

Recent observations of reptiles in the Comoro islands (Western Indian Ocean)

MIGUEL A. CARRETERO¹, D. JAMES HARRIS and SARA ROCHA

Centro de Investigação em Biodiversidade e Recursos Genéticos (CIBIO/UP), Campus Agrário de Vairão, 4485-661 Vairão, Portugal. ¹E-mail: carretero@mail.icav.up.pt [corresponding author]

THE Comoro Islands constitute a volcanic archipelago, geologically recent (between 0.13 MY for Grand Comoro and 7.7 MY for Mayotte based on age of the oldest exposed lavas; Emerick & Duncan, 1982) located in the Mozambique Channel, approximately halfway between Madagascar and northern Mozambique (separated by 300 km from both; Fig. 1). As expected for similar insular systems, the reptile fauna is typically impoverished, unbalanced but rich in endemics. Some recently introduced species are also present. The lizard fauna is dominated by gekkonids and scincids but two chameleons, one agamid and one iguanid (= oplurid) are also present, whereas snakes are represented by two typhlopids and three colubrids (Meirte, 1992; Glaw & Vences, 1994; Henkel & Schmidt, 2000; Meirte, 2004). Regardless of all this published information, many doubts persist concerning some taxonomically complex groups or about the autochthonous status of some of the species.

Here we present the results of a three-week herpetological trip to this archipelago carried out in October – November 2003. A total of 61 localities from the four main islands of the archipelago were surveyed (Fig. 1, Table 1). Specimens were collected for morphological identification but just a minor part of them were kept as vouchers in the CIBIO collection (Vairão, Portugal). However, considering the complexity of the systematics and the degree of knowledge of the reptile fauna in this area we confirmed the morphological diagnoses using sequencing data from tissue samples. Details of the analytical methods, GeneBank accession numbers and phylogenetic conclusions are already available

elsewhere for the genera *Furcifer* (Rocha *et al.*, in press), *Hemidactylus* (Rocha *et al.*, 2005), *Phelsuma* (Rocha *et al.*, unpubl. data) and *Cryptoblepharus* (Rocha *et al.*, 2004).

Family Agamidae

Agama agama (Linnaeus 1758)

Localities and dates: Grande Comore 21a (18-19/10/2003), 21b (01-02/11/2003).

This large agamid is widespread in Sub-Saharan Africa occupying an impressive range between Senegal, Egypt, Angola and Tanzania. In eastern Africa, it is usually found lower than 1500 m in mesic habitats where rocks and trees are available and it is common in human settlements (Spawls *et al.*, 2001). Specimens collected on Grande Comore displayed the typical external features diagnostic for this species (Branch, 1998, Spawls *et al.*, 2001; Hallermann, pers. comm.) including distinct occipital scale, homogeneous dorsal scales, yellow-orange heads in males and green-speckled heads in females. Subadults and juveniles were greyish and with striped throats (Fig. 3).

About 40 specimens were observed at least eight different sites (21a and between 21a and 21b). Individuals were usually aggregated in colonies which included one or two adult males, several females, subadults and juveniles. All observations corresponded to urban habitats, namely walls, buildings (both inhabited and abandoned), stone piles, gardens and road edges. Most individuals, but especially adults, were observed climbing higher than 2 m. Adult males with brightly coloured heads usually displayed head-bobbing to the observer.

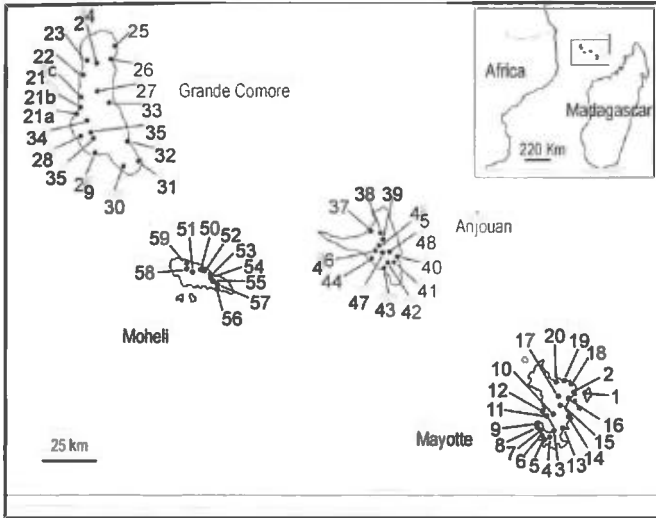
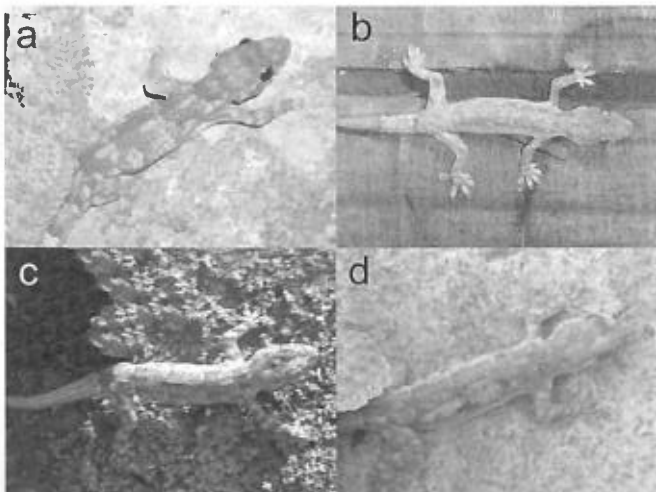


