

Reflections on *Thinornis rossii*

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Abstract: *Thinornis rossii* is a charadriiform taxon represented by a single specimen reportedly collected on the Auckland Islands, south of New Zealand, in 1840, and obviously closely related to the shore plover (*T. novaeseelandiae*), of mainland New Zealand and the Chatham Islands. Since the early 20th century, the name *T. rossii* has commonly been treated as a synonym of *T. novaeseelandiae* owing to doubts over its provenance based on an untraced quotation from the naturalist (Robert McCormick) who was presumed to have collected it. However, there seems to be no other evidence that the specimen might originate from somewhere close to modern-day Auckland, in the northern part of New Zealand's North Island, rather than the Auckland Islands, despite the fact that the relevant collecting expedition visited both areas. Moreover, the untraced quotation questioning the Auckland Islands origin seems very possibly to be an artefact of a misremembered reading of McCormick's unpublished diary or his memoirs, and the circumstantial published and unpublished evidence points with reasonable strength to the bird having been collected where originally stated. Morphological characters (darker, browner upperparts, brownish-grey flanks, longer central toe) suggest that *T. rossii* might be a valid (but extinct) taxon most appropriately ranked at subspecific level, but the possibility remains that it represents a melanistic specimen. Ideally, the type should be subject to a counterpart molecular investigation.

Kirwan, G.M.; Collar, N.J. 2020. Reflections on *Thinornis rossii*. *Notornis* 67(4): 773–781.

Key words: *Thinornis*; shore plover; Auckland Islands; Robert McCormick

INTRODUCTION

The shore plover (*Thinornis novaeseelandiae*) (J.F. Gmelin, 1789) is a charadriiform wading bird confined to New Zealand, where it originally occurred on both the North and South Islands, as well as the Chatham Islands and some adjacent smaller islands of New Zealand, e.g. Great Barrier Island (Hutton 1868; Davis 1994). It was first

reported to scientific audiences as a result of Cook's second voyage in 1772–75 and, on the authority of Latham (1785), its type locality was accepted as Queen Charlotte Sound, in the north of the South Island. However, Medway (2007) demonstrated that Dusky Sound, in the south-west of the same island, which was visited by Cook's men in April 1773, is the correct *terra typica*. Thereafter, the species was not reported again on the South Island (in Otago) until approximately 1844, when a pair was seen near Port Chalmers (Buller 1888) and it was apparently also observed at Taieri (Davis 1994).

Received 10 March 2020; accepted 2 May 2020

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Thinornis novaeseelandiae bred on the South Island, where available records are quite widespread, and was speculated to migrate to the North Island in the non-breeding season (Buller 1888), but it was already very rare or even extinct in mainland New Zealand by the late 19th century (Fleming 1939; Marchant & Higgins 1993; Davis 1994). The species' decline was probably due to predation by introduced rodents and feral cats; there were no records on mainland New Zealand after 1878 (Hamilton 1878; Davis 1994). Wiersma & Piersma (1996) dated the last record from 1888, but this appears to be unsupported by evidence and therefore is probably a transcription error for 1878.

In the modern age the species has been confined to rocky shore platforms and barren turf on the Chatham Islands, where it was only discovered in the 1870s (Travers & Travers 1872). Currently it breeds on Rangatira (South East Island), off Pitt Island, and Mangere, to which birds were recently translocated from Rangatira (Aikman & Miskelly 2004; Dowding & O'Connor 2013). Shore plovers also recently became extinct on the Western Reef, off the main Chatham Island, when the last bird was taken into captivity in 2003 (Aikman & Miskelly 2004; Dowding 2016) following the discovery of a population in 1999 (Bell & Bell 2000). The species formerly occurred on other islands in the Chatham group, but was extirpated on both Pitt and Mangere probably by introduced cats (Dowding & Murphy 2001), while on Rangatira hundreds were apparently collected between 1890 and 1910 for sale as scientific specimens (Fleming 1939; Oliver 1955; Marchant & Higgins 1993).

