Towards a resolution of nomenclatural instability in the Helmeted Friarbird Philemon buceroides complex

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Towards a resolution of nomenclatural instability in the Helmeted Friarbird *Philemon buceroides* complex

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Summary.—A trend to treat Queensland populations of Helmeted Friarbird *Philemon buceroides* (Swainson, 1838) *sensu lato* of Indonesia, Australia and Papua New Guinea as Hornbill Friarbird *P. yorki* Mathews, 1912, while consistent with >100 years of scientific name usage before 1975, and not without merit, has been poorly defended. Given the region's biogeography, rigorous assessment is needed of which of several taxa described from New Guinea and often treated as subspecies of *P. novaeguineae* (S. Müller, 1843) might be most closely related to *yorki*. This will be critical in establishing nomenclatural priority. Introduction of 'Hornbill Friarbird' evidently overlooks 'Helmeted Friarbird' having been associated almost exclusively with Queensland populations for >100 years. Clarifying relationships within and among Australian populations to each other and to those in Indonesia and Papua New Guinea will be a key starting point in eliminating legitimate, lingering dissatisfaction with the broader group's taxonomy and nomenclature.

Since 1975, Helmeted Friarbird *Philemon buceroides* (Swainson, 1838) *sensu lato* has often been considered a widespread, polytypic species comprising up to 11 subspecies across the Indo-Pacific in Indonesia, northern Australia and Papua New Guinea (Schodde 1975, Schodde *et al*. 1979, Schodde & Mason 1979, Christidis & Boles 2008, Dickinson & Christidis 2014, del Hoyo & Collar 2016, Clements *et al*. 2022, BirdLife Australia 2022; Fig. 1). It has been considered a member of what was long known as the Black-faced Friarbird *P. moluccensis s. l*. group comprising *P. buceroides s. l.* and several other *Philemon* species (Mayr 1944, Schodde & Mason 1999). The group's nomenclature is currently unsettled (e.g., Higgins *et al*. 2008, Gregory 2017, Eaton *et al*. 2021, Joseph 2021, Gill *et al*. 2023). This in turn reflects an old challenge in avian systematics: how many species are there among very closely related geographically isolated populations exhibiting low phenotypic diversity? This challenge is especially pertinent to birds such as the friarbirds discussed here and found in Indonesia's island archipelagos, Australia and New Guinea (for other examples see Parker 1982, Andersen *et al*. 2015, Rheindt *et al*. 2020, Johnstone *et al*. 2022, Ó Marcaigh *et al*. 2022, Wu *et al*. 2022).

Here I review key points in the nomenclatural history of *P. buceroides s. l*. My first aim is to understand the origins of the current nomenclatural flux. I then focus on the Australian populations because their position at the geographical centre of the group's distribution is a useful pivot from which to achieve a second aim of deriving key questions requiring research. Answers to these questions should help bring stability though improved understanding of relationships among the entire group.

Nomenclatural background

The type locality of *Philedon buceroides* Swainson, 1838, the earliest species-group name applicable to any populations considered part of this complex, was given by Swainson (1838) as New Holland, i.e., Australia. For nearly a century thereafter, Australian populations were

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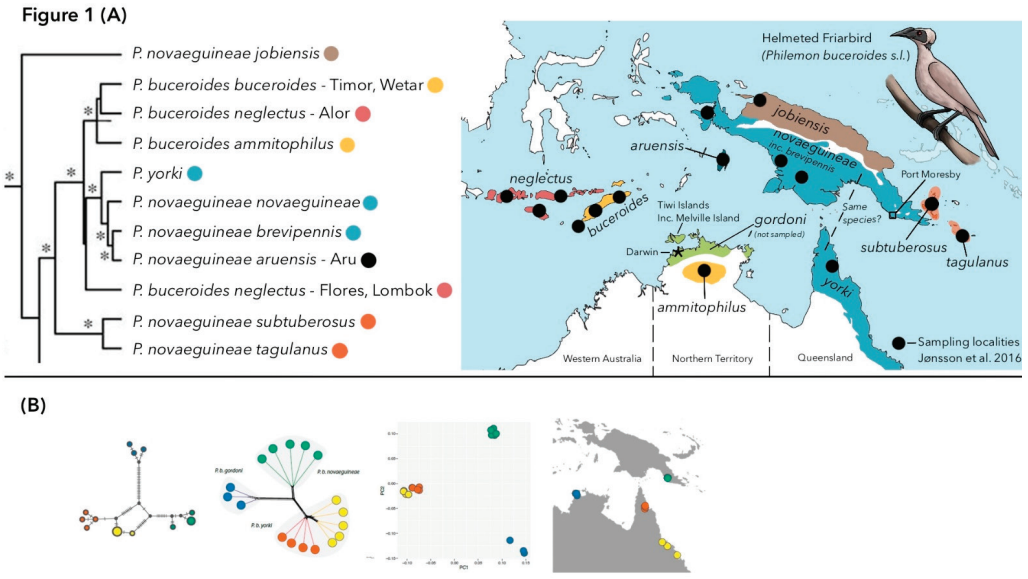

