Notornis, 2019, Vol. 66: 213-216
0029-4470

SHORT NOTE

Evidence of late breeding of spotless crakes (*Porzana tabuensis*) at two North Island peat bog lakes

EMMA M. WILLIAMS
Matuku Ecology, 7 Kowhai Terrace, St Martins, Christchurch 8022, New Zealand
Present address: Terrestrial Science Unit, Biodiversity Group, Department of Conservation, PO Box 4715, Christchurch 8410, New Zealand

Knowledge of breeding ecology and behaviours has important management implications for the conservation of any species. In particular, accurate knowledge of the timing and duration of the breeding season for native, threatened species is important as it often defines when and for how long conservation interventions should occur, and what those interventions should be. For example, predator control is often prioritised to occur when a native species is nesting and at its most vulnerable, particularly if that species nests on the ground or fledglings are known to be particularly vulnerable to predators. In contrast, habitat modifications that are often necessary but known to be intrusive (e.g. intensive weed control) should occur when native threatened species are not breeding.

The spotless crake (*Porzana tabuensis*) is a small, secretive, cryptic wetland bird from the Rallidae family. Spotless crakes are widespread from the Philippines to south-west Polynesia, including Australasia. Overall, the species is classed as least concern by the IUCN, but the New Zealand subspecies (pūweto, *Porzana tabuensis tabuensis*) is declining (Robertson *et al.* 2017; BirdLife International 2018). Spotless crakes are distributed erratically throughout the North Island of New Zealand, and rarely found in the South Island (Robertson *et al.* 2017; BirdLife International 2018). Ecological knowledge of the species and its behaviours is limited, with few published reports on the timing of breeding in spotless crakes in New Zealand. Hadden (1970) suggested that egg laying occurs between late-August and late-September, while Buddle (1941) proposed that egg laying occurs from October until early-December. The latter is supported by observations of spotless crake eggs being laid between mid-October and mid-December on Raoul Island (cited by Oliver 1955). Yet, Fraser (1972) reported 'newly hatched young' in early-September, and as late as late-January. The current study provides evidence that spotless crake breeding occurs into February, indicating a long breeding season for the species in New Zealand.

Ten fyke nets and ten box-cage traps were used to catch crakes at Lakes Ruatuna and Rotomanuka (37°55.631'S, 175°18.222'E), Waikato, between 15 February and 4 March 2017. Nets and traps were set on the surface of raupō (*Typha orientalis*) beds, or in the *Carex* tussock-lands. Birds that were caught were banded with metal D-bands with an internal diameter of 4.5 mm, then fitted with a BD2 Holohil® transmitter using a standard figure-8 leg-loop harness adapted for rail species (Rappole & Tipton 1991; Haramis & Kearns 2000). Transmitters weighed less than 3% of a bird's body weight (<1.1 g) and birds were subsequently followed for *c.* 5 weeks. The purpose of attaching transmitters to birds was to measure home range sizes of spotless crakes to inform wetland restoration efforts and

Received 22 July 2019; accepted 7 September 2019
Correspondence: *emwilliams@doc.govt.nz*

allow better interpretation of monitoring data and management practices. The results of this aspect of the study are not the subject of this paper and are presented elsewhere (Williams 2017a; Williams 2017b). However, due to the intrusive nature of the work (i.e. handling and trapping birds), the project was purposefully timed to take place in February and March after the crake breeding season was expected to have finished.

A spotless crake pullus chick and an adult with a brood patch were caught in fyke nets in February. The chick was captured at Lake Rotomanuka on 21 February 2017 and followed until the battery of its radio-tag expired on 12 March 2017. The adult was captured at Lake Ruatuna on 28 February 2017 and had evidence of a brood patch. This crake was followed until the study ended on 31 March 2017, and during this time behavioural evidence suggested the bird may have been sharing brooding duties with its mate during the first eleven days of observations (28 February to 9 March 2017).