History of *Thinornis rossii*

With a primary remit to conduct magnetic observations in the Southern Hemisphere, the British naval expedition of 1839–43 under the overall command of Sir James Clark Ross, with two specialised warships the HMS *Erebus* and HMS *Terror*, completed a circumnavigation of the Antarctic continent and visited many of the subantarctic islands (Headland 1989). Among the biological material taken during the voyage, a species of shorebird related to *T. novaeseelandiae* was described by Gray (1845) from an unsexed specimen stated as being collected on the Auckland Islands, 465 km south of New Zealand, in 1840. If 1840 is the correct year of collection (but see below), the month of collection would have been late November or early December (November given in Hume 2017), based on the expedition travelogue published over 40 years later by the naturalist Robert McCormick (1884). McCormick was a naval surgeon and naturalist with James Clark Ross's Antarctic expedition of 1839–42, on which most

of the naturalist duties were performed by Joseph Dalton Hooker, with McCormick, assisted in part by Thomas Abernethy, concentrating on geology and bird collecting (Ross 1847). Gray's (1845) description, the year of which was confirmed by Bruce & Jones (2011) and Evenhuis (2015), reads as follows:

THINORNIS ROSSII.

Blackish brown, lighter on the wings; forehead, cheeks, sides, fore part of neck, and a narrow collar round the neck brownish black; band across the head, over the eyes and extending down to the nape, breast and abdomen, margins of secondaries, some of the tertials margined or entirely, and the outer tail-feathers, pure white; sides of the breast and abdomen varied with blackish-brown feathers. Length, 8 inches; bill from gape, 11 lines; wings, 5 inches; tarsi 9¾ lines.

A single specimen of this bird was brought by the Expedition from Auckland Island.'

Frequently misspelt *rossi* (even in Sharpe 1896 and Warren 1966; hence also on the red type label in Fig. 1), *Thinornis rossii* was generally accepted up until 1870 (e.g. Bonaparte 1856; Finsch 1870), but thereafter doubts over its validity began to surface: Potts (1873) suggested that it was the female of *T. novaeseelandiae*, while Buller (1873, 1888) posited that it was the immature of that species and even described it as such. Buller, who lived in London between 1871 and 1874, reached this conclusion after inspecting the type, as reported by Sharpe (1875), who added that Buller had done so 'with good reason'. However, 20–30 years later both men changed their minds: Sharpe (1896) declared that Buller's assertion 'is certainly not correct, for the bird in question is quite adult, and must, in my opinion, belong to a distinct species', and Buller (1905) acceded to this judgement, albeit with the proviso that 'Further specimens should be obtained before this matter can be considered settled.'

Nevertheless, while Hamilton (1909) accepted the validity of *T. rossii*, Mathews & Iredale (1913) again treated it as a synonym of *T. novaeseelandiae*, stating that their re-examination of the type indicated it to be 'immature' and adding that the bird 'has never been found again on the Auckland Islands, and we would suggest that the specimen was not procured there, but at Auckland in the North Island'. They supported this assertion with the remark that 'It bears no original label, and McCormick states that "Only one Plover was observed and no specimen obtained at the Auckland Islands".'

This demotion of *T. rossii* to the status of synonym was accepted by Mathews (1927, unsurprisingly!), Oliver (1930), and Peters (1934).

Other than Greenway (1967, see below), Fleming (1939: 11) was perhaps the last authority to give *T. rossii* serious consideration, and indeed the only one to discuss the issue of its taxonomic status in any detail, writing: 'I am confident that ... *Thinornis rossii* [sic], if correctly described and illustrated, is not this condition [a juvenile], nor could it represent a female bird as Potts thought. [It] may represent an intermediate between the condition described above [juvenile] and the adult plumage or a melanistic mutant or actually a different species which has succumbed to rats on the Auckland Islands—although this last I personally doubt.' His rationale for considering 'this last' unlikely is not stated—possibly because he knew that Adams and Disappointment had never had introduced predators (but its succumbing to rats, however, certainly could not have occurred, as rats have never been recorded on the islands: Russell *et al.* 2020)—although he went on to speculate that *T. rossii* might represent the winter plumage of *T. novaeseelandiae*. Since Peters, however, most commentators have been content either to ignore or to dismiss *T. rossii*, among them Fleming (1982), Hayman *et al.* (1986), Marchant & Higgins (1993), Wiersma & Piersma (1996), Dickinson (2003), Gill *et al.* (2010), Bahr (2011), Dickinson & Remsen (2013), del Hoyo & Collar (2014), and Hume (2017). Nevertheless, Marchant & Higgins commented 'Single specimen allegedly taken at Auckland Is (described as separate species *T. rossii* [sic]), usually considered same species that strayed or with incorrect locality data, but issue unsettled', and Gill *et al.* (2010) remarked that the 'holotype of *Th. rossii*, a putative endemic taxon from the Auckland Islands, is considered by most authorities to be an immature *Th. novaeseelandiae*, whose location was incorrectly recorded'. Greenway (1967) suggested that *T. rossii* was perhaps a distinct sibling species, and Carlton *et al.* (1999) recommended 'the still-extant type specimen may be worthy of molecular examination', a proposal that we second (see below). Most recently, Miskelly & Taylor (2020) concluded their brief discussion of *T. rossii* by stating that the 'specimen is much darker than typical *T. novaeseelandiae*, and may represent an extinct (and distinct) taxon' (see also Miskelly *et al.* 2020).