Figure 1. Location of the Comoros archipelago and sampling sites (for numbers see table 1).

We do not know if other similar populations exist in the Comoros but similar search effort expended in the same season in other urban, rural and undisturbed habitats of Grand Comoro as well as on the other big islands of the archipelago produced negative results. The distribution, restricted to a port city with intense trading relationships, traditional and present, with

Figure 2. *Hemidactylus* species from Comoro Islands. a: *H. brooki*, Moutsamoudou (Anjouan); b: *H. frenatus*, Bouéni (Mayotte); c: *H. mercatorius*, Moroni (Grande Comore); d: *H. platycephalus*, Bouéni (Mayotte).



mainland Africa, the lack of previous observations of this conspicuous lizard, the association with urban habitats and the poor distinction with respect to the continental forms support the hypothesis of a recent, human-mediated introduction of this species. Meirte (2004) indicates 1998 as the probable date for this introduction. A previous record from Reunion Island (Glaw, pers. comm. in EMBL, 2005) previously considered questionable, may be re-evaluated in light of this finding. We can only speculate on the possible effects of this introduction: no predation on local lizards is expected since diet is usually comprised chiefly of ants and termites (Spawls *et al.*, 2001) and competitive relationships with the ecologically similar *Oplurus cuvieri* are at present negligible since the latter is restricted to some cliffs on the N and NE coasts of the island (Meirte, 1992, 2004) about 25–30 km from Moroni.

Family Chamaeleonidae

The two Comorean chameleons, endemic to Grande Comore and Mayotte, respectively, belong to the genus *Furcifer*. They are, however, not closely related but derived from two independent colonisation events from Madagascar (Rocha *et al.*, in press).

Furcifer cephalolepis (Günther 1880)

Localities and dates: Grande Comore 24 (19/10/2003), 35 (31/10/2003).

This species, endemic to Grande Comore, was observed in the two nuclei of mountain in the island forest (La Grille and Karthala), far from human settlements.

Furcifer polleni (Peters 1874)

Localities and dates: Mayotte 12 (17/10/2003), 14 (17/10/2003), 17 (03/11/2003), 18 (04/11/2003), 20 (04/11/2003); Mayotte (Petit Terre) 1 (18/10/2003).

This chameleon is endemic to Mayotte where it occurs on both the main island and Petit Terre. It has also been reported as an



Figure 3. Subadult *Agama agama* from Moroni (Grande Comore). In the upper right corner, detail of throat.



Figure 5. Two of the Comorean forms of *Cryptoblepharus boutoni*. a: *C. b. mohelicus* Djoyézi, Moheli; b: *C. b. ater* north of Moroni, Grande Comore.

introduced species in Anjouan (Mierte, 2004). In contrast with its congener, observations were made not only in pristine forest but also in disturbed



Figure 4. The two species of *Mabuya* in the Comoros. a: *M. maculilabris*, Fomboni, Moheli; b: *M. striata*, Haiko, Anjouan.



Figure 6. *Typhlops comorensis*. Boboni, Grande Comore.

habitats such as plantations, agricultural plots and urban gardens. In one case (locality 14), an adult male and female were found near a stream.

Family Gekkonidae

Geckos constitute the bulk of the reptile diversity of the Comores with both introduced and endemic species.

Ebenavia inunguis Boettger 1878

Localities and dates: Grande Comore 35 (27/10/2003).

This species is found on all four islands as well as in Madagascar and the Mascarenes (Henkel & Schmidt, 2000). Our only observation was made in an area of montane forest on Mount Karthala. The specimen was found on a *Pandanus* plant.

Geckolepis maculata Peters 1880

Localities and dates: Grande Comore 29 (27/10/2003).

This species, recognisable by the large semicircular scales that are easily shed when touched, is found in Madagascar and in the Comoros (Glaw & Vences, 1994). One individual was observed climbing the base of a big tree in an area of humid forest.

