Agreement on the Conservation of Albatrosses and Petrels

Thirteenth Meeting of the Advisory Committee

Edinburgh, United Kingdom, 22 – 26 May 2023

Report of the Taxonomy Working Group

Taxonomy Working Group: Mark Tasker (Convenor), Mike Brooke, Theresa Burg, Mike Double, Julie McInnes, Andrea Polanowski, Peter Ryan, Paul Scofield, Alan Tennyson

SUMMARY

A summary of progress by the Taxonomy Working Group is provided.

RECOMMENDATIONS

The Taxonomy Working Group recommends that:

1. The taxonomic treatment of both Buller's *Thalassarche bulleri* and Short-tailed *Phoebastria albatrus* Albatrosses should not change despite additions to the evidence on the taxonomy of the two species.
2. Advisory Committee provide guidance over the consequences of a potential change in accepted taxonomic treatment of Balearic Shearwater *Puffinus mauretanicus* as either synonymous with Yelkouan Shearwater *P. yelkouan* or a sub-species of Yelkouan Shearwater.
3. Advisory Committee members nominate further experts to the Taxonomy Working Group.
4. Advisory Committee take note of TWG's progress and comment if required.

1. MEMBERSHIP

We are pleased to welcome three new members since the twelfth meeting of the Advisory Committee: Theresa Burg (Canada), Julie McInnes (Australia) and Andrea Polanowski (Australia). We thank Paul Scofield for his input over earlier years. Geoff Chambers has continued to assist the Working Group on an ad hoc basis. The Taxonomy Working Group would be happy for further experts to be nominated.

2. TERMS OF REFERENCE

The Taxonomy Working Group (TWG) was asked to carry out the following actions in the past (2019-21, extended to 2022) triennium.

1. Keep the Taxonomy Working Group's bibliographic database updated.

2. Continue the establishment of a morphometric and plumage database.

3. Maintain a database of site-specific information on the availability of samples relevant to studies of population genetics of ACAP species.

4. Consider taxonomic issues relating to species proposed for addition to Annex 1 of the Agreement.

5. Respond to queries on taxonomic issues relating to ACAP species, including maintenance of a species reference table with scientific and common names across multiple languages.

2.1. BIBLIOGRAPHIC DATABASE

There is not a separate ACAP bibliographic database for taxonomy issues, though all members have their own databases or access to resources. The Secretariat maintains a searchable database of references accessible via the data portal (https://data.acap.aq) that includes many relevant taxonomic sources. TWG has supplied suitable references to the Secretariat for uploading. TWG has considered how a very large bibliography developed by the late John Warham covering all albatrosses and petrels could be made available for ACAP use, but has yet to solve technical difficulties (and corrections needed) in translating to modern software.

2.2. MORPHOMETRIC AND PLUMAGE DATABASE

A pilot database of samples from dead birds was established a few years ago using Australian information, but this database has not been developed further. TWG notes that if a central database of morphometrics were to be established, there would be a need to ensure standardisation of methods for conducting measurements as there is evidence of considerable variation between scientists carrying out such measurements. TWG agree that it would be very useful to have a catalogue of standardised images of known-age and sex birds from various populations, ideally tracking the same individuals over time, so that it might finally be possible make some headway on field identification of difficult taxa, for example *Diomedea dabbenena* and *D. antipodensis* in relation to *D. exulans*.

Peter Ryan is in the process of analysing several hundred known age and sex (inferred in some cases) photographs of *D. dabbenena* from Gough (age range 3-39). Older males probably can be told from *D. exulans* based on a combination of mostly white tail and relatively dark upperwing. Older birds also lack any vermiculations in the tail feathers, unlike many *D. exulans* (so presence of vermiculations excludes *dabbenena*, but does not necessarily confirm *exulans*. It would particularly be useful to get similar images (known age and sex) from *gibsoni* and *antipodensis*.

2.3. GENETIC SAMPLES DATABASE

Following a lack of progress on the issue in the past, the Population and Conservation Status Working Group (PaCSWG) decided at AC9 that ACAP should just produce a list of nodes/contact institutions that people could use to find samples/dead birds. This became Task 2.14 in the AC Work Programme. It is unclear to TWG if this task should be dropped from TWG's work given that it has been taken over by PaCSWG.

2.4. ADDITIONS TO ANNEX 1

There have been no proposals for addition to Annex 1.

2.5. QUERIES ON TAXONOMIC ISSUES

2.5.1. IOC Updates

Following the adoption of the IOC standard taxonomy by ACAP, TWG has followed developments published by the IOC (see worldbirdnames.org).

The following changes have been considered since the start of 2018.

