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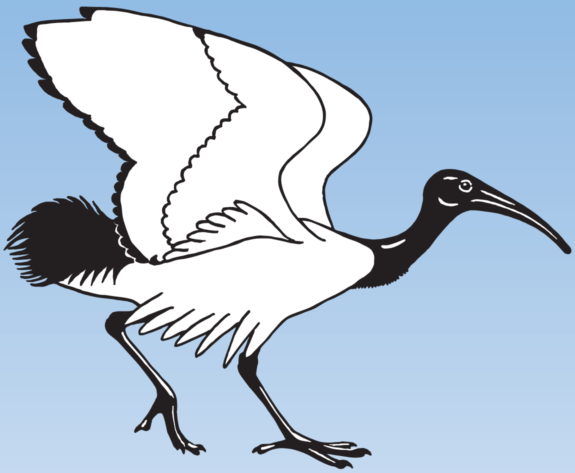
Bulletin of the British Ornithologists' Club



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CLUB ANNOUNCEMENTS

The next meeting of the Club will be on Monday 23 March 2026, when George Candelin, Keeper of the Swifts at Oxford University Museum of Natural History (OUMNH) will speak about *30 Years in the Tower*. It will be held in the upstairs room at the Barley Mow, 104 Horseferry Road, London SW1P 2EE. Doors open at: 6.00 pm for a 6:30 pm start.

Abstract.—The Oxford University Museum of Natural History building is famous for both the collections and the Huxley–Wilberforce evolution debate of 1860. The Museum Tower also hosts a long-established colony of Common Swifts *Apus apus*, birds known for spending nearly their entire lives in flight—feeding, sleeping and even mating on the wing. The swifts' hidden nestboxes at the top of the tower can be viewed via webcams streaming from May to September. Research on this colony began in 1947 by Elizabeth & David Lack, making it one of the world's longest continuous studies of a single bird species. Their findings were published in *Swifts in a tower* (1956), later reissued in 2018. Despite this legacy, the UK swift population has declined by 42% since 1994, probably due to loss of nesting sites and food. The RSPB's Oxford Swift City project, launched in 2017, works to raise awareness and support swift conservation in Oxford. George Candelin, Keeper of the Swifts, will reveal the fascinating history of the project and some of the discoveries about these extraordinary birds in the last 78 years.

Biography.—George Candelin trained as an aeronautical engineer but then became an air traffic controller in the Royal Air Force. Thereafter, he worked as a sales engineer but trained as a ringer under Dr Andy Gosler. George has been involved in two of Dr David Lack's projects, one involving breeding Great Tits *Parus major* in Wytham Wood and the other being the swifts in the OUM tower. Four seasons were spent in France ringing migrating Aquatic Warblers *Acrocephalus paludicola* and he has also worked on Little Terns *Sternula albifrons* and European Turtle Doves *Streptopelia turtur*. He is a Fellow of the BTO and President of the Oxford Ornithological Society.

BOOK REVIEW

Slater, C. A., Mundy, P. J. & Williams, R. B. 2025. *John Henry Gurney: a passion for birds*. John Beaufoy Publishing in association with the British Ornithologists' Club. 478 pp. ISBN 978-1913679743. UK£39.99.

John Henry Gurney was the prime mover in the development of Norwich Museum and its bird collections in the 19th century. He was a global authority on birds of prey, and the southern African avifauna. This biography looks at his life, which was dogged by misfortune, as well as his ornithological legacy. The book starts with a dedication to Peter Mundy, one of its co-authors, who sadly died before the book was published.

The contents list is followed by acknowledgements, abbreviations and a glossary—the latter useful to those unfamiliar with nomenclatural terms (but note there is no entry for paratype). The preface explains some of the background as to how the three authors came to write the book and includes a thoughtful note on how they have distinguished John Henry Gurney Sr. and his son, John Henry Gurney Jr., in the text. A short introduction outlines the scope of the book and poses many questions which are answered (with few exceptions) in the following chapters.

For those not familiar with the county of Norfolk, in eastern England, there is a map showing places associated with the Gurney family, as well as a helpful family tree. The latter is not as reticulated as some Norfolk family trees, but marriage of cousins was not unusual in the Quaker community at that time.

Ten chapters cover Gurney's background and personal life, including family difficulties, and his relationship with bird illustrators, collectors and museum-based taxonomists. There are also detailed notes about species described by Gurney or named for him.

The four appendices include a timeline listing significant events in Gurney's life; the difficult period following his wife's elopement; an annotated list of contributors to Gurney's collection of raptors; and a bibliography of Gurney's publications. These are followed by source references and other information pertaining to the numbered notes throughout each chapter; a list of cited references; and an index.

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The account of Gurney's marriage and divorce will ring familiar for those who delight in celebrity misfortune. Never mind social media—ink and paper were all that were needed to embarrass, educate and entertain in the name of journalism, and misinformation and 'alternative facts' were just as in vogue then as they are today.

Fortunately, the authors have been mindful of their responsibilities and have produced a thoroughly researched volume, quoting original sources (mostly personal correspondence). Although primarily about John Henry Sr., setting the context for his life's work necessarily involves reference to many other 19th-century ornithologists, collectors, dealers and taxidermists.

On p. 111 the authors note that Wolf's Barbary Falcon *Falco pelegrinoides* plate is figured in Gurney's portrait (but note that the portrait is reversed on the dustjacket, which I feel should have been acknowledged). The original portrait shows the pocket watch in his right-hand waistcoat pocket, suggesting that Gurney was left-handed. (I have no idea whether this is likely to be significant.)

The phrase 'further references and information are also available' regularly appears in the text and serves as a reminder that the book is necessarily selective, but readers wanting more detail can approach the authors for details, or they may perhaps offer more information. As an example, in relation to Laughing Owl *Sceloglaux albifacies*, on p. 146, it states that 'the fate of Boileau's other specimen is unknown'. I was surprised and can only suggest that I had assumed, incorrectly, that the authors knew all about it. Blaming covid is a bit clichéd, but Worthy (1997) does not mention its existence either, although he was aware that Gurney Jr. had written about it in the *Transactions of the Norfolk and Norwich Naturalists Society*. Perhaps there was confusion over which bird was presented to the museum by Gurney Sr. in 1854. The live bird that Boileau had in captivity was mounted, cased after its demise and presented to Norwich Museum by the Revd. B. V. Wardle. Quite why the owl (and other specimens) ended up in the rector's care, I do not know. Suffice to say that this specimen was donated to the museum in 1958, four years after the great raptor sale of 1954, so it is still in Norwich (reg. no. 1958.181).

In the list of references authored by Gurney, I found it significant that so many were not about birds, but concerned mammals, fish and marine invertebrates. One thinks of Gurney being completed focused on birds, but his natural history interests were evidently much wider.

Despite my best efforts, I could find very few errors in the text. I really liked this book. It contains a mass of well-organised information, with something to interest everyone. While it is a great read, worth borrowing from a library, I suspect that many of us will want our own copy so we can delve into it time and time again.

Tony Irwin

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BOC Occasional Publications are available from the BOC Office or online at info@boc-online.org. Future BOC-published checklists will be available from NHBS and as advised on the BOC website. As its online repository, the BOC uses the British Library Online Archive (in accordance with IZCN 1999, Art. 8.5.3.1).

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The status of Sabine's Gull *Xena sabini* in the southern Benguela Upwelling System, South Africa

by Les G. Underhill

Received 3 April 2024; revised 4 November 2025; published 5 March 2026

http://zoobank.org/urn:lsid:zoobank.org:pub:6788C244-2940-45B8-92C6-55903CDA93FD

Summary.—Sabine's Gull *Xema sabini* was first recorded off South Africa in 1957. The numbers of this species migrating to the southern Benguela Upwelling System subsequently increased steadily so that, by the 1980s, flocks numbering in the thousands were observed regularly in Table Bay, South Africa. This population has since declined, however, to the extent that the species was observed only singly or in small flocks in the early 2020s.

Sabine's Gull *Xema sabini* breeds at scattered localities in the Arctic, in Siberia from the Taimyr Peninsula east to Alaska, northern Canada and northern Greenland; there are a few breeding records in Iceland, Scandinavia and Russia west of the Taimyr Peninsula (Day *et al*. 2020). Post-breeding, the species undertakes a trans-equatorial migration to two of the largest boundary upwelling systems on the planet; the Humboldt Current in the eastern Pacific off Peru, and the Benguela Upwelling System in the south-east Atlantic, off Namibia and South Africa (Davis *et al*. 2016, Day *et al*. 2020).

Stenhouse *et al*. (2012) retrieved 11 geolocators from Sabine's Gulls breeding in north-east Greenland, at 20.45°W; all had migrated to the Benguela Upwelling System. From a study site at 96.03°W in the Canadian high Arctic, Davis *et al*. (2016) described movements for 26 breeders; two (7%) migrated east and south to the Benguela Upwelling System, one each to Namibia and South Africa, whereas 24 (93%) moved west then south to the Humboldt Current.

The first record of Sabine's Gull in southern Africa was on 29 December 1957, when one was seen in Cape Town harbour within a large mixed flock of terns and Hartlaub's Gulls *Larus hartlaubii* feeding on shoals of small fish (Morgan & Wheeler 1958).

Two months later, on 26 February 1958, the skipper of a fishing trawler observed a bird he did not know 10 km off Slang Bay (34.2°S, 24.6°E), Eastern Cape. It was shot, presented as a museum specimen (East London Museum, ELM 17311) and identified as a Sabine's Gull in 'very worn condition' (Liversidge 1958). Stresemann & Stresemann (1966) reported what appear to be the third to fifth records of Sabine's Gull in South African waters. Specimens ELM 6210 and ELM 6215 were adults collected on 6 February 1959 off Port Alfred (33.6°S, 26.9°E), and specimen ELM 8754 was a juvenile collected off Bird Island (33.8°S, 26.3°E), Algoa Bay, on 7 December 1960 (confirmed by P. A. Whittington). The sixth record was made three years later, on 26 March 1961, when four were seen (one, then two more 30 minutes later, and another individual 15 minutes after that) off Cape Peninsula within three hours of docking in Cape Town harbour, i.e. *c*.50 km from port (Edwards 1961). Note that the latter record was not off Cape Agulhas as reported by Zoutendyk (1965b) and was the sixth off South Africa (the third to fifth records were still unpublished at this time).

Peter Zoutendyk was an oceanographer (Field & Griffiths 2017) who between 1958 and at least 1968 spent much time at sea off South Africa and Namibia doing routine field work and, between sampling stations, he undertook seabird surveys; in the pre-computer era, he devised a punch card system for storing and analysing his extensive records (Zoutendyk

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1965a). His record-keeping was meticulous, and the survey method was consistent across seasons, so that the abundance and seasonal occurrence of Sabine's Gull, documented for the period 1961–67 in Zoutendyk (1965b, 1968) can be considered reliable. Over this period, he demonstrated that abundance increased steadily, from four birds observed erratically in 1961 to regular midsummer flocks. with a max. estimated size of 300 in 1966/67. Peak abundance was in February.

This pattern of increase was sustained subsequently; thus, Hockey *et al*. (1989) summarised the species' status in the summer months in the 1980s as: 'up to 4,000 gather in Table Bay'. This has been repeated in subsequent regional field guides; e.g., Sinclair *et al*. (2020) considered it a common summer migrant to coastal waters, occurring in flocks, and estimated the regional population at 5,000–10,000 birds.

Phil Whittingon, a Ph.D. student at the time, and subsequently an ornithologist at the East London Museum, Eastern Cape, was resident on Dassen Island from 16 January–4 March 1996. His diary noted that the species was present in the thousands around the island throughout that period, with a max. of *c*.4,400 on 14 February (P. A. Whittington *in litt*. 2025). Observations of Sabine's Gulls like this around Dassen Island are no longer made (B. M. Dyer *in litt*. 2025). This appears to be the only quantitative information from the 1990s.

Bruce Dyer was involved with seabird surveys on all the South African offshore islands during a career spanning 1978–2021. The total time he spent at sea per year was fairly uniform up to 2014, but then decreased. Besides official seabird monitoring (e.g. Crawford *et al*. 2007), he recalls observing large flocks of Sabine's Gulls in the 1990s and early 2000s; splitting his detailed field notes into two nine-year periods, he recorded the species on 15 occasions in 1997–2005, with max. flock sizes of *c*.500 and *c*.300, and on nine occasions during 2006–14, with two flocks of *c*.50 (B. M. Dyer *in litt*. 2025).

From 2001 to 2025, the Earthwatch 'South African Penguins' *Spheniscus demersus* project conducted field work on Robben Island annually from March until September (and therefore did not cover the full period during which Sabine's Gulls had been recorded). Project records showed that between 6 and 16 March 2001, thousands of Sabine's Gulls were present continuously around the island, and large numbers were observed the same month on the 11-km ferry trips between Cape Town harbour and Robben Island. They were recorded regularly until mid-April that year. In 2002, 50 were seen on 14 March, and a further individual a week later. In 2003, one was recorded in early March. Thereafter, there were two more records; singles in March 2005 and March 2007, but there were no subsequent records until March 2024, when one was seen (P. J. Barham *in litt*. 2024).

The Second Southern African Bird Atlas Project (SABAP2) started in July 2007 and in 2024 was ongoing (Underhill 2016, Brooks *et al*. 2022, Lee *et al*. 2022). The project is based on checklists collected on a five-minute grid of latitude and longitude, with the grid cells known as pentads. Robben Island is in pentad 3345_1820; using the data collection app BirdLasser (Lee & Nel 2020), observers know exactly when they are entering the pentad, and all of them arrive on the ferry from Cape Town harbour to Robben Island Museum. As a result, most atlas checklists for this pentad include an 'at sea' component. A total of 258 full-protocol SABAP2 checklists were made between 2007 and 2024, each based on at least two hours of field work; they provide a fairly even coverage by month and over the years. Four of these checklists reported Sabine's Gulls as present, one each in December 2008, September 2009, February 2012 and November 2019. Three of the four records were therefore during the first five years of the project, but the sample size is too small to consider this as evidence of decrease in abundance during the 18-year atlas period. However, the overall reporting rate of 1.6% suggests that the species was rare after 2007.

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The Virtual Museum (Underhill & Navarro 2023) started in 2012 and contains 15 photographic records of Sabine's Gull. Most of these were made offshore of Cape Peninsula; 14 records involved singletons; one photograph shows a small flock between Cape Town harbour and Robben Island on 18 February 2020.

In the summers (November–March) of 2023/24 and 2024/25, the teams monitoring breeding African Oystercatchers *Haematopus moquini* on Robben Island, including Karis Daniel, Felicity Ellmore, Jean Ramsay, Dieter Oschadleus and myself, made ferry trips between Cape Town harbour and Robben Island at *c*.6-day intervals. These teams kept as careful a watch as feasible for seabirds and marine mammals during the crossing. Alert to the decrease in the abundance of Sabine's Gulls, a special watch was maintained for them; one was observed on one trip, in March 2024.

It seems likely that the increase in abundance of Sabine's Gulls in the decades after 1957 was not an artefact of observer awareness. It seems also that numbers peaked in the 1980s; it is possible that the decrease started during the 1990s while observations from various sources since 2000 are indicative of a genuine decrease in abundance since the observed peak.

A similar pattern of increase and decline in abundance has been recorded for another long-distance migrant to South Africa, Red Knot *Calidris canutus* (Summers *et al*. 2011). This species was uncommon in South Africa until the 1950s; the rate of increase was largest in the 1970s, peaking in the 1980s, with a decline thereafter. Summers *et al*. (2011) suggested that this increase and decrease was a 'buffer effect' and that the species migrated further south during a period when the population was large. If true, it is possible that this explanation is also applicable to the observations made here; during a period in which numbers of Sabine's Gulls were larger, a proportion migrated farther south, into the southern Benguela Upwelling System.

This suggestion circumvents the issue of why populations of these two species should have increased and then decreased over recent decades. Both Sabine's Gull and Red Knot breed in tundra zones of the far north; in places they nest in close proximity (for example at Pronchishcheva Lake, Taimyr Peninsula, Siberia, in 1991; Schekkerman & van Roomen 1995). Is it possible that the ecological character of suitable tundra for these two species to breed improved for several decades and then deteriorated? This could be attributable to early impacts of climate change on the tundra, commencing in the 1960s, with early impacts being positive on breeding habitat, and subsequent impacts being negative.

Acknowledgements

Peter J. Barham, Bruce M. Dyer and Philip A. Whittington provided information. Lincoln Fishpool and Iain Stenhouse made valuable comments as referees. Robert Prŷs-Jones commented on an earlier draft.

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The composite identity of *Psittacus galgulus* Linnaeus, 1758: did the ancient Romans know about hanging parrots? (Psittaculidae: *Loriculus*)

by Matthew R. Halley

Received 12 March 2025; revised 10 October 2025; published 5 March 2026

http://zoobank.org/urn:lsid:zoobank.org:pub:C8CBD4D3-6329-4917-BE8D-0765D8ED4FD3

Summary.—The original description of Blue-crowned Hanging Parrot *Psittacus galgulus* Linnaeus, 1758—type species of the genus *Loriculus* Blyth, 1849—linked the taxon to a bird called 'Galgulos' by Pliny the Elder (*c.*77 CE), which was said to roost in an inverted position. I demonstrate that Pliny's 'Galgulos' was likely the Eurasian Golden Oriole *Oriolus oriolus* and that Linnaeus misapplied the reference: the ancient Romans did not know about hanging parrots. Furthermore, even after setting aside the Pliny citation, *P. galgulus* was based on a composite type series comprising multiple species and genera, of which no syntypes or suitable lectotypes exist. Despite centuries of uncritical citation, the name's application remains uncertain, demanding corrective action via neotypification. This case study illustrates how classical texts (and their misinterpretation) shaped early taxonomy, and how modern historical research—no less than taxonomic revision—can reveal nomenclatural instability and justify corrective action under the Code.

The genus *Loriculus* Blyth, 1849, is a clade of diminutive parrots with a broad distribution from India to New Guinea, known for roosting in an inverted position (Collar 1997). This paper discusses the taxonomic history of the Blue-crowned Hanging Parrot *L. galgulus* (Linnaeus, 1758), the type species of *Loriculus* (Gray 1855a: 88), which is resident on the Malay Peninsula, Sumatra, Borneo, Java, and many smaller islands in the region. All modern checklists treat *L. galgulus* as monotypic (e.g., Dickinson & Remsen 2013, Gill *et al.* 2025). Two supposed subspecies—*L. g. lamprochlorus* Oberholser, 1912, and *L. g. dolichopterus* Oberholser, 1912—were described from specimens collected on islands off Sumatra's western coast, based on phenotypic differences that Junge (1938) and Ripley (1944) argued were inconsistent and non-diagnostic (Rheindt *et al.* 2020). However, although the identity of *L. galgulus* has been taken for granted for two centuries, there are lingering anomalies in Linnaeus's (1758) original description that deserve our attention. This paper reviews the material basis of the species.[1]

Linnaeus (1758: 103) adapted the name *galgulus* from the *Naturalis historia* (*c.*77 CE) of Pliny the Elder (23/24–79 CE), the ancient Roman naturalist, who had described a bird ('Galgulos') that was said to roost in an inverted position. Linnaeus (1758) noted that his *Psittacus galgulus* also 'sleeps hanging by one foot' ('Pede altero suspensus dormit') and implied that they were the same species: 'Plin. [Book] X, [Chapter] 33: Galgulos ipsos dependentes pedibus somnum capere confirmat, quia tutiores ita se sperent' (Fig. 1). English translation: 'He confirms that the [galgulos] indeed seize sleep hanging down by

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[1] For more than two centuries, Linnaeus's names have been treated with extraordinary deference, often cited without careful scrutiny of his Latin descriptions or cited works. Consequently, some composite names like *Muscicapa virens* Linnaeus, 1766 (Halley 2023) and *Psittacus galgulus* (see below) have persisted well into the 21st century, unchallenged despite their unstable foundations. A thorough review of Linnaean bird names is warranted, but beyond the scope of this case study.

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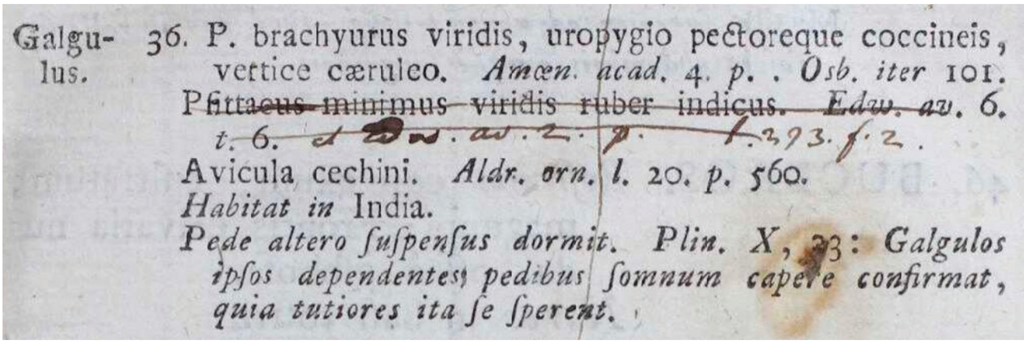


Galgu- 36. P. brachyurus viridis, uropygio pectoreque coccineis,
lus. vertice cæruleo. *Amœn. acad.* 4. *p.* . *Osb. iter* 101.
P~~sittacus minimus viridis ruber indicus. *Edw. av*~~. 6.
~~*t.* 6. ed Edw. av. 2. p.~~ t. 293. f. 2.
Avicula cechini. *Aldr. orn. l.* 20. *p.* 560.
Habitat in India.
Pede altero ſuſpenſus dormit. Plin. X, 33*: Galgulos ipſos dependentes, pedibus ſomnum capere confirmat, quia tutiores ita ſe ſperent.*

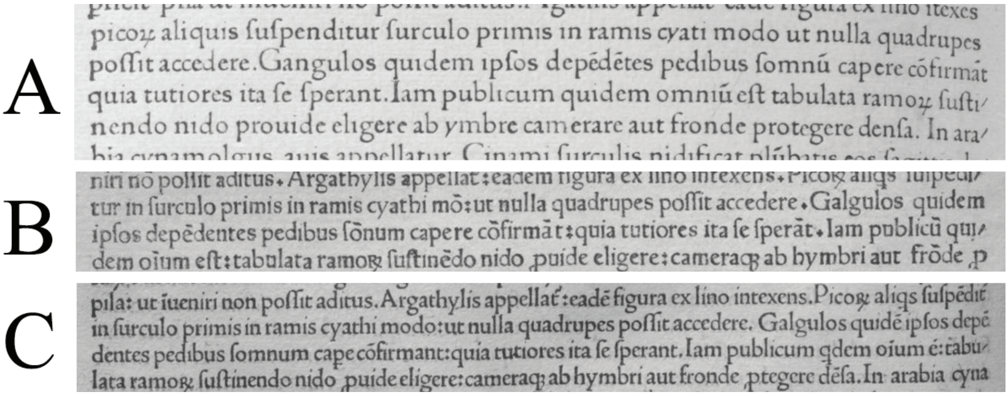
Figure 1. Original description of *Psittacus galgulus* Linnaeus, 1758, scanned from Linnaeus' personal (annotated) copy of the book. Note the missing page number in the first citation, '*Amoen. acad*. 4. p. [blank]', which refers to an older manuscript that was not published until Linnaeus (1759). Linnaeus evidently made the annotations during the preparation of the 12th edition (Linnaeus 1766, see text). Reproduced courtesy of the Linnean Society of London (BL.16/1).

their feet because they hope [trust] that they are more safe.' This quote, and his choice of the name, are indications that Linnaeus (1758) considered *P. galgulus* to be synonymous with the 'Galgulos'. Therefore, we must scrutinise the material basis of Pliny's description for the same reason as the other indications—to determine the syntype series (ICZN 1999, Art. 72.4.1).

The identity of Pliny's 'Galgulos' and parrots of ancient Rome

Naturalis historia had been in print for almost three centuries by the time Linnaeus (1758) quoted from it in the original description of *P. galgulus*. To 'ground-truth' the accuracy of the Pliny quote, and to ensure that it had been used in an appropriate context, I consulted 14 unique editions of *Naturalis historia* published between 1469 and 1856 (Fig. 2).

Only five ancient codices (palimpsests) of *Naturalis historia* are extant. These, along with the oldest surviving medieval manuscripts ('vetustiores'), contain no content from Book X (Armstrong 1983, Reynolds 1983). Therefore, the oldest available sources for the 'Galgulos' quote are printed works. In the first printed edition, published by Spira (1469) about 30 years after the invention of movable-type printing, the relevant quote appeared as follows: 'Gangulos [*sic*] quidem ipsos depédétes pedibus somnú capere cófirmát quia tutiores ita se



picoꝝ aliquis ſuſpenditur ſurculo primis in ramis cyati modo ut nulla quadrupes
poſſit accedere. Gangulos quidem ipſos depédétes pedibus ſomnú capere cófirmát
quia tutiores ita ſe ſperant. Iam publicum quidem omniũ eſt tabulata ramoꝝ ſuſti-
nendo nido prouide eligere ab ymbre camerare aut fronde protegere denſa. In ara-

tur in ſurculo primis in ramis cyathi mō: ut nulla quadrupes poſſit accedere. Galgulos quidem
ipſos depēdentes pedibus ſōnum capere cōfirmāt: quia tutiores ita ſe ſperāt. Iam publicū qui-
dem oīum eſt: tabulata ramoꝝ ſuſtinēdo nido ꝓuide eligere: cameraqꝫ ab hymbri aut frōde ꝓ

pila: ut īueniri non poſſit aditus. Argathylis appellāt: eadē figura ex lino intexens. Picoꝝ aliqs ſuſpēdit
in ſurculo primis in ramis cyathi modo: ut nulla quadrupes poſſit accedere. Galgulos quidē ipſos depē
dentes pedibus ſomnum cape cōfirmant: quia tutiores ita ſe ſperant. Iam publicum qdem oīum ē: tabu-
lata ramoꝝ ſuſtinendo nido ꝓuide eligere: cameraqꝫ ab hymbri aut fronde ꝓtegere dēſa. In arabia cyna

Figure 2. Scans of the 'Galgulos' passage (Book X, Chapter 33) in three early editions of Pliny's *Naturalis Historia*: (A) Spira 1469; (B) Beroaldo 1481; (C) Barbaro 1497.

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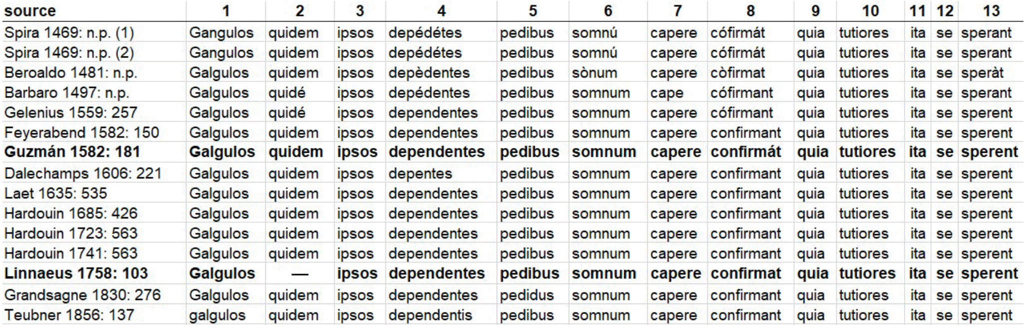

source	1	2	3	4	5	6	7	8	9	10	11	12	13
Spira 1469: n.p. (1)	Gangulos	quidem	ipsos	depédétes	pedibus	somnú	capere	cófirmát	quia	tutiores	ita	se	sperant
Spira 1469: n.p. (2)	Gangulos	quidem	ipsos	depédétes	pedibus	somnú	capere	cófirmát	quia	tutiores	ita	se	sperant
Beroaldo 1481: n.p.	Galgulos	quidem	ipsos	depèdentes	pedibus	sònum	capere	còfirmat	quia	tutiores	ita	se	speràt
Barbaro 1497: n.p.	Galgulos	quidé	ipsos	depédentes	pedibus	somnum	cape	cófirmant	quia	tutiores	ita	se	sperant
Gelenius 1559: 257	Galgulos	quidé	ipsos	dependentes	pedibus	somnum	capere	cófirmant	quia	tutiores	ita	se	sperent
Feyerabend 1582: 150	Galgulos	quidem	ipsos	dependentes	pedibus	somnum	capere	confirmant	quia	tutiores	ita	se	sperent
Guzmán 1582: 181	**Galgulos**	**quidem**	**ipsos**	**dependentes**	**pedibus**	**somnum**	**capere**	**confirmát**	**quia**	**tutiores**	**ita**	**se**	**sperent**
Dalechamps 1606: 221	Galgulos	quidem	ipsos	depentes	pedibus	somnum	capere	confirmant	quia	tutiores	ita	se	sperent
Laet 1635: 535	Galgulos	quidem	ipsos	dependentes	pedibus	somnum	capere	confirmant	quia	tutiores	ita	se	sperent
Hardouin 1685: 426	Galgulos	quidem	ipsos	dependentes	pedibus	somnum	capere	confirmant	quia	tutiores	ita	se	sperent
Hardouin 1723: 563	Galgulos	quidem	ipsos	dependentes	pedibus	somnum	capere	confirmant	quia	tutiores	ita	se	sperent
Hardouin 1741: 563	Galgulos	quidem	ipsos	dependentes	pedibus	somnum	capere	confirmant	quia	tutiores	ita	se	sperent
Linnaeus 1758: 103	**Galgulos**	**—**	**ipsos**	**dependentes**	**pedibus**	**somnum**	**capere**	**confirmat**	**quia**	**tutiores**	**ita**	**se**	**sperent**
Grandsagne 1830: 276	Galgulos	quidem	ipsos	dependentes	pedidus	somnum	capere	confirmant	quia	tutiores	ita	se	sperent
Teubner 1856: 137	galgulos	quidem	ipsos	dependentis	pedibus	somnum	capere	confirmant	quia	tutiores	ita	se	sperent

Figure 3. Typographical variants in the 12–13 words that comprise the 'Galgulos' quote (Book X, Chapter 33), as they appeared in 14 print editions of Pliny's *Naturalis historia* published across four centuries (1469–1856). The earliest editions were not paginated and contain many unique variants. Two copies of the first edition, in the Natural History Museum, London (NHM) and Princeton University, respectively, contain identical variants. Among the editions examined here, Guzmán (1582) is closest but not a perfect match to Linnaeus (1758), who alone omitted the word 'quidem'.

sperant' (Fig. 2). Spelling variants were later introduced and copied in editions by Beroaldo (1481), Barbaro (1497), Gelenius (1559), Feyerabend (1582), Guzmán (1582), Dalechamps (1606), Laet (1635) and Hardouin (1685, 1723, 1741), among others, producing a variety of mosaic versions (Fig. 3). Most variations merely reflected the gradual infiltration of vernacular pronunciations and did not change the meaning of the sentence. The variants in Linnaeus (1758) are closest to those of Guzmán (1582: 181–182), but not identical (Fig. 3). Thus, although no original (non-print) sources of Book X survive, we may justifiably interpret the quote given by Linnaeus (1758) to reflect ancient knowledge recorded by Pliny (*c.*77 CE)—but was it referring to a hanging parrot?

The 'Galgulos' sentence appeared in a paragraph describing 'the ingenuity of birds in nest-building' (Guzmán 1582: 181, 'De [avium] solertia in nidificando'). In the previous sentence, Pliny had mentioned the nests of some 'woodpeckers' ('Picorum', likely misidentified) that were said to be built in the outer branches of trees, beyond the reach of quadrupeds. Then, immediately after the 'Galgulos' sentence, he continued his discussion of nest construction and related behaviours. Thus, the sentence about the inverted roosting behavior of the 'Galgulos' seems out of context. Linnaeus (1758) apparently assumed that it was a tangential aside—another example of predator avoidance—and not directly related to the 'Picorum' of the previous sentence. However, he (and later authors, e.g., Jobling 2010, Ruickbie 2016) apparently overlooked Pliny's original use of the plural name 'galguli' in Book X, Chapter 25: 'Temporum magna differentia auibus. Perennes, ut columbae: semestres, ut hirundines: trimestres, ut turdi & turtures, & quae, cùm foetum eduxere, abeunt, ut galguli, upupae' (Guzmán 1582: 179). English translation: 'There is a great difference in the seasons of birds. Some are perennial, like doves; some are semiannual, like swallows; some are for three months, like thrushes and turtledoves; and those that, when they have raised their young, depart, like galguli and hoopoes.' In this passage, Pliny's 'galguli' were clearly migratory European birds—not parrots imported from Asia.

Furthermore, apparently unbeknown to Linnaeus, the identity of the 'galguli' had already been a topic of discussion among scholars of the early 16th century. William Turner (1508–68), the English physician-naturalist, upon identifying three woodpecker species in the writings of Aristotle (384–322 BCE), remarked (Harrison 1954: 5):

> 'Pliny seems to make a fourth [species], for in Book 10 and Chapter 33 he tells us that a certain Picus hangs its nest, in fashion like a cup, upon a twig among the outer branches

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> of a tree, so that no quadruped is able to come nigh ... Except the Vireo [= Oriole] alone, I know of no other bird in Europe which places its nest in such a way. Wherefore I find no other than the above which the fourth kind of Picus possibly can be.'

Turner plausibly identified Pliny's 'Galgulos' as a female Eurasian Golden Oriole *Oriolus oriolus* (Linnaeus, 1758), which he contended 'in English [was known as] a witwol' (Harrison 1954: 6). Notably, ever since Willughby & Ray (1678), the name 'witwol' has been commonly associated with woodpeckers, especially Great Spotted Woodpecker *Dendrocopos major* (Linnaeus, 1758)—not *O. oriolus*—but Turner's identification of the 'galguli' (*O. oriolus*) remains plausible. Orioles are often seen in inverted positions, attending to their pendulous nests. Inverted roosting has also been documented in a few bird species (notably in Corvidae and Psittacidae), although it is rarely observed (Katzner 2016). Pliny's comment about the inverted sleeping position of the 'Galgulos' could also have been based on local superstition. In any case, it was apparently just a coincidence that the same unusual behaviour was later documented in a genus of Asian parrots (Buffon 1775: 349, 1779: 364). Incidentally, although overlooked by Linnaeus (1758, 1759, 1766), Turner's influence persisted well into the 19th century, as evidenced by an English edition of *Naturalis historia* in which 'galgulos' was translated 'wit-wall' (Bostock & Riley 1855: 515).

Robert Constantin (*c.*1530–1605), the French lexicographer and Turner's contemporary, agreed with Turner's identification. Constantin considered the words 'Galgulos' and 'galbula' to be synonyms and applied them both to *O. oriolus*, which was known in France as the 'Loriot' (Buffon 1775: 349). In defence of this position, Constantin (1573) cited Pliny's original use of the word 'galguli' (which, two centuries later, Linnaeus overlooked):

> 'Plinius libro 30. cap. 11. Avis iterus [*sic*, = icterus] vocatur a colore, quae si spectetur, sanari id malum tradunt, & avem mori—hanc puto Latine vocari galgulum. Et libro. 10. cap. 25. Et quae cum foecum eduxere, ut galguli, upupae.' English translation: 'Pliny, book 30, chapter 11, notes that the bird called 'iterus' takes its name from its color, and if observed, it is believed that it cures illness, but the bird dies—I think this bird is called 'galgulum' in Latin. In book 10, chapter 25, it is said that when these birds expel their young, they leave, like galguli and hoopoes.'

Finally, the absence of the 'galguli' from Book X, Chapter 42, where Pliny discussed 'parrots & the birds that speak' (Guzmán 1582: 181–182, 'Psittaco, & auibus quae loquuntur'), provides still more evidence that Linnaeus was mistaken. In that account, Pliny mentioned only one kind of parrot (*psittacus*) and wrote: 'India sends this bird, which they call psitace [*sic*], with the whole body green marked only by a scarlet ring upon the nape.' It is said that the *psittaci* (***ψιττακοί***) were first brought to the ancient Mediterranean after Alexander the Great's (356–323 BCE) invasion of north-west India (Punjab) in 326 BCE—a plausible story but lacking details (Barnicoat 1979: 20). Pliny's description clearly refers to a species in the genus *Psittacula* Cuvier, 1800, and plausibly matches Rose-ringed Parakeet *P. krameri* (Scopoli, 1769), which is widespread on the Indian Subcontinent. However, parakeets depicted in surviving Greek and Roman frescos often have the reddish shoulder patches of the larger, sympatric Alexandrine Parakeet *Psittacula eupatria* Linnaeus, 1766 (e.g., Fig. 4), and at least one ancient source (Crinagoras) described the wing as 'multicolored' (Franco 2024), which supports that identification. In any case, only one *Loriculus* species occurs on the Indian Subcontinent—Vernal Hanging Parrot *Loriculus vernalis* (Sparrman, 1787)—and Alexander's campaign did not advance to within 1,000 km of its modern range. To my

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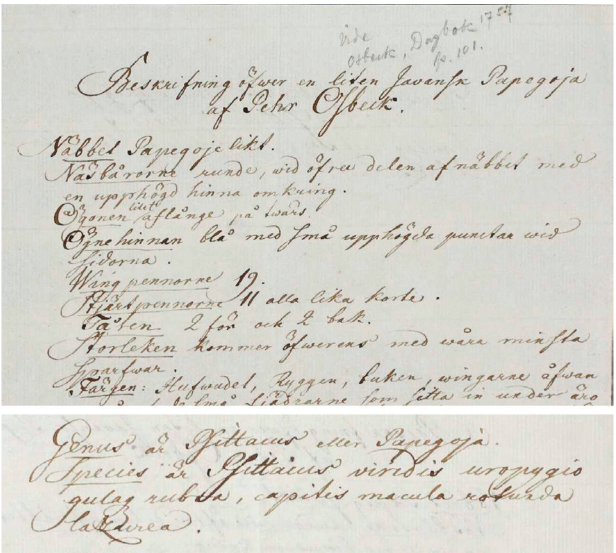
Figure 4. Ancient mosaics depicting the red-shouldered Alexandrine Parakeet *Psittacula eupatria*, or possibly Rose-ringed Parakeet *P. krameri*, found at (left) Pergamon, Türkiye, 2nd century BCE; (centre) Santa Maria Capua Vetere, Italy, *c.*1st century BCE–1st century CE; and (right) Kom el-Dikka, Alexandria, Egypt, *c.*2nd century CE (Edwin Brock). The bluish parakeet in the Capua Vetere panel, preserved at Museo Archeologico Nazionale, Naples (MANN 9992), may be a Malabar Parakeet *P. columboides* (Vigors, 1830) or colour variant of *P. eupatria*.

knowledge, there is no evidence that the ancient Greeks or Romans knew about *Loriculus* or any parrot genus other than *Psittacula* (Franco 2024).