Genus *Hemidactylus*

These nocturnal or crepuscular geckos are abundant throughout the archipelago where they can be sighted on any kind of vertical surface, either natural or artificial. Although just two species, *H. frenatus* and *H. mabouia* are reported by Meirte (2004), in fact, recent studies involving morphometrics and molecular analysis (Vences *et al.*

Figure 7. Communal clutch of *Hemidactylus platycephalus*, Chiroungoui (Mayotte).



et al., 2004, Rocha *et al.*, 2005) indicate that four species are present (Fig. 2). The biogeographic relationships between the different populations of these species are obscured by their proven abilities for natural overseas dispersal as well as the association with humans involving repeated introductions (Vences *et al.*, 2004, Rocha *et al.*, 2005).

Hemidactylus brookii Gray 1845

Localities and dates: Anjouan 37 (16/10/2004), 40 (27/10/2004).

This species ranges across Central Africa from the Gulf of Guinea to the eastern coast, the Indian Subcontinent and SE Asia, as well as scattered populations in the Caribbean (EMBL, 2005). In the western Indian Ocean, it is only found in the Mascarenes and the Comoros (Vences *et al.*, 2004). Genetic analysis indicated mtDNA haplotypes close to those from Mascarenes and Sri Lanka, together with the low levels of variation suggests recent colonisation (Rocha *et al.*, 2005).

The two observations in this study were from a population found in an urban context and a juvenile in a plantation by the coast. The first one was in syntopy with *H. platycephalus*.

Hemidactylus frenatus Duméril & Bibron 1836

Localities and dates: Mayotte 7 (16/10/2004); Grande Comore 21a (18/10/2004), 25 (19/10/2004); Moheli 50 (26/10/2004).

This species is found worldwide in tropical and subtropical regions in the Pacific, Australia, SE Asia, Indian Peninsula, the eastern Africa coast and in isolated introduced populations in the Caribbean (EMBL, 2005). In the western Indian Ocean, it can be found in the Seychelles, the Mascarenes, Madagascar and the Comoros (Vences *et al.*, 2004). The individuals analysed shared mtDNA haplotypes with Malagasy populations or were closely related ones with them, again pointing to introduction (Rocha *et al.*, 2005).

Observations were made in an isolated building in a coastal forest on Mayotte and urban buildings on Moheli where it was in syntopy, but not in syntopy, with the larger and more strongly tubercular *H. platycephalus*.

