





New records of Painted Button-quail *Turnix varius* in North Queensland suggest a distribution through southern and central Cape York Peninsula

Patrick T.D. Webster* , Nicholas P. Leseberg , Stephen A. Murphy 
and James E.M. Watson 

Research and Recovery of Endangered Species, School of Earth and Environmental Sciences,
University of Queensland, St Lucia QLD 4072, Australia
*Corresponding author. Email: p.webster@uq.edu.au

Abstract. The current ornithological literature describes the Painted Button-quail *Turnix varius* having a distribution in Queensland that reaches its northern limit around Cooktown. North of Cooktown, the species is thought to be replaced by the Buff-breasted Button-quail *T. olivii* in savanna habitats of Cape York Peninsula. Here we present observations of Painted Button-quail at four locations throughout southern and central Cape York Peninsula, representing a northern range extension of at least ~150 km. Breeding was confirmed at one location. Whether these observations represent a recent northern expansion or a portion of their distribution that has until now been unrealised is uncertain. In addition, we present four skins and a clutch of eggs labelled as Painted Button-quail collected on Cape York Peninsula that have remained absent from current literature, although we argue that one specimen is inaccurate and the others need to be treated cautiously. This northern range extension for the Painted Button-quail has implications for reports of Buff-breasted Button-quail from Cape York Peninsula.

Introduction

Across Queensland, the Painted Button-quail *Turnix varius* is distributed through timbered environments along the eastern coast north to Cooktown as well as inland through the Brigalow Belt and Mulga Lands (Marchant & Higgins 1993; Menkhorst *et al.* 2019). The current literature suggests that it reaches its northern limit of distribution near Cooktown in North Queensland (Marchant & Higgins 1993; Nielsen 2015; Menkhorst *et al.* 2019). Further north through Cape York Peninsula, the Painted Button-quail is thought to be replaced by the Buff-breasted Button-quail *T. olivii* (Macdonald 1971).

At the northern limit of its currently described Queensland distribution, the Painted Button-quail was first collected in Cooktown by E. Olive on 16 March 1900 (Greenway 1973; LeCroy 2017). This specimen, now held at the American Museum of Natural History (AMNH 544625), was described by Mathews (1912) as a new subspecies *Turnix varius subminuta* on account of its smaller size. This taxon was later invalidated, as it was realised that the small size was because of sexual dimorphism in the species, not geographical variation (Hartert 1929). Reports of Painted Button-quail in the vicinity of Cooktown to date are scarce. In May 2015, a male and female were photographed ~30 km west of Cooktown near the Dickson Plateau (Shurcliff 2015). However, south of the local vicinity of Cooktown the species is frequently observed (L. Roberts pers. comm.).

Further to the south of Cooktown, towards the Atherton Tablelands, the species is frequently recorded. Records include several specimen-based records (Atlas of Living Australia 2020), observational notes by natural historians (Bourke & Austin 1947; Bravery 1970), birdwatchers and, in recent decades, those searching for the Buff-breasted Button-quail (Squire 1990; Rogers 1995; Nielsen 2000; Mathieson & Smith 2017).

Here we present confirmed records of Painted Button-quail from southern and central Cape York Peninsula, including a breeding record. These represent significant northern range extensions of the species. Additionally, we detail five specimens of Painted Button-quail ascribed to collection localities within Cape York Peninsula.