The material basis of *L. galgulus* (Linnaeus)

Having shown that the Pliny quote was misapplied, we must re-evaluate the rest of Linnaeus's description of *L. galgulus* to determine its identity. The remainder of his description drew on at least four distinct sources, each of which must be re-examined. The first citation ('*Amoen. acad.* 4. p. [blank].') referred to a forthcoming account in *Amoenitates academicae* (Linnaeus 1759: 236), which was already available in manuscript form (unlocated, but written by 1754 according to Finsch 1868: 699). This work was unpublished at the time Linnaeus (1758) cited it and therefore does not fulfill the requirements of the Code (ICZN 1999, Art. 12.2). Nevertheless, the older Linnaeus (1759) account contained a longer and more detailed description of *P. galgulus* than the original description (Linnaeus 1758). It was based primarily on a manuscript (1751–52) that Linnaeus received from Pehr Osbeck (1723–1805), one of his so-called 'apostles' (Nyberg 2007), which described a specimen from Java, Indonesia (Fig. 5):



vide Osbeck, Dagbok 1757 p. 101.

Beskrifning öfwer en liten Javanſk Papegoja
af Pehr Oſbeck.

Näbbet Papegoje likt.
Näsbårorne runde, wid öfre delen af näbbet med en upphögd hinna omkring.
Ögonen litet aflånge på twärs.
Ögnehinnan blå med ſmå upphögda punctar wid ſidorna.
Wingpennorne 19.
Stjärtpennorne 11 alla lika korte.
Tåen 2 för och 2 bak.
Storleken kommer öfwerens med wåra minſta Sparfwar.
Färgen: Hufwudet, Ryggen, buken, wingarne åfwan

Genus är Psittacus eller Papegoja.
Species är Psittacus viridis uropygio gulag rubra, capitis macula rotunda lazurea.

Figure 5. Partial view of a manuscript written by Pehr Osbeck (1723–1805), containing a description of a specimen of *Loriculus galgulus* from Java, Indonesia ('Javansk Papegoja'). Reproduced courtesy of the Linnean Society of London (GB-110/LM/MA/OSB/1). The Latin inscription (bottom panel: 'Psittacus viridis uropygio gulag [*sic*] rubra, capito macula rotunda lazurea') classifies the species in the genus *Psittacus* and draws attention to its overall green colour, red rump and throat, and blue crown spot.

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Beskrifning öfwer en liten Javanisk Papegoja af Pehr Osbeck.
[Description of a small Javanese parrot, by Pehr Osbeck.]

Näbbet papegoja-likt
[Beak parrot-like.]

Näsbårorne runde wid öfra delen af näbbet med en upphögd hinna omkring.
[Nostrils round, at the upper part of the beak, with a raised membrane around them.]

Ögonen litet aflånge på twars
[Eyes slightly elongated transversely.]

Ögnehinnan blå med små upphögda punctar wid sidorna
[Iris blue, with small raised dots at the sides.]

Wingpennorne 19.
[Wing feathers 19.]

Stjärtpennorne 11, alla lika korta.
[Tail feathers 11, all equally short.]

Tåren 2 för ock 2 bak.
[Toes 2 forward and 2 backward.]

Storleken kommer öfwerens med wåra minsta sparfwar.
[Size corresponds with our smallest sparrows.]

Färgen: Hufwudet, ryggen, buken, wingarne äfwan på och de små fjädrarne som sitta in under äro gröne, men innerst wid basin mästan purpurfärgade. Hjässan är betäckt med en rund högblå fläck. Hakan och fjädrarne åfwan stjärten (uropygium) röde [sic, = *röda*]. *Åfwan på halssen en brandgul fläck. En gul fläck wid slutet af ryggen. Wingpennorne på yttre sidan blå, de andre gröne. Stjärtpennorne åfwan gröne, in under blå, föga längre än [de] täckfjädrar. Låren täckte med små gulagtige* [sic, = *gulaktiga*] *fjädrar. Töttren hwite, smutsige.*
[Coloration: Head, back, belly, wings, and the small feathers underneath are green, but at the base almost purplish. The crown is covered with a round, bright blue patch. The chin and the feathers above the tail (uropygium) are red. On the upper neck there is a flame-coloured patch. A yellow patch at the end of the back. The wing feathers on the outer side are blue, the others green. The tail feathers above are green, beneath blue, scarcely longer than the coverts. The thighs are covered with small yellowish feathers. The toes white, dirty.]

Dess art består där uti, att han är mästendels tyst, blir gärna dum då han stänges i burar, hänger sig så i trän och burar med föttren, att magen och stjärten weter uppåt.
[Its nature consists in this: that it is for the most part quiet, readily becomes dull when shut in cages, and hangs in branches and cages by the feet, so that the belly and tail point upwards.]

Hemwisten är Javae skogar och de där in till gränsande öar.
[Its home is the forests of Java and the neighboring islands.]

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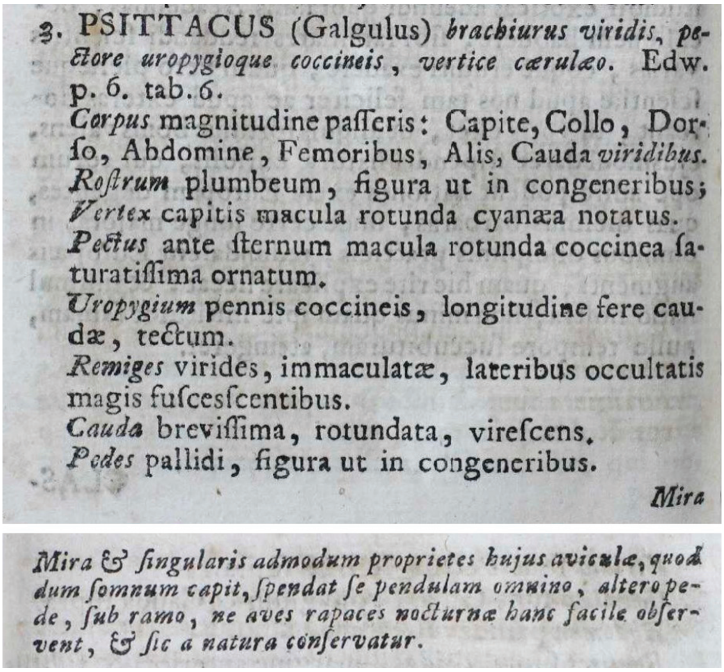
> *Namnet är hos de infödde och Europeer Parkiki eller ibland af de senare Parakitter*.
> [Its name among the natives and Europeans is *Parkiki*, or sometimes among the latter *Parakitter*.]

After returning to Sweden, Osbeck (1757: 101) published his own description of the same specimen, which Linnaeus (1758) cited ('*Osb. iter* 101.'). Linnaeus (1759) apparently borrowed Osbeck's phrase 'capito macula rotunda' (Fig. 5) but changed 'lazurea' to 'cyanaea notatus' (Fig. 6). This establishes that one of the syntypes of *L. galgulus* was in fact a Blue-crowned Hanging Parrot, offering hope for achieving stability via lectotypification. However, Osbeck's specimen came from Java, where the native status of *L. galgulus* is doubtful, making it a poor choice for a lectotype. *Loriculus* species tend to be allopatric, and Java already hosts the endemic Yellow-throated Hanging Parrot *L. pusillus* G. R. Gray, 1859. Furthermore, the appearance of *L. galgulus* ('Serindit Melayu') in the *Syair Ken Tambuhan*, a traditional 'Panji tale' about a Javan prince of Kahuripan (an 11th-century Hindu-Buddhist kingdom), is not strong evidence of native status. Despite the Javanese storyline, the oldest surviving (18th-century) manuscripts were recorded on Sumatra and Borneo (Teeuw 1966, Koster 1995, Wieringa & Pudjiastuti 2020), where *L. galgulus* is indisputably native and integrated into traditional beliefs and customs (e.g., Elfis *et al*. 2020). Thus, it appears that the cultural symbolism of the 'Serindit Melayu' was also imported to Java, sometime after the biological introduction of *L. galgulus*.

Linnaeus's (1758) third citation, which also appeared in Linnaeus (1759)—'Psittacus minimus viridis ruber indicus. Edw. av. 6. t. 6.'—referred to Edwards's (1743: 6, Pl. 6) account and illustration of a pickled specimen from 'some Dutch settlement in the *East Indies*' (Fig. 7, left), now thought to be the first depiction of Sri Lanka Hanging Parrot *Loriculus beryllinus* (Pennant, 1781). Pennant's (1781: 40) description of *L. beryllinus* was based solely on Brisson (1760: 390), which in turn was based uniquely on Edwards (1743: 6, Pl. 6). The identification is speculative because Edwards (1743: 6) neglected to mention the pale blue throat of his



3. PSITTACUS (Galgulus) *brachiurus viridis, pectore uropygioque coccineis, vertice cærulæo.* Edw. p. 6. tab. 6.

Corpus magnitudine paſſeris: Capite, Collo, Dorſo, Abdomine, Femoribus, Alis, Cauda *viridibus*.

Roſtrum plumbeum, figura ut in congeneribus;

Vertex capitis macula rotunda cyanæa notatus.

Pectus ante ſternum macula rotunda coccinea ſaturatiſſima ornatum.

Uropygium pennis coccineis, longitudine fere caudæ, tectum.

Remiges virides, immaculatæ, lateribus occultatis magis fuſcesſcentibus.

Cauda breviſſima, rotundata, vireſcens.

Pedes pallidi, figura ut in congeneribus.

Mira

Mira & ſingularis admodum proprietes hujus aviculæ, quod dum ſomnum capit, ſpendat ſe pendulam omnino, altero pede, ſub ramo, ne aves rapaces nocturnæ hanc facile obſervent, & ſic a natura conſervatur.

Figure 6. Account of *Psittacus galgulus* published in Linnaeus (1759), scanned from Linnaeus' personal (annotated) copy of the book. The account contains a citation to Edwards (1743: 6) and a detailed description of *Loriculus galgulus*, which appears to have been based on the description Osbeck sent him in 1752 (see text). Image courtesy of the Peter H. Raven Library, Missouri Botanical Garden, downloaded from Biodiversity Heritage Library (www.biodiversitylibrary.org, accessed 8 September 2024).

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Figure 7. (left) Print from Edwards (1743, Pl. 6) depicting the 'The smallest red and green parrakeet' (now Sri Lanka Hanging Parrot *Loriculus beryllinus* of Sri Lanka), courtesy of the National Library Board, Singapore, and downloaded from Biodiversity Heritage Library (www.biodiversitylibrary.org, accessed 8 September 2024); (centre) print from Aldrovandi (1603: 560) depicting the 'Avicula cechini' cited by Linnaeus (1758), an unknown species with colouration reminiscent of *Charmosyna* lorikeets, courtesy of the University of Bologna; (right) print from Brisson (1760, Pl. XXX).

specimen, and conceded that its colours ('a fine Green-colour, lighter on the Throat, Breast, Belly, and Thighs') may have been affected by the 'Camphorated Spirits' in which the specimen had been submerged; only 'when taken out, washed and dried, [did it become] the Colours above described.' Nevertheless, the specimen illustrated by Edwards (1743), which is one of the *P. galgulus* syntypes, was certainly not a Blue-crowned Hanging Parrot.

The fourth citation in Linnaeus (1758)—'*Aldr. Orn. l.* 20. p. 560.'—referred to the work of Aldrovandi (1603: 560), who described a specimen from an unspecified island in Portuguese Malacca ('Malaca insula'). The specimen's donor ('Rauennas'), who presumed it to be a kingfisher ('Alcyonem'), evidently labelled it with the name 'Martinus Cechinus'. Aldrovandi (1603) reidentified it as a parrot ('Psittacorum') and described one of the distinguishing characters of *L. galgulus* ('capitis vertex ceu cyanea corolla insignitur' = the top of the head is marked like a blue crown). However, although Aldrovandi's (1603) description is a plausible match to *L. galgulus*, his wood-cut print was clearly not, showing colours reminiscent of lorikeets in the genus *Charmosyna* Wagler, 1832 (Fig. 7, centre). Thus, Aldrovandi's (1603) account was itself composite, and his Blue-crowned Hanging Parrot could have originated on any of the islands of the region, including Java.

According to the Code (ICZN 1999, Art. 72.4.2), 'If a new nominal species-group taxon is based, in whole or in part, on a published misidentification by an earlier author, the type series consists of or includes the specimen or specimens which had been misidentified, whether the later author refers to them directly or through an illustration or a description.' Therefore, even after setting aside the misapplied Pliny reference, *Psittacus galgulus* Linnaeus, 1758, was based on a mixed syntype series consisting of, in chronological order, (1) an unpreserved *L. galgulus* specimen from 'Malaca insula' (unknown island in South-East Asia) described by Aldrovandi (1603); (2) an unidentified specimen, illustrated by Aldrovandi (1603), possibly of the genus *Charmosyna*; (3) an unpreserved *L. galgulus* specimen from Java, described by Osbeck (1757) and Linnaeus (1759); and (4) a specimen apparently of *L. beryllinus*, which was described and illustrated by Edwards (1743). None of these syntypes is extant to my knowledge.

Downstream effects of the composite

Two years after Linnaeus (1758) described his composite *L. galgulus*, Brisson (1760: 386–390) treated the birds described by Aldrovandi (1603) and Edwards (1743: 6) as different species, 'La petite Perruche de Malaca … Psittacula Malaccensis' and 'La petite Perruche des Indes … Psittacula Indica,' respectively. He also introduced a third species ('La petite

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Perruche des Philippines … Psittacula Philippensis') based on Philippine specimens obtained by M. l'Abbe Aubry (Brisson 1760: 392), now known as Philippine Hanging Parrot (Statius Müller, 1776). The same year, Edwards (1760: 293) described and illustrated an adult male *L. galgulus* under the name 'Psittacus minor, vertice sapphirino', based on a specimen from Sumatra (Fig. 8A).

In response, Linnaeus (1766: 150) struck out the Edwards (1743: 6) citation (see Fig. 1) and replaced it with Edwards (1760: 293, Fig. 6) but failed to disentangle the composite (Fig. 9). The citation to Linnaeus (1759: 236), a composite based in part on Edwards (1743: 6) and Aldrovandi (1603: 560), remained intact. Linnaeus (1766) even added another composite layer, with a citation to Brisson's (1760: 392) description of *L. philippensis* and a note ('*Conf. Edw. t.* 6') leading the reader to Edwards's (1743: 6) description of *L. beryllinus*. He apparently assumed that the type of *L. beryllinus* was an immature *L. philippensis*, although Edwards (1743: 6) had stated that the bird came from 'some Dutch settlement in the *East Indies*' and the Philippines were controlled by the Spanish.

The taxonomic literature soon became even more tangled. After Linnaeus (1766) published his updated account, an illustration of an adult *L. galgulus* was published under the erroneous name 'Petite Perruche, du Pérou' in the *Planches enluminées d'histoire naturelle* (*Pl. Enl*. 190, Fig. 8B). Illustrations of male and female *L. philippensis* also appeared in that work (*Pl. Enl*. 520, Fig. 8C–D). Buffon (1780: 238), who did not use the Linnaean

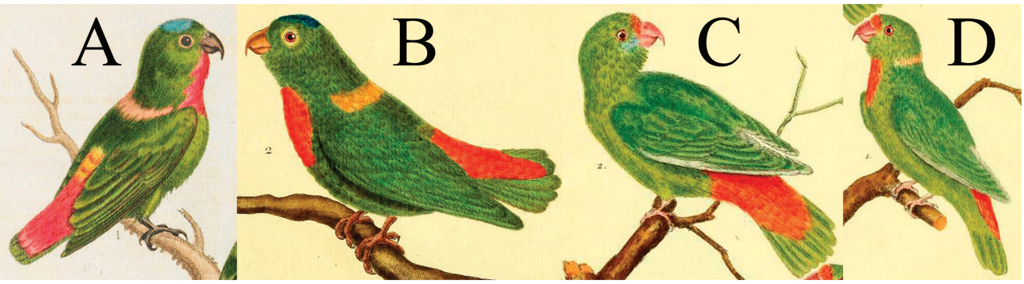
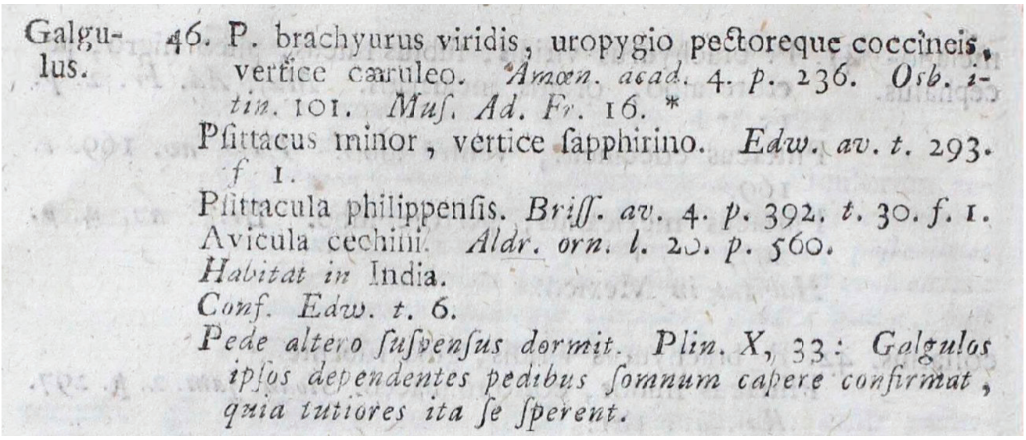


Figure 8. (A) Adult male Blue-crowned Hanging Parrot *Loriculus galgulus*, as depicted in Edwards (1760, Pl. 293); (B) Adult male *L. galgulus*, as depicted in *Planches enluminées d'histoire naturelle* Pl. 190; (C) female and (D) adult male Philippine Hanging Parrot *L. philippensis*, as depicted in *Planches enluminées d'histoire naturelle* Pl. 520. Reproduced courtesy of Smithsonian Libraries and Archives and Biodiversity Heritage Library (www.biodiversitylibrary.org, accessed 10 September 2024).



Galgu- 46. P. brachyurus viridis, uropygio pectoreque coccineis,
lus. vertice cæruleo. *Amœn. acad.* 4. *p.* 236. *Osb. itin.* 101. *Muſ. Ad. Fr.* 16. *
Pſittacus minor, vertice ſapphirino. *Edw. av. t.* 293. *f.* 1.
Pſittacula philippenſis. *Briſſ. av.* 4. *p.* 392. *t.* 30. *f.* 1.
Avicula cechini. *Aldr. orn. l.* 20. *p.* 560.
Habitat in India.
Conf. Edw. t. 6.
Pede altero ſuſpenſus dormit. Plin. X, 33*: Galgulos ipſos dependentes pedibus ſomnum capere confirmat, quia tutiores ita ſe ſperent.*

Figure 9. Account of *Psittacus galgulus* in Linnaeus 1766, scanned from Linnaeus' personal copy of the book. Reproduced courtesy of the Linnean Society of London (BL.19/2).

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system, assumed that Brisson (1760) and Linnaeus (1766) had confused 'le Coulacissi' of the Philippines (now *L. philippensis*) with 'la perruche couronnée de Saphir, donnée par Edwards' (now *L. galgulus*); and Boddaert (1783: 12), incorrectly assuming that the birds in *Pl. Enl*. 190 and 520 were the same species, treated the names *P. philippensis* and *P. galgulus* as synonyms.

Gmelin (1788: 349), who read Buffon (1780) but not Boddaert (1783), merged the two species under the name *P. galgulus*, while moving the problematic Edwards (1743: 6) citation to an account of a different species, *Psittacus indicus* J. F. Gmelin, 1788, which eventually became a junior synonym of *L. beryllinus* (Pennant, 1781). However, although Gmelin (1788) evidently associated the bird in Edwards (1743: 6) with the species now known as *L. beryllinus*, he still cited Linnaeus (1759: 236) in the *P. galgulus* account, which was based in part on Edwards (1743: 6)—in other words, he failed to disentangle the composite; and so did Latham (1790: 131), who accepted Gmelin's (1788) merger but cited the composite accounts of Linnaeus (1759, 1766).

Authors fared little better in the 19th century. Wagler (1832: 626) came closest to clearing up the composite, when he omitted all citations to Linnaeus in his circumscription of *L. galgulus*. However, he gave Edwards (1751, Pl. 177) as his principal citation, which was based on a specimen from the 'West Indies' that matches Orange-fronted Parakeet *Eupsittula canicularis* Linnaeus, 1758, albeit an individual with reduced orange on the forecrown. Selby (1836: 167), like other authors who attributed *L. galgulus* to Wagler (1832), overlooked this problem. Gray (1855b: 54) and Horsfield & Moore (1856: 626) cited Linnaeus (1766: 150), not Linnaeus (1758), but failed to identify its composite nature. Finsch (1868: 699) and Salvadori (1891: 531) cited Linnaeus's unavailable 1754 '*Amoen. acad*.' manuscript (later published by Linnaeus 1759) and, like Gray (1855b), also cited Linnaeus (1766, 'syn. emend.'), but which of (and why) the synonyms were to be disregarded was not stated. Others including Giebel (1875: 498), Salvin (1882: 459) and Elliot (1891: 12), simply cited the composite Linnaeus (1766).

Authors in the 20th and early 21st centuries also failed to disentangle the composite. Hartert (1902) reverted to simply citing Linnaeus (1758) while '[substituting] as the typical locality [the] Malay Peninsula, Malacca.' All subsequent authors have followed Hartert (1902) including Richmond (1903: 496), Riley (1929, 1930), Peters (1937: 258), and modern authors and checklists (e.g., Collar & Boesman 2020, Clements *et al*. 2023, Gill *et al*. 2025, HBW 2024)—even though none of the *L. galgulus* syntypes originated in Peninsular Malaysia.

Taxonomic implications

The original description of *Psittacus galgulus* Linnaeus, 1758, is demonstrably composite, based on a syntype series that included Osbeck's (1751–52) specimen of Blue-crowned Hanging Parrot from an introduced (or captive) population in Java, Edwards' (1743) depiction of *L. beryllinus*, and Aldrovandi's (1603) woodcut of an unidentified (possibly *Charmosyna*) species. Linnaeus' additional reference to Pliny's 'Galgulos' (likely *Oriolus oriolus*), the namesake of his *P. galgulus*, further underscores the confused and composite basis of the name. Under the Code, all of these published indications collectively constitute the type series, irrespective of later interpretations (ICZN 1999, Art. 72.4.2). Because they constitute more than one species, the identity of *P. galgulus* cannot be defined objectively. Ignoring this fact for short-term convenience leaves the name unstable and perpetually vulnerable to challenge. For example, a future author could legitimately redefine *P. galgulus* by privileging the Edwards (1743) indication, thereby rendering the name *L. beryllinus* (Pennant, 1781) a junior synonym and creating a nomenclatural vacancy for the Sri Lanka

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Hanging Parrot. Similarly, privileging Aldrovandi's (1603) woodcut could redirect the name toward a lorikeet (possibly *Charmosyna*). Competing usages such as these arise from the composite syntype series, and remain permissible under the Code until the name is stabilised by corrective action. This is precisely the kind of situation that Art. 75 was designed to remedy.

One could argue that stability has prevailed in practice for more than two centuries and that no competing usage has arisen (heretofore). However, the Code neither permits subjective conjectures about 'what Linnaeus really meant' (beyond the published indications) nor requires a recent split or lump (taxonomic revision) to justify action. If the type series is composite (Art. 72.4.2) and no name-bearing specimen survives, the trigger for corrective action is when 'an author [singular] considers that a name-bearing type is necessary to define the nominal taxon objectively' (Art. 75.1). Taxonomic revision is not required to trigger action—historical research alone may reveal instability that justifies correction. In such cases, neotypes are not designated 'as an end in itself, or as a matter of curatorial routine,' as some might argue, when the author expresses legitimate doubt about the name's application (fulfilling the Code's requirement). Composite taxa are by definition 'complex zoological problems' (Art. 75.2).

Designating a lectotype (Art. 74) may be the preferred remedy to preserve long-standing nomenclature (e.g., Halley 2021, Stopiglia *et al*. 2022, Areta *et al*. 2024, Kirwan *et al*. 2024)—but no suitable lectotype exists in this case. Osbeck's (1757) specimen was from Java, where *L. galgulus* is likely non-native, whilst Aldrovandi's (1603) specimen from 'Malaca insula' could have come from any island in the region, including Java. In such cases, the Code (Art. 75.1) provides neotypification as the appropriate and only remedy, thereby securing long-term stability by anchoring the name to a single, unambiguous specimen from the species' native range (e.g., Kirwan *et al*. 2014, Halley 2018, 2019, 2023).

Therefore, to fix the taxonomic identity of Blue-crowned Hanging Parrot *L. galgulus* (Linnaeus) in accordance with prevailing use, I hereby designate a neotype that restricts the name to the Sumatran population: ANSP 38948, an adult male (by plumage, not label data) in the collection of the Academy of Natural Sciences of Drexel University (ANSP), Philadelphia (Fig. 10). The neotype was collected in August or September 1901, by Alfred C. Harrison, Jr., and Dr H. M. Hiller, at Batu Sangkar, Tanah Datar, Padang, West Sumatra, "1,300–1,500 ft." (396–457 m). This action resolves a complex zoological problem and stabilises nomenclature by anchoring the name *L. galgulus* to a verifiable specimen from its native range, thereby preventing alternative identifications. It clarifies the taxonomic application (status) of the name (Art. 75.3.1), describes, illustrates and references the defining characters of *L. galgulus* and its neotype (Art. 75.3.2), provides data sufficient to ensure recognition of the neotype specimen (Art. 75.3.3), provides grounds for believing that all original type material has been lost and is untraceable (Art. 75.3.4),

Figure 10. ANSP 38948, the neotype of *Psittacus galgulus* Linnaeus, 1758 (Matthew R. Halley)

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shows that traits of the neotype are included in the original description (Art. 75.3.5), fixes the taxon to a population with undisputed native status, i.e., Sumatra not Java (Art. 75.3.6), and the neotype is preserved in a recognised scientific institution (Art. 75.3.7).

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Filling distributional gaps for birds in a complex Andean landscape: insights from the northern East Andes of Colombia

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Summary.—The East Andes of Colombia is a biogeographically complex region with significant avian diversity and endemism. Despite previous efforts, large portions of its northern sector remain unexplored ornithologically. We report new distributional data for 38 bird species at 42 localities in Santander and Norte de Santander departments, spanning elevations from 825 m to 3,700 m. These records bridge notable distributional gaps for several Andean species and expand known ranges northward, particularly in montane forest ecosystems. Among others, we report range extensions for Solitary Eagle *Buteogallus solitarius*, Chapman's Swift *Chaetura chapmani*, Cinnamon Screech Owl *Megascops petersoni*, Yellow-throated Spadebill *Platyrinchus flavigularis* and Sooty Grassquit *Asemospiza fuliginosa*, as well as the first specimen records for Colombia of Streak-capped Treehunter *Thripadectes virgaticeps tachirensis* and Russet Antshrike *Thamnistes anabatinus gularis*. The results underscore the role of geographic barriers, such as arid river canyons and high elevations in shaping avian distributions, leading to disjunct populations and potential zones of secondary contact. Our study emphasises the value of combining historical data, modern observations and specimen collection to clarify species distributions, taxonomy and evolutionary patterns. It also stresses the need for rigorous field documentation, including detailed locality descriptions and habitat notes, to improve data quality and their long-term utility. Continued exploration of understudied areas, such as the east slope of the Sierra Nevada del Cocuy and fragmented foothill forests, is essential to uncover additional biodiversity and to inform conservation efforts.

Knowledge of Colombia's avifauna has improved dramatically due to an increase in the number of field surveys in poorly explored regions, and more recently due to the growing popularity of birdwatching among both local observers and foreign visitors. This has contributed to a more complete understanding of bird species composition and distribution at both regional and local scales (McMullan 2021, Echeverry-Galvis *et al*. 2022, Chaparro-Herrera *et al*. 2024). However, significant gaps persist in certain regions and ecosystems across the country. These gaps stem from logistical challenges, including difficult terrain, limited infrastructure and security concerns in remote areas, which have led to and maintained geographic biases in available data (Córdoba-Córdoba 2009, Arbeláez-Cortés 2013, Avendaño *et al*. 2017b).

Particularly the East Andes of Colombia has seen an increase in the number of ornithological surveys of once poorly explored areas such as the east slope, isolated mountain ranges on the west slope like the Serranía de las Quinchas and Serranía de los

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Yariguíes, remote regions of the altiplano Cundiboyacense, and its northernmost extension the Serranía de Perijá (Stiles & Rosselli 1998, Salaman *et al*. 1999, 2002b, Stiles & Bohórquez 2000, Bohórquez 2002, Laverde-R. *et al*. 2005, Cuervo *et al*. 2007, Donegan *et al*. 2007, 2010, Ayerbe-Quiñones *et al*. 2008, Calderón-L. *et al*. 2011, Delgado-C. *et al*. 2014, López-O. *et al*. 2014, Ávila-Campos 2016, Gómez-Bernal *et al*. 2016, Chaparro-Herrera *et al*. 2018, 2020, Córdoba-Córdoba & Sierra 2019, Arbeláez-Cortés *et al*. 2020, García-Monroy *et al*. 2020, Linares-Romero *et al*. 2020). In contrast, some regions such as the Orinoco foothills between Boyacá and Arauca departments, and the northern sector of the East Andes between the Sierra Nevada del Cocuy and Serranía de los Motilones have been comparatively less studied, making for an incomplete picture of the biogeography of this sector (Donegan *et al*. 2003, Peraza *et al*. 2004, Avendaño *et al*. 2013a, Suárez-Sanabria & Cadena 2014, Acevedo-Charry 2017, Collazos-González & Echeverry-Galvis 2017, Cediel & Lozano-Flórez 2020, Chaparro-Herrera *et al*. 2020, Collazos-González *et al*. 2020, Arbeláez-Cortés *et al*. 2023).

The avifauna of the northern sector of the East Andes in the departments of Santander and Norte de Santander stands out among the Colombian Andes for its high species richness and endemism, which probably result from its environmental and topographic complexity (Cracraft 1985, Graham *et al*. 2010, Chaparro-Herrera *et al*. 2024). Ecosystem diversity on both slopes of the cordillera ranges from humid and dry habitats in the foothills (*c*.500–1,000 m) to a steep gradient of Andean montane forest and *páramo* (*c*.4,530 m) (Hernández-Camacho *et al*. 1992, Róndón-González 2007). The west slope drains to the Magdalena River; the east slope to the Arauca and Catatumbo Rivers. Geographic barriers like arid inter-Andean river valleys (e.g., the Chicamocha-Sogamoso river canyon) and the high-elevation ridge of the cordillera have probably influenced the distribution of bird species as composition varies between slopes (Kattan *et al*. 2004), with some forming contact zones or being replaced by taxa extending from the Serranía de Perijá, Mérida Andes of Venezuela (Cracraft 1985) and the Serranía de los Yariguíes (Donegan *et al*. 2007). Moreover, several widely distributed species restricted to Andean forest and *páramo* exhibit distributional gaps or reach their northern limit in the altiplano Cundiboyacense (i.e., south of the Chicamocha-Sogamoso river canyon) or the isolated Serranía de los Yariguíes, whilst possessing disjunct populations in the Serranía de Perijá or the Mérida Andes (Hilty & Brown 1986, Hilty 2002, Donegan *et al*. 2010, López-O. *et al*. 2014). These distributional gaps could result from naturally fragmented populations or reflect the paucity of documentation despite ornithological research in the region dating back 200 years (Rodríguez-Toloza 1985, Avendaño 2017). Thus, knowledge of the avifaunal composition and distribution of birds in this sector of the Colombian Andes remains incomplete.

Between 1998 and 2022, we conducted field work at 42 study sites on both slopes of the cordillera in the departments of Santander and Norte de Santander in Colombia. We recorded new distributional data for 38 bird species, based on detailed sight records, sound recordings or voucher specimens collected by us or previously overlooked in museum collections.

Study sites and Methods

Our study area spans 42 localities sampled between 1998 and 2022 in the northern sector of the East Andes of Colombia (Fig. 1; Table 1). Our sampling was concentrated between 07°26′N and 07°00′N. Thirty-seven sites were located on the west slope (Santander), with five sites on the east slope (Norte de Santander). The study area covered an elevational gradient from 825–3,700 m. We sampled a few dry and humid forest sites in the foothills, while uniformly surveying pre-montane, montane and *páramo* habitats (mean elevation

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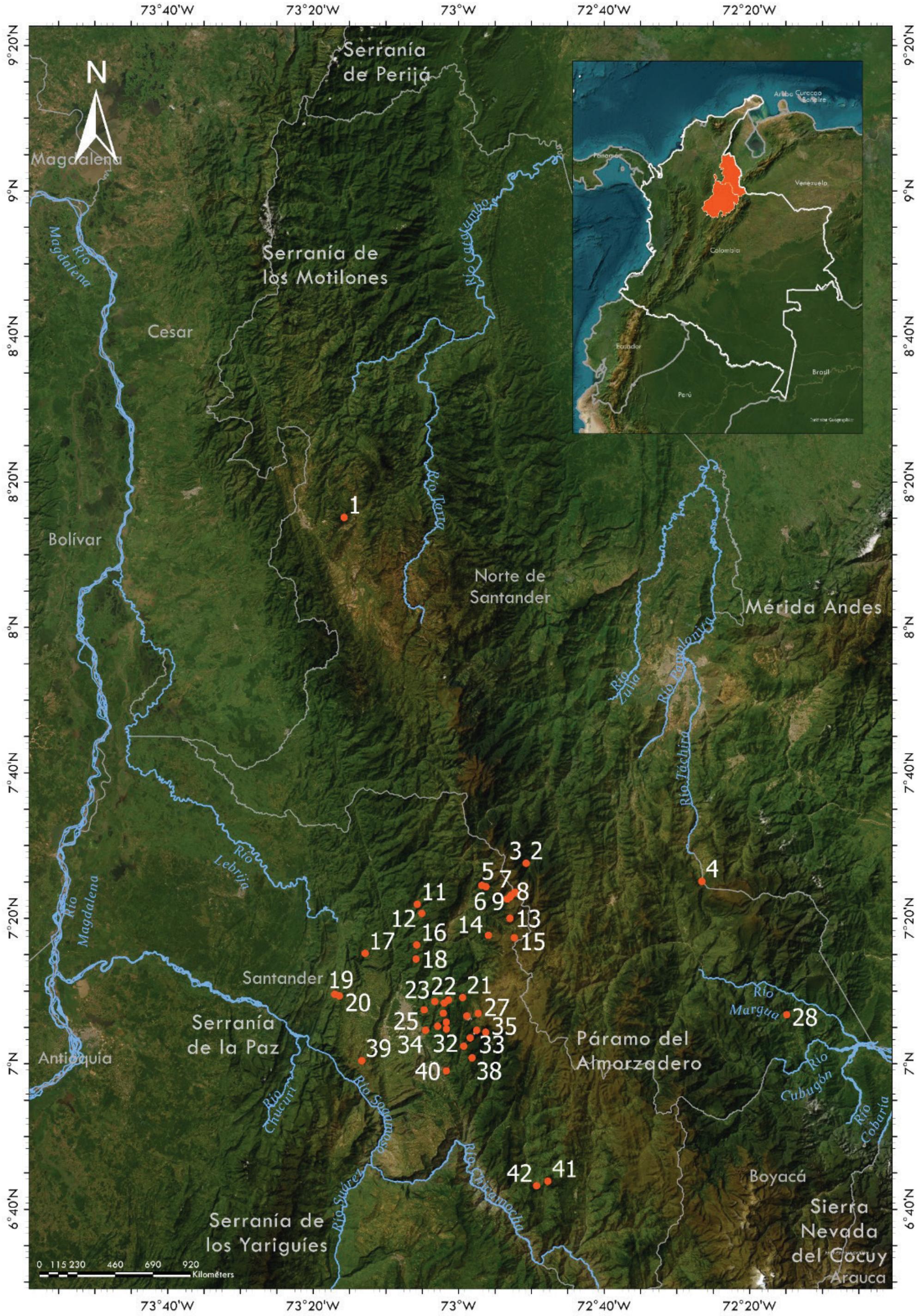

Figure 1. Sampling localities and topography of the northern East Andes of Colombia. The 42 study sites (orange circles) are predominantly located on the west slope (in Santander), with additional sites on the east slope (in Norte de Santander), spanning an elevational range from 825–3,700 m. Key geographic features (e.g., serranías, rivers) and departmental boundaries relevant to the distributional records discussed in the text are indicated. Detailed coordinates and site information are provided in Table 1.

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TABLE 1

List of 42 study sites sampled between 1999 to 2022 in the northern sector of the East Andes of Colombia in the departments of Santander and Norte de Santander, with geographic and sampling details. Localities are numbered in descending order, north to south (Fig. 1).