No.	Locality	Island	Coordinates	Habitat
1	Dzaouzi, airport road	Mayotte (Petit Terre)	12° 46' 60S, 45° 16' 60E	disperse urban, plantations
2	Mamoutzu	Mayotte	12° 46' 46S, 45° 13' 38E	urban
3	Chirongui	Mayotte	12° 55' 55S, 45° 8' 54E	isolate building, forest
4	road Chirongui-Kani-Kéli	Mayotte	12° 57' 34S, 45° 7' 28E	isolate buildings, forest
5	Kani-Kéli	Mayotte	12° 57' 13S, 45° 6' 12E	isolate building, forest
6	M'zouazia	Mayotte	12° 55' 32S, 45° 6' 4E	forest and plantations
7	Bouéni (road to)	Mayotte	12° 54' 9S, 45° 4' 34E	coastal forest
8	Bambo Ouest	Mayotte	12° 55' 19S, 45° 5' 14E	beach and palms
9	M'boucanatsa	Mayotte	12° 56' 30S, 45° 5' 59E	beach and palms
10	Ouangani	Mayotte	12° 50' 47S, 45° 8' 10E	buildings, forest
11	Mangajou	Mayotte	12° 50' 30S, 45° 6' 50E	forest
12	Sada	Mayotte	12° 50' 53S, 45° 5' 51E	plantations
13	Bambo Est	Mayotte	12° 55' 34S, 45° 10' 26E	beach and palms
14	Bandrélé	Mayotte	12° 54' 24S, 45° 11' 29E	coastal forest
15	Koualé	Mayotte	12° 47' 43S, 45° 9' 51E	riverine forest, plantations
16	Passamenti	Mayotte	12° 47' 56S, 45° 12' 37E	coastal forest
17	Vahibé	Mayotte	12° 46' 55S, 45° 10' 14E	forest
18	Majikavo	Mayotte	12° 44' 59S, 45° 13' 43E	coastal forest
19	Trévani	Mayotte	12° 43' 51S, 45° 11' 46E	coastal forest
20	Longoni	Mayotte	12° 43' 54S, 45° 9' 40E	coastal forest
21a	Moroni	Grande Comore	11° 42' 15S, 43° 14' 25E	urban
21b	Itzandra	Grande Comore	11° 40' 16S, 43° 15' 17E	urban
21c	Gouni (Sandini)	Grande Comore	11° 39' 13S, 43° 15' 24E	rocky coast
22	N of Moroni airport	Grande Comore	11° 31' 1S, 43° 16' 40E	volcanic scrublands
23	Mouadja	Grande Comore	11° 28' 5S, 43° 17' 13E	plantations
24	Foret de La Grille	Grande Comore	11° 28' 40S, 43° 19' 5E	mountain forest
25	Hantsindzi	Grande Comore	11° 25' 45S, 43° 24' 8E	banana plantations
26	Itzandzéni	Grande Comore	11° 28' 22S, 43° 23' 4E	plantations
27	Itsoundzou	Grande Comore	11° 37' 23S, 43° 20' 24E	grasslands
28	Mouanzaza Ambouani	Grande Comore	11° 46' 16S, 43° 13' 59E	urban, plantations
29	Mbamani	Grande Comore	11° 50' 59S, 43° 19' 52E	forest
30	Ifoundihé Chambouani	Grande Comore	11° 54' 1S, 43° 24' 44E	forest, plantations
31	Foumbouni	Grande Comore	11° 51' 42S, 43° 29' 3E	urban, plantations
32	Bandanadzi	Grande Comore	11° 47' 4S, 43° 26' 40E	plantations
33	Koimbani	Grande Comore	11° 37' 23S, 43° 21' 24E	urban, plantations
34	Mvouni	Grande Comore	11° 42' 58S, 43° 15' 53E	forest, plantations
35	Belvedere	Grande Comore	11° 43' 38S, 43° 16' 29E	isolated building, forest
36	Boboni	Grande Comore	11° 45' 9S, 43° 16' 49E	mountain forest
37	Moutsamoudou	Anjouan	12° 9' 46S, 44° 23' 47E	urban
38	Bazimini	Anjouan	12° 0' 45S, 44° 26' 56E	plantations, m. forest
39	Chandra	Anjouan	12° 1' 42S, 44° 27' 53E	riverine forest
40	Mbouéladoungou	Anjouan	12° 16' 28S, 44° 31' 35E	beach, plantations
41	Adda-Douéni	Anjouan	12° 17' 33S, 44° 29' 50E	urban, plantations
42	Foret de Moya	Anjouan	12° 18' 24S, 44° 27' 42E	forest
43	Moya	Anjouan	12° 18' 24S, 44° 26' 16E	rocky coast, plantations
44	Pomoni	Anjouan	12° 16' 48S, 44° 24' 32E	urban, plantations
45	Dindi	Anjouan	12° 12' 36S, 44° 27' 9E	plantations
46	Mchakojou	Anjouan	12° 13' 45S, 44° 26' 6E	plantations, m. forest
47	Haiko	Anjouan	12° 4' 32S, 44° 25' 11E	grasslands, plantations
48	Koni-Djodjo	Anjouan	12° 13' 47S, 44° 28' 54E	urban, plantations
49	Houngouni	Anjouan	12° 2' 57S, 44° 29' 13E	scrublands, plantations
50	Fomboni	Moheli	12° 16' 48S, 43° 44' 33E	urban
51	Badjo	Moheli	12° 17' 31S, 43° 41' 52E	mountain forest, plantations
52	Fomboni "harbour"	Moheli	12° 16' 48S, 43° 44' 41E	rocky coast
53	Djoyézi	Moheli	12° 17' 51S, 43° 46' 24E	rocky coast
54	Gnombéni	Moheli	12° 18' 2S, 43° 46' 41E	plantations
55	Ouhoni	Moheli	12° 19' 11S, 43° 47' 39E	forest
56	Sambia	Moheli	12° 22' 1S, 43° 47' 46E	coastal forest, beach
57	Ouanani	Moheli	12° 20' 15S, 43° 47' 51E	palms
58	Mbouerani	Moheli	12° 16' 46S, 43° 41' 3E	mountain forest
59	Mbatsé	Moheli	12° 15' 34S, 43° 41' 52E	plantations

Table 1. Samplings sites in the Comoro islands.

Hemidactylus mercatorius Gray 1842

Localities and dates: Mayotte 2 (15/10/2004), 7 (16/10/2004), 12 (17/10/2004), 13 (17/10/2004), 3 (18/10/2004); Mayotte (Petit Terre) 1 (18/10/2004); Grande Comore 21a (10/18/2004).

This gecko ranges across the eastern African coast, Seychelles, Mascarenes, Madagascar and the Comoros. The relationships of this taxon with *H. mabouia* (Moreau de Jonnès, 1818), distributed through sub-Saharan Africa, South America and the Caribbean, are complex (Vences *et al.*, 2004, Rocha *et al.*, 2005) and further genetic research is needed to clarify the status of both forms. This is also true for the Comoro Islands, since available mtDNA analysis indicates high genetic diversity in Mayotte where most samples are clearly related to N Madagascar but also to the Gulf of Guinea (theoretically, *H. mabouia*). However, one sample from Mayotte (locality 2) and the one from Grande Comore belong to a Central Madagascar clade (Rocha *et al.*, 2005), indicating that occasional introductions from Madagascar may in fact occur.