Figure 1. Distribution of the Helmeted Friarbird *Philemon buceroides sensu lato* complex and patterns in molecular data modified from (A) Jønsson *et al*. (2016; mtDNA) and (B) Peñalba *et al*. (2019; nuclear DNA). Colours in the map at the right in (A) summarise and match the initial phylogeographic structuring of the tree at the left (but note paraphyly among *P. b. neglectus* at left). Jønsson *et al*. (2016) adopted a three-species hypothesis in labelling their tree; epithets shown on the map in (A) follow Dickinson & Christidis (2014) where *brevipennis* was synonymised with *novaeguineae* as indicated. The dotted line highlights the need to clarify relationships among *yorki* and New Guinea taxa. Jønsson *et al*. (2016) listed a specimen held in the Naturalis Biodiversity Centre, Leiden, RMNH.AVES.75014, as *gordoni*; examination of the specimen and its locality data (https://www.naturalis.nl/) show it to be *ammitophilus* as here depicted in (A), *gordoni* being shown as not sampled in (A). The star shows the location of Darwin and the square in south-east New Guinea shows the approximate location of playback observations referred to in the text and Joseph (2021). Modified from Joseph (2021); prepared by Julian Teh.

known only from Queensland on the continent's east coast (Fig. 1). After the spelling of *Philedon* was emended to *Philemon*, these Queensland populations were therefore known as *Philemon buceroides* (e.g., Gould 1865, Mathews 1912a,b, 1913). Swainson's type locality was long ago shown to be in error (Hellmayr 1916). Jansen (2018) fixed it to Kupang Bay, Kupang, East Nusa Tenggara in present-day West Timor, Indonesia.

Linkage of the epithet *buceroides* to Lesser Sunda populations was thus cemented. Hellmayr (1916) also firmly aligned the epithet *yorki* Mathews, 1912, with Queensland populations. Mathews (1912b) named the coastal Northern Territory populations in central-north Australia (Fig. 1) then still known only from the Tiwi Islands (Fig. 1) as *P. buceroides gordoni* and Salomonsen (1967) followed this 55 years later. Hellmayr (1916) and Mathews (1927) implicitly assumed *gordoni* to be closely related to Queensland populations as indicated by their use of *P. yorki gordoni* (hereafter epithets alone will be used when feasible or necessary).

Therefore, for much of the 20th century after 1916, *P. buceroides* comprised several subspecies in the Lesser Sundas of Indonesia and the coastal Northern Territory population. After Hellmayr (1916; see above) and until 1975, Queensland populations were mostly known as *P. yorki*. Schodde (1975) and later reviews, albeit with reservations (Schodde & Mason 1999, Schodde *et al*. 1979), included *P. yorki* of Queensland and New Guinea Friarbird *P. novaeguineae* (Müller, 1843) and the latter's various nominal subspecies in what became the broadly if not unanimously accepted view of *Philemon buceroides s. l.* as a

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polytypic species widespread across Indonesia, northern Australia and Papua New Guinea (e.g., White & Bruce 1986, Coates & Bishop 1997, Higgins *et al*. 2008, Beehler & Pratt 2016, *cf*. Sibley & Monroe 1990; Fig. 1).

Given these foundations, current nomenclature of the three Australian subspecies can be further probed, and can be used to suggest a research pathway to improve understanding of the entire group.

A focus on Australian populations

Queensland populations.—Since Schodde (1975), *P. buceroides yorki* has prevailed for Queensland populations (Higgins *et al*. 2001, 2008, Christidis & Boles 2008, Pizzey & Knight 2012, Menkhorst *et al*. 2017, 2019, BirdLife Australia 2022). Recent literature has seen reversion to *P. yorki* at species rank (e.g., Gill & Wright 2006, Jønsson *et al*. 2016, Marki *et al*. 2017, Davies *et al*. 2022) sometimes with openly stated reservations (e.g., Gill *et al*. 2023) but I know of no explicitly argued defence.

