

Use of arboreal and terrestrial space by a small mammal community in a tropical rain forest in Borneo, Malaysia

Abstract

Aim: Small mammals were live-trapped in a primary rain forest to evaluate the relative distribution of species to each other and to microhabitat properties on the ground and in the canopy. **Location:** Kinabalu National Park in Borneo, Sabah, Malaysia. **Methods:** Seven trapping sessions were conducted along two grids with 31 trap points at distances of 20 m on the ground and in the lower canopy at an average height of 13.5 m. **Results:** Species diversity and abundance of small mammals proved to be high: 20 species of the families Muridae, Sciuridae, Tupaiidae, Hystricidae, Viverridae and Lorisidae were trapped, with murids being dominant in both habitat layers. The terrestrial community was significantly more diverse with 16 captured species (Shannon-Wiener's diversity index $H_{terr}' = 2.47$), while 11 species were trapped in the canopy ($H_{arb}' = 1.59$). The Whitehead's rat, *Maxomys whiteheadi*, and the red spiny rat, *Maxomys surifer*, dominated the terrestrial community whereas the large pencil-tailed tree mouse, *Chiropodomys major*, was by far the most abundant species in the canopy. Other abundant species of the canopy community, the dark-tailed tree rat, *Niviventer cremoriventer*, and the lesser treeshrew, *Tupaia minor*, were also abundant on the ground, and there was no clear boundary between arboreal and terrestrial species occurrences. **Main conclusions:** As most species were not confined to specific microhabitats or habitat layers, species seemed to rely on resources not necessarily restricted to certain microhabitats or habitat layers, and separation of species probably resulted mainly from a species' concentrated activity in a preferred microhabitat rather than from principal adaptations to certain habitats. Ecological segregation was stronger in the more diverse terrestrial community, though microhabitat selection was generally not sufficient to explain the co-occurrences of species and the variability between local species assemblages. Constraints on small mammal foraging efficiency in the three-dimensional more complex canopy may be responsible for the similarity of microhabitat use of all common arboreal species. Community composition was characterized by mobile species with low persistence rates,

resulting in a high degree of variability in local species assemblages with similar turnover rates in both habitats.