

using the risky strategy of drinking over the open sea and this observation in *P. giganteus* may have been misinterpreted. Deliberate salt-water immersion does not appear to have been reported from other bats, although it may easily be confused with drinking and it could be a useful parasite removal strategy for other island fruit bat species.

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## NOTES

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### Observations on some reptiles in Seychelles

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The lizard fauna of Seychelles plays important roles in food webs as predators of invertebrates, as consumers of the eggs of seabirds and the fish and other prey that they drop in flight and from their nests (Brook & Houston 1983) and carrion (Gerlach 1999), and as the prey of birds such as the Seychelles kestrel (*Falco araea*) and the Madagascar coucal (*Centropus toulou insularis*) and even the hunting spider *Rhitymna valida* (Blackwall, 1877) (Ineich & Ineich 1993; Matyot 2001). In spite of several studies (Cheke 1984), many gaps remain in our knowledge of the distribution, biology and ecology of all species. The following observations were made incidentally during research on lizard-insect interactions.

#### 1. *Hemidactylus frenatus* Duméril & Bibron, 1836 (Order Squamata: Family Gekkoniidae)

I previously reported the presence of the “wandering gecko”, *Hemidactylus mercatorius* Gray, 1842 on Mahé island (Matyot 2001). We now know that the “barking gecko”, *H. frenatus*, previously known only from the outer, coralline, islands, is present on both Mahé and Praslin. During the period January 1999-June 2003 a call typical of this species, a “multiple chirp call, a gack-gack-gack suggestive of the barking of a small dog” (Marcellini 1974) was heard on many occasions in the vicinity of houses at Hangard Street, La Rosière and Hermitage and inside the radio station of the Seychelles Broadcasting Corporation (SBC) at Union Vale (all localities near Victoria on Mahé) and at the airport at Amitié on Praslin (at the latter heard in July 2002). A gecko that was uttering such a call was noticed twice, in the evening, near a wall light inside a house at La Rosière and several times, during the day, near a ceiling light that had been switched on inside the production office of SBC AM Radio at Union Vale (probably one individual demonstrating site fidelity). In the majority of cases it was not possible to identify the species with certainty because the animal retired into a crevice at the slightest attempt to approach it, but during the second sighting at La Rosière and once at SBC Radio I was able to make out small tubercles on the uniformly coloured back and spinose scales along each side of the tail as well as extremely reduced first (inner)

toes, all distinguishing features of *H. frenatus*. Subsequently, I re-examined a photograph taken at SBC Radio in March 1997 of a gecko caught by a hunting spider (*Rhitymna valida* (Blackwall, 1877)) and that appeared in the Seychelles Nation (Anon 1997; Matyot 2001). The reduced first toes and spiky outline to the tail typical of *H. frenatus* are clearly visible.

*H. frenatus* is one of the “edificarian” geckos (Howard *et al.* 2001), i.e. associated with buildings and other man-made structures. Believed to be native to Asia and the Indo-Pacific (Buden 2000), it is considered at present to be circumtropical in distribution (Ota 1989). In Seychelles, it was previously known only from islands in the Amirantes group and on Bird island and Platte (Cheke 1984). *H. frenatus* is the most common of the three species of anthropophilous geckos from Asia and the Pacific that are accidentally imported into New Zealand (Gill *et al.* 2001). Sperm storage for at least 36 weeks in females and the ability of inseminated females to produce an average of seven viable clutches of two eggs each while isolated from males (Murphy-Walker & Haley 1996) as well as aggressive behaviour towards other species (Ota 1989; Wells 2002) and omnivorous/opportunistic eating habits (Gupta 1998) are among the factors that explain its establishment success as a coloniser. In Australia and elsewhere, it has been shown to be responsible for the competitive displacement of other lizards (Wells 2002; S. Richards, pers. comm.), and research is under way in Mauritius to investigate its impact on native geckos (Cole 2002). It is not strictly nocturnal in Mauritius, with significant activity throughout the day, and frequently comes into contact with diurnal geckoes; moreover, parasites that are found on *H. frenatus* are infecting the native *Phelsuma ornata* Gray, 1825 with possible detrimental effects (N. Cole, pers. comm.).

In June 2002 I confirmed the presence of *H. frenatus* on D’Arros island in the Amirantes. Two or three individuals were seen at a time on walls near lights at night, both inside and outside buildings. One was caught and examined for positive identification, and was found to have large numbers of red mites clinging to its toes.

