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A new record of the Christmas Island Blind Snake, *Ramphotyphlops exocoeti* (Reptilia: Squamata: Typhlopidae).

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ABSTRACT – The endemic Christmas Island Blind Snake *Ramphotyphlops exocoeti* is a species rarely collected since initial faunal collections were conducted on Christmas Island in 1887. Twenty-three years after the last record in 1986, an individual was collected on 31 July 2009. Here we catalogue historical collection records of this animal. We also describe the habitat and conditions in which the recent collection occurred and provide a brief morphological description of the animal including a diagnostic feature that may assist in future identifications. This account provides the first accurate spatial record and detailed description of habitat utilised by this species.

KEYWORDS: Indian Ocean, Yellow Crazy Ant, recovery plan

INTRODUCTION

Christmas Island is located in the Indian Ocean (10°25'S, 105°40'E), approximately 360 km south of the western head of Java, Indonesia (Geoscience Australia 2011). This geographically remote, rugged and thickly vegetated island is the exposed summit of a large mountain. It has a high proportion of endemism in its herpetofauna with five of the six naturally occurring reptile species considered endemic (Cogger and Sadlier 1981). Five additional species have been introduced to the island since human colonisation.

The Christmas Island Blind Snake, *Ramphotyphlops exocoeti* (Boulenger, 1887), has always been the most enigmatic of these reptiles, largely due to its primarily fossorial habit. Originally described as *Typhlops exocoeti*, it was placed arbitrarily in the genus *Ramphotyphlops* by Cogger et al. (1983), then excluded from this genus by Greer (1997) and returned, by inference, to *Typhlops* (Cogger 2005). However, Wallach (2003) has shown that it should be correctly assigned to *Ramphotyphlops*.

This species was described from two specimens collected by officers of the survey vessel HMS Flying Fish when it visited Christmas Island in 1887 (Boulenger 1887). Another specimen was collected by Lister in 1887 from under a fallen log (Lister 1888). Andrews collected several specimens in 1897-98 from 'damp places, under rocks and fallen trees' (Andrews 1900). Gibson-Hill (1947) reported that the species was 'fairly common' and could be found under the trunks of fallen trees. In 1975 a specimen collected from Stewart Hill, located in the central west of the island in a mine lease known as Field 22, was deposited in the Australian Museum (Cogger and Sadlier 1981). A specimen was caught by N. Dunlop in 1984 while pit trapping in the vicinity of a site known as Loading Bay 4 (LB4) (N. Dunlop, personal communication, 2012), and a specimen was caught in 1986 by phosphate mine workers while clearing land on the southern peninsula in a mine lease known as Field 17 (H. Yorkston, personal communication, in James 2005). See Figure 1 for locations.

After reviewing literature records, museum catalogues and anecdotes, Cogger (2005) accepted a total of 22 records of the species since humans began to visit and eventually settled the island. To the best of our knowledge, there were no confirmed sightings of this species from 1986 until 2009. Because of its scarcity, a general lack of knowledge about its life history and the potential impact of threatening processes, such as habitat loss, this species is listed as vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and as such, has a National Recovery Plan in place (Cogger 2006).

Twenty-three years after the last recorded observation, an individual was collected on 31 July 2009 by two of us (DM, RB). The discovery was made at 13:00 on a relatively cool day (24.5°C) in damp