1. A proposed split of Whenua Hou Diving Petrel from South Georgia Diving Petrel *Pelecanoides georgicus* based primarily on slight phenotypic differences (Fischer *et al*. 2018). This proposal was not accepted at present and the taxon is being treated as a subspecies (*whenuahouensis*) of *georgicus* pending vocal and genetic diagnoses.

2. A proposed split of Pacific Fulmar [*Fulmarus rodgersii*] from Northern Fulmar *Fulmarus glacialis* based primarily on deep mtDNA divergence and minor morphological differences was not accepted.

3. The Oceanodroma storm petrels have been merged into Hydrobates.

4. A proposed split of Kermadec Storm Petrel [*Pelagodroma albiclunis*] from White-faced Storm Petrel *Pelagodroma marina* based on consistent differences in plumage and tail morphology (Gill *et al*. 2010) was not accepted.

5. The English name of *Pterodroma defilippiana* was changed from De Filippi's Petrel to Masatierra Petrel.

6. The English name of *Hydrobates hornbyi* was changed from Hornby's Storm Petrel to Ringed Storm Petrel.

7. New Caledonian Storm Petrel *Fregetta lineata* was recognised as a resurrected and redescribed species, distinct from the other taxa within *Fregetta*, based on biometrics and limited phylogenetic analysis (Cibois *et al*. 2015; Robertson *et al*. 2016; Bretagnolle *et al*. 2022). The species was added to the IOC list after Black-bellied Storm Petrel *Fregatta tropica*.

8. A proposed split of MacGillivray's Prion *Pachyptila macgillivrayi* from Salvin’s Prion. MacGillivray’s Prion was accepted based on bill morphology and other more subtle morphological differences, supported by genetic analysis (HBW/BirdLife; Harrison *et al*. 2021; Masello *et al*. 2022). MacGillivray’s Prion follows Salvin’s Prion *Pachyptila salvini* on the IOC list.

2.5.2 Second Assessment of Taxonomic Status of Buller’s Albatross *Thalassarche bulleri*

Northern and Southern Buller’s Albatrosses

The taxonomic status of this pair of taxa was evaluated by the Taxonomic Working Group in 2006 (Double, 2006). At that time, Northern Buller’s was sometimes referred to as Pacific Albatross. For convenience, this summary refers to Northern (Pacific) Buller’s as *platei* and Southern Buller’s as *bulleri*.

Recent taxonomic history

Robertson and Nunn (1998) proposed that the subspecies *Thalassarche bulleri platei* (Murphy 1936) breeding on the Chatham and Three Kings Islands and those breeding on the Solander and Snares Islands (*T. bulleri bulleri*) should be treated as distinct species (*T. platei* and *T. bulleri* respectively). *T. platei* has been referred to as *T. sp. nov*. because Robertson and Nunn (1998) suggested the type specimen for *T. platei* is in fact a juvenile *T. bulleri*; however evidence to support this view has not been published.

Primary publications or reviews of data relevant to the taxonomy of Northern and Southern Buller's Albatrosses

1. Nunn *et al*. (1996) only included DNA sequence data from *bulleri* but provided convincing justification for the placement of Buller's Albatrosses in the genus *Thalassarche*. Similarly, no molecular data for *platei* were presented in Nunn and Stanley (1998).

2. Robertson and Nunn (1998), in justification for the recognition of two species, state "In the case of *T. bulleri* breeding is two months later at The Snares and Solander Islands than at the Chatham Islands (*T. platei*) and incubation stints are about three times the length." No primary data sources were cited to justify these assertions.

3. Tickell (2000) summarised data available for *bulleri* and *platei* (but no primary sources were cited) and showed that all measurements overlap considerably. To our knowledge no statistical analyses of morphometric data have been published for these taxa.

4. van Bekkum *et al*. (2006) found no genetic structure between four colonies of Southern Buller's albatross (*bulleri*), three colonies on Snares Is and one on Solander Is, despite high natal philopatry.

5. Chambers *et al*. (2009) systematically examined the genetic evidence supporting ACAP's taxonomic treatment of all albatrosses and supported the view that *bulleri* and *platei* are one species.

6. Wold *et al*. (2018) sampled mitochondrial DNA from breeding Buller's albatrosses (26 *platei* and 47 *bulleri*). A high degree of genetic differentiation was found, allowing great confidence in assigning samples from bycaught Buller's albatross to the two taxa.

7. Wold *et al*. (2021) sampled 13 *platei* and 40 *bulleri* and analysed the whole genome. Results showed two distinct clusters indicating limited gene flow between the two taxa (and no population structure in *bulleri*).

