

# Herpetofaunal observations on Eagle Island, Middle Brother, North Brother and Diego Garcia, with an overview of previous records in the Chagos Archipelago.

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**Abstract:** Eagle Island of the Chagos Archipelago is the second largest island of the largest coral atoll structure in the World and yet nothing is known of the island's terrestrial herpetofauna. Eagle Island was extensively surveyed for terrestrial reptiles and amphibians over a ten week period during the Chagos Ecological Restoration Project 2006. Nesting attempts of marine turtles were also recorded over the duration of the project. Herpetofaunal observations were also made on the neighbouring islands, Middle Brother and North Brother and the largest island of the archipelago Diego Garcia. Five species were encountered: green turtle *Chelonia mydas*, hawksbill turtle *Eretmochelys imbricata*, common house gecko *Hemidactylus frenatus*, mourning gecko *Lepidodactylus lugubris* and the marine toad *Bufo marinus*. These findings are presented with an overview of previous records of herpetofauna in the Chagos Archipelago.

**Key Words:** Chagos, Diego Garcia, Gecko, Bufo, Turtle.

## Introduction

The Chagos Archipelago is comprised of five emergent atolls including more than 60 small islands and represents the World's largest atoll structure. The archipelago is positioned approximately 500km to the South of the Maldives in the middle of the Indian Ocean. Herpetofaunal records do exist for Diego Garcia, the Peros Banhos and Salomon atolls, and two islands in the Great Chagos Bank. However, the terrestrial herpetofauna has not previously been surveyed on Eagle Island of the Great Chagos Bank. At 243ha Eagle Island is the second largest island in the archipelago and significantly larger than most other islands, the majority of which are below 100ha in size.

Eagle Island was extensively surveyed over a ten week period, between February and April 2006, during the Chagos Ecological Restoration Project to eradicate the island's introduced population of black rats *Rattus rattus*, Linnaeus 1758 (Hillman 2006, Meier 2006). Limited time was also spent on Middle Brother and North Brother of the Great Chagos Bank and Diego Garcia. Like Eagle Island, terrestrial herpetofauna has not previously been recorded for North Brother. Five species were recorded during this project; the green turtle *Chelonia mydas*, Linnaeus 1758, the hawksbill turtle *Eretmochelys imbricata*, Linnaeus 1766, the common house gecko *Hemidactylus frenatus*, Schlegel 1836, the mourning gecko *Lepidodactylus lugubris*, Duméril & Bibron 1836 and the marine toad *Bufo marinus*, Linnaeus 1758.

## A history of observations

All five species observed throughout the duration of the project have been previously recorded within the Chagos Archipelago. Bourne (1886a,b) recorded the presence of the green turtle and hawksbill turtle, the Mauritian gecko *Platydactylus mauritanicus*, Linnaeus 1758 and the mud tortoise *Geoemyda trijuga thermalis*, Schweigger 1812. *Platydactylus mauritanicus* is the former name for the Moorish gecko *Tarentola mauritanica*, which is found throughout the Mediterranean region. Bourne (1886a) suggests that the gecko probably arrived from Mauritius, although it has never been recorded there (Cole 2005, Cheke & Hume 2008). Bourne was most likely referring to the common house gecko, which is the most abundant non-native lizard in Mauritius and at a glance, is somewhat similar to the Moorish gecko in being a small greyish scansorial lizard. The mud tortoise described as *G. t. thermalis*, is the former name of the Sri Lanka black turtle or Ceylon terrapin *Melanochelys trijuga thermalis*, which was thought to have been introduced to Diego Garcia (Boulenger 1889, Deraniyagala 1939). The African mud turtle *Pelusios subniger*, Lacépède 1788 was recorded on Diego Garcia in the Percey Sladen Trust expedition to the Indian Ocean in 1905 by Gardiner & Cooper (1907) who suggested that the species was introduced from either Zanzibar or Madagascar. Both turtle species were thought to have died out by the 1940s, although turtles were reported in the 1970s it is unknown whether it was one or both species (see Lever 2003). From the Percey Sladen Trust expedition Boulenger (1908) identified specimens of the common house gecko collected from Diego Garcia, the Peros Banhos and Salomon atolls and specimens of the mourning gecko collected from Diego Garcia.

