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Photographic evidence of an adult Long-tailed Cuckoo *Urodynamys taitensis* visiting the nest of a Norfolk Island Golden Whistler *Pachycephala pectoralis xanthoprocta*

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Abstract. A remote motion-triggered camera captured images of an adult Long-tailed Cuckoo *Urodynamys taitensis* visiting and possibly depredating a Norfolk Island Golden Whistler *Pachycephala pectoralis xanthoprocta* nest in late December 2018. This is the first documented instance of a Long-tailed Cuckoo visiting the nest of a *Pachycephala* species, and is a rare occurrence of this Cuckoo on Norfolk Island at this time of year. A preliminary comparison of the eggs of the Cuckoo and the Whistler indicates the Whistler as a potential brood-host for this Cuckoo on Norfolk Island.

Introduction

The Long-tailed Cuckoo *Urodynamys taitensis* is a migratory, obligate brood-parasite that breeds in New Zealand after a southward migration through the Pacific (Higgins 1999; Gill & Hauber 2016). Its migratory flyway encompasses numerous Pacific islands, including Norfolk and Lord Howe Islands (Boles *et al.* 2015; Gill & Hauber 2016). Norfolk Island is a small oceanic island ~742 km north-west of Cape Reinga, New Zealand, and 1471 km east of Brisbane, Australia. Although this Cuckoo was "very common" during spring and summer on Norfolk Island in the early 20th century (Basset Hull 1909, p. 678), it is now relatively rare there, typically occurring in October, and only occasionally in other months (Higgins 1999; Menkhorst *et al.* 2017; M. Christian pers. comm.). There are unconfirmed historical reports of breeding on Norfolk Island although the host species involved have not been identified (Higgins 1999). In New Zealand, common brood-hosts of the Long-tailed Cuckoo are the Yellowhead *Mohoua ochrocephala,* Whitehead *M. albicilla* and Pipipi *M. novaeseelandiae* (Gill 2013; Fidler *et al.* 2016). These three species are the extant representatives of the New Zealand Mohouidae family, which shares taxonomic affinities with the Pachycephalidae (whistler) family (Aidala *et al.* 2013). The Long-tailed Cuckoo is also known to parasitise numerous New Zealand species including multiple robin species *Petroica* spp., the Grey Fantail *Rhipidura fuliginosa*, and the Silvereye *Zosterops lateralis*, with eggs occasionally found in the nests of other (mostly open-cup-nesting) passerine species (Higgins 1999).

The Norfolk Island Golden Whistler *Pachycephala pectoralis xanthoprocta* is the Norfolk Island subspecies of a highly diverse species complex whose distribution spans the Asia–Pacific (Andersen *et al.* 2014). This resident subspecies is endemic to Norfolk Island, and inhabits forested areas year-round (Higgins & Peter 2002; AHN unpubl. data). It is an open-cup nester that typically breeds from September to December, laying a clutch of 1–3 eggs (Schodde *et al.* 1983; AHN unpubl. data). This subspecies is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*, and its major contemporary predators include the Black Rat *Rattus rattus* and feral Cat *Felis catus* (Department of the Environment and Energy 2019).

We recorded the present observation during a field study investigating nest outcomes of Norfolk Island's endemic passerines, where we searched for active nests of the focal species (including the Norfolk Island Golden Whistler) and, where possible, deployed remote motion-triggered cameras (Moultrie game camera model: M40i) at nests to monitor activity. All cameras were programmed to capture a single photograph without delay any time when motion was detected, and with a maximum 1-second delay between any subsequent photographs.

The Norfolk Island Golden Whistler nest in this study was discovered on 25 November 2018 in the Palm Glen Picnic Area of Norfolk Island National Park (29°0′49.18″S, 167°56′45.89″E). This area is characterised by mixed native open bush with a nearby thicket of the woody weed Cherry Guava *Psidium cattleyanum.* The nest was constructed ~3.5 m off the ground in the fork of a Hopwood *Dodonaea viscosa* beside a path with fairly high human traffic, and within 5 and 10 m, respectively, of two relatively large open, grassy areas. At least every second day, an observer inspected the activity at the nest and checked the contents using an extendable nest mirror. The nest contained one egg on 25 November, no further eggs were laid, and the single chick was first detected during a nest check on 10 December. The camera that captured the event was deployed on 18 December and removed on 23 December.

Observations

On 20 December, between 0558 and 0602 h Norfolk Isand Time (Universal Time Coordinated +11), a remote motion-sensing camera took 17 images of an adult Long-tailed Cuckoo approaching the nest of a Norfolk Island Golden Whistler and possibly depredating or at least removing the single 10-day-old Whistler nestling (Figure 1a–i shows a selection of these images). The Cuckoo visited the nest twice: once at 0558–0559 h

Figure 1. A selection of sequential images captured with a remote motion-triggered camera showing a Long-tailed Cuckoo visiting the nest of a Norfolk Island Golden Whistler, and possibly attacking the 10-day-old nestling within, 20 December 2018. Image (a) is the first captured image of the Cuckoo at 0558 h. Image (e) shows the Cuckoo facing the nest, what appears to be a leg of the nestling extending above the nest, and, to the left, an extended wing of what looks like an adult Whistler at 0559 h. Images (g) and (h) show the nestling alive in the nest after the Cuckoo's initial visit at 0559 h. Image (i) is the only image of the Cuckoo's second visit, and the last captured image of the Cuckoo at 0602 h. Photos: Clarke Lab, Monash University

