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BIOTROPICA 33(1): 207–211 2001

## Bait Use in Tropical Litter and Canopy Ants—Evidence of Differences in Nutrient Limitation<sup>1</sup>

*Key words:* ant; canopy; carbohydrate; litter; Neotropics; nutrient limitation; protein.

INCREASINGLY, RESOURCE (OR “BOTTOM-UP”) LIMITATION is seen as key to understanding gradients of diversity, trophic structure, and population regulation (Oksanen *et al.* 1981, Powers 1992, Rosenzweig & Abramsky 1993). The essence of bottom-up control is that a taxon's density and diversity are tied to its ability to build and fuel tissue. Roughly, this corresponds to the taxon's ability to harvest both protein and carbohydrates (CHOs) from its environment. The quality of a food resource is thus linked to its carbon:nitrogen (C:N) ratio.

Plants yield C:N ratios of 40:1 or more while heterotroph organisms yield C:N ratios of *ca* 10:1 (Swift *et al.* 1979, Begon *et al.* 1996). A common assumption is that most terrestrial organisms are limited by the availability of N (White 1978). But the contribution of plants to the resource base of a food web varies widely among habitats (Polis *et al.* 1997). In mature tropical rain forests, the canopy harbors most of the forest's photosynthesizing tissue, whereas the understory contributes only a tiny fraction of the total photosynthate (S. Mulkey, pers. comm.). If true, consumers from the canopy would be more likely to be N-limited than consumers from the litter 20 m below.

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<sup>1</sup> Received 3 May 1999; revision accepted 22 January 2000.