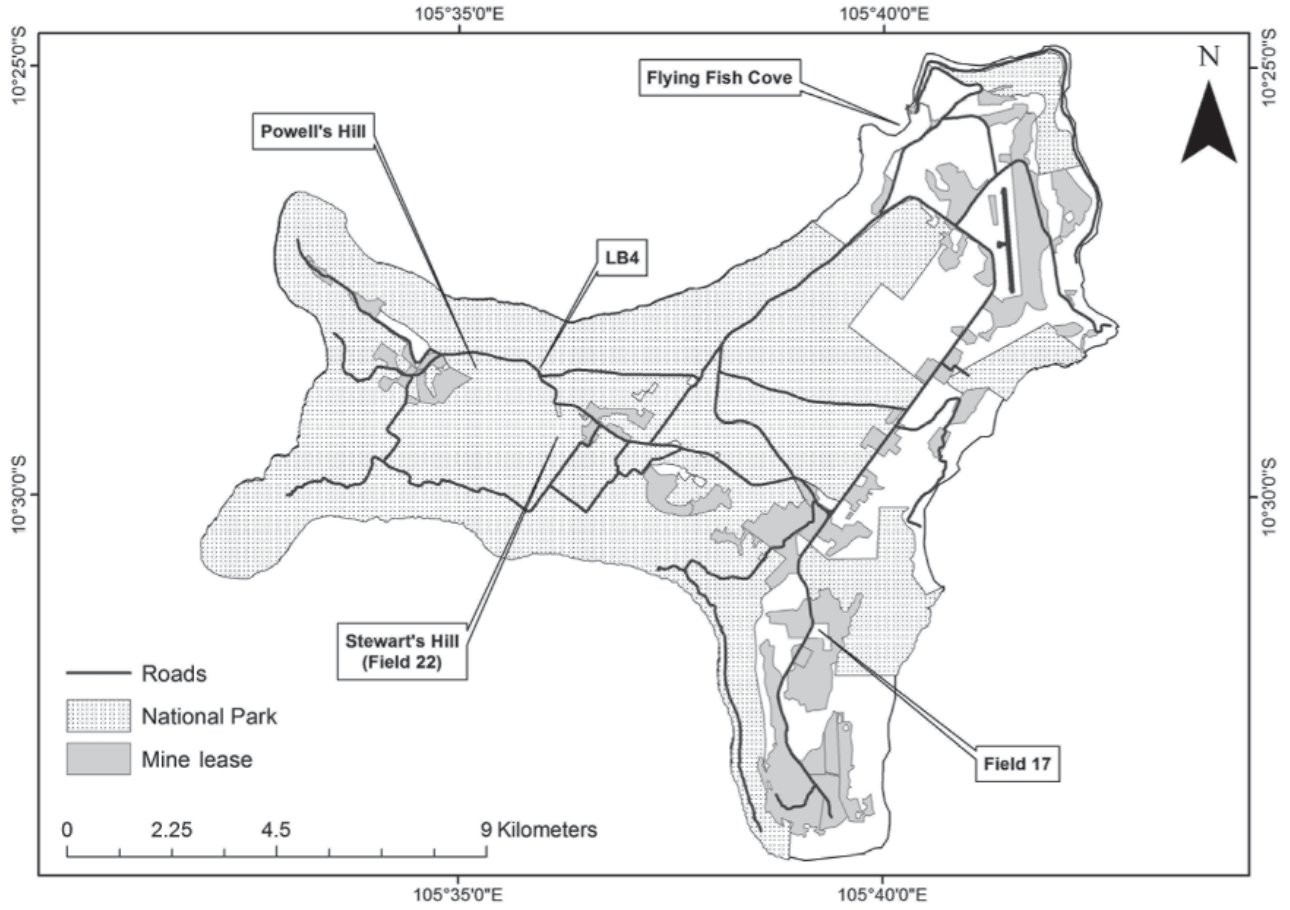

FIGURE 1 Christmas Island, Indian Ocean.

conditions following a month of moderately overcast and wet conditions (Bureau of Meteorology 2011). It was found in the presence of Yellow Crazy Ants *Anoplolepsis gracilipes* (Smith, 1857), a significant invasive pest species on the island and a listed threat to *R. exocoeti* (Cogger 2006). We were plotting the perimeter of a 63 hectare *A. gracilipes* super colony at the time of discovery.

Ant super colonies are defined as areas where ant densities are high enough to cause significant mortality to the Christmas Island Red Crab *Gecarcoidea natalis* (Pocock, 1888) (O'Dowd et al. 2003). This extirpation often causes a rapid and catastrophic shift in the rainforest ecosystem as *G. natalis* regulates seedling recruitment and litter breakdown across the island rainforest (O'Dowd and Green 2010). *Anoplolepis gracilipes* super colonies are very likely to have caused high levels of mortality to endemic reptiles such as Blue-tailed Skinks *Cryptoblepharus egeriae* (Boulenger, 1889); Forest Skinks *Emoia nativitatis* (Boulenger, 1887) and Lister's Gecko *Lepidodactylus listeri* (Boulenger, 1889) all of which are in rapid decline (Smith et al. in press).

For over a decade, the spread of *A. gracilipes* super colonies have been controlled by Christmas Island National Park. The control program applies the insecticide Fipronil® within AntOff® granular ant baits (active ingredient is Fipronil® 0.01g/kg) either by hand or aerially using a helicopter. In this instance, a helicopter baited the adjacent area in September 2009; it was the densest super colony on the island at the time (Boland et al. 2011).

The capture occurred within Christmas Island National Park, but was less than 400 m from an inactive mine lease (Geoscience Australia 2011). The location was at the highest point of Powell's Hill on the plateau area of the north-western region of the island (Figure 1). A *Garmin GPSmap 60CSx* was used to mark the location as 10°28'40.9"S, 105°35'15.6"E WGS 84, which at the same time recorded an altitude of 361 m above sea level. Interestingly, the maximum altitude of Christmas Island is considered to be 361 m (Claussen 2005).