More recent herpetological surveys have been conducted in the Chagos Archipelago, which include the 1978/79 Joint Services Chagos Research Expedition (Dutton 1981) and the 1996 Friends of the Chagos Expedition (Barnett & Emms 1998). Only two reptile species were recorded in the 1970s expedition; the common house gecko and the hawksbill turtle (Dutton 1981). The 1990s expedition recorded three terrestrial species; the common house gecko, the mourning gecko and the marine toad (Barnett & Emms 1998). The common house gecko was recorded on Ile Diamant, Ile du Coin, Ile Yeye, Moresby Island and Petite Soeur of the Peros Banhos atoll; Ile Anglais, Ile Boddam and Ile Poule of the Salomon atoll; Danger Island and Middle Brother of the Great Chagos Bank; and Diego Garcia. The mourning geckos were recorded on Ile Takamaka of the Salomon atoll; Ile du Coin of the Peros Banhos atoll; and Diego Garcia. Barnett & Emms (1998) also record the marine toad as being very common on Diego Garcia. Nests of the hawksbill turtle were recorded on all 11 islands of the Salomon atoll and 11 of the 17 islands searched of the Peros Banhos atoll (Dutton 1981). However, it is thought that Dutton may have confused green turtle tracks and nests for those of hawksbills as significant numbers of both species were found nesting in a survey of 67 islands throughout the archipelago (Mortimer & Day 1999).

Recent introductions to Diego Garcia include the marine toad and the brown tree snake *Boiga irregularis*, Merrem 1982; fortunately the snake has been prevented from establishing, but the marine toad is common on the island (Fritts 1993, Barnett & Emms 1998, Cheke 2008, *pers. obs.*). In 2006 there were unsubstantiated accounts of

the mutilating gecko *Gehyra mutilata*, Wiegmann 1836 and the agamid lizard *Calotes versicolor*, Daudin 1802 on Diego Garcia. These two reptiles were not seen during the 2006 project, but an agamid lizard was observed on the island near Simpson Point in March 2007 by Jenny Daltry, Chris Hillman and Guntram Meier during a follow-up expedition to the 2006 Chagos Ecological Restoration Project (C. Hillman *pers. comm.*).

### **Observations on Diego Garcia**

Searches on Diego Garcia were limited between the harbour and Simpson Point in north-western arm of the island between the 1<sup>st</sup> and 3<sup>rd</sup> Feb and on the 25<sup>th</sup> April 2006. Nevertheless, three species were found, the common house gecko, mourning gecko and marine toad. The common house gecko (snout to vent length [SVL] $\pm$ SD = 51.6 $\pm$ 4.0mm, mass $\pm$ SD = 2.9 $\pm$ 0.6g, N = 6) were the most frequently encountered species and were found in abundance on all buildings and coastal vegetation (predominantly the trunks of coconut palms *Cocos nucifera*, L., and branches of *Scaevola taccada*, Gaertner-Roxb.) at night, but could also be heard calling at all times day or night in most locations. The mourning gecko (SVL $\pm$ SD = 42.8 $\pm$ 2.1mm, mass $\pm$ SD = 1.6 $\pm$ 0.4g, N = 6) were occasionally found on buildings occupied by the common house gecko, but were most abundant on roadside telegraph poles in the absence of the common house gecko. Marine toads were also encountered after heavy rainfall along the road verge leading to Simpson Point from the airport.

### **Observations on Middle and North Brother**

Middle Brother and North Brother were both visited on the 7<sup>th</sup> Feb 2006, between 1000hrs and 1230hrs and 1400hrs and 1430hrs, respectively. To prevent disturbance to the nesting seabird colonies only the coastal perimeter was surveyed on Middle Brother and a 100m stretch of coast on North Brother. Three common house geckos (SVL $\pm$ SD = 49.1 $\pm$ 2.6mm, mass $\pm$ SD = 2.7 $\pm$ 0.4g, N = 3) and two eggs from the same species were found beneath loose bark of fallen coconut palms and *Tournefortia argentea*, L.f., on Middle Brother. Nothing was heard or seen on North Brother, despite suitable habitat. However, owing to the restricted amount of time spent and limited areas surveyed little can be said about the absence of geckos.

### **Observations on Eagle Island**

Searches were made over the entire island, whilst creating more than 80km of tracks to set and service bait stations on a daily basis by team members of the Chagos Ecological Restoration Project (Hillman 2006, Meier 2006). Numerous additional searches were made in the day and night across the island and around the coastline. Four species were encountered; the green turtle, hawksbill turtle, common house gecko and mourning gecko.