Figure 2. A selection of sequential images captured with a remote motion-triggered camera depicting an adult Norfolk Island Whistler visiting its nest *c*. 1 hour after the nest was visited by a Long-tailed Cuckoo. Image (a) shows the first captured image of the Whistler visiting its nest after the event at 0714 h. Image (b) shows the Whistler standing near the nest with either a food item or faecal sac in its bill at 0715 h. Image (c) is the last captured image of the Whistler at 0717 h; no further images of a Whistler or Cuckoo were captured after this image. Photos: Clarke Lab, Monash University

(Figure 1a–f) (after which the nestling was still alive and in the nest: Figure 1g–h); and a second time at 0602 h (captured by a single image: Figure 1i). Although the sequence of images did not show the Cuckoo holding the nestling or carrying it from the nest, there were no further images of the nestling after the last image of the Cuckoo at 0602 h. Between 0603 and 0713 h, the camera captured 13 images (almost certainly triggered by leaf movement), none of which contained signs of the Whistler nestling or any adult birds. From 0714 to 0717 h, the camera captured eight images of an adult Whistler perched at the nest, with no signs of the nestling inside (Figure 2a–c shows a selection of these images). The penultimate image of the adult Whistler at 0715 h shows it holding either a food item or faecal sac in its bill (Figure 2b). The bird's head is obscured by leaves in most of the images, so it is not possible to determine whether the Whistler arrived at the nest with an item in its bill. The last image of a Whistler was captured at 0717 h (Figure 2c), after which there was no further visitation to the nest by either the Whistlers or Cuckoo for the remaining 3 days of camera observation. In the hundreds of preceding images, the nestling can often be seen in the absence of a parental visit, which suggests that absence of the nestling in the many subsequent photographs is indicative of a true absence.

Dee Donaldson inspected the nest with a nest mirror on 21 December and determined that it was empty. We did not find any remnants of the nestling in the nest or on the ground beneath the nest-tree. No more eggs were laid in the nest over the duration of the monitoring period (ending 23 December). Apart from our camera record, we did not directly observe any signs of the presence of Long-tailed Cuckoos. What can be seen of the Cuckoo's plumage indicates that the Cuckoo had attained adult-like plumage (dorsal transverse red-brown bars, and light ventral plumage with dark-brown longitudinal streaks: see Figure 1; Gill & Hauber 2013), but its sex could not be determined.

Discussion

Reports of Long-tailed Cuckoos on Norfolk Island in late December are rare, as most Cuckoos are expected to have returned to New Zealand for the peak breeding months (Gill & Hauber 2016). Gill & Hauber (2013) demonstrated that typically only breeding adults return to New Zealand during breeding months, but they were unsure whether immature or transitional individuals remained in the Pacific in their first non-breeding summer. Given this information, it is possible that the individual from the present observation was not yet of breeding age and had thus over-summered on Norfolk Island. Otherwise, it is possible that this individual was an adult capable of breeding that completed only partial migration for reasons unknown.

Although the images capturing this observation do not provide conclusive evidence of depredation, we believe this was the outcome; Long-tailed Cuckoos, particularly adults, are known to depredate eggs and nestlings that are not necessarily of host-species (Higgins 1999; Gill *et al.* 2018). Our observation also corroborates local historical anecdotes of this species depredating nestlings of Norfolk Island's "small native birds" (Basset Hull 1909, p. 679). Our observation also raises the question of whether the Cuckoos utilise Golden Whistler *P. pectoralis* subspecies as a food source throughout their Pacific migration.

Of note is the sequence of events from Figure 1e onwards; Figure 1e shows an outstretched wing of what appears to be an adult Whistler—and by inference a parent—suggesting that a Whistler might have returned to the nest during the Cuckoo's initial visit. As the nestling is seen to be alive in the nest after this point (Figure 1g–h), it is possible that the Cuckoo was temporarily deterred by an adult Whistler, before returning to the nest 3 minutes later and removing the nestling at *c*. 0602 h.

Norfolk Island Golden Whistler eggs are of similar size and coloration to Long-tailed Cuckoo eggs (Figure 3; see Gill 2013 to compare with Long-tailed Cuckoo egg). As the

Figure 3. Norfolk Island Golden Whistler egg, measuring 26 mm x 17 mm. This particular egg originated from an unrelated depredated nest where the unknown predator removed one of two eggs and destroyed the nest. Photo: Alexandra H. Nance

Long-tailed Cuckoo's eggs mimic the appearance of the hosts' eggs (Gill 2013), the Whistler appears to be a prime candidate to be parasitised by the Cuckoo on Norfolk Island. This possibility is all the more plausible considering the phylogenetic affinity and similar nest characteristics of the Pachycephalidae (whistlers) and Mohouidae (to which the common hosts of the Long-tailed Cuckoo belong: Aidala *et al.* 2013). Our observation does not provide evidence for parasitism of the Whistler by the Cuckoo, but it has raised the question of whether the Whistler is or has ever been a brood-host of the Long-tailed Cuckoo.

Our observation provides anecdotal insight into the migratory, predatory and potentially parasitic habits of the Long-tailed Cuckoo outside New Zealand. It also provides evidence that this Cuckoo can cause nest failure in the endemic and vulnerable Norfolk Island Golden Whistler.

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