

THE ROLE OF WIND AND DISPERSAL ABILITY IN A CANOPY LEVEL PREDATOR-PREY COMMUNITY

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The effect of *Anolis* lizards on arthropods was examined in a series of experiments and observations conducted at canopy level in a Caribbean rain forest in Puerto Rico. Lizard densities and lizard community stability (measured as variance of relative abundances) were well correlated with flying insect abundance. Canopy that was immediately downwind of a forest gap had a higher abundance of flying insects and insectivorous lizards and a lower variance in relative abundances of lizard species than did closed canopy or canopy that was adjacent to but upwind of a gap. The supply of flying insects to the *Anolis* communities within the forest canopy was shown to be determined by exposure to prevailing winds using sticky-traps and wind vanes suspended in canopy and over gaps.

Most flying insects were dipterans whose larval habits were terrestrial rather than arboreal. In contrast, nearly all leaf-sampled arthropods had entirely arboreal life histories. The spatial decoupling of dipteran source from canopy predation suggested a one-way predator-prey interaction that may enhance predator-prey coexistence. In contrast, populations of leaf arthropods did not appear decoupled from predator control and may be under significant predatory selection by anoles.

A six-month removal experiment performed at canopy level quantified the predatory role of insectivorous *Anolis* lizards on the two groups of arthropods. Counts were made of flying insects caught in sticky-traps and of leaf-dwelling arthropods on leaf surfaces. An index of dispersal ability was measured using cylindrical sticky-traps

suspended over forest gaps. Removal and exclusion of anoles from individual tree crowns of tabonuco (*Dacryodes excelsa*) using trunk collars revealed strong responses in abundances of several arthropod groups. These responses were moderated by the dispersal ability of each group.

For those groups that showed a significant response to lizard removal, the rank order by dispersal ability was the reverse of the rank order by strength of response to lizard removal. In addition, while the length distributions of poorly-dispersing, leaf-dwelling taxa were significantly different between removals and controls, the length distributions of well-dispersing insects did not significantly differ between removals and controls. Moreover, the abundances of dipterans in removal crowns were well correlated with the abundances in control crowns and with mean weekly rainfall, indicating an escape from lizard control. In contrast, abundances of orthopterans and blattarians were not well correlated between removal and control crowns, and while abundances of these two groups in removal crowns were well correlated with new leaf growth, abundances in controls were not well correlated with new leaf growth. Lizards exerted control on these groups.

The results indicate that wind provisions crown-dwelling anoles with limiting food resources (flying insects). These insects are not controlled by anoles, but instead respond to rainfall. Local crown populations of poorly dispersing arthropod groups are controlled by anoles. These groups respond to an increase in their resources when lizards are absent but not present.