The ecological significance of sexual dimorphism in the Crescent Honeyeater, *Phylidonyris pyrrhoptera.*

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Abstract

The mechanisms underlying the evolution of sexual size dimorphism in honeyeaters were investigated in the Crescent Honeyeater, *Phylidonyris pyrrhoptera*, at Cromer Conservation Park, and Parndana, South Australia.

Ecological data were acquired from natural, manipulated field, and laboratory environments. Birds were banded and morphology, movements, and behavioural ecology recorded for six years at Cromer. Field experiments determined the impact of reducing male numbers on foraging ecology in females. Birds were housed in aviaries to determine standard energetic requirements, food preference, interactions, preferred height and associated behaviour.

Males had greater body mass, and longer bills, wings and tarsi than females in age class comparisons. Standard nocturnal energy requirements/day were significantly greater for males, but not when scaled for body mass. Some males were continuously resident at Cromer, whilst all females vacated this site periodically. Sex ratio at fledging was 0.9:1 but adult males outnumbered females by more than 2:1. The skewed sex ratio reflected decreased longevity of females, with mean survival ages being 1.2 and 1.4 years (females and males respectively).

Sex differences in foraging of non-breeding birds indicated niche partitioning. Males spent more time at upper heights frequently forcing females to lower heights. Time budgets of males differed for time spent singing and time feeding at upper heights. Males dominated females unless birds were mated, when males were less dominant and females fed more in upper strata.

Removing males (field experiments), resulted in females feeding more in upper strata, indicating 'plasticity' and reversal of foraging segregation. In choice experiments (birds alone in the aviary), nectar preference and time spent feeding per height did not differ between sexes. However, when together, males dominated females, forced them from preferred feeders, and controlled the upper height. Preferred feeders were a function of sugar concentration and height, although males first chose according to quality.

Sexual size dimorphism is driven by a complex array of underlying factors and behavioural strategies. Factors include energy requirements, dominance, competition and food resources. Strategies include movement, residency, breeding, niche separation and raiding. Outcomes of these mechanisms are altered sex ratio, differences in longevity and ultimately differences in size and morphology between sexes. In Crescent Honeyeaters, the sexes behave differently and respond in different ways to environmental pressures. Depletion of lower storey vegetation will more profoundly affect survival of females than males, and ultimately survival of the species.