



Spatial and matrix influences on the biogeography of insect taxa in forest fragments in central Uganda

Perpetra Akite

Dissertation for a cotutelle award of Doctor of Philosophy Degree of Makerere University, Uganda and University of Bergen, Norway



Makerere University



University of Bergen

2016

ABSTRACT

How best to manage forest patches, mitigate the consequences of forest fragmentation, and enable landscape permeability are key questions facing conservation scientists and managers. In Uganda, most protected forests have undergone considerable changes from a range of human activities in recent decades. As such once continuous forests now exist as ‘islands’ (patches) in a matrix of non-forest habitats. In fragmented forest landscapes, the capacity of matrix habitats to support forest species varies. However, very little is known of how faunal communities and in particular insect assemblages utilize resources within the patch-matrix landscape. This study explored spatial and temporal patterns of diversity and distribution of butterflies, moths and grasshoppers in the patch-matrix landscapes of three protected forests: Mabira (largely stable and recovering from past encroachment, albeit with minor illegal logging, but disturbed at the edges), Zika and Mpanga (relatively undisturbed and unchanged internally, but with substantially altered matrix), all in central Uganda. All together, 25156 individuals (326 species) of butterflies, 1131 individuals (41 species) of silkmths, 1564 individuals (44 species) of hawkmoths and 2173 individuals (49 species) of grasshoppers were recorded in the forests and surrounding matrix habitats. There was a marked decline in species richness and abundance over time and across the land-use gradient: from mature forests to mixed gardens. The decline was more evident for forest specialist species, while generalist species mostly showed the reverse trend. This decline was observed even in relatively stable Zika and Mpanga forests. Along the vertical stratum, there were more individuals in the understorey compared to the canopy, but higher proportions of specialists were in the canopy. One strategically directed survey in Mabira resulted in the re-discovery of *Oshwea dubiosa* only previously known from a single holotype female from West-Central Democratic Republic of Congo. This has added to the scientific knowledge of the species, its range and habitat affiliation. Although results of this study underscore the value of protected forests in maintaining biodiversity, it also acknowledges the importance of some of the altered habitats such as cardamom and shade coffee plantations that maintain relic forest species. Therefore detailed knowledge of species and threats within patch-matrix landscape is critical to site prioritization and conservation planning. Since protected forests are ecologically linked to their surrounding habitats, failure to stem broad-scale loss and degradation of the matrix habitats will consequently increase the likelihood of serious biodiversity declines and subsequent extinction.