Site no.	Study site (slope; municipality)	Coordinates; elevation	Dates	Observers	Days
1	Piritama (W slope; La Playa de Belén)	08°15′N, 73°15′W; 1,600–1,700 m	May, Jul 2003	JEA	6
2	Sisavita-Salinas (E slope; Cucutilla)	07°24′N, 72°50′W; 2,300–2,350 m	Mar 2002	FE & SCC	2
3	Sisavita-La Grande (E slope; Cucutilla)	07°26′N, 72°50′W; 2,380–2,520 m	Mar 2002	FE & SCC	2
4	Orocué (E slope; Toledo)	07°25′N, 72°26′W; 2,400 m	Sep 2008	IAvH staff	5
5	Pangote (W slope; Suratá)	07°24′N, 72°56′W; 2,550–2,600 m	Aug 2006	JEA	4
6	La Palmita (W slope; Suratá)	07°24′N, 72°56′W; 2,950–3,000 m	Aug 2006	JEA	4
7	El Romeral (E slope; Sisavita)	07°23′N, 72°52′W; 3,600 m	Jun 2009	DARG	4
8	Los Laches (W slope; California)	07°23′N, 72°52′W; 3,400–3,500 m	Jun 2009	JEA & DARG	3
9	Las Picotas (W slope; California)	07°22′N, 72°52′W; 3,200 m	Jun 2009	JEA & DARG	4
10	Fuego Verde (W slope; California)	07°22′N, 72°53′W; 3,050 m	Jun 2009	DARG	5
11	El Sinaí (W slope; Matanza)	07°21′N, 73°05′W; 1,700–2,300 m	Nov 2007	RHO	5
12	Bremen (W slope; Matanza)	07°20′N, 73°05′W; 1,650–1,700 m	Jun 2009	JEA & CMI	5
13	El Salado (W slope; Vetas)	07°20′N, 72°52′W; 3,400–3,700 m	Mar, Jul 2009	JEA, ERBL, FE & DARG	6
14	Bucaré (W slope; Suratá)	07°17′N, 72°55′W; 3,300–3,375 m	Jul 2009	JEA	3
15	Laguna de Cuntas (W slope; Vetas)	07°17′N, 72°55′W; 3,700 m	Dec 1998	ERBL & FE	3
16	Honduras (W slope; Rionegro)	07°16′N, 73°05′W; 1,600–1,700 m	May 2007	JEA	6
17	La Honda (W slope; Rionegro)	07°15′N, 73°12′W; 825–875 m	Dec 2005	JEA	5
18	El Aburrido alto (W slope; Bucaramanga)	07°14′N, 73°05′W; 1,700 m	Aug 2005	JEA	5
19	Granja El Puente (W slope; Lebrija)	07°09′N, 73°17′W; 1,100 m	Oct 2005	JEA	8
20	Cañaverales (W slope; Lebrija)	07°09′N, 73°16′W; 1,100–1,200 m	May, Sep 2005	JEA	6
21	La Plazuela (W slope; Tona)	07°09′N, 72°59′W; 2,190–2,250 m	Mar, Apr 2003; Feb, May 2004	JEA & José Gregorio Moreno	10
22	Guarumales (W slope; Tona)	07°08′N, 73°01′W; 1,820–2,170 m	Nov 2001	CDMB staff	7
23	El Brasil (W slope; Tona)	07°08′N, 73°03′W; 1,700–2,000 m	Jun 2006	JEA & RHO	4
24	El Diviso (W slope; Floridablanca)	07°08′N, 73°01′W; 1,700–2,100 m	Jan 2004	JEA, ERBL, CDMB staff	4
25	Parque La Niebla (W slope; Bucaramanga)	07°07′N, 73°04′W; 1,750 m	Jan, Oct, Dec 2004	JEA	4

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26	San Ignacio (W slope; Floridablanca)	07°06′N, 73°02′W; 1,950–2,000 m	Aug 2003	JEA, ERBL, CDMB staff	5
27	Berlín (W slope; Tona)	07°06′N, 72°57′W; 3,300–3,400 m	Dec 1998; Mar 2006	JEA, ERBL, FE	3
28	El Diamante (E slope; Toledo)	07°06′N, 72°14′W; 1,100 m	Sep 1999	IAvH staff	1
29	El Picacho (W slope; Tona)	07°06′N, 72°58′W; 2,950–3,100 m	Oct 1999	ERBL & FE	3
30	Pico Cerro La Judía (W slope; Piedecuesta)	07°05′N, 73°01′W; 2,600–2,700 m	Feb 2004	ERBL	4
31	Los Maklenkes (W slope; Floridablanca)	07°05′N, 73°02′W; 1,625–1,900 m	Jul 2005; Mar 2009	JEA & ERBL	4
32	La Mata alta (W slope; Piedecuesta)	07°04′N, 73°01′W; 2,250–2,425 m	Jun 2004	JEA & ERBL	4
33	Llano adentro (W slope; Tona)	07°04′N, 72°57′W; 3,000–3,380 m	Oct 1999	ERBL & FE	4
34	Helechales (W slope; Floridablanca)	07°04′N, 73°04′W; 1,000–1,450 m	Oct–Dec 2002; Jan–Feb, Apr–May 2003; Apr 2004; Aug 2021	JEA & ERBL	17
35	Alto Río Manco (W slope; Piedecuesta)	07°04′N, 72°56′W; 3,100 m	Jul 2007	JEA & CMI	5
36	Filo El Rasgón (W slope; Piedecuesta)	07°03′N, 72°58′W; 2,600–2,700 m	Apr 2004	ERBL	4
37	El Rasgón (W slope; Piedecuesta)	07°02′N, 72°59′W; 2,200 m	Sep 2004; Mar 2009	JEA, ERBL and others	8
38	Sector España (W slope; Piedecuesta)	07°00′N, 72°58′W; 2,450 m	Jul 2007	JEA & CMI	5
39	El Pantano (W slope; Girón)	07°00′N, 73°13′W; 1,280–1,400 m	Nov 2006; Apr 2014	JEA	6
40	Las Amarillas (W slope; Piedecuesta)	06°59′N, 73°01′W; 1,550 m	Sep 2009	DARG	5
41	La Pica (W slope; Molagavita)	06°43′N, 72°49′W; 2,880–3,050 m	Jul–Aug 2009	JEA	6
42	El Tablón (W slope; San Andrés)	06°43′N, 72°49′W; 2,750–2,800 m	Sep 2009; Jan 2022	JEA & María Paula Rodríguez	15

2,327 ± 785 m). Study sites were selected as part of different projects aimed to characterise bird diversity associated with remnant forest patches in the region.

Sampling methods were similar between sites, but with differences in effort ranging from 1–17 days per site. In total, we conducted 219 days of field work. At most sites, we implemented a combination of sampling techniques recommended for maximising efficiency and effectiveness during short-term inventories (Stiles & Rosselli 1998, Stiles & Bohórquez 2000). This included making visual and auditory records along extensive trails (1–4 km) trying to cover all available habitats, as well as use of a variable number (4–20) of mist-nets (12 × 2 m; 30 mm mesh size) to capture and collect representative specimens. We prepared specimens as conventional skins, now deposited in the Museo de Historia Natural, Universidad Industrial de Santander, Bucaramanga (UIS-AV), Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá (ICN) and the Instituto Alexander von Humboldt, Villa de Leyva (IAvH-A). Tissue samples of each specimen were preserved in 95% ethanol and deposited at the Colección de Tejidos Uniandes, Bogotá (Andes-T) and the Colección de Tejidos, Instituto Alexander von Humboldt (IAvH-CT).

To understand the novelty of our records, we compared our data mostly with regional field guides (Hilty & Brown 1986, Hilty 2002, Ayerbe-Quiñones 2019, McMullan 2021) and new distributional bird data published since 1986 for the Colombian Andes. While

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global aggregators like gbif.org are invaluable for broad-scale analyses, our validation process prioritised sources with the highest spatial resolution and taxonomic curation for our specific region. Therefore, we focused on: (1) checking for specimens reported in the regional database Biomap (2014), (2) directly accessing the databases of ICN, IAvH-A and UIS-AV, i.e., the national and regional collections that have most actively and consistently sampled the study area in recent decades and whose data may not be fully integrated or error-checked in global portals, and (3) reviewing visual and media records in specialised online repositories (eBird.org, xeno-canto.org) to complement the species accounts presented below. This multi-source approach, centred on regional expertise and primary data, ensured robust validation of distributional novelty.

Because each new record was contrasted against geographically adjacent known populations, we provide a list of key historical ornithological localities (with approximate coordinates and elevations) for reference. Boyacá department: Arcabuco (05°04′N, 73°27′W; 2,594 m); Iguaque (05°40′N, 73°27′W; 2,900 m); Pajarito (05°25′N, 72°42′W; 2,018 m); Soatá (06°20′N, 72°41′W; 2,045 m). Norte de Santander department: Alto del Pozo (08°06′N, 73°03′W; 2,500 m); ANU Los Estoraques (08°13′N, 73°14′W; 1,457 m); Bochalema (07°37′N, 72°39′W; 1,170 m); Buenos Aires (08°01′N, 72°58′W; 1,800 m); Cáchira (07°44′N, 73°03′W; 2,015 m); Cachirí (07°30′N, 73°01′W; 1,890 m); Las Ventanas (07°48′N, 73°06′W; 2,000–3,000 m); Ocaña (08°15′N, 73°20′W; 1,200 m); Pamplona (07°23′N, 72°39′W; 2,340 m); Páramo de Tamá (07°25′N, 72°26′W; 3,330 m); Páramo de Tierra Negra (07°20′N, 72°35′W; 3,100 m); Ramírez (07°48′N, 73°05′W; 2,000 m). Santander department: Barichara (06°38′N, 73°14′W; 1,340 m); Barrancabermeja (07°03′N, 73°52′W; 80 m); Bucaramanga (07°08′N, 73°09′W; 1,010 m); Charalá (06°17′N, 73°10′W; 1,370 m); Coromoro (06°17′N, 72°57′W; 3,070 m); El Peñón (06°02′N, 73°47′W; 2,860 m); Encino (06°04′N, 73°09′W; 2,400 m); Lebrija (07°07′N, 73°13′W; 1,090 m); Molagavita (06°41′N, 72°50′W; 2,150 m); Onzaga (06°21′N, 72°42′W; 3,500 m); Páramo de la Rusia (05°59′N, 73°05′W; 4,320 m); San José de Suaita (06°09′N, 73°25′W; 1,680 m); Santa Bárbara (07°01′N, 72°53′W; 2,850 m); Suratá (07°22′N, 73°00′W; 1,740 m); Virolín (06°05′N, 73°12′W; 1,900 m). Avian taxonomy and classification follow the South American Classification Committee (Remsen *et al*. 2026).

Species accounts

BLACK-FRONTED WOOD QUAIL *Odontophorus atrifrons*

Distinguished from Gorgeted Wood Quail *O. strophium* by its black forehead, face and throat, and typical *bob-a-white* song, which was frequently heard at several localities from *c*.2,000–3,200 m near the Páramo de Santurbán (Pangote, La Palmita, Fuego Verde, Las Picotas, Los Laches), southwards in the Cerro La Judía (Maklenkes, San Ignacio and Alto Río Manco), and near the type locality of *O. a. variegatus* (La Pica) at El Tablón. Although all these localities are within the historical range of *variegatus*, previously documented from Ramírez in Norte de Santander to Molagavita in Santander (Hilty & Brown 1986, Renjifo *et al*. 2002); these records are significant because this subspecies has been considered potentially extinct (Carroll *et al*. 2020). Our records are mostly associated with fragments of mature montane forest, but far from their edges, possibly in response to hunting by humans and feral dogs. Recent records from the east slope of the Serranía de los Yariguíes (https://ebird.org/checklist/S140407676) require documentation to eliminate *O. strophium* which inhabits similar elevations (Donegan *et al*. 2010). The population at Ocaña, Norte de Santander (XC22264) may pertain to *O. a. variegatus*, but the unusually low elevation in this sector of the cordillera (*c*.800–1,200 m) could permit potential contact with *O. a. navai* from the Serranía de Perijá, a pattern documented in other mid-elevation taxa that converge in the Ocaña region (Donegan *et al*. 2014).

SWALLOW-TAILED NIGHTJAR *Uropsalis segmentata*

Adult males were collected on the west slope at Alto Río Manco (ICN 36433) and La Pica (ICN 37547), and on the east slope at Sisavita-Salinas (IAvH-A 12085). Our specimens differ from male Lyre-tailed Nightjar *U. lyra* by their overall dark brown plumage spotted with tawny, no hindneck collar, and their shorter tail (Hilty & Brown 1986). These records fill a *c*.270 km gap between Arcabuco in Boyacá and Alto del Pozo in Norte de Santander (Hilty & Brown 1986, Costa *et al*. 2016).

CHAPMAN'S SWIFT *Chaetura chapmani*

An adult female (ICN 36403; Fig. 2) was collected over a ridge with secondary forest at 1,700 m at Bremen on 19 June 2007. It was part of a flock of 4–6 individuals of Chestnut-collared Swift *Streptoprocne rutila*, White-collared Swift *S. zonaris* and White-tipped Swift *Aeronautes montivagus*. There are few records of *C. chapmani* in Colombia, mostly of the austral subspecies *C. c. viridipennis* in the northern West Andes and Cali (Hilty & Brown 1986). Our specimen has the pale rump and uppertail-coverts of the nominate subspecies (Marín 1997) and represents the second in a national museum (F. G. Stiles pers. comm.). It had an enlarged ovary (4.4 × 2.8 mm), abundant fat, and showed body and wing moult (in the outer primaries). A male collected in September 1991 in the West Andes had small testes and was also in moult (Cuervo *et al*. 2003). These data are indicative of breeding in northern Colombia. Our record represents a range extension of *c*.280 km from Las Alturitas, Zulia, Venezuela (Hilty 2002), and *c*.190 km from El Real on the Río Nechí, Antioquia (USNM 401418). There are additional sightings from Santa Rosa del Sur, Bolívar (Salaman *et al*. 2002a) and Chicaque National Park, Cundinamarca (Downing 2005); however, given difficulties in sight identification, specimen verification is desirable (Hilty & Brown 1986).

Figure 2. Plumage variation in *Chaetura* swifts that could occur in the northern East Andes. The two specimens on the left are of Chapman's Swift *C. chapmani* from Santander and Risaralda departments (ICN 36403, 31117), which can be separated from the Nearctic migrant Chimney Swift *C. pelagica* (ICN 44579) and resident Grey-rumped Swift *C. cinereiventris* (ICN 31120) by having paler and greyer lower back to uppertail-coverts, shorter tails, and weakly contrasting throats (Yamid Benavides & Laura Ramos)

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GREENISH PUFFLEG *Haplophaedia aureliae*

Singles mist-netted at Las Picotas and Los Laches in the Páramo de Santurbán, visiting shrubs at 3,400 m, 300–400 m above the species' previously reported upper elevational limit (3,100 m; Hilty & Brown 1986). On the east slope we observed the species at Sisavita-La Grande (*c*.2,500 m). They were distinguished from similar species by their copper-green head and rump, small whitish leg puffs, and white spot behind the eye (Hilty & Brown 1986). The species is known from specimens collected in south-western Santander at Virolín and Encino (Romero-Zambrano & Hernández-Camacho 1979; E. Arbeláez-Cortés pers. comm.). Other recent records include a specimen from San José de Suaita, Santander (F. G. Stiles pers. comm.) and sight records from the west slope of the Serranía de los Yariguíes (https://ebird.org/checklist/S132302727). These records extend the species' distribution *c*.150 km north along both slopes of the East Andes.

BLUE-THROATED STARFRONTLET *Coeligena helianthea*

One male observed on 29 July 2003 on a humid slope in Piritama (*c*.1,600 m) at ANU Los Estoraques. Although previously collected at Buenos Aires and Alto del Pozo on the Ábrego–Sardinata road (*c*.30 km south-east of our record), this is the northernmost record of *C. h. tamai* in the northern East Andes (Rodríguez-Toloza 1985). Given its tolerance of 'more open or bushier terrain than other *Coeligena* in Colombia' (Hilty & Brown 1986), presence further north in the Serranía de los Motilones is probable (Hilty 2002).

CHESTNUT-BELLIED HUMMINGBIRD *Saucerottia castaneiventris*

Six individuals were trapped at El Pantano on 23–24 April 2014, and at least three were seen in scrub bordering the marsh and surrounding crops. This abundance contrasted with the absence of records on 29–30 November 2006 at the same site. El Pantano is *c*.18 km south-east of Portugal where at least eight were collected by M. A. Carriker during March–May 1962–64 (Renjifo *et al*. 2002, Biomap 2014). The species also went unrecorded around Portugal during 18 days of field work in May–June and October–September 2005 (JEA pers. obs.), although it was seen on 25 November 2018 (https://ebird.org/checklist/S50219526). The species' unpredictability at these localities could result from poorly understood, seasonal movements in response to breeding and local flowering events (BirdLife International 2019). Additional studies in the Chicamocha-Sogamoso drainage are needed to understand the phenology, particularly seasonal movements, of this globally threatened species.

ASH-THROATED CRAKE *Mustelirallus albicollis*

One to two individuals heard giving the typical vibrating rattled song at El Pantano in November 2006 and April 2014. As observers have become familiar with its vocalisation, the species has been recorded at adjacent localities, from the Serranía de los Yariguíes (XC273615) south to Virolín (https://ebird.org/checklist/S93339492). Mainly distributed in the *llanos* in Colombia, but occurs locally in the lower Magdalena and upper Cauca Valleys (Hilty & Brown 1986). However, it probably occurs more widely in the trans-Andean region given recent records in the northern Central Andes (Calderón-Franco *et al*. 2017) and in the middle and upper Magdalena Valley (https://ebird.org/checklist/S211401686).

SOLITARY EAGLE *Buteogallus solitarius*

One was initially seen perched at Granja El Puente on 8 June 2005. Its dark slate-grey appearance with a short tail and broad wings in flight eliminated similar raptors like Common Black Hawk *B. anthracinus* and Great Black Hawk *B. urubitinga*, found at lower elevations west of Bucaramanga (https://ebird.org/checklist/S45455799; https://ebird.org/

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checklist/S56299250). Previously known in the East Andes on the east slope in Caquetá and Boyacá, and further north in the Serranía de Perijá (Hilty & Brown 1986, Chaparro-Herrera & Laverde-R. 2014). One was recorded at El Rasgón and El Diviso between October 2002 and February 2003 (Roa-Cáceres & Guerrero-Higuita 2002), and it has recently been reported on the west slope of the Serranía de los Yariguíes (https://ebird.org/checklist/S4899602). These records extend the species' distribution *c.*300 km south along the west slope of the East Andes.

WHITE HAWK *Pseudastur albicollis*

A soaring individual was seen at Las Amarillas on 10 September 2009. This record together with recent sightings west of the Serranía de los Yariguíes and Ocaña (https://ebird.org/checklist/S110109820; https://ebird.org/checklist/S209666754) close a gap between the Serranía de Perijá (Hilty & Brown 1986) and Serranía de las Quinchas (Stiles & Bohórquez 1999), suggesting a more continuous distribution in the foothills of the cordillera.

WHITE-THROATED HAWK *Buteo albigula*

An adult was seen flying above steep slopes with montane and high-Andean forest at Bucaré on 20–21 July 2006. Recently photographed on the west slope between Ábrego and Cáchira, Norte de Santander, on 14 February 2021 (https://ebird.org/checklist/S114888769), and on the east slope at Tamá National Park on 28 August 2008 (https://ebird.org/checklist/S29526521). The overall brown-and-white appearance, with dark flank patches, and streaks mostly confined to the sides of breast and flanks, distinguished this species from Short-tailed *B. brachyurus* and Broad-winged Hawks *B. platypterus*. These records, as well as most of those from the Sabana de Bogotá (April–September; eBird.org), probably involved austral migrants, but there is a possibility that the species breeds in the northern Andes (Trejo *et al*. 2007). The status of populations in the Central and West Andes of Colombia is unknown (Hilty & Brown 1986, Trejo *et al*. 2007), although the Venezuelan population in Mérida is considered resident (Hilty 2002). More field observations and searches for nests are needed to clarify the species' status in the Colombia. These are the first records for the northern East Andes and a range extension of *c.*250 km from the Mérida Andes and *c.*320 km from the Sabana de Bogotá.

RUFESCENT SCREECH OWL *Megascops ingens*

Singles recorded at several localities from 1,600–2,100 m in the Cerro La Judía (Los Maklenkes; XC604136), Guarumales, and northernmost localities in the foothills of the Santurbán massif (El Brasil, El Aburrido alto, Honduras [XC282412], Bremen). Distinguished from Cinnamon Screech Owl *M. petersoni*, which also occurs at mid-elevations, by the longer and higher-pitched territorial song (Krabbe 2017), larger size, and overall brown plumage with variable amounts of white-buff (ICN 34994). These records fill a gap between populations in the Serranía de Perijá, the Mérida Andes in Venezuela (Hilty & Brown 1986, Hilty 2002), the west slope of the Serranía de los Yariguíes, and its southernmost records on the west slope at Reserva Biológica Cachalú in Encino, Santander, and Bojacá, Cundinamarca (Donegan *et al*. 2010, Chaparro-Herrera *et al*. 2014, 2018).

CINNAMON SCREECH OWL *Megascops petersoni*

Two adults and a juvenile female were mist-netted in primary forest at Los Maklenkes (1,960 m) on 6 February 2004. Both adults were released but the juvenile was collected (UIS-AV 2815). This specimen has overall less cinnamon plumage than the adults, with browner upperparts (Fig. 3); and matches an uncatalogued UIS-AV specimen, which has apparently

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Figure 3. Age-related plumage variation in Cinnamon Screech Owl *Megascops petersoni* specimens from Santander. The juvenile (left image, and right individual in the centre and right images; UIS-AV 2815) is less cinnamon than the adult (UIS-AV 2180), with browner upperparts, as well as more yellowish underparts and a barred pattern on the wing-coverts (Elkin R. Briceño-L. & Enrique Arbeláez-Cortés)

lost its original label (Arbeláez-Cortés *et al*. 2020). Most records in Colombia are from three regions: the northern Central Andes at Anorí, Antioquia (Cuervo *et al*. 2008, Freeman & Julio 2010), the east slope of the East Andes at Cubarral, Meta (Chaparro-Herrera *et al*. 2014), and on the west slope from Parque Natural Chicaque in Cundinamarca (XC265391) to the Serranía de los Yariguíes (Arbeláez-Cortés *et al*. 2020). Thus, our record fills a gap between the East Andes and records from Páramo de Tamá in Venezuela (Naveda-Rodríguez & Torres 2015). Breeding data are limited to two nest cavity descriptions and a single-egg clutch (Freeman & Julio 2010, Alarcón & Shanee 2022). Our observation of a juvenile suggests breeding occurs during the early dry season (November–February) on the west slope, in alignment with previous dry-season breeding records in the Central Andes and Ecuador.

SHORT-EARED OWL *Asio flammeus*

A lone individual was observed in November 2003 in Helechales at 1,100 m. Other larger owls like Striped Owl *Asio clamator* and Spectacled Owl *Pulsatrix perspicillata* occur at the same locality (JEA pers. obs.). However, it lacked conspicuous ear-tufts, and had yellow eyes, a buff-and-white facial disc and tawny-buff underparts streaked dark brown, which are distinctive for Short-eared Owl (Hilty & Brown 1986). It perched for a few seconds at 2 m on a small bush, then departed in bounding flight. In the East Andes mostly found in the altiplano Cundiboyacense, from the Sabana de Bogotá north to Tunja (Chaparro-Herrera *et al*. 2014). Ours and recent records in El Páramo, Barichara and Páramo del Almorzadero (https://ebird.org/checklist/S70743238; https://ebird.org/checklist/S204380454) extend the species' distribution *c*.160 km north in the cordillera.

WHITE-MANTLED BARBET *Capito hypoleucus*

A male was observed foraging 10–12 m above ground at Honduras on 12 May 2007 and a flock of four was seen at Bremen in June 2007 performing an agonistic display towards a raptor hidden in second growth. The vocal display and movements of the group were led by a very active female, which held its body stretched with the tail horizontal or

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erect, and changed position rapidly close to the unidentified raptor. The behaviour lasted eight minutes and attracted a Crimson-rumped Toucanet *Aulacorhynchus haematopygus* and a mixed-species flock of tanagers, flycatchers and warblers. The nearest previous records of this threatened species are from Cundinamarca (Hilty & Brown 1986) and, more recently, the Serranía de las Quinchas, the west slope of Serranía de los Yariguíes, and Serranía de la Paz (Stiles & Bohórquez 2000, Donegan *et al*. 2007). The population north of Bucaramanga is now known to be the northernmost in the East Andes, following recent sightings at a location some 30 km north of ours (https://ebird.org/checklist/S198623219).

BROWN-BREASTED PARAKEET *Pyrrhura calliptera*

Seen in pairs and small flocks (*c*.10 individuals) at Llano adentro and El Picacho on the west slope at 3,150–3,400 m, and at Sisavita-La Grande on the east slope. These are the northernmost records on the both slopes. The nearest previous records are *c*.100 km to the south at Soatá, Boyacá on the west slope and El Peñón, Santander (Córdoba-Córdoba & Sierra 2018) and Tamá National Park on the east slope (Renjifo *et al*. 2002, Botero-Delgadillo *et al*. 2014).

RUSSET ANTSHRIKE *Thamnistes anabatinus*

A female (IAvH-A 10903) collected at vereda El Diamante, municipality of Toledo, Tamá National Park, Norte de Santander in September 1999 has the rich-coloured throat and

Figure 4. Geographic variation in three subspecies of Russet Antshrike *Thamnistes anabatinus* found in Colombia, from left to right: *T. a. intermedius* (male, ICN 15909), Mutatá, Río Imamandó, Antioquia; *T. a. aequatorialis* (male, IAvH-A 11360), San José de la Fragua, vereda La Esmeralda, alto Río Yurayaco, Caquetá; *T. a. gularis* (female, IAvH-A 10903), Toledo, vereda El Diamante, Tamá National Park, Norte de Santander; note the more ochraceous (less yellowish throat) in *T. a. gularis* compared to the other two taxa (Jorge Enrique Avendaño)

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underparts typical of *T. a. gularis* (Fig. 4). This identification was confirmed by comparing the specimen with the geographically adjacent *T. a. aequatorialis*, which has an olive-yellow throat and olive underparts, and ranges over the east slope of the East Andes from the Serranía de la Macarena south to the Marañón River, and *T. a. intermedius* from the Pacific slope of Colombia and Ecuador, which has much darker underparts than *gularis* and *aequatorialis* (Zimmer & Isler 2003; Fig. 4). *T. a. gularis* was previously known from only a single locality in the south-western Venezuelan Andes (Hilty 2002, Zimmer & Isler 2003). Ours is the first record of *gularis* for Colombia. Recent sightings in the foothills of Arauca and Meta may pertain to *T. a. aequatorialis* (https://ebird.org/checklist/S52174411; https://ebird.org/checklist/S288596481).

CHESNUT-CROWNED GNATEATER *Conopophaga castaneiceps*
Commonly heard and mist-netted in secondary forest at El Aburrido alto, Honduras and Bremen. At Honduras two females and three males were collected (ICN 36362, 36365–66, 36373, 36377) with two additional males heard along a 200 m transect, which suggests a density estimate of >1 pair/ha in appropriate habitat. All were collected in May and had gonads larger than specimens collected in December 2006 at Serranía de los Yariguíes (JEA pers. obs.), which suggests they were in breeding condition. Previously recorded on the east slope of the East Andes (Salaman *et al*. 2002b) and from the Serranía de las Quinchas and the west slope of the Serranía de los Yariguíes (Stiles & Bohórquez 1999, Donegan *et al*. 2007). Our records represent the species' northernmost locality in the East Andes.

UNDULATED ANTPITTA *Grallaria squamigera*
Singles heard in high-Andean forest and *subpáramo* at Bucaré, Fuego Verde, Los Laches and Las Picotas (XC282395), with a recent record at Molagavita (https://ebird.org/checklist/S71070586) on the west slope. Although Great Antpitta *G. excelsa* is known from the adjacent Venezuelan Andes (Hilty 2002), the song recorded at Las Picotas is shorter, with fewer notes and a slower pace than the latter species (Fig. 5). In addition, three overlooked specimens from Pamplona and Cáchira in Norte de Santander confirm its presence on the east slope (Nicéforo María & Olivares 1968, Biomap 2014). Mostly known from Bogotá and environs (Hilty & Brown 1986), but recently recorded further north in the altiplano Cundiboyacense at Soatá (XC471158), and the west slope of Serranía de los Yariguíes (https://ebird.org/checklist/S61764403). All these records suggest a continuous distribution on both slopes from the altiplano to the northern part of the cordillera.

RUSTY-BREASTED ANTPITTA *Grallaricula ferrugineipectus*
An unsexed individual collected on 18 November 2007 at El Sinaí (UIS-AV 1543) and a series of five collected at San José de Suaita, Santander, have been assigned to the nominate subspecies (ICN; F. G. Stiles pers. comm.). Previously known on the east slope at Chinácota and Tamá National Park in Norte de Santander (Nicéforo María & Olivares 1968, Socolar & Peña 2022), and in Cundinamarca on the west slope (Nicéforo María 1947, Hilty & Brown 1986). The Santander records extend the species' range *c.*300 km northwards on the west slope.

STREAK-CAPPED TREEHUNTER *Thripadectes virgaticeps*
Singles at El Sinaí and above Floridablanca (https://ebird.org/checklist/S68133338). Recently collected in the Serranía de los Yariguíes and at San José de Suaita, Santander (Donegan *et*

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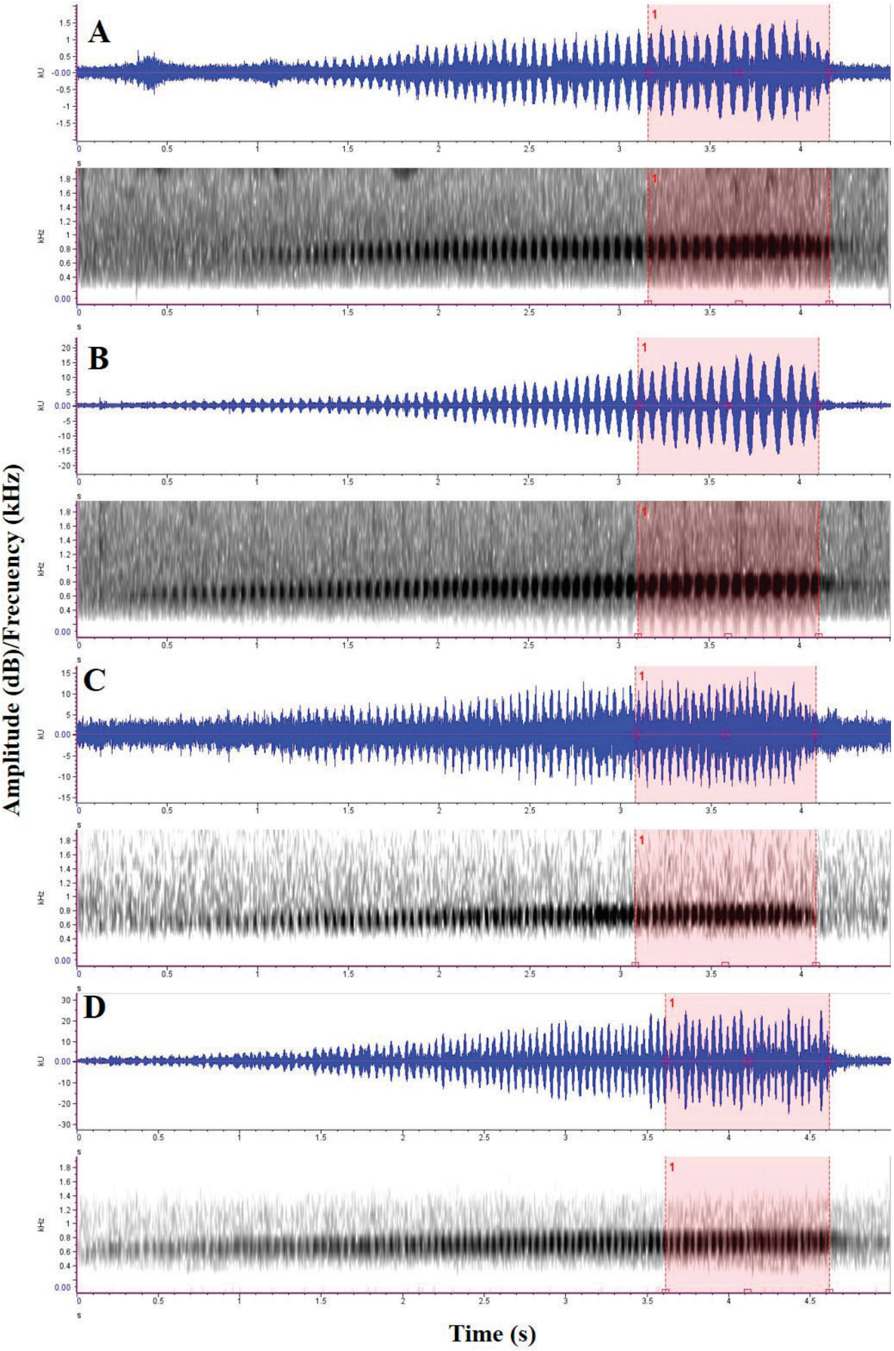

Figure 5. Comparative sonograms of the songs of Undulated Antpitta *Grallaria squamigera* (A–B) and Great Antpitta *G. excelsa* (C–D). Recordings are from: (A) Las Picotas, Santander, Colombia (this study; XC282395); (B) Iguaque, Boyacá, Colombia (XC119727); (C) El Morro, Mérida, Venezuela (XC223614); Yacambú National Park, Lara, Venezuela (XC223615). The red box highlights the final second of each song, illustrating one of the diagnostic differences between these taxa: songs of *G. squamigera* (A–B) contain fewer notes and a slower terminal pace compared to those of *G. excelsa* (C–D). Sonograms created in Raven Pro 1.6.4 using a Blackman window type (DFT size = 512 samples), adjusting contrast and brightness for each recording, and applying a noise filter (0–400 Hz).

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al. 2007), and at El Diamante (Tamá National Park) on the east slope (IAvH-A 10857, 10885). Tamá specimens have diffuse streaks on the throat grading gradually into the olive-ochre breast, characteristic of Venezuelan *T. v. tachirensis* (Fig. 6), confirming the presence of this taxon in Colombia, as had been suggested by Socolar & Peña (2022) who sound-recorded the species at San Alberto, municipality of Toledo. These plumage characters are intermediate between *magdalenae* (slight streaks, yellowish-brown underparts) from the west slope of the East Andes, and *sclateri* (darker streaks, overall plumage dark brown) mostly from the west slope of the Central Andes (Phelps & Phelps Jr. 1958, Remsen 2003). Although specimens from the west slope of the East Andes in Santander (ICN 33372, 36190) have been assigned to *magdalenae*, they differ in their darker throat streaking and darker olive-brown underparts, suggesting that the taxonomy of the group in the region may be more complex than currently recognised. This possibility is further supported by the suggestion that birds on the Venezuelan slope of the Serranía de Perijá represent an undescribed subspecies (Lentino *et al*. 2004).

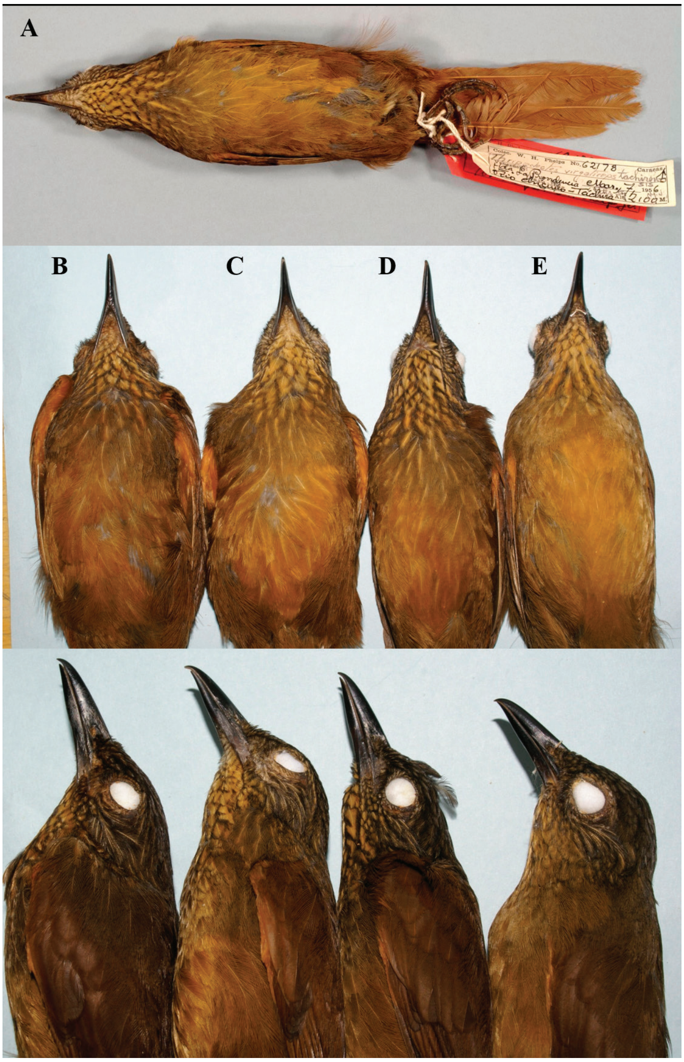

Figure 6. Geographic variation in Streak-capped Treehunter *Thripadectes virgaticeps* in Colombia and Venezuela. Specimens from the east slope of the East Andes in Tamá National Park (C) are more similar to *T. v. tachirensis* from the Mérida Andes (A). In contrast, specimens from the west slope of the East Andes in Santander (D) exhibit differences in the underparts compared to *T. v. tachirensis* (A, C) and *T. v. magdalenae* (E), which is assumed to be present on the west slope in Santander. Note that the Santander specimen (D) has darker underparts similar to *T. v. sclateri* (B) from the West Andes of Colombia. Specimens as follows: (A) Holotype of *T. v. tachirensis* (male, COP 62178, currently at the American Museum of Natural History, New York), Hacienda La Providencia, Río Chiquito, Táchira, Venezuela. (B) *T. v. sclateri* (male, ICN 32282), corregimiento Altaquer, Barbacoas, Nariño, Colombia. (C) *T. v. tachirensis* (male, IAvH-A 10885), vereda El Diamante, Cerro de San Agustín, Toledo, Tamá National Park, Norte de Santander. (D) *T. v. tachirensis* (male, ICN 33372), Suaita, *c*.4 km east-northeast of San José de Suaita, La Meseta, Santander. (E) *T. v. magdalenae* (male, ICN 38626), vereda Salazar, Finca Bodega Vieja, Trocha Aguadeña, Amalfi, Antioquia, Colombia (Paul Sweet, M. Shanley & Jorge Enrique Avendaño)

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ANDEAN TIT-SPINETAIL *Leptasthenura andicola*
Lone individuals seen in *subpáramo* vegetation at El Salado and Laguna de Cuntas in Páramo de Santurbán, near Berlín, where M. A. Carriker collected a female (MVZ 154535) in 1964. Recent sightings southwards in Santander are from Páramo del Almorzadero, municipality of Cerrito (https://ebird.org/checklist/S33897409). Previously known from the Sierra Nevada del Cocuy south to Cundinamarca (Olivares 1973, Hilty & Brown 1986), ours are the first records for Santander and extend the species' known range on the west slope by *c*.100 km.

WHITE-BROWED SPINETAIL *Hellmayrea gularis*
Seen at the high-Andean forest-*subpáramo* transition at El Picacho, Pico Cerro La Judía, El Salado, and southward in the municipality of Santa Bárbara (https://ebird.org/checklist/S50133914). These records close a gap in the species' distribution in the East Andes as it is known from the Serranía de los Yariguíes and the east slope in Norte de Santander south to Cundinamarca (Hilty & Brown 1986, Donegan *et al*. 2007). This is particularly relevant because populations in the northern sector, to which our records belong, are genetically and phenotypically divergent from southern populations (López-O. *et al*. 2014), highlighting the biogeographic significance of this region.

