

Termite assemblage collapse along a land-use intensification gradient in lowland central Sumatra, Indonesia

Abstract

1. Termites are major decomposers in tropical regions and play an important role in soil processes. This study measured the impact of land-use intensification on the termite assemblage of lowland rain forest in Jambi Province, on the Indonesian island of Sumatra. Termite composition was assessed in seven land-use types along a disturbance gradient, from primary forest, through different silvicultural systems, to grassland and cultivated land without trees. A range of environmental variables was also measured.

2. Termite species richness and relative abundance declined as follows: primary forest > selectively logged forest > mature 'jungle rubber' (a diverse agro-forest dominated by rubber trees) > mature rubber plantation > young *Paraserianthes falcataria* plantation (a softwood tree) > *Imperata cylindrica* grassland > cassava garden. Termite richness fell from 34 species in the primary forest to one species in the cassava garden. The relative abundance of soil-feeding termites showed a significantly greater decline along the gradient than did wood-feeding termites.

3. Of the environmental variables, woody plant basal area was most strongly correlated with termite species richness ($r = 0.973$) and relative abundance ($r = 0.980$). This reflects the response of forest-adapted termites to progressive simplification of the physical structure of the habitat, resulting in the reduction of canopy cover and alteration in microclimate, and the loss of feeding and nesting sites.

4. Synthesis and applications . Comparisons with other studies show that the decline in termite species richness and relative abundance seen at Jambi is a general trend that occurs elsewhere when forests are converted to other land uses. To help mitigate the loss of termites when forests are disturbed, we recommend the following management practices: the use of reduced-impact logging techniques, maximizing forest patch size

and connectivity, minimizing length of forest edges, and leaving dead wood to decay in situ .