The area adjacent to the capture site was quite flat; however, there were outcroppings of limestone pinnacles (a common feature of the island), within 50 m of the site. Anecdotal evidence suggests that these pinnacles provide a habitat for *R. exocoeti* following periods of high rainfall (Kim Chey, personal communication, in James 2005). The vegetation surrounding the capture site was evergreen tall closed

FIGURE 2 Tall closed canopy forest at the capture site.

FIGURE 3 Forest floor at the capture site.

FIGURE 4 *Ramphotyphlops exocoeti.* Length 300 mm. (Image: Dr. Dave Hunter).

forest typical of the deep soiled plateau (Claussen 2005). The dominant understorey species was *Pandanus elatus* and the dominant canopy species were *Inocarpus fagifer* and *Pisonia umbellifera*. The emergent species *Syzygium nervosum* and *Hernandia ovigera* were present (Figure 2). Canopy cover was calculated as 85% using Gap Light Analyzer 2.0. Leaf litter was present, but not abundant, and bare soil was exposed (Figure 3).

The snake was found beneath a small, flat and rectangular section of rotting wood (400 × 150 × 20 mm) and was first sighted as the piece of wood was overturned while DM searched for *A. gracilipes*. Once disturbed, the animal sought to escape into a small tunnel with a diameter of approximately 7 mm. The tunnel was carefully excavated in order to retrieve the snake but the depth was not recorded.

Initially, the snake was suspected to be an introduced Flower Pot Blind Snake *R. braminus* (Daudin, 1803), as these snakes are now commonly found on Christmas Island (DM, personal observation, 2012). However, after

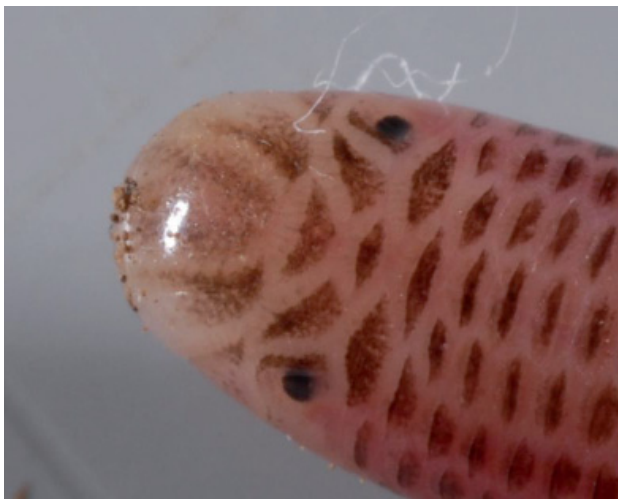

FIGURE 5 *Ramphotyphlops exocoeti*. Anterior dorsal view. (Image: Dr. Dave Hunter).

closer inspection, it became apparent that the pinkish colouration and relatively long size of the individual were features consistent with previous descriptions of *R. exocoeti*. In addition to that, the larger specimens of *R. braminus* collected on Christmas Island are generally smaller and darker in coloration (DM, personal observation, 2012).

The specimen was 300 mm in length and 6 mm in diameter. The snout-vent length was 290 mm. The tail section was 10 mm long, squat and quite similar in general dimensions to the anterior. The colouration was pale pink at the anterior, fading to pink grey at the posterior (Figure 4). Dorsal surfaces were darker in coloration than ventral and scale pigmentation was darker farther from the scale margin where pigmentation paled markedly. This feature was described as 'brown spots' by Boulenger (1887) which is an accurate description. Scales were flat, very smooth and juxtaposed. Vestigial eyes were distinct under the ocular scale with a dark coloration (Figure 5).

One of us (MS) compared the specimen with photographs of *R. braminus* and noted that the rostral scale of *R. exocoeti* was noticeably wider than that of *R. braminus* as described by Cogger and Sadlier (1981). Images of the specimen were collected and emailed to Dr Hal Cogger for confirmation, who confirmed it as *R. exocoeti* and noted that diagnostic characters were based on a limited number of observations of *R. exocoeti* and a small number of *R. braminus* (H. Cogger, personal communication, 2011). While in captivity the dimensions of the rostral scale were not measured and an opportunity for a definitive measurable diagnostic feature was missed, however, we believe this morphological observation strengthens the use of the rostral scale as a diagnostic feature for future identification.

This discovery confirms that *R. exocoeti* is extant in the wild. The discovery of this individual fulfilled the first specific objective of the National Recovery Plan which was to find the species in the wild (Cogger 2006).

The specimen was released shortly after its identity was confirmed. Subsequent visits to the area have not produced further sightings.

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