There are three possible scenarios to explain the newly-discovered presence of *H. frenatus* on Mahé and Praslin: (1) it may have been there for some time at a very low population level and is only now beginning to increase in numbers; (2) it may have been brought in accidentally from the outer islands as a result of increasing shipping and air traffic; or (3) it may have been accidentally imported recently from a locality outside Seychelles.

## 2. *Hemidactylus mercatorius* Gray, 1842 (Order Squamata: Family Gekkonidae)

The occurrence of this species on Cosmoledo atoll has been reported previously (Bayne *et al.* 1970), but its presence on individual islands there, apart from Menai, was not clearly established. In November 2002, during an expedition to Cosmoledo organised by the Island Conservation Society (ICS) and the CORDIO (Coral Reef Degradation in the Indian Ocean) survey group, I found *H. mercatorius* to be present on Menai, Ile du Nord, Ile du Sud-Ouest, Grande Ile and Grand Polyte. On Menai and Grande Ile it was observed on the walls of the disused settlement buildings at night, but it was also found in hollow, rotting branches, including those of *Tournefortia argentea* (“bwa taba” in Creole), on all the above-mentioned islands. Eggs, presumably of this species, were also present in some hollow branches.

## 3. *Phelsuma sundbergi longinsulae* Rendahl, 1939 (Order Squamata : Family Gekkonidae)

Earlier authors treated the green gecko found on Menai in the Cosmoledo group as *Phelsuma abbotti menaiensis* (Bayne *et al.* 1970). Cheke (1982) considered it to be *P.*

*longinsulae menaiensis*. According to Gardner (1987), it is *P. sundbergi longinsulae*. During the ICS-CORDIO expedition mentioned above I found this lizard to be common in the vicinity of the abandoned settlement on Menai. It was often observed during the day on introduced plants, including on the trunks of *Moringa oleifera* and the inflorescence stalks of the invasive *Agave sisalana*. The species was not observed on the other islands of the Cosmoledo group that were visited.

4. *Zonosaurus madagascariensis insulanus* Brygoo, 1985 (Order Squamata: Family Cordylidae)

This sub-species of plated lizard was described from specimens collected in the Glorieuses islands and on Cosmoledo. To collate the available information in a readily accessible form, the provenance of the eight specimens known to Brygoo (1985), six from the Glorieuses and two from Cosmoledo, is summarised in Table 1.

Since a specimen was collected by Vesey-Fitzgerald in 1937, there was no recorded sighting of *Z. m. insulanus* in the Cosmoledo group up to November 2002, during the ICS-CORDIO expedition, when I observed the species on several occasions on the island of Menai (Matyot 2002). Individuals were seen during daytime crawling over or near piles of dry coconut fronds on the ground near the abandoned settlement. The lizard was not particularly shy although it moved around in a “nervous” manner, continually scanning its surroundings, and on one occasion it rushed forward to grab hold of a small piece of ripe tomato that I had dropped in front of it. In Madagascar, Heying (2001) observed *Z. madagascariensis* (subspecies unknown/not specified)) preying on the frog *Mantella laevigata* Methuen & Hewitt, 1913.

*Z. m. insulanus* is still present on Grande Glorieuse: Mathieu Le Corre observed and photographed it there in May 1996 and May 2003 and noted that it is “quite common in various habitats, including areas covered with coconut palms (*Cocos nucifera*) as well as what remains of the native coastal forest” (Le Corre, personal communication). The assertion by Henkel & Schmidt (2000) that “the populations on Glorieuse and Aldabra (sic) can be traced back to introduction by humans” is not substantiated and appears to be one of a number of inaccuracies in their work (the presence of cinnamon in Seychelles since the end of the 15<sup>th</sup> century; orchids and bamboo being among the “typical plants” of the mid-altitude vegetation of the granitic islands, etc.).

**Table 1:** Specimens of *Zonosaurus madagascariensis insulanus* known to Brygoo (1985). [BM = The Natural History Museum, London, previously the British Museum of Natural History; USNM =The National Museum of Natural History, Washington, previously the United States National Museum]

Specimens	Provenance
BM 83.1.22.12	Glorieuses (collected by naval surgeon Richard Coppinger during “Alert” expedition 1882)
BM 83.1.22.13	Glorieuses (as for previous specimen)
USNM 20462	Glorieuses (collected by American naturalist William Abbott 1893)
BM 1906.8.15.2	Glorieuses (collected by “Valhalla” expedition of Earl of Crawford on Ile du Lys 1906)
USNM 231630	Glorieuses (collected by John G. Frazier after it had been caught by a cat near the meteorological station on Grande Glorieuse 1972 )
USNM 231631	Glorieuses (as for previous specimen)
BM 1910.3.18.27	Cosmoledo (collected by John Fryer “on the North-East islands” - during the second Percy Sladen Trust Expedition 1908-1909)
BM 1938.8.3.27	Cosmoledo (collected by Desmond Vesey-Fitzgerald 1937)

