INSECT DIVERSITY AND POTENTIAL ECOSYSTEM SERVICES IN TROPICAL ROOF GARDENS

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Abstract

Roof gardens have increasing emerged as nature-based solutions for improving urban environmental quality, supporting biodiversity, and promoting urban agriculture. Whilst insects, particularly pollinators, play a crucial role in maintaining the ecosystem functions and services necessary for the long-term health of roof gardens, it remains unclear how effectively tropical roof gardens can support insect communities. Here, we documented insect diversity on tropical roof gardens and assess their potential to support biodiversity and ecosystem services in a tropical mega-city. We surveyed five high-rise roof gardens (~60 m height) in Bangkok using sweep netting and visual observations. We visited each site four times during November 2023 and July 2024. Insects were identified to the family-level and classified into six function feeding groups: decomposition, herbivory, parasitism, pollination, predation, and seed dispersal. A total of 869 individuals were recorded, representing 54 families across 9 orders. Mean insect abundance was 173.8 ± 65.85 (SD), ranging 113–284 individuals, while mean family richness was 22.4 ± 8.39 (SD), ranging 15–36 families. Hymenoptera was the most abundant and diverse insect order (338 individuals in 18 families), with Apidae being the most abundant family (174 individuals). Pollination was the dominant functional insect group, both by abundance and diversity. The dominance of pollinators in tropical roof gardens highlight their potential to support urban agriculture and apiculture. Further studies comparing roof gardens biodiversity with ground-level greenspaces using a finer taxonomic scale are needed to uncover vertical dispersal patterns, informing biodiversity conservation and ecosystem services in rapidly growing tropical cities.

Keyword: green roofs, tropical insects, urban greenspace, nature-based solutions, functional feeding groups