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CONSEQUENCES OF FOREST CONVERSION TO COFFEE PLANTATIONS ON LITTER BEETLE AND ANT COMMUNITIES

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There have been dramatic changes in land-use over the past few centuries. The effects of these alterations on larger organisms such as mammals and birds have been studied to a certain extent. In contrast, almost no information exists about changes that have occurred in highly diverse and functionally important groups such as the invertebrates (Watt *et al*., 1997).

The changes in litter ant and beetle communities resulting from conversion of forests to two types of coffee plantations were studied in the humid tropical forest belt of Chikmagalur district in the Western Ghats of Karnataka, India. Four replicate blocks with homogeneous topography, each containing a control forest and two adjacent coffee plantations, one with polyculture shade trees and the other with monoculture silver-oak (*Grevillea robusta*) shade trees, were chosen for the study. Pitfall traps (n=7) were placed along 2 transects in each of the land-use treatments. They were used to sample for arthropods occurring in the litter. There were two rounds of sampling at the beginning and end of the dry season. Beetles and ants captured in the traps were removed and sorted to the level of morphospecies. Microclimatic parameters and litter characteristics were measured at each site. Composition and structure of the vegetation was assessed at each of the sites. Measures of diversity and

several non-parametric estimators of diversity were used to compare forests and the two types of coffee in terms of their ant and beetle fauna.
Preliminary analyses indicate that there are large differences in the composition of the litter beetle and ant communities in the forests and coffee estates. Beetle morphospecies richness and Shannon's diversity are highest for the forests, and lowest for the monoculture-shade coffee plantations, with intermediate richess in the polyculture-shade coffee plantations. The number of ant morphospecies observed in the forests and coffee estates are almost the same. The ant communities occurring in the monoculture-shade coffee plantations are dominated by fewer species, leading to a lower Shannon's diversity than in the other two land-use types. The total number of individuals of beetles is highest in the forests, followed by polyculture-shade coffee plantations, and muc lower in the monoculture coffee. The total number of ant individuals, however, is much higher in the silver-oak shade coffee plantations than in the polyculture-shade coffee plantations and lowest in the forests. Estimators of diversity that give importance to rare species, such as Chao1 and Chao2 (Anderson and Ashe, 2000), give similar trends for beetles as the Shannon's index, although not as marked. These estimators of diversity for the ants have the highest values in coffee polyculture-shade plantations, followed by the monoculture-shade plantations.

Conversion of forests, especially to monoculture shade coffee, is causing the local extinction of many beetle species and the proliferation of a few ant species. The ecological implications of such changes are currently unknown. Incentives to coffee planters and other measures to maintain polyculture shade and protect remnant forests within a mosaic of land-uses are urgently required.

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