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The Black-tailed Antechinus, *Antechinus arktos* sp. nov.: a new species of carnivorous marsupial from montane regions of the Tweed Volcano caldera, eastern Australia

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Abstract

We describe a new species of dasyurid marsupial within the genus *Antechinus* that was previously known as a northern outlier of Dusky Antechinus (*A. swainsonii*). The Black-tailed Antechinus, *Antechinus arktos* sp. nov., is known only from areas of high altitude and high rainfall on the Tweed Volcano caldera of far south-east Queensland and north-east New South Wales, Australia. *Antechinus arktos* formerly sheltered under the taxonomic umbrella of *A. swainsonii mimetes*, the widespread mainland form of Dusky Antechinus. With the benefit of genetic hindsight, some striking morphological differences are herein resolved: *A. s. mimetes* is more uniformly deep brown-black to grizzled grey-brown from head to rump, with brownish (clove brown—raw umber) hair on the upper surface of the hindfoot and tail, whereas *A. arktos* is more vibrantly coloured, with a marked change from greyish-brown head to orange-brown rump, fuscous black on the upper surface of the hindfoot and dense, short fur on the evenly black tail. Further, *A. arktos* has marked orange-brown fur on the upper and lower eyelid, cheek and in front of the ear and very long guard hairs all over the body; these characters are more subtle in *A. s. mimetes*. There are striking genetic differences between the two species: at mtDNA, *A. s. mimetes* from north-east New South Wales is 10% divergent to *A. arktos* from its type locality at Springbrook NP, Queensland. In contrast, the Ebor *A. s. mimetes* clades closely with conspecifics from ACT and Victoria. *A. arktos* skulls are strikingly different to all subspecies of *A. swainsonii*. *A. arktos* are markedly larger than *A. s. mimetes* and *A. s. swainsonii* (Tasmania) for a range of craniodental measures. *Antechinus arktos* were historically found at a few proximate mountainous sites in south-east Queensland, and have only recently been recorded from or near the type locality. Even there, the species is likely in low abundance. The Black-tailed Antechinus has plausibly been detrimentally affected by climate change in recent decades, and will be at further risk with increasing warming trends.

Key words: Marsupialia, Dasyuridae, *Antechinus swainsonii*, taxonomy, Binna Burra, O'Reilly's, Springbrook National Park, Lamington National Park

Introduction

A recent assessment of the Australian dasyurid marsupial genus *Antechinus* by Van Dyck (2002) recognised ten extant species: *A. minimus* (Geoffroy); *A. flavipes* (Waterhouse); *A. stuartii* Macleay; *A. swainsonii* (Waterhouse); *A. bellus* (Thomas); *A. adustus* (Thomas); *A. godmani* (Thomas); *A. leo* Van Dyck; *A. agilis* Dickman, Parnaby, Crowther and King and *A. subtropicus* Van Dyck and Crowther. In the past three years, our research group has undertaken a systematic and taxonomic revision of the extant members of the genus (see Baker, Mutton & Hines 2013; Baker, Mutton & Van Dyck 2012; Baker & Van Dyck 2012, 2013a,b). Baker, Mutton & Van Dyck (2012) diagnosed an eleventh species, the Buff-footed Antechinus *A. mysticus*, which was previously referred to the ubiquitous Yellow-footed Antechinus, *A. flavipes*; *A. mysticus* has a likely scattered coastal distribution in eastern Australia, ranging north from near the Queensland (Qld)/New South Wales (NSW) border north to Eungella NP, near Mackay, mid-east Qld. In the process of investigating the distributional range of *A. mysticus* between south-east and mid-east Queensland, Baker, Mutton & Hines (2013) found a twelfth antechinus species, the Silver-headed

are recent reports of the species from Brindle Creek. Yet we caught no *A. arktos* on this survey and only 5 *A. stuartii*. We also caught 41 *Rattus fuscipes* and 22 *Melomys cervinipes*. The capture rates of *A. stuartii* were very low – just 5 animals in 675 trap nights. However, 4 of these animals were pregnant and the fifth had birthed a few days prior to capture; in the last two weeks of pregnancy, female antechinus are generally difficult to catch (AB, pers. obs.). But once young are established in the pouch, antechinus females will regularly enter traps, plausibly at least in part because milk is a high nutrient food source which is energetically expensive to produce and baited traps are harder for needy lactating mothers to resist. If our predictions for mating in *A. arktos* are accurate, by mid-September any mothers should have been catchable, carrying well-established young, about 1–4 weeks old. Further, in our 675 trap nights, there was higher than usual opportunity for the antechinus to enter traps, since catch rates of *R. fuscipes* were low, with one capture every 17 traps (*R. fuscipes* can occur in every third trap in some locales within south-east Queensland – north-east New South Wales (AB and TM, pers. obs.)). Also, the majority of traps were left undisturbed; in many areas, Scrub Turkeys, *Alectura lathami*, and/or Northern Brown Bandicoots, *Isodon macrourus*, regularly interfere with traps and set them off – up to half of the baited traps may be affected (AB and TM, pers. obs.).

Conservation status. *A. arktos* has only been captured at a few sites and in very low numbers despite extensive trapping effort and it appears likely that its populations are in decline. Data on trapability are scant, however the four females that we captured in a single gully trap line over two nights at Best of All Lookout suggest that if the animals are present they will readily enter Elliott traps. Thus, the overall limited returns from extensive surveying are most likely a reflection of species' absence or low population density, rather than an artifact of trapability.

The distribution of *A. arktos* appears to have contracted. In southeast Queensland there are no recent records from the Binna Burra and O'Reilly's areas despite ongoing and at times targeted surveys there. It seems that the species may now be restricted to the highest parts of the Tweed Volcano Caldera, such as the upper parts of Springbrook where we successfully captured the species in May 2013. The most likely explanation for such a contraction is climate change. Given the predictions of future climate in the region (IPCC, 2013 and references therein) this threat will increase. We therefore make a preliminary recommendation that *A. arktos* be listed as threatened, pending results from our continuing surveys of the region. Although we do not attempt a formal assessment of species status here, it qualifies (e.g., under criterion B) for an IUCN threat category of endangered or possibly critically endangered, given that it is suspected to be in decline and is known from few locations in a restricted habitat under threat (IUCN, 2013). Future surveys to determine the status of populations should include a large number of trap nights per site and be undertaken during May–June when both males and females are present and likely engaged in pre-mating activity, to give the greatest chance of capture success. This research is underway.

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