

Habitat creation in a different way: Superb Fairy-wrens *Malurus cyaneus* nesting inside a tree guard

Matthew Mo^{1*}, Hugh Pitty², Myron van der Waerden², Ishta Dielemans²
and Carmen Mataic²

¹43 Bridge Street, Hurstville NSW 2220, Australia

²Friends of Glebe Wetlands, 125 East Street, Bega NSW 2550, Australia

*Corresponding author. Email: matthew.sk.mo@gmail.com

Abstract. Nest predation is a chief cause of reproductive failure in birds, warranting defensive strategies such as nest concealment. This note reports an observation of a Superb Fairy-wren *Malurus cyaneus* nest built on top of a sedge grass enclosed by a tree guard at a tree-planting site in Bega, New South Wales. Although this meant that the nest was lower to the ground than a typical natural nest, its situation within the tree guard might have conversely offered the benefits of visual concealment and a physical barrier from nest predators. With at least three nestlings close to fledging age present, this nesting attempt would be considered successful. This outcome is significant in light of high rates of nest predation observed in other studies.

Introduction

Nest predation is regarded as the main cause of reproductive failure in birds, with their eggs and altricial nestlings having no means of evading predators once discovered (Ricklefs 1969). In response, birds exhibit defensive behaviours such as distraction displays that draw predators' attention away from nests (Humphreys & Ruxton 2020) and active mobbing of predators to distract or drive them away (Dutour *et al.* 2016; Cunha *et al.* 2017). Birds may also conceal their nests to avoid detection from predators (Weidinger 2002; Borgmann & Conway 2015) or nest in inaccessible sites, such as tree or rock cavities or dense vegetation (Schill & Yahner 2009).

The Superb Fairy-wren *Malurus cyaneus* is a small (length 11–14 cm, body mass 9–12 g) territorial passerine of south-eastern Australia (Higgins *et al.* 2001). It is known to live in cooperative breeding groups that consist of a dominant breeding pair and typically one to four subordinate helpers (Mulder 1997). The reproductive biology of this species is well studied, with detailed work undertaken in the Australian Capital Territory at sites in Gungahlin (Rowley 1957, 1965) and Canberra (Langmore & Mulder 1992; Mulder & Cockburn 1993; Mulder & Langmore 1993; Mulder & Magrath 1994; Mulder *et al.* 1994; Dunn *et al.* 1995; Green *et al.* 1995; Mulder 1995, 1997; Dunn & Cockburn 1998; Double & Cockburn 2003; Cockburn *et al.* 2008a,b), New South Wales (NSW) at sites in Booligal (Tidemann 1983, 1986; Tidemann & Marples 1988) and Armidale (Nias 1984, 1986, 1987; Ligon *et al.* 1991; Nias & Ford 1992), and South Australia at sites in the Mount Lofty Ranges and Fleurieu Peninsula (Colombelli-Négrel & Kleindorfer 2009; Kleindorfer *et al.* 2014). Breeding occurs from September to March (Rowley 1965), with nests (generally dome-shaped and consisting of fine plant materials) constructed on tussocks of grass, shrubs or fallen tree branches from ground level to 5.6 m above the ground (McFarland 1987; Nias 1987; Tidemann & Marples 1988; Higgins *et al.* 2001).

Though naturally an inhabitant of woodlands and open forests, the Superb Fairy-wren exhibits a high degree of

plasticity, persisting in a range of environments where dense understorey vegetation remains (Tidemann 1990; Higgins *et al.* 2001). Subsequently, it occurs widely across human-altered environments, such as urban and agricultural landscapes (Tidemann 2004), in contrast with the extirpation of other birds in response to the loss of natural habitats (Mortelliti & Lindenmayer 2015; Ward *et al.* 2022). As a means of addressing the latter, organisations and individuals are promoting and implementing habitat restoration projects with the long-term goal of re-establishing vegetation communities (Hale *et al.* 2019; Loch *et al.* 2020). In the short term, aspects of these activities may provide habitat opportunities for wildlife, which we exemplify with our observations of a Superb Fairy-wren nest built within a tree guard at a vegetation-restoration site.

Observations

The observations were made at Glebe Lagoon Park, a public parkland reserve in the township of Bega, NSW (36.6814°S, 149.8507°E). The reserve covers ~6 ha, mostly comprising a wetland area, known as Glebe Lagoon, partially enclosed by sections of dense native and exotic vegetation around the edges of the lagoon and maintained lawns with scattered trees.

On 17 February 2024, while working in a revegetation site, we located a Superb Fairy-wren nest on top of a Tall Sedge *Carex appressa* enclosed by a corflute tree guard (Figure 1). The nest was ~30 cm above the ground and ~10 cm below the top rim of the tree guard. Its opening had an east-facing aspect. Based on the location of the tree guard within the site, the tree guard was generally exposed to direct sunlight only during the early morning, with vegetation along the fringes of the lagoon north and west of the tree guard providing shade refuge for most of the remainder of the day (Figure 2). A single Black Poplar *Populus nigra* situated 3 m to the east of the tree guard would have also provided a period of shading from direct sunlight during the early morning (Figure 3).



