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Independent fledglings of Forty-spotted Pardalotes *Pardalotus quadragintus* stay in their natal territory: Implications for translocations

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Abstract. The Endangered Forty-spotted Pardalote *Pardalotus quadragintus* is restricted to a small proportion of its former range, with the vast majority of birds occurring on two small Tasmanian islands. As such, the species is threatened by landscape-scale fires that could severely impact these populations. This has led to interest in reintroducing the species to parts of its former range that are now beyond its natural dispersal capabilities. One potential way of doing this is to transfer fledglings from their natal territories to unoccupied habitat. However, it is not known when fledglings are able to survive without their parents. This study found that fledglings first appeared independent of their parents for food 11 days after leaving the nest, and remained within the natal territory for several weeks thereafter. This finding could help guide options for future translocation planning.

Introduction

The Forty-spotted Pardalote *Pardalotus quadragintus* is an Endangered passerine with a highly restricted distribution (Webb *et al.* 2019; Bryant *et al.* 2022). Although once scattered across eastern, northern and central Tasmania, the species is now largely restricted to two small islands in south-eastern Tasmania — Bruny Island (362 km^2) and Maria Island (115.5 km^2) (Webb *et al.* 2019; Bryant *et al.* 2022). There are also a few small populations along the coast of mainland Tasmania adjacent to Bruny Island, and possibly still a small number of birds on Flinders Island in eastern Bass Strait (Webb *et al.* 2019; Bryant *et al.* 2022). Although habitat that appears suitable for the Forty-spotted Pardalote occurs across a wide area outside its current distribution (Alves *et al.* 2022), this may now be unoccupiable because of several factors, including being beyond the dispersal capabilities of the species (Webb *et al.* 2019). Genetic analysis suggests that this species occasionally disperses from Bruny Island to nearby parts of mainland Tasmania, but the genetic dissimilarity between populations on North and South Bruny Island suggests that dispersal over even these within-island distances is infrequent (Alves 2021).

This restricted distribution makes Forty-spotted Pardalotes vulnerable to threatening processes, such as landscape-scale fires (Webb *et al.* 2019), that could adversely affect remaining populations, which has led to recent proposals for reintroducing the species to its former range (Webb *et al.* 2019; Alves *et al.* 2022; Bryant *et al.* 2022). Given the potential benefits of reintroductions, developing a translocation plan for this process is now a recommended strategy in the Draft Recovery Plan for the species (Commonwealth of Australia 2022). It is known that pairs defend permanent territories from conspecifics (Woinarski & Bulman 1985), which means that fledglings must leave their natal territory to find their own before they can breed and they might suffer high rates of mortality in the process. Hence, one approach to creating founder populations in its former range, or in new areas, would be to transfer offspring from their natal territories to suitable unoccupied habitat. Because Forty-spotted Pardalotes regularly use wooden nest boxes for breeding, with doors that allow access by researchers (Edworthy 2016a; Edworthy *et al.* 2019; Alves *et al.* 2020), the collection of nestlings immediately before fledging for transfer to new areas could be an operationally easier option than catching birds after they fledge. However, it is not known whether Forty-spotted Pardalotes are independent of their parents as soon as they fledge, or if they must continue to be fed after fledging and/or learn foraging techniques from their parents. In other passerines, fledglings remain dependent on their parents for food for at least 5 days (Russell 2000) so the former scenario seems unlikely. If fledglings remain dependent on their parents, their collection for transfer would require capture after they become independent of their parents but before they disperse from their natal territories. However, it is not known when, or if, this window of opportunity occurs. This note reports observations of fledglings within their natal territory, focusing on the length of time that they are fed by their parents and when they forage independently.

Methods

Forty-spotted Pardalotes were observed opportunistically during 14 days from 30 October until 26 November 2022, with each day's observations spanning around 1 hour in the morning. Observations were made from a 3.5-m-high viewing platform in a patch of Manna Gum *Eucalyptus viminalis* trees at Inala, a privately owned nature reserve on South Bruny Island (43°23′28″S, 147°15′04″E). During this period, four territories with active nests were held by Forty-spotted Pardalotes adjacent to the platform, and at least another 12 nests of this species were active among Manna Gums within 300 m of the platform.