METHODS

The type of *Thinornis rossii* is held at the Natural History Museum, Tring, UK, registration number NHMUK 1842.12.16.78 (Fig. 1). We compared the unique specimen from the Auckland Islands with a total of 32 specimens of *T. novaeseelandiae*, mainly from the Chatham Islands, and now held at the American Museum of Natural History (AMNH), New York ($n = 24$) and NHMUK ($n =$

8) (see Appendix). All mensural data were taken by NJC, using a standard metal wing rule with a perpendicular stop at zero, and digital callipers, recording: wing chord length, tail length (from pygostyle to tip), bill length (from tip of the culmen to the feathers), bill depth (at the front edge of the nares), tarsus (from the back of the intertarsal joint to the last complete scute before the toes diverge), and length of middle toe to tip of claw. The NHMUK material was inspected by both authors.

We also trawled the literature for references to *Thinornis rossii*, for example using the search facility within the Biodiversity Heritage Library site (<https://www.biodiversitylibrary.org/>), in order to recreate a history of the taxon. In particular, given the comments of Mathews & Iredale (1913) concerning the possibility that the type of *T. rossii* was not collected on the Auckland Islands, we checked the text of McCormick's memoirs (McCormick 1884) pertaining to the periods the *Erebus* and *Terror* expedition spent around the Auckland Islands archipelago and subsequently in the Bay of Islands and the vicinity of Auckland.

RESULTS

Thinornis rossii differs in the following three characters from all of the specimens of *T. novaeseelandiae* that we have studied: darker, browner upperparts (including rectrices), brownish-grey (versus all-white) flanks, and longer central toe (see Table 1, Fig. 1). However, it merits mention that the legs are attached by wire to the specimen, and it has been suggested to us that they might not belong to it, perhaps as a result of the specimen being made up as a mount (H. van Grouw *pers. comm.*); so the long central toe may not be relevant. Based on these findings, and on the balance of possibilities to be made in the minimal circumstantial evidence in this case, we judge that *T. rossii* could be treated as a valid, albeit presumably extinct, taxon, which precautionarily, given its close overall resemblance to the shore plover, we recommend be assigned the rank of subspecies of *T. novaeseelandiae*, i.e. *Thinornis novaeseelandiae rossii* Gray, 1845, using a modern interpretation of the biological species concept (e.g. Remsen 2010). (Under a phylogenetic rather than biological species concept its divergence in two certain characters might be considered sufficient to trigger species status.) Alternatively, the specimen might be a melanistic variant of *T. novaeseelandiae*, especially because the dark markings on the flanks are asymmetrical. Melanism does not, however, appear to have been reported in *T. novaeseelandiae*, and it would be something of a double coincidence if the type of *T. rossii* represents both the only record of *T. novaeseelandiae* from the Auckland Islands and the only record of melanism in that species. On

the other hand, there are two documented records of leucism in shore plover, one an almost entirely white specimen, NHMUK 1939.12.9.38 (Oliver 1930), and a largely white adult photographed by Dowding & Gummer (2003), while J. Dowding (*in litt.* 2020) reports that this colour aberration is not uncommon in the Rangitira population.

Table 1. Mensural data (means, with range and sample size in brackets) for female, male and unsexed specimens of *Thinornis novaeseelandiae* in the American Museum of Natural History, New York (AMNH) and Natural History Museum, Tring (NHMUK), plus the type of *T. rossii* (NHMUK 1842.12.16.78). All specimens of *T. novaeseelandiae* are from the Chatham Islands, except two from mainland New Zealand (AMNH 737849 and NHMUK 1896.7.1.685). All measurements taken by NJC according to the protocol outlined in Methods. Birds measured are mainly adults or in breeding plumage; wings were not measured if they were judged to be in moult.