Methods and study area

Surveys for button-quail on Cape York Peninsula were conducted throughout the year from January 2019 to June 2022. Surveys were conducted in areas deemed suitable habitat for a large savanna-dwelling button-quail: open savanna with an understorey of native perennial grasses. Sites that were surveyed were traversed on foot. Particular attention was paid to the substrate for the presence of scratched platelets — scratches in the substrate formed by foraging button-quail — a reliable method of detecting button-quail (McConnell & Hobson 1995; Webster & Stoetzel 2021; Webster *et al.* 2022a). At sites where platelets were detected, three methods were used to determine the species present. Firstly, call-playback of the advertising *oom* vocalisation of the female Painted, Chestnut-backed *T. castanotus* (Webster *et al.* 2021) and potential Buff-breasted Button-quail (Smith & Mathieson 2019) were broadcast and any response documented. Failing a response, either a camera trap (HF2X, Reconyx, Wisconsin, USA) baited with sterilised bird seed (Canary and Finch Mix, Trill) or an autonomous recording unit (ARU) (Song Meter 4, Wildlife Acoustics, Massachusetts, USA) was deployed at the site and left *in situ* for 2–6 weeks. Images recorded on camera traps were visually scanned for the presence of button-quail. Audio recordings from ARUs were scanned with Kaleidoscope Pro Analysis Software (Wildlife Acoustics, Massachusetts, USA) using search parameters selected to extract the low-frequency calls typical of button-quail (Marchant & Higgins 1993;

Smith & Mathieson 2019). Any potential calls were viewed as spectrograms in Audacity (Audacity 2.2.2: Audacity Team 2018). At each site where Painted Button-quail were recorded, a rapid habitat assessment was performed. This involved identifying the vegetation present in each stratum within 250 m² of the sighting (Table 1), though given the conditions of the dry season when follow-up work occurred, identification of some specific annual grasses and forbs in the ground-cover was limited.

Results

Painted Button-quail were recorded at four locations on Cape York Peninsula from 2020 to 2021 (Figure 1). At

three of these sites, the presence of Painted Button-quail was confirmed with photographs (Figure 2). At the fourth site, this was confirmed by an advertising *oom* vocalisation of a female Painted Button-quail recorded on an ARU (Figure 2). At all sites where Painted Button-quail were found, platelets were detected in the immediate area (Webster *et al.* 2022a).

Kalpowa

Painted Button-quail were located at Bathurst Head, Kalpowa (14.33312 S, 144.22124 E) on 23 October 2021. The species was first detected by a concentration of ~40 platelets in an area of ~25 m². Faeces and feathers

Table 1. Vegetation recorded at each of the locations where Painted Button-quail were recorded in this study. Dominant species are presented in bold.

Site	Canopy	Understorey	Grasses	Dominant Regional Ecosystem
Kalpowa	Darwin Stringybark <i>Eucalyptus tetrodonta</i> Blotchy Bloodwood <i>Corymbia stockeri</i> Clarkson's Bloodwood <i>Corymbia clarksoniana</i>	Silver Oak <i>Grevillea parallela</i> Red Wattle <i>Acacia flavescens</i>	Kangaroo Grass <i>Themeda triandra</i> Giant Speargrass <i>Heteropogon triticeus</i> Black Speargrass <i>Heteropogon contortus</i> Plume Sorghum <i>Sarga plumosum</i>	3.10.6 <i>Eucalyptus tetrodonta</i> +/- <i>Corymbia stockeri</i> subsp. <i>stockeri</i> woodland on sandstone plateaus
Artemis	Darwin Stringybark <i>Eucalyptus tetrodonta</i> Clarkson's Bloodwood <i>Corymbia clarksoniana</i> Broad-leaved Paperbark <i>Melaleuca viridiflora</i>	Broad-leaved Paperbark <i>Melaleuca viridiflora</i> Bushman's Clothes Pegs <i>Grevillea glauca</i> Fern-leaved Grevillea <i>Grevillea pteridifolia</i> Smooth-leaved Quinine <i>Petalostigma banksii</i> Forest Grasstree <i>Xanthorrhoea johnsonii</i>	<i>Eriachne stipacea</i> <i>Ectrosia agrostoides</i> Cockatoo Grass <i>Alloteropsis semialata</i> <i>Aristida</i> spp. Black Speargrass <i>Heteropogon contortus</i> <i>Pseudopogonatherum irritans</i> <i>Eragrostis</i> spp. <i>Scleria</i> spp.	3.3.49 <i>Melaleuca viridiflora</i> +/- <i>Corymbia clarksoniana</i> low open woodland on floodplains and alluvial plains
Dixie	Darwin Stringybark <i>Eucalyptus tetrodonta</i> Blotchy Bloodwood <i>Corymbia stockeri</i> Clarkson's Bloodwood <i>Corymbia clarksoniana</i> Cooktown Ironwood <i>Erythrophleum chlorostachys</i>	Saplings of canopy species <i>Brachychiton</i> sp.	Giant Speargrass <i>Heteropogon triticeus</i> Plume Sorghum <i>Sarga plumosum</i>	3.11.7 <i>Eucalyptus cullenii</i> and <i>Corymbia clarksoniana</i> woodland on low metamorphic hills and rises 3.11.11 <i>Corymbia stockeri</i> +/- <i>Eucalyptus tetrodonta</i> woodland on hills and erosional surfaces
Laura	Darwin Stringybark <i>Eucalyptus tetrodonta</i> Blotchy Bloodwood <i>Corymbia stockeri</i>	<i>Acacia</i> spp.	<i>Spinifex Triodia microstachya</i> Fire Grass <i>Schizachyrium fragile</i> Giant Speargrass <i>Heteropogon triticeus</i> Plume Sorghum <i>Sarga plumosum</i> Citronella Grass <i>Cymbopogon bombycinus</i>	3.10.6 <i>Eucalyptus tetrodonta</i> +/- <i>Corymbia stockeri</i> subsp. <i>stockeri</i> woodland on sandstone plateaus

