

Abstract

The Ecological Interaction of *Heliconia hirsuta* L.f. (Heliconiaceae) and its Ant Partners

Shane T. Ballah

This study originated in chance field observations that inflorescences of *Heliconia hirsuta* L.f. (Heliconiaceae) commonly are visited by large numbers of ants, in contrast to other plants of the same genus. This prompted further investigations to ascertain the species composition of these visitors, the reasons for their attraction to the inflorescence, the factors responsible for the variation in ant activity with inflorescence age and the functional role of these visitors. The discovery of secretions on the bracts during the course of the study prompted further work into its composition and source.

I developed a six-stage system for aging the developing inflorescences of *H. hirsuta* based on four characteristics of the inflorescences. The stages developed ranged from emergence of the inflorescence through to its decay. This system may be applied to the aging of inflorescences of *H. hirsuta* in the field. This system was used in assessing the interaction of ant visitors to the inflorescences.

Seventeen, generalist ant species visited inflorescences of *H. hirsuta* in the Arena Forest reserve, Trinidad. Of these the most common were *Ectotomma tuberculatum*, *Crematogaster* sp. A and *Solenopsis altinodis* Forel 1912. The

aggressive behaviour of *E. tubercualtum* makes it a potentially good defender of *H. hirsuta* inflorescences. Ant visitors collected secretions produced by inflorescence bracts, tended membracids and nested. These various activities varied with the age of the inflorescences. This variation appears to be related to the timing of secretion production by the bracts.

The secretion produced by the bracts arises from a formless extrafloral nectary comprising secretory cells within the abaxial hypodermal layer and associated vascular bundles, stomata and sub-stomatal chambers. The resulting secretion in *H. hirsuta* can be categorised as extrafloral nectar based on its origin and possible function. Its description represents the first such record for *H. hirsuta* inflorescences.

Exclusion experiments designed to test the effect of ant visitors on reproductive success of *H. hirsuta* inflorescences were inconclusive. I postulate that, by providing an alternative nutrient source, the extrafloral nectar serves to deter ant visitors from the flowers and fruits of *H. hirsuta*. Protection of the bracts from herbivores is secondary to this function. The use of extrafloral nectaries in this manner may have arisen as a protective function in *Heliconia* species lacking deep moat like bracts.

Keywords: *Heliconia hirsuta*, ants extra-floral, nectary, inflorescences, secretions, reproductive success, exclusion