Taxon	Sex	Bill	Bill depth	Wing	Tail	Tarsus	Middle toe
<i>Thinornis novaeseelandiae</i>	F	27.8 (24.5–29.4, n = 8)	4.1 (3.2–4.6, n = 7)	118 (114–123, n = 6)	59.6 (58–61, n = 8)	22.1 (21–23, n = 7)	21 (18–23, n = 8)
	M	27.7 (27.3–28.9, n = 12)	4.1 (3.5–4.7, n = 8)	117 (114–121, n = 11)	60.1 (58–64, n = 12)	22.9 (22–25, n = 11)	21.2 (19–22, n = 12)
	U	27.8 (26.5–30.1, n = 12)	4.1 (3.5–4.6, n = 8)	118 (113–120, n = 12)	60.3 (58–62, n = 12)	22.9 (22–24, n = 12)	21.3 (20–23, n = 12)
<i>Thinornis rossii</i>	U	28.1	3.8	121	62	22	24



Figure 1. Dorsal, ventral and both lateral views of the holotype (NHMUK 1842.12.16.78) of *Thinornis rossii*, collected in the Auckland Islands, New Zealand, in late 1840 (Hein van Grouw, © The Natural History Museum, London).

Several further potential characters are worth noting: the band over the crown between the eyes is only slightly paler than the feathering either side of it (and certainly not ‘pure white’ as in the original description); the dark brown-grey feathers of the throat appear to extend a little further onto the breast than in *T. novaeseelandiae*; and the second outermost rectrix (R5) has a much larger dark central patch of colour. Moreover, according to Buller (1873, 1888) there is inter-digital webbing between the middle and outer toes, based on the depictions of both taxa in *Zoology of the voyage of the H.M.S. Erebus and Terror*, but he suggested that this was an error on the artist’s part (we see no trace of this character, but acknowledge the possibility, noted above, that the legs and feet of the specimen may not be original); however, an anonymous reviewer mentions that such webbing exists in *T. novaeseelandiae*. The crown-band may be a genuine difference, since it is more pronounced in specimens of *T. novaeseelandiae* in similar plumage, but even so the sample is too small for confidence; the more extensive dark feathering on the throat and breast is almost certainly an illusion created by preparation style; and the fuller coloration of R5 may be real but again sample size is problematic. Although Sharpe (1896: 306) indicated that the holotype was not mounted in the late 19th century, this seems to have been a *lapsus* on his part, given that the specimen’s legs are clearly wired so as to project downwards, as if the bird was standing, and it has dark glass eyes (Fig. 1). Interestingly, however, an amendment penned in the NHMUK accession register, in the same hand as the main entry, records that the specimen had ‘irides a bluish grey’, whereas *T. novaeseelandiae* typically has dark brown eyes (Marchant & Higgins 1993; Dowding & Gummer 2003); we can only speculate that this information, which seems hardly likely to have been invented, might have been written on the specimen’s original label.

We have been unable to trace the unreferenced quotation from McCormick in Mathews & Iredale (2013) that no plover was collected at the Auckland Islands. This claim contradicts the previously unchallenged assertion that the type specimen was taken there, but the quotation is not in McCormick (1884), the only publication where such a remark might be expected to have been made. Furthermore, C. Miskelly *in litt.* (2020) reports that the only mention of a plover in McCormick’s unpublished diary (held in the New Zealand National Library; Micro-MSColl-20-2665) is from the entry for 29 November 1840. It reads: ‘At 1.30 pm landed in the Cutter with the Gunner, at the Small Island off the Point beyond “Deas Head” [=Friday Island], with a fair wind left the Ship at one. Found a Ringed Plover, 2 larks and a Penguin on it’. Given that there is no other possible known source for a commentary by McCormick on

his visit to the Auckland Islands (correspondence with Mathews and Iredale being ruled out by McCormick’s death in 1890), we judge that the only plausible explanation of the quote in Mathews & Iredale (1913) is that they were paraphrasing (and misremembering/misinterpreting) what they, or one of Iredale’s correspondents, had read in either or both McCormick (1884) and his diary. M. D. Bruce (*in litt.* 2020) has suggested that the answer to this conundrum might lie in Iredale’s correspondence (at least some of which is now held in the Tess Kloot Collection at the State Library of Victoria, Australia) or in that of one of his New Zealand contacts, perhaps W. R. B. Oliver (Museum of New Zealand, Wellington).

