

Vertical habitat use and foraging activities of arboreal and ground ants (Hymenoptera: Formicidae) in a bornean tropical rainforest

Abstract

In a tropical forest, the food web of the canopy stratum is carbohydrate-rich and nitrogen-poor, whereas that of the ground stratum is carbohydrate-poor and nitrogen-rich. We have previously shown that ground- and arboreal-nesting ants extend their activity from the nesting stratum to other strata via the tree-trunk. In the present study, we conducted a foraging experiment using baits located on tree trunks in same locality, to ascertain whether this foraging extension by the two ant assemblages is related to their foraging response to carbohydrate and nitrogen resource distribution and availability in tropical forests. We collected ants using honey and tuna bait traps, representing carbohydrate or nitrogen resources, in day and night time. Baits on trunks were primarily occupied by ground ants during day-time, and arboreal ants at night. Furthermore, ground ants preferred honey baits and arboreal ants preferred tuna baits. This indicates that the ground ants foraged in the canopy to acquire carbohydrate nutrients, mostly during day-time, and the arboreal ants foraged on the ground to acquire nitrogen nutrients, mostly at night. The foraging activities may provide the nutrients that are most limiting in the respective nesting habitats, and most needed for colony growth or maintenance. Therefore, we infer that extending vertical habitat-use of the two ant assemblages is an important foraging strategy in tropical forests.