This species seems to be more abundant in Mayotte than in the rest of the Archipelago. Most observations were associated with urban habitats but also with isolated buildings in more natural habitats. Sympatry with *H. platycephalus* and *H. frenatus* has been detected.

Hemidactylus platycephalus Peters 1854

Localities and dates: Mayotte 3 (16/10/2004), 5 (16/10/2004), 7 (16/10/2004), 8 (16/10/2004), 9 (16/10/2004), 12 (17/10/2004), 18 (04/11/2004); Grande Comore 21a (18/10/2004), 25 (19/10/2004), 27 (19/10/2004), 28 (19/10/2004), 30 (20/10/2004), 31 (20/10/2004), 33 (20/10/2004), 34 (20/10/2004), 36 (31/10/2004); Anjouan 37 (22/10/2004), 44 (23/10/2004); Moheli 50 (26–28/10/2004).

This species ranges across eastern Africa, northern Madagascar and the Comoros, where it is clearly the most abundant member of its genus (Vences *et al.*, 2004; Rocha *et al.*, 2005). Identical mtDNA haplotypes in the samples analysed from all islands indicate the recent arrival of this species in the archipelago (Rocha *et al.*, 2005).

This gecko can be found in buildings and very disturbed habitats but also in well-conserved, humid forests where it usually climbs the trunks of big trees. In the most anthropogenically effected areas, it can be observed in sympatry with any of the other *Hemidactylus*. Communal clutches, assigned to this species through genetic analysis (locality 3, Rocha *et al.*, 2005), were found under stones surrounded by forest (Fig. 7). It can be easily recognised in the field because it is the member of the genus in the Comoros displaying regional integumentary loss (Carretero *et al.*, in press).

Paroedura santijohannis (Günther 1879)

Localities and dates: Mayotte 4 (16/10/2003), 6 (16/10/2003).

This species, restricted to the Comoros, constitutes the only member of its genus occurring out of Madagascar (Glaw & Vences, 1994). The two observations correspond to forest habitats and confirm the presence of the species on this island, previously reported by Vaillant (1887).

Genus *Phelsuma*

This genus of arboreal, diurnal geckos has mainly diversified in Madagascar (21 species, 16 of them endemic, Glaw & Vences, 1994) but some representatives reach different islands of the Indian Ocean including the Mascarenes, the Seychelles, Zanzibar, Pemba, the Andamans and, of course, the Comoros where several endemics are found together with more widespread species (Henkel & Schmidt, 2000, Mierte, 2004). Of the seven members of this genus previously reported, six were detected in this study. A seventh species, *P. nigristriata* endemic to Mayotte, was not detected.

Phelsuma comorensis (Boettger 1913)

Localities and dates: Grande Comore 24 (19/10/2003).

This species, endemic to Grande Comore, can be found in mountane forest habitats of the north of the island (La Grille).

Phelsuma dubia (Boettger 1881)

Localities and dates: Grande Comore 21a

(18/10/2003), 27 (19/10/2003), 28 (20/10/2003), 31 (20/10/2003), 33 (20/10/2003), 34 (20/10/2003), 35 (31/10/2003); Anjouan 37 (25/10/2003); Moheli 50 (26-28/10/2003), 58 (29/10/2003), 59 (29/10/2003).

This day gecko occurs in Madagascar, the east African coast (Tanzania, Kenya, Mozambique), Zanzibar and the Comoros. Genetic variation within Comoros and between Comoros and Zanzibar is minimal suggesting recent colonisation, probably from Madagascar (Rocha *et al.*, unpubl. data).

This species was observed in urban habitats, banana and palm plantations and even in rain forest clearings. A juvenile was collected in Mayotte (locality 2). It can be found in syntopy with *Phelsuma v-nigra comoraegrandensis* on Grande Comore.

Phelsuma laticauda (Boettger 1880)

Localities and dates: Mayotte 2 (15/10/2003), 3 (16/10/2003), 10 (17/10/2003), 12 (17/10/2003), 16 (03/11/2003), 20 (04/11/2003); Mayotte (Petit Terre) 1 (05/11/2003); Anjouan 37 (22-25/10/2003); 38 (23/10/2003).

This large species is found in northern Madagascar, the Comoros and the Seychelles, and one population has been reported from Hawaii. Null haplotype variation in mtDNA of Comoran samples confirms the introduced status proposed for this species (Rocha *et al.*, unpubl. data).

Many observations correspond to urban habitats but it also occupies plantations and open forest. It has been observed in syntopy with *P. robertmertensi* on Mayotte.

Phelsuma pasteuri (Meier 1984)

Localities and dates: Mayotte 15 (17/10/2003).