Three Forty-spotted Pardalotes fledged from a custom-made nest box (Box BAI1), 18 m west of the platform, on the first day of the observation period. This box could be seen just above eye level from the platform and was in a territory comprising a clump of six Manna Gum trees approaching

20 m in height with a collective canopy extending north—south for 25 m and east—west for 18 m. After fledging, the young birds could readily be differentiated from adults by their absence of a yellow cheek-patch and initially also by the presence of a pale gape flange. This family group became the focus of future observations.

One key assumption made during this study was that all observations of fledglings within the territory associated with Box BAI1 were those from that box. During the observation period, no Forty-spotted Pardalote fledglings were seen within the Inala population outside this territory, suggesting that the fledglings from Box BAI1 were the only ones present in the study area at the time. While I was observing birds from the viewing platform, no fledglings were seen in the other three adjacent territories, and casual observations in other territories made while walking around Inala, and during monitoring for ≤20 minutes of all other nest boxes and hollows within the population for use by pardalotes, also failed to detect other fledglings. However, in the absence of banding of the fledglings, the possibility that some of these observations were of fledglings from other territories cannot be completely excluded.

Results

On 30 October 2022, a Forty-spotted Pardalote nestling could be seen just inside the entrance hole of Box BAI1. Adults repeatedly alighted on the outside of the box and fed the nestling inside the box (Table 1). After *c*. 10 minutes, the young bird left the box, flying ~4 m and landing within the natal territory. The heads of another two nestlings could then be seen inside the box, and these nestlings were then fed repeatedly by the adults over the next 15 minutes, when observations ceased for the day (Table 1).

Two days later, three fledglings were observed sitting within 0.5 m of each other <1 m above the box. All three were preening and being fed by adults (Table 1).

The first observation of foraging by a fledgling occurred 4 days after the first bird had left the box (Table 1). Two fledglings were still being fed repeatedly while following two adults, which foraged by systematically pecking at the bases of petioles of Manna Gum. One of these fledglings was seen doing the same pecking action at the bases of petioles, presumably imitating that of the adults (Table 1).

On 4 November, 5 days after the first fledgling had left the box, one of the fledglings went back into the box, where it remained for at least 1 minute. As it had not re-emerged after this time, my attention shifted to searching for other fledglings, and so the total time that the fledgling spent inside the box is unknown.

Fledglings were still being fed by adults 7–8 days after their first flights, but also engaged in regular foraging by pecking at the bases of petioles of Manna Gum. This was apparent for two fledglings on 6 November, and three on 7 November (Table 1).

On 9 November, two fledglings were seen perched in their natal territory but were not seen foraging or being fed.

From 11–17 days after fledging, young birds foraged by pecking at the bases of petioles of Manna Gum within their natal territory but were seldom fed (Table 1). Two fledglings were seen foraging each day on 10–12 November, and again on 15 November, and one on 13 November and 16 November (Table 1). On 12 November, one fledgling was largely ignored by a foraging adult that it was following, being fed on only one occasion (Table 1).

Table 1. Numbers of Forty-spotted Pardalote nestlings seen in nest box BAI1 and fledglings seen near this nest box and in the surrounding territory that were being fed by adults or foraging independently, 30 October–26 November 2022.

Date	*Days since fledging*	*Being fed*	*Foraging*
30 Oct.	0	3	
1 Nov.	2	3	
3 Nov.	4	2	1
4 Nov.	5		
6 Nov.	7	2	2
7 Nov.	8	3	3
9 Nov.	10		
10 Nov.	11		2
11 Nov.	12		2
12 Nov.	13	1	2
13 Nov.	14		1
15 Nov.	16		2
16 Nov	17		1
26 Nov.	27		2

No opportunities for further monitoring occurred until 27 days after fledging. By this time, two fledglings were still foraging within the focal Manna Gum trees. However, these trees no longer appeared to form the territory of the parental birds, which were not seen in the trees, and nest box BAI1 was now occupied by a pair of Striated Pardalotes *Pardalotus striatus.*

Discussion

These preliminary observations suggest that newly fledged Forty-spotted Pardalotes remain dependent on their parents for food, and to learn foraging techniques, for *c.* 10 days after fledging. This suggests that Forty-spotted Pardalote nestlings that are about to fledge, and newly fledged birds, are unsuitable for relocation to new areas unless accompanied by their parents. However, young birds may be suitable *c.* 2 weeks after fledging.