The wing feathers of the chick were not fully developed, and still had sheaths and emergent feathers <10 mm in length (Fig. 1a). The pink on the chick's bill only extended just beyond the nares (Fig. 1b) and had not reached the edge of the upper mandible, let alone spread to the lower mandible as would be expected with a chick more than 40 days old. Eye colour was olive-drab, and the head was covered in black down (Fig. 1b). However, the feathers of the crural tract had reached a stage where they were continuous with the ventral tract and were brownish grey in colour (Fig. 1c). This was consistent with Kaufmann (1988)'s description

Figure 1. a) A photo showing the developmental features of a spotless crake chick, caught at Lake Rotomanuka on 21 February 2017. This photo shows that the sheaths and emergent feathers of the wing were <10 mm respectively, indicating that the chick must be <40 days old; b) eye colour was olive-drab; the head was covered in black down; the pink on the bill had extended beyond the nares but still had not reached the edge of the upper mandible; c) and the feathers of the crural tract were brownish grey and appeared to be continuous with the ventral tract. These combined observations were most consistent with Kaufmann (1988)'s description of a 29-day old chick.

of a 29-day old chick. If the bird was older than 29 days, we would have expected the small pink patch on its black bill to have expanded beyond the nares and onto the lower mandible (Kaufmann 1988). Chicks older than 40 days would be expected to have an iris that had progressed beyond olive-drab to brownish-orange, and all feathers should at least have partially emerged, including those on the head and wings (Kaufmann 1988). The sheaths on the primary and secondary wing feathers would be expected to be 15–18 mm long, with emergent feathers 18–26 mm long (Kaufmann 1988). As these milestones were not yet apparent on the crake, but the eye colour and feather development were consistent with Kaufmann (1988)'s observations at 29 days, we estimate the chick to have been from 29–39 days old, most likely closer to the former rather than the latter age. Incubation times are reported to be between 20 and 22 days (Fitzgerald 2013), so extrapolating backwards from when the bird was caught on 21 February 2017, it is likely the clutch the bird came from was laid after 1 January, with hatching taking place in late-January (*c.* 23rd). This is the second record of spotless crake chicks hatching in late-January (Fraser 1972). Most literature suggests that peak egg laying by spotless crakes occurs during September and November (Oliver 1955; Heather & Robertson 1996), and that laying also occurs between late-August and mid-December. Kaufmann & Lavers (1987) reported an earliest date of 30 August and a latest date of 19 December. The chick caught in the current study is likely to have hatched from an egg laid outside the previously reported range of laying dates.

There was also evidence of late breeding by the adult bird caught on 28 February 2017. In the hand, the bird had a noticeable brood-patch, although this was small with some feather regrowth around the edges. Additionally, for the first 11 days of radio-tracking the bird was stable in its territory and behaviour, spending the majority of monitored time either foraging or stationary in one particular location. For example, the bird spent 75.2% of the monitored time within an area <0.085 ha, and regularly remained stationary within this area for up to two hours at a time. This observation indicated that the bird was likely to have been brooding small chicks. In contrast, the tagged chick was constantly active across the full range of its territory (0.39 ha).

In support of the theory that the tagged adult was brooding, loud, periodic 'begging' calls were often heard while the bird was in the suspected nest area. Similarly, vocal exchanges (mostly soft 'books') were often heard at this location between the tagged adult and a second adult bird. These usually coincided with the arrival of our tagged adult at the suspected nest location or just prior to it leaving to forage. Searches of the suspected nest site during this time revealed three inactive nest platforms, hidden in *Carex* tussocks, fitting the description of a spotless crake brooder nest (Kaufmann & Lavers 1987). After 11 days, the tagged adult no longer visited the suspected nest site and instead began foraging in an area 0.26 ha in size that was 100 m north of its previous territory.

The observations of the chick and the adult caught in February 2017 indicate that spotless crake breeding can occur in February and that the breeding season for the species in New Zealand can extend for seven months from August to February. The stable territory, sounds of chick begging calls, and site-specific vocal patterns of the tagged adult bird suggest the bird was brooding young chicks in late-February. For this to have occurred, egg laying must have taken place at the end of January, a month later than any previous records. Furthermore, the chick caught in this study appeared likely to have hatched in late-January. Considering there have been few studies of spotless crake nests, it is possible that late breeding could be more frequent than previously thought, particularly in the Waikato region.

