

Successional response of a tropical forest termite assemblage to experimental habitat perturbation

Abstract

1. Research into the successional responses of tropical forest communities following disturbance has potential applications for habitat restoration. Currently little is known of how these responses relate to the recovery of biodiversity and ecosystem processes. Succession of assemblages of decomposer arthropods is essential for the recovery of the soil community and nutrient cycling processes.

2. This study investigated the successional response of a termite assemblage to the experimental perturbation of forest habitat in southern Cameroon, examining the implications for tropical forest restoration. A randomized block design consisting of four experimental perturbations of differing severity was established in an old secondary forest in the Mbalmayo Forest Reserve. Isolated control sites were left in undisturbed forest. Recovery of the termite assemblage was assessed by measuring termite species richness and abundance at regular intervals over the subsequent 12 months.

3. The speed of recovery of the termite assemblage varied with the type and extent of perturbation. In treatments involving severe soil and canopy disturbance, termite species richness and abundance recovered more rapidly when dead wood was left on the ground following perturbation. The availability of dead wood also resulted in recolonization by a subset of the termite assemblage that was distinct compositionally from that sampled from all other treatments. This subset at sites with additional dead wood included not only certain wood-feeding species, but also soil feeders.

4. The positive effects upon the termite assemblage of leaving substantial dead wood on the ground has implications for the restoration of tropical forests following human-induced disturbances such as logging. The accelerated recovery of termite diversity and assemblage composition is a significant component of soil community recovery and the restoration of nutrient cycles. These benefits are expected to influence soil fertility and,

ultimately, forest regeneration. The duration and persistence of these effects will depend crucially on the type, scale and intensity of the original disturbance. The impact of termites on soil properties, and vice versa, clearly deserves more attention in studies of tropical forest regeneration and recovery.