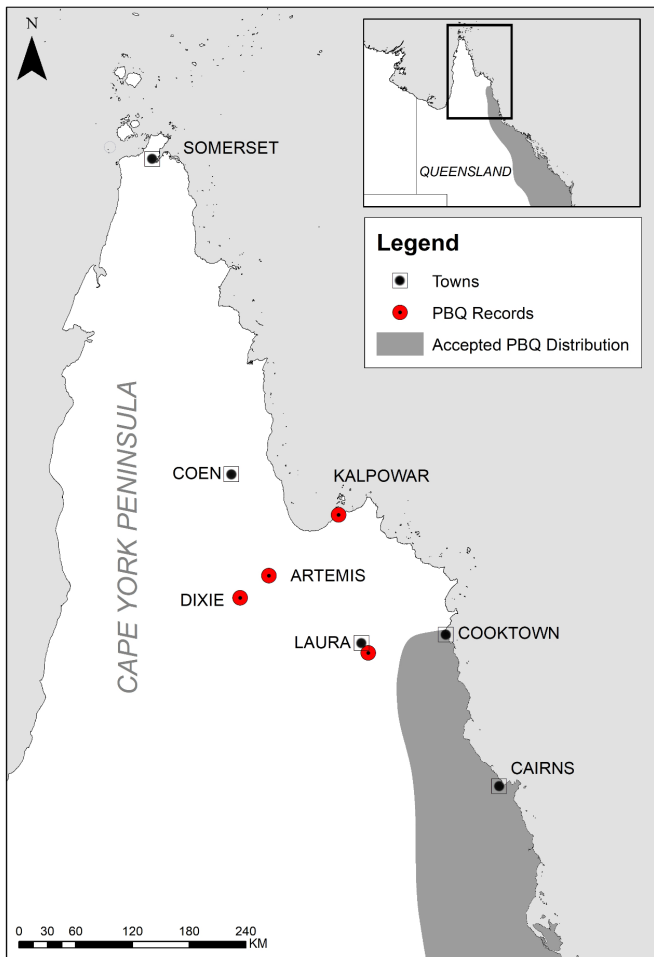


Figure 1. Map of locations where Painted Button-quail (PBQ) were recorded on Cape York Peninsula, Queensland, and the previously accepted distribution of the species (adapted from Marchant & Higgins 1993 and Menkhorst *et al.* 2019). Note the location of Somerset at the northern tip of Cape York Peninsula, where the Cockerell and Thorpe specimens were reportedly collected.

were detected in a dust bath, which was suggestive of Painted Button-quail. A short series of call-playback was performed, which enabled the species to be observed visually. Two females and three males (Figure 2) were observed. Data from an ARU deployed at this site were retrieved on 24 November 2021. Audio recordings were obtained of the species' advertising *oom* vocalisation from 11 to 15 November, representing 24 advertising vocalisations. The observation occurred along a prominent ridge, and platelets were spread over ~1 km of the ridge from 65 m to 116 m above sea level (asl). The substrate was mostly small to medium-sized lateritic sandstone rocks with areas of bare soil. Habitat at this site was very open savanna with an extremely sparse understorey and moderately dense perennial grasses (Figure 3C).

