

Sexual dimorphism and the evolution of seasonal variation in sex allocation in the Hawaii akepa

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ABSTRACT

Questions: Can changing sexual dimorphism of fledglings during different months reflect seasonal variation in sex allocation, given that such changes are expected? Can a major shift in the sex ratio of young birds be attributed to food limitation that affects seasonal variation in sex allocation? How is sexual dimorphism related to seasonal variation in sex allocation?

Hypotheses: Hawaii akepa females have an advantage of producing male offspring early in the breeding season, either by increasing the fitness of their sons or by minimizing their own costs of moult–breeding overlap. Sexual dimorphism in bill length is maintained by stabilizing selection on the two sexes. Dismantling of seasonal variation in sex allocation by competition with an introduced bird will be based on decline of the sex that is most exposed to the competition as a nestling or fledgling.

System: Hawaii akepa (*Loxops coccineus coccineus*).

Location: Hakalau Forest National Wildlife Refuge, Island of Hawaii.

Methods: Fledglings were captured during June–September from 1987 to 2005, weighed, and measured. Sex was determined by future plumage of survivors and by CHD gene test for non-survivors. Sex was similarly determined for second-year birds captured throughout the year. Age was determined by plumage for males at all ages and for second-year and older females.

Results: The consistency over years of changing sexual dimorphism of fledglings fits the predictions of seasonal variation of sex allocation. In association with food limitation, the sex ratio of young birds became strongly biased towards males, the larger sex, with a significant change in adult sex ratio favouring males in all study sites. Stabilizing selection on male bills, particularly during sub-adult ages, indicates a fitness advantage to females that produce long-lived sons, with adequately sized bills, when food is more abundant. Females that produce sons early in the breeding season also have reduced costs of moult–breeding overlap while the bills of their sons are still growing.

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