GOLDEN-WINGED MANAKIN *Masius chrysopterus*
Single males and females in secondary forest at El Aburrido alto, Honduras, Bremen and El Sinaí (UIS-AV 1537) are the northernmost records on the west slope after recent records from the Serranía de los Yariguíes, southern Santander (Donegan *et al*. 2007) and Serranía de las Quinchas (Laverde-R. *et al*. 2005). Two males collected at El Aburrido alto (ICN 35560–61) have the hindcrown and nape broadly tipped orange like the nominate subspecies (Restall *et al*. 2006), which is known from the west slope of the cordillera in the upper Magdalena Valley north to Cundinamarca (Hilty & Brown 1986), and the Venezuelan Andes. It was not recorded at any of the localities on the east slope surveyed; however, a recent record at Lourdes in Norte de Santander (https://ebird.org/checklist/S131057391) confirms its presence there.

WHITE-THROATED SPADEBILL *Platyrinchus mystaceus*
Seen and mist-netted at several localities on the west slope: La Honda, Cañaverales, Maklenkes, El Diviso, El Brasil, El Aburrido alto, Honduras (ICN 36380) and El Sinaí (UIS-AV 1534); with recent records further north at El Playón (https://ebird.org/checklist/S164021250), and to the south at San José de Suaita (XC245138), Coromoro (Arbeláez-Cortés *et al*. 2023), Charalá and Encino (ICN specimens). On the east slope collected at El Diamante (Tamá National Park; IAvH-A 10799, 10900) filling a distributional gap between the Mérida Andes and local populations on the west slope of the cordillera (Salaman *et al*. 2002b, 2007, Laverde-R. *et al*. 2005).

YELLOW-THROATED SPADEBILL *Platyrinchus flavigularis*
One mist-netted and collected (ICN 35792) at El Brasil; and recently seen and tape-recorded on the west slope of the Serranía de los Yariguíes (https://ebird.org/checklist/S18236396; XC14026). Our specimen belongs to the nominate subspecies. This rare species is known locally in Colombia from the Serranía de Perijá, the west slope of the East Andes in Cundinamarca and Huila, and the east slope in Nariño and the Sierra de la Macarena (Hilty & Brown 1986, Salaman *et al*. 2002b).

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RUFOUS-HEADED PYGMY TYRANT *Pseudotriccus ruficeps*
Singles seen at El Aburrido alto, and recently southwards in Tona and Málaga, Santander (https://ebird.org/checklist/S49004518). Previously known on the east slope from Pajarito, Boyacá, south to Nariño (Hilty & Brown 1986, Salaman *et al*. 2002b) although its range extends north to Cáchira, Norte de Santander (Biomap 2014) and Apure, Venezuela (XC6128). It is known locally on the west slope of the East Andes in Huila, Cundinamarca and on both slopes of the Serranía de los Yariguíes (Hilty & Brown 1986, Donegan *et al*. 2007). Ours is the northernmost record on the west slope of the cordillera.

RUFOUS-BROWED TYRANNULET *Phylloscartes superciliaris*
Singles at Bremen, Cerro La Judía and Parque La Niebla (https://ebird.org/checklist/S237772247). Known locally in the East Andes by historical specimens from Virolín, Santander (Hilty & Brown 1986, Biomap 2014) and recent sightings in the Serranía de las Quinchas and the Serranía de los Yariguíes (Laverde-R. *et al*. 2005, Donegan *et al*. 2010). These records are the northernmost on the west slope of the East Andes.

CROWNED CHAT-TYRANT *Silvicultrix frontalis*
Singles observed on the west slope at 2,950–3,100 m, at El Picacho, Filo El Rasgón, and at Sisavita-Salinas at 2,200 m. These records fill a gap in the northern part of the cordillera. Previously known from southern Norte de Santander and Cundinamarca (Hilty & Brown 1986, Socolar & Peña 2022), with recent specimens from Iguaque, Boyacá (IAvH-A 12288–89; 3,220 m) and a sight record in northern Boyacá (http://ebird.org/checklist/S55982210). The species' patchy distribution probably reflects its restriction to a narrow elevational band at the high-Andean forest/*subpáramo* transition.

BLACK-HOODED THRUSH *Turdus olivater*
One was seen at Guarumales in November 2001. Previously known from the Serranía de Perijá and the east slope of the East Andes in Norte de Santander (Hilty & Brown 1986, López-O. *et al*. 2014). Our record is the first for the west slope of the cordillera of this poorly known thrush.

COMMON CHLOROSPINGUS *Chlorospingus flavopectus trudis/jacqueti*
Very common at El Tablón where 14 were collected (ICN 37552–53, 37556, 37563–69, 37571–72, 37574; ANDES-O 602) on 10–16 September 2009, and one was seen at La Pica in July 2009. All specimens pertained to the Colombian endemic *C. f. trudis*, which differs from nominate *flavopectus* (found southwards in Coromoro and Virolín) by its more yellowish-green upperparts, paler crown and smaller size (Olson 1983, Arbeláez-Cortés *et al*. 2023). Until now, *trudis* was known only from the type locality, La Pica (Paynter 1997), which is located in Molagavita *c*.3 km east of our study site (Table 1). Our series included four males (three adults, one subadult) and ten females (four adults, one subadult, five immatures), which were aged based on skull ossification, gonad size, rictus and iris coloration. Full adults have a dark brick-red iris, whilst subadults have the iris reddish brown, and immatures have mostly brown irides, with the youngest individuals being greenish grey. The presence of immatures and small testis and ovary sizes in adults agree with nesting records for *flavopectus* during August 1999 in the altiplano Cundiboyacense (Cadena *et al*. 2007), suggesting that breeding probably occurs during the second dry season of the year (July–August). On the other hand, (Olson 1983) found *C. f. jacqueti* separated by *c*.40 km (to the north) of *trudis* with no evident geographic barrier between them, and suggested special attention be paid to any contact zone, as these taxa belong to morphologically distinct groups

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(i.e., *flavopectus* and *ophthalmicus*), which may represent separate species. Interestingly, we found *jacqueti* (greyish-brown head and white postocular spot) to occur with *trudis* at El Tablón, occupying similar habitats in smaller numbers, but behaving differently. Whilst *trudis* foraged in family groups of 6–8 mostly in tall bushes and forest borders, *jacqueti* moved singly or in pairs in the understorey and canopy of primary forest. They were never seen foraging together. Furthermore, we heard presumed *trudis* males singing the typical dawn song of *flavopectus* from Cundinamarca and Boyacá, whereas *jacqueti* was heard during the daytime singing the typical rhythmic series of *chit* notes of other *ophthalmicus* populations in Colombia (Cadena *et al*. 2007, Avendaño *et al*. 2013b). This evidence, coupled with an ongoing integrative taxonomic analysis, suggests that populations of *C. flavopectus* in the East Andes of Colombia may comprise at least two species (Cordoba-Cordoba 2014, Rodríguez *et al*. unpubl. data).

WHITE-NAPED BRUSHFINCH *Atlapetes albinucha*
Singles observed at Guarumales, and recently at Los Maklenkes and the road between Bucaramanga and Páramo de Berlín (https://ebird.org/checklist/S76418617), where often sympatric with Moustached Brushfinch *A. albofrenatus*. These records fill a distributional gap between the altiplano Cundiboyacense and Serranía de los Yariguíes (Hilty & Brown 1986, Donegan *et al*. 2007), and scattered records in Ocaña and the east slope in Pamplona (https://ebird.org/checklist/S159105969; https://ebird.org/checklist/S284416485).

SCARLET-RUMPED CACIQUE *Cacicus uropygialis*
Singles or pairs at El Sinaí, La Plazuela and El Rasgón, with recent sightings on both slopes of the Páramo de Santurbán (https://ebird.org/checklist/S119927687). Known locally on the west slope from Cundinamarca north to the Sierra Nevada del Cocuy (Hilty & Brown 1986). Also recorded on the west slope of Serranía de los Yariguíes (Donegan *et al*. 2007, Arbeláez-Cortés *et al*. 2020), and on the east slope from the municipality of Bochalema south to Serranía de los Churumbelos, where it is locally abundant in larger forest patches (Renjifo *et al*. 2002). Our records represent a minor extension from the Serranía de los Yariguíes to the northern tip of the cordillera of this rare and local montane taxon.

PÁRAMO SEEDEATER *Catamenia homochroa*
Singles or small groups at Páramo de Santurbán (Los Laches, El Romeral and El Salado), with other records at Páramos de Berlín, Almorzadero and Tamá (https://ebird.org/checklist/S70743238; https://ebird.org/checklist/S25474529) suggesting a local distribution on both slopes in this part of the cordillera. The nearest records are from the altiplano Cundiboyacense, Serranía de los Yariguíes, and Mérida Andes (Hilty & Brown 1986, Hilty 2002, Donegan *et al*. 2007).

SLATY FINCH *Haplospiza rustica*
Singles observed and mist-netted at El Diviso, La Mata alta and alto Río Manco (ICN 36422), with recent sightings and specimens from Suratá and Santa Bárbara (Arbeláez-Cortés *et al*. 2020; https://ebird.org/checklist/S41231357). Previous records on the west slope are from the north at Cachirí, Las Ventanas and Buenos Aires (Biomap 2014), and the Serranía de los Yariguíes (Donegan *et al*. 2007); whilst it is known on the east slope only at Páramo de Tamá (Orocué; IAvH-14970) and Tierra Negra (https://ebird.org/checklist/S214749736). Its patchy distribution reflects a nomadic strategy to track irregular *Chusquea* bamboo masting events, a crucial resource for breeding (Hilty 2002). Thus, the species' occurrence is limited by the

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ephemeral availability of this food source (Ramírez-Narváez & Velasco-Linares 2016), not only by the presence of bamboo or large forest patches.

BLACK-HEADED HEMISPINGUS *Pseudospingus verticalis*
Mist-netted and collected at La Palmita (ICN 36128–29), Alto Río Manco (ICN 36414), Los Laches (ICN 37500) and El Romeral on the west slope, with recent records further south at Onzaga (https://ebird.org/checklist/S27471910). Previously known on the east slope from Ramírez south (Hilty & Brown 1986, Biomap 2014). Our records suggest a continuous distribution along both slopes of the northern part of the cordillera south to Cundinamarca.

BLACK-EARED HEMISPINGUS *Sphenopsis melanotis*
Mist-netted and collected at Sector Orocué (IAvH-A 10671, 10695, 14814, 14891, 14924) and Sisavita-La Grande (IAvH-A 12053). There are also several specimens from Las Ventanas and Ramírez (Biomap 2014) and recent records around Chinácota (https://ebird.org/checklist/S121116224). Previously known on the west slope of the cordillera from Santander south to Cundinamarca, where it also occurs on the east slope (Hilty & Brown 1986, Donegan *et al*. 2007). These records fill a gap in the species' range between the east slope of the cordillera and the Venezuelan Andes in Táchira (Hilty 2002).

SOOTY GRASSQUIT *Asemospiza fuliginosa*
Seen and mist-netted at La Honda (ICN 35809, 35816), Cañaverales (ICN 35551, 35806), El Pantano, Las Amarillas and Helechales (*c*.1,100 m). It was common in shrubbery and secondary forest edges at Rionegro where 14 females, three males and two immatures were trapped. Collected by M. A. Carriker in the 1960s at nearby localities in Lebrija (Portugal, Palonegro) and Girón (Cedrito de Lebrija) (Biomap 2014). These scattered records may reflect its local distribution and presumably nomadic movements (Hilty & Brown 1986). However, mist-net data from recent surveyed sites in Santa Marta and the Serranías de los Yariguíes and San Lucas suggest it is locally abundant (Strewe & Navarro 2004, Donegan *et al*. 2007, Donegan 2012). Our specimens are the only ones in a Colombian museum.

LACRIMOSE MOUNTAIN TANAGER *Anisognathus lacrymosus*
A single at La Palmita on 20 August 2006 was foraging in the canopy of Andean forest, with a recent record near Alto de Cachirí (https://ebird.org/checklist/S186444979). Given its slaty-blue upperparts and dark green face, the individual probably involved *A. l. tamae*, which was known from Paramo de Tamá in Venezuela south to Norte de Santander and Boyacá on the east slope of the East Andes (Donegan & Avendaño 2010, Hilty 2011). Thus, these records extend the species' range to the west slope of the cordillera.

Discussion

Documentation of the avifauna of the northern East Andes of Colombia (in Santander and Norte de Santander) has followed a punctuated trajectory. An initial wave of collecting efforts by foreign and local ornithologists spanned 1870 to the mid-1970s. These historical collections were heavily biased towards the vicinity of Bucaramanga and the west bank of the Magdalena River (Avendaño 2017), whilst vast areas, particularly the east slope in Norte de Santander, have seen only sporadic study since the mid-20th century (Nicéforo María 1945, 1947, 1948, 1955, Córdoba-Córdoba *et al*. 2002, Socolar & Peña 2022). Following a prolonged period of limited activity from the mid-1970s to the late 2000s, the last decade has seen renewed, albeit local, efforts exemplified by the growth of institutional collections such as UIS-AV (Arbeláez-Cortés *et al*. in press). Despite these valuable contributions,

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our understanding of the region's avifauna remains fragmentary. Thus, even with the integration of historical data (Hilty & Brown 1986) and modern citizen science repositories (eBird.org; xeno-canto.org) into modern field guides (Ayerbe-Quiñones 2019, McMullan 2021), substantial knowledge gaps endure. The 38 distributional records reported here confirm that the avifauna of this complex landscape is still incompletely documented, highlighting the need for continued and systematic exploration across under-surveyed areas.

Because our sampling focused mostly on elevations between 1,700 m and 3,000 m on both slopes of the cordillera, our records primarily fill distributional gaps for species restricted to premontane (42%) and montane (24%) elevations, previously known to occur north of the Sierra Nevada del Cocuy, southern Santander, and the Serranía de los Yariguíes (Hilty & Brown 1986, Donegan *et al*. 2010). In addition, we gathered novel data on species known from scattered records on the east slope, the Mérida Andes and trans-Andean lowlands (Hilty & Brown 1986, Hilty 2002). Although these findings enhance our understanding of the geographic and ecological distribution of these species, future surveys of the east slope in Norte de Santander will undoubtedly produce further novel data as recently found by others (Socolar & Peña 2022). Moreover, there are areas of the cordillera that deserve further exploration, like the remnant montane forest between Suratá (07°22'N) and the Serranía de los Motilones, and the *páramo* ecosystems between Páramo del Almorzadero and Sierra Nevada del Cocuy (Suárez-Sanabria & Cadena 2014). However, the least-explored region corresponds to the east slope of the Sierra Nevada del Cocuy in the departments of Norte de Santander, Boyacá and Arauca (Olivares 1973, Acevedo-Charry 2017). This may represent one of the last continuous elevational gradients (*c*.500–3,500 m) in Colombia embracing savanna and humid forests at its base to *páramo* in the highlands.

One of the poorly represented ecosystems in our study were dry and humid forests in the cordillera's foothills (800–1,500 m). This sampling bias may reflect improved security conditions in Colombia in recent decades, as the decline in armed conflict permitted ornithologists to safely access and study montane areas that were previously inaccessible or too dangerous for sustained field work (e.g. Donegan *et al*. 2010, López-O. *et al*. 2014). However, an additional explanation is the difficulty in locating relatively well-conserved relicts of dry and humid forest, particularly on the west slope of the cordillera, because they are mostly restricted to small and fragmented patches associated with streams, rivers and steep slopes (Stiles & Bohórquez 2000, Pizano *et al*. 2014). Despite this, we advocate the continued exploration of these foothill habitats because they harbour unique and poorly documented bird communities (Acevedo-Charry 2017, Collazos-González & Echeverry-Galvis 2017, Avendaño *et al*. 2018a,b), as well as populations of threatened or locally distributed species.

This is the case for degraded patchy habitats like the marsh known as El Pantano, where the abundance of Chestnut-bellied Hummingbird *Saucerottia castaneiventris* seems to fluctuate seasonally. Further, a single White-tailed Goldenthroat *Polytmus guainumbi* observed at this locality is one of the three known records in the Magdalena Valley of this trans-Andean population, which is also known from specimens collected at the Atrato River in the 1970s and a recent sighting between Pueblo Nuevo and Ocaña (Freeman *et al*. 2012, Avendaño *et al*. 2013a). A local population of Recurve-billed Bushbird *Clytoctantes alixii* was discovered in 2009 in a small patch of second growth in Vereda Vijagual (895 m), north of Bucaramanga (Herrera-Ordóñez & Rincón-Guarín 2014). Since then, many records have accumulated around this locality (eBird.org); however, few efforts have been made to search for the species at El Tambor (middle Lebrija River watershed) where M. A. Carriker collected two males in 1916–17 (Rogers 2022). As Carriker (1955) pointed out, it is possible

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that the apparent rarity of this species may be an artefact of the difficulty of searching for it in 'the most impenetrable type of second-growth'. In sum, the above examples highlight the need for continuing field work at historical ornithological localities to gain a better picture of the distribution and status of poorly known species.

This task has been advanced by a large community of citizen scientists in Colombia. As of January 2026, more than 30,000 birdwatchers have contributed to eBird in the country, generating thousands of bird records and sound-recordings (eBird.org). However, while citizen science platforms like eBird provided valuable complementary data for our study, their utility in filling fine-scale distributional gaps is often limited by inconsistent metadata. A common issue is the lack of precise locality descriptions (e.g., municipality, vereda or site name) beyond geographical coordinates, making it difficult to confirm unique sites or reconcile records with historical data. This issue echoes challenges represented by vaguely labelled museum specimens (e.g., Santander) and underscores that precise spatial referencing for future inventories requires both coordinates and standardised locality descriptions (Chapman & Wieczorek 2020). Our experience confirms that improvements will be essential for effectively leveraging citizen science data to resolve detailed distributional patterns in complex landscapes like the northern East Andes. Ultimately, maximising the long-term scientific value of ornithological observations, whether from citizen scientists or researchers, requires meticulous documentation, including detailed habitat notes and precise locality descriptions, ensuring that modern data remain useful for decades to come (Remsen 1977).

Our study also demonstrates the significance of supplementing visual and auditory data with the collection of specimens, which were crucial to confirm taxonomically difficult taxa like the poorly known *Chaetura chapmani* and the subspecies *Thamnistes anabatinus gularis* and *Thripadectes virgaticeps tachirensis*, both previously known only from the Venezuelan Andes. Likewise, specimen collection permitted knowledge of the juvenile plumage of *Megascops petersoni*, which was not previously described. The series of *Chlorospingus flavopectus trudis* we collected represents the first in a national collection and has been used to clarify distribution and species limits within the *C. flavopectus* complex (Rodríguez *et al*. in prep.). Recent studies in Santander have included the collection of specimens as part of inventories (Donegan *et al*. 2007, Córdoba-Córdoba & Sierra 2018, Arbeláez-Cortés *et al*. 2020, 2023) and for the description of new taxa (Donegan & Avendaño 2008, 2010, Donegan *et al*. 2013, Avendaño & Donegan 2015). Several of these specimens have been included in evolutionary studies that have unveiled interesting patterns of genetic differentiation such as the phylogeographic break between montane populations separated by the Chicamocha-Sogamoso Valley. In contrast, the depression that connects the Serranía de los Yariguíes with the rest of the East Andes (Graham *et al*. 2010) seems not to play a major role in restricting historical gene flow between populations of the serranía and the main cordillera at lower montane elevations (Palacios *et al*. 2019, Arbeláez-Cortés & Trujillo-Arias 2021). However, the presence of endemic subspecies restricted to the *páramo* of the Yariguíes Mountains (Donegan & Avendaño 2008, 2010) suggests that species in *páramo* habitats may tell a different evolutionary story from populations at lower elevations. Consequently, there is a need to continue collecting specimens to acquire a complete picture of the genetic patterns and biogeographic history of the East Andes avifauna, and that of the country in general (Cuervo *et al*. 2006, Avendaño *et al*. 2017a).

Conclusions

In sum, this study highlights the need for continued documentation of the avifauna in Colombia's East Andes, particularly in understudied areas like the east slope from Norte de

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Santander to Arauca and fragmented dry and humid foothill forests. Whilst recent efforts have filled distributional gaps, critical regions such as *páramos* and remnant montane forests remain poorly explored. The integration of historical data, contemporary observations and specimen collections has proven essential for understanding the distribution, taxonomy and evolutionary patterns of birds in this region. However, it is crucial to improve the quality of data collected by promoting rigorous documentation practices, such as detailed descriptions of localities and habitats, and complementing visual and auditory records with specimen collection. These efforts will not only enrich our understanding of the Colombian avifauna but also provide essential tools for the conservation of threatened species and management of vulnerable ecosystems. Finally, the role of citizen science and new technologies should be leveraged responsibly, ensuring that the data generated are accurate, detailed and useful for future generations of researchers and conservationists.

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Breeding biology and nest success of the East Amazonian Fire-eye *Pyriglena leuconota pernambucensis* in the Atlantic Forest of north-east Brazil

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Summary.—The breeding biology of the East Amazonian Fire-eye *Pyriglena leuconota* is not yet fully understood. We investigated the ecology of the north-eastern subspecies, *P. l. pernambucensis*, in an Atlantic Forest remnant on the border between Pernambuco and Alagoas, north-east Brazil. Between 1986 and 2022, we found 40 nests between September and June, indicating a protracted breeding season. Each active nest was monitored regularly from a hide. The closed/globular/base nest weighed on average 41.0 g and measured 17.7 × 16.8 cm. Clutch size was two eggs, measuring 24.6 × 17.9 mm, mass 4.0 g. Mean incubation and nestling periods were 15.5 and 13.1 days, respectively. Apparent nest success rate (nests where at least one nestling fledged) was 42.5%, but lower using the Mayfield method (34.1%). Nestlings were fed spiders and insects, supplemented with lizards and frogs from day ten onwards.

Pyriglena leuconota pernambucensis J. T. Zimmer, 1931, is one of the three currently recognised subspecies (Remsen *et al*. 2025) of the East Amazonian Fire-eye *P. leuconota* (Spix, 1824), which also includes *P. l. interposita* O. M. O. Pinto, 1947. Until recently, Western Fire-eye *P. maura* (Ménétries, 1835) and Tapajos Fire-eye *P. similis* J. T. Zimmer, 1931, were also part of the *P. leuconota* complex, but they are now considered species apart (Isler & Maldonado-Coelho 2017, Remsen *et al*. 2025). However, Pacheco *et al*. (2021) treated *P. l. pernambucensis* as a species, based on the genetic study by Maldonado-Coelho *et al*. (2013) and morphology; its taxonomic status requires further investigation (Maldonado-Coelho *et al*. 2013, Isler & Maldonado-Coelho 2017).

P. leuconota is endemic to Brazil, with *P. l. interposita* in southern Pará, from the rio Xingu to rio Tocantins and *P. l. leuconota* in eastern Pará (east of the rio Tocantins) and northern Maranhão (Zimmer *et al*. 2025). *P. l. pernambucensis* is a distinct population isolated in coastal north-east Brazil, in the states of Pernambuco and Alagoas (Zimmer *et al*. 2025), in the Pernambuco Endemism Centre (Silveira *et al*. 2003), one of the most devastated regions of the Atlantic Forest, where only 12.1% of the original vegetation remains (Ribeiro *et al*. 2009). *P. leuconota*, including *P. similis* and *P. maura*, is assessed as Least Concern on the IUCN Red List (BirdLife International 2024) but *P. l. pernambucensis* is treated as Vulnerable on the Brazilian Red List (Leal & Assis 2018).

P. leuconota occurs in the undergrowth of lowland and foothill evergreen forest (Zimmer *et al*. 2025). It shuns the relatively open understorey of mature forest, favouring instead the dense vegetation typical of mature second growth, forest edges and light gaps in primary forest. Its range extends to an elevation of 950 m. The species feeds on a variety of insects, especially orthopterans, as well as arachnids, centipedes, small lizards and slugs (Zimmer *et al*. 2025). In a study near Belém, Pará, lizards up to 11 cm long were the most commonly identified prey fed to older nestlings (Zimmer *et al*. 2025).

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Information on breeding is limited to a few studies in northern Pará (Oniki 1979, Willis 1981). According to geographical distribution, these studies involved either *P. l. interposita* or *P. l. leuconota*. As *P. l. pernambucensis* is geographically isolated, its biology, including reproductive ecology, may differ. Our aim here is to investigate the factors shaping the breeding biology of *P. l. pernambucensis* and compare it with published data on the other subspecies. We examined nest form and size, clutch and egg size, the breeding period, nesting success, and the diet of nestlings.

Study site and Methods

This study was conducted in and around Pedra Talhada Biological Reserve (09°11′–09°16′S, 36°22′–36°28′W), on the border of Alagoas and Pernambuco (Studer *et al*. 2015). This forest enclave forms part of the Atlantic Rainforest biome. Locally known as a 'brejo de altitude' (Studer *et al*. 2015), it is far more humid than the surrounding lowlands, with mean annual precipitation of 1,628 mm between 1912 and 1990 (Studer *et al*. 2015). The rainy season usually occurs from April–August but varies annually. Vegetation includes forests on level ground, slopes and rocky terrain, with both evergreen and deciduous trees reaching up to 35 m tall, as well as low vegetation on rocky outcrops, in clearings and marshes (Studer *et al*. 2015). Pristine vegetation that formerly surrounded the forest has been almost entirely destroyed, and today the forest is surrounded by private cattle ranches.

Nests were located either opportunistically or by observing conspicuous adult behaviour (Martin & Geupel 1993). Once an active nest was found, it was visited every 3–4 days, or every other day near hatching or fledging. If the exact date of hatching or fledging could not be determined, it was recorded as the median date of the two most recent visits (Dudley & Saab 2003). Observations using binoculars were made from a camouflaged hide sited 6–8 m from the nest. Opportunistic photographic and video recordings were also made when activity was observed around the nest.

We weighed the eggs using a Pesola Spring scale accurate to 0.1 g and measured their width and length using callipers accurate to 0.1 mm. Eggs were measured immediately after laying, or as soon as the nest was found if laying could not be determined. Nests were measured using a ruler (accurate to 0.5 cm) and their mass was measured using a spring scale (to 0.5 g), once the young had fledged, to minimise disturbance. They were measured on site and were not collected.

The incubation period was defined as the time between the date the last egg was laid and first nestling hatching. The nestling period was defined as the time between the hatching of the first egg and the fledging of the last nestling. A nest was considered successful if at least one nestling fledged. Nest success was calculated using the Mayfield method (Mayfield 1975). Notes were also taken on foraging and other breeding behaviour, and habitat preference.

Results

We found a total of 40 *P. l. pernambucensis* nests between 1986 and 2022 in Pedra Talhada Biological Reserve. All nests were found between September and June, especially at the start of the dry (October and November, *n* = 11) and the rainy season (April–May, *n* = 9).

Nests were of the closed/globular/base type (*sensu* Simon & Pacheco 2005) and were constructed of dry leaves, interwoven with radicles and strands of black *Marasmius* sp. fungus. No lining was evident. They were sited mainly in primary forest, but occasionally at forest edges and in clearings. Nests were placed low, on average 37.5 ± 10.6 cm (30–45 cm, *n* = 2) above ground, in the undergrowth and often protected by plants (Fig. 1). They weighed

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Figure 1. Nest of East Amazonian Fire-eye *Pyriglena leuconota pernambucensis* hidden close to the ground in the undergrowth, Pedra Talhada Biological Reserve, Alagoas/Pernambuco border, Brazil, February 2018; the position of the nest is indicated by the arrow (Nordesta Reforestation & Education collection)

Figure 2. Eggs of East Amazonian Fire-eye *Pyriglena leuconota pernambucensis* in the nest, Pedra Talhada Biological Reserve, Alagoas/Pernambuco border, Brazil, February 2018 (Nordesta Reforestation & Education collection)

on average 41.0 ± 16.1 g (18–80 g, *n* = 16). Mean nest dimensions were as follows: length 17.7 ± 1.8 cm (14–20 cm, *n* = 9); width 16.8 ± 5.8 cm (7–32 cm, *n* = 22); internal diameter 7.9 ± 3.4 cm (6–20 cm, *n* = 18); and external height 15.4 ± 4.1 cm (7–20 cm, *n* = 16).

Clutch size was two in all studied nests (*n* = 40). Eggs had a mean length of 24.6 ± 0.8 mm (23.0–26.6 mm, *n* = 51) and mean width of 17.9 ± 0.8 mm (15.8–19.9 mm, *n* = 51). Mean mass was 4.0 ± 0.5 g (3.0–5.1 g, *n* = 51). They were oval-shaped (*sensu* Baicich & Harrison 1997) and coloured beige to pale lilac, entirely covered by fine, sinuous, dark red vein-like markings (Fig. 2). Hatchlings had greyish-purple skin and were entirely naked. They had a dark grey bill with white gape flanges, and bright yellow oral commissures and gape (Fig. 3); they also had dark grey legs. On fledging, young had black plumage.

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Figure 3. Nestlings of East Amazonian Fire-eye *Pyriglena leuconota pernambucensis*, Pedra Talhada Biological Reserve, Alagoas/Pernambuco border, Brazil, February 2018 (Nordesta Reforestation & Education collection)

TABLE 1

Causes and periods of nest failure for 21 of East Amazonian Fire-eye *Pyriglena leuconota pernambucensis* nests. Percentages represent the proportion of failed nests.

	Predation	**Abandonment**	**Humans**	**Total**
Egg	7 (33.3%)	1 (4.8%)	1 (4.8%)	9 (42.9%)
Nestling	12 (57.1%)	0	0	12 (57.1%)
Total	19 (90.4%)	1 (4.8%)	1 (4.8%)	21 (100%)

Of the 40 nests observed, 17 (42.5%) were successful, 21 (52.5%) failed and the fate of two (5%) was unknown. Predation was the main cause of nest failure (90.4% of failed nests) (Table 1). Nests failed more frequently during the nestling stage (57.1%) than at the egg stage (42.9%). Mean incubation period was 15.5 ± 0.7 days (15–16 days, $n = 2$) and mean nestling period was 13.1 ± 1.7 days (11–16 days, $n = 13$). The complete cycle occupied 29.5 ± 2.1 days (28–31 days, $n = 2$). Daily survival rate during the incubation period was 0.972, whereas during the nestling period it was 0.953. Therefore, the survival rate for the mean incubation period was 0.641, and for the mean nestling period it was 0.532. The Mayfield nest success rate was thus 34.1%.

During the non-breeding season, adults formed small flocks of 4–12 individuals that foraged on the forest floor. It was common for individuals to vocalise while foraging. During the breeding season, the pair would isolate itself and both the male and the female built the nest, incubated the eggs, and fed the offspring (Figs. 4–5).

A total of 1,280 minutes (21 hours 30 minutes) of observations on nestling diet was made at four nests. Fifty-eight feeding events were observed: males fed the nestlings 60% of the time and females 40%. Prey recorded included caterpillars (Lepidoptera), spiders (Araneae),

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Figure 4. Adults of East Amazonian Fire-eye *Pyriglena leuconota pernambucensis* incubating, Pedra Talhada Biological Reserve, Alagoas/Pernambuco border, Brazil, February 2018: (a) female, (b) male (Nordesta Reforestation & Education collection)

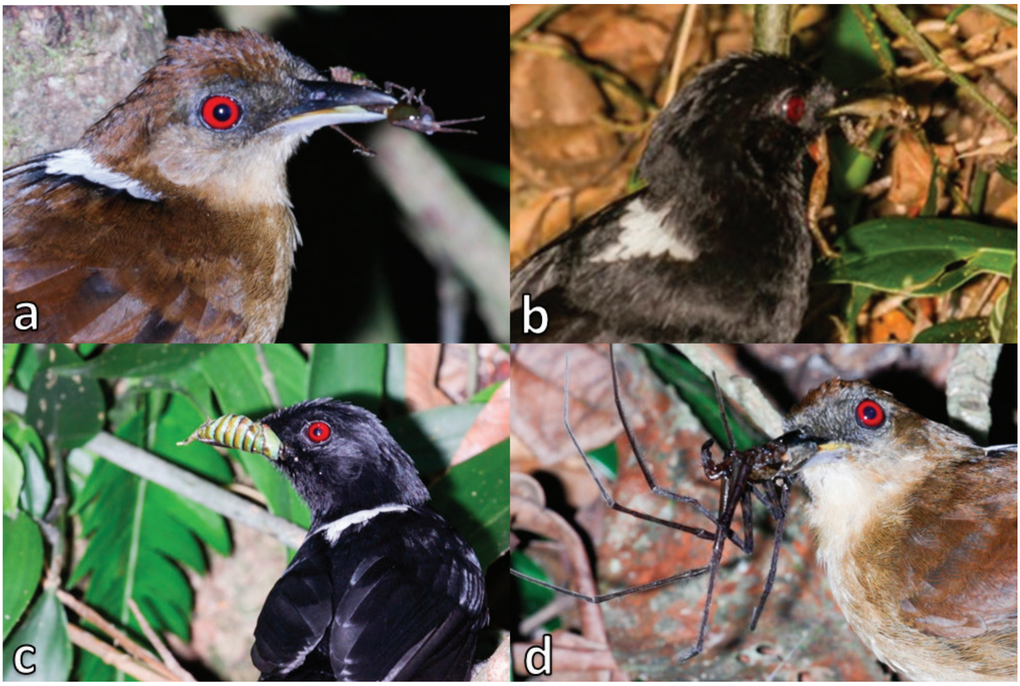

Figure 5. Prey brought to East Amazonian Fire-eye *Pyriglena leuconota pernambucensis* nestlings, Pedra Talhada Biological Reserve, Alagoas/Pernambuco border, Brazil, February 2018: (a) female with a cricket (Orthoptera); (b) male carrying a *Pristimantis* sp. frog (Anura); (c) male bringing a chrysalid (Lepidoptera); and (d) female with a spider (Araneae) (Nordesta Reforestation & Education collection)

cicadas (Cicadidae), crickets (Gryllidae), tree bugs (Heteroptera), beetles (Coleoptera) and army ants (*Eciton* sp., Formicidae) (Table 2, Fig. 5). Lizards and frogs (*Pristimantis* sp.) also formed part of the nestlings' diet from day ten onwards. Once, a female tried to feed two nine-day-old nestlings a small frog, but neither of the young could swallow it. She then hit the frog against a branch and tried to feed them again, also without success. Finally, the female swallowed the amphibian herself.

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TABLE 2
Abundance of prey items from 58 observed feeding events at four nests of East Amazonian Fire-eye *Pyriglena leuconota pernambucensis*.

Prey item	**Order**	*n*	**%**
Tree bugs	Hemiptera	1	1.7%
Beetles	Coleoptera	1	1.7%
Army ants (*Eciton* sp.)	Hymenoptera	2	3.4%
Lizards	Squamata	2	3.4%
Caterpillars	Lepidoptera	4	6.8%
Cicadas (Cicadidae)	Hemiptera	4	6.8%
Crickets (Gryllidae)	Orthoptera	5	8.5%
Frogs (*Pristimantis* sp.)	Anura	9	15.3%
Spiders	Araneae	12	20.4%
Unidentified insects	-	18	30.6%

Discussion

Excluding the peak of the rainy season (July–August) in the region, this population of *P. l. pernambucensis* breeds throughout the year. Year-round breeding has previously been reported in *P. leuconota*, albeit with much-reduced activity in the early dry season (Willis 1981, Zimmer *et al*. 2025). Similar behaviour has also been observed for several other species at the same locality, and other studies suggest that it may be a common pattern among passerines in the area (Studer *et al*. 2018, 2019, Studer & Perroulaz 2026).

P. l. pernambucensis builds a closed nest mainly of dry leaves, close to the ground and hidden among vegetation. Nests of *P. leuconota* found in Pará were also constructed of leaves and hidden among the leaf litter (Oniki 1979, Willis 1981). A nest of White-shouldered Fire-eye *P. leucoptera* in bamboo was constructed of bamboo stems and rolled sheaths, and placed atop an old nest of dead leaves on the ground (Protomastro 2002). A nest of Fringe-backed Fire-eye *P. atra* in Bahia was made of dry leaves and palm fibres, and also placed on the ground amid dry leaves (Lima & Neto 2007). *Pyriglena* nests therefore appear to be very similar within species: a closed/globular nest of leaves concealed within ground-level vegetation.

Information about the length of the nesting cycle of *P. leuconota* is scarce, as we are aware of data from just one study involving five nests in Belém (Oniki 1979). Incubation was reported to last >12 days in one nest and the nestling period was 10–11 days at another nest. The latter is shorter than our mean (13.1 days). At one nest of *P. atra* in Bahia an incubation period of at least 18 days and a nestling period of 13 days were reported (Lima & Neto 2007). However, in this case the nestlings left the nest in response to alarm calls by the female following an experiment with a stuffed rattlesnake. We therefore do not know if the nestlings were truly ready to fledge. Information about nest-cycle length does not exist for *P. similis*, *P. maura* or *P. leucoptera*. Given the limited available data, it is clear that further research is needed to more accurately determine incubation and nestling periods of these taxa.

Clutch size was two eggs, which is consistent with other studies on *P. leuconota*, which reported one or two eggs (Oniki 1979, Willis 1981). Eggs we found were beige to pale lilac, covered by fine dark red vein-like markings, consistent with prior descriptions from Pará (Oniki 1979, Willis 1981). *P. leucoptera* also lays two eggs, which are white or creamy white

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with darker markings (Zimmer *et al*. 2025). A clutch of two eggs was also reported at one nest of *P. atra* (Lima & Neto 2007). Our apparent nest success rate was 42.5%, whereas the rate estimated using the Mayfield method was 34.1%. This is higher than the apparent nest success of 21% in 19 *P. leuconota* nests at Belém (Willis 1981). Our nest predation rate (47.5%) was much lower than the 80% observed in another study on *P. leuconota* (Willis & Oniki 1978). Based on the few available data, it is difficult to identify major differences in the breeding biology of *P. l. pernambucensis* compared to the other subspecies. The cycle appears to be longer and nest success higher, but additional studies of all taxa are needed to confirm these trends.

With respect to diet, most prey were swallowed very quickly, making identification challenging. Due to the high proportion of unidentified insects in our data, it is not possible to draw conclusions about preferences. However, spiders, frogs, crickets, cicadas and caterpillars constituted a large proportion of nestling diet, which is largely consistent with other data on the species, although frogs had not previously been reported (Zimmer *et al*. 2025). Larger prey, such as amphibians, appear to be fed to the nestlings only after they reach ten days old. This is also consistent with a study on *P. leuconota* which observed larger prey being fed to older nestlings (Oniki 1979).

Predation was the main cause of nest loss for *P. l. pernambucensis* in the study region, and is also the case for other tropical bird species, irrespective of nest type (Lack 1954, Nice 1957, Martin & Geupel 1993). With a nest success rate of 34.1%, calculated using the Mayfield method (Mayfield 1975), *P. l. pernambucensis* falls within the range indicated for other cavity- or closed-nest birds in tropical regions, i.e., between 27% and 50% (Brawn *et al*. 2011).