A long breeding season for spotless crakes is significant for wildlife managers for several reasons. It suggests that spotless crakes have the potential to produce multiple clutches within a single season and hence that crake populations might increase quickly in response to predator control and to habitat management interventions. The management of wetlands where crakes are present should take into account the long breeding season, with water levels and predator control maintained, and weed control avoided from August until the end of February.

ACKNOWLEDGEMENTS

I would like to thank: the rest of the radio-tracking team (Mark Lammas, Danielle Sijbranda, and Bernie Kelly); Mike Paviour for assistance in sourcing funding; the local landowners at Lake Rotomanuka and Lake Ruatuna for providing land access permission; Ngaati Apakura for allowing us to work on their Taonga species; Waipa District Council for access to Lake Ruatuna camp as our field base; Colin O'Donnell, Dion Patterson, Rose Graham, and Jack van Hal for comments on earlier drafts. The project was funded by Living Water (Fonterra with the Department of Conservation). Transmitters and capture equipment were provided by the Department of Conservation Arawai Kākāriki programme. This work forms part of Department of Conservation Science Investigation No. 4231. Animal trapping and handling protocols were approved by Department of Conservation Ethics Committee (Application AEC 310; DOCDM 2961335). Radio-tracking procedures complied

with Department of Conservation radio-tracking protocols (DOCDM-708212).

LITERATURE CITED

BirdLife International. 2018. *Zapornia tabuensis*. IUCN Red List of Threatened Species, International Union for Conservation of Nature.

Buddle, M.G. 1941. Birds of the Poor Knights. *Emu 41*: 56–68.

Fitzgerald, N. 2013 [updated 2017]. Spotless crake. *In*: Miskelly, C.M. (ed.) *New Zealand Birds Online*. www.nzbirdsonline.org.nz.

Fraser, E. 1972. Some notes on the Spotless Crake. *Notornis 19*: 87–88.

Hadden, D. 1970. Notes on the Spotless Crake in the Waingaro district. *Notornis 17*: 200–213.

Haramis, M.G.; Kearns, G.D. 2000. A radio transmitter attachment technique for soras. *Journal of Field Ornithology 71*: 135–139.

Heather, B.; Robertson, H. 1996. *The field guide to the birds of New Zealand*. Auckland, New Zealand, Penguin Books (NZ) Ltd.

Kaufmann, G. 1988. Development of Spotless Crake chicks. *Notornis 35*: 324–327.

Kaufmann, G.; Lavers, R. 1987. Observations of breeding behaviour of Spotless Crake (*Porzana tabuensis*) and Marsh Crake (*P. pusilla*) at Pukepuke Lagoon. *Notornis 34*: 193–205.

Oliver, W.R.B. 1955 *New Zealand birds*. 2nd edn. Wellington, New Zealand, AH & AW Reed.

Rappole, J.H.; Tipton, A.R. 1991. New harness design for attachment of radio transmitters to small passerines. *Journal of Field Ornithology 62*: 335–337.

Robertson, H.A.; Baird, K.; Dowding, J.E.; Elliott, G.P.; Hitchmough, R.A.; Miskelly, C.M.; McArthur, N.; O'Donnell, C.F.J.; Sagar, P.M.; Scofield, R.P.; Taylor, G.A. 2017. Conservation status of New Zealand birds, 2016. New Zealand Threat Classification Series 19. Wellington, Department of Conservation. 23 pp.

Williams, E.M. 2017a. *Long-term wetland bird monitoring at Lakes Ruatuna, Rotomanuka and Areare in response to restoration efforts: Year 2 (2016–17) results and comparisons with Year 1*. Christchurch, New Zealand, Matuku Ecology.

Williams, E.M. 2017b. *Trial attachment of transmitters to spotless crakes at Lakes Ruatuna and Rotomanuka: some preliminary results*. Christchurch, New Zealand, Matuku Ecology.

Keywords: *Porzana tabuensis*, wetland, early breeding, radio transmitter