

INTERSPECIFIC FEEDING BETWEEN AN INSECTIVORE AND A GRANIVORE – MALE PURPLE-CROWNED FAIRY-WREN *Malurus coronatus* FEEDS NESTLING CRIMSON FINCHES *Neochmia phaeton*

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INTRODUCTION

Skutch (1961) described helping behaviour in birds, including cases where non-breeding individuals assist with rearing offspring of others of the same species (cooperative breeding), as well as cases where individuals feed young of a different species (interspecific feeding). Cooperative breeding is common in some groups of birds, and may arise because ecological constraints limit opportunities for independent reproduction, or because of benefits of helping such as rearing relatives (kin selection) or the acquisition of parenting skills (Heinsohn *et al.* 1990; Cockburn 2003). Interspecific feeding has attracted the interest of evolutionary biologists where it involves interspecific brood parasitism (Davies 2000), but the evolutionary significance of other forms of interspecific feeding is unclear. They are likely to represent rare, maladaptive 'mistakes', but could contribute to the acquisition of parenting skills (Dawkins 1976). Shy (1982) reviewed 140 cases of such interspecific feeding, identifying feeding by 65 species in 22 families of 71 species in 22 families. Both insectivorous and granivorous species were represented among both adopting and fed species, but how often interspecific feeding occurred between feeding guilds was not reported. Here we report a case of interspecific feeding involving an insectivorous cooperative breeder feeding nestlings of a granivore.

Purple-crowned Fairy-wrens *Malurus coronatus* and Crimson Finches *Neochmia phaeton* are riparian specialists that nest in dense vegetation along rivers and creeks in northern Australia, often in *Pandanus aquaticus*. Colour-banded populations of both species living along Annie Creek in Mornington Wildlife Sanctuary (17°30'47"S, 126°06'36"E) are closely monitored in two separate research programs (Milenkaya unpub. data; Hall and Peters 2008, 2009; Kingma *et al.* 2009). The two species are similarly sized, but Purple-crowned Fairy-wrens are slightly heavier (males 11.2 ± 0.07 g, $n = 73$, and females 10.4 ± 0.07 g, $n = 74$) than Crimson Finch (males 10.0 ± 0.08 g, $n = 96$, and females 9.7 ± 0.08 g, $n = 81$) – Hall and Milenkaya unpub. data. Purple-crowned Fairy-wrens are cooperatively breeding insectivores that deliver insect prey to nestlings six to ten times per hour (MLH pers. obs; Rowley

and Russell 1993). Crimson Finches are granivores that breed as socially monogamous pairs, feeding nestlings one to two times per hour by regurgitating grass seed from their crops (OM pers. obs; Immelmann 1982). Adults also feed on insects during the breeding season, and young receive regurgitated insects in addition to grass seeds (in 247 feeding events at 92 nests, adults never carried food in their bills – Milenkaya unpub. data; Immelmann 1982).

On 6 March 2008, we observed a male Purple-crowned Fairy-wren feeding a brood of Crimson Finch nestlings approximately ten days old (the nest contained three nestlings and two unhatched eggs). The fairy-wren's own nest appeared to have been partially preyed upon and abandoned halfway through incubation, as only one egg remained from the clutch of four eggs (laid 26–29 February) that his partner had been incubating. She began building a new nest the following day. The Crimson Finch nest was also in pandanus, about four metres from the abandoned fairy-wren nest. During observations on the morning of 7 March, the male fairy-wren fed the Crimson Finch nestlings twice in 15 minutes (food items carried to the nest, not regurgitated) and removed a 'faecal sac' before the Crimson Finch pair arrived. He chased them once, but then the male Crimson Finch attended the nest and chased the fairy-wren away. He returned later to feed the nestlings, but the Crimson Finch pair was still at the nest, and he left. In the late afternoon, the fairy-wren male fed the Crimson Finch nestlings four times in an hour, and the male Crimson Finch visited the nest three times, only encountering the fairy-wren on the last visit. Early in the morning on 8 March, the male Crimson Finch visited the nest twice, remaining near the nest entrance when the male fairy-wren appeared in the vicinity of the nest (without food) and displacing him whenever he came close. Both males were within one metre of the nest, and about 0.5 metres apart for nearly ten minutes before the fairy-wren left, and the Crimson Finch remained guarding the nest. In the early afternoon, the two males each visited the nest area once in 90 minutes but neither entered the nest. Upon inspection, the Crimson Finch nest was empty, the nestlings presumably taken by an unknown predator.

Both Purple-crowned Fairy-wrens had parenting experience. The female had been colour-banded as an adult 2.5 years previously and reared several successful broods in that time. She showed no interest in the Crimson Finch nest after her own nest failed, but immediately began building a new nest. The male fairy-wren, who was a product of one of her earlier successful broods, had been colour-banded as a nestling 18 months previously, and subsequently assisted with feeding as a subordinate helper at one successful nest. He inherited the position of dominant male on the territory after the disappearance of his father, and paired with his mother about six weeks before she started building the current nest. The male assisted with feeding nestlings as the dominant male in a subsequent nest (55% of 53 observed trips to the nest), but those nestlings were predated prior to fledging. Genetic analysis revealed that neither the abandoned egg in the partially predated nest nor the three chicks in the subsequent nest had been sired by the male (Kingma, Hall and Peters unpub. data), and the female divorced him some time later with no further nesting attempts.

Close proximity of nests is one of the main factors associated with interspecific feeding events. It was the most common of the seven probable proximate causes of interspecific feeding identified by Shy (1982), implicated in 23.8 percent of the reviewed cases, and was associated with the event reported here. In this case, the 'helper' had also suffered recent nest failure, another contributing factor identified by Shy (1982), but since nest failure is common in Purple-crowned Fairy-wrens, the close proximity of the two nests is likely to have been more important.

It is not clear that this case of interspecific feeding would have benefitted either the Crimson Finch nestlings or the male Purple-crowned Fairy-wren. Crimson Finches are granivorous and, though nestlings normally receive some insect food (Immelmann 1982), the high feeding rate and lack of regurgitation by the fairy-wren may have challenged the digestive systems of the nestlings, while the conflict between him and the Crimson Finch could have attracted the attention of predators to the nest. The male fairy-wren had some prior parenting experience, and provisioned well at the subsequent fairy-wren nest. Though cuckolded by his mother, he nevertheless would have gained an indirect benefit from his investment in the fairy-wren nestlings, which were his half-siblings, had the nest been successful. However, he obviously gained no such benefit from his investment in the Crimson Finch nestlings and it is unlikely that his parenting skills improved significantly. Instead, this case of interspecific feeding probably represents a rare and maladaptive event, with the stimulus-response mechanism that normally results in parents feeding their own young or kin resulting in misdirected feeding of young of a different species (Jamieson 1987).

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