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Twenty-three years on: an updated list of extinct and endangered (E&E) birds for collections management

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Summary.—Extinct and endangered (E&E) specimens are among the most valued in natural history collections and are often subject to heightened curatorial care. Based on data published in 2000 by BirdLife International as part of its assessment of species against the IUCN Red List criteria, Adams *et al*. (2003) established an E&E list of 481 bird species for use by museum collection managers. However, given the dynamic nature of extinction risk and improved knowledge of many threatened taxa over the past 23 years, several aspects of this list are now outdated. Using criteria similar to those developed by Adams *et al*. (2003), we provide an updated E&E list comprising 626 species (of which 164 are listed on the IUCN Red List as Extinct). The increase in the number of species admitted by 29% is attributable chiefly to four factors: (1) genuine changes in species' extinction risk; (2) corrections to the data underpinning Red List assessments; (3) changes in taxonomy; and (4) the novel inclusion of species listed as Data Deficient. Our list provides a suggested update for E&E inventories but may be adapted by museums and others to ensure the protection of other ornithological material considered of heightened value or scarcity.

In an era of intense pressure on the planet and its biodiversity, museum collections continue to make a unique contribution to environmental change research (Norris *et al*. 2024) and help inform our understanding of species' distributions and extinction risk (Collar *et al*. 2003). Naturally, material of species that have gone extinct—or are on the cusp of becoming so—are often afforded an elevated distinction and heightened collection management effort (Cooper & Adams 2005). By its nature, this material is 'either irreplaceable or very nearly so' and 'new specimens of these species are likely to reach collections only very infrequently, and we must therefore preserve with particular care what material we already have' (Adams *et al*. 2003). Given limited resources, and a striving to avoid duplication of effort, it is helpful for curatorial staff to have a global list of extinct and endangered (E&E) species to refer to.

To meet this challenge, following workshops held in 1999, Adams *et al*. (2003) published a list of 481 extinct and endangered (E&E) species. This list comprised 352 extant and 129 extinct species and was derived from data published by BirdLife International (2000) as part of its assessment of the world's birds against the IUCN Red List criteria. BirdLife International, as the Red List Authority for birds, has continued to assess the global extinction risk of all bird species against IUCN Red List criteria, completing comprehensive assessments (i.e. assessing all the world's birds) five times since 2000 (the most recent cycle was finalised in 2025). Given the increasing pressures acting on bird species globally, and the conservation community's responses, a list of E&E birds is naturally subject to change over time. Conscious that the list provided by Adams *et al*. (2003) is now based on data 25 years old (BirdLife International 2000), we here provide an update to this important resource.

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Updating the criteria

As expressed by Adams *et al*. (2003), it is 'clearly impractical, probably undesirable and often plainly unnecessary' to include in an E&E list all extinct and globally threatened species (i.e., all bird species evaluated as Extinct, Critically Endangered, Endangered, or Vulnerable; *n* = 1,425 in 2025; BirdLife International 2025). The thresholds and criteria used by Adams *et al*. (2003) instead prioritised species listed as Extinct (for which obviously no more specimens will be collected), and extant highly threatened species with very small population sizes and small geographic ranges (of which presumably very little, if any, future material will be collected). To do this they subsetted BirdLife International (2000) data (see Adams *et al*. 2003: table 2) concentrating on Criterion B (geographically restricted species), Criterion C (species with small population sizes and a decreasing population trend) and Criterion D (species with very small population sizes) of the IUCN Red List criteria, excluding species assessed as highly threatened *only* under Criterion A (rapid population reduction) but which remain globally numerous (e.g. many *Gyps* vultures). These criteria

TABLE 1

Updated list of criteria for inclusion in the Extinct & Endangered (E&E) list of species. Categories and thresholds refer to those used by the IUCN Red List of Threatened Species (IUCN 2012).

IUCN Red List status (per BirdLife International 2025)	**Criterion definition**	**Number of qualifying species***
Extinct (EX)	No reasonable doubt that last individual is dead (since 1500)	164
Extinct in the Wild (EW)	Only known to survive in captivity	5
Critically Endangered (CR)**	**B1** **Small range** Extent of Occurrence <100 km^2 + two subcriteria.	37
	B2 **Small range** Area of Occupancy <10 km^2 + two subcriteria	6
	C1 **Small population size + declining** <250 mature individuals + population trend declining at certain rate†	9
	C2 **Small population size + declining** <250 mature individuals + population trend declining + subpopulation structure criterion met†	85
	D **Very small population size** Population size <50 mature individuals†	78
Endangered (EN)	**D** **Very small population size** Population size <250 mature individuals†	188
Vulnerable (VU)	**D1** **Small population size** Population size <1,000 mature individuals	404
Data Deficient (DD)	Currently inadequate information to make a direct, or indirect, assessment of its risk of extinction	36

*Because species may meet several of these criteria, the total number in this column greatly exceeds the number of species in our finalised list.

**Note that this includes species listed as Critically Endangered (Possibly Extinct) (CR(PE)) and Critically Endangered (Possibly Extinct in the Wild) (CR(PEW)), all of which are listed under Criterion D and thus admitted to the list.

†Given the inclusion of species listed as VU under D1, these two criteria/thresholds are effectively redundant for inclusion on the list.

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remain broadly appropriate for the compilation of an updated E&E list and their use again aids continuity. Nonetheless, we make two adjustments to the subsetting, outlined below (see Table 1 for the final criteria applied), which were applied to the BirdLife International (2025) taxonomic checklist and IUCN Red List statuses.

BirdLife International (2000) followed a previous version of the IUCN Red List categories and criteria (IUCN 1994) which has since been superseded (IUCN 2012). The changes between the two are minor and the thresholds applied in Adams *et al*. (2003) are still applicable to Criteria C and D. However, the structure of Criterion B has now changed such that it is appropriate to slightly amend the threshold used. Adams *et al*. (2003) admitted all species that were listed as Critically Endangered under Criterion B that had an Extent of Occurrence (EOO) of <100 km^2. This circumstance now refers only to Criterion B1 (which had a different definition in IUCN 1994). We also include species listed as Critically Endangered under Criterion B2, where a species must have an Area of Occupancy (AOO) of <10 km^2 and any two (of three) additional subcriteria are met (IUCN 2012, which see for definitions and ways of calculating EOO and AOO).

All Data Deficient species (*n* = 36 in 2025) are now added. These species are among the most poorly known birds in the world, with an extinction risk that cannot reasonably be inferred from available data and, with better information, could be in any category between Least Concern and Critically Endangered. In all instances, these species are rare in museum collections (pers. obs.).

Comparison of key differences between the original and revised lists

Our updated E&E list contains 626 species (164 Extinct, five Extinct in the Wild, and 457 extant), an increase of *c*.30% on the list of 481 species published 23 years ago (Adams *et al*. 2003). Because of many taxonomic changes in the years between these two assessments (see below), it is not possible to directly compare the two lists and determine the precise degree to which different circumstances have driven the increase in E&E species over the past 23 years. However, four principal reasons can be expected to have done so.

Genuine changes in species' extinction risk.—Given the dynamic nature of threats and conservation actions, the extinction risk of individual species is not static. Over the past 23 years, the conservation status of a species may have improved or deteriorated to a degree that deletes it from, or admits it to, the E&E list under the criteria used. Perhaps predictably, the number of genuine improvements in conservation status is outnumbered by the number of deteriorations (Butchart *et al*. 2025). For example, Hooded Grebe *Podiceps gallardoi* was not listed as globally threatened in 2000 (BirdLife International 2000) and was not included in the E&E list published by Adams *et al*. (2003). However, following a population crash (Roesler 2016) which has seen the species listed as Critically Endangered since 2012, it now has a population size numbering fewer than 1,000 mature individuals (BirdLife International 2019) and accordingly meets the criteria set for inclusion in our E&E list. For similar reasons and circumstances, Masked Finfoot *Heliopais personatus*, Spoon-billed Sandpiper *Calidris pygmaea*, Bahama Warbler *Setophaga flavescens* and Mao *Gymnomyza samoensis* now also make the list. Conversely, Greater Adjutant *Leptoptilos dubius* was listed in 2000 as Endangered with a population size estimated at (probably much) fewer than 1,000 mature individuals. Following the implementation of conservation action in its two contemporary range states (India and Cambodia), the population size was estimated in 2023 to number 1,360–1,510 mature individuals and was still increasing (BirdLife International 2023); accordingly, it no longer meets the thresholds for inclusion in the E&E list. Similarly, Hawaiian Goose *Branta sandvicensis* and Spanish Imperial Eagle *Aquila adalberti* are no longer included.

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Corrections to species' extinction risk (i.e., non-genuine changes).—Most changes in a species' IUCN Red List status are not caused by genuine changes to extinction risk (see above) but improvements in the information available (AJB pers. obs.). A species may at one time be known from only a small area supporting an extremely small population size and thereby be judged to have a high risk of extinction (and to meet the thresholds for inclusion in the E&E list). Later, other larger populations may be discovered, its population size re-calculated, and its extinction risk re-evaluated. For example, having been described only a year earlier (Rasmussen 1999), BirdLife International (2000) precautionarily listed Cinnabar Boobook *Ninox ios* as Vulnerable, judging it to have a small range and population size and hence admitting it to Adams *et al*.'s (2003) E&E list. Following a better understanding of its vocalisations (King 2005, Hutchinson *et al*. 2006) and distribution (e.g. Berryman & Eaton 2020), it has since proved locally common and rather widespread; it is now listed as Least Concern (BirdLife International 2022) and is removed from our E&E list. Similar circumstances have led to the exclusion of Christmas Island Imperial-pigeon *Ducula whartoni* (Garnett *et al*. 2011), Dja River Swamp-warbler *Bradypterus grandis* (Fontaine 2003), Black-browed Babbler *Malacocincla perspicillata* (Akbar *et al*. 2020) and Rodrigues Fody *Foudia flavicans* (BirdLife International 2025).

Taxonomy.—Of the four factors listed here, this is perhaps the most significant. BirdLife International (2000) listed 9,925 bird species globally (of which 129 were treated as Extinct); BirdLife International (2025) lists 11,185 (165 Extinct). The increase in the number of species recognised between 2000 and 2025 is largely due to major taxonomic overhauls approximately a decade ago (del Hoyo & Collar 2014, 2016) and further revisions since. While newly recognised species are statistically no more likely to be assessed as threatened on the IUCN Red List (Simkins *et al*. 2019), this inflation in the total number of recognised species is very likely to have partially driven the increase in the number of species admitted to the E&E list. Of the 626 species in our revised E&E list, 146 (*c*.23%) comprise taxonomic concepts that did not exist in BirdLife International (2000), most of them having been split from more widespread, less threatened forms (pers. obs.). For example, Sangihe Dwarf-kingfisher *Ceyx sangirensis*, Saint Kitts Bullfinch *Melopyrrha grandis* and Bahama Nuthatch *Sitta insularis* were previously lumped into, respectively, Sulawesi Dwarf-kingfisher *C. fallax*, Puerto Rican Bullfinch *P. portoricensis* and Brown-headed Nuthatch *S. pusilla*, but have since been recognised as Critically Endangered species, whilst relatively recently Hume (2011) described three new species of long-extinct pigeons from the Mascarene Islands. Conversely, BirdLife International (2000), and hence Adams *et al*. (2003), included Hooded Seedeater *Sporophila melanops* and Bogota Sunangel *Heliangelus zusii*, two taxa now known to be invalid (Areta *et al*. 2016, Pérez-Emán *et al*. 2018).

Adjustments to the criteria used to include species on the E&E list.—While the method for compiling this list is like that used by Adams *et al*. (2003), the various adjustments (see above) will have had some effect. This is particularly the case for the admission of all ($n = 36$) Data Deficient species which were intentionally excluded in 2003. We argue it is appropriate that these are included given that it is plausible that some of these might prove to be at a high risk of extinction and that they are all poorly represented in museum collections (usually <20 specimens known globally; pers. obs.).

Use, limitations and the future of the updated list

Given the dynamic nature of extinction risk and ever-improving information, it is naturally desirable for the E&E list to be updated regularly so that rare and irreplaceable specimens are appropriately identified and safeguarded. Doing so annually is unnecessarily burdensome for both museum curators using the list and those tasked with compiling it. As

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part of an effort to unify most current global avian checklists (Rheindt *et al*. 2025), BirdLife International is committed to aligning its taxonomy with AviList (AviList Core Team 2025). Revising the E&E list once this harmonisation process is complete may be appropriate, but this process is anticipated to take several years (AJB). For those interested in how our updated E&E list translates to AviList v1 (AviList Core Team 2025), a crosswalk is provided in the Appendix.

We also emphasise, as did Adams *et al*. (2003), that our updated list offers a suggestion, not a prescription, and the extent to which it is used and implemented remains a matter of each collection's discretion. Collections might, therefore, reasonably adjust our E&E list according to their own circumstances or judgements (e.g. Ghiraldi & Aimassi 2019, Gouraud 2021, Gouraud & Jansen 2024). For example, our list admits only species (per BirdLife International), not subspecies. While including extinct subspecies may be desirable for some end-users, to do so is beyond the scope of this paper. BirdLife International's list of extinct species is derived using a robust, IUCN-endorsed methodology to consistently determine extinction probability; there is no equivalent single body providing a similar list at the subspecies level. Our list also makes no allowance for local, national or regional prioritisations. Species known to be rare in museum collections, often either because of their cryptic behaviour or occurrence in regions with low collection effort (e.g. White-winged Potoo *Nyctibius leucopterus*, Moluccan Woodcock *Scolopax rochussenii*; Holyoak 2001, Adams *et al*. 2003), may also be included, as could all 'Lost Birds' (species without a documented record from the wild for >10 years and no ex-situ population; see Rutt *et al*. 2024) which are poorly known in life and often scarce in museum collections. For those seeking to refine the E&E list further, other thresholds to IUCN Red List data can be used, as could additional, complementary metrics; for example, collections with limited resources or E&E collection space might choose to prioritise evolutionarily distinctive threatened species using Evolutionarily Distinct and Globally Endangered (EDGE) scores (Gumbs *et al*. 2023).

Similarly, species only recently described and judged to have a low extinction risk (e.g. three new species of tapaculo [Krabbe *et al*. 2020], Satin Berrypecker *Melanocharis citreola* [Milá *et al*. 2021], Babar Myzomela *Myzomela babarensis* [Berryman *et al*. 2025]) may best be placed in an E&E collection until the quantity of museum material increases.

And finally, for museums with smaller global holdings, the filtered list may of course be unnecessarily granular, and the inclusion of *all* extinct and globally threatened species may be more practical and entirely appropriate.

Notwithstanding the potential for adjustments, we naturally encourage the uptake of our revised list and its use as an underpinning of E&E collections and initiatives. How E&E material is treated in a collection is clearly a matter of curatorial discretion (Adams *et al*. 2003), but we emphasise the importance of E&E material to both science and conservation efforts, and the duty of care that collections managers have for it given its scarcity.

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Appendix

An updated list of extinct and endangered (E&E) birds for collections managers. This list is subsetted (see Methods) from BirdLife International (2025) data and provides an update to the list published by Adams *et al.* (2003). Common names and taxonomy follow BirdLife International (2025), with corresponding scientific and common names according to AviList v2025 (AviList Core Team 2025) when these differ. The appendix is also available as a separate Excel file download.

Family	**BirdLife International scientific name**	**BirdLife International English name**	**IUCN Red List status 2025**	**AviList v2025 scientific name (when different from BL)**	**AviList v2025 English name (when different from BL)**
Casuariidae	*Dromaius minor*	King Island Emu	EX	*Dromaius novaehollandiae minor*	[Emu ssp. *minor*]
Casuariidae	*Dromaius baudinianus*	Kangaroo Island Emu	EX	*Dromaius novaehollandiae baudinianus*	[Emu ssp. *baudinianus*]
Apterygidae	*Apteryx rowi*	Okarito Kiwi	VU		
Megapodiidae	*Aepypodius bruijnii*	Waigeo Brushturkey	EN		
Megapodiidae	*Megapodius nicobariensis*	Nicobar Scrubfowl	VU		Nicobar Megapode
Megapodiidae	*Megapodius tenimberensis*	Tanimbar Scrubfowl	VU		Tanimbar Megapode
Megapodiidae	*Megapodius pritchardii*	Tongan Scrubfowl	VU		Tongan Megapode
Cracidae	*Penelope albipennis*	White-winged Guan	EN		
Cracidae	*Pipile pipile*	Trinidad Piping-guan	CR		Trinidad Piping Guan
Cracidae	*Oreophasis derbianus*	Horned Guan	EN		
Cracidae	*Crax pinima*	Belem Curassow	CR	*Crax fasciolata pinima*	[Bare-faced Curassow ssp. *pinima*]
Cracidae	*Crax blumenbachii*	Red-billed Curassow	EN		

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Cracidae	*Mitu mitu*	Alagoas Curassow	EW		
Cracidae	*Pauxi koepckeae*	Sira Curassow	CR		
Phasianidae	*Rhizothera dulitensis*	Dulit Partridge	DD		
Phasianidae	*Polyplectron katsumatae*	Hainan Peacock-Pheasant	EN		
Phasianidae	*Coturnix novaezelandiae*	New Zealand Quail	EX		
Phasianidae	*Perdicula manipurensis*	Manipur Bush-quail	CR		Manipur Bush Quail
Phasianidae	*Ophrysia superciliosa*	Himalayan Quail	CR		
Phasianidae	*Pternistis camerunensis*	Mount Cameroon Spurfowl	EN		
Phasianidae	*Pternistis ochropectus*	Djibouti Spurfowl	CR		
Phasianidae	*Lophura edwardsi*	Vietnam Pheasant	CR (PEW)		Edwards's Pheasant
Anatidae	*Mergus australis*	New Zealand Merganser	EX		
Anatidae	*Mergus octosetaceus*	Brazilian Merganser	CR		
Anatidae	*Camptorhynchus labradorius*	Labrador Duck	EX		
Anatidae	*Alopochen mauritiana*	Mauritius Shelduck	EX		Mauritius Sheldgoose
Anatidae	*Alopochen kervazoi*	Reunion Shelduck	EX		Reunion Sheldgoose
Anatidae	*Tadorna cristata*	Crested Shelduck	CR		
Anatidae	*Chenonetta finschi*	Finsch's Duck	EX	–	–
Anatidae	*Asarcornis scutulata*	White-winged Duck	CR		
Anatidae	*Aythya innotata*	Madagascar Pochard	CR		
Anatidae	*Aythya baeri*	Baer's Pochard	CR		
Anatidae	*Rhodonessa caryophyllacea*	Pink-headed Duck	CR		
Anatidae	*Anas laysanensis*	Laysan Duck	CR		
Anatidae	*Anas wyvilliana*	Hawaiian Duck	VU		
Anatidae	*Anas theodori*	Mauritius Duck	EX		Mascarene Teal
Anatidae	*Anas bernieri*	Madagascar Teal	EN		Bernier's Teal
Anatidae	*Anas marecula*	Amsterdam Duck	EX	*Mareca marecula*	Amsterdam Wigeon
Podicipedidae	*Tachybaptus rufolavatus*	Alaotra Grebe	EX		
Podicipedidae	*Podilymbus gigas*	Atitlan Grebe	EX		
Podicipedidae	*Rollandia microptera*	Titicaca Grebe	EN		
Podicipedidae	*Podiceps andinus*	Colombian Grebe	EX		
Podicipedidae	*Podiceps taczanowskii*	Junin Grebe	EN		
Podicipedidae	*Podiceps gallardoi*	Hooded Grebe	CR		
Rhynochetidae	*Rhynochetos jubatus*	Kagu	EN		
Columbidae	*Columba argentina*	Silvery Pigeon	CR		
Columbidae	*Columba versicolor*	Bonin Woodpigeon	EX		Bonin Wood Pigeon

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Columbidae	*Columba jouyi*	Ryukyu Woodpigeon	EX		Ryukyu Wood Pigeon
Columbidae	*Columba thiriouxi*	Mauritius Woodpigeon	EX	–	–
Columbidae	*Nesoenas mayeri*	Pink Pigeon	VU		
Columbidae	*Nesoenas duboisi*	Reunion Pigeon	EX	*Nesoenas mayeri duboisi*	[Pink Pigeon ssp. *duboisi*]
Columbidae	*Nesoenas cicur*	Mauritius Turtle-dove	EX	–	–
Columbidae	*Nesoenas rodericanus*	Rodrigues Turtle-dove	EX		Rodrigues Pigeon
Columbidae	*Ectopistes migratorius*	Passenger Pigeon	EX		
Columbidae	*Starnoenas cyanocephala*	Blue-headed Quail-Dove	EN		
Columbidae	*Geotrygon purpurata*	Purple Quail-Dove	EN		
Columbidae	*Geotrygon leucometopia*	White-fronted Quail-Dove	EN		
Columbidae	*Leptotila wellsi*	Grenada Dove	CR		
Columbidae	*Zentrygon carrikeri*	Tuxtla Quail-Dove	EN		
Columbidae	*Zenaida graysoni*	Socorro Dove	EW		
Columbidae	*Columbina cyanopis*	Blue-eyed Ground Dove	CR		
Columbidae	*Paraclaravis geoffroyi*	Purple-winged Ground Dove	CR		
Columbidae	*Gallicolumba platenae*	Mindoro Bleeding-heart	CR		
Columbidae	*Gallicolumba keayi*	Negros Bleeding-heart	CR		
Columbidae	*Gallicolumba menagei*	Sulu Bleeding-heart	CR		
Columbidae	*Pampusana kubaryi*	Caroline Ground Dove	EN		White-fronted Ground Dove
Columbidae	*Pampusana erythroptera*	Polynesian Ground Dove	CR		
Columbidae	*Pampusana rubescens*	Marquesas Ground Dove	EN		Marquesan Ground Dove
Columbidae	*Pampusana canifrons*	Palau Ground Dove	EN		
Columbidae	*Pampusana sanctaecrucis*	Santa Cruz Ground Dove	EN		
Columbidae	*Pampusana salamonis*	Thick-billed Ground Dove	EX		
Columbidae	*Pampusana ferruginea*	Tanna Ground Dove	EX		
Columbidae	*Otidiphaps insularis*	Black-naped Pheasant-pigeon	CR	*Otidiphaps nobilis insularis*	[Pheasant Pigeon ssp. *insularis*]
Columbidae	*Microgoura meeki*	Choiseul Pigeon	EX		
Columbidae	*Caloenas maculata*	Liverpool Pigeon	EX		Spotted Green Pigeon
Columbidae	*Raphus cucullatus*	Dodo	EX		

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Columbidae	*Pezophaps solitaria*	Rodrigues Solitaire	EX		
Columbidae	*Didunculus strigirostris*	Tooth-billed Pigeon	CR		
Columbidae	*Phapitreron frontalis*	Cebu Brown-dove	CR	*Phapitreron amethystinus frontalis*	[Amethyst Brown Dove ssp. *frontalis*]
Columbidae	*Phapitreron cinereiceps*	Tawitawi Brown-dove	EN		Tawitawi Brown Dove
Columbidae	*Treron psittaceus*	Timor Green-pigeon	EN		Timor Green Pigeon
Columbidae	*Ducula aurorae*	Polynesian Imperial-pigeon	EN		Polynesian Imperial Pigeon
Columbidae	*Ducula galeata*	Nuku Hiva Imperial Pigeon	EN		
Columbidae	*Alectroenas nitidissimus*	Mauritius Blue-pigeon	EX		Mauritius Blue Pigeon
Columbidae	*Alectroenas payandeei*	Rodrigues Blue-pigeon	EX	–	–
Columbidae	*Ptilinopus arcanus*	Negros Fruit-dove	CR		Negros Fruit Dove
Columbidae	*Ptilinopus mercierii*	Red-moustached Fruit-dove	EX		Red-moustached Fruit Dove
Columbidae	*Ptilinopus huttoni*	Rapa Fruit-dove	CR		Rapa Fruit Dove
Columbidae	*Ptilinopus chalcurus*	Makatea Fruit-dove	VU		Makatea Fruit Dove
Columbidae	*Hemiphaga chathamensis*	Chatham Islands Pigeon	VU		
Caprimulgidae	*Eurostopodus nigripennis*	Solomons Nightjar	VU		
Caprimulgidae	*Eurostopodus exul*	New Caledonian Nightjar	CR		
Caprimulgidae	*Eleothreptus candicans*	White-winged Nightjar	VU		
Caprimulgidae	*Setopagis maculosa*	Cayenne Nightjar	DD		
Caprimulgidae	*Siphonorhis americana*	Jamaican Poorwill	CR (PE)		
Caprimulgidae	*Caprimulgus prigoginei*	Prigogine's Nightjar	DD		
Aegothelidae	*Aegotheles savesi*	New Caledonian Owlet-nightjar	CR		
Apodidae	*Cypseloides storeri*	White-fronted Swift	DD		
Apodidae	*Aerodramus papuensis*	Papuan Swiftlet	DD		Three-toed Swiftlet
Apodidae	*Aerodramus whiteheadi*	Whitehead's Swiftlet	DD		
Apodidae	*Aerodramus orientalis*	Mayr's Swiftlet	DD		
Apodidae	*Aerodramus sawtelli*	Atiu Swiftlet	VU		
Apodidae	*Apus sladeniae*	Fernando Po Swift	DD	*Apus barbatus sladeniae*	[African Black Swift ssp. *sladeniae*]
Trochilidae	*Sephanoides fernandensis*	Juan Fernandez Firecrown	CR		
Trochilidae	*Discosura letitiae*	Coppery Thorntail	DD		Letitia's Thorntail
Trochilidae	*Lophornis brachylophus*	Short-crested Coquette	CR		
Trochilidae	*Taphrolesbia griseiventris*	Grey-bellied Comet	EN		

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Trochilidae	*Oreotrochilus cyanolaemus*	Blue-throated Hillstar	CR		
Trochilidae	*Oxypogon cyanolaemus*	Blue-bearded Helmetcrest	EN		
Trochilidae	*Eriocnemis nigrivestis*	Black-breasted Puffleg	EN		
Trochilidae	*Eriocnemis isabellae*	Gorgeted Puffleg	CR		
Trochilidae	*Eriocnemis godini*	Turquoise-throated Puffleg	CR (PE)		
Trochilidae	*Eriocnemis mirabilis*	Colorful Puffleg	EN		
Trochilidae	*Coeligena orina*	Glittering Starfrontlet	EN		Dusky Starfrontlet
Trochilidae	*Coeligena consita*	Perija Starfrontlet	EN		
Trochilidae	*Eulidia yarrellii*	Chilean Woodstar	CR		
Trochilidae	*Riccordia bracei*	Brace's Emerald	EX		
Trochilidae	*Riccordia elegans*	Caribbean Emerald	EX	–	–
Trochilidae	*Anthocephala floriceps*	Santa Marta Blossomcrown	VU		
Trochilidae	*Campylopterus phainopeplus*	Santa Marta Sabrewing	CR		
Trochilidae	*Eupherusa cyanophrys*	Oaxaca Hummingbird	EN		
Trochilidae	*Amazilia alfaroana*	Guanacaste Hummingbird	CR	–	–
Trochilidae	*Chrysuronia lilliae*	Sapphire-bellied Hummingbird	EN		
Cuculidae	*Coua delalandei*	Snail-eating Coua	EX		
Cuculidae	*Centropus steerii*	Black-hooded Coucal	CR		
Cuculidae	*Coccyzus ferrugineus*	Cocos Cuckoo	VU		
Cuculidae	*Coccyzus rufigularis*	Bay-breasted Cuckoo	EN		
Cuculidae	*Nannococcyx psix*	Saint Helena Cuckoo	EX		St. Helena Cuckoo
Heliornithidae	*Heliopais personatus*	Masked Finfoot	CR		
Rallidae	*Sarothrura ayresi*	White-winged Flufftail	CR		
Rallidae	*Laterallus podarces*	Saint Helena Crake	EX	*Aphanocrex podarces*	St. Helena Rail
Rallidae	*Rallus wetmorei*	Plain-flanked Rail	EN		
Rallidae	*Lewinia mirifica*	Brown-banded Rail	DD		
Rallidae	*Gallirallus lafresnayanus*	New Caledonian Rail	CR		
Rallidae	*Diaphorapteryx hawkinsi*	Hawkins's Rail	EX		
Rallidae	*Aphanapteryx bonasia*	Red Rail	EX		
Rallidae	*Erythromachus leguati*	Rodrigues Rail	EX		
Rallidae	*Cabalus modestus*	Chatham Islands Rail	EX	*Gallirallus modestus*	Chatham Rail
Rallidae	*Hypotaenidia okinawae*	Okinawa Rail	EN	*Gallirallus okinawae*	
Rallidae	*Hypotaenidia poeciloptera*	Bar-winged Rail	EX	*Gallirallus poecilopterus*	

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Rallidae	*Hypotaenidia owstoni*	Guam Rail	CR	*Gallirallus owstoni*	
Rallidae	*Hypotaenidia wakensis*	Wake Island Rail	EX	*Gallirallus wakensis*	
Rallidae	*Hypotaenidia dieffenbachii*	Dieffenbach's Rail	EX	*Gallirallus dieffenbachii*	
Rallidae	*Hypotaenidia sylvestris*	Lord Howe Woodhen	EN	*Gallirallus sylvestris*	
Rallidae	*Hypotaenidia pacifica*	Tahiti Rail	EX	*Gallirallus pacificus*	
Rallidae	*Dryolimnas augusti*	Reunion Rail	EX		
Rallidae	*Mundia elpenor*	Ascension Crake	EX		
Rallidae	*Cyanolimnas cerverai*	Zapata Rail	CR	*Mustelirallus cerverai*	
Rallidae	*Neocrex colombiana*	Colombian Crake	DD	*Mustelirallus colombianus*	
Rallidae	*Gymnocrex talaudensis*	Talaud Rail	EN		
Rallidae	*Zapornia astrictocarpus*	Saint Helena Rail	EX		St. Helena Crake
Rallidae	*Zapornia palmeri*	Laysan Rail	EX		
Rallidae	*Zapornia olivieri*	Sakalava Rail	EN		
Rallidae	*Zapornia sandwichensis*	Hawaiian Rail	EX		
Rallidae	*Zapornia nigra*	Miller's Rail	EX		Tahiti Crake
Rallidae	*Zapornia monasa*	Kosrae Crake	EX		
Rallidae	*Porphyrio albus*	White Swamphen	EX		
Rallidae	*Porphyrio paepae*	Marquesan Swamphen	EX		
Rallidae	*Porphyrio kukwiedei*	New Caledonia Gallinule	EX	–	–
Rallidae	*Porphyrio caerulescens*	Reunion Gallinule	EX	–	–
Rallidae	*Porphyrio mantelli*	North Island Takahe	EX		
Rallidae	*Porphyrio hochstetteri*	South Island Takahe	EN		
Rallidae	*Pareudiastes silvestris*	Makira Moorhen	CR	*Gallinula silvestris*	Makira Woodhen
Rallidae	*Pareudiastes pacificus*	Samoan Moorhen	CR	*Gallinula pacifica*	Samoan Woodhen
Rallidae	*Gallinula nesiotis*	Tristan Moorhen	EX		
Rallidae	*Tribonyx hodgenorum*	Hodgen's Waterhen	EX	–	–
Rallidae	*Fulica newtonii*	Mascarene Coot	EX		
Psophiidae	*Psophia obscura*	Black-winged Trumpeter	CR	*Psophia viridis obscura*	[Dark-winged Trumpeter ssp. *obscura*]
Gruidae	*Grus americana*	Whooping Crane	EN		
Otididae	*Ardeotis nigriceps*	Great Indian Bustard	CR		
Otididae	*Houbaropsis bengalensis*	Bengal Florican	CR		
Otididae	*Sypheotides indicus*	Lesser Florican	CR		
Oceanitidae	*Oceanites gracilis*	White-vented Storm-petrel	DD		Elliot's Storm Petrel
Oceanitidae	*Oceanites pincoyae*	Pincoya Storm-petrel	DD		Pincoya Storm Petrel
Oceanitidae	*Fregetta maoriana*	New Zealand Storm-petrel	CR		New Zealand Storm Petrel

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Oceanitidae	*Fregetta lineata*	New Caledonian Storm-petrel	DD		New Caledonian Storm Petrel
Oceanitidae	*Nesofregetta fuliginosa*	Polynesian Storm-petrel	EN		Polynesian Storm Petrel
Hydrobatidae	*Hydrobates monteiroi*	Monteiro's Storm-petrel	VU		Monteiro's Storm Petrel
Hydrobatidae	*Hydrobates macrodactylus*	Guadalupe Storm-petrel	CR (PE)		Guadalupe Storm Petrel
Diomedeidae	*Diomedea amsterdamensis*	Amsterdam Albatross	EN		
Diomedeidae	*Phoebastria irrorata*	Waved Albatross	CR		
Procellariidae	*Pterodroma rupinarum*	Large Saint Helena Petrel	EX		St. Helena Petrel
Procellariidae	*Pterodroma brevipes*	Collared Petrel	VU		
Procellariidae	*Pterodroma cahow*	Bermuda Petrel	EN		
Procellariidae	*Pterodroma caribbaea*	Jamaican Petrel	CR (PE)		
Procellariidae	*Pterodroma deserta*	Desertas Petrel	VU		
Procellariidae	*Pterodroma madeira*	Zino's Petrel	EN		
Procellariidae	*Pterodroma magentae*	Magenta Petrel	CR		
Procellariidae	*Puffinus bryani*	Bryan's Shearwater	CR		
Procellariidae	*Puffinus myrtae*	Rapa Shearwater	CR		
Procellariidae	*Puffinus auricularis*	Townsend's Shearwater	CR		
Procellariidae	*Puffinus heinrothi*	Heinroth's Shearwater	VU		
Procellariidae	*Pseudobulweria macgillivrayi*	Fiji Petrel	CR		
Procellariidae	*Pseudobulweria aterrima*	Mascarene Petrel	CR		
Procellariidae	*Pseudobulweria becki*	Beck's Petrel	CR		
Procellariidae	*Bulweria bifax*	Small Saint Helena Petrel	EX		Olson's Petrel
Procellariidae	*Pelecanoides whenuahouensis*	Whenua Hou Diving-petrel	CR	*Pelecanoides georgicus whenuahouensis*	[South Georgia Diving Petrel ssp. *whenuahouensis*]
Ciconiidae	*Ciconia stormi*	Storm's Stork	EN		
Threskiornithidae	*Threskiornis solitarius*	Reunion Ibis	EX		
Threskiornithidae	*Pseudibis davisoni*	White-shouldered Ibis	CR		
Threskiornithidae	*Thaumatibis gigantea*	Giant Ibis	CR	*Pseudibis gigantea*	
Threskiornithidae	*Geronticus eremita*	Northern Bald Ibis	EN		
Threskiornithidae	*Nipponia nippon*	Asian Crested Ibis	EN		Crested Ibis
Threskiornithidae	*Bostrychia bocagei*	Dwarf Ibis	CR		Sao Tome Ibis
Ardeidae	*Ixobrychus novaezelandiae*	New Zealand Little Bittern	EX	*Botaurus novaezelandiae*	New Zealand Bittern
Ardeidae	*Nycticorax duboisi*	Reunion Night Heron	EX		

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Ardeidae	*Nycticorax mauritianus*	Mauritius Night Heron	EX		
Ardeidae	*Nycticorax megacephalus*	Rodrigues Night Heron	EX		
Ardeidae	*Nyctanassa carcinocatactes*	Bermuda Night Heron	EX		
Ardeidae	*Ardea insignis*	White-bellied Heron	CR		
Phalacrocoracidae	*Leucocarbo carunculatus*	Rough-faced Shag	VU		New Zealand King Shag
Phalacrocoracidae	*Leucocarbo onslowi*	Chatham Islands Shag	CR		Chatham Shag
Phalacrocoracidae	*Leucocarbo ranfurlyi*	Bounty Islands Shag	VU		Bounty Shag
Phalacrocoracidae	*Urile perspicillatus*	Spectacled Cormorant	EX		
Phalacrocoracidae	*Phalacrocorax featherstoni*	Pitt Island Shag	EN		Pitt Shag
Pluvianellidae	*Pluvianellus socialis*	Magellanic Plover	VU		
Haematopodidae	*Haematopus meadewaldoi*	Canarian Oystercatcher	EX		Canary Islands Oystercatcher
Haematopodidae	*Haematopus chathamensis*	Chatham Islands Oystercatcher	EN		
Recurvirostridae	*Himantopus novaezelandiae*	Black Stilt	CR		
Charadriidae	*Charadrius obscurus*	Southern Red-breasted Plover	CR	*Anarhynchus obscurus*	New Zealand Plover
Charadriidae	*Charadrius sanctaehelenae*	Saint Helena Plover	VU	*Anarhynchus sanctaehelenae*	St. Helena Plover
Charadriidae	*Thinornis novaeseelandiae*	Shore Plover	EN		
Charadriidae	*Vanellus macropterus*	Javan Lapwing	CR (PE)		
Pedionomidae	*Pedionomus torquatus*	Plains-wanderer	EN		
Rostratulidae	*Rostratula australis*	Australian Painted-snipe	EN		
Jacanidae	*Actophilornis albinucha*	Madagascar Jacana	EN		
Scolopacidae	*Numenius borealis*	Eskimo Curlew	CR (PE)		
Scolopacidae	*Numenius tenuirostris*	Slender-billed Curlew	EX		
Scolopacidae	*Calidris pygmaea*	Spoon-billed Sandpiper	CR		
Scolopacidae	*Prosobonia leucoptera*	Tahiti Sandpiper	EX		
Scolopacidae	*Prosobonia ellisi*	Moorea Sandpiper	EX		
Scolopacidae	*Prosobonia cancellata*	Christmas Sandpiper	EX		Kiritimati Sandpiper
Scolopacidae	*Prosobonia parvirostris*	Tuamotu Sandpiper	EN		
Scolopacidae	*Coenocorypha iredalei*	South Island Snipe	EX		
Scolopacidae	*Coenocorypha barrierensis*	North Island Snipe	EX		
Scolopacidae	*Tringa guttifer*	Spotted Greenshank	EN		Nordmann's Greenshank
Turnicidae	*Turnix novaecaledoniae*	New Caledonian Buttonquail	CR		

