Research in Zoology 2019, 9(1): 12-15
DOI: 10.5923/j.zoology.20190901.03

A Description of a New Endemic Carnivorous Marsupialia in Myrtoideae Forests of Australia: A Taxonomic Misadventure with Phototypes

Stephen J. Maxwell

School of Zoology and Ecology, James Cook University, Cairns, Australia

Abstract This paper uses the now accepted tool of phototyping in conjunction with extensive published anecdotal evidence to describe a new carnivorous Marsupialia. This new taxon differs from all known Marsupialia in having reduced incisors and greatly developed canines. *Bicingulatus ninjabearus* new species is purported to be an aggressive mimic, with the primary prey item *Phascolarctos* (sl.). This paper tests the limits for taxonomic validity using phototypes, where the formal structure for erecting taxa grants validity irrespective of physical evidence, and also where the use of phototypes can be demonstrably supported with axillary evidence. This paper seeks to establish precedents on how nature-bound encounters resulting in the capture of an image of a purported new species that is then widely distributed is treated. It is demonstrated that the use of that image can be as a phototype and primary evidence for a species description in taxonomy. Therefore, this paper seeks to test the limits on the application of phototypes. (urn:lsid:zoobank.org:pub:453BD8CA-E8C5-48DE-8578-A42D7633E006)

Keywords Aggressive Mimic, Carnivorous, Drop Bear, Myth, Phototype, Taxonomy, Australia

1. Introduction

The use of phototypes in the place of a physical specimen is not a new concept to biology [1,2]. Historically, the use of image based types, the archaic equivalent of phototypes, was the norm rather than the exception [3-5]. However, the late nineteenth and twentieth centuries saw a move to ground taxonomy in a more physical realm, leading to the use of physical types and the formulation of rules governing the importance of these types as touchstones to taxonomic intent of the original authors [6-8]. Currently, the option of phototypes is available in circumstances, such as when the ability to capture a preserved type is difficult, or where a death assemblage would lack key taxonomic indicators that enable decrement of one taxonomic form from another [9].

The lack of physical evidence often results in the use of taxonomic attributions, often described with incorrect nomenclatural processes, resulting in invalid descriptions that may become perpetuated in the literature [10,11]. For that reason, the use of photographs as types can be justified as a means of bringing a hypothetical reference point to facilitate a basis for final taxonomic resolution of a species that would otherwise remain undescribed. Often the only evidence we have for a new species is the photographic record of discerning characteristics, particularly in the case of sympatric species, such as aggressive mimics [12]. However, the establishment of a species based on anecdotal evidence can be problematic, particularly where there are reported human interactions that have been documented without ever having physical evidence, leading to dismissal of a taxon as an urban myth or folklore [11]. However, upon closer examination, much of the "mythical" may well exist. One need look no further than *Architeuthis dux* Steenstrup, 1857 or *Ornithorhynchus anatinus* Shaw, 1799 all once believed mythical. One possible reason for the mythical status of some taxa is a lack of taxonomic explicitness. Simply, without a formal description, you cannot know what you are looking for.

This paper revises the taxonomy associated with an anecdotally well-known, yet undescribed marsupial. This taxon has a long history of web-based evidence, although much of this evidence has historically been conflated with the *Thylarctos plummetus nomen nudum* ex Janssen, 2012 [11,13]. This paper also addresses the primary reason for the failure of ecologists and mammal taxonomists to uncover this cryptic species though the provision of an explicit formal definition to enable a positive identification. This formal definition gives taxonomic clarity to enable a more concerted focus on finding examples of this elusive creature.

* Corresponding author:
stephen.maxwell@my.jcu.edu.au (Stephen J. Maxwell)
Published online at http://journal.sapub.org/zoology

Furthermore, with regard to an ability to formally describe species based on a photograph, this paper demonstrates that such phototypes can lead to taxonomic misadventures, particularly when there is a strong cultural belief underpinning the assumption of existence. Finally, this paper presents a discussion on the role of myth in species determination. Finally, terms of the use of photoypes, this paper demonstrates that there are no limits.