Alternatively, some authors have treated Queensland populations as conspecific with, or at least more closely related to, New Guinean Friarbird *P. novaeguineae* by listing them as *P. novaeguineae yorki* or *P. novaeguineae* (e.g., Mayr 1944, Keast 1961, Salomonsen 1967, Slater 1974, Sibley & Monroe 1990, MacDonald 1992, Gregory 2017). Note that the epithet *novaeguineae* (S. Müller, 1843) has priority over *yorki* Mathews, 1912 (see Salomonsen 1967, Dickinson & Christidis 2014).

A key issue here is conspecificity of bird populations in New Guinea and north-east Queensland where *yorki* occurs. This is a common pattern in Australo-Papuan biogeography (e.g., Schodde & Mason 1999, Beehler & Pratt 2016, Joseph *et al*. 2019). New Guinea populations of these friarbirds, however, may well comprise more than one species (Jønsson *et al*. 2016, Gregory 2017, Marki *et al*. 2017), which issue too requires more analysis and discussion. The question arises as to which New Guinea populations might be conspecific with, or at least most closely related to, Queensland populations (e.g., *cf*. *Ptiloris* riflebirds; see Beehler & Pratt 2016). Jønsson *et al*.'s (2016) mitochondrial DNA data (Fig. 1; essentially reanalysed in Marki *et al*. 2017) suggest southern New Guinea populations are most closely related to *yorki*; so, too, do my anecdotal observations of responses of southern New Guinea birds to playback of *yorki* reported in Joseph (2021; see Fig. 1). If *yorki* was judged to be conspecific with those populations, Queensland birds would be known as *P. novaeguineae yorki*.

The point here is *not* to deny merit in separating *yorki* from *P. buceroides*; it is that the relationships of *yorki* to all other populations within *P. buceroides s. l*. but especially to New Guinea populations and how many species they too comprise must be rigorously assessed. This will determine to which species the Queensland populations belong and thus their appropriate taxonomic name and rank. Analyses of data in Jønsson *et al*. (2016), Marki *et al*. (2017) and Peñalba *et al*. (2019) comprise an excellent foundation here (see Fig. 1) but are limited in their sampling of subspecies, populations and nucleotides.

Northern Territory populations.—These have had a turbulent taxonomic and nomenclatural history. There are coastal and inland populations (Fig. 1). I treat these separately but note the possibility of geographic and genetic connections between the two populations via riparian habitats (see also Schodde *et al*. 1979).

Excitement met the possibility in 1962 that what was then known as Melville Island Friarbird *Philemon gordoni* (e.g., Officer 1964) thought to occur only in the Tiwi Islands might also occur on the mainland in Darwin (Fig. 1). Officer (1968) eventually confirmed that *P. gordoni* had been recorded at two localities in Darwin. (Ornithological field work around Darwin in 1962 would have been much harder than now.)

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Officer (1968, 1975) evidently overlooked Deignan's (1964) account of the 1948 expedition from the United States National Museum. Deignan had collected specimens in suburban Darwin and at Yirrkala *c*.600 km east of Darwin. Deignan reported these specimens as *Philemon moluccensis gordoni*. His use of *gordoni* indicated that he knew they were what had *until then* been known as Melville Island Friarbird *Philemon gordoni* (or *Philemon yorki gordoni*—see above). His use of *moluccensis* indicated that he treated *gordoni* as a subspecies of what was then considered another Indonesian species the Black-faced Friarbird *P. moluccensis*.

Concerning inland populations, Deignan had collected another friarbird of this group from sandstone escarpments of Arnhem Land near today's Kakadu National Park well inland from the more coastal habitat of *gordoni* (Fig. 1). This too he classified as Melville Island Friarbird *P. moluccensis gordoni*. In 1968, the British Museum's Harold Hall Expeditions collected more friarbirds from Arnhem Land's sandstone escarpments (Colston 1974). Parker (1971) concluded that the sandstone populations were not Melville Island Friarbirds but that they were *P. buceroides buceroides*, i.e., the same form of *P. buceroides* as on Timor and Savu. Indeed, he explicitly stated that two species were present in Northern Territory, coastal *P. gordoni* and *P. b. buceroides* of sandstone escarpments. Eventually, Schodde *et al*. (1979) named Arnhem Land populations *P. buceroides ammitophila*, so completing discovery and naming Australia's three component taxa in the complex. These taxa and *P. b. neglectus* form a trichotomy in Jønsson *et al*.'s (2016) findings (Fig. 1) so Parker's (1971) surprising hypothesis may be worth revisiting.