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Turnicidae	*Turnix olivii*	Buff-breasted Buttonquail	CR		
Turnicidae	*Turnix worcesteri*	Luzon Buttonquail	DD		
Glareolidae	*Rhinoptilus bitorquatus*	Jerdon's Courser	CR		
Laridae	*Larus fuliginosus*	Lava Gull	VU	*Leucophaeus fuliginosus*	
Laridae	*Sternula lorata*	Peruvian Tern	EN		
Laridae	*Sterna acuticauda*	Black-bellied Tern	EN		
Laridae	*Thalasseus bernsteini*	Chinese Crested Tern	CR		
Alcidae	*Pinguinus impennis*	Great Auk	EX		
Tytonidae	*Tyto prigoginei*	Itombwe Owl	DD		
Strigidae	*Ninox albifacies*	Laughing Owl	EX		
Strigidae	*Ninox spilonotus*	Romblon Boobook	EN		
Strigidae	*Ninox rumseyi*	Cebu Boobook	VU		
Strigidae	*Ninox leventisi*	Camiguin Boobook	VU		
Strigidae	*Ninox natalis*	Christmas Island Boobook	VU		Christmas Boobook
Strigidae	*Mascarenotus grucheti*	Reunion Owl	EX	*Otus grucheti*	Reunion Scops Owl
Strigidae	*Mascarenotus murivorus*	Rodrigues Owl	EX	*Otus murivorus*	Rodrigues Scops Owl
Strigidae	*Mascarenotus sauzieri*	Mauritius Owl	EX	*Otus sauzieri*	Mauritius Scops Owl
Strigidae	*Athene blewitti*	Forest Owlet	EN		
Strigidae	*Glaucidium mooreorum*	Pernambuco Pygmy-owl	CR (PE)		Pernambuco Pygmy Owl
Strigidae	*Xenoglaux loweryi*	Long-whiskered Owlet	VU		
Strigidae	*Aegolius gradyi*	Bermuda Saw-whet Owl	EX		
Strigidae	*Otus thilohoffmanni*	Serendib Scops-owl	EN		Serendib Scops Owl
Strigidae	*Otus hartlaubi*	Sao Tome Scops-owl	VU		Sao Tome Scops Owl
Strigidae	*Otus bikegila*	Principe Scops-owl	CR		Principe Scops Owl
Strigidae	*Otus moheliensis*	Moheli Scops-owl	EN		Moheli Scops Owl
Strigidae	*Otus insularis*	Seychelles Scops-owl	CR		Seychelles Scops Owl
Strigidae	*Otus siaoensis*	Siau Scops-owl	CR		Siau Scops Owl
Strigidae	*Bubo blakistoni*	Blakiston's Eagle-owl	VU	*Ketupa blakistoni*	Blakiston's Fish Owl
Cathartidae	*Gymnogyps californianus*	California Condor	CR		
Accipitridae	*Leptodon forbesi*	White-collared Kite	EN		
Accipitridae	*Chondrohierax wilsonii*	Cuban Kite	CR		
Accipitridae	*Spilornis klossi*	Great Nicobar Serpent-eagle	EN		Great Nicobar Serpent Eagle
Accipitridae	*Pithecophaga jefferyi*	Philippine Eagle	CR		
Accipitridae	*Gyps tenuirostris*	Slender-billed Vulture	CR		

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Accipitridae	*Nisaetus bartelsi*	Javan Hawk-eagle	EN		
Accipitridae	*Nisaetus floris*	Flores Hawk-eagle	EN		
Accipitridae	*Circus maillardi*	Reunion Marsh-harrier	EN		Reunion Harrier
Accipitridae	*Circus macrosceles*	Malagasy Harrier	EN		
Accipitridae	*Circus maurus*	Black Harrier	EN		
Accipitridae	*Accipiter gundlachi*	Gundlach's Hawk	EN	*Astur gundlachi*	
Accipitridae	*Accipiter henstii*	Henst's Goshawk	VU	*Astur henstii*	
Accipitridae	*Haliaeetus sanfordi*	Sanford's Sea-eagle	VU	*Icthyophaga sanfordi*	Sanford's Sea Eagle
Accipitridae	*Haliaeetus vociferoides*	Madagascar Fish-eagle	CR	*Icthyophaga vociferoides*	Madagascar Fish Eagle
Accipitridae	*Buteogallus coronatus*	Crowned Solitary Eagle	EN		Chaco Eagle
Accipitridae	*Bermuteo avivorus*	Bermuda Hawk	EX		
Accipitridae	*Buteo ridgwayi*	Ridgway's Hawk	CR		
Accipitridae	*Buteo galapagoensis*	Galapagos Hawk	VU		
Accipitridae	*Buteo ventralis*	Rufous-tailed Hawk	EN		
Accipitridae	*Buteo socotraensis*	Socotra Buzzard	VU		
Bucerotidae	*Anthracoceros montani*	Sulu Hornbill	CR		
Bucerotidae	*Penelopides mindorensis*	Mindoro Hornbill	EN		
Bucerotidae	*Rhyticeros narcondami*	Narcondam Hornbill	VU		
Upupidae	*Upupa antaios*	Saint Helena Hoopoe	EX		St. Helena Hoopoe
Alcedinidae	*Ceyx sangirensis*	Sangihe Dwarf-kingfisher	CR		Sangihe Dwarf Kingfisher
Alcedinidae	*Alcedo euryzona*	Javan Blue-banded Kingfisher	CR		
Alcedinidae	*Todiramphus cinnamominus*	Guam Kingfisher	EW		
Alcedinidae	*Todiramphus gambieri*	Tuamotu Kingfisher	CR		
Alcedinidae	*Todiramphus godeffroyi*	Marquesas Kingfisher	CR		Marquesan Kingfisher
Alcedinidae	*Tanysiptera hydrocharis*	Little Paradise-kingfisher	DD		Little Paradise Kingfisher
Picidae	*Campephilus principalis*	Ivory-billed Woodpecker	CR		
Picidae	*Campephilus imperialis*	Imperial Woodpecker	CR (PE)		
Picidae	*Meiglyptes tristis*	White-rumped Woodpecker	EN		Zebra Woodpecker
Picidae	*Colaptes fernandinae*	Fernandina's Flicker	EN		
Picidae	*Colaptes oceanicus*	Bermuda Flicker	EX		
Picidae	*Dendrocopos noguchii*	Okinawa Woodpecker	EN		
Falconidae	*Caracara lutosa*	Guadalupe Caracara	EX		

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Falconidae	*Falco punctatus*	Mauritius Kestrel	EN		
Falconidae	*Falco araeus*	Seychelles Kestrel	VU		
Falconidae	*Falco duboisi*	Reunion Kestrel	EX		
Falconidae	*Falco hypoleucos*	Grey Falcon	VU		
Falconidae	*Falco fasciinucha*	Taita Falcon	VU		
Strigopidae	*Strigops habroptilus*	Kakapo	CR		
Strigopidae	*Nestor productus*	Norfolk Island Kaka	EX		Norfolk Kaka
Cacatuidae	*Cacatua haematuropygia*	Philippine Cockatoo	CR		Red-vented Cockatoo
Psittacidae	*Poicephalus robustus*	Cape Parrot	VU		
Psittacidae	*Hapalopsittaca fuertesi*	Indigo-winged Parrot	EN		Fuertes's Parrot
Psittacidae	*Amazona vittata*	Puerto Rican Amazon	CR		
Psittacidae	*Amazona arausiaca*	Red-necked Amazon	VU		
Psittacidae	*Amazona martinicana*	Martinique Amazon	EX	–	–
Psittacidae	*Amazona imperialis*	Imperial Amazon	CR		
Psittacidae	*Amazona violacea*	Guadeloupe Amazon	EX	–	–
Psittacidae	*Amazona guildingii*	Saint Vincent Amazon	VU		St. Vincent Amazon
Psittacidae	*Forpus xanthops*	Yellow-faced Parrotlet	VU		
Psittacidae	*Pyrrhura griseipectus*	Grey-breasted Parakeet	EN		
Psittacidae	*Pyrrhura eisenmanni*	Azuero Parakeet	VU	*Pyrrhura subandina eisenmanni*	[Subandean Parakeet ssp. *eisenmanni*]
Psittacidae	*Pyrrhura subandina*	Sinu Parakeet	CR (PE)		Subandean Parakeet
Psittacidae	*Pyrrhura orcesi*	El Oro Parakeet	EN		
Psittacidae	*Anodorhynchus leari*	Lear's Macaw	EN		
Psittacidae	*Anodorhynchus glaucus*	Glaucous Macaw	CR (PE)		
Psittacidae	*Rhynchopsitta pachyrhyncha*	Thick-billed Parrot	EN		
Psittacidae	*Conuropsis carolinensis*	Carolina Parakeet	EX		
Psittacidae	*Cyanopsitta spixii*	Spix's Macaw	EW		
Psittacidae	*Ara glaucogularis*	Blue-throated Macaw	CR		
Psittacidae	*Ara ambiguus*	Great Green Macaw	CR		
Psittacidae	*Ara tricolor*	Cuban Macaw	EX		
Psittacidae	*Ara rubrogenys*	Red-fronted Macaw	CR		
Psittacidae	*Ognorhynchus icterotis*	Yellow-eared Parrot	VU		
Psittacidae	*Psittacara labati*	Guadeloupe Parakeet	EX	–	–
Psittacidae	*Mascarinus mascarin*	Mascarene Parrot	EX	*Mascarinus mascarinus*	
Psittacidae	*Coracopsis barklyi*	Seychelles Parrot	VU		Seychelles Black Parrot

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Psittacidae	*Psephotellus chrysopterygius*	Golden-shouldered Parrot	EN		
Psittacidae	*Psephotellus pulcherrimus*	Paradise Parrot	EX		
Psittacidae	*Cyanoramphus zealandicus*	Black-fronted Parakeet	EX		
Psittacidae	*Cyanoramphus ulietanus*	Raiatea Parakeet	EX		
Psittacidae	*Cyanoramphus forbesi*	Chatham Islands Parakeet	VU		
Psittacidae	*Cyanoramphus malherbi*	Malherbe's Parakeet	CR		
Psittacidae	*Pezoporus occidentalis*	Night Parrot	CR		
Psittacidae	*Neophema chrysogaster*	Orange-bellied Parrot	CR		
Psittacidae	*Charmosyna toxopei*	Blue-fronted Lorikeet	DD	*Charmosynopsis toxopei*	
Psittacidae	*Charmosyna diadema*	New Caledonian Lorikeet	CR (PE)	*Vini diadema*	
Psittacidae	*Charmosyna amabilis*	Red-throated Lorikeet	CR	*Vini amabilis*	
Psittacidae	*Vini kuhlii*	Rimatara Lorikeet	EN		Kuhl's Lorikeet
Psittacidae	*Vini stepheni*	Henderson Lorikeet	VU		Stephen's Lorikeet
Psittacidae	*Vini ultramarina*	Ultramarine Lorikeet	CR		
Psittacidae	*Lorius domicella*	Purple-naped Lory	EN		
Psittacidae	*Trichoglossus forsteni*	Scarlet-breasted Lorikeet	EN		Sunset Lorikeet
Psittacidae	*Cyclopsitta coxeni*	Coxen's Fig-parrot	CR	*Cyclopsitta diophthalma coxeni*	[Double-eyed Fig Parrot ssp. *coxeni*]
Psittacidae	*Prioniturus verticalis*	Sulu Racquet-tail	CR		Blue-winged Racket-tail
Psittacidae	*Prioniturus luconensis*	Green Racquet-tail	EN		Green Racket-tail
Psittacidae	*Eclectus infectus*	Oceanic Eclectus	EX		
Psittacidae	*Tanygnathus everetti*	Blue-backed Parrot	EN		
Psittacidae	*Alexandrinus eques*	Echo Parakeet	VU	*Psittacula eques*	
Psittacidae	*Alexandrinus exsul*	Rodrigues Parakeet	EX	*Psittacula exsul*	Newton's Parakeet
Psittacidae	*Palaeornis wardi*	Seychelles Parakeet	EX	*Psittacula wardi*	
Psittacidae	*Lophopsittacus bensoni*	Mauritius Grey Parrot	EX	*Psittacula bensoni*	Mascarene Grey Parakeet
Psittacidae	*Lophopsittacus mauritianus*	Broad-billed Parrot	EX		
Psittacidae	*Necropsittacus rodricanus*	Rodrigues Parrot	EX		
Acanthisittidae	*Xenicus longipes*	Bushwren	EX		
Acanthisittidae	*Traversia lyalli*	Stephens Island Rockwren	EX		Lyall's Wren
Pittidae	*Erythropitta meeki*	Louisiade Pitta	DD		
Pittidae	*Pitta superba*	Superb Pitta	EN		
Thamnophilidae	*Clytoctantes alixii*	Recurve-billed Bushbird	EN		

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Thamnophilidae	*Formicivora paludicola*	Marsh Antwren	CR	*Formicivora acutirostris paludicola*	[Marsh Antwren ssp. *paludicola*]
Thamnophilidae	*Myrmotherula snowi*	Alagoas Antwren	CR		
Thamnophilidae	*Terenura sicki*	Orange-bellied Antwren	CR		
Thamnophilidae	*Thamnophilus shumbae*	Maranon Antshrike	VU		
Thamnophilidae	*Myrmoderus ruficauda*	Scalloped Antbird	EN		
Thamnophilidae	*Percnostola arenarum*	Allpahuayo Antbird	VU		
Grallariidae	*Grallaria gigantea*	Giant Antpitta	VU		
Grallariidae	*Grallaria chthonia*	Tachira Antpitta	CR		
Grallariidae	*Grallaria kaestneri*	Cundinamarca Antpitta	EN		
Grallariidae	*Grallaria ridgelyi*	Jocotoco Antpitta	EN		
Grallariidae	*Grallaria fenwickorum*	Urrao Antpitta	CR	*Grallaria urraoensis*	
Grallariidae	*Hylopezus auricularis*	Masked Antpitta	VU		
Rhinocryptidae	*Eleoscytalopus psychopompus*	Bahia Tapaculo	EN		
Rhinocryptidae	*Merulaxis stresemanni*	Stresemann's Bristlefront	CR		
Furnariidae	*Cinclodes aricomae*	Royal Cinclodes	EN		
Furnariidae	*Cinclodes palliatus*	White-bellied Cinclodes	CR		
Furnariidae	*Cichlocolaptes mazarbarnetti*	Cryptic Treehunter	EX		
Furnariidae	*Philydor novaesi*	Alagoas Foliage-gleaner	EX		
Furnariidae	*Aphrastura masafuerae*	Masafuera Rayadito	CR		
Furnariidae	*Asthenes perijana*	Perija Thistletail	EN		
Furnariidae	*Thripophaga cherriei*	Orinoco Softtail	VU		
Furnariidae	*Synallaxis infuscata*	Pinto's Spinetail	EN		
Pipridae	*Antilophia bokermanni*	Araripe Manakin	CR	*Chiroxiphia bokermanni*	
Cotingidae	*Phibalura boliviana*	Apolo Cotinga	EN	*Phibalura flavirostris boliviana*	[Swallow-tailed Cotinga ssp. *boliviana*]
Cotingidae	*Lipaugus conditus*	Grey-winged Cotinga	VU		
Cotingidae	*Lipaugus weberi*	Chestnut-capped Piha	CR		
Cotingidae	*Cotinga maculata*	Banded Cotinga	CR		
Tityridae	*Onychorhynchus swainsoni*	Atlantic Royal Flycatcher	VU		
Tityridae	*Tityra leucura*	White-tailed Tityra	DD		
Tyrannidae	*Calyptura cristata*	Kinglet Calyptura	CR		

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Tyrannidae	*Phylloscartes ceciliae*	Alagoas Tyrannulet	CR		
Tyrannidae	*Elaenia ridleyana*	Noronha Elaenia	VU		
Tyrannidae	*Phyllomyias urichi*	Urich's Tyrannulet	EN		
Tyrannidae	*Anairetes fernandezianus*	Juan Fernandez Tit-tyrant	EN		
Tyrannidae	*Tyrannus cubensis*	Giant Kingbird	EN		
Tyrannidae	*Myiotheretes pernix*	Santa Marta Bush-tyrant	EN		Santa Marta Bush Tyrant
Dasyornithidae	*Dasyornis longirostris*	Western Bristlebird	EN		
Meliphagidae	*Gymnomyza samoensis*	Mao	EN		
Meliphagidae	*Gymnomyza aubryana*	Crow Honeyeater	CR		
Meliphagidae	*Myzomela albigula*	White-chinned Myzomela	DD		
Meliphagidae	*Anthornis melanocephala*	Chatham Islands Bellbird	EX		
Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	CR		
Meliphagidae	*Manorina melanotis*	Black-eared Miner	EN		
Acanthizidae	*Gerygone insularis*	Lord Howe Gerygone	EX		
Oriolidae	*Turnagra tanagra*	North Island Piopio	EX		
Oriolidae	*Turnagra capensis*	South Island Piopio	EX		
Oriolidae	*Oriolus isabellae*	Isabela Oriole	CR		
Oriolidae	*Oriolus cruentus*	Javan Oriole	DD		
Pachycephalidae	*Coracornis sanghirensis*	Sangihe Whistler	CR		
Vireonidae	*Vireo gracilirostris*	Noronha Vireo	VU		
Campephagidae	*Lobotos oriolinus*	Eastern Wattled Cuckooshrike	DD		
Campephagidae	*Edolisoma nesiotis*	Yap Cicadabird	EN		
Campephagidae	*Lalage typica*	Mauritius Cuckooshrike	EN		
Campephagidae	*Lalage newtoni*	Reunion Cuckooshrike	CR		
Malaconotidae	*Chlorophoneus kupeensis*	Mount Kupe Bushshrike	EN		
Lamproliidae	*Eutrichomyias rowleyi*	Cerulean Flycatcher	CR		
Dicruridae	*Dicrurus fuscipennis*	Comoro Drongo	EN		Grande Comore Drongo
Dicruridae	*Dicrurus menagei*	Tablas Drongo	EN		
Monarchidae	*Myiagra freycineti*	Guam Flycatcher	EX		
Monarchidae	*Symposiachrus boanensis*	Black-chinned Monarch	CR		Boano Monarch
Monarchidae	*Pomarea pomarea*	Maupiti Monarch	EX	*Pomarea maupitiensis*	
Monarchidae	*Pomarea nigra*	Tahiti Monarch	CR		
Monarchidae	*Pomarea dimidiata*	Rarotonga Monarch	VU		

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Monarchidae	*Pomarea fluxa*	Eiao Monarch	EX		
Monarchidae	*Pomarea iphis*	Iphis Monarch	CR		
Monarchidae	*Pomarea whitneyi*	Fatu Hiva Monarch	CR		
Monarchidae	*Pomarea nukuhivae*	Nuku Hiva Monarch	EX		
Monarchidae	*Pomarea mira*	Ua Pou Monarch	CR		
Monarchidae	*Pomarea mendozae*	Marquesas Monarch	EN		Marquesan Monarch
Monarchidae	*Clytorhynchus sanctaecrucis*	Nendo Shrikebill	EN		Santa Cruz Shrikebill
Monarchidae	*Terpsiphone corvina*	Seychelles Paradise-flycatcher	VU		Seychelles Paradise Flycatcher
Laniidae	*Lanius newtoni*	Newton's Fiscal	CR		Sao Tome Fiscal
Corvidae	*Dendrocitta bayleii*	Andaman Treepie	VU		
Corvidae	*Cissa thalassina*	Javan Green Magpie	CR		
Corvidae	*Pica asirensis*	Asir Magpie	EN		
Corvidae	*Corvus hawaiiensis*	Hawaiian Crow	EW		
Corvidae	*Corvus unicolor*	Banggai Crow	CR		
Corvidae	*Corvus kubaryi*	Mariana Crow	CR		
Paradisaeidae	*Paradisaea decora*	Goldie's Bird-of-paradise	VU		
Callaeidae	*Callaeas cinereus*	South Island Kokako	CR (PE)		
Callaeidae	*Heteralocha acutirostris*	Huia	EX		
Petroicidae	*Petroica multicolor*	Norfolk Island Robin	EN		Norfolk Robin
Petroicidae	*Petroica dannefaerdi*	Snares Tomtit	VU	*Petroica macrocephala dannefaerdi*	[Tomtit ssp. *dannefaerdi*]
Petroicidae	*Petroica traversi*	Black Robin	VU		
Hyliotidae	*Hyliota usambara*	Usambara Hyliota	EN		
Alaudidae	*Heteromirafra archeri*	Liben Lark	CR		Archer's Lark
Alaudidae	*Mirafra pulpa*	Friedmann's Lark	DD		
Alaudidae	*Alauda razae*	Raso Lark	CR		
Macrosphenidae	*Sylvietta philippae*	Philippa's Crombec	DD		
Macrosphenidae	*Sylvietta chapini*	Lendu Crombec	CR	*Sylvietta leucophrys chapini*	[White-browed Crombecs ssp. *chapini*]
Cisticolidae	*Artisornis moreaui*	Long-billed Forest-warbler	EN		Long-billed Forest Warbler
Cisticolidae	*Artisornis sousae*	Mozambique Forest-warbler	EN	*Artisornis moreaui sousae*	[Long-billed Forest Warbler ssp. *sousae*]
Cisticolidae	*Apalis fuscigularis*	Taita Apalis	CR		
Cisticolidae	*Apalis lynesi*	Namuli Apalis	EN		
Cisticolidae	*Cisticola restrictus*	Tana River Cisticola	DD		

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Cisticolidae	*Bathmocercus cerviniventris*	Black-headed Rufous-warbler	DD		Black-headed Rufous Warbler
Acrocephalidae	*Nesillas aldabrana*	Aldabra Brush-warbler	EX		Aldabra Brush Warbler
Acrocephalidae	*Acrocephalus sorghophilus*	Streaked Reed-warbler	CR		Speckled Reed Warbler
Acrocephalidae	*Acrocephalus luscinius*	Guam Reed-warbler	EX		Nightingale Reed Warbler
Acrocephalidae	*Acrocephalus nijoi*	Aguijan Reed-warbler	EX		Aguiguan Reed Warbler
Acrocephalidae	*Acrocephalus yamashinae*	Pagan Reed-warbler	EX		Pagan Reed Warbler
Acrocephalidae	*Acrocephalus astrolabii*	Mangareva Reed-warbler	EX		Mangareva Reed Warbler
Acrocephalidae	*Acrocephalus familiaris*	Millerbird	EN		
Acrocephalidae	*Acrocephalus vaughani*	Pitcairn Reed-warbler	EN		Pitcairn Reed Warbler
Acrocephalidae	*Acrocephalus rimitarae*	Rimatara Reed-warbler	CR		Rimatara Reed Warbler
Acrocephalidae	*Acrocephalus musae*	Forster's Reed-warbler	EX		Garrett's Reed Warbler
Acrocephalidae	*Acrocephalus caffer*	Tahiti Reed-warbler	VU		Tahiti Reed Warbler
Acrocephalidae	*Acrocephalus longirostris*	Moorea Reed-warbler	CR		Moorea Reed Warbler
Locustellidae	*Poodytes rufescens*	Chatham Islands Fernbird	EX		
Locustellidae	*Cincloramphus grosvenori*	New Britain Thicketbird	VU		
Locustellidae	*Cincloramphus rufus*	Long-legged Thicketbird	EN		
Bernieridae	*Crossleyia tenebrosa*	Dusky Tetraka	DD		
Hirundinidae	*Eurochelidon sirintarae*	White-eyed River Martin	CR	*Pseudochelidon sirintarae*	
Hirundinidae	*Petrochelidon perdita*	Red Sea Swallow	DD		Red Sea Cliff Swallow
Hirundinidae	*Progne modesta*	Galapagos Martin	EN		
Pycnonotidae	*Chlorocichla prigoginei*	Prigogine's Greenbul	DD		
Pycnonotidae	*Hypsipetes olivaceus*	Mauritius Bulbul	VU		
Pycnonotidae	*Hypsipetes platenae*	Sangihe Golden Bulbul	CR		
Pycnonotidae	*Pycnonotus zeylanicus*	Straw-headed Bulbul	CR		
Pycnonotidae	*Pycnonotus nieuwenhuisii*	Blue-wattled Bulbul	DD	*Microtarsus nieuwenhuisii*	
Pycnonotidae	*Pycnonotus snouckaerti*	Aceh Bulbul	EN		
Zosteropidae	*Zosterornis nigrorum*	Negros Striped Babbler	EN		
Zosteropidae	*Rukia ruki*	Teardrop White-eye	EN		

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Zosteropidae	*Zosterops semiflavus*	Marianne White-eye	EX		
Zosteropidae	*Zosterops chloronothos*	Mauritius Olive White-eye	CR		
Zosteropidae	*Zosterops ficedulinus*	Principe White-eye	EN		
Zosteropidae	*Zosterops modestus*	Seychelles White-eye	VU		
Zosteropidae	*Zosterops nehrkorni*	Sangihe White-eye	CR		
Zosteropidae	*Zosterops rotensis*	Rota White-eye	CR		
Zosteropidae	*Zosterops luteirostris*	Gizo White-eye	VU		
Zosteropidae	*Zosterops paruhbesar*	Wangi-Wangi White-eye	EN		
Zosteropidae	*Zosterops conspicillatus*	Bridled White-eye	EX		
Zosteropidae	*Zosterops albogularis*	White-chested White-eye	EX		
Zosteropidae	*Zosterops strenuus*	Robust White-eye	EX		
Pellorneidae	*Napothera pasquieri*	White-throated Wren-babbler	EN		
Leiotrichidae	*Garrulax rufifrons*	Rufous-fronted Laughingthrush	EN		
Leiotrichidae	*Pterorhinus courtoisi*	Blue-crowned Laughingthrush	CR		
Leiotrichidae	*Montecincla jerdoni*	Banasura Chilappan	EN		Banasura Laughingthrush
Leiotrichidae	*Liocichla bugunorum*	Bugun Liocichla	CR		
Sittidae	*Sitta insularis*	Bahama Nuthatch	CR		
Troglodytidae	*Ferminia cerverai*	Zapata Wren	EN		
Troglodytidae	*Troglodytes tanneri*	Clarion Wren	VU		
Troglodytidae	*Troglodytes monticola*	Santa Marta Wren	CR		
Troglodytidae	*Thryophilus nicefori*	Niceforo's Wren	CR		
Sturnidae	*Gracupica jalla*	Javan Pied Starling	CR		Javan Pied Myna
Sturnidae	*Leucopsar rothschildi*	Bali Myna	CR		Bali Starling
Sturnidae	*Fregilupus varius*	Reunion Starling	EX		Hoopoe Starling
Sturnidae	*Necropsar rodericanus*	Rodrigues Starling	EX		
Sturnidae	*Acridotheres melanopterus*	Black-winged Myna	EN		
Sturnidae	*Gracula robusta*	Nias Hill Myna	CR	*Gracula religiosa robusta*	[Common Hill Myna ssp. *robusta*]
Sturnidae	*Aplonis santovestris*	Mountain Starling	EN		
Sturnidae	*Aplonis pelzelni*	Pohnpei Starling	CR		
Sturnidae	*Aplonis corvina*	Kosrae Starling	EX		
Sturnidae	*Aplonis ulietensis*	Raiatea Starling	EX	–	–
Sturnidae	*Aplonis mavornata*	Mysterious Starling	EX		Mauke Starling
Sturnidae	*Aplonis fusca*	Tasman Starling	EX		

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Mimidae	*Mimus graysoni*	Socorro Mockingbird	CR		
Mimidae	*Mimus trifasciatus*	Floreana Mockingbird	EN		
Mimidae	*Mimus macdonaldi*	Espanola Mockingbird	VU		
Mimidae	*Toxostoma guttatum*	Cozumel Thrasher	CR		
Turdidae	*Myadestes myadestinus*	Kamao	EX		
Turdidae	*Myadestes woahensis*	Amaui	EX		
Turdidae	*Myadestes lanaiensis*	Olomao	CR (PE)		
Turdidae	*Myadestes palmeri*	Puaiohi	CR		
Turdidae	*Zoothera terrestris*	Bonin Thrush	EX		
Turdidae	*Geokichla guttata*	Spotted Ground-thrush	VU		Spotted Ground Thrush
Turdidae	*Turdus helleri*	Taita Thrush	EN		
Turdidae	*Turdus swalesi*	La Selle Thrush	VU		
Turdidae	*Turdus xanthorhynchus*	Principe Thrush	CR		
Turdidae	*Turdus ravidus*	Grand Cayman Thrush	EX		
Muscicapidae	*Copsychus sechellarum*	Seychelles Magpie-robin	EN		
Muscicapidae	*Cyornis ruckii*	Rück's Blue Flycatcher	CR		
Muscicapidae	*Cyornis banyumas*	Javan Blue Flycatcher	CR		
Muscicapidae	*Larvivora ruficeps*	Rufous-headed Robin	EN		
Muscicapidae	*Larvivora tanensis*	Izu Robin	VU		
Muscicapidae	*Myophonus blighi*	Sri Lanka Whistling-thrush	EN		Sri Lanka Whistling Thrush
Muscicapidae	*Oenanthe dubia*	Sombre Rockchat	DD		Sombre Rock Chat
Mohoidae	*Moho braccatus*	Kauai Oo	EX		
Mohoidae	*Moho apicalis*	Oahu Oo	EX		
Mohoidae	*Moho bishopi*	Bishop's Oo	EX		
Mohoidae	*Moho nobilis*	Hawaii Oo	EX		
Mohoidae	*Chaetoptila angustipluma*	Kioea	EX		
Dicaeidae	*Dicaeum dayakorum*	Spectacled Flowerpecker	DD		
Dicaeidae	*Dicaeum quadricolor*	Cebu Flowerpecker	CR		
Nectariniidae	*Dreptes thomensis*	Giant Sunbird	VU		
Ploceidae	*Foudia delloni*	Reunion Fody	EX	–	–
Ploceidae	*Foudia rubra*	Mauritius Fody	EN		
Ploceidae	*Ploceus megarhynchus*	Finn's Weaver	EN		
Estrildidae	*Estrilda nigriloris*	Black-lored Waxbill	DD		
Passeridae	*Passer hemileucus*	Abd al Kuri Sparrow	VU		Abd al-Kuri Sparrow

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Motacillidae	*Hemimacronyx chloris*	Yellow-breasted Pipit	VU		
Motacillidae	*Amaurocichla bocagii*	Sao Tome Shorttail	VU	*Motacilla bocagii*	
Fringillidae	*Fringilla polatzeki*	Gran Canaria Blue Chaffinch	EN		
Fringillidae	*Melamprosops phaeosoma*	Poo-uli	EX		
Fringillidae	*Paroreomyza maculata*	Oahu Alauahio	CR		
Fringillidae	*Paroreomyza flammea*	Kakawahie	EX		
Fringillidae	*Oreomystis bairdi*	Akikiki	CR		
Fringillidae	*Telespiza ultima*	Nihoa Finch	CR		
Fringillidae	*Rhodacanthis palmeri*	Greater Koa-finch	EX		Greater Koa Finch
Fringillidae	*Rhodacanthis flaviceps*	Lesser Koa-finch	EX		Lesser Koa Finch
Fringillidae	*Chloridops kona*	Kona Grosbeak	EX		
Fringillidae	*Loxioides bailleui*	Palila	CR		
Fringillidae	*Psittirostra psittacea*	Ou	EX		
Fringillidae	*Dysmorodrepanis munroi*	Lanai Hookbill	EX		
Fringillidae	*Akialoa stejnegeri*	Kauai Akialoa	EX		
Fringillidae	*Akialoa ellisiana*	Oahu Akialoa	EX		
Fringillidae	*Akialoa lanaiensis*	Lanai Akialoa	EX		Maui-nui Akialoa
Fringillidae	*Akialoa obscura*	Hawaii Akialoa	EX		Lesser Akialoa
Fringillidae	*Hemignathus hanapepe*	Kauai Nukupuu	EX		
Fringillidae	*Hemignathus lucidus*	Oahu Nukupuu	EX		
Fringillidae	*Hemignathus affinis*	Maui Nukupuu	EX		
Fringillidae	*Pseudonestor xanthophrys*	Maui Parrotbill	CR		
Fringillidae	*Viridonia sagittirostris*	Greater Amakihi	EX		
Fringillidae	*Loxops caeruleirostris*	Akekee	CR		
Fringillidae	*Loxops wolstenholmei*	Oahu Akepa	EX		
Fringillidae	*Loxops ochraceus*	Maui Akepa	EX		
Fringillidae	*Drepanis funerea*	Black Mamo	EX		
Fringillidae	*Drepanis pacifica*	Hawaii Mamo	EX		
Fringillidae	*Himatione fraithii*	Laysan Honeycreeper	EX		
Fringillidae	*Palmeria dolei*	Akohekohe	CR		
Fringillidae	*Ciridops anna*	Ula-ai-hawane	EX		
Fringillidae	*Carpodacus ferreorostris*	Bonin Grosbeak	EX		
Fringillidae	*Carpodacus sillemi*	Sillem's Rosefinch	DD		
Fringillidae	*Pyrrhula murina*	Azores Bullfinch	VU		
Fringillidae	*Crithagra concolor*	Sao Tome Grosbeak	CR		
Emberizidae	*Emberiza jankowskii*	Jankowski's Bunting	EN		
Passerellidae	*Spizella wortheni*	Worthen's Sparrow	EN		

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Passerellidae	*Pipilo naufragus*	Bermuda Towhee	EX		
Passerellidae	*Atlapetes blancae*	Antioquia Brushfinch	CR		
Passerellidae	*Atlapetes pallidiceps*	Pale-headed Brushfinch	EN		
Passerellidae	*Junco insularis*	Guadalupe Junco	VU		
Icteridae	*Psarocolius cassini*	Baudo Oropendola	VU		
Icteridae	*Icterus oberi*	Montserrat Oriole	VU		
Icteridae	*Agelaius xanthomus*	Yellow-shouldered Blackbird	EN		
Icteridae	*Quiscalus palustris*	Slender-billed Grackle	EX		
Icteridae	*Macroagelaius subalaris*	Mountain Grackle	EN		Colombian Mountain Grackle
Icteridae	*Anumara forbesi*	Forbes's Blackbird	VU		
Parulidae	*Vermivora bachmanii*	Bachman's Warbler	CR (PE)		
Parulidae	*Leucopeza semperi*	Semper's Warbler	CR		
Parulidae	*Setophaga flavescens*	Bahama Warbler	EN		
Parulidae	*Setophaga subita*	Barbuda Warbler	VU		
Parulidae	*Basileuterus ignotus*	Pirre Warbler	VU		
Thraupidae	*Nemosia rourei*	Cherry-throated Tanager	CR		
Thraupidae	*Emberizoides duidae*	Duida Grass-finch	DD		Duida Grass Finch
Thraupidae	*Incaspiza watkinsi*	Little Inca-finch	VU		Little Inca Finch
Thraupidae	*Melopyrrha grandis*	Saint Kitts Bullfinch	CR		St. Kitts Bullfinch
Thraupidae	*Melanospiza richardsoni*	Saint Lucia Black Finch	EN		St. Lucia Black Finch
Thraupidae	*Geospiza pauper*	Medium Tree-finch	CR	*Camarhynchus pauper*	Medium Tree Finch
Thraupidae	*Geospiza heliobates*	Mangrove Finch	CR	*Camarhynchus heliobates*	
Thraupidae	*Geospiza acutirostris*	Genovesa Ground-finch	VU		Genovesa Ground Finch
Thraupidae	*Geospiza conirostris*	Espanola Cactus-finch	VU		Espanola Cactus Finch
Thraupidae	*Geospiza propinqua*	Genovesa Cactus-finch	VU		Genovesa Cactus Finch
Thraupidae	*Conothraupis mesoleuca*	Cone-billed Tanager	EN		
Thraupidae	*Nesospiza wilkinsi*	Wilkins's Finch	CR		
Thraupidae	*Rowettia goughensis*	Gough Island Finch	CR		Gough Finch
Thraupidae	*Diglossa venezuelensis*	Venezuelan Flowerpiercer	EN		
Thraupidae	*Bangsia aureocincta*	Gold-ringed Tanager	VU		

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A Ruddy *Oxyura jamaicensis* × White-headed Duck *O. leucocephala* hybrid diagnosed in Denmark

by Kees Wanders & Peter A. Hosner

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http://zoobank.org/urn:lsid:zoobank.org:pub:AED856FF-907C-4645-B5BB-CCEC982DC36D

Summary.—The endangered White-headed Duck *Oxyura leucocephalus* is threatened by the prospect of hybridisation and genetic introgression from the invasive Ruddy Duck *O. jamaicensis*, which became established in Europe from a small captive population imported from North America to England. Previous studies have demonstrated that these species readily hybridise in the wild if they come into contact, but the prospect of hybrids occurring far outside the range of *leucocephala* has not previously been described. Here we use whole-genome-sequencing to confirm the identity of a female F_1 *jamaicensis* × male *leucocephala* hybrid culled in Denmark in 2022. *O. leucocephala* is a rare vagrant in Denmark, with the species' typical range limited to Central Asia, southern Europe and North Africa. The presence of a hybrid so far outside this core range highlights the importance of international co-operation to extirpate invasive species that threaten native wildlife, as well as the importance of carefully identifying female *Oxyura* when assessing management choices and quantifying the frequency of hybrids in Europe.

The introduction of non-native species often leads to hybridisation between previously isolated taxa (Ottenburghs 2021). The subsequent introgression of non-native DNA can endanger local species, by breaking up co-adapted gene complexes and reducing genotypic and phenotypic diversity through genetic swamping (reviewed in Bohling 2016, Ottenburghs 2021). One such endangered species is the White-headed Duck *Oxyura leucocephala*, which is native to Central Asia, southern Europe and North Africa (Salvador *et al.* 2023). The resident population in Europe (Spain) has recently recovered from a severe bottleneck in the 1970s and 1980s (Muñoz-Fuentes *et al.* 2005), and the greatest long-term threat to the European population today is introgressive hybridisation with the invasive Ruddy Duck *O. jamaicensis* (Hughes *et al.* 2006).

The European *O. jamaicensis* population was founded when a small captive population of seven individuals imported from North America to England, in 1948, became established in the wild and subsequently spread across Europe (Muñoz-Fuentes *et al.* 2006). This species readily hybridises with the threatened *leucocephala* and produces fertile offspring (Muñoz-Fuentes *et al.* 2007). An international effort to extirpate the Ruddy Duck from Europe by culling has been underway since 1993 (Muñoz-Fuentes *et al.* 2013). However, small populations of Ruddy Duck remain, mostly in Germany, France, Belgium, the Netherlands and the UK (Cranswick & Hall 2023), and research into their interactions with the European *O. leucocephala* population continues to inform conservation policy (Muñoz-Fuentes *et al.* 2013, Pirog *et al.* 2023).

Here we use whole-genome sequencing to confirm the identity of a putative *O. jamaicensis* × *leucocephala* hybrid culled in Denmark in 2022. To our knowledge, *jamaicensis* × *leucocephala* hybrids have not previously been known to occur so far outside the range of *O. leucocephala* (*c.*1,700 km from the northern limit of its Spanish range), with the only other confirmed hybrid outside of Spain culled in north-east France in 2020 (Pirog *et al.* 2025).

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The Danish record is especially surprising given that *leucocephala* has been documented in Denmark only once, a male at Selsø Sø between 13 February and 29 March 2022 (Nyegaard 2022), which sometimes associated with a female *O. jamaicensis*. Confirming the identity of this putative hybrid may therefore be informative for the ongoing conservation efforts to protect *O. leucocephalus* and to extirpate the invasive *O. jamaicensis*.

