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The Impact of Cacao Agroforests on Insect Biodiversity

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Abstract

Nowadays, the topic of biodiversity loss is much addressed. Scientists try to quantify changes in landscape due to human impact and look for feasible solutions how to improve negative situations. Agroforestry systems are currently being viewed as an alternative land use system that can conserve original biodiversity. Our investigation dealt with the impact of cacao agroforests on beetle (Coleoptera) and true bug (Heteroptera) biodiversity in Peruvian Amazon. We compared the species richness and diversity among four habitat types: primary and secondary forest, cacao agroforest and annual crop production systems. Insects were collected on 20 plots (5 in each ecosystem) using pitfalls and window traps during 24 h repeated three times (in total 690 trapping days) in the dry season (August-September 2012). In total 1,295 beetles of 574 morphospecies and 48 heteropteran morphospecies were captured. Results contained 60 beetle families and 17 true bug families. In general, all biodiversity indices were relatively high in all habitats, showing that even with a high human disturbance of natural forest the insect diversity still remains high, although the species composition changed substantially. Species composition of cacao agroforest was the most comparable with the secondary forest. Window traps at two different heights in primary forest suggested large differences in species composition. Most of the primary forest species of the family Curculionidae (39 species) with subfamily Scolytinae (21 species), are predominantly forest demanding species and are negatively affected by the transformation of the forest to other habitats. Cacao agroforests can serve as reservoir for insects.

Keywords: Biodiversity, cacao, coleoptera, heteroptera, land use, pitfall trap, window trap