

# First record of intraspecific adoption by a female Superb Fairy-wren *Malurus cyaneus*

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## Background

At our study site on the western shores of Lake Samsonvale (27°16'S, 152°51'E), Queensland, we have been monitoring productivity and survival of a population of Superb Fairy-wrens *Malurus cyaneus* since 2015. Through the capture and banding of individuals, each Superb Fairy-wren bears a unique combination of three plastic colour bands along with an aluminium band issued by the Australian Bird and Bat Banding Scheme (ABBBS). With a unique identifier that is visible in the field, we are able to follow individual Superb Fairy-wrens and monitor and study their behaviours under natural settings.

## Observations

On 24 August 2017, JAK found a Superb Fairy-wren nest during its construction (Nest A). The nest was attended by a pair of adult fairy-wrens, male-IBBS and female-ILIS. At seven days old, each of the chicks received a unique combination of colour bands in addition to an ABBBS band. On 25 September, the day before the chicks fledged, both male-IBBS and female-ILIS were observed attending the nest with food on this day. This was the last time female-ILIS was observed. The following day, all three chicks fledged and were being provisioned solely by male-IBBS.

On 3 September, another Superb Fairy-wren nest (Nest B), containing three incubated eggs, was located c. 450 m south of Nest A. Nest B was attended by adult male-IONS and adult female-CINS. As with the chicks in Nest A, the chicks of Nest B received bands at seven days old. On 25 September, the expected date of fledging, Nest B was found to be empty. We searched for the fledglings for 90 min, but were unable to locate them. Concurrently, in the territory surrounding Nest B (Territory B) we watched male-IONS and female-CINS foraging and giving alarm calls but neither were observed collecting food. Our conclusion was that the nest had been depredated during the preceding 24 hours. This was also the last time we observed male-IONS.

On 5 October, NMR again visited Territory B but failed to locate male-IONS or female-CINS. Later the same day NMR visited the territory where Nest A was located (Territory A) and found male-IBBS feeding the fledglings of Nest A and, to our surprise, in the company of female-CINS. This was the first sighting of female-CINS since 25 September and the first time she was seen outside Territory B. We later observed two fledglings, both identified as fledging from Nest A, begging at female-CINS whilst perched together on a twig. Female-CINS was then observed attending the fledglings, including feeding one individual four times. Meanwhile, male-IBBS foraged close by and, on multiple occasions, paused to give quiet bursts of song. At no point did we observe male-IBBS interact aggressively with female-CINS. The apparent family group of female-CINS, male-IBBS and the fledglings of Nest A remained together until the end of October 2017, with both adults continuing to feed the fledglings until they were able to forage independently. On 31 October, female-CINS returned to Territory B and paired with a new male, male-NOIS; the two remained here at least until the end of 2017.

## Discussion

Cooperative breeding, in which a non-breeding helper, most often a male, assists with the rearing of young, is common in the Superb Fairy-wren (Rowley 1957, 1964; Mulder 1995). On the other hand, intraspecific adoption of fledglings has hitherto never been observed in this species, yet our observations clearly show that female-CINS from Territory B took over the parental role from female-ILIS for the dependent chicks that fledged from Nest A. Furthermore, although frequent in wildfowl (Eadie *et al.* 1988), to our knowledge, our observation makes the Superb Fairy-wren one of only three species of passerine in which intraspecific adoption has been recorded, the others being the North Island Robin *Petroica longipes* (Berggren 2006) and Eastern Bluebird *Sialia sialis* (Plissner & Gowaty 1988; Meek & Robertson 1991, Wetzel & Chandler 2008). Although not intraspecific adoption, one case of interspecific adoption by a female Superb Fairy-wren, observed by S. C. Tidemann, closely mirrors the events we have documented, and is detailed in Higgins *et al.* (2001):

“At Booligal, on death of [the] resident female, a new female moved in to assist [the] male in feeding a nestling Horsfield’s Bronze Cuckoo *Chrysococcyx basalus*, and continued to feed it after it fledged.”