2. Systematic Part

Class: Mammalia
Infraclass: Marsupialia
Supraorder: Australidelphia

Pseudodiprodontia
New order

Type: Pseudophascolarctos new family

Definition: The mouth bears a pair of sharp canines on the upper and lower jaw, with reduced front incisors. The rear premolars are sharp and pointed, while the molars are somewhat blunted and not fused. The second and third digits are basally fused on the hind legs.

Remarks: This order is erected to contain the known marsupial carnivores that would have been historically included in the Diprotodonta but differs from that complex in having reduced incisors and greatly developed canines [14]. This order is very similar to Vombatiformes in terms of ecological habitat choice and gross external morphology. It is hypothesized that Pseudodiprodontia will also demonstrate a higher degree of similarity in relation to mating and arboreal behaviour to Phascolarctos (sl.). However, the presence of the upper incisors precluded inclusion, based on their definitions, within Vombatiformes and Diprotodonia which are defined by their pair of front incisor teeth on the lower jaw [14,15].

Pseudophascolarctos
New family

Type: *Bicingulatus* new genus

Definition: A large solid head and large blunted hairless black nose. The palms on all four limbs are without hair. The ears are fury.

Remarks: The family *Bicingulatus* is characterised by the use of aggressive mimicry and is monotypic.

Bicingulatus
New genus

Type: Bicingulatus ninjabearus new species

Definition: A medium sized animal up to 15kg in weight, with a solidly callused rear-end and an arboreal habit.

Bicingulatus ninjabearus
New species
Figure 1A

Type: Phototype – figure 1A. This photo is well documented in the peer reviewed literature, and has been attributed incorrectly to *Thylarctos plummetus nomen nuda* ex Janssen 2012 [1,11].

Definition: With two upper and lower well-developed canines that are not centred, but separated by sharp moderately developed incisors. The premolars are sharp, while the molars are blunt and not fused. The head is solid, with a large, blunt, hairless, black nose. The ears are rounded and hairy, with white patches. Eyes are small and forward facing. Primarily nocturnal when it uses its aggressive mimicry to cosy up to *Phascolarctos* (sl.), its primary prey, to maximum effect.

Synonymy (peer reviewed):

2012 *Thylarctos plummetus nomen nudem* ex Janssen, p. 446, pl. 1. Livingston et al. 2017, Fig 2b.

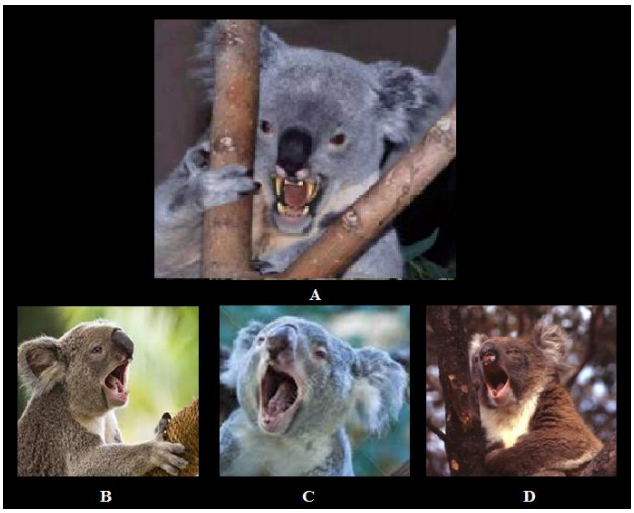

Figure 1. Described extant taxon within the *Bicingulatus* (s.l) and *Phascolarctos* (s.l): A) *B. ninjabearus* new species, clearly showing the upper forward, non-centred canines in contrast to *Phascolarctos* (s.l) (Phototype – Janssen 2012, fig 1a); B) *P. cinereus cinereus* (http://www.borisviskin.com accessed 30th August, 2018); C) *P. cinereus adustus* (https://www.123rf.com accessed 30th August, 2018); D) *P. cinereus victor* (http://www.andreavellani.it/images/australia/koala.jpg accessed 30th August, 2018)

Etymology: The name is a play on the nature of the animal: cryptically aggressive- ninja like; and the association with the prey koala "bear".