Originally described as a subspecies of *Phelsuma v-nigra* this Mayotte endemic is now considered a full species on the basis of morphology (lack of mental "V", Mierter, 2004) and genetics (Rocha *et al.*, unpubl. data). Instead, its phylogenetic affinities are with *P. robertmertensi*. The only locality in which it was found corresponds to a inland area of forest and plantations.

Phelsuma robertmertensi Meier 1980

Localities and dates: Mayotte 6 (16/10/2003), 16 (03/11/2003), 20 (04/11/2003).

Endemic to Mayotte, this species is related to *P. pasteuri* (Rocha *et al.*, unpubl. data). It has been found in forested coastal localities. A blue specimen was observed at locality 20.

Phelsuma v-nigra Boettger 1913

Localities and dates: Grande Comore 21a (18/10/2003), 26 (19/10/2003), 32 (20/10/2003), 33 (20/10/2003), 34 (20/10/2003), 35 (31/10/2003); Anjouan 42 (23/10/2003), 49 (24/10/2003); Moheli 51 (26/10/2003), 54 (27/10/2003), 57 (27/10/2003).

This species, endemic to the Comoros, is divided into three subspecies; *P. v. comoraegrandensis* Meier 1986 on Grande Comore, *P. v. anjouanensis* Meier 1986 on Anjouan and *P. v. v-nigra* Boettger 1913 on Moheli (Mierter, 2004). Our genetic analysis (Rocha *et al.*, unpubl. data) confirms that these three forms are related but not to the form *pasteuri* from Mayotte, which corresponds to a different species.

Most *P. v-nigra* were observed in association with forest sometimes opened by plantations. In such cases (for instance in Grande Comore), they can be in sympatry with the more opportunistic *P. dubia*.

Family Scincidae

Amphiglossus johannae (Günther 1880)

Localities and dates: Anjouan 46 (24/10/2003).

This Comorean endemic inhabits all four islands of the archipelago but it was recorded only on Anjouan for this study. Recently, Whiting *et al.* (2004) and Schmitz *et al.* (2005), using several molecular markers, have demonstrated that *Amphiglossus* is paraphyletic and that the morphological features used for diagnostic (number of presacral vertebrae) are not definitive, this name being restricted to one of the species clades but, unfortunately, *A. johannae* has still to be analysed (see also Andreone & Greer, 2002). One individual of this fossorial species was found under a stone in a mountain area, recently deforested.

Cryptoblepharus boutonii (des Jardins 1831)

Localities and dates: Mayotte 2 (01/11/2003); Grande Comore 21a (21/10/2003), 21c (02/11/2003); Anjouan 37 (23–25/10/2003), 43 (25/10/2003); Moheli 52 (27/10/2003), 53 (19–27/10/2003).

The genus *Cryptoblepharus* occupies two separated ranges in the western Indian Ocean and in Australia and Pacific Ocean. Traditionally, only one species, *C. boutonii*, has been recognized with as many as 36 subspecies, most restricted to single island, based on colour pattern and minor scalation differences (Mertens, 1931; Brygoo, 1986). In the Comoros, the forms found are: *C. b. mayottensis* Mertens 1928 (four clear stripes) on Mayotte, *C. b. ater* Boettger 1913 (melanistic, Fig. 5) on Grande Comore, *C. b. degrigjsi* Mertens 1928 (five clear stripes, blue tail) on Anjouan and *C. b. mohelicus* Mertens 1928 (two clear stripes, blue tail, Fig. 5) on Moheli. The systematics of this group are complex and some of the forms may deserve full specific status whereas others may be just ecotypes. The genetic analysis of Comorean specimens together with others from the Indian Ocean (Rocha *et al.*, 2004) indicates relatively low variation supporting present subspecific arrangement. Phylogeographic structuring of the populations with consistent interinsular differentiation suggests natural colonisation and two independent groups: Mayotte and Anjouan, related to NW Madagascar and Moheli and Grande Comore whose external relations are unknown (Rocha *et al.*, 2004).

These littoral skinks are restricted to the rocky coasts with low, gradual slope where they are found in high densities feeding on invertebrates and small fish in the intertidal zone. This unusual way of life in a lizard, with all the physiological adaptations involved, make them good candidates for natural overwater dispersal.

Mabuya maculilabris (Gray 1845)

Localities and dates: Mayotte 3 (16/10/2003), 5 (16/10/2003), 6 (16/10/2003), 7 (16/10/2003), 10 (17/10/2003), 11 (17/10/2003), 12 (17/10/2003), 13 (17/10/2003), 14 (17/10/2003), 16 (03/11/2003), 18 (04/11/2003), 19 (04/11/2003);

Mayotte (Petit Terre) 1(18/10/2003); Grande Comore 21a (18/10/2003), 21b (02/11/2003), 21b (02/11/2003), 22 (19/10/2003), 25 (19/10/2003), 26 (19/10/2003), 28 (20/10/2003), 29 (20/10/2003), 32 (20/10/2003); Anjouan 37 (23/10/2003), 38 (23/10/2003), 39 (23/10/2003), 40 (23/10/2003), 41 (23/10/2003), 42 (23/10/2003), 44 (23/10/2003), 45 (23/10/2003), 46 (24/10/2003), 47 (24/10/2003), 48 (24/10/2003); Moheli. 50 (26–28/10/2003), 51 (26/10/2003), 54 (27/10/2003), 56 (27/10/2003), 57 (27/10/2003), 58 (29/10/2003), 59 (27/10/2003).