Forty-spotted Pardalote fledglings were dependent on their parents for at least 1 week after leaving the nest. They were fed for at least 8 days and showed no signs of foraging for themselves for the first 3 days after fledging. This behaviour appears not to be unique to this family group, as another fledgling with a pale gape flange was seen being fed by an adult and not foraging for itself on 14 and 15 January 2023 in another territory adjacent to the viewing platform where adults ceased provisioning nestlings somewhere between 8 and 13 January (pers. obs.). Hence, it seems unlikely that birds collected

from nests immediately before fledging would survive if transferred to new areas without their parents.

Not only do fledglings appear dependent on provisioning by adults, but they may also need to learn how to forage by imitating their parents. Fledglings followed their parents which were foraging by pecking at the bases of petioles of Manna Gum, consistent with foraging for manna (Case & Edworthy 2016), and began to engage in the same behaviour within 4 days of leaving the nest. Consistent with this, the fledgling seen on 15 January also followed an adult that was pecking at the bases of petioles of Manna Gum (pers. obs.).

Fledglings may also be reliant on the natal cavity and continue to return to it for brief periods after fledging. In this study, one fledgling re-entered the nest box 5 days after the first fledgling left, consistent with a report of two adults and three fledglings all re-entering a natural nest cavity at dusk presumably to roost (S. Bryant pers. comm.). Such occasions might provide the easiest opportunities to capture fledglings for translocations, although in this study the returning fledgling was not yet independent of its parents for food.

Forty-spotted Pardalote fledglings appeared to be largely independent of adults for food from 11 days after leaving the nest and remained within their natal territory for several weeks. Hence, this species appears to be among the passerines with the shortest time to independence (range 5–200 days across 347 species: Russell 2000), particularly for those in the Southern Hemisphere and tropics where only 18% of species reached independence within 20 days of fledging (Russell 2000). However, this is consistent with the tendency for smaller passerines to become independent sooner after fledging (Russell *et al.* 2004), and with observations of Spotted Pardalotes *P. punctatus* commencing laying a second clutch just 8 days after a previous clutch had fledged (Mollison 1960). Such fledglings of Forty-spotted Pardalotes could possibly be captured and transferred to unoccupied habitat to establish founder populations to expand the range of the species. In this study, Forty-spotted Pardalotes were seen repeatedly foraging by pecking at the bases of petioles of Manna Gum consistent with manna consumption (Case & Edworthy 2016) between 11 and 17 days after fledging. However, 13 days after first leaving the nest, a fledgling was seen following a foraging adult and, despite being largely ignored, was fed once. By 4 weeks after fledging, young birds seemed to be able to forage without their parents because the fledglings were still present and foraging on manna but the adults appeared to have vacated their territory. However, it is not known if these fledglings would have remained in their natal territory this long if their parents still held the nest box and had laid a second clutch, or if they would have been evicted by their parents. In other passerines it is common for fledglings to be evicted in readiness for a subsequent clutch, while those from the final clutch of the season are tolerated in the natal territory for longer (Russell 2000).

Despite the potential for such fledglings to be used to establish new populations of Forty-spotted Pardalotes, there is a risk that such birds are not yet ready for this. To stimulate the production of manna, Forty-spotted Pardalotes actively make incisions at the base of petioles of Manna Gum where manna has not been secreted (Case & Edworthy 2016). This action would need to be done by any birds released into areas not currently occupied by conspecifics, and it is not known if these fledglings were doing this or simply collecting manna from incisions made by the adults. Fledglings may also benefit from the presence of their parents in ways other than through food provisioning, such as learning predator-avoidance behaviour. An alternative approach would be to remove established pairs of adults from their territories, introducing these more experienced birds into new areas, and allowing their recently fledged offspring to inherit their territory that is rich with manna-secreting incisions. In this study, fledglings appeared able to remain in their natal territory after their parents had apparently vacated it following usurpation of their nest by Striated Pardalotes.

The documented usurpation by the larger Striated Pardalote of a nest box that had been used by Forty-spotted Pardalotes in this study is a common occurrence. Antagonistic behaviour between these two congeners is well documented (Woinarski & Rounsevell 1983) and Edworthy (2016b) found that of 195 Forty-spotted Pardalote nests monitored, 10% were usurped by Striated Pardalotes, but that Forty-spotted Pardalotes did not evict Striated Pardalotes from any of the 91 Striated Pardalote nests monitored. An even larger passerine, the Tree Martin *Petrochelidon nigricans*, has also been documented usurping nests of Forty-spotted Pardalotes (Edworthy 2016b) including while the latter were provisioning nestlings (pers. obs.).