Adult house geckos (SVL $\pm$ SD = 50.7 $\pm$ 3.3mm, mass $\pm$ SD = 2.8 $\pm$ 0.6g, N = 11) were mostly encountered at night on the trunks of coconut palms and the trunks and branches of *Guettada speciosa*, L., *Hibiscus tiliaceus*, L., *Morinda citrifolia*, L., *S.*

*taccada* and *T. argentea* at almost all locations across the island. House gecko calls could also be heard at all locations on the island, but individuals were rarely seen in areas of closed canopy palm forest or wetland mangrove dominated by *Lumnitzera racemosa*, Willd. (see Hillman 2006). All house geckos observed in the closed canopy palm forest were high within the palm fronds. Sub-adult and juvenile individuals were most often seen amongst the herbaceous ground layer in relatively open areas. In contrast to the house gecko on Eagle Island the abundance and distribution of the mourning gecko was respectively lower and more restricted. Mourning geckos (SVL $\pm$ SD = 43.7 $\pm$ 1.8mm, mass $\pm$ SD = 1.9 $\pm$ 0.2g, N = 5) were frequently found close to and on the remains of buildings, on small boulders along the shoreline and also within the mangrove area on the western side of the island (see Hillman 2006). Mourning geckos were also encountered, albeit rarely, at other locations across the island on the trunks of *G. speciosa* and the fronds of coconut palms. Eggs of both gecko species were found in the areas where individuals were known to be present. Mourning geckos are ‘egg gluers’ attaching pairs of eggs directly to the substrate and often communally with several pairs of eggs glued at the same site. Mourning gecko eggs were mostly found within cavities of *L. racemosa* trunks and associated entanglements of *Cassytha filiformis*, L., above high-tide mark in the mangrove. Mourning gecko eggs were also found within crevices of coralline stone walls and upon palm fronds. House geckos deposit their eggs loosely in pairs within substrates and were mostly found behind loose bark, within litter collected at the base of palm fronds, and crevices and cavities within tree trunks.

All turtle observations, tracks and nests were recorded during daily walks along the coastline of Eagle Island by members of the Chagos Ecological Restoration Project. Twenty six individual turtle tracks were recorded along the sandy beach that ran clockwise from the northeast to the southeast coast of the island. The width of all tracks were measured and assigned by their size to either the green or hawksbill turtle (see Hillman 2006). After each track had been measured and the location recorded it was erased from the beach to prevent it being recorded again. Green turtles accounted for 23 of the tracks recorded and were mostly found along the narrow beach on the central east coast of the island (Hillman 2006). Green turtles were also the most common of the two species seen within the surrounding lagoon. Two of the tracks were made by hawksbill turtles, one of which was observed nesting early one morning on the northeast coast of the island (Hillman 2006). Of the two species seen within the lagoon, green turtles were the most common. These observations support the previous findings of Mortimer & Day (1999) that green turtle nest more frequently within the Great Chagos Bank area than hawksbill turtles.

### **Introductions of the terrestrial herpetofauna**

The terrestrial herpetofauna recorded over the past 120 years are known or at least thought to have been introduced by the early inhabitants. The marine toad is certainly a recent introduction that has established on Diego Garcia, arriving sometime in the 1980s (Lever 2003). The introduction of the cane toad, the agamid lizard and probable arrival mutilating gecko have most likely occurred accidentally or purposefully as a result of military activities and occupation of Diego Garcia (Cheke 2008). This is

known to be true at least for the brown tree snake. Both of the predominantly nocturnal gecko species are highly commensal with people and have been introduced to numerous locations outside of their natural range throughout the tropics and sub-tropics. However, there is some evidence to suggest that these two species may have arrived to the Chagos Archipelago naturally. The common house gecko is native throughout Asia and the Indo Pacific and has been introduced to at least nine locations within the Indian Ocean, although it is thought to be native to the Seychelles (Cheke 1984). The species is thought to have arrived from Sumatra by self dispersal, rafting on debris washed out to sea and carried by oceanic currents (Cheke 1984). If this is the case then the geckos are likely to have arrived in the Chagos by the same means, as the archipelago is positioned directly between Sumatra and the Seychelles. Likewise the mourning gecko, with a similar native distribution to the house gecko, is thought to have reached the island of Rodrigues within the Mascarenes by self dispersal across the Indian Ocean (EN. Arnold *pers. comm.*). The origins of the gecko species and how they arrived to the Chagos Archipelago remains unclear. Tail tips were collected from both gecko species from each population discovered on the islands. These samples have been deposited at the Natural History Museum (London) where subsequent genetic work may help toward determining the natural and unnatural spread and origin of these anthropogenic species throughout the Indian Ocean.

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