Although, the *Mabuya* species of Comores has been often referred as *Mabuya comorensis* (Peters 1854), in fact, this form is genetically identical to *M. maculilabris causerinae* Broadley 1974. from Mozambique using sequence data (Jesus *et al.*, 2005). The problematic *M. maculilabris*, occupying an enormous range across tropical Africa, probably constitutes a species complex (Jesus *et al.*, 2005). If eventually it has to be split in several taxa, *casuarinae* would take precedence over *comorensis* for designating the Comorean form which, however, would not be restricted to this archipelago but is also present in the eastern African coast.

This lizard (Fig. 4) was, without any doubt the most abundant and ubiquitous, in the archipelago. Populations were abundant in urban and heavily degraded habitats but also in plantations alternating with cleared forest. However, they were very scarce in intact forest. Specimens living in more covered, humid sites tended to be smaller, darker and more striped.

Mabuya striata (Peters 1844)

Localities and dates: Anjouan 47 (24/10/2003).

The status of this species, widespread in south and east Africa, has usually been considered doubtful in the Comoros and even erroneous (Mierte, 2004). Two individuals were observed in a severely deforested mountane area where agricultural land and grassland had replaced forest. *Mabuya maculilabris* was also present in strict syntopy. This observation definitively confirms the presence of this species in the archipelago.

Family Typhlopidae

Ramphotylops braminus (Daudin 1803)

Localities and dates: Mayotte 10 (17/10/2003); Moheli 50 (28/10/2003).

This parthenogenetic, fossorial snake is widely distributed in the tropics and on many islands of Indian and Pacific Oceans as well as the Caribbean. It has recently reported for the Gulf of Guinea (Jesus *et al.*, 2003). Both localities in the Comoros are associated with highly modified urban habitats. On Mayotte, two adult specimens were found in a village near a small stream under the same stone. On Moheli, two individuals were found separately in urban gardens.

Typhlops comorensis Boulenger 1889

Localities and dates: Grande Comore 36 (31/10/2003).

The only previous citation of this species corresponds to the description of Boulenger (1889) based on a single specimen from British Museum collection labelled as 'Comoro Island' which has been considered doubtful (Mierite, 2004). This new citation (Fig. 6) confirms the existence of an endemic *Typhlops* in the archipelago. The observation was made at an abandoned human settlement in the mountain forest of Mount Karthala.

ACKNOWLEDGEMENTS

This study was supported by project POCTI/BSE/46647/2002 (to DJH and MAC) and grants SFRH/BPD/3596/2000 (to MAC) and SFRH/BPD/5702/2001 (to DJH), all from Fundação para a Ciência e Tecnologia (Portugal). Thanks are due to Jakob Hallermann for morphologically confirming the identification of *Agama agama* and to Aaron Bauer for providing useful literature and valuable comments on an earlier draft of the manuscript. MAC deeply thanks Msr. Alix from the French Embassy in the Comoros and especially Enzo Pier Scian for surviving support.

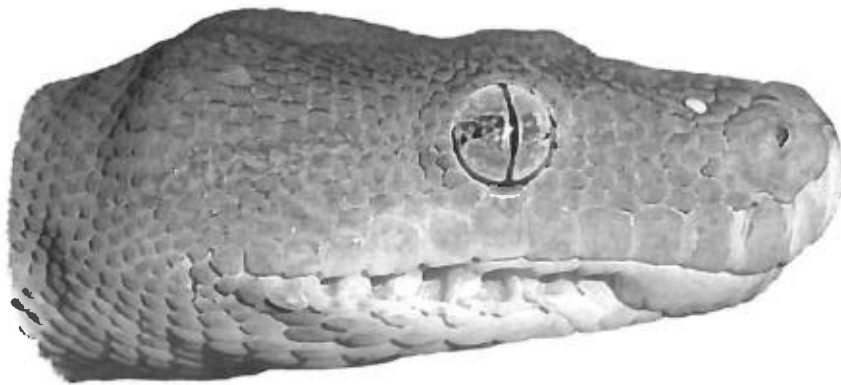
REFERENCES

Andreone, F. & Greer, A. E. (2002). Malagasy scincid lizards: description of nine new species, with notes on the morphology, reproduction and

taxonomy of some previously described species (Reptilia, Squamata: Scincidae). *J. Zool. Lond.*, **258**, 139–181.