A nomenclatural note concerning the gender of the species-group epithet *ammitophila* is warranted. Although *ammitophila* was intended as a noun in apposition when published (R. Schodde pers. comm. 28 January 2023), its current use in masculine form *ammitophilus* evidently traces to Dickinson (2003) who changed it reasonably but without explicit comment. Reasons were later elaborated by David & Gosselin (2011) who, in turn, cited Liddell & Scott (1996): once Latinised, a compound species-group name derived from Greek and ending in *-phila*, such as *ammitophila*, is to be treated only as an adjective (ICZN 1999: Art. 31.2, 34.2) and does not fall under Art. 31.2.2.

Linkage of P. yorki to 'Hornbill' Friarbird.—Until the taxonomic revision of Schodde (1975), the English name "Helmeted Friarbird" had been applied mostly without qualifiers and in effect exclusively to Queensland populations of these friarbirds (e.g., Gould 1865, Mathews 1912a, 1913, 1925, 1927, the index to the first 50 years of *The Emu* [1901–50], Officer 1964, 1975).

Hornbill Friarbird was introduced by Gill & Wright (2006) as an English name for Queensland populations, which they also recognised as *Philemon yorki*, but they proffered no basis for either decision. Hornbill Friarbird has since entered popular usage (e.g., del Hoyo & Collar 2016, Gregory 2017, BirdLife Australia 2022, Clements *et al*. 2022, Davies *et al*. 2022). Reflecting the discussion above, Gill *et al*. (2023) noted that the species status of 'Hornbill Friarbird *P. yorki*' is dubious and they wisely called for more study. Officer (1975) gave the English name Sandstone Friarbird to what has been known mostly as *P. buceroides ammitophilus*.

Molecular data and relationships: a way ahead?

Jønsson *et al*. (2016; reanalysed in Marki *et al*. 2017) derived mitochondrial DNA data from *Philemon* friarbirds generally. Their primary purpose was not a thorough assessment of relationships within *P. buceroides s. l*., so their data were understandably limited in sampling of individuals and populations. Nonetheless, their mtDNA data imply a close relationship between southern New Guinea and Queensland populations and, as noted,

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raise the possibility of several species in New Guinea (Fig. 1). (Note, however, Joseph's 2021 corrected identification as *ammitophilus* of the Northern Territory sample cited by Jønsson *et al*. 2016 as *gordoni*; Fig. 1.) Eaton *et al*. (2021) have already used Jønsson *et al*.'s (2016) results to advocate recognition of Indonesian populations west of New Guinea as Tenggara Friarbird *P. buceroides*. In contrast, nuclear DNA data (Peñalba *et al*. 2019; Fig. 1), similarly derived for other purposes, might be seen as more suggestive of separate species rank for *yorki*, but I note the similarly limited sampling of New Guinea populations on which those data are based.

Lastly here, and pending improved understanding of character evolution in *Philemon* friarbirds generally, Schodde & Mason (1999) noted the possibility of *yorki* aligning with the Silver-crowned Friarbird *P. argenticeps* also of northern Australia (see Mayr 1944).

Conclusion

Clarification is needed of relationships among populations and subspecies of the entire *P. buceroides s. l*. group from Indonesia to Papua New Guinea (Eaton *et al*. 2021, Joseph 2021) and of course to other friarbirds such as *P. moluccensis s. l*. and *P. argenticeps*. Key questions are (1) whether the three Australian taxa should be recognised as one, two or three species, (2) to which other populations they are each most closely related in Indonesia, Papua New Guinea and within Australia, and (3) how many species are present in Indonesia, Australia and Papua New Guinea? These tasks require a robust phylogenetic framework with which to better understand character evolution and defend any separations of taxa at species rank in a taxonomic revision.

These questions are challenging and will require field, museum and laboratory work spanning states, territories, provinces and regencies in Australia, Indonesia and Papua New Guinea. Analysis of DNA and vocalisations as well as traditional and novel methods for scoring and analysing plumage and morphometric traits are needed. Notwithstanding the foundation provided by Jønsson *et al*. (2016) and Peñalba *et al*. (2019), thorough sampling across the entire geographical range of populations (e.g., improved sampling of *gordoni*, *yorki* and *jobiensis*), individuals and, for DNA work, nucleotides will be needed. This will surely entail study of DNA extracted from toe pads of older museum specimens. Only then would we achieve an understanding of patterns of relationships and present and past gene flow as sea levels have changed (see Peñalba *et al*. 2019) and move towards a stable taxonomy and nomenclature for these friarbirds.

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