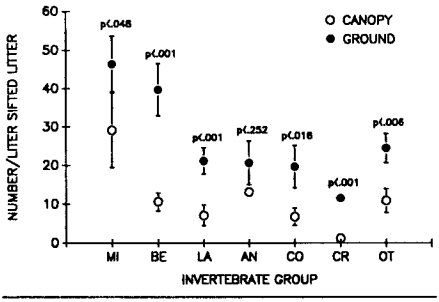

FIGURE 1. Invertebrate density (number of individuals/liter of sifted litter) by invertebrate group for ground and canopy samples. MI = mites, BE = adult beetles, LA = holometabolous insect larvae, AN = adult ants, CO = Collembola, CR = amphipods and isopods, OT = other (Hemiptera, Homoptera, Orthoptera, Dictyoptera, Dermaptera, adult Diptera, Thysanoptera, parasitic Hymenoptera, Apterygota, Symphyla, millipeds, centipeds, spiders, other Arachnida, Gastropoda, Annelida). Significance values above categories are results of paired-sample *t*-tests. Error bars represent two standard errors of the means.

similar invertebrate community with the forest floor (Fig. 1). Total invertebrate abundance was higher on the ground than in the canopy for all 8 sample pairs, with a mean density 2.6 times greater on the ground than in the canopy. Six of the seven invertebrate categories were significantly less abundant in the canopy (Fig. 1). Ants were the exception, exhibiting no consistent differences between canopy and ground. Mite densities were only slightly (but significantly) lower in the canopy. The remaining categories differed strongly between canopy and ground. Dead organic matter in the canopy was clearly depauperate in beetles and larvae. Terrestrial crustaceans, the largest invertebrates in the samples, were readily visible on the ground, but rarely seen in the canopy samples.

What factors might explain lower invertebrate densities in the canopy? Differences in microclimate could affect their composition and abundance. In general, tree crowns are subject to greater amounts of insolation, wind, and more frequent wetting/drying cycles than the forest floor (Cachan 1963, Hosokawa *et al.* 1964, Lawton 1982, Chazdon & Fetcher 1984). Numerous studies have documented sensitivity of invertebrates to microclimatic regimes, particularly moisture, temperature, and insolation; many important detritivore groups tend to drop out with increasing desiccation. Terrestrial crustaceans, for example, are very sensitive to moisture conditions (Edwards 1974) and were very rare in our canopy samples. Difficulties of dispersal to the canopy and/or within crowns of trees may exist for particular invertebrate groups, especially many of the sedentary groups and those living in nest structures or galleries (Moran & Southwood 1982, Adis *et al.* 1984, Seastedt 1984, Stork 1987). Litter substrate differences may cause differences in invertebrate populations. Little published data exist for differences in canopy and forest floor organic matter, but preliminary data suggest that they differ greatly in a variety of physical and chemical characteristics (Nadkarni & Vance, pers. comm.).

Elucidation of which factors depress invertebrate density in the canopy, and conversely, which canopy organic matter characteristics may be caused by depressed invertebrate density, await further investigation. We have shown that canopy-held organic matter, an ecosystem component of tropical montane forests, differs from forest floor organic matter in an important biotic characteristic. This implies that organic matter in the canopy should be treated as a separate compartment in ecosystem studies, and cannot be subsumed under studies of organic matter on the forest floor.

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