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Taxonomic status of *Podabrus albocaudatus* Krefft, 1872 and declaration of *Sminthopsis granulipes* Troughton, 1932 (Marsupialia: Dasyuridae) as a protected name for the White-tailed Dunnart from Western Australia

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Abstract

The name *Sminthopsis granulipes* Troughton, 1932 has universally and uncontroversially been used for the White-tailed Dunnart since its description in 1932. We regard the forgotten name *Podabrus albocaudatus* Krefft, 1872 to be an available name and demonstrate that it is a disused, neglected senior synonym of *S. granulipes*. The holotype of *granulipes* Troughton is also likely to be the holotype of Krefft's *albocaudatus* and therefore an objective synonym. Consequently, *Sminthopsis granulipes* Troughton, 1932 is declared a *nomen protectum* and *Podabrus albocaudatus* Krefft, 1872 a *nomen oblitum*, as required by Article 23.9.2 of the International Code of Zoological Nomenclature. This action in no way alters current use of *Sminthopsis granulipes* for the White-tailed Dunnart but is required to ensure continued nomenclatural stability.

Key words: nomenclature, dasyurid, *nomen protectum*, *nomen oblitum*, Gerard Krefft, Ellis Troughton, George Maxwell, Albany, King George Sound, holotype

Introduction

Maintaining the stability of zoological nomenclature is a fundamental objective of the International Code of Zoological Nomenclature (ICZN 1999), hereafter the *Code*. The purpose of this note is to ensure continued nomenclatural stability of *Sminthopsis granulipes* Troughton, 1932 as the name applied to the White-tailed Dunnart, a small dasyurid marsupial restricted to south-western Western Australia (McKenzie & Kitchener 2008). Our aim is to foreclose the possibility of re-instatement of *Podabrus albocaudatus* Krefft, 1872—a disused, overlooked or ignored name that we demonstrate, apparently for the first time, to be a senior synonym of *Sminthopsis granulipes*. Although the name *Sminthopsis granulipes* has universally, and uncontroversially been used for the White-tailed Dunnart since its description in 1932, the need for this note stems from the requirements of Article 23.9.2 of the *Code*. It states that, provided certain requirements are met, an author who discovers that a name is an unused, senior synonym of an established younger name, should cite the two names together and state explicitly that the younger name is valid, by declaring it a *nomen protectum*, and thereby prevent future displacement of the name by use of the senior name, which is declared a *nomen oblitum*.

Troughton (1932) based his description of *Sminthopsis granulipes* on a single specimen collected in the 19th century that he found in the "old collection" of the Australian Museum (AM), Sydney. To our knowledge, *Sminthopsis granulipes* Troughton, 1932 has been universally applied to this taxon ever since. Troughton (1941) reported that two further specimens found in the collection of the Western Australian Museum, Perth, conformed to his original diagnostic criteria for the species. The White-tailed Dunnart was subsequently known from only ten specimens (Frith 1973) and was considered to be rare until biological surveys that commenced during the 1970s resulted in a revised status of common but localized (Kitchener 1983).

During the preparation of a paper on the mammal type specimens in the Australian Museum by the present authors, we became aware that Troughton's holotype of *granulipes* is most probably also the holotype of *Podabrus*

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albocaudatus Krefft, 1872. We therefore report that *Podabrus albocaudatus* Krefft, 1872 is a senior objective synonym of *Sminthopsis granulipes* Troughton, 1932.

The forgotten *Podabrus albocaudatus* Krefft, 1872

Gerard Krefft published popular accounts on Australian zoology in a long series of articles under the general title "Natural History" in *The Sydney Mail*, a leading daily newspaper of the late 19th century. This included seven articles titled "The Dasyuridae" published from 12 October to 30 November, 1872. One such article (Krefft 1872) included his original description of *Podabrus albocaudatus* in which he enumerates all known species of *Podabrus*, a generic name erected by Gould (1845). However, Thomas (1887) proposed the replacement name *Sminthopsis*, as he recognised that *Podabrus* had been applied to a genus of beetles by Westwood (1840), thus predating Gould. In his original account, Krefft (1872) did not include illustrations or measurements of *Podabrus albocaudatus*, and his text, reproduced in its entirety, is:

"White-tailed Podabrus (Podabrus albocaudatus). This new species was obtained at King George's Sound by Mr. Maxwell, the well known collector. Only one specimen was secured, so that I was unable to sacrifice it for a close examination of the teeth. The colour is the usual mouse grey, fur very soft, and the tail slightly incrassated in the middle, and covered with white hairs."