Assessment of diagnosability (ANNEX 1; Section 3)

Based on data provided in the studies described above:

A. Same age/sex individuals of *bulleri* and *platei* cannot be distinguished by one or more qualitative differences.

B. Same age/sex individuals of *bulleri* and *platei* cannot be distinguished by a complete discontinuity in one or more continuously varying characters.

C. Same age/sex individuals of *bulleri* and *platei* cannot be distinguished by a combination of two or three functionally independent characters.

Decision

These taxa fail to meet any of the diagnosability criteria described in ANNEX 1 to this paper. We therefore recommend that these taxa do not warrant specific status. TWG continues to recommend that these taxa are recognised as subspecies.

Comments

Very few comparative data are available for these taxa and the molecular data on their own does not justify the recognition of these taxa as species. To our knowledge no comparative morphometric data and quantitative plumage descriptions are currently available. To facilitate taxonomic decisions a detailed quantitative comparative analysis of morphometric and plumage (adult and subadult) data for these taxa would be valuable. TWG notes that Howell and Zufelt (2019) treat the two taxa as separate species on the basis of head colour and bill differences, but this is not primary literature, nor is it peer reviewed.

References

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2.5.3 Assessment of Taxonomic Status of Short-tailed Albatross *Phoebastria albatrus*

Recent taxonomic history

Short-tailed Albatrosses *Phoebastria albatrus* breed primarily on two island groups: Torishima and Senkaku/Tiaoyutai/Diaoyu islands, hereafter referred to in this document as "western-most current breeding site". The species has long been considered monophyletic, but recent research has shown differences between the populations breeding on the two island groups.

Primary publications or reviews of data relevant to the taxonomy of Short-tailed Albatross

1. Eda and Higuchi (2012) noted mitochondrial DNA haplotype frequencies differ between the Torishima and western-most current breeding site birds. There are also ecological and morphological differences between the Torishima and western-most current breeding site albatrosses and they proposed a taxonomic re-examination of the two albatross taxa is required through comparative studies of ecological and ethological traits.
2. Eda *et al*. (2016) noted that several un-ringed birds in subadult plumage have been observed breeding on Torishima. Since almost all birds hatched on Torishima over the previous 25 years had been ringed, the natal site of the un-ringed birds was suspected to be the western-most current breeding site. The proportion of pairs containing ringed and un-ringed birds was significantly lower than if the birds had mated randomly, indicating assortative mating, but that there was incomplete pre-mating isolation between birds from the two island groups. They concluded that the two groups are likely to be hybridizing.
3. Eda *et al*. (2020) examined the morphological differences between immigrants from the western-most current breeding site to Torishima (western-most current breeding site -type) and native birds on Torishima (Torishima-type). The immigrants were identified genetically as it is currently not possible to visit the western-most current breeding site. There were some significant differences in morphological characteristics between males of the two taxa. In general, Torishima-type birds were larger than western-most current breeding site -type birds, whereas western-most current breeding site -type birds had relatively longer beaks. Sample sizes were small however and insufficient to analyse female differences statistically.

Assessment of diagnosability (ANNEX 1; Section 3)

Based on data provided in the studies described above:

A. Same age/sex individuals of western-most current breeding site -type and Torishima-type cannot be distinguished by one or more qualitative differences.

B. Same age/sex individuals of western-most current breeding site -type and Torishima-type cannot be distinguished by a complete discontinuity in one or more continuously varying characters.

C. Same age/sex individuals of western-most current breeding site -type and Torishima-type cannot be distinguished by a combination of two or three functionally independent characters.

Decision

These taxa fail to meet any of the diagnosability criteria described in ANNEX 1. We therefore recommend that these taxa do not warrant specific status.

Comments

Assessment of the two types of Short-tailed Albatross is undoubtedly hampered by low sample sizes and the inability to visit the western-most current breeding site. It remains possible that further research might demonstrate that the two types represent two sub-species, but the morphometric discrimination is not great and the assortative mating is incomplete and likely reflects the known differences in timing of courtship/breeding in the two populations.

References

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2.5.4 Balearic *Puffinus mauretanicus* and Yelkouan *P. yelkouan* Shearwaters

Obiol *et al*. (2023) conducted a comprehensive genetic analysis of the *Puffinus* shearwaters of the North Atlantic and Mediterranean. They found that current taxonomies are not supported by genomic data and propose a more accurate taxonomy by integrating genomic information with other sources of evidence. With particular relevance to ACAP, they found no support for the split of Balearic Shearwater (*Puffinus mauretanicus*) and Yelkouan Shearwater (*P. yelkouan*) into two different species and propose that these two Mediterranean taxa should be considered as conspecific. Taxonomic precedence would then make the Balearic Shearwater a sub-species (or sub-population) of Yelkouan Shearwater. If this analysis is accepted, this presents a difficulty for ACAP as Article 1.1 states “This Agreement shall apply to the species of albatrosses and petrels listed in Annex 1 to this Agreement”, in other words Annex 1 should list species, not separate sub-species or populations. Guidance on this issue is requested from the Advisory Committee.