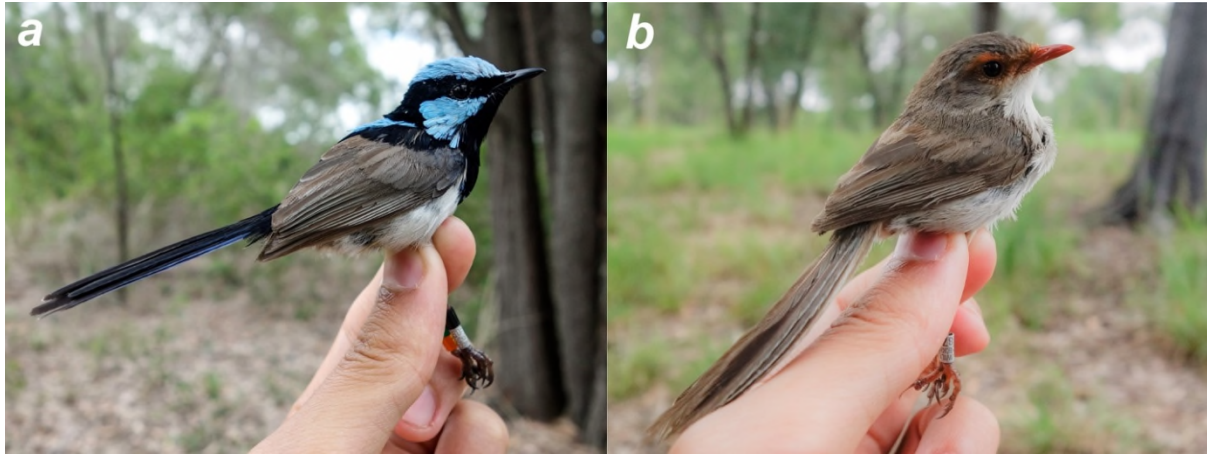
It is possible that in this case of adoption, supernormal stimuli by the nestling cuckoo triggered feeding by the new female Superb Fairy-wren. This has been proposed as an explanation for feeding of nestling and fledgling cuckoos by individuals other than the foster parents (Sealy & Lorenzana 1997; Feeney & Riehl 2019).

In our case of adoption, supernormal stimuli were unlikely to have been involved due to the absence of cuckoo chicks so we propose three hypotheses for intraspecific adoption behaviour. It is possible that female-CINS is a daughter of female-ILIS and male-IBBS, and adoption was an effort to maximise inclusive fitness. However, studies have shown that helper fairy-wrens are often unrelated to the young they help to rear (Dunn *et al.* 1995). Alternatively, adoption could have been an effort to enhance the future probability of breeding by pairing with an unpaired male. This would be concordant with findings in instances of adoption by male and female Eastern Bluebirds (Meek & Robertson 1992; Wetzel & Chandler 2008). Third, the recent loss of female-CINS’s own brood triggered feeding of an apparently unrelated brood of conspecifics. Although the mechanism for adoption under these circumstances is not understood, it would be consistent with observations made in cases of interspecific brood parasitism (Shy 1982; Shaw *et al.* 2014). We suggest that the third hypothesis may be the most plausible explanation as female-CINS did not remain paired and did not attempt to breed with male-IBBS. However, further studies are needed to identify whether overlap in the breeding cycle and/or the disappearance of the resident female are necessary for intraspecific adoption to occur, and whether chick-parent signalling and stimuli could trigger the adoption of an apparently unrelated brood.

Due to the difficulties associated with identifying individual birds of the same species that are not uniquely marked, it is possible that intraspecific adoption is under-recorded in Superb Fairy-wrens as well as other passerine species. Thus, this study highlights the importance of monitoring colour-banded populations of common species as a tool to further our understanding of bird behaviour and our knowledge of species’ life histories.

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**Figure 1.** Superb Fairywrens *Malurus cyaneus*: (a) male-IONS, the mate of female-CINS whilst attending Nest B and (b) female-CINS, the individual observed to adopt fledglings of Nest A. Photos: James A. Kennerley.

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