Methods

Initial detection and sampling.—On 23 February 2022, a female *Oxyura* was seen and later photographed at Sundet, Faaborg (55.098°N, 10.252°E). On 28 February 2022, the bird was shot using a .22 rifle by Miljøstyrelsen as part of an active *O. jamaicensis* culling programme (MST case #2022-38). When it was realised that the specimen displayed some characters similar to *O. leucocephala*, it was compared to the series of *O. jamaicensis* and *O. leucocephala* held at the Natural History Museum Denmark, Copenhagen, where it was putatively identified as a hybrid (Fig. 1). The specimen was prepared (NHMD 1711126) as a study skin with detached spread wing and muscle tissues stored in ethanol and frozen, confirmed to be a female (ovary 10 × 7 mm, ova 1 mm), and immature (bursa 15 × 12 mm). Previous work has indicated that *O. jamaicensis* × *O. leucocephala* hybrids are not particularly conspicuous (Randler 2004), that their morphology cannot be used reliably to separate F_1 hybrids from backcrosses, and that variation can lead to incorrect identification of putative hybrids (Muñoz-Fuentes *et al*. 2007, Pirog *et al*. 2025). Therefore, we implemented whole-genome sequencing to confirm the bird's identity.

Nuclear genome analysis.—DNA extraction, library preparation and short-read genome sequencing were completed by Novogene UK. The putative hybrid was sequenced to a depth of *c*.15X using Illumina paired-end sequencing. These data were supplemented with *c*.60X paired-end sequencing of a single *O. leucocephala* sample of captive origin (NCBI pending, data available from https://b10k.com/index/index/species.html), and *c*.60X paired-end sequencing of a single *O. jamaicensis* sample from Scotland Neck, North Carolina, USA (GCA_011077185.1; Wuitchik *et al*. 2022). All sequencing files were filtered to remove adaptors and overlapping reads using fastp v0.24 (Chen *et al*. 2018), and each was aligned to the closest available outgroup reference—Black-headed Duck *Heteronetta atricapilla* (GCA_011075105.1; Wuitchik *et al*. 2022)—using the bwa v0.7.18 mem algorithm with default settings (Li 2013). VCF files were then produced separately for each sample following the GATK 'best practices' variant calling pipeline (which includes steps for excluding duplicated reads and estimating the quality of individual variant calls; Van der

Figure 1. The *Oxyura* hybrid culled in Denmark in 2022, and now retained as a specimen at the Natural History Museum Denmark, Copenhagen (NHMD 1711126) (Peter Hosner)

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Auwera & O'Connor 2020). SNP calling focused on *H. atricapilla* scaffolds longer than 1Mbp (31 scaffolds) and invariant sites were retained. VCF files were then filtered to exclude INDELs and merged using bcftools (Danecek *et al*. 2021).

The merged VCF file contained variant calls for all three samples, and was filtered to exclude sites where all samples were identical, where calls were missing for any sample, where read depth was less than ten or genotype quality less than 20 for any individual, or where more than two alleles were called (filtering was again completed using bcftools; Danecek *et al*. 2021). The filtered VCF file was then split into two subsets—one contained sites where the *O. leucocephala* sample was homozygous-reference (matching the *H. atricapilla* reference) but *O. jamaicensis* presented an alternative homozygous genotype ('*jamaicensis*-derived sites'), whilst the other subset contained sites with the opposite pattern ('*leucocephala*-derived sites'). The distribution of genotypes among these site categories for the ten largest scaffolds (all >25 Mbp) was then used to identify the putative hybrid. Each of these scaffolds contained 6,000–31,000 *jamaicensis*-derived sites and 8,000–40,000 *leucocephala*-derived sites. Such large scaffolds are very likely to be placed on different chromosomes, and can be considered independent data points.

Mitochondrial genome analysis.—We accessed the complete mitochondrial genome for *O. jamaicensis* (MW574354.1) and partial sequences for the *O. leucocephala* mitochondrial genome (AY747862.1, A4747868.1, AY747702.1) from the NCBI database. The complete mitochondrial genome of the putative hybrid was generated from the filtered sequencing data using GetOrganelle v1.7.7.0 using default settings (Jin *et al*. 2020), and all sequences were aligned using the MUSCLE algorithm with a gap opening penalty of -400 and no gap extension penalty (Edgar 2004). In total, 3,404 bp were aligned. We identified the number of sites where the putative hybrid matched *leucocephala* but not *jamaicensis* and the number of sites where the putative hybrid matched *jamaicensis* but not *leucocephala*. These counts were compared to ascertain the maternal genotype.

Data accessibility.—Raw data and analysis scripts can be found at 10.5281/zenodo.16322554.

Results

Nuclear genome analysis.—The putative hybrid was heterozygous at *c*.95% of *leucocephala*-derived homozygous sites and *c*.82% of *jamaicensis*-derived homozygous sites (Fig. 2). F_1 hybrids are predicted to be heterozygous at *c*.100% of sites where parental lineages exhibit fixed differences, whereas F_2 hybrids or backcrossed individuals are predicted to be homozygous at ≥50% of such sites. The very high level of heterozygosity in *leucocephala*-derived sites clearly indicates that the putative hybrid is an F_1 hybrid of *jamaicensis* and *leucocephala*. The lower lever of heterozygosity in *jamaicensis*-derived sites probably reflects the historical divergence of European and American *jamaicensis* populations (Muñoz-Fuentes *et al*. 2006). The alternative explanation for a *c*.82% rate of heterozygosity would be introgression between *leucocephala* and the European *jamaicensis* population, followed by hybridisation; however, this explanation would predict similar levels of heterozygosity for *jamaicensis*-derived and *leucocephala*-derived sites. Furthermore, previous analyses have indicated that there has so far been no appreciable introgression from *jamaicensis* into the *leucocephala* gene pool (Muñoz-Fuentes *et al*. 2007).

Mitochondrial genome analysis.—At 3.5% of mitochondrial sites (122/3,404), the putative hybrid matched published *jamaicensis* mitochondrial DNA and differed from published *leucocephala* mitochondrial DNA. In contrast, the putative hybrid matched *leucocephala* and differed from *jamaicensis* at just 0.15% of sites (5/3,404). These results indicate that the maternal genotype of the putative hybrid is *O. jamaicensis*.

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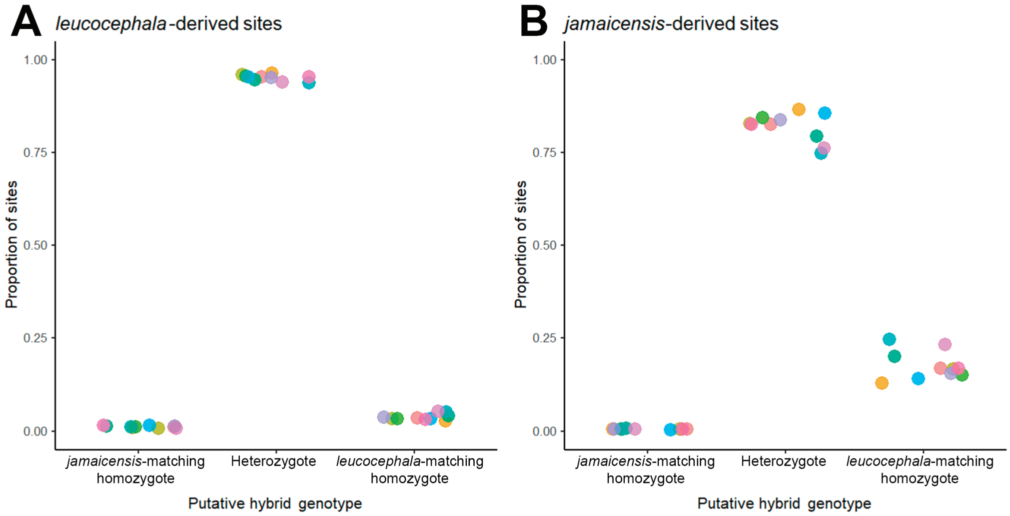

Figure 2. The distribution of putative hybrid genotypes for (A) sites where White-headed Duck *Oxyura leucocephala* exhibits a derived homozygous genotype whilst Ruddy Duck *O. jamaicensis* exhibits a reference (Black-headed Duck *Heteronetta atricapilla*-matching) homozygous genotype and for (B) sites where *O. jamaicensis* exhibits a derived homozygous genotype whilst *O. leucocephala* exhibits a reference homozygous genotype. Data points represent genotype proportions from the ten largest *H. atricapilla* scaffolds (all >25 Mbp), each of which is based on 6,000–40,000 individual sites.

Discussion

Whole-genome-sequencing successfully ascertained the identity of a putative *O. jamaicensis* × *O. leucocephala* hybrid culled in Denmark. Analysis of nuclear and mitochondrial sites provided unambiguous evidence that the putative hybrid was an F_1 cross of an *O. jamaicensis* female and an *O. leucocephala* male. This matches most documented pairings, and the pattern is thought to reflect the greater efficiency of eradication programmes in removing *O. jamaicensis* males, which are easier to distinguish from *O. leucocephala* than females (Muñoz-Fuentes *et al.* 2007).

The appearance of a hybrid between the invasive *O. jamaicensis* and the threatened *O. leucocephala* in Denmark, far outside the usual range of *leucocephala* and where *O. jamaicensis* is only observed occasionally, highlights the importance of international co-operation in dealing with invasive species (Hughes *et al.* 2006). *O. leucocephala* is a vagrant throughout western Europe, and these birds should be checked carefully for indications of hybridisation. Given the scarcity of both species in Denmark, and the exhaustive documentation of vagrants by the recreational birding community, it is most likely that the hybrid individual was a vagrant to Denmark, rather than hatched locally. In the winter of 2022, a putatively pure male *O. leucocephala*, a putatively pure female *O. jamaicensis* and a hybrid were all present in Denmark, suggesting some factor (e.g., warm southerly winds or low food availability in the usual range) contributed to unprecedented movements north from southern Europe that year (Lees & Gilroy 2009). More widely, this study indicates that conservation efforts limited to a core range may not be sufficient to protect dispersive species from introgressive hybridisation.

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Taxonomic identities of *Phasianus melanocephalus* J. E. Gray, 1829, *Dicrurus cathoecus* Swinhoe, 1871, *D. macrocercus* Vieillot, 1817, and *D. indicus* Stephens, 1826, fixed through designation of lectotypes and neotypes held in the Natural History Museum, Tring

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Summary.—During ongoing research, initiated by JM, in the Natural History Museum, Tring, bird collections, four cases have been identified where it is necessary to objectively define the relevant taxa; two by lectotypification and two by neotypification. The first of these is Western Tragopan *Tragopan melanocephalus* (J. E. Gray, 1829), of which the male and female syntypes are identifiable as different species, with the female being a juvenile male Satyr Tragopan *T. satyra* (Linnaeus, 1758). The second involves *Dicrurus cathoecus* Swinhoe, 1871, currently treated as a subspecies of Black Drongo *D. macrocercus* (Vieillot, 1817) and which was described from specimens collected in mainland China, the islands of Hainan and Taiwan. Subsequently, *Dicrurus ater harterti* E. C. S Baker, 1918, now also a subspecies of *D. macrocerus*, was named on the basis of a specimen collected on Taiwan, but without unambiguously excluding Swinhoe's nomen from Taiwan. The final case pertains to *Dicrurus macrocercus* Vieillot, 1817, and its objective synonym *D. indicus* Stephens, 1826, which were based on Levaillant's (1805: pl. 174) 'le Drongolon', supposedly from South Africa. Since the mid-19th century, authors have invariably applied the name *D. macrocercus* to the birds of 'India' *sensu lato*, but to which taxon within the *macrocercus* complex this name applies there is no consensus. To our knowledge, the type material of Levaillant's 'le Drongolon' no longer exists, and therefore there are also no extant types of Vieillot's and Stephens' nominal species. As a result, lectotype designations are offered for the first two above cases, and the same neotype designation for *Dicrurus macrocercus* Vieillot, 1817, and *D. indicus* Stephens, 1826, in order to fix the identities on the universally understood taxonomic concept associated with each of these taxa.

In common with many other ornithological collections across the world, the Natural History Museum at Tring (NHMUK), formerly the British Museum (Natural History) (BM(NH)) and based in London, has segregated its name-bearing type specimens based on published type catalogues (Warren 1966, Warren & Harrison 1971). Despite that during research for these catalogues literally thousands of type specimens were identified and confirmed, only a single representative example of each taxon was transferred to the museum's type cabinets, and only those details associated with the same specimen were recorded in the relevant volume of the catalogue. In cases where multiple types (syntypes) of a taxon were present, the remainder of this material was left *in situ* in the main collection, although its presence was usually (but not invariably) noted in the catalogue.

During the past decade, staff at NHMUK have devoted effort to the (re-)identification and segregation of this 'other', and additional, name-bearing type material. In doing so,

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cases of mixed type series have come to light, resulting in the need to designate lectotypes from NHM material in order to define a taxon objectively (e.g., Kirwan *et al*. 2024, van Grouw & Kirwan 2025). Here, we deal with two cases in which the available syntypes comprise specimens of different taxa, necessitating a lectotype in each case, and two cases requiring neotype designations to define the relevant taxa objectively.

WESTERN TRAGOPAN *Tragopan melanocephalus*

John Edward Gray (1829: 29) described *Phasianus Melanocephalus* from specimens in the collection of General Hardwicke. Major-General Thomas Hardwicke (1756–1835) was an English soldier and naturalist who, during his time in India (1777–1823), amassed a large collection of specimens, and commissioned drawings of these by native artists. In England, he collaborated with Gray, who described many new species from Hardwicke's collection, and his collection was bequeathed during the early 1830s to the then British Museum (Sharpe 1906: 169–170). He had also earlier, in 1824, donated specimens to the Honourable East-India Company Museum (Horsfield & Moore 1854: iv), often referred to as 'the India Museum'.

Although Gray did not report how many specimens of *P. melanocephalus* he had seen, his description is of both sexes. One specimen from the former Hardwicke collection is present in NHMUK (see Table 1), a male (Fig. 1), and this specimen has always been treated as a syntype of *P. melanocephalus* (Ogilvie-Grant 1893: 275, Warren 1966: 182). Warren listed details of the male, NHMUK Vell. Cat. 34.23a, but stated that 'this specimen does not exactly fit the original description.' She did not elaborate as to how it did not match, but probably she was referring to the specimen clearly exhibiting horns and a wattle (Fig. 1) whilst the original description stated that the male lacked both appendages. In the first instance that seems to be a mistake by Gray as, based on pl. 46 (Fig. 2) in Gray (1831), the specimen was drawn with erect horns and wattle. Pl. 47 (Fig. 3), however, in Gray (1831) is of a male visibly without either. The original drawing used as a draft for pl. 47 (Fig 4), by a local artist in India before Hardwicke returned to England, also lacks horns and a wattle. This drawing is annotated in pencil, in Hardwicke's hand, saying 'I have examined several specimens of this Bird, but found no appearances of the appendage so conspicuous in Ph. cornutus [= *T. satyra*] - neither has it the gular appendage. Melagris Cristatus, Black headed Pheasant without Horns, from Almorah.'

Shortly after Gray's description in 1829, it was discovered that males of this species *do* have horns and a wattle, which they can exhibit during display. It appears that after this discovery, NHMUK Vell. Cat. 34.23a may have been re-prepared to exhibit the horns and wattle, which is supported by the fact that the head has been separated from the body in the past (HvG pers. obs. 2025), presumably as that would have made it easier to re-hydrate those parts of the skin necessary to 'erect' the horns and wattle. Although using a head from another skin or even from a fresh-dead specimen might have been technically easier, we

TABLE 1

Type material pertaining to *Phasianus melanocephalus* J. E. Gray, 1829, in the Natural History Museum, Tring, as identified by us, including their status following this paper.

NHMUK reg. no.	Sex	Locality	Other notes concerning provenance	Status following this paper
Vel. Cat. 34.23a	male	Almorah, India [Himalayas]	Presented by General Hardwicke; from Hardwicke's collection	lectotype
1880.1.1.1838	female	'India' [Almora]	Presented by the India Museum; from Hardwicke's collection	paralectotype

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Figure 1 (left). Syntype of *Phasianus melanocephalus* Gray, 1829, NHMUK Vell. Cat. 34.23a, male, Almora, Almora district, Uttarakhand state, India; formerly part of the Hardwicke collection, and designated as lectotype of the taxon herein (Jonathan Jackson, © Trustees of the Natural History Museum, London)

Figure 2 (below left). Plate 46 in Gray (1831), depicting a male Black headed horned pheasant *Satyra melanocephala*, drawn by Benjamin Waterhouse Hawkins; why Gray used the generic name *Satyra*, and not *Phasianus* as in the original description and in plate 47 (see Fig. 3) is unknown.

Figure 3 (below right). Plate 47 in Gray (1831), depicting a male Black headed pheasant *Phasianus melanocephalus*.

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Figure 4 (above left). Original painting of a male Black headed pheasant *Phasianus melanocephalus* by an unknown artist and which was used to create plate 47 in Gray (1831). The notes in pencil, in Hardwicke's hand, read, 'I have examined several specimens of this Bird, but found no appearances of the appendage so conspicuous in Ph. cornutus [= *T. satyra*] - neither has it the gular appendage. Melagris Cristatus, Black headed Pheasant without Horns, from Almorah.'

Figure 5 (above right). Original painting of a, supposed, female Black headed pheasant *Phasianus melanocephalus* by an unknown artist, which was used to create plate 48 in Gray (1831).

Figure 6 (right). Plate 48 in Gray (1831), supposedly depicting a female Black headed pheasant *Phasianus melanocephalus*.

consider it unlikely that another specimen would have been available at that time as, until 1838, Hardwicke's specimen was the sole example of the species in the British Museum collection. Therefore, despite the specimen's appearance having been altered, we are confident that NHMUK Vell. Cat. 34.23a *is* the male syntype of *Phasianus melanocephalus* J. E. Gray, 1829. The re-prepared specimen, then still mounted, must have been the model for pl. 46 in Gray 1831 (Fig. 2), which was drawn by Benjamin Waterhouse Hawkins (1807–94).

Neither Ogilvie-Grant (1893: 275) nor Warren (1966: 182) mentioned a female syntype, probably because no female Western Tragopan specimen from Hardwicke's collection appears to be present in the NHMUK collection. The female was described as having the 'crown, crested, black and brown banded; neck, bright red' (Gray 1829: 29), but female Western Tragopan lacks these characteristics. The original description (Gray 1829: 29), and both the painting by a native Indian artist (Fig. 5) used as a draft for pl. 48 in Gray (1831) and pl. 48 (Fig. 6) itself all suggest a juvenile male Satyr Tragopan *T. satyra* (Linnaeus, 1758) instead. A Satyr Tragopan from Hardwicke's collection that matches both the description

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Figure 7. Paralectotype of *Phasianus melanocephalus* J. E. Gray, 1829, NHMUK 1880.1.1.1838, 'India' [Almora], formerly part of the Hardwicke collection; the purported female specimen is, in fact, a juvenile male Satyr Tragopan *Tragopan satyra* (Linnaeus, 1758) (Jonathan Jackson, © Trustees of the Natural History Museum, London)

and the plates is present in Tring. This specimen, NHMUK 1880.1.1.1838 (Fig. 7), was received from the India Museum in 1880; on arrival it was registered as '*Ceriornis melanocephala*', suggesting that it was incorrectly identified as Western Tragopan whilst still in the India Museum. Therefore, without doubt we consider this to be the purported 'female' syntype of *P. melanocephalus* J. E. Gray, 1829.

In light of the discovery that the two syntypes represent different species, it becomes necessary to fix the identity on the universally understood taxonomic concept associated with *Phasianus melanocephalus* and maintain stability of this nomen via designation of the unambiguously identified male specimen as its lectotype (NHMUK Vell. Cat. 34.23a; Fig. 1), collected at 'Almorah' [= Almora, Almora district, Uttarakhand state], India. This designation satisfies Arts. 74.7.1, 74.7.2 and 74.7.3 (both original and amended versions; ICZN 1999, 2003), as well as being in accord with Recommendations 74A, 74C and 74E. It results in NHMUK 1880.1.1.1838 (Fig. 7) becoming a paralectotype of *Phasianus melanocephalus*, irrespective of its taxonomic identity.

BLACK DRONGO *Dicrurus macrocercus cathoecus*

Swinhoe (1871: 377) described *Dicrurus cathoecus*, currently a subspecies of Black Drongo *D. macrocercus* Vieillot, 1817, based on an unstated number of specimens from mainland China and the islands of Hainan and Formosa (now Taiwan). Warren & Harrison (1971: 98) did not mention any syntypes in the NHMUK collection. Sharpe (1877: 247) had previously listed two specimens from Formosa collected by Swinhoe but also failed to recognise them as syntypes. Subsequently the museum acquired another 28 specimens from Swinhoe's collection, all still present at NHMUK (see Table 2) and, based on their collection date, all syntypes. Two more syntypes are present in the American Museum of Natural History

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TABLE 2
Type material pertaining to *Dicrurus cathoecus* Swinhoe, 1871, in the Natural History Museum, Tring, as identified by us, including their status following this paper.

NHMUK reg. no.	Sex/Age	Locality & date	Other notes concerning provenance	Status following this paper
1876.1.6.41	Juv.	Formosa [Taiwan]	Purchased from H. Whitely, collected by R. Swinhoe	paralectotype
1876.1.6.42	Imm.	Formosa [Taiwan]	Purchased from H. Whitely, collected by R. Swinhoe	paralectotype
1879.4.5.1129	Juv.	S.W. Formosa [S.W. Taiwan], 1861	Presented by Godman & Salvin, collected by R. Swinhoe	paralectotype
1887.12.1.836	Male	Formosa [Taiwan], Dec. 1859	Tweeddale Collection, presented by Wardlaw Ramsay, collected by R. Swinhoe	paralectotype
1887.12.1.837	Ad.	S.W. Formosa [S.W. Taiwan], 1861	Tweeddale Collection, presented by Wardlaw Ramsay, collected by R. Swinhoe	paralectotype
1887.12.1.838	Ad.	S.W. Formosa [S.W. Taiwan], 1861	Tweeddale Collection, presented by Wardlaw Ramsay, collected by R. Swinhoe	paralectotype
1887.12.1.839	Ad.	S.W. Formosa [S.W. Taiwan], 1861	Tweeddale Collection, presented by Wardlaw Ramsay, collected by R. Swinhoe	paralectotype
1897.6.1.543	Female	Szechuen [Sichuan province, S.W. China], 21 May 1869	Seebohm Collection, ex R. Swinhoe Collection, collected by A. David.	paralectotype
1897.6.1.544	Male	Szechuen [Sichuan province, S.W. China], 21 May 1869	Seebohm Collection, ex R. Swinhoe Collection, collected by A. David	lectotype
1897.6.1.545	Juv.	Peking [Beijing, China], Oct. 1869	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.546	Juv.	Peking [Beijing, China], July 1868	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.548	Ad.	Amoy [Xiamen, Fujian province, S.E. China], Feb. 1867	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.549	Imm.	Amoy [Xiamen, Fujian province, S.E. China]. Nov. 1856	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.550	Imm.	Formosa [Taiwan], Nov. 1865	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.551	Ad.	Formosa [Taiwan], Oct. 1865	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.552	Ad.	Formosa [Taiwan], March 1866	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.553	Ad.	Formosa [Taiwan], March 1866	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.554	Ad.	Formosa [Taiwan], Nov. 1865	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.555	Ad.	Formosa [Taiwan], Dec. 1865	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.556	Ad.	S.W. Formosa [S.W. Taiwan], 1861	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.557	Ad.	S.W. Formosa [S.W. Taiwan], 1861	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.558	Juv.	S.W. Formosa [S.W. Taiwan], 1861	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.559	Juv.	S.W. Formosa [S.W. Taiwan], 1861	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.560	Juv.	S.W. Formosa [S.W. Taiwan], 1861	Seebohm Collection, collected by R. Swinhoe	paralectotype

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1897.6.1.561	Juv.	S.W. Formosa [S.W. Taiwan], 1861	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.562	Juv.	S.W. Formosa [S.W. Taiwan], 1861	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.563	Ad.	S.W. Formosa [S.W. Taiwan], 1861	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.564	Ad.	Takow [Kaohsiung, Taiwan], Dec. 1865	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.565	Ad.	Ape's Hill [Taiwan]	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.568	Ad.	Hainan, Mar. 1868	Seebohm Collection, collected by R. Swinhoe	paralectotype
1897.6.1.569	Ad.	Hainan, Mar. 1868	Seebohm Collection, collected by R. Swinhoe	paralectotype

(AMNH), New York (LeCroy 2014: 52), and Dekker & Quaisser (2006: 56) listed another 23 syntypes in what is now the Naturalis Biodiversity Center, Leiden (RMNH).

Almost 50 years after Swinhoe, Baker (1918: 299) described a new subspecies of *Dicrurus* from Formosa, collected at Tai-peh on 6 April 1896, as *Dicrurus ater harterti*, based on a specimen from Alan Owston's (1853–1915) collection, at that time in Rothschild's collection at the Tring Museum (now in New York, AMNH 671951, see LeCroy 2014: 52). In the same publication, Baker (1918: 298) reported the type locality for *cathoecus* as China and failed to acknowledge that Swinhoe (1871) had material from Formosa that he had also explicitly included when describing his new 'species'. Three years later, Hartert (1921: 2017) followed Baker (1918) in restricting *cathoecus* within China to its southern part, but, without details, he *did* acknowledge that Formosan specimens had been included in Swinhoe's initial series.

Figure 8. Lectotype of *Dicrurus cathoecus* Swinhoe, 1871, NHMUK 1897.6.1.544, male, Sichuan province, south-central China, 21 May 1869, formerly part of Swinhoe's collection and probably collected by Armand David (Jonathan Jackson, © Trustees of the Natural History Museum, London)

There is general acceptance in the relevant literature that *harterti* (endemic to Taiwan) and *cathoecus* can be separated subspecifically, as the first-named has a considerably shorter tail and is, in fact, the only subspecies that on average has the tail shorter than the wings (Rocamora & Yeatman-Berthelot 2009, 2020, del Hoyo & Collar 2016), a detail already noted by Baker (1918: 299).

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Dekker & Quaisser (2006: 56–57) acknowledged that Swinhoe's type series is mixed or, in their words 'composed', but did not designate a lectotype from the two mainland China specimens in the Leiden collection. To settle the matter—fixing the name *Dicrurus cathoecus* Swinhoe, 1871, to the mainland China population—we select as the lectotype of *D. cathoecus* the adult male (NHMUK 1897.6.1.544; Fig. 8) collected in 'Szechuen' [= Sichuan province, China] on 21 May 1869. The collector was probably Armand David (1826–1900), who collected birds in Sichuan in 1869 (David 1872–74). This designation satisfies Arts. 74.7.1, 74.7.2 and 74.7.3 as well as being in accord with Recommendations 74A, 74C, 74D and 74E. It results in all 27 of the additional specimens listed in Table 2 becoming paralectotypes of *D. cathoecus*, irrespective of their taxonomic identities. All specimens listed by LeCroy (2014: 52) and Dekker & Quaisser (2006: 56) as syntypes also become paralectotypes of *C. cathoecus*.

BLACK DRONGO *Dicrurus macrocercus macrocercus*

Vieillot (1817: 588) named *Dicrurus macrocercus* based on the plate and description of 'Le Drongolon', of unknown origin, in Levaillant (1805: 72 & pl. 174; see Fig. 9). François Levaillant (also Le Vaillant, 1753–1824) had two specimens and, although he did not ascribe a locality to these, South Africa might be assumed based on the publication in which the species was described. Vieillot, presumably because he was not sure, did not give a locality for his *D. macrocercus*. The description and plate are of an all-black drongo with a deeply forked, long, flat tail with narrow but not pointed outer remiges; this, in fact, can apply to two drongo species: *D. adsimilis* Bechstein, 1794, and *D. macrocercus* Vieillot, 1817. It is unknown from where or from whom Levaillant obtained his material. Many of his surviving specimens are housed in Naturalis, Leiden and the Muséum national d'Histoire naturelle, Paris, but no drongos of the above-mentioned species with a direct link to Levaillant are present in either Leiden (P. Kamminga *in litt*. 2025) or Paris (P. Boussès *in litt*. 2025). Therefore, to our knowledge, the current whereabouts of the type material for 'Le Drongolon', and therefore for *D. macrocercus*, are unknown, if the specimens survived.

Figure 9. Plate 174 in Levaillant (1805), depicting 'Le Drongolon'.

Following Vieillot (1817), in the 1820s and 1830s *D. macrocercus* was generally accepted as a valid species of unknown origin (e.g. Ranzani 1823: 162–163, Lesson 1828: 149, Drapiez 1838: 581), although Lichtenstein (1823: 52) ascribed the locality of his *Muscicapa biloba*, which he believed to be the same species as Levaillant's 'Le Drongolon', pl. 174, as 'Ind. Orient'. Without reference to Vieillot's *D. macrocercus*, Lichtenstein included details

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(measurements) in his description which are absent from Levaillant (1805); consequently, his description must have been based on specimens he had seen, and these are the types of *M. biloba*. As a result, *M. biloba* is a subjective synonym of *D. macrocercus*. At least one Black Drongo in the Museum für Naturkunde, Berlin, ZMB 2013, an adult female from the 'East Indies' received from Carl Delbrück, possibly in October 1822, is believed to be a syntype of *M. biloba* (P. Eckhoff & S. Frahnert *in litt*. 2025).

Latham (1822: 62) based his 'Long-tailed Shrike' on Levaillant's 'Le Drongolon', and stated that it inhabits 'India'. Apart from the number of tail feathers—12—Latham included no new details in his description. Although Levaillant did not mention the number of rectrices, Latham must have taken these from the plate as, despite the species having ten tail feathers, the specimen figured has 12 so, consequently, Latham's description was based on the specimens seen by Levaillant. Subsequently Stephens (1826: 139) provided a scientific name, *Dicrurus Indicus*, for Levaillant's 'Le Drongolon' and Latham's 'Long-tailed Shrike', but without new details and, therefore, the types of *D. indicus* are also those seen by Levaillant, resulting in *D. indicus* being an objective synonym of *D. macrocercus*.

The earliest direct reference to *D. macrocercus* being an Asian species was by J. E. Gray (1828: 372) who, without elaboration, ascribed to it the range 'East Indies', a broad term that could apply to most of the Indomalayan region. Others believed that *macrocercus* originated from 'Africa' (Schinz 1836: 78), more specifically southern Africa (Lesson 1831: 330, 1838: 423), presumably influenced by the fact that Vieillot's name was based on a species in Levaillant's *Histoire naturelle des oiseaux d'Afrique*. Subsequently Sundevall (1857: 23–60) demonstrated that many of the 300 species discussed by Levaillant as being from South Africa do not occur anywhere in the continent, and many are, in fact, 'Indian' species (see also Rookmaaker *et al*. 2004). Sundevall (1857: 44 & 60) believed 'Le Drongolon' came from Java, possibly following Cabanis (1853: 111) who suggested that Java is the type locality of *Dicrurus bilobus* (M. H. C. Lichtenstein, 1823).

Since the mid-19th century, most authors have applied the name *D. macrocercus* to the birds of 'India' *sensu lato*. However, there appeared to be no consensus as to a more detailed distribution, and therefore to which taxon within the current concept of the *macrocercus* complex this name applies. Blyth (1843: 100), Jerdon (1846: 121) and many others (e.g. Strickland in Sundevall 1846: 170, Dallas 1855: 279, Sharpe 1877: 247, Oates 1883: 218–219) applied it to birds across the whole Indian Peninsula, then known as 'British India', but Tickell (1848: 304) pointed out that, by doing so, it is unclear to which of the different taxa in British India the name applies. Jerdon (1872: 118–119) later stated without details that 'Vieillot's name was applied to a Malayan bird' instead, and Blyth (1875: 129) also had a change of heart and subsequently applied *macrocercus* to the Javan population.

Baker (1918: 296) confused matters by applying the name '*Dicrurus ater*' (based on *Muscicapa atra* Hermann, 1804, with 'Tranquebaria' [= Tharangambadi, Tamil Nadu, southern India] as the type locality) to birds 'throughout the whole of India and Ceylon, Burma, the Malay Peninsula, Java, Cochin China, Siam, Gambodia [*sic*], and China.' Baker divided *ater* into six subspecies based on tail and wing measurements stating, 'I can find no variation in colour to assist in the division of this species into geographical subspecies.' He (Baker, 1918: 297) included *D. macrocercus* in the synonymy of *Dicrurus ater ater* and, although he claimed that 'this bird inhabits the whole of India south of the foothills and adjacent plains of the Himalayas to the extreme south of Travancore', by doing so Vieillot's nomen became 'linked' to the type locality of *Muscicapa atra* Hermann, 1804. As the name *Muscicapa atra* Hermann, 1804, was unavailable, preoccupied by *Muscicapa atra* Statius Müller (1776: 169) and *Muscicapa atra* J. F. Gmelin (1789: 946), Baker (1924: 356) replaced it

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with the next oldest available name, *macrocercus* Vieillot, 1817, restricting its type locality to Orissa' [= Odisha, eastern India].

Ticehurst (1932: 20) objected to 'Orissa' as the type locality of *D. macrocercus*, as suggested by Baker (1924: 356). He acknowledged that birds from the central and southern Indian Peninsula are the same as those which Hermann (1804: 208) described from 'Tranquebar' as *Muscicapa atra*, but as mentioned above that name is unavailable. Ticehurst was of the opinion, following Cabanis (1853: 111), that *D. biloba* occurred on Java and, since *biloba* is a synonym of *macrocercus*, the type locality of *macrocercus* must also be Java. As a result, according to Ticehurst birds from the central and southern Indian Peninsula were unnamed, which he rectified by calling them *Dicrurus macrocercus peninsularis* Ticehurst, 1932. As his holotype (NHMUK 1932.10.19.1, Fig. 10), Ticehurst chose a male from 'Madras City' [Chennai], in the state of Tamil Nadu, presumably to match the type locality of Hermann's *Muscicapa atra*.

Figure 10. Holotype of *Dicrurus macrocercus peninsularis* Ticehurst, 1932, NHMUK 1932.10.19.1, male, Chennai, 7 May 1931, collected by personnel from the Madras Museum and presented by Hugh Whistler (Jonathan Jackson, © Trustees of the Natural History Museum, London)

Vaurie (1949: 238) disagreed with Ticehurst regarding the type locality of *D. macrocercus* and remarked that Kloss (1921: 207) had already noted that 'India' of Stephens' *D. indicus* was quite definite, antedates Cabanis' 'Java', and must therefore be accepted as the type locality for 'Le Drongolon' and for the first scientific name applied to it, *D. macrocercus*. Vaurie argued that Ticehurst's *D. m. peninsularis* is yet another synonym of *D. m. macrocercus*, but that his choice 'Madras City' as its type locality is 'unequivocal' and therefore Vaurie adopted it for *D. m. macrocercus*. Vaurie (1949) considered the range for nominate *macrocercus* to be 'the whole of peninsular India, from latitude 20°N. southward', which he repeated subsequently (Vaurie 1959: 120, 1962: 141). As a result, the name *macrocercus* is now consistently applied to the Black Drongo of southern India (Ripley 1961: 287, Ali & Ripley 1987: 117, Rocamora & Yeatman-Berthelot 2009: 222, Dickinson & Christidis 2014: 219, del Hoyo & Collar 2016: 322, Gill *et al*. 2025).

Vieillot's name *macrocercus* is available, having both a description and an indication (Art. 12.2). Because the description is derived from the work given as an indication, i.e. Levaillant (1805: 72, pl. 174), the types of *macrocercus* are the specimens seen by Levaillant, i.e. two syntypes, locality unknown. Given former confusion concerning its identity

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and the lack of any extant type material (see above) for *Dicrurus macrocercus* Vieillot, 1817, a neotype for this taxon is assigned herein (Fig. 11). Designation of a neotype is regulated by Art. 75.3 (ICZN 1999), which states that a neotype should be designated only if there is an exceptional need. The need for a neotype is the former confusion regarding the identity of Levaillant's 'Le Drongolon', as described above, and to fix the current meaning of *macrocercus*. By designating a neotype, we help to clarify the taxonomic status of the nominate subspecies of Black Drongo (Art. 75.3.1). According to Rocamora & Yeatman-Berthelot (2020), *D. m. macrocercus* is smaller in all measurements (see below) than *D. m albirictus* (wing 153 mm, tail 170 mm, tail fork 66 mm), the subspecies in northern India, and larger in all measurements than *D. m. minor* (wing 131 mm, tail 137 mm, tail fork 47 mm) from Sri Lanka (Arts. 75.3.2 and 75.3.3). Because *macrocercus* was based on the two specimens described and figured by Levaillant as 'Le Drongolon', and these appear not to exist, Art. 75.3.4 is satisfied, as is Art. 75.3.5 because the neotype is of the same life stage as Levaillant's 'Le Drongolon', pl. 174. The type locality of the specimens used by Levaillant, and therefore that of Vieillot's *D. macrocercus*, was indirectly implied to be Africa but without foundation. To maintain current usage, a locality close to the type locality of *Muscicapa atra* Hermann, 1804, the first description of the nominate subspecies of Black Drongo, has been selected (Art. 75.3.6). Allocating a neotype for *D. macrocercus* from the type series of *M. atra* would be appropriate. However, no Black Drongo specimen from Hermann's collection is present in the Musée d'Histoire Naturelle de la ville de Strasbourg (E. Ludes-Fraulob *in litt*. 2025), the museum founded on Hermann's collection. The herein selected neotype is housed in the NHM at Tring (Art. 75.3.7).

Fig. 11. Neotype of *Dicrurus macrocercus* Vieillot, 1817, and of *Dicrurus indicus* Stephens, 1826, NHMUK 1949.Whi.1.2295, male, Kambam Valley, Theni district, Tamil Nadu state, India, 11 December 1929, collected by Vivian Stanley La Personne, formerly part of Hugh Whistler's collection (Jonathan Jackson, © Trustees of the Natural History Museum, London)

Based on the above, and to our knowledge, the conditions in Art. 75.3 of ICZN (1999) apply, and we designate as the neotype of *Dicrurus macrocercus* Vieillot, 1817: NHMUK 1949.Whi.1.2295, adult male, collected by Vivian Stanley La Personne (1897–after 1957) in the Cumbum Valley, Madras, India [= Kambam Valley, Theni district, Tamil Nadu state, India] on 11 December 1929 (Fig. 11). Measurements (taken by HvG) of the neotype are as follows: wing length 139 mm, tail length 154 mm, tail fork 59 mm.