5. *Mabuya sechellensis* (Duméril & Bibron, 1839) (Order Squamata: Family Scincidae)

Although there have been a number of studies on the skink *M. sechellensis* (Evans & Evans 1980; Brooke & Houston 1983), some aspects of the biology and ecology of the species observed on Mahé island appear not to have attracted attention so far. These include its ecological plasticity enabling it to behave occasionally as an anthropophilous species, foraging and roosting in the vicinity of and even inside houses (Cheke (1984) did point out that « the two Mabuyas ... do not hesitate to enter houses in search of scraps » but he appeared to suggest that this occurs only on rat-free islands); and its habit of roosting amid foliage on low vegetation, up to at least a metre above the ground. *M. sechellensis* also climbs readily onto shrubs and bushes to catch insects, including butterflies (Lepidoptera) of the family Lycaenidae feeding on flowers, and spiders. In May 2003 an individual was seen caught in a web of the spider *Nephila inaurata* about half a metre above the ground at La Rosière near Victoria. Closer inspection revealed that the lizard was alive and was holding the resident female spider in its jaws, suggesting that it must have jumped into the web to catch it. The skink broke free, fell to the ground and scurried away, still holding on to the spider.

Another individual was observed in 1987 swallowing a flowerpot snake (*Ramphotyphlops braminus* (Daudin, 1803)). In May 2002 yet another was found to have discovered an opening in a rearing cage, kept indoors, and to have been feeding on newly-hatched leaf insects (*Phyllium bioculatum* Gray, 1832) escaping from the cage. For several days after the opening was closed and the *Phyllium* nymphs could no longer get out the lizard was observed lurking around the cage, presumably on the look-out for nymphs that it expected to appear. This suggests that *M. sechellensis* could be a worthwhile subject for studies on perception, motivation, learning and memory (D. Lachaise, pers. comm.).

*M. sechellensis* was erroneously stated as the skink occurring on Ile aux Récifs in a previous report (Matyot 2001); as had been reported by Vesey-Fitzgerald (1947), *M. wrighti* is actually the species found on that island.

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## NOTES

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### Observations on the Seychelles tree frog living in residential habitats

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The Seychelles tree frog *Tachynemis sechellensis* (Gunther, 1868) is common on the highlands of Mahé and Silhouette, where the loud call of the males - a single percussive syllable repeated 4-10 times in a slight crescendo-decrescendo - can be heard at night in the woodlands and is a typical and dominant component of the soundscape (Rocamora *et al.* 1999). On Mahé, the species can also be found in gardens and houses of the residential areas above 300m and bordering the forests of the Morne Seychellois National Park such as La Misère-Souvenir, Fairview Estate, Mission Road and Le Niol. Between 1995 and 2003, I lived with my family in a house at Fairview that permanently hosted 6 to 8 Seychelles tree frogs, and we had the opportunity to make a number of interesting observations on their morphology, behaviour and ecology.

#### *Colour and size*

Four different colour morphs were regularly found in or around the house. The large majority of these frogs (c.90%) were light green, and measured 5-7cm head and body length. Exceptionally some measured up to 8-9cm. All these were identified as adult females and were the only ones found living almost permanently inside the house, although they were found as well on various trees in the garden (pis-pis *Spathodea campanulata*, frangipanier *Plumeria obtusa* and other ornamental species). The three other morphs, dark red, brown and beige, were normally found only in the garden and very occasionally inside the house. These were smaller (4-5cm) and presumed males or young individuals.