Krefft (1872) states that his only specimen of *Podabrus albocaudatus* was obtained by Mr Maxwell, who is likely to be Mr George Maxwell (c.1805–1879); Whittell 1954) who resided at King George Sound (=Albany) until his death. Maxwell was known primarily as a collector of botanical and entomological specimens, but he operated a store on the jetty, from which he sold natural history specimens to fund his collecting sojourns (Heberle undated). Maxwell could have sold or donated the specimen to George Masters, then employed as a collector for the AM, who collected specimens at King George Sound and adjoining regions during two visits, 1866 (Krefft 1867) and 1868–69 (AM Archive document C:40.69.13). Another possibility is that Maxwell sent the specimen to Krefft, either directly, or via botanical collectors from Melbourne, such as visits from von Mueller in the late 1860's (Mueller 1880).

We are not aware of any published citation of *albocaudatus* Krefft, either as a valid name, synonym, *nomen nudum* or as a name *incertae sedis*, other than the oblique reference to an unpublished register entry by Troughton (1932) (see below), who did not cite the actual name, and a single listing by Whitley (1969: 40), who simply lists "*Podabrus albocaudatus*, sp.n." but without comment on the taxonomic status. The taxon is not listed in the Integrated Taxonomic Information System database (ITIS 2014), or in any of the major taxonomic works or checklists of marsupials published since Krefft's description (Thomas 1888; Cabrera 1919; Iredale & Troughton 1934; Tate 1947; Troughton 1965; Archer 1981; Mahoney & Ride 1988; Groves 2005).

We regard Krefft's description to be both validly published under Article 8 of the *Code*, and an available name under Article 12.1, i.e. it is not a *nomen nudum*. In his diagnosis of *Sminthopsis granulipes*, Troughton (1932) contrasted the sparse, white hairs of the tail of his new species, which he described as being "quite different" to the bluish-grey, denser bristles of the tail of *Sminthopsis crassicaudata* (Gould), the only other species referred to in his diagnosis. Consequently, he regarded the white tail hairs, also mentioned in Krefft's description, to be a diagnostic feature. Although Krefft's brief description is based solely on external criteria, it nevertheless included criteria adequate to differentiate it from other taxa, namely the white tail or tail hairs. Other diagnostic criteria cited by Troughton (1932) for distinguishing *S. granulipes* from *S. crassicaudata* include ear shape, skull size and robustness, the shorter pes of the former species, and the structure of the manus and pes, particularly the finer granulations of manus and pes of *S. granulipes*. Krefft, who had presumably examined the holotype as a fresh specimen, focused on its striking tail colouration as indicated by his proposed vernacular name of White-tailed Podabrus, also reflected by its current name of White-tailed Dunnart. Troughton, aware that the holotype was an old, potentially faded specimen and the only one known at that time, placed more reliance on foot pad morphology, upon which he based his specific name, and for which he later proposed the vernacular name Granule-footed Sminthopsis (Iredale & Troughton 1934; Troughton 1941).

Provenance of the holotype of *Sminthopsis granulipes*

In his original account of *Sminthopsis granulipes*, Troughton (1932) cites the registration number of the holotype as 669 in the Palmer register, noting that the specimen was from "the old collection". Specimen 669 (now PA.669) appears to have been registered in about 1879. Specimens in the AM collection were not assigned registration numbers until after Edward Pierson Ramsay became Curator (=Director) in September, 1874. Ramsay organised the first general register of acquisitions, the A register, which started in January, 1875. Incoming specimens did not begin to be assigned registration numbers until June, 1877, before which items were simply listed with minimal details in the register. The A register was replaced by the B register in 1883, which was followed in 1885 by separate department registers (including the Mammal Department register). Ramsay engaged Secretary Edward Gillet Worcester Palmer (1842–1914) to register the backlog of unnumbered specimens from the previous decades and his registration entries constitute the "Palmer register", which ran concurrently with the A and B registers. The term "old collection" was commonly used for old, unregistered specimens sporadically found in the collection at the time of the A and B registers and the departmental registers, i.e. specimens that escaped registration in the Palmer register (Glenn Shea, pers. comm., 2014).