Artemis Station

A large button-quail was flushed on 12 September 2021 on Artemis Station (14.91526 S, 143.55858 E) and platelets were found in the area. An immediate attempt was made to locate the species responsible. A Red-backed Button-quail *T. maculosus* was located nearby in dense sedges; however, a larger button-quail was not located on this occasion.

Two camera traps were deployed on 12 September and retrieved on 25 October 2021. The presence of at least one male and one female Painted Button-quail was recorded on the camera traps. This observation occurred in moderately dense savanna on sandy plains at low altitude (80 m asl) with a moderately dense understorey of sparse annual and perennial grasses (Figure 3D). On 31 October 2021, two female Painted Button-quail were heard in response to call-playback, suggesting that there were at least three birds at this site (Figure 2). Two ARUs were deployed at this site over the ensuing wet season (2021–2022). Analysis of the audio data revealed at least two female Painted Button-quail giving the advertising *oom* vocalisation. As breeding was presumed, four camera traps were set on 5 May and retrieved on 6 June 2022. An image of a male and two chicks was captured on 13 May. These chicks appeared to be c. 10 days old, aged according to Starck (1991) (Figure 4).

Olkola freehold (Dixie Station)

Platelets suggestive of a large button-quail were detected on *Olkola freehold* land (Dixie Station; 15.12303 S, 143.28186 E) on 21 March 2020 but no birds were observed. An ARU was deployed on 16 December 2020 and retrieved on 29 May 2021. Audio recordings (Figure 2) were obtained of the Painted Button-quail's advertising *oom* from 18 March to 3 May 2021, representing 32 vocalisations. This observation occurred in tall savanna on low undulating hills with a dense understorey of saplings and moderately dense perennial grasses (Figure 3A).

Laura

On 12 September 2021, ~30 platelets suggestive of a large button-quail were detected at Laura (15.65014 S, 144.50227 E) scattered over a stretch of ~100 m but no birds were observed. A return visit to the site on 15 September 2021 yielded views of a single female Painted Button-quail (Figure 2) following a short period of call-playback. This observation occurred on top of a sandstone escarpment. The substrate was skeletal sandstone with areas of gravelly sand. Habitat at this site was open savanna with a sparse understorey and sparse perennial and annual grasses (Figure 3B).

Review of literature and museum specimens

Four skins and one clutch of eggs attributed to Painted Button-quail collected on Cape York Peninsula, but not represented in contemporary literature, were found during this research. The skins were collected by J.E. Cockerell and J. Thorpe, with the collection locality listed as Somerset, Cape York (Figure 5). They are now held at the Natural History Museum, Tring, UK (NHM). Two are listed as being collected between 1867 and 1868 (NHM 1889.5.13.140 and 1889.5.13.141), and the other two have no collection date (NHM 1881.11.7.984 and 1881.11.7.985). Additionally, a clutch of eggs attributed to Painted Button-quail was reported to have been collected by W.R. McLennan on 7 March 1923 with the collection locality listed as Coen. This clutch is held at the Australian Museum (AM O.54107).