Further work will be required to determine if changes to the design of nest boxes, including reductions in the diameter of the entrance hole and/or the volume of the box, can restrict access by these larger competitors while still allowing Forty-spotted Pardalote access (Edworthy 2016b). Such changes could potentially be informed by measurements of the dimensions of natural hollows used by Forty-spotted Pardalotes, as has been the case when designing nest boxes for Swift Parrots *Lathamus discolor* (Stojanovic *et al.* 2020). The deployment of boxes that can be used exclusively by Forty-spotted Pardalotes could prove highly beneficial by assisting population increases in existing populations, thereby making more birds available for translocations into new areas, as well as assisting founder populations to establish in the presence of Striated Pardalotes and Tree Martins.

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References

Alves, F. (2021). Conservation and Management of the Forty-spotted Pardalote (*Pardalotus quadragintus*). PhD Thesis. Australian National University, Canberra.

Alves, F., Langmore, N., Heinsohn, R. & Stojanovic, D. (2020). 'Self-fumigation' of nests by an endangered avian host using insecticide-treated feathers increases reproductive success more than ten-fold. *Animal Conservation* **24**, 239–245.

Alves, F., Potts, J., Round, V., Stojanovic, D., Webb, M., Heinsohn, R. & Langmore, N.E. (2022). Modelling the distribution of a key habitat feature to guide future on-ground habitat assessment for an endangered specialist songbird. *Austral Ecology* **47**, 1350–1361.

Bryant, S., Baker, G.B. & Newman, M. (2022). Forty-spotted Pardalote, *Pardalotus quadragintus.* In: Newman, M., Baker, G.B., Ehmke, G. & Jones, W. (Eds). *The State of Tasmania's Birds 2022: Tasmanian Endemics*, pp. 18–19. BirdLife Tasmania, Hobart.

Case, S.B. & Edworthy, A.B. (2016). First report of 'mining' as a feeding behaviour among Australian manna-feeding birds. *Ibis* **158**, 407–415.

Commonwealth of Australia (2022). *Draft National Recovery Plan for Forty-spotted Pardalote (*Pardalotus quadragintus*)*. Commonwealth of Australia, Canberra.

Edworthy, A.B. (2016a). Avian hosts, prevalence and larval life history of the ectoparasitic fly *Passeromyia longicornis* (Diptera: Muscidae) in south-eastern Tasmania. *Australian Journal of Zoology* **64**, 100–106.

Edworthy, A.B. (2016b). Competition and aggression for nest cavities between Striated Pardalotes and endangered Forty-spotted Pardalotes. *Condor* **118**, 1–11.

Edworthy, A.B., Langmore, N.E. & Heinsohn, R. (2019). Native fly parasites are the principal cause of nestling mortality in an endangered Tasmanian pardalote. *Animal Conservation* **22**, 96–103.

Mollison, B.C. (1960). Notes on Tasmanian birds II: Observations on the nesting of the Spotted Pardalote. *Emu* **60**, 119–123.

Russell, E.M. (2000). Avian life histories: Is extended parental care the southern secret? *Emu* **100**, 377–399.

Russell, E.M., Yom-Tov, Y & Geffen, E. (2004). Extended parental care and delayed dispersal: Northern, tropical, and southern passerines compared. *Behavioral Ecology* **15**, 831–838.

Stojanovic, D., Owens, G., Young, C.M., Alves, F. & Heinsohn, R. (2020). Do nest boxes breed the target species or its competitors? A case study of a critically endangered bird. *Restoration Ecology* **29**, e13319.

Webb, M., Alves, F., Tulloch, A., Shaw, J., Bryant, S., Stojanovic, D., Crates, R. & Heinsohn, R. (2019). All the eggs in one basket: Are island refuges securing an endangered passerine? *Austral Ecology* **44**, 523–533.

Woinarski, J.C.Z. & Bulman, C. (1985). Ecology and breeding biology of the Forty-spotted Pardalote and other pardalotes on North Bruny Island. *Emu* **85**, 106–120.

Woinarski, J.C.Z. & Rounsevell, D.E. (1983). Comparative ecology of pardalotes, including the Forty-spotted Pardalote, *Pardalotus quadragintus* (Aves: Pardalotidae) in south-eastern Tasmania. *Australian Wildlife Research* **10**, 351–361.

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