Troughton (1932: 352) states, with reference to the original entry in the Palmer register for PA.669 that "....it is remarkable that the striking features did not lead to earlier description. In the handwriting of the original entry is written a specific name which indicated that it was regarded as "new" and that as a fresh specimen the white coloration of the hair of the tail, and possibly skin, was a remarkable feature."

We examined the original brief register entry for PA.669, presumably made by Palmer, which states "Podabrus albocaudatus, King Georges Sound" but collector/donor or date of collection or registration are not indicated. In the remarks column of the register, ditto marks indicate that the specimen was in spirits, i.e. preserved in alcohol (Fig. 1). Subsequently, an undated, anonymous entry by another person states "Coll[ector]? Masters 1869? C40/69?" (the annotation "C40/69" refers to an Archival document discussed below). Although we do not know who made the latter entry, it was most likely made in 1907 during an inventory of the collection as discussed below. Troughton (1932) relied on this registry entry, and the uncertain attribution of Masters as collector of the holotype of *S. granulipes* remains entrenched in the literature.

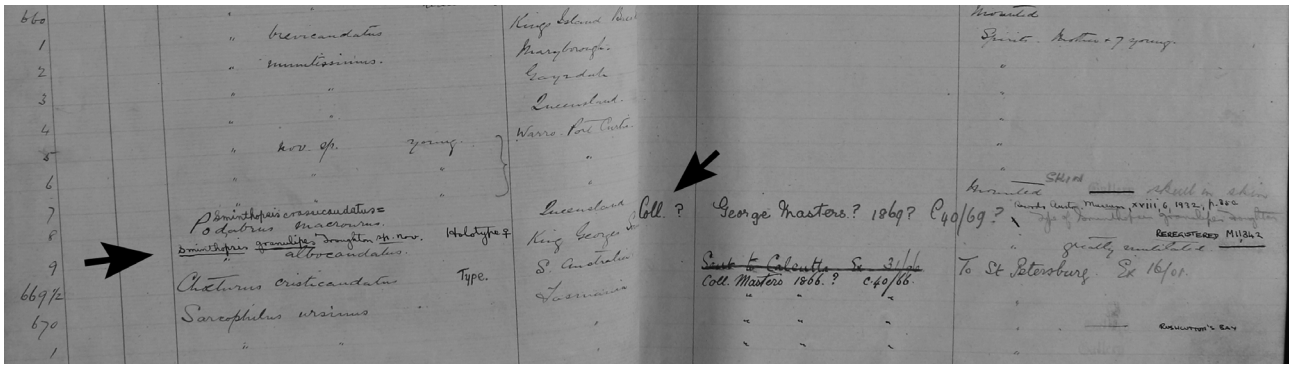

FIGURE 1. Palmer register entry for AM PA.669, *Podabrus albocaudatus*, indicated by arrows, with entries by subsequent Museum staff. The column headings from the left are: registration number, scientific name, collecting locality, how acquired, collector/donor's name, remarks. (Photo: Australian Museum Archives).

An examination of AM Archival documents has not revealed any evidence that Masters collected PA.669 and it seems more likely to have been obtained (purchased) from Maxwell, as stated by Krefft (1872). This conclusion is based on three considerations:

(1) In 1907 an inventory of the AM collection was commenced for the newly founded "X register", which ran for a number of years but failed to locate any of Maxwell's specimens. This register was set up by then director Robert Etheridge Jnr., who instructed William Walford Thorpe (1879–1932, in 1901 appointed assistant to Etheridge Jnr., see Strahan 1979: 50) to match Palmer registered specimens against original documentation associated with specimens that had been obtained in previous decades, mostly prior to 1893 (Vanessa Finney, AM Archives, pers. comm. August 2014). Any documents that listed specimens that could not be found in the collection, or matched with a Palmer registration number, were to be given a number in the X register. X register

entry X.194 refers to document "C.10.0.1", which is titled "List of specimens purchased of Mr Maxwell from King Georges Sound" but is undated, not even to year (AM Archives: AMS7, Letters received. C.10.0.1, nd.). This lists seven mammal and 19 reptile specimens purchased from Maxwell and the only dasyurid listed is one "Podabrus species". The X register entry for X.194 indicates that none of the 26 specimens could be matched with Palmer registration numbers nor could they be located in the collection.

(2) The annotation "C40/69" against PA.669 in the Palmer register refers to an archival document (AM Archives: AMS7, Letters received. C:40.69.13), lodged with the AM in 1869. The document is a hand-written species list of vertebrate specimens collected by AM collector George Masters in Western Australia from 22 September, 1868 to 1 April, 1869 indicating total number of specimens per species but without field numbers, and probably written by Masters. The list has Palmer registration numbers annotated in ink for many of the listed specimens, signed by W. W. Thorpe and dated 26 July, 1907 and was almost certainly done as part of the X register inventory. Masters had listed one "Podabrus" in alcohol, but without a species name, against which is a pencil annotation "601 or 669?". The pencil entry was also likely to be part of the X register inventory, and was later amended by Thorpe, who crossed out 669, thereby leaving specimen 669 unaccounted for. The specimen currently registered as PA.601 is a *Parantechinus apicalis* (Gray) which has "C40/69" listed in the accompanying database notes. There is therefore no indication from document C40/69 that PA.669 was collected by Masters in 1869. Masters made one other collecting trip to King George Sound (and Spencer Gulf) and collected a large number of *Sminthopsis*. These are listed as "54 *Antechinus fuliginosus*" by Krefft (1867) but all seem to be accounted for in the Palmer register.

(3) The X register in effect, is an inventory of old documentation relating to specimen acquisition yet of the 776 documents entered in the register, X.194 is the only document for which we found a reference to Maxwell.

Krefft was the only vertebrate zoologist on the AM staff during his Curatorship of 1861–1874, which ended in September, 1874 with his physical eviction from the Museum grounds (Scott 1875: 3), due to unconscionable behaviour by the AM Board of Trustee's (see Strahan 1979, pp. 28–35 for an account of this convoluted affair). Significantly, it appears that Krefft was permanently barred from further access to the AM collections. We believe that Krefft, who named *Podabrus albocaudatus* in 1872, would have been responsible for the species identification and any label information accompanying PA.669. Palmer would have copied whatever data was associated with the specimen, when he registered it about seven years later. We have not found any other specimens registered as *Podabrus albocaudatus* in the early AM registers from that or subsequent periods, nor any reference to that taxon in AM annual reports.

We regard PA.669 to be the likely holotype of *Podabrus albocaudatus*, as Krefft (1872) states that he had only one specimen upon which he established the taxon. However, we cannot exclude the possibility that Krefft obtained additional material of the species between 1872 and 1874, and that if he did, whether the holotype was retained in the AM, or sent to taxonomists in Europe. This could be resolved in future by a detailed examination of archival material such as AM specimen purchases and Krefft's correspondence. Consequently, we have not yet determined the year of collection of the holotype of *granulipes*, but it is likely to be between about 1865 to 1872.

The register entry against PA.669 gives the locality as "King Georges Sound" (Albany), and Krefft (1872) states that Maxwell obtained his specimen of *albocaudatus* from the same locality, but it is not clear whether the specimen actually came from the environs of Albany, or was obtained from adjoining regions. Although current understanding of the distribution and habitat of *S. granulipes* does not include the Albany region (McKenzie 2008; McKenzie & Kitchener 2008), either the species occurred there in the 1860's, or more likely, the specimen was collected in an adjoining region. Maxwell was known to have travelled widely in south-western Australia during his collecting forays and was apparently still collecting until his death (Mueller 1880).