3. OTHER ISSUES

3.1 WORKING GROUP ON AVIAN CHECKLISTS (WGAC)

The International Ornithologists’ Union (IOU) has formed the Working Group on Avian Checklists (WGAC) with the aim of bringing together the three main global bird taxonomies (IOC, eBird/Clements and BirdLife/Birds of the World) to produce and maintain on the IOU website an open-access global checklist of birds (the IOU Global Checklist), intended to serve as the benchmark reference for all taxa of the class Aves.

It will classify the Aves from class to subspecies based on up-to-date, corroborative information on the phylogeny of birds and the differentiation of species and subspecies. It will also provide authors and references to the original description of all taxa of all ranks covered by the International Code of Zoological Nomenclature (ICZN). Type localities for species and subspecies, and type taxa for all ranks from subgenus to superfamily will be specified. Sources for taxonomic and nomenclatural decisions also will be referenced. Although English names for species will be drawn primarily from the IOC World Bird List, modifications to better align with preferences of checklist committees of individual continents, such as the North American Checklist Committee (NACC) and South American Checklist Committee (SACC) will also be incorporated. Geographic distributions will synchronize with those in the Birds of the World project. Ultimately, type data and deposition for species-group names and synonyms are planned for inclusion as well.

The WGAC is split into two teams. One, the taxonomic team, is responsible for all classificatory decisions and for the geographical distribution of species-group taxa. This team comprises leading avian systematists specializing in different avifaunal regions around the globe. The other team includes experienced bibliographers who provide authors, dates, references to original publications of names, type data and nomenclatural explanations.

The final checklist will produce more than just a hierarchical list of species and recommended names. It will provide, through its detailed fields and connections to external references, the basic information for all ornithology – professional ornithologists, citizen scientists, conservationists and students – to draw on the full record of diversity of earth's birdlife.

As of 10 June 2022 (the latest publicly available update), the WGAC Taxonomic group had finalised decisions on the taxonomic treatment of 165 families with 13 more being worked on. These 178 families cover 5585 species-level taxa that have been finalized, or just over half (50.4%) of the species list for the world. Albatrosses and petrels have yet to be considered but it is understood informally that the Diomedidae (6 issues), Hydrobatidae (1 Issue) and Procellariidae (8 issues) will be reviewed during May 2023 with results available a month or two later. eBird/Clements and IOC have begun adopting WGAC decisions with upcoming revisions of those taxonomies in order to facilitate the full transitioning to the IOU Global Checklist soon after the first public release. BirdLife also plans to adopt many of these decisions but is moving carefully due to their responsibility for the IUCN Red List and their own Data Zone. It was anticipated that at least another year will be needed to complete the remainder of the taxonomic work. Subspecies are not being assessed in detail at this stage, but a draft list currently includes 19896 subspecies.

It is expected that the IOU Global Checklist will eventually supersede the IOC World Bird List, at which point we recommend adopting the Global Checklist for non-ACAP listed species. TWG will consider and make recommendations if differences arise between the Global Checklist and the taxonomy of Annex 1 of ACAP.

4. REFERENCES

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ANNEX 1. FROM TWG REPORT, AC2 DOC 11.

GUIDELINES FOR THE IDENTIFICATION OF SPECIES BOUNDARIES AMONG TAXA LISTED BY THE AGREEMENT ON THE CONSERVATION OF ALBATROSSES AND PETRELS (ACAP)

TAXONOMIC WORKING GROUP OF ACAP

1. Introduction

Resolution 1.5 of the First Session of the Meeting of the Parties (MOP1) to ACAP provides for the establishment by the Advisory Committee of a Working Group on the taxonomy of albatross and petrel species covered by the Agreement.

The objective of this Working Group (WG) is to establish a transparent, defensible and highly consultative taxonomic listing process. The Scientific Meeting (MOP1; ScM1; Section 4.3) stated that "…given the importance that species lists have upon conservation policy and scientific communication, taxonomic decisions must be based on robust and defensible criteria. It is important to resolve differences in a scientific and transparent manner with appropriate use of peer-reviewed publications."

The guidelines to identify species boundaries among taxa listed by ACAP are listed below. These guidelines are largely based on those presented by Helbig *et al*. (2002). This document should not be considered an original piece of work, but an adaptation of the guidelines presented by Helbig et al. (2002).

