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“Development on the margin”

## High Hymenopteran Species Richness in Small Scale Farming Systems of Coastal Belize

CHRISTOF SCHÜEPP<sup>1</sup>, SARAH RITTNER<sup>1</sup>, MARTIN H. ENTLING<sup>2</sup>

<sup>1</sup>*University of Bern, Community Ecology, Switzerland*

<sup>2</sup>*University of Koblenz-Landau, Ecosystem Analysis, Germany*

### Abstract

An important today's challenge is to meet the increasing demands for resources and at the same time the need of biodiversity and ecosystem protection. Research in agro-ecology aims to identify systems where food and goods can be produced while conserving biodiversity. In northern coastal Belize, Central America, we compared hymenopteran communities between small scale farming areas and natural forests along a humidity gradient. Specifically, we investigated three functional groups of Hymenoptera: wild bees (Apiformes) as important pollinators of wild and crop plants, paper wasps (Vespidae) which predate on insects and may play a role in pest control, and spider wasps (Pompilidae) that provide their brood cells with anesthetized spiders (an intermediate form between predation and parasitism). In 2010 wasps and bees were collected with Malaise-traps in the protected forest area of Shipstern Nature Reserve (seven sites) and in adjacent small scale farming areas (eight sites). Traps operated for three months during the transition from wet to dry season. Farming areas consisted of a mosaic of open habitat, secondary forest, and agroforestry. First results are available for paper wasps; the results of the remaining groups are under way. Paper wasps showed higher abundance and species richness (almost doubled) in the farming areas compared to protected forest. The higher species richness in farming areas was due to supplementary species that did not occur in the forest, however all forest species were found in farming areas, too. The communities in the farming areas were highly dominated by one single species whereas the communities in protected forest were more evenly distributed. These first results indicate that small scale farming adjacent to protected areas may not only conserve but even favour biodiversity of some taxonomic groups. This pattern could be driven by the higher habitat heterogeneity and therefore better resource availability in small scale farming systems compared to closed forests.

**Keywords:** Agroforestry, Belize, biodiversity, community evenness, habitat heterogeneity, Hymenoptera, Malaise trap, species dominance, subtropical forest ecosystem, sustainable land use, wasps and bees