Podabrus albocaudatus Krefft, 1872, a *nomen oblitum*

The Principle of Priority, as set out in Article 23.1 of the *Code*, states that the valid name of a taxon is the oldest available name applied to it. However, some circumstances call for a reversal of precedence (Article 23.9) to ensure stability of nomenclature if a junior synonym is in long established use, provided both conditions of Article 23.9.1 apply. These are: 1, the senior synonym has not been used as a valid name after 1899 (Article 23.9.1.1); and 2, the junior synonym has been used for a particular taxon, as its presumed valid name, in "at least 25 works,

FIGURE 2. Holotype skull and mandible of *Sminthopsis granulipes*, PA.669. Scale bar = 5 mm. (Photo: Sally Cowan).

FIGURE 3. Holotype alcoholic body of *Sminthopsis granulipes*, PA.669, with metal registration tag attached to right manus. Scale rule in cms. (Photo: Anja Divljan).

published by at least 10 authors in the immediately preceding 50 years and encompassing a span of not less than 10 years" (Article 23.9.1.2). Accordingly, we declare *Sminthopsis granulipes* Troughton, 1932 as a *nomen protectum*, and *Podabrus albocaudatus* Krefft, 1872 as a *nomen oblitum*, in accordance with Article 23.9.1. and as required by Article 23.9.2. of the *Code*. The Principle of Priority is reversed to maintain prevailing use of the junior synonym *granulipes* Troughton, 1932 instead of *Podabrus albocaudatus* Krefft, 1872 which must not be used as a replacement name, because both conditions of Article 23.9.1. are met. First, *albocaudatus* Krefft, 1872 has not, to our knowledge, been used as a valid name after 1899, thereby fulfilling the condition of Article 23.9.1.1. Second, the condition of Article 23.9.1.2 also applies because *granulipes* Troughton, 1932 has been used as a valid name in at least 25 works by ten or more authors over the past 50 years. Article 23.9.2 stipulates that a declaration of a junior synonym as a *nomen protectum* requires evidence that the condition of 23.9.1.2 applies. Accordingly, the Appendix lists 25 works published by more than ten authors over the past 50 years, all of which use *S. granulipes* Troughton, 1932 as a valid name.

Discussion

The decision to erect a new name and species on a specimen labelled *Podabrus albocaudatus* need not have been gratuitous opportunism by Troughton. Troughton (1932; 1941) believed that the holotype of *granulipes* was probably collected in 1869 by Masters (although we reject this), and he must have realized that the author of that

name was likely to be Krefft, or possibly Ramsay. It remains unknown whether Troughton was aware that the name *Podabrus albocaudatus* had been published by Krefft in a newspaper article, rather than just representing a registration entry, but even if he was, he might not have regarded a newspaper article as valid publication given that a likely prevailing view was a requirement for publication in a scientific journal. The names of many new taxa first appeared in local newspapers, which were an important medium for disseminating scientific information in early colonial Australia, and often, but not always, appeared in articles that published abstracts from scientific meetings (Mahoney & Ride 1975). Although it is clear that at least some early authors such as Charles Walter De Vis in 1907 (see Ingram 1990) regarded newspaper articles as valid scientific publishing, the validity of names published in newspapers is determined by interpretation of the relevant articles of the current edition of the *Code*.

FIGURE 4. Plantar view of the right pes of the holotype of *Sminthopsis granulipes*, AM PA.669. Scale bar = approximately 1 mm. (Photo: Stuart Humphreys, Australian Museum).

Troughton (1932) gives line drawings of ear structure and the soles of manus and pes of the holotype of *granulipes*, along with external, dental and cranial measurements. To our knowledge, the only published illustrations of the holotype skull and mandible are given in the comprehensive generic revision of Archer (1981: 125), who also lists cranial and dental measurements of the holotype. Although images given by the latter authors are informative, we provide photographs of the holotype of *granulipes* (Figs 2–4) that give more detail than previously published images.

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APPENDIX

The following 25 works published by more than ten authors over the past 50 years cite *Sminthopsis granulipes* Troughton as a valid species, thereby meeting the requirements of Article 23.9.1.2 of the *Code*.

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