It is worth recalling the following paragraph written by Helbig et al. (2002) when reading these guidelines:

> "*No species concept so far proposed is completely objective or can be used without the application of judgement in borderline cases. This is an inevitable consequence of the artificial partitioning of the continuous processes of evolution and speciation into discrete steps. It would be a mistake to believe that the adoption of any particular species concept will eliminate subjectivity in reaching decisions*."

2. Species concepts

Helbig *et al*. (2002) adopt the General Lineage Concept (GLC: de Queiroz 1998; de Queiroz 1999) a concept very similar to the Evolutionary Species Concept (ESC: Mayden 1997) but stresses that "differences between concepts are largely a matter of emphasis" and that the tenets of other common concepts such as the Biological Species Concept, the Phylogenetic Species Concept (PSC: Cracraft 1983) and the Recognition Species Concept are largely encompassed by the GLC.

The General Lineage Concept defines species as:

> *"…population lineages maintaining their integrity with respect to other lineages through time and space; this means the species are diagnosably different (otherwise we could not recognize them), reproductively isolated (otherwise they would not maintain their integrity on contact) and members of each (sexual) species share a common mate recognition and fertilization system (otherwise they would not be able to reproduce)."* (Helbig *et al*. 2002)

Helbig *et al*. (2002) state that to produce a practical taxonomy for West Palaearctic birds the species definition must only include taxa "for which we are reasonably certain that they will retain their integrity no matter what other taxa they encounter in the future."

The WG considers this criterion difficult or impossible to apply to predominantly allopatric taxa such as procellariiform seabirds. The WG therefore restricts its considerations to only the first of the two questions posed by Helbig *et al*. (2002) in order to delimit species.

They were:

1. Are the taxa diagnosable?

2. Are they likely to retain their genetic and phenotypic integrity in the future?

By adopting this strategy, the WG applies the less stringent GLC (de Queiroz 1998; de Queiroz 1999) and ESC (Wiley 1978) which recognise species that are currently maintaining their integrity but "do not require species to maintain their integrity in the future" (Helbig *et al*. 2002).

Below we list a set of guidelines the WG will use to decide if taxa are diagnosable and if they therefore warrant specific status.

3. Guidelines to identify species (Diagnosability)

3.1.Taxon diagnosis is based on characters or character states. Characters used in diagnosis must be considered, or preferably shown to have a strong genetic (heritable) component and not likely to be the product of environmental differences. Characters known to evolve rapidly in response to latitude must be considered less informative *e.g*. morphometrics, timing of breeding and moult patterns.

3.2 In the assessment of diagnostic characters, the WG, whenever possible, will only consider primary data published in peer reviewed journals. Conclusions drawn by such studies must be supported by appropriate statistical analyses. Once established the Taxonomy WG will aim to maintain the stability of the ACAP List of Taxa. Modifications to the List will only be considered when a study published in a peer-reviewed journal suggests change.

3.3 As stated by Helbig *et al*. (2002), taxa are diagnosable if:

A) "Individuals of at least one age/sex can be distinguished from the same age/sex class of all other taxa by at least one qualitative difference. This means that the individuals will possess one or more discrete characters that members of the other taxa lack. Qualitative differences refer to presence/absence of a feature (as opposed to a discontinuity in a continuously varying character)."

B) "At least one age/sex class is separated by a complete discontinuity in at least one continuously varying character (*e.g*. wing length) from the same age/sex class of otherwise similar taxa. By complete discontinuity we mean that there is no overlap with regard to the character in question between two taxa." To detect a discontinuity, the number of individuals compared should be based on sound judgement.

C) "If there is no single diagnostic character, we regard a taxon as statistically diagnosable if individuals of at least one age/sex class can be clearly distinguished from individuals of all other taxa by a combination of two or three functionally independent characters." Body measurements are not considered independent characters.

A useful example here is the one presented by Helbig *et al*. (2002). *Larus michahellis* and *L. armenicus* "can be distinguished by a combination of wing-tip pattern, darkness of mantle and mtDNA haplotypes, although none of these characters is diagnostic on its own."

3.4 Because of the difficulties assessing reproductive isolation in allopatric taxa, Helbig *et al*. (2002) apply more stringent criteria to allopatric than sympatric taxa. They suggest that allopatric taxa should be recognised as species only if “they are fully diagnosable in each of several discrete or continuously variable characters relating to different function contexts, e.g. structural features, plumage colours, vocalisations, DNA sequences, and the sum of the character differences corresponds to or exceeds the level of divergence seen in related species that exist in sympatry.”

4. References

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