- Boulenger, G.A. (1889). Descriptions of new Typhlopidae in the British Museum. *Ann. Mag. nat. Hist.*, **6**: 4: 360–363.
- Branch, B. (1998). *Field Guide to the Snakes and Other Reptiles of Southern Africa*. London: New Holland.
- Brygoo, E. R. 1986. Systématique des Lézards Scincidés de la région malgache XVIII. Les *Cryptoblepharus*. *Bull. Mus. natn. Hist. nat. Paris* **4**(8), 843–890.
- Carretero, M. A., Harris, D. J. & Rocha, S. in press. *Hemidactylus platycephalus* (Flat-headed Tropical House Gecko). Regional integumentary loss. *Herpetological review*.
- EMBL Reptile Database (2005). The EMB Reptile Database. January 2005 update. <http://www.embl-heidelberg.de/~uetz/LivingReptiles.html>
- Emerick, C. M. & Duncan, R. A. (1982). Age progressive volcanism in the Comores Archipelago, western Indian Ocean and implications for Somali plate tectonics. *Earth Planet. Sci. Lett.* **60**, 415–428.
- Glaw, F. & Vences, M. (1994). *A Fieldguide to the Amphibians and Reptiles of Madagascar*. Vences & Glaw Verlag, Köln.
- Henkel, F. W. & Schmidt, W. (2000). *Amphibians and Reptiles of Madagascar and the Mascarene, Seychelles and Comoro Islands*. Krieger, Malabar, Florida.
- Jesus, J., Brehm, A. & Harris, D. J. (2003). The herpetofauna of Annobon island, Gulf of Guinea, West Africa. *Herpetol. Bull.* **86**, 20–22.
- Jesus, J., Brehm, A. & Harris, D. J. (2005). Relationships of scincid lizards (*Mabuya* spp.) from the islands of the Gulf of Guinea based on mtDNA sequence data. *Amphibia-Reptilia* (in press).
- Meirite, D. (1992). Occurrence of *Oplurus cuvieri* (Reptilia, Iguanidae) on Grand Comoro, Indian Ocean. *Brit. Herpetol. Soc. Bull.* **39**, 3–4.
- Meirite, D. (2004). Reptiles. In *La faune terrestre de l'archipel des Comores* pp. 199–120. Louette, M. & Meirite, D. & Jocqué, R. (Eds.). Studies in Afrotropical Zoology, n° 293. Tervuren, MRAC, Tervuren.

- Mertens R. (1931). *Ablepharus boutonii* (Des Jardins) und seine geographische variation. *Zool. Jahrb. Syst.* 6, 63–210.
- Rocha, S., Carretero, M. A. & Harris, D. J. (2005). Diversity and phylogenetic relationships of *Hemidactylus* geckos from the Comoro islands. *Mol. Phyl. Evol.* 35, 292–299.
- Rocha, S., Carretero, M. A. & Harris, D. J. (in press). Mitochondrial DNA sequence data suggests two independent colonizations of the Comoros islands by *Furcifer* genus (Chamaeleonidae). *Bel. J. Zool.*
- Rocha, S., Vences, M., Glaw, F., Carretero, M. A. & Harris, D. J. (2004). Estruturação genética do género *Cryptoblepharus* nas ilhas Comores e Madagáscar. VIII Congreso Luso-Español, XII Congreso Español de Herpetología. Málaga (Spain).
- Schimitz, A., Brandley, M. C., Mausfeld, P., Vences, M., Glaw, F., Nussbaum, R. A. & Reeder, T. W. (2005). Opening the black box: phylogenetics and morphological evolution of the Malagasy fossorial lizards of the subfamily "Scincinae". *Mol. Phyl. Evol.* 34, 118–133.
- Spawls S. & Howell, K. & Drewes, R. & Ashe, J. (2001). *A field guide to the reptiles of Eastern Africa*. Academic Press, London.
- Vaillant, L. (1887). Materiaux pour servir a l'histoire herpétologique des Iles Comores. *Bull. Soc. Phil. Paris*, 131–136.
- Vences, M., Wanke, S., Vieites, D. R., Branch, W. R., Glaw, F., & Meyer, A. (2004). Natural colonization or introduction? Phylogeographical relationships and morphological differentiation of house geckos (*Hemidactylus*) from Madagascar. *Biol. J. Linn. Soc.* 83, 115–130.
- Whiting, A. S., Sites, J. W. jr. & Bauer, A. M. 2004. Molecular phylogenetics of Malagasy skinks (Squamata: Scincidae). *Afr. J. Herpetol.* 53(2), 135–146.



Morelia viridis (Aru Islands). Illustration by Will Brown, produced from original photograph enhanced and manipulated using digital imaging software.
www.blueridgebiological.com