Figure 1. A Superb Fairy-wren nest on top of a Tall Sedge enclosed by a tree guard, viewed from above. Photo: Matthew Mo



Figure 3. A view of the revegetation site photographed from a west-facing position, showing shading from a Black Poplar during the early morning. The tree guard enclosing the Superb Fairy-wren nest is indicated by the arrow. Vegetation along the fringes of the lagoon west of the nest are visible in the background of this photograph in the top right quadrant. Photo: Matthew Mo



Figure 2. A view of the tree guard enclosing the Superb Fairy-wren nest (foreground) within the revegetation site photographed from an east-facing position. Vegetation along the fringes of the lagoon north of the nest are visible in the background of this photograph in the top left quadrant. Photo: Matthew Mo



Figure 4. Superb Fairy-wren nestlings begging for food. Photo: Matthew Mo

To minimise disturbance, we limited our observations of the nest to <1 minute. During this time, our presence at the nest triggered nestlings within to exhibit begging behaviour, and we were able to count a minimum of three nestlings (Figure 4). We noted that their eyes were slightly open and bodies not fully feathered. After a few seconds, the nestlings retreated, which enabled a visual examination of part of the interior of the nest. The nest had been lined with feathers, which (based on their size) were probably from other bird species (Figure 5). We observed the area of the nest for c. 15 minutes afterwards, during which adult Fairy-wrens approached (Figure 6) and some visited the nest.

We re-inspected the nest on four consecutive days (18–21 February) following the initial observation. On each visit, a minimum of three nestlings were present and there were no visible signs of disturbance or damage to the nest. We subsequently re-inspected the nest on 27 February, when the nestlings were no longer present. On this visit, the nest had similarly not sustained any movement or damage to indicate any disturbance or predation events, which suggested successful fledging.



Figure 5. Part of the interior of the Superb Fairy-wren nest, showing feathers from other bird species used as lining. Photo: Matthew Mo



Figure 6. An adult male Superb Fairy-wren in foliage ~5 m from the nest. Photo: Matthew Mo

Discussion

Our observation of a Superb Fairy-wren nest built within a tree guard demonstrates behavioural plasticity, especially considering the site's apparent abundance of dense vegetation that would provide natural nesting opportunities. Such adaptability may represent one of the factors influencing the persistence of the species in urban and suburban environments (Parsons *et al.* 2008; Fitzsimons *et al.* 2011).

With nest predation constituting a major threat to reproductive success in birds, there is great impetus for birds to reduce probabilities of predators detecting their eggs and nestlings (Ibáñez-Álamo *et al.* 2015; Menezes & Marini 2017). From the mean height of Superb Fairy-wren nests (~70 cm above ground level: Tidemann & Marples 1988; Higgins *et al.* 2001), the height of the nest we observed would be considered quite low. Although this may seem disadvantageous in terms of susceptibility to terrestrial predators and human disturbance, the tree guard might have provided benefits such as additional visual concealment of the nest, a widespread strategy against nest predators that rely on visual cues such as other birds like corvids (Santisteban *et al.* 2002). This is reflected in a study that found that Superb Fairy-wren nests surrounded by >40% vegetation cover had lower predation than more exposed nests (Colombelli-Négrel & Kleindorfer 2009). The tree guard might also have provided a physical barrier limiting access to the nest from non-volant predators such as rodents (Colombelli-Négrel *et al.* 2009) and snakes (Warham 1958).

Based on the nestlings' appearance, we estimate their age to have been 5–10 days at the time of the initial observation (eyes typically open after 5 days and complete feathering is usually attained at 8–10 days: Higgins *et al.* 2001). Fledging typically occurs after 10–14 days (Rowley 1965; Tidemann 1983; Nias 1987; Mulder 1995), so the nestlings were very close to leaving the nest during our visits over the five consecutive days. The absence of the birds from the nest 10 days after the initial observation suggests that fledging had occurred. The nest was visibly

not moved or damaged, which suggests that there was no disturbance to the nest or predation. Clutch sizes in this species are typically three or four eggs, though clutches of five eggs have also been recorded (Rowley 1965; Nias 1987; Mulder *et al.* 1994). Considering this, our observations of at least three nestlings represent a high rate of brood survival, which is especially significant in light of high rates of nest predation observed in other studies (24–83% annually: Rowley & Russell 1997; Colombelli-Négrel & Kleindorfer 2009; Kleindorfer *et al.* 2014).

Finally, we note that it was especially intriguing that a native bird situated its nest within a tree guard that was being utilised in that environment to facilitate habitat restoration. The foliage that will be produced from that revegetation process will eventually provide nesting and feeding habitats for a range of native species. However, in the interim, this tree guard has itself provided a short-term opportunity for nesting in a native bird. This is encouraging as this scenario shows that this tree guard has had an unexpected additional purpose in creating habitat.

Acknowledgements

Glebe Lagoon Park is situated on land owned by Bega Valley Shire Council. The volunteer group Friends of Glebe Wetlands has contributed substantially to habitat restoration and maintenance in the reserve. Useful comments by Jack Bilby and Genevieve A. Heggarty improved the manuscript.

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