Range: Unknown but is expected to be restricted to areas inhabited by *Phascolarctos* (sl.).

Remarks: The new species falls with the common lexicon attributed to poorly defined *Thylarctos plummetus nomen nuda* ex Janssen 2012, although it is not that species, based on the dentine structure, even if poorly defined [13]. The images in the literature clearly show the front canines of *B. ninjabearus* [1], which is in stark contrast to the defining feature of premolar incisors in *T. plummetus* [13]. Therefore, Janssen [1] is taxonomically problematic. Janssen [1] notes that there are two *Thylarctos* (sl.) species that have been taxonomically conjoined and evolved from a single ancestor based on megafaunal bones from Aboriginal middens of the Holocene. However, we cannot find any evidence for the existence of one of these "species" *Thylarctos plummetus vampirus* Lestat *nomen nuda* ex Janssen, 2012, and it is

therefore considered as derived purely based on folk law [11]. We propose that *B. ninjabearus* is that second species determined from midden evidence [10].

Given that *B. ninjabearus* is sympatric with, and morphologically similar to *Phascolarctos cinereus* Goldfus, 1817 (sl.), as an aggressive mimic, the shift in phenotype of *P. cinereus* (sl.) that occurs across its range will also be matched at a demonstrable level of phenotypic plasticity by *B. ninjabearus*. Predation by *B. ninjabearus* on *P. cinereus* may well account for some of the declines observed in these *P. cinereus* populations [16], and may also explain the contrast in isolated introduced *P. cinereus* populations that have increased where the predator has not be jointly relocated [17]. Similarly, attacks on *P. cinereus* that have been attributed to domestic animals [18] may have been misreported and it is probable that some have been perpetrated by the new species.

3. Discussion

Phascolarctos (sl.), *Thylarctos* (sl.) and *Bicingulatus* (sl.) are very similar in behaviour and external morphology, such that it is possible that many self-reported injuries and second hand accounts of attacks attributed to *T. plummetus* were perpetrated by *B. ninjabearus* [19]. Furthermore, it is also possible that many reported aggressive *Phascolarctos* (sl.) could be the consequence of taxonomic confusion resulting from a lack of formal definition of the new species. In addition, those caring for sick and injured *Phascolarctos* (sl.) may inadvertently be starving *Bicingulatus* (sl.) as a consequence of taxonomic misidentification resulting in incorrect food offerings.

While the *B. ninjabearus* is primarily a hunter of its similar formed *Phascolarctos* (sl.) prey species, it has been known to attack intruders by dropping out of trees [10]. However, this is believed to primarily be an act of territorial aggression rather than predatory intent. If the victim of this defensive aggression is knocked unconscious, however, it is likely to be subjected to opportunistic feeding, resulting in death.

4. Conclusions

This paper argues that where a widely accepted, and peer published illustration exists, the lack of physical evidence of the organism, should not preclude it from being described. This is particularly the case when the mythology is accepted a cultural reality. The new species is highly aggressive and territorial, and it is highly probable that it is the only potential predator to actively attack humans in territorial defence away from water bodies in Australia. It is proposed that *B. ninjabearus* be known by the common name "fanged-drop bear". Historically, there has been a broad conspiracy to dismiss this new species as spurious, a result of the hubbub generated by the combination of taxonomic inconclusivity and myth generation. Now that the true identity of this mimic species has formally been defined, it is important that the government formulate a comprehensive management plan, commencing with a fully funded expedition to uncover the extent of the population before more people are injured or predated upon or goes extinct along with its primary prey item. After all, who in their right mind would come to country where not only are you under threat of death by the myriad of species that are simply referred to as crocodiles, snakes, spiders, stonefishes, cone shells, octopi, sharks, stingrays, cassowaries, jellyfish, bees, wasps, scorpions, ticks, wild pigs, dogs, cows, lizards and now to add to this list, a predatory koala look-alike that nobody knows where or when it could strike?

ACKNOWLEDGEMENTS

The author would like to thank Dr. Tasmin Rymer for her invaluable insights into mammal taxonomy and comments on the working draft.