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As demonstrated above, the nominal species *Dicrurus indicus* Stephens, 1826, was described independently of *Dicrurus macrocercus* Vieillot, 1817, on the basis of Levaillant's (1805) 'le Drongolon'. It was generally understood as a junior objective synonym of *macrocercus* and shared its taxonomic fate. However, with the designation of a neotype for *D. macrocercus*, the taxonomic identity of *D. indicus* remains unfixed. Therefore, and for the reasons listed above for *macrocercus*, we here also designate NHMUK 1949.Whi.1.22695, as the neotype for *Dicrurus indicus* Stephens, 1826.

This results in the following sequence: *Dicrurus m. macrocercus* Vieillot, 1817. Neotype NHMUK 1949.Whi.1.22695 (designation herein). Synonyms: *Muscicapa atra* Hermann, 1804, *Muscicapa biloba* Lichtenstein, 1823, *Dicrurus indicus* Stephens, 1826, neotype NHMUK 1949.Whi.1.22695 (designation herein), and *Dicrurus macrocercus peninsularis* Ticehurst, 1932.

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[1] For dating see Mlíkovský (2012).

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The only North American record of the extinct Slender-billed Curlew *Numenius tenuirostris*

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Summary.—An historical record of the extinct Slender-billed Curlew *Numenius tenuirostris* from Ontario, Canada, is quite exceptional, being the only North American record. Its inclusion in North American, Canadian, or Ontarian avifaunal lists is patchy, and the specimen has not been assessed against current identification criteria. We show that the specimen is extant, in the collection of the Buffalo Museum of Science, and is indeed a Slender-billed Curlew. Here, we compile the history of the specimen and its collector in the wider context of the ornithology of the Niagara Region.

The Slender-billed Curlew *Numenius tenuirostris* is a recently extinct species that formerly bred in the steppe region of southern Russia and Kazakhstan (Ushakov 1912, 1925, Buchanan *et al*. 2018) and migrated west through southern Europe and North Africa to winter mainly in Morocco and elsewhere in north-west Africa (Gretton 1991). The last confirmed sighting was of a single individual at the Merja Zerga wetlands in Morocco in February 1995 (Buchanan *et al*. 2010, 2025). Despite numerous searches on the breeding and wintering grounds (Belik 1994, Danilenko *et al*. 1996, Buchanan *et al*. 2010), there have been no confirmed records since. Following a thorough analysis of specimen records and sightings (Buchanan *et al*. 2025), it was declared extinct in 2025 (BirdLife International 2025).

Of the documented specimens, one is an exceptional extralimital record: an individual in the Buffalo Museum of Science (Buffalo, New York) that was ostensibly shot at Crescent Beach, Fort Erie, Ontario, Canada (42°53′3″N, 78°57′54″W) in the Niagara Region in autumn 1925 (Beardslee & Mitchell 1965). It was not included in the first edition of *The birds of Canada* (Godfrey 1966) and was only cursorily mentioned in the revised edition (Godfrey 1986). Other mid-20th century publications also neglected the specimen (Snyder 1951, Sheppard 1960) or made only passing reference to it (Sheppard 1968, Speirs 1985). The record does not appear in the fourth (AOU 1931) or fifth (AOU 1957) editions of the *Check-list of North American birds*, but only in the sixth (AOU 1983), alongside reference to a sight record from North Carolina, which is not mentioned in the seventh edition (AOU 1998). The first recognition of it appears to be Beardslee & Mitchell (1965), though even more recent publications seem to overlook the record (e.g., Lees & Gilroy 2021), or include it but do not cite a source (van Gils *et al*. 2020). The record was formally accepted by the Ontario Bird Records Committee in 1982 (James 1982).

Other notable vagrancy records of Slender-billed Curlew are known, including three unverified sightings from the Azores (Clarke 2006) and an apparent early 20th-century specimen from Japan (Brazil 1991). In recent years, however, several supposed Slender-billed Curlew specimens and sightings have proven erroneous (e.g., Skerrett 2011, Hudeček 2016); advances in identification (Marchant 1984, Corso *et al*. 2014) have been crucial to our understanding of both specimen and sight records. Given the exceptional nature of the Buffalo specimen, the only verifiable record from North America, we revisit its identity and compile its history.

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Identification

The specimen measurements, reported in Beardslee & Mitchell (1965), are: culmen 76 mm, tarsus 62 mm, wing (worn) 241 mm, tail 96 mm. Diagnostic features of Slender-billed Curlew were reviewed by Corso *et al*. (2014), who found the most reliable to be the underside of the outermost primary feathers (see their fig. 3); other features are less useful in museum specimens where preparation and fading can influence these features. In Slender-billed Curlew, the undersides of the outermost primaries are 'uniformly dark grey or blackish-grey' (Corso *et al*. 2014: 347), whilst in Eurasian Curlew *Numenius arquata*, there are larger pale patches towards the feather base (Corso *et al*. 2014). The underside of the outermost primaries on both wings of the Buffalo specimen are dark with a pale trailing edge (Fig. 1) somewhere between the uppermost two examples of *N. tenuirostris* in fig. 3 in Corso *et al*. (2014). The specimen can therefore be confirmed as a Slender-billed Curlew.

History

The specimen was donated to the Buffalo Museum of Science in September 1942 by Dr Irvin L. Terry Sr., a dentist from Buffalo, as part of his larger bird collection comprising 60 birds and a mounted head of White-tailed Deer *Odocoileus virginianus* (BSNS unpubl. data). His son, Dr Irvin L. Terry Jr., was elected a Fellow of the Buffalo Society of Natural Sciences, where he was also a life member, following the donation of his father's collection to the museum (Goodyear 1994). The elder Terry is not mentioned in the history of the society or the museum (Goodyear 1994).

The specimen of Slender-billed Curlew (BSNS O2092) is mounted on a piece of driftwood identical to that in the photograph in Beardslee & Mitchell (1965). Terry's collection lacks original labels, as he apparently removed these after becoming worried that some may have been collected illegally (Beardslee & Mitchell 1965). Correspondence from a Mr W. R. Harris, who was Terry's hunting companion, to Beardslee & Mitchell (1965) during preparation of their *Birds of the Niagara Frontier Region* provide some insight into the specimen's history and is summarised below.

The bird was shot 'on the east side of the point in the western end of Crescent Beach Bay', likely in the autumn and 'about 1925' (Beardslee & Mitchell 1965). Terry engaged the taxidermist at the Buffalo Museum of Science, Joseph A. Santens, originally from Belgium

Figure 1. The underside of the left primaries showing the extensive dark colour characteristic of Slender-billed Curlew *Numenius tenuirostris* (Corso *et al*. 2014) (Paige R. Langle & A. L. Hines, Buffalo Museum of Science, BSNS O2092, reproduced with permission)

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Figure 2. The mounted Slender-billed Curlew *Numenius tenuirostris* in the Buffalo Museum of Science (Paige R. Langle, Buffalo Museum of Science, BSNS O2092, reproduced with permission)

but who trained at Ward's Natural Science Establishment in Rochester, New York and subsequently worked at the Carnegie Museum, Pittsburgh (Goodyear 1994), to mount the specimen. Santens worked at the museum in Buffalo from 1917–26 (Goodyear 1994), which agrees with Harris' interpretation of the year of collection, 'about 1925'.

Terry had the bird mounted because 'it was a most unusual species, and Mr Santens was interested in helping Dr Terry develop a bird collection' (Beardslee & Mitchell 1965). The curlew was apparently the only European taxon represented in Terry's collection (Beardslee & Mitchell 1965). It remains in the Buffalo Museum of Science (Fig. 2).

There are strong ornithological links between Buffalo, New York, and the Niagara Region of Ontario dating from the foundation of the Buffalo Society of Natural Sciences in 1861 (Jackin 2010), which also founded the Buffalo Museum of Science (Hamilton 2010) and spawned the Buffalo Ornithological Society, founded in 1929. The society's remit included members and observations as far west as Port Weller, along the Welland River to Dunnville, incorporating portions of Welland, Lincoln and Haldimand Counties of Ontario, as well as encompassing areas further west from Grimsby Beach on the south shore of Lake Ontario to Rainham Centre on the north shore of Lake Erie (Beardslee & Mitchell 1965, Hamilton 2010), an area which includes Crescent Beach and Fort Erie, Ontario. As a Buffalo resident with many specimens from the area covered by the Buffalo Ornithological Society, Terry donated his collection, including this noteworthy record and specimen from Canada, to the museum in Buffalo. Terry does not appear to have had any notable connection to either organisation (Beardslee & Mitchell 1965, Hamilton 2010, Jackin 2010), aside from the donation of his collection in 1942.

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Does phenotypic variation in the Arabian Bustard *Ardeotis arabs* warrant taxonomic recognition?

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Summary.—The Arabian Bustard *Ardeotis arabs* occupies open arid country from West (and formerly north-west) Africa to coastlands either side of the Red Sea. Five subspecies have been described, nominate *arabs* in south-west Arabia and north-east Africa, *stieberi* from the Red Sea to the Atlantic Ocean, *butleri* in South Sudan and Kenya, *geyri* in north-west Niger, and the extinct *lynesi* in Morocco. All taxa were described on the basis of the shade of upperpart coloration, with *lynesi* and *butleri* equally dark, and *arabs*, *stieberi* and *geyri* each successively paler. Of these, *geyri* alone has been widely discounted as invalid, for reasons of diagnosability and possible clinality which, however, could equally well apply to the other taxa. Indeed, ten informal commentaries on the variation found in the species, taken together, imply significant scepticism over the value of dividing it into subspecies. Examination of museum specimens and photographs of wild birds justifies that scepticism, with the holotype of *geyri* proving darker than a specimen of *stieberi*, a proportion of *stieberi* darker than nominate *arabs*, a specimen of the former as dark as a pale *lynesi*, and a living *butleri* as pale as nominate *arabs* and some *stieberi*; no strong differences in size between taxa, including the seemingly slightly smaller *lynesi*, are apparent. This evidence confounds the diagnosability of any subspecies and suggests the observed variation may simply reflect the influence of Gloger's Rule or else substrate matching. A better option is to treat the species as monotypic.

The Arabian Bustard *Ardeotis arabs* occupies open, arid country in a wide range across the Sudanian Savanna region of Africa, from Mauritania and Senegal in the west to Ethiopia, Djibouti and north-westernmost Somaliland in the east (Collar & Wacher 2025), with a population in Morocco, now extinct (Collar 2024), and a population in Yemen, now remnant but once extending 1,000 km along the coastal plains of western and south-western Arabia (Collar *et al*. 2024). Despite being named by Linnaeus in 1758 it took a century and a half before exploration and specimen accumulation produced attempts to define geographical variation in the species, which in another half-century had been divided into five taxa: nominate *arabs* in western Saudi Arabia and Yemen, eastern Eritrea, north-east Ethiopia, Djibouti and north-west Somaliland, *stieberi* (Neumann 1907) in western Eritrea and north-west Ethiopia west to coastal Mauritania, *butleri* (Bannerman 1930) in South Sudan and north-west Kenya, *geyri* (Niethammer 1954) in north-west Niger, and *lynesi* (Bannerman 1930; extinct) in Morocco.

These divisions were all based on variation in the shade of colours on the head (*stieberi*) and upperparts (*lynesi*, *butleri* and *geyri*, with *stieberi* added on this latter character later). Such divergence in morphology, when producing discrete, diagnosable geographic populations, is appropriately expressed through subspecific designation (Remsen 2010). However, the phenotypic distinctions in this case are single and minor, and the degree to which they represent genuine subspecific differentiation is open to debate, for three reasons. First, the sample sizes involved in the establishment of the taxa were small: one

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for *stieberi* (head, neck and wings only: Niethammer 1954), two for *geyri*, five for *butleri* and five for *lynesi*. Second, the incompleteness of museum material across the wide range of the species leaves open the possibility that the variation observed is merely or mostly clinal (see Donald 2020); the detailed map of localities in Collar & Wacher (2025) reveals a continuous distribution for all populations except that in Morocco. Third, even if the changes exhibit a geographical relationship, the further possibility exists that the differences are the product of 'substrate colour-matching', a phenomenon which in arid-land larks (Alaudidae) is speculated to result either from the ad- or absorption of colorants or particulates in the environment or from environmentally stimulated epigenetic melanisation (Donald *et al*. 2017). These uncertainties suggest the desirability of a new consideration of what evidence may be available.

Subspecific variation: evidence for

Neumann (1907) distinguished the subspecies *stieberi* on the basis of a single (partial) specimen showing yellow and black barring across the central crown feathers (vs. greyish-white and black in what then became the nominate form), adding that the carpal area and wing-coverts are 'slightly paler yellow'. The crown character was rejected simultaneously by Bowen (1925) and Lynes (1925) on the grounds that it depends 'on stain or age', not geography. Bannerman (1930) agreed on this point, but (having access to complete specimens) still found *stieberi* 'so strikingly different from typical *C. arabs arabs* that we must unquestionably recognize it as a valid race', basing this on its 'sandy-yellow', 'sandy-reddish' (twice) or 'reddish sandy' overall coloration rather than the 'altogether browner' nominate Arabian and Eritrean birds at his disposal.

Bannerman (1930) reached this conclusion by laying out all 23 specimens available to him in the British Museum (now Natural History Museum, Tring; NHMUK) in geographical sequence, and by this method he discriminated two further subspecies, *lynesi* from Morocco and *butleri* from what is now South Sudan. He diagnosed

- *lynesi* from nominate *arabs* by having 'darker, more coarsely vermiculated' upperparts and 'darker barring on the neck' and from *stieberi* by 'having plumage dark brown instead of reddish sandy brown', adding that it 'tends also to be small'; and
- *butleri* by being 'even darker and probably larger than the Moroccan birds', while differing from nominate *arabs* 'in its rather browner upper parts (less grey-brown), with coarser vermiculations, particularly noticeable on the wing-coverts, and generally larger size', and from *stieberi* 'in having brown instead of reddish sandy-coloured plumage'.

Bannerman was, however, in a dilemma over describing *butleri* because, as he admitted elsewhere in the paper, 'no diagnosis can be found which will differentiate the one [*lynesi*] from the other', leaving him to ponder if the name *lynesi* should also be applied to the hugely disjunct population (separated by *stieberi*) in South Sudan. His confusion is apparent in his paradoxical use of 'dark brown' in the diagnosis of *lynesi* from *stieberi* but only 'brown' in that of *butleri* from *stieberi*, even though in his view (despite his claim of undiagnosability) *butleri* is 'darker… than the Moroccan birds'. He found nominate *arabs* from Arabia (see the appendix for clarification of a locality he reported there) easier to judge, being 'rather a grey-brown bird, with finer vermiculations and females comparatively small in size', and birds in Ethiopia and Eritrea agreeing 'fairly closely', albeit their upperparts are 'rather paler, less brown'. (It bears noting that Erlanger [1905] had found birds from Arabia and Somaliland indistinguishable.)

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In January 1954 two male Arabian Bustards collected at Abbangarit (I-n-Abanghaghit), north-west Niger, a site (my translations) 'only 100 km south of the entirely vegetationless and birdless desert', were 'so pale sandy' that Niethammer (1954) established the name *geyri* to represent the population from which they came, which he imagined to occupy 'probably the whole transitional zone of the southern Sahara'. He diagnosed it:

> 'The palest race of *arabs*, pale sandy above, crown and neck very pale pure grey. Compared to the type of *stieberi* (head, neck and wings only): much paler… On every feather of the wing-coverts, carpals, secondaries and upper back the dark brown patterning gives way to a pale sandy tone; in *stieberi*… the brown vermiculations on each feather are broader, the sandy tone darker and rustier. Crown in *geyri* greyer, not so strongly mixed with brown as in *stieberi*. Grey vermiculations on head and neck paler in *geyri* and purer than in *stieberi*.'

He deemed the contrast between the pale *geyri* and the dark *butleri* so stark that they could be taken for different species.

Peters (1934) accepted all four subspecies as itemised by Bannerman (1930), and this arrangement has prevailed ever since, e.g. Cramp & Simmons (1980), Collar *et al*. (1986), Johnsgard (1991), Collar (1996), Dickinson (2003), Clements (2007), Dickinson & Remsen (2013) and del Hoyo & Collar (2014). The later-described *geyri* did not enjoy such favour, however. Heim de Balsac & Mayaud (1962) accepted it but, in the wake of Vaurie's (1965) statement that 'its validity requires confirmation', the name seems never to have been used again (Vaurie also defied Bannerman's decision by lumping *butleri* with *lynesi*). In this regard Niethammer (1954) did not help his case by admitting that *geyri* could well be the northern end of a cline and adding, somewhat mystifyingly, that in the absence of larger samples 'it is not yet possible to differentiate *geyri* and *stieberi* clearly'. Almost as mystifyingly, no subsequent authority used the same line of argument to question the validity of the other taxa. Thus *geyri* quickly dropped out of use, with Johnsgard (1991), Dickinson (2003) and del Hoyo & Collar (2014) indicating it as a synonym of *stieberi* while other lists and treatments made no reference to it at all. This pattern reflects a widespread phenomenon in biological documentation whereby authorities defer uncritically to an earlier arrangement on the assumption that it rests upon a sound evidence-based opinion, thereby producing a copycat effect that only reinforces the illusion of consensus.

In similar fashion, Bannerman's (1930) suspicion that *lynesi* was smaller than other taxa steadily became an entrenched given. Niethammer (1954) claimed to have confirmed the point, particularly as it related to the otherwise seemingly identical but geographically very distant *butleri*, after measuring three of the latter. Bouet (1955), Heim de Balsac & Mayaud (1962) and Etchécopar & Hüe (1964) then all asserted the smaller size of *lynesi* with no caveat. Cramp & Simmons (1980) went so far as to mention it has a 'relatively short tarsus, toe, and bill'.

Subspecific variation: evidence against

A steady accrual of information and opinion over the same time-frame as these developments, here presented chronologically, suggests an alternative view of the situation, but the anecdotal nature of the evidence lacked the necessary coherence to represent a challenge to the increasingly entrenched taxonomic status quo.

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1. Koenig (1911), who found the species 'everywhere in the grasslands' in what is now South Sudan and therefore within the supposed range of *butleri*, reported that 'the upperparts vary in colour from a light pearl grey to a saturated clay brown'.
2. Sclater & Mackworth-Praed (1920), obviously using the UK's Natural History Museum series, mentioned that a specimen corresponding to Neumann's diagnosis of *stieberi* is from near Rabat, Morocco, and thereby included Morocco in the range of *stieberi*.
3. Working with much the same material as Bannerman (1930), Hartert (1921, 1921–22) found infraspecific classifications impossible. He recognised that birds from Arabia and the Red Sea coast tended to be 'more sandy-yellowish', those from the Nile and Kordofan 'darker, more brownish-red' and those from Morocco 'very dark, most still more reddish'; but he also found anomalies, with 'individual variation… not inconsiderable', and advised no action until larger series with representatives of intervening, unsampled areas became available.
4. Apart from considering *stieberi* a product of 'stain or age' (see above), Lynes (1925) could not see 'any but individual differences between ours [Sudanese] and other Sudanese, Arabian and Moroccan specimens, age for age'. Moreover, concerning the amount of white and lavender-grey in the wings of adults vs. young birds, he wrote: 'the differences are really so great that, what with the enormous variation in size of these birds (22 lbs weight for an old male, 7¾ lbs for an immature but fully grown female), we always thought there must be two different kinds in Darfur until we came to the comparative examination in the Museum'.
5. Friedmann (1930) reported neutrally on two specimens collected at adjacent localities in the space of three days in north-central Ethiopia (range of nominate *arabs*), the male being 'much darker brown than the female'.
6. Paludan (1936) reported a female from eastern Mali with a 'strikingly large' wing (575 mm) when 'according to Bannerman… the females should only measure 512–550.'
7. Archer & Godman (1937) simply remarked that the differences between the recently proposed subspecies 'are so slight that some ornithologists doubt the validity of the separation.'
8. Guichard (1947), travelling east from the Atlantic, declared that 'the largest Sudan [=Arabian] Bustards seen were in South Mauretania [*sic*], the old males on the wing looking almost lavender with large white wing patches…', seemingly 'far and away bigger than any of the Niger Colony or Chad birds, a large male from the Niger Colony weighing only 15 pounds.' While not necessarily incompatible with classification as a single taxon, and clearly a subjective observation, these remarks again imply a variability not captured in the partitioning of the species into different taxa.
9. Niethammer (1954) himself reported that a large male collected at Daragaia (Junaynah), Sudan, by Wettstein (1917) was assigned to the form *stieberi* on the basis of its colour, yet the 'patterning [i.e. respective width of the dark and pale vermiculations]… is not as in *stieberi*, but… as in *geyri*'.
10. Much more recently, surveys in Eritrea, scoping opportunities to capture Arabian Bustards for *ex situ* conservation breeding, found that 'considerable variations exist in color, pattern and size, related to sex, age and moult within a single population' (Anon. 2000).

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Evidence revisited

I examined and measured material in NHMUK, the American Museum of Natural History (AMNH), New York, and the Museum of Comparative Zoology (MCZ), Cambridge, MA (bill measured from tip to skull, wing curved, tarsus from notch behind intertarsal joint to base of middle toe, and tail from tip to point of insertion). I generally excluded specimens that were juvenile, unsexed or (based on size) questionably sexed; however, I included as a separate analysis three specimens of *lynesi* in NHMUK (1893.11.23.1, 1897.10.27.1, 1910.6.10.1) considered male by Bannerman (1930) but female by me (Table 1) plus one nominate *arabs* in NHMUK (1885.12.23.18) which, while unsexed, is indubitably male on size. I also gratefully received from Prof. S. I. Cherkaoui measurements (taken to my specification, for which see above) and photographs of a male *lynesi* in the Institut Scientifique de Rabat (ISR 229 001), Morocco. For the most part I relied on well-established and uncontroversial ranges of taxa to allocate specimens to subspecies, although the situation becomes undependable in Ethiopia/Eritrea, where three taxa are considered to occur (see Ash & Atkins 2009), hence an evident male from 'Abyssinia' (NHMUK 1840.9.24.290) had to be omitted. This filtering yielded a sample of one male (unseen by me; see above) and five 'female' *lynesi* (NHMUK *n* = 3, AMNH *n* = 2; these kept separate in order to show their similarity), seven male and four female *stieberi* (NHMUK *n* = 4 + 3, AMNH *n* = 3 + 1), two male and four female *butleri* (NHMUK *n* = 1 + 3, AMNH *n* = 1 [male], MCZ *n* = 1 [female]), and five male and seven female nominate *arabs* (NHMUK *n* = 5 + 6, AMNH *n* = 1 [female]), total 14 males and 20 females. Sample sizes for particular variables were sometimes reduced owing to damage, including three cases where birds were evidently caught, kept alive and had their primaries cut.

I photographed certain specimens in this sample and, through the kindness of Guy Kirwan, obtained further images of material in the Leibniz Institute for the Analysis of Biodiversity Change, Museum Koenig (ZFMK), Bonn, these latter including an image of one of the two specimens used to establish the name *A. a. geyri* (the whereabouts of the other specimen is seemingly unknown). I also reviewed and compared photographs of living Arabian Bustards, some posted on the Macaulay Library (www.macaulaylibrary.org), others acquired from colleagues in recent years from various parts of the species' range.

Evidence reconsidered

The cumulative effect of the ten pieces of testimony cited in 'Evidence against' is to loosen the confidence with which Arabian Bustards in different parts of their range can be assigned to a given taxon based on phenotype. In the 95 years since Bannerman (1930) established the basis for the current recognition of four subspecies, there has been no advance in an understanding of the situation beyond the plausible notions, prompted by two specimens, that populations closest to the plant-less Sahara are palest and that this variation may be clinal (Niethammer 1954). Meanwhile, there is testimony from South Sudan (Koenig 1911) and Eritrea (Anon. 2000) that birds in those areas are highly variable, a record suggesting the same in north-central Ethiopia (Friedmann 1930), and an attestation of the phenomenon seemingly everywhere (Hartert 1921, 1921–22). One commentator (Lynes 1925) indicated major size differences based on age *within* the sexes, and a specimen from Mali (Paludan 1936) seems to support that, whilst a long-distance traveller (Guichard 1947) judged there to be a steady decline in size from west to east.

In this last regard it is interesting to note that C. S. Roselaar *in* Cramp & Simmons (1980) reported that *stieberi* was the largest form but that it becomes 'slightly smaller towards [the] Red Sea province of Sudan'; he noted that *butleri* was almost as large while

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arabs and *lynesi* were smaller. There is, however, no indication of the size and geographical representativeness of the samples on which these judgements were reached, but if birds can vary in morphometrics by age and by sex, and in plumage with individual as much as by area, then a definitive view of the situation would seem to require many dozens of specimens taken from a broad sample of the 24 known range states (Collar & Wacher 2025), something now patently beyond the bounds of even the remotest possibility.

The issue of the size of *lynesi* is particularly puzzling, owing to discrepancies between Bannerman's assertions of the sex of his sample and what the labels of that sample state. He examined five specimens and indicated they were all male, adding explicitly 'No females are available for comparison of size'. Of these five, three including the holotype are in NHMUK, and two were in Lord Rothschild's collection in Tring, UK (now at AMNH); from the localities Bannerman listed it is clear that these are the five birds on which he founded the name *lynesi*. By what method he determined that this sample was all male is, at this distance in time, unfathomable. However, there are five challenges to this attribution. First, the holotype is only provisionally sexed male, having square brackets around the symbol on the label, something Bannerman himself copied in his original description. Second, the two other specimens in NHMUK are unsexed according to their labels. Third, an unequivocal female symbol appears on the original labels of both birds in AMNH while on the secondary (Rothschild Museum) labels the symbol is placed in inverted commas with a question-mark. Fourth, my measurements of all five of Bannerman's sample conform closely with those of four female *stieberi* and four female *butleri* in NHMUK, AMNH and MCZ (Table 1), albeit somewhat larger in wing and tail dimensions. Fifth, the measurements of a bird identified as male *lynesi* in the Institut Scientifique de Rabat conform closely with measurements of males of the other three taxa (Table 2), which all greatly exceed those of Bannerman's sample (Table 1). Consequently, it is clear that these latter birds are (a) all the same sex and (b) female, not male, in which case it is also clear that Moroccan birds were no different in size from those elsewhere (see Table 2). In contrast, the seven female nominate *arabs* emerge a little smaller than females of other taxa, providing some support for Roselaar's notion that birds around the Red Sea may be smaller overall, but even so, given the sample sizes involved, inferences cannot be trusted and the differences are arguably only marginal (complete overlap in bill, partial overlap in tail, and only 4 mm and 8 mm respectively separating the longest tarsus and wing of *arabs* from the shortest tarsus and wing of the other taxa).

One further point to review concerns the suggestion that the white spots on the median and lesser coverts in the Arabian Bustard vary in number and size with taxon. This idea appears to have been mentioned first by C. S. Roselaar *in* Cramp & Simmons (1980), who reported those of *stieberi* 'large' and those of *lynesi* 'few and small'. The notion was picked up by Collar *et al*. (1986), who reported such spots 'conspicuous' in *stieberi* but 'much reduced' in both *lynesi* and nominate *arabs* (no comment for *butleri*). I checked this in the museum material I consulted and could not confirm a taxonomic basis for the variation involved; moreover, Plate 1 in Collar *et al*. (2024) shows a nominate *arabs* with a strong representation of mid-sized or large white spots on its forewing. Paillat (2000) formed the opinion that wing-spotting increases in size with a bird's age, something that might be tested through the use of marked individuals over time.

Bannerman (1930) laid out all 23 specimens held at that time in NHMUK in order to make his subspecific divisions. I laid out six of the same specimens (two *lynesi*, two *stieberi*, one *butleri* and one nominate *arabs* plus a 1930s *arabs*) in order to judge those divisions (Fig. 1). This exercise confirms that the upperparts of *lynesi* and *butleri* are similar to each other in shade, slightly darker than those of nominate *arabs* and obviously darker than

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Figure 1. Specimens of Arabian Bustard *Ardeotis arabs* in the Natural History Museum (Tring), left to right: two *lynesi* (NHMUK 1897.10.27.1, 1893.11.23.1), two *stieberi* (NHMUK 1915.2.9.2, 1915.12.24.102), one *butleri* (holotype, NHMUK 1902.4.20.328), and two nominate *arabs* (NHMUK 1935.12.15.6, 1895.10.23.18) (Alex J. Berryman, © Trustees of the Natural History Museum, London)

Figure 2 (left). Arabian Bustard *Ardeotis arabs stieberi*, Ouadi Rime–Ouadi Achim Faunal Reserve, Chad, 24 August 2017 (© Tim Wacher)

Figure 3 (right). Arabian Bustard *Ardeotis arabs arabs*, Bajil area, Yemen, 4 November 2008 (© Xavier Eichaker)

those of *stieberi*. However, it also discloses differences between birds of the same designated taxon, suggesting less clear-cut divisions: the left-hand *stieberi* is darker than the right and the right-hand nominate *arabs* is darker than the left, so the paler *arabs* and the darker *stieberi* converge. Indeed—always accepting that different camera settings, light conditions and backgrounds render comparisons between images taken by different photographers in different locations somewhat undependable—photographs of live birds from the ranges of nominate *arabs* and subspecies *stieberi* reveal that, confounding Bannerman's (1930) assertion that the former is 'browner' and the latter (in various combinations) 'sandy', nominate *arabs* can simply be paler than *stieberi* (Figs. 2–3), and the latter can at least occasionally be notably dark above (Macaulay Library ML617124177 and Demey 2025: 117). On this basis alone the validity of *stieberi* dissolves in an instant. Moreover, other specimens show similar such variation:

- the two AMNH female *lynesi* in Fig. 4 are paler than the two in Fig. 1, and the right-hand bird is paler than the left;

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- of two AMNH specimens of *stieberi* in Fig. 5 the left-hand individual is darker than the right and seemingly indistinguishable in shade from the right-hand *lynesi* in Fig. 4;
- the AMNH specimen of *stieberi* in Fig. 6 is far paler than those in Figs. 1 and 5, and even than the supposedly extra-pale *geyri* in Fig. 7;
- the AMNH specimen of *butleri* in Fig. 6 is darker than the ZFMK specimens in Figs. 7 and 8;
- and the MCZ specimen of *butleri* in Fig. 9 is much redder than the *butleri* in Figs. 1 and 6–8.

Still further, a live bird from Lokichogio, Kenya (near the border with South Sudan), i.e. *butleri* on range, is as pale as a nominate *arabs* or *stieberi* (Fig. 10). Such evidence (and the relative uniformity of mensural data: Tables 1–2) clearly undermines the prevailing assumption that the present trinomial classification applying to *A. arabs* reflects real and constant phenotypic differences between its name-bearing populations.

This is not to deny that there is a *trend* towards darker birds well to the north-west and south-east of the Sahel zone, where most records of Arabian Bustards are distributed (see Collar & Wacher 2025). However, if this variation is related to substrate colour-matching

Figure 4 (left). Specimens of *Ardeotis arabs lynesi* (AMNH 547522 left, AMNH 547521 right) in the American Museum of Natural History, New York (N. J. Collar)

Figure 5 (right). Specimens of *Ardeotis arabs stieberi* (AMNH 26191 left, AMNH 26190 right) in the American Museum of Natural History, New York (N. J. Collar)

Figure 6 (left). Specimens of *Ardeotis arabs stieberi* (AMNH 547523, below) and *butleri* (AMNH 196759 above) in the American Museum of Natural History, New York (© P. R. Sweet)

Figure 7 (right). Specimens of *Ardeotis arabs geyri* (ZFMK_ORN 1954.565, below) and *butleri* (ZFMK_ORN M.IV.6.a$^{\alpha}$ above) in Museum Koenig, Bonn (© Guy M. Kirwan)

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Figure 8 (left). Specimens of *Ardeotis arabs butleri* (ZFMK_ORN M.IV.6.a$^{\gamma}$ below, ZFMK_ORN M.IV.6.a$^{\beta}$ above) in Museum Koenig, Bonn (© Guy M. Kirwan)

Figure 9 (right). Specimen of *Ardeotis arabs butleri* (MCZ 63286) in the Museum of Comparative Zoology, Cambridge, MA (N. J. Collar, © President and Fellows of Harvard College)

TABLE 1

Means and ranges of four variables in 'female' specimens of four taxa of Arabian Bustard *Ardeotis arabs* in NHMUK, AMNH and MCZ. Specimens of *A. a. lynesi* in NHMUK are judged here female on appearance, despite Bannerman (1930) (see text); specimens in AMNH were originally labelled female and are judged such on appearance, again despite Bannerman (1930). For the other taxa, appearance and label attributions of sex coincide. [1]*n* = 2; [2]*n* = 3; [3]*n* = 6.

Taxon	Sample	Bill	Tarsus	Wing	Tail
A. a. lynesi (NHMUK)	3	80 (75–84)	175 (172–179)	558[1] (551–564)	351 (326–365)
A. a. lynesi (AMNH)	2	86 (82–89)	173 (172–173)	566 (556–576)	332 (331–333)
A. a. stieberi	4	86 (83–90)	178 (175–183)	528[2] (506–544)	314[2] (299–340)
A. a. butleri	4	79 (74–87)	180 (177–187)	536 (511–603)	317 (308–331)
A. a. arabs	7	80[3] (74–89)	157 (148–168)	477 (435–498)	283 (248–303)

TABLE 2

Measurements of four variables in male specimens of four taxa of Arabian Bustard *Ardeotis arabs* in the Institut Scientifique de Rabat (*lynesi*, kindly taken by S. I. Cherkaoui) and the Natural History Museum (Tring) and American Museum of Natural History (New York) (other three taxa). For the latter means and ranges are given, and the appearance and label attributions of sex coincide, except in one nominate (see text). [1]*n* = 5; [2]*n* = 1; [3]*n* = 4.

Taxon	Sample	Bill	Tarsus	Wing	Tail
A. a. lynesi	1	97	224	669	347
A. a. stieberi	7	92 (80–100)	201 (195–206)	624[1] (602–676)	346[1] (323–358)
A. a. butleri	2	93[2] (93)	195 (191–198)	603 (595–610)	346 (337–355)
A. a. arabs	5	95 (93–98)	192 (185–197)	590[3] (578–602)	363 (333–388)

through soil particle adsorption or feather melanisation (Donald *et al*. 2017), or is simply clinal in response to increasing humidity (Gloger's Rule: Delhey 2019)—both wholly

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Figure 10. Arabian Bustard *Ardeotis arabs butleri*, Lokichogio, Kenya, 15 November 2022 (© Adam Scott Kennedy)

plausible and perhaps not even mutually exclusive explanations—then its taxonomic significance is nullified. On top of this, the fact that the upperparts of birds vary in shade *within* the various regions to which subspecific identities have been assigned renders the entire proposition of taxonomic subdivision problematic. Consequently, pending an entirely fresh programme of range-wide research into the species, using multiple lines of enquiry including genetic analysis, I consider it preferable on current evidence not to admit any subspecific division in the Arabian Bustard and to treat it, for all its shades of brown on the upperparts, as monotypic. It should nevertheless be acknowledged that genetic differences may exist between areas across the species' range, so that any attempts at the re-establishment of an extirpated population or the reinforcement of a declining one would advisedly test for this and make use of stock that offers the identical (or closest) genetic match (which might be expected to be from the closest geographical area).

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Appendix: The identity of 'Wadi Asrum', a published locality for Arabian Bustard *Ardeotis arabs*

In revising the taxonomy of the Arabian Bustard *Ardeotis arabs* Bannerman (1930) enumerated the specimens he had examined and listed localities for them. Against the nominate subspecies he mentioned six specimens and two localities, these latter being 'Wadi Asrum, and from near Lahej, S. Arabia' (where 'S.' stands for southern). Collar *et al*. (2024) identified 30 localities at which the Arabian Bustard was recorded in Arabia but missed this reference to Wadi Asrum. Bannerman only examined material in what is now the Natural History Museum, UK (NHMUK), and Lord Rothschild's museum in Tring, UK. I have examined this material, the former now in Tring, the latter in the American Museum of Natural History (AMNH), New York, and not found a specimen labelled as being from Wadi Asrum. I therefore speculated that a specimen might have gone missing from one of these collections and sought to pursue the issue, interested to discover what significance this missed locality might hold for our understanding of the species' former range and status in Arabia.

It seemed certain that the site was in Yemen, because before 1930 all museum material of Arabian Bustards from Arabia now in NHMUK and AMNH came from Yemen and not from what is now Saudi Arabia. However, all searches online drew a blank. Artificial intelligence made certain claims about a Wadi Asrum being in the Hadramaut in Yemen, but was incapable of any specificity and provided different answers on different days. All material in NHMUK before 1894 was itemised in the catalogue (Sharpe 1894) so, knowing the approximate dates of the acquisitions of subsequent bird collections from Yemen in the museum, I searched the handwritten registers there for any specimen of the species from 'Wadi Asrum' received between 1894 and 1930, without success. I then reserved an afternoon to consult gazetteers and search maps of Yemen dating back to the mid-19th century held in the Cambridge University Library Map Room; and again found nothing.

However, in examining one map during the Map Room search I noticed Wadi Abrain, a locality for the species already documented by Collar *et al*. (2024), and was immediately struck that this might be the source of Bannerman's 'Wadi Asrum'. A reconsideration of the evidence quickly verifies the point. Of the six specimens from Arabia Bannerman studied, all four available to him in NHMUK have the name Lahej on the label. The other two must have been in the Rothschild Museum, one without locality (this appears now lost) and the other from Wadi Abrain (a locality Bannerman did not mention). On the original Rothschild Museum label the b of Abrain (and of *arabs*) is cursive, leaving the top of the loop open, having no obvious resemblance to an s (Fig. 11). However, Bannerman will have made a manuscript copy of this. We may assume that: he gave the b a short stem (upright line) and a rounded bowl, resulting in something that could easily be mistaken for a cursive s (i.e. one with no upper loop open to the right); wrote the a of 'ain' without fully closing the top (a common habit); and misread the in of 'ain' as an m (already possible from the Rothschild Museum label, on which the i is not dotted: Fig. 11). A word resembling 'Asrum' would have been the result.

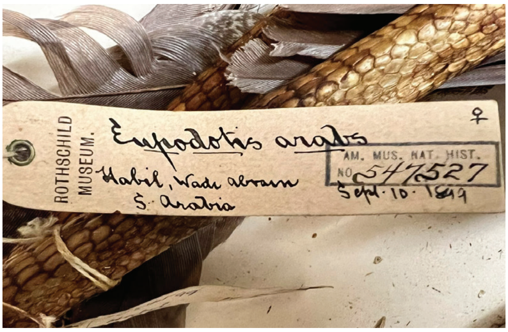

Figure 11. Rothschild Museum label of what is now AMNH 547527 (© Thomas J. Trombone)

Since (1) there is no good evidence of a Wadi Asrum in Yemen or indeed anywhere else, (2) Bannerman saw what is now AMNH 547527 when undertaking his research, and (3) no other specimen he saw had a name other than Lahej associated with it, it is clear that the locality in question is an erroneous transcription of Wadi Abrain.

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