McCormick (1884: 180) also mentioned the ‘ringed plover’ on the Auckland Islands, again without specifying whether or not it was collected. ‘*Sunday, 29th.*—Accompanied Abernethy, our worthy gunner, on shore for a ramble, when we fell in with two large hogs in the thickest bushes, and I saw a falcon, ringed plover, two larks, some other small birds, and a number of gulls on the point. ... We landed on the island at the point beyond Deas Head, and returned on board at 4.30 p.m.’ There is no mention of the penguin.

It is obvious that McCormick was referring generally to a ‘ringed’ plover, rather than to a specific species, and given that on the same day he also mentioned finding ‘two larks’ (presumably Australasian pipits *Anthus novaeseelandiae aucklandicus*, the types of which were collected by the expedition: Gray 1862; Warren & Harrison 1971) we need to treat his testimony cautiously. As noted by Miskelly & Taylor (2020) and Miskelly *et al.* (2020), this bird might have been a banded dotterel (*Charadrius bicinctus*), which clearly more closely resembles a ‘ringed’ plover than does *Thinornis*, but *C. bicinctus* was certainly not collected by the expedition in the Auckland group (Gray 1845: 12)—indeed was still unknown from these islands when Gray (1862: 234) compiled his list of New Zealand birds—and, because neither McCormick (1884) nor his diary states whether the bird concerned was collected, there can be no definite reason to exclude the possibility that it was the type of *T. rossii*.

It is also worth noting that while McCormick apparently had principal responsibility for collecting birds during the Ross expedition, Thomas Abernethy and Lieutenants Henry Oakeley and Alexander Smith are also known to have taken specimens (Ross 1847; Salvin 1896; Miskelly & Taylor 2020). McCormick’s (1884) memoirs often differentiate between birds he merely saw and those he shot, but on 29 November 1840 we know that he was joined by Abernethy, and there is no evidence that McCormick was punctilious about recording the activities of others. Consequently,

even if McCormick really did not collect the type of *T. rossii* on the Auckland Islands, this does not preclude the possibility that another member of the expedition's company did so.

The general history of the expedition preceding the mammal and bird parts was prepared by Joseph Hooker (1844), who recorded that the *Erebus* and *Terror* spent three months in the Bay of Islands, in the far north-west of New Zealand's North Island, in August–November 1841. Presumably, this was the basis of Mathews & Iredale's (1913: 254) contention that the specimen was collected 'at Auckland in the North Island'. Confusion with Auckland Province can be excluded as this was founded only in 1853 (McClintock 1966). However, in McCormick's (1884) narrative there is no suggestion that the expedition encountered any plovers during their late winter/spring sojourn, although he mentioned a number of other bird species. Miskelly & Taylor (2020) remarked that 'stated provenance [i.e. the Auckland Islands] of this bird may be correct'. We go a little further: in the absence of firm evidence to the contrary, and in particular a source for the quotation in Mathews & Iredale (1913), we consider that the given type locality should stand. It is clear from Gray (1845) that a reasonable number of specimens, belonging to multiple species, were collected in the Bay of Islands during the expedition's stay there, but Auckland itself (which was founded in September 1840, i.e. only 2–3 months before the type of *rossii* was collected) is never mentioned. This greatly reduces the likelihood that the settlement and the archipelago of the same name were somehow confused. Moreover, if McCormick disagreed with the official report of the expedition (Gray 1845), which states that the specimen was secured on the Auckland Islands, he might have been expected to say so in his memoirs (McCormick 1884), and he did not.

DISCUSSION

It has been variously suggested that *T. rossii* represents the female (Potts 1873), immature (Buller 1873, 1888; Mathews & Iredale 1913) or non-breeding plumage of *T. novaeseelandiae* (Fleming 1939). However, from the first detailed study of plumage maturation and sexual differences in the latter species, prepared by Fleming (1939), and subsequent literature (e.g. Marchant & Higgins 1993; Dowding 2016), it is apparent that *T. rossii* is extremely unlikely to be an immature or juvenile based on its head and bill patterns, while it is now established that there is no seasonal plumage variation in *T. novaeseelandiae* (Marchant & Higgins 1993; Dowding 2016). Juveniles of *T. novaeseelandiae* are paler than adults on the crown, not darker (Marchant & Higgins 1993). The bill pattern of

T. rossii does, however, appear closer to female *T. novaeseelandiae*, showing a dark tip that extends approximately half the length of the bill, while the colour of the face is also much closer to the female plumage of the latter species; males are black. At least one photograph of a bird (Dowding 2016) considered to be immature shows a fairly solid blackish-brown face and throat, but only the very base of the bill is coloured.