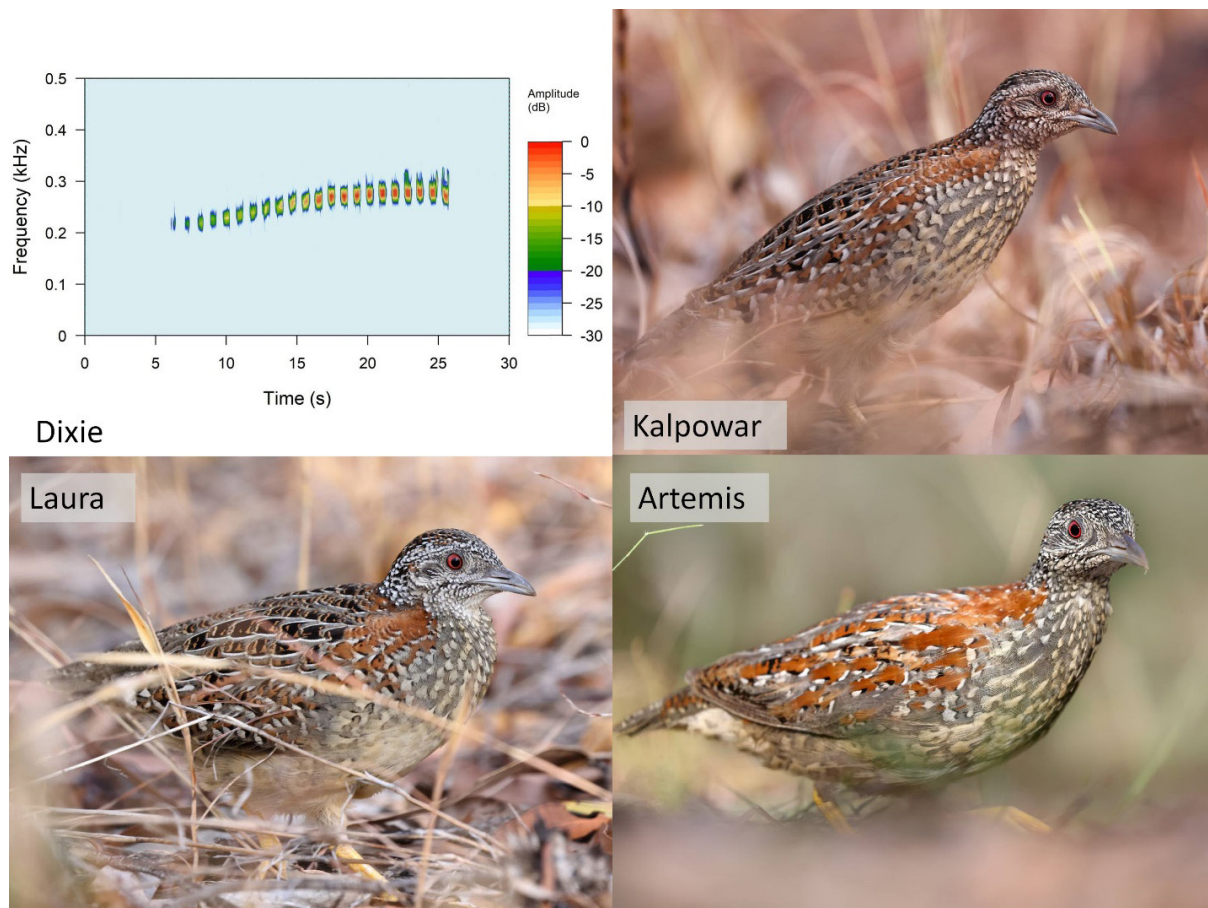


Figure 2. Record photographs of Painted Button-quail from Kalpowar, Laura and Artemis Stations. Note that a bird was not seen at Dixie, but a series of Painted Button-quail vocalisations was recorded there. A spectrogram (top left) depicts the advertising oom of the female Painted Button-quail recorded at Dixie. Photos: Patrick T.D. Webster

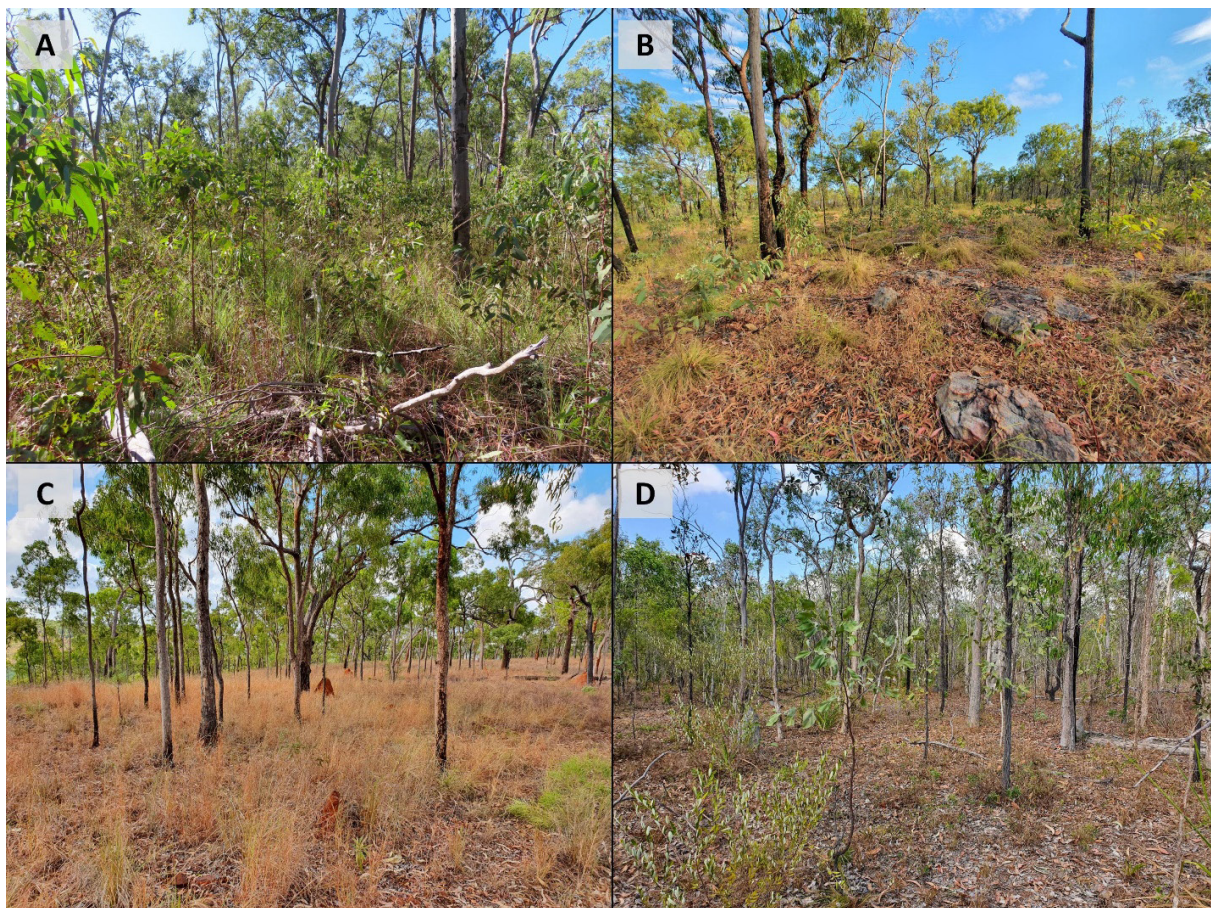


Figure 3. Habitat at the sites where Painted Button-quail were recorded on Cape York Peninsula. (A) Dixie. (B) Laura, (C) Kalpowar and (D) Artemis. Photos: Patrick T.D. Webster



Figure 4. Camera-trap image of male Painted Button-quail with two chicks recorded on 13 May 2022 at Artemis Station, Cape York Peninsula. Photos: Patrick T.D. Webster



Figure 5. Painted Button-quail specimens collected by Cockerell and Thorpe and attributed to a collection locality of Somerset, Cape York. Specimens held at the Natural History Museum, Tring, Hertfordshire, UK. a. NHM 1889.5.13.140, b. NHM 1889.5.13.141, c. NHM 1881.11.7.984, d. NHM 1881.11.7.985. Photos: Douglas Russell

(Figure 6). This clutch of five eggs bears very little similarity to any *Turnix* spp., but does closely resemble those of Brown Quail *Synoicus ypsilophorus*. No original data card for this record exists.

Discussion

Our discovery of Painted Button-quail in southern and central Cape York Peninsula suggests that the species is currently more widely distributed in North Queensland than previously documented (Marchant & Higgins 1993;

Nielsen 2015; Menkhorst *et al.* 2019). It remains unclear whether the records presented here are within the historical distribution of Painted Button-quail, or represent a recent northerly expansion of their range. There is a potential record of this species from Kalpowar, where we detected the species in 2021, in the form of a clutch of eggs. This clutch was collected by J.P. Dwyer in 1947 and attributed to Buff-breasted Button-quail. As argued by Webster *et al.* (2022b), this clutch, though labelled as Buff-breasted Button-quail, bears a strong resemblance to a Painted Button-quail clutch. This clutch requires DNA analysis to confirm its identity, which is currently underway. If found

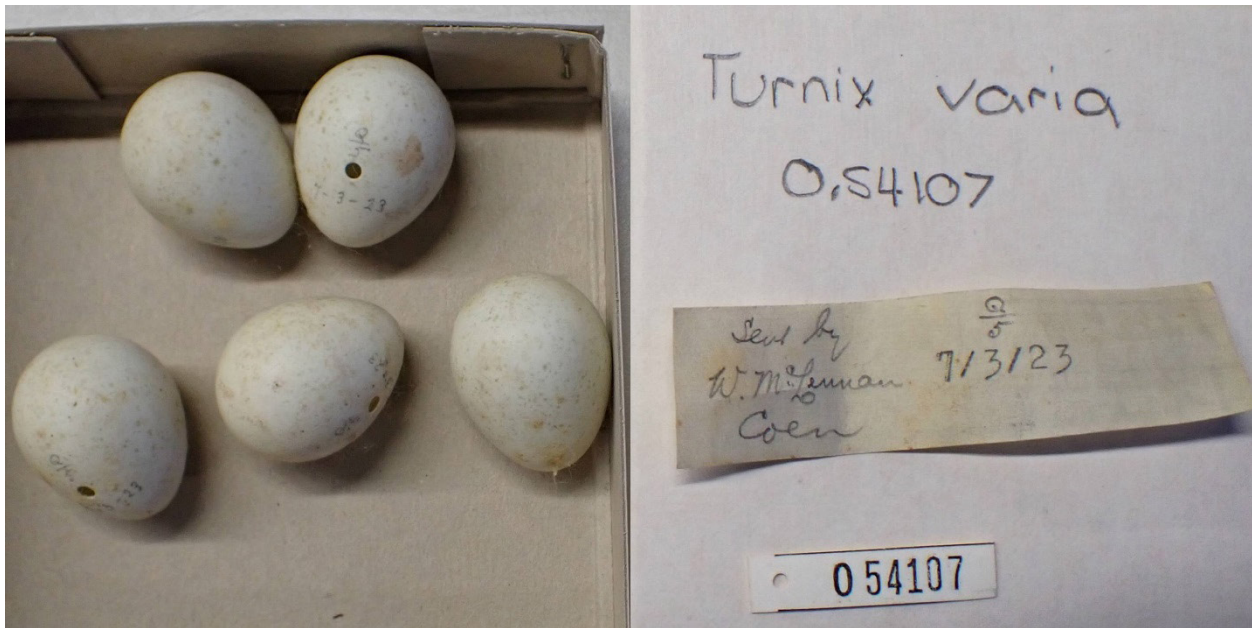


Figure 6. Clutch of eggs (AM O.54107) collected by William Rae McLennan at Coen in 1923 and registered as Painted Button-quail at the Australian Museum though likely attributable to Brown Quail. Photos: Leah Tsang

to be attributable to Painted Button-quail, it would confirm that the observation of the species in 2021 described here is not a recent expansion, but simply a detection from an unrealised part of the species' distribution. Similarly, a report of a button-quail at Artemis Station in 1994 attributed to Buff-breasted Button-quail was identified at the time primarily on the basis of distribution in addition to assumptions about size and call. This report was only 10 km from the site where we found Painted Button-quail in 2021 and might have been a Painted Button-quail (S. Garnett pers. comm.). Though the identification of this bird cannot be accurately determined, it presents the possibility that Painted Button-quail have simply remained undetected in this region of Cape York Peninsula.

