

## **Ecological impacts of tropical forest fragmentation: How consistent are patterns in species richness and nestedness?**

### Abstract

Large areas of tropical forest now exist as remnants scattered across agricultural landscapes, and so understanding the impacts of forest fragmentation is important for biodiversity conservation. We examined species richness and nestedness among tropical forest remnants in birds (meta-analysis of published studies) and insects (field data for fruit-feeding Lepidoptera (butterflies and moths) and ants). Species-area relationships were evident in all four taxa, and avian and insect assemblages in remnants typically were nested subsets of those in larger areas. Avian carnivores and nectarivores and predatory ants were more nested than other guilds, implying that the sequential loss of species was more predictable in these groups, and that fragmentation alters the trophic organization of communities. For butterflies, the ordering of fragments to achieve maximum nestedness was by fragment area, suggesting that differences among fragments were driven mainly by extinction. In contrast for moths, maximum nestedness was achieved by ordering species by wing length; species with longer wings (implying better dispersal) were more likely to occur at all sites, including low diversity sites, suggesting that differences among fragments were driven more strongly by colonization. Although all four taxa exhibited high levels of nestedness, patterns of species turnover were also idiosyncratic, and thus even species-poor sites contributed to landscape-scale biodiversity, particularly for insects.