The Auckland Islands are listed as an Endemic Bird Area by BirdLife International (Stattersfield *et al.* 1998). In terms of avifauna, the following are currently recognised as species endemic to the archipelago under at least one of the four major world checklists (del Hoyo & Collar 2014; Christidis *et al.* 2018; Clements *et al.* 2019; Gill *et al.* 2020): Auckland Island teal (*Anas aucklandica*), Auckland Island rail (*Lewinia muelleri*), Auckland Island shag (*Leucocarbo colensoi*) and Auckland Island snipe (*Coenocorypha aucklandica*). Another, the Auckland Island merganser (*Mergus australis*), is now extinct (since c. 1902), probably owing to introduced predators and, almost certainly, scientific collecting (Stattersfield *et al.* 1998; Tennyson & Martinson 2006; Miskelly *et al.* 2020). In addition, the Auckland Island tomtit (*Petroica macrocephala marrineri*) and Auckland Island banded dotterel (*Charadrius bicinctus exilis*) are also endemic (Miskelly *et al.* 2020). Given this level of endemism, it appears entirely plausible that another taxon, namely *Thinornis novaeseelandiae rossii*, might also have been confined to the islands but became extinct during the historical period.

The lack of any subfossil evidence of the species from the Auckland Islands might argue against this hypothesis. However, among the 3,500 avian bones collected on Enderby Island, just one of the relatively common Auckland Island banded dotterel was found, presumably indicating the low likelihood of such bones being found in sand dune deposits (Tennyson 2020).

We support the suggestion of Carlton *et al.* (1999) that genetic testing would be a worthwhile exercise to attempt to clarify the status of *T. rossii*, and indeed this may now be the only recourse available to establish whether the unique specimen is a melanistic *T. novaeseelandiae* or deserves taxonomic recognition (but to test this and the possibility that the legs were added later the tissue sampling needs to come from both the toepads and elsewhere in the specimen). The lack of shore plover specimens from either the North Island or South Island is another complicating factor. Genetic analyses have recently shed seemingly decisive light on a number of cases involving single anomalous specimens, e.g. hooded seedeater (*Sporophila melanops*) (Areta *et al.* 2016), Liberian greenbul (*Phyllastrephus leucolepis*) (Collinson *et*

al. 2018) and Bogota sunangel (*Heliangelus zusii*) (Pérez-Emán *et al.* 2018). Consequently, while we provisionally recommend that *T. rossii* hold the rank of subspecies of *T. novaeseelandiae* and are confident that the Auckland Islands are its type locality, resolution of its taxonomic status using molecular techniques should be pursued.

ACKNOWLEDGEMENTS

We are grateful to Mark Adams, Hein van Grouw and Alison Harding for access to specimens, including the type of *Thinornis rossii*, and library materials at NHMUK (Tring), and to Paul Sweet for similar courtesies at AMNH (New York). Hein van Grouw kindly shared his thoughts on the unique specimen of *T. rossii* and photographed it on our behalf, and Colin Miskelly very helpfully and speedily provided the quote from McCormick's unpublished diary. Murray Bruce freely shared his knowledge of Tom Iredale. Alan Tennyson and John Dowding contributed much constructive criticism on the submitted draft.

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Appendix: Specimens examined.

Thinornis novaeseelandiae: AMNH 212104, 212105, 212107, 212108, 216517, 216518, 216521, 216522, 220880, 737848, 737849, 737852, 737853, 737854, 737855, 737856, 737860, 737861, 737865, 737867, 737868, 737869, 737870, 737871; NHMUK 1892.10.31.5, 1892.10.31.6, 1892.10.31.7, 1892.10.31.8, 1896.7.1.685, 1896.7.1.686, 1939.12.9.6, 1939.12.9.7.

Thinornis rossii: NHMUK 1842.12.16.78.