#### *Diurnal roosting*

The tree frogs were only active at night. During the day, between dawn and dusk, they used to stay at roosting sites, either inside or outside the house, completely immobile, with no perceptible breathing movements, their eye pupil reduced to a tiny thin vertical line. The most regular roosting sites were in a first floor bathroom, a cool place well shaded by large trees from the neighbouring woodland. There, 2-3 frogs, sometimes up to 4, used to roost in a variety of places, generally on the wall in well hidden corners, sometimes behind a curtain or a piece of furniture. Some frogs also used to roost on the large window panes of the veranda. In the bathroom, they were often found inside or close by two flush-type reservoirs permanently filled with water into which they entered through small circular holes. One reservoir had larger holes compared to the other (c. 2.8 compared to 2.5cm diameter) and was clearly preferred by the frogs. Being for our own water consumption, the latter reservoir had normally its holes blocked and the frogs would then roost nearby or in the other one. When these reservoirs were checked, frogs present inside were always found close to the water level. In addition, there was in this bathroom a tank permanently filled with 50-150 litres of water, although the frogs could not get inside it. The tree frogs seemed to have a preference for roosting sites close to open water, probably because humidity was higher and facilitated their skin breathing, apparently responsible for most of their respiration during their immobile diurnal phase. Some of these frogs had distinctive black marks on the skin of their head or elsewhere and could be identified individually. We noticed that the same frog normally returned to the same roosting site over a certain period of time (several weeks to several months), although sometimes they could be found roosting for a few days in a different place nearby before returning to the original site. During the rainy days, when the humidity was high, the frogs usually went outside the house through an open window and did not return to their bathroom roost for one or more days. On several occasions they were observed during day time roosting on the leaf of exotic ornamental trees close to the bathroom. Sometimes, several frogs were observed roosting close to each other, especially in the reservoirs (up to 3 frogs roosting), but most of the time they used to roost in scattered places outside the flush reservoir. Individual frogs recognisable from a distinctive mark eventually disappeared from their bathroom roost after a few months and were almost immediately replaced by others at the same spot (inside the reservoir or behind a furniture). Sometimes they were seen again after a while somewhere else in the house, and then never seen ever again.

### *Nocturnal activities*

During the night the frogs used to hunt for prey in or outside the house. On many occasions we observed the frogs coming out of their roosts at dusk. As daylight was diminishing, the frogs were becoming progressively active, their pupils enlarging to occupy their entire eyes to allow a good night vision. Active respiration and blood circulation became also apparent from the movement of the skin under the frogs' throat. Most of the time, tree frogs were observed hunting in the vicinity of their diurnal roost, although sometimes as far as 10-15 meters. The three tree frogs roosting in the bathroom were normally seen hunting in different rooms. Whilst one frog generally remained in the bathroom at night, the two others were observed repeatedly in different neighbouring rooms or downstairs, as if each had its own hunting area. Every time we could recognise a particular individual from some peculiar skin coloration and size patterns, we clearly observed some sort of site fidelity over a certain period of time. One particular individual was repeatedly seen coming downstairs

to the living room at night and was always back to its first floor roost the following mornings. Although we had the impression that frogs were avoiding each other when hunting, we never observed any sign of aggression or territoriality between individuals that were found close to each other. The frogs living inside the house used to hunt in complete darkness, over the white interior walls of the house or perching on various objects and furniture from where they could spot their prey and jump on them. In contrast, other frogs (normally 2 to 3) preferred to hunt close to the lights of our garage and veranda where insects were always attracted, as did house geckos *Gehyra mutilata* and day geckos *Phelsuma astriata* with which they were directly competing for insects. There too, tree frogs normally hunted in different areas (normally one in the garage and one in the veranda around each bulb) as if there was some sort of mutual exclusion, although this was not systematic. One of these frogs had for example a clear preference for a large door glass where we could easily observe its hunting behaviour. Tree frogs were trying to catch a variety of flying insects that would perch or fly close to them. We observed catching attempts on small moths, mosquitoes, flies, flying ants and termites, but very few effective captures. The best way to investigate the diet of the tree frogs would be to collect their faeces (which are very easy to find in a house environment) and identify the invertebrates present from the remains. We once observed a same frog of c. 6cm snout-vent length that had caught by a wing a large moth with a body length of c. 4cm long. After a while, the moth was able to escape, possibly because our presence created some disturbance to the frog. On another occasion, the same frog had caught a small house gecko (c. 4cm long) whose tail was coming out of its mouth. The frog kept the gecko a very long time (c. an hour) in its mouth, probably waiting for it to die before swallowing it. We observed this phenomenon only once, but it is likely that the tree frogs were able to catch such small geckos on a regular basis. Tree frogs being in that particular circumstance direct competitors and occasional predators of house geckos, it is possible that their high density in this house may have limited the abundance of geckos.

Tree frogs, presumably males, were regularly heard singing at night in the garden outside the house. We never heard any of our light green (presumed female) individuals producing any kind of sound at any time of the year.

Despite the fact that our observations were done in a very peculiar artificial environment and not in the usual natural habitat of the Seychelles tree frog, these may still contribute to improve our knowledge of this relatively common but still poorly known endemic frog of Seychelