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Lectotypification of the Subantarctic Diving Petrel *Pelecanoides urinatrix exsul* Salvin, 1896 (Procellariiformes: Procellariidae)

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Summary.—The description of the Subantarctic Diving Petrel *Pelecanoides urinatrix exsul* Salvin, 1896, creates confusion because the type series contains specimens of three different taxa. Here we nominate a lectotype, thereby fixing the identity of this taxon, and restrict its type locality to the Baie de l'Observatoire, La Grande Terre, Kerguelen Islands, Indian Ocean. This stabilises its taxonomy.

Diving petrels (genus *Pelecanoides*) comprise five species of small Southern Ocean Procellariiformes, which show limited morphological differentiation, thus complicating their identification (Fischer *et al*. 2018). The circumpolar and widespread Common Diving Petrel *P. urinatrix* is considered to number six subspecies: *P. u. urinatrix* (J. F. Gmelin, 1789); *P. u. berard* (Gaimard, 1823); *P. u. exsul* Salvin, 1896; *P. u. dacunhae* Nicoll, 1906; *P. u. copperingi* Mathews, 1912; and *P. u. chathamensis* Murphy & Harper, 1916 (Marchant & Higgins 1990, Dickinson & Remsen 2013).

The original description of *P. u. exsul* by Salvin (1896: 438) in the *Catalogue of the birds in the British Museum* diagnosed the taxon as a species, primarily based on the greyness of the throat, flank and underwing feathers. Specifically, he stated: '*Adult*. Similar to *P. urinatrix*, but the feathers of the sides and middle of the throat with a distinct subterminal grey bar; flanks mottled with grey, each feather with a grey shaft; under wing-coverts also grey, with white edges and dark shafts. Sexes alike. *Hab*. Southern Indian Ocean, from the Crozette Islands to Kerguelen Land'. This description was followed by a list of the 23 specimens that constituted the type series. However, the original description contains ambiguities: the type series consists of specimens from several widespread locations and the morphological description is too vague to define any diagnostic characters of the taxon.

Salvin's (1896) descriptions of the various *Pelecanoides* species did not note any of the diagnostic bill-shape characters of *P. urinatrix*, including the posteriorly sited nostril septa later diagnosed by Murphy & Harper (1921). In addition, Salvin's description for *P. u. exsul* also failed to mention the relatively short wing compared to *P. u. urinatrix* (see Marchant & Higgins 1990; means of sexed birds from breeding colonies 119.6–123.9 mm for *P. u. exsul*, and 127.0–131.8 mm for *P. u. urinatrix*).

Murphy & Harper (1921: 544) fixed the type locality for *P. u. exsul* as the Kerguelen Islands and published an updated diagnosis for the taxon. They primarily noted minor differences between *P. u. exsul* and other subspecies of *P. urinatrix* in bill shape (i.e., more converging bill sides of *P. u. exsul*) and a greater amount of grey on the lower throat of *P. u. exsul*.

Warren (1966: 94) identified 15 of the 23 syntypes of *P. u. exsul* listed by Salvin, and provided details of an adult male from the Kerguelen Islands (Natural History Museum, Tring [NHMUK 1880.11.18.656]). She noted that the 'locality' for the taxon was originally defined as 'southern Indian Ocean' but had been 'restricted to Kerguelen Island' by Murphy & Harper (1921). NHMUK 1880.11.18.656 was subsequently placed in one of the

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type collection cabinets at Tring, and labelled 'TYPE'. However, as it was not formally designated as a lectotype (Warren specifically referred to it as a syntype and mentioned 'fourteen other syntypes'), it maintained the same nomenclatorial status as all of the other specimens in the type series of *P. u. exsul* (Arts. 72.4.7 and 74.5; ICZN 1999).

Both Salvin (1896) and Murphy & Harper (1921) considered *P. exsul* to be a species, separate from *P. urinatrix*. Today *P. u. exsul* is commonly recognised subspecifically, but its distinctiveness has been questioned (e.g., see Clancey 1981, Norman & Brown 1987). Marchant & Higgins (1990) concluded that the supposedly diagnostic features of *P. u. exsul* noted by Salvin (1896) and Murphy & Harper (1921) occurred in some individuals of other subspecies of *P. urinatrix*, which leaves no clear morphologically diagnosable features for *P. u. exsul*. However, DNA work (using the mitochondrial cytochrome *b* gene) provided support for the distinctiveness of *P. u. exsul* (Grosser *et al*. 2021). Yet, this research did not clearly support other commonly recognised subspecies of *P. urinatrix*. Hence, the taxonomy of *P. urinatrix sensu lato* remains unsettled and is in need of re-examination.

To clarify the identity of *P. u. exsul* and help resolve ongoing confusion concerning the validity of the various subspecies of *P. urinatrix*, we relocated and re-examined the syntypes of *Pelecanoides u. exsul* at NHMUK. Although Salvin (1896) did not provide registration numbers for any of the specimens that he listed, he did provide sufficient information (some collection data and a unique letter for each specimen) to identify almost all of the syntype series. Salvin's letters between 'a' and 'w' were located on labels of 15/23 of these specimens. Seven other specimens were identified using their collection data (Table 1). Additionally, an unattached, isolated label at NHMUK was subsequently linked to a further syntype that was received by the South Australian Museum, Adelaide (SAMA) in 1982 on exchange from NHMUK (P. Horton *in litt*. 2019). All of the specimens were measured to the nearest 0.1 mm using the methods described in Fischer *et al*. (2018): wing length; inner (RT1) and outer (RT6) tail feather length; culmen length; bill width at base; bill depth at base; arch length; head length; and tarsometatarsus length. In addition, we scored the position of the nostril septa (Fig. 1, see Fischer *et al*. 2018 and supporting materials) and the angle and shape of the mandibles (viewed dorsally and ventrally). We provide details of these specimens in Tables 1–3. Two of the 23 syntypes on Salvin's list could not be identified with a high level of certainty.

Our investigation (see Table 3, Figs. 1–3) indicates that the syntype series of *P. u. exsul* includes three different taxa: *P. u. urinatrix* (J. F. Gmelin, 1789), *P. u. exsul* Salvin, 1896, and South Georgia Diving Petrel *P. georgicus* Murphy & Harper, 1916. A syntype series consisting of more than one taxon can cause taxonomic confusion, therefore to stabilise the name *Pelecanoides urinatrix exsul* Salvin, 1896, here we designate NHMUK 1876.4.26.13 (female, collected 'Observatory Bay, Royal Sound', 'Kerguelen's Land' [= Baie de l'Observatoire, La Grande Terre, Kerguelen Islands] by A. E. Eaton, on 14 October 1874) as the lectotype of this taxon (Figs. 1A, 2) in accordance with the amended Art. 74.7.3 (ICZN 1999). No previous lectotypification has been made for this taxon.

We chose NHMUK 1876.4.26.13 as the lectotype because (a) it is from the Kerguelen archipelago, to which the type locality was restricted by Murphy & Harper (1921), and (b) it displays morphological features usually associated with *P. u. exsul*, i.e. posteriorly sited nostril septa, relatively short, converging mandible sides, and comparatively short wings (<125 mm). Selecting this lectotype aligns with Recommendation 74A of the *Code* (ICZN 1999). Whilst ten syntypes met the same basic selection criteria (Table 3), NHMUK 1876.4.26.13 is the only one that also has a collection date, a collector and its sex recorded, as well as an undamaged bill. This designation results in all of the other syntypes listed in Tables 1–3 becoming paralectotypes of *P. u. exsul*, irrespective as to their taxon they are recognised as.

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TABLE 1

List of *Pelecanoides urinatrix exsul* Salvin, 1896, syntypes, including their NHMUK and SAMA registration numbers and other information from their specimen labels. The 'Salvin letter' is in bold and italics where it appears on a specimen's label. Position of nostril septa from base / posterior end (posterior = 0%, anterior = 100%). Sex: M = male; F = female. ? = unclear. - = unknown. The designated lectotype is highlighted.

Salvin (1896) letter	NHMUK reg. no.	Specimen type	Nostril septa	Sex	Collecting locality	Collector; (P) = presented to museum	Extra notes
a	1891.6.18.107	Skin	?	-	Crozet Islands	-	ex Shelley Mus., S Africa no.10825
b	1893.3.20.3	Skin	30%	-	Crozet Islands	H. Saunders (P)	Ex E. L. Layard
c	1841.4.729	Skin	30%	-	At sea, near Kerguelen Islands	Antarctic expedition/ Admiralty (P)[1]	May 1840[1]
d	1841.4.731 (now SAMA B36415)	Skin	30%	M	Kerguelen Islands	Antarctic expedition/ HMS *Terror*[1]	Original label detached and retained in NHMUK
e	1841.4.730	Skin	30%	F	Kerguelen Islands	Antarctic expedition/ HMS *Terror*/ Admiralty (P)[1]	
f	1841.4.732	Skin	?30%	-	Kerguelen Islands	J.R.[presumably James Clark Ross on HMS *Erebus*], Antarctic expedition/ Admiralty (P)[1]	
g	1841.4.728	Skin	?	-	Christmas Harbour, Kerguelen Islands	Antarctic expedition/ Admiralty (P)[1]	20 July[1]
h	1890.12.13.18	Skin	30%	-	On board ship, Christmas Harbour, Kerguelen Islands	Mc'Cormick [Robert McCormick on HMS *Erebus*] (P)[1]	8 June 1840[1]
i	1880.11.18.660	Skin	?30%	M	Christmas Harbour, Kerguelen Islands	*Challenger* expedition[2]	
j	1880.11.18.656	Skin	?30%	M	Kerguelen Islands	*Challenger* expedition[2]	
k	1880.11.18.655	Skin	30%	F	Kerguelen Islands	*Challenger* expedition[2]	
l	1880.11.18.657	Skin	30%	F	Kerguelen Islands	*Challenger* expedition[2]	
m	1880.11.18.661	Skin	50%	-	Kerguelen Islands	*Challenger* expedition[2]	Downy chick
o	1880.11.18.659	Skin	30%	M	Betsy Cove, Kerguelen Islands	*Challenger* expedition[2]	Damaged bill
n	1880.11.18.658	Skin	30%	M	Betsy Cove, Kerguelen Islands	*Challenger* expedition[2]	Jan 1874
p	1876.4.26.12	Skin	30%	M	Observatory Bay, Kerguelen Islands	A. E. Eaton[3]	
q	1876.4.26.13	Skin	30%	F	Observatory Bay, Kerguelen Islands	A. E. Eaton[3]	14 Oct 1874[3]
r	1875.7.2.25	Skin	30%	-	New Zealand	-	ex New Zealand Colonial Museum [Wellington]
s	1842.6.11.13	Skin	?	-	Auckland Islands	Lieut. A. Smith [presume Alexander Smith on HMS *Erebus*][1]	November[1]
t or u	1884.2.29.21[4]	Complete skeleton	-	-	-	*Challenger* expedition[2]	
t or u (possibly)	S/2001.50.61[5]	Complete skeleton	30%	-	-	-	
v (possibly)	S/2001.50.63[5]	Sternum, pectoral bones, mandible	-	-	-	-	

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Salvin (1896) letter	NHMUK reg. no.	Specimen type	Nostril septa	Sex	Collecting locality	Collector; (P) = presented to museum	Extra notes
w	1884.2.29.22[4]	Skull	-	-	-	*Challenger* expedition/ Admiralty (P)[2]	

[1]During the UK Admiralty's 1839–43 Antarctic expedition, HMS *Erebus* first anchored at the Kerguelen Islands on 12 May 1840 and HMS *Terror* joined her the following day; both ships left Kerguelen on 20 July 1840 (Ross 1847). The same expedition visited the Auckland Islands from 20 November to 12 December 1840 (Ross 1847).

[2]The UK HMS *Challenger* oceanographic expedition visited the Kerguelen Islands from 6 January to 1 February 1874 (Thomson & Murray 1911).

[3]Alfred Edwin Eaton was part of the UK Transit of Venus expedition to the Kerguelen Islands between 11 October 1874 and 27 February 1875 (Godley 1970).

[4] NHMUK 1884.2.29.21 and 1884.2.29.22 are considered to be syntypes because they were collected on the *Challenger* expedition, as were several (other) syntypes, and they match Salvin's (1896) descriptions of 'Skeleton' and 'Skull' respectively.

[5]S/2001.50.61 and S/2001.50.63 are considered to be possible syntypes because they potentially match Salvin's (1896) descriptions of 'Skeleton' and 'Sternum' respectively.

TABLE 2

Measurements of the *Pelecanoides urinatrix exsul* Salvin, 1896, type series. L = length; *dried open. Some comparative measurements could not be taken from the skeletal specimens due to their state of preservation. All measurements in mm, taken by A. J. D. Tennyson (or P. Horton for SAMA B36415). The designated lectotype is highlighted.

NHMUK reg. no.	Wing L	Tail RT6 L	Tail RT1 L	Culmen L	Bill width at base	Bill depth at base	Bill arch L	Head L	Tarsometatarsus L
1891.6.18.107	120	33.7	29.4	16.1	7.9	9.8	4.6	53.3	26.4
1895.3.20.3	124	29.9	30.9	16.9	8.3	9.5	3.8	53.3	27.5
1841.4.729	121	32.5	32.2	16.8	8.3	*	6.7	53.4	25.8
1841.4.731 (now SAMA B36415)	121	36.0	39.0	15.9	9.2	9.7	6.5	52.0	27.5
1841.4.730	115	33.6	31.7	17.4	8.4	10.4	5.1	57.4	25.5
1841.4.732	122	32.8	34.6	18.0	8.6	10.0	5.2	57.3	29.4
1841.4.728	125	27.7	30.8	15.8	8.6	9.9	5.0	53.6	25.9
1890.12.13.18	124	39.2	39.2	16.8	8.5	*	5.5	54.1	28.7
1880.11.18.660	120	34.2	38.7	17.1	8.1	9.6	7.0	55.0	26.6
1880.11.18.656	121	35.4	35.8	16.1	8.1	9.1	5.5	53.5	26.2
1880.11.18.655	122	32.7	38.1	16.6	7.7	8.6	4.7	51.6	28.9
1880.11.18.657	124	35.2	38.3	15.9	6.9	8.2	3.8	51.4	25.9
1880.11.18.661	86	22.4	22.6	13.2	6.8	*	4.4	47.7	23.2
1880.11.18.659	118	29.4	32.7	15.8	8.9	9.3	6.5	54.2	26.9
1880.11.18.658	120	32.5	34.6	15.7	7.8	8.2	5.4	51.9	26.0
1876.4.26.12	121	37.2	38.2	15.7	8.2	8.7	7.2	49.6	26.5
1876.4.26.13	121	35.3	36.3	16.3	7.9	8.7	6.4	47.9	23.5
1875.7.2.25	133	40.0	39.5	17.2	8.0	8.9	6.5	53.8	27.1
1842.6.11.13	123	34.0	37.3	15.5	7.7	*	5.0	50.5	26.3
1884.2.29.21					*c*.7.9			*c*.48.6	
S/2001.50.61									
S/2001.50.63									
1884.2.29.22					*c*.8.7			53.3	

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TABLE 3
Current taxon identity of specimens in the *Pelecanoides urinatrix exsul* Salvin, 1896, type series, based on this study. Mandible shape: SB = short and bowed, LP = long and parallel-sided. Wing length short: <125 mm. The designated lectotype is highlighted.

NHMUK reg. no.	Collecting locality	Nostril septa	Mandible shape	Wing length	Taxon	Primary lectotype criteria met (see text)
1891.6.18.107	Crozet Islands	?	SB	120	*P. u. exsul*	No
1895.3.20.3	Crozet Islands	30%	SB	124	*P. u. exsul*	No
1841.4.729	At sea, near Kerguelen Islands	30%	SB	121	*P. u. exsul*	Yes
1841.4.731 (now SAMA B36415)	Kerguelen Islands	30%	SB	121	*P. u. exsul*	Yes
1841.4.730	Kerguelen Islands	30%	SB	115	*P. u. exsul*	Yes
1841.4.732	Kerguelen Islands	?30%	SB	122	*P. u. exsul*	No
1841.4.728	Christmas Harbour, Kerguelen Islands	?	SB	125	*P. u. exsul*	No
1890.12.13.18	On board ship, Christmas Harbour, Kerguelen Islands	30%	SB	124	*P. u. exsul*	Yes
1880.11.18.660	Christmas Harbour, Kerguelen Islands	?30%	SB	120	*P. u. exsul*	No
1880.11.18.656	Kerguelen Islands	?30%	SB	121	*P. u. exsul*	No
1880.11.18.655	Kerguelen Islands	30%	SB	122	*P. u. exsul*	Yes
1880.11.18.657	Kerguelen Islands	30%	SB	124	*P. u. exsul*	Yes
1880.11.18.661	Kerguelen Islands	50%	-	86 (nestling)	*P. georgicus*[1]	No
1880.11.18.659	Betsy Cove, Kerguelen Islands	30%	SB	118	*P. u. exsul*	Yes
1880.11.18.658	Betsy Cove, Kerguelen Islands	30%	SB	120	*P. u. exsul*	Yes
1876.4.26.12	Observatory Bay, Kerguelen Islands	30%	SB	121	*P. u. exsul*	Yes
1876.4.26.13	Observatory Bay, Kerguelen Islands	30%	SB	121	*P. u. exsul*	Yes
1875.7.2.25	New Zealand	30%	LP	133	*P. u. urinatrix*[2]	No
1842.6.11.13	Auckland Islands	-	SB	123	*P. u. exsul*	No
1884.2.29.21	-	-	?SB	-	*P. urinatrix* ssp.[3]	No
S/2001.50.61	-	30%	?SB	-	*P. urinatrix* ssp.[3]	No
S/2001.50.63	-	-	-	-	*Pelecanoides* sp.	No
1884.2.29.22	-	-	?SB	-	*P. urinatrix* ssp.[3]	No

[1]On label it is noted 'This is a nestling of *P. georgicus* Murphy & Harper, RA Falla May 1939, Aug 1956'.

[2]The collection location 'New Zealand' suggests that this specimen was collected around the main North or South Islands, rather than at an offshore island group, and the bird's relatively large size indicates that it is *P. u. urinatrix*.

[3]Identification based on comparison with figures in Worthy (1998).

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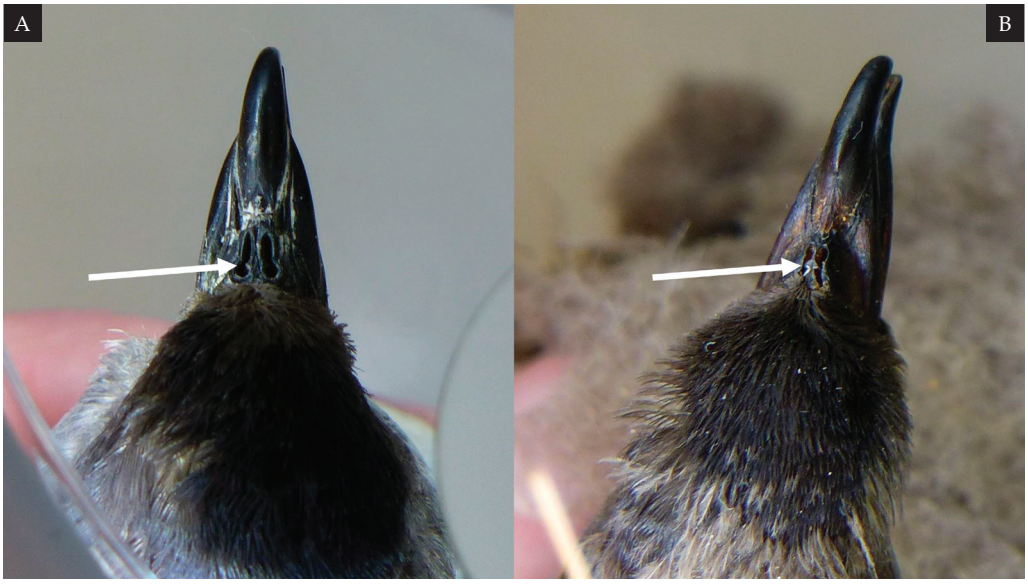

Figure 1. Dorsal views of bills of specimens from the type series of *Pelecanoides u. exsul*, showing positions of the nostril septa. (A) *Pelecanoides u. exsul*, NHMUK 1876.4.26.13 (lectotype), showing posteriorly (30% score, see arrow) sited nostril septa; (B) South Georgia Diving Petrel *P. georgicus* juvenile, NHMUK 1880.11.18.661 (paralectotype of *P. u. exsul*), showing centrally sited (50% score, see arrow) nostril septa (A. J. D. Tennyson, © Trustees of the Natural History Museum, London)

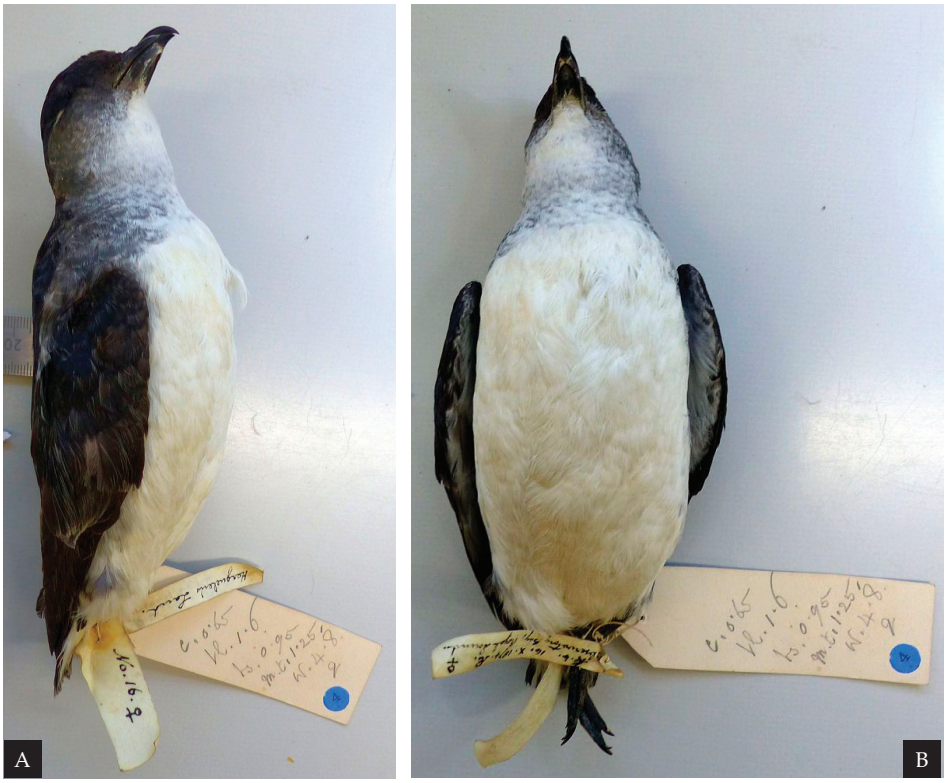

Figure 2. Lateral (A) and ventral (B) views of the lectotype of *Pelecanoides u. exsul*, NHMUK 1876.4.26.13 (A. J. D. Tennyson, © Trustees of the Natural History Museum, London)

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Figure 3. Lateral views of paralectotypes of *Pelecanoides u. exsul*. (A) South Georgia Diving Petrel *P. georgicus* juvenile, NHMUK 1880.11.18.661; (B) *Pelecanoides u. urinatrix*, NHMUK 1875.7.2.25 (A. J. D. Tennyson, © Trustees of the Natural History Museum, London)

These designations fix the identity of *P. u. exsul* and maintain stability of the names most commonly used for *Pelecanoides* taxa globally. They therefore fulfil a primary objective of the International Commission on Zoological Nomenclature to promote stability of scientific names (ICZN 1999).

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