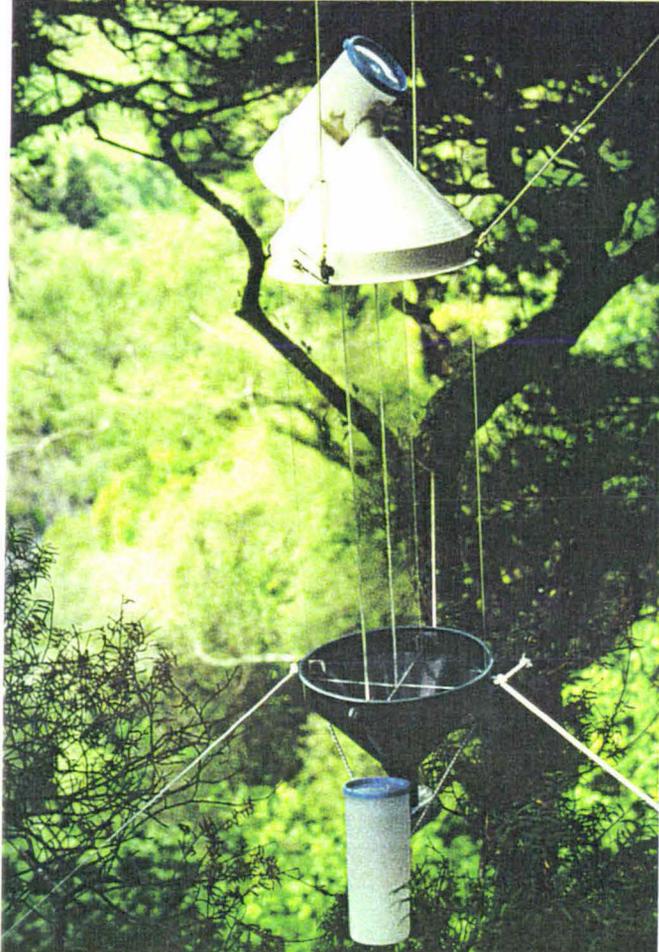


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ARBOREAL ARTHROPOD COMMUNITIES OF REMNANT
PODOCARP-HARDWOOD RAINFOREST,
NORTH ISLAND, NEW ZEALAND



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Abstract

Arthropod communities in the canopies of three species of native tree (*Metrosideros robusta*, *Podocarpus totara*, and *Beilschmiedia tawa*) were studied in three small lowland reserves of podocarp-hardwood forest in the Manawatu-Wanganui Region, New Zealand. The communities were sampled continuously from June 1994 to May 1995 using 18 flight-interception traps which were cleared monthly. Overall, 13 929 individuals from 863 morpho-species and 21 arthropod orders were captured. The number of species and individuals was highest in mid-summer with both variables strongly correlated with maximum air temperature. Arboreal arthropod communities of the smallest, most isolated forest reserve had the lowest overall diversity and species equitability. *B. tawa* had the lowest abundance and diversity of arthropods of all three tree species examined possibly because the narrow, flexible leaves of this tree make it an unsuitable habitat for arthropods to live or alight upon. Diptera made up 34% of the total number of arthropods captured, while Coleoptera contributed 12% and Araneae 11% to the total catch. The relative abundance and species richness of Diptera peaked in spring, Coleoptera in summer and Araneae in autumn. Multivariate analysis of overall community structure suggests that season is the dominant determinant of community structure in the arthropod communities of these forest patches whereas site and tree species have minor effects. Given the large number of morpho-species collected, the conservation value of small forest patches for forest dwelling arthropods in New Zealand should not be underestimated.

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Introduction

Forest canopies have become the focus of increasing research attention over the last two decades, and 1994 saw the establishment of the International Canopy Network for communication among conservationists, educators, and scientists interested in research and management of this unique habitat. Amongst the rapidly growing literature on physical, chemical and biological aspects of forest canopies, one of the largest fields of study is that of arboreal arthropod communities. Insects are vital to the functioning of forest ecosystems, playing important roles in pollination and seed dispersal, herbivory and predation, nutrient turnover and the promotion of soil structure, and in providing food for other organisms (Majer & Recher, 1988). They are also the most species rich class of organisms on earth, making up approximately 63% of all described species (Samways, 1994). Estimates of the total number of species inhabiting the earth range from 10 to 80 million and generally center on the potential contribution to be made by as yet undescribed insect species in tropical rainforests (Erwin, 1982; Stork, 1988; Samways, 1994). The greatest losses of biodiversity today are through the destruction of these forests (Wilson, 1988).

While research into arboreal arthropod communities has begun to flourish around the world, I am aware of only two other studies that have considered the arboreal arthropod communities of forests in New Zealand (Moeed & Meads, 1984; Didham, 1992). New Zealand does not have the same species richness of terrestrial arthropods boasted by the tropical regions, however 90% of the estimated 20 000 species present are endemic to these islands (Watt, 1980) and are therefore of considerable international conservation value. In recent years the destruction of New Zealand's native forests has declined, but most lowland areas suitable for farming have already been cleared of their forests, and all native forests which remain continue to be threatened and impoverished by introduced animals and plants. The introduced possum (*Trichosurus vulpecula*) probably presents the greatest threat to New Zealand's forests today through selective browsing by an unsustainable population.

In this study I explore the diversity and composition of arboreal arthropod communities in lowland remnants of podocarp-hardwood rainforest in the intensively farmed Manawatu-Wanganui Region of the North Island, New Zealand. Three canopy tree species were selected for the study: *Beilschmiedia tawa* as one of the most common trees in North Island forests, *Podocarpus totara* as a representative of the native conifers, and *Metrosideros rata* as a species under particular threat because of its palatability to possums (Meads, 1976). The selection of tree species together with sampling through an entire year is intended to give a broad understanding of the arthropod communities in the canopies of these three forest remnants.