, also depends on these insects for seed dispersal. Through comprehensive field observations and laboratory experiments, we confirmed that both camel crickets (*Diestrammena robusta*) and ants (*Aphaenogaster famelica* and *Pheidole nodus*) contribute not only to pollination but also to seed dispersal. Camel crickets consumed the fruits and defecated intact seeds, while ants transported the fruits to new locations. This provides strong evidence of double mutualism between *B. subcupularis* and these insects, marking the first documented case where both pollination and seed dispersal are facilitated by the same invertebrate species.

Suetsugu, K. and H. Hashiwaki. 2025. Ants and Camel Crickets: Dual Partners in Pollination and Seed Dispersal. Bull Ecol Soc Am 106(1):e02202. https://doi.org/10.1002/bes2.2202



Photo 1. Fruiting plants of the non-photosynthetic *Balanophora subcupularis*, with thousands of tiny dry fruits located at the base of fleshy, club-shaped structures (claviform bodies, likely modified bracts). Upon closer inspection, the surface is covered in reddish-brown granules (the claviform bodies), with the fruits hidden beneath them. Photo credit: Hiromu Hashiwaki.



Photo 2. The ground beetle *Synuchus* sp. feeding on some fruits and claviform bodies of *Balanophora subcupularis*. *Synuchus* spp., a known seed predator, did not defecate intact seeds. Photo credit: Hiromu Hashiwaki.



Photo 3. The camel cricket *Diestrammena robusta* feeding on some fruits and claviform bodies of *Balanophora subcupularis*. *D. robusta* defecated many seeds that were morphologically intact. Photo credit: Hiromu Hashiwaki.



Photo 4. The ant *Aphaenogaster famelica* transporting some fruits and claviform bodies of *Balanophora subcupularis*. Photo credit: Hiromu Hashiwaki.

These photographs illustrate the article "Beyond pollination: Ants and camel crickets as double mutualists in a non-photosynthetic plant" by Suetsugu and Hashiwaki, published in *Ecology*. https://doi.org/10.1002/ecy.4465