The four skins and one clutch of eggs found during our research, reportedly collected in far northern Cape York Peninsula and attributable to Painted Button-quail, are of biogeographic interest for both this species and for other similar species. These specimens are not accompanied by diaries or any further information to support their collection locality. The clutch of eggs collected at Coen by W.R. McLennan (AM O.54107) bears a strong resemblance to eggs of the Brown Quail, but unfortunately does not carry original data cards or other supporting documents. This clutch of eggs should not be treated as of Painted Button-quail and has likely been mislabelled or misidentified following its collection. To add to the uncertainty surrounding the veracity of the Cockerell and Thorpe specimens, the veracity of some of their specimens were questioned by ornithologists at the time (Mathews 1916–1917), on account of dubious data and inaccurate locations, though this should not be said for all of the Cockerell and Thorpe collection (Horton 2018). The specimens collected by Cockerell and Thorpe are accurately identified as Painted Button-quail (Figure 5) but, given the collection locality, they should be treated cautiously. The collection locality of 'Somerset' might have been listed as a general location of Cape York Peninsula from a period when other settlements were yet to be established. If the collection locality of

specimens of Cockerell and Thorpe were verified, this would imply that the Painted Button-quail is distributed much further throughout Cape York Peninsula than our current understanding suggests. Given the uncertainty of the provenance of the Cockerell and Thorpe specimens, they should be treated as unconfirmed until further supporting information is uncovered

Here we also present the first confirmed breeding record of Painted Button-quail in the Cape York Peninsula bioregion. Two chicks c. 10 days old were recorded on 13 May 2022 at Artemis Station. Given the age of the chicks, an average clutch size of four and an average incubation period of 14 days, laying likely occurred between 16 and 20 April. The record of Painted Button-quail breeding at Artemis Station and a covey of five birds at Kalpowar Station suggest that these observations are unlikely to be the result of individuals dispersing outside of their normal distribution. Coupled with the yet unconfirmed 1947 Kalpowar clutch collected by J.P. Dwyer and the 1994 report from Artemis Station, it is reasonable to consider that the Painted Button-quail has a resident breeding distribution that at least encompasses southern and central Cape York Peninsula.

It is evident in the observations presented here that our understanding of the Painted Button-quail, and indeed all button-quail, in North Queensland is poor. This is somewhat surprising, given the popularity of North Queensland amongst amateur birdwatchers and the attention that the Buff-breasted Button-quail has brought to button-quail in North Queensland. However, this group of birds is well recognised as being understudied (Yarwood *et al.* 2019), partly because of their cryptic behaviours and plumage (Debus 1996). The remoteness of potentially suitable habitat in North Queensland likely adds to this inattention. It is clear that further surveys and targeted research are required to understand the full distribution of this species in North Queensland, their autecology, and whether they are potentially sympatric with the threatened Buff-breasted Button-quail. We implore researchers and birdwatchers to

be aware of the potential for encountering this species on Cape York Peninsula and suggest that any observations be recorded in databases such as eBird (2020) or Atlas of Living Australia (2020), preferably supported by photographs. The northern range extension described here for the Painted Button-quail suggests that on Cape York Peninsula this species might have previously been misidentified as Buff-breasted Button-quail, especially given the previously undescribed, seasonal variation in plumage of Painted Button-quail in North Queensland (see Webster 2022). This potential confusion raises concerns for the conservation status, and indeed continued existence, of the Buff-breasted Button-quail (Webster *et al.* 2022b).

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