REFERENCES

[1] Jørgensen, P. M., 1997, Lichen phototypes, natures unmanageable misprints? Taxon, 46(4), 721-722.

[2] Duszynski, D. W. and Wilber, P. G., 1997, A guideline for the preparation of species descriptions in the Eimeriidae. The Journal of Parasitology, 83(2), 333-336.

[3] Linné, C., 1758, Systema naturae per regna tria naturae secundum classes, ordines, genera, species, cum caracteribus, differentiis, synonymis, locis, volume 1, 10th edn. reformata, Holmiae: Laurentii Salvii.

[4] Gmelin, J. O., 1791, Systema naturae per regna tria naturae secundum classes, ordines, genera, species, cum caracteribus, differntiis, synonymis, locis, volume 1, part VII, 13th edn. acta, reformata, Lugduni, Apud J.B. Delamolliere.

[5] Röding, P. F., 1798, Museum Boltenianum sive catalogus cimeliorum e tribus regnis naturæ quæ olium collegerat Jon. Fried Bolten, M.D.p.d. per XL. Annus proto physicus Hamburgensis: Pars secunda continens conchylia sive testacea univalvia, bivalvia and multivalvia, Hamburgi: Typis Johan. Christi. Trappii.

[6] International Commission on Zoological Nomenclature (ICZN), 1999, International code of Zoological Nomenclature. London: The International Trust for Zoological Nomenclature.

[7] Šlapeta, J., 2013, Ten simple rules for describing a new (parasite) species. International Journal of Parasitology, 2: 152-154.

[8] Turland, N. J., Wiersema, J. H., Barrie, F. R., Greuter, W., Hawksworth, D. L., Herendeen, P. S., Knapp, S., Kusber, W.-H., Li, D.-Z., Marhold, K., May, T. W., McNeill, J., Monro, A. M., Prado, J., Price, M. J. and Smith G. F., eds., 2018, International Code of Nomenclature for algae, fungi,

and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017. Regnum Vegetabile 159. Glashütten: Koeltz Botanical Books.

[9] Marshall, S. A. and Evenhuis, N. L., 2015, New species without dead bodies: a case for photo-based descriptions, illustrated by a striking new species of Marleyimyia Hesse (Diptera, Bombyliidae) from South Africa. Zookeys, 525: 117–127.

[10] Janssen, V., 2012, Indirect tracking of drop bears using GNSS technology. Australian Geographer, 43(4): 445-452.

[11] Livingston, C., Goldfinch. F. and Morgan, R., 2017, Man-eating teddy bears of the scrub: exploring the Australian drop bear urban legend. eTropic 16(1): 79-95.

[12] Ramya, N., Kumar, P. V., Meerthi, M. C., Srinivasa, N. and Ramesh, K. B., 2017, Aggressive mimicry: A potential tool for predators. Journal of Pharmocognosy and Phytochemistry. 6(5):1305-1307.

[13] Australian Museum, 2015, Drop bear {web page}. www.australianmuseum.net.au (accessed 10/10/2018).

[14] Owen, R., 1858, Odontology. Teeth of mammals. Encyclopedia Britannica, 16: 447.

[15] Owen, R., 1859, On the fossil mammals of Australia. Part II. Description of a mutilated skull of the large marsupial carnivore (Thylacoleo carnifex Owen), from a calcareous conglomerate stratum, eighty miles S. W. of Melbourne, Victoria. Philosophical Transactions of the Royal Society, 149: 309-322.

[16] Gonzalez-Astudilio, V., Allavena, R., McKinnon, A., Larkin, R. and Henning, J., 2017, Decline causes of Koalas in South East Queensland, Australia: A 17 year retrospective study of mortality and morbidity. Science Reports, 7: 42587.

[17] Molsher, R., 2017, Kangaroo Island Koala Management Program Annual Report 2015-16. Natural Resources Kangaroo Island, South Australia.

[18] Department of Environment and Heritage Protection, 2018, Koalas and Dogs. Brisbane, Queensland Government.

[19] Dropbearaware, 2009, Drop bear attack caught on film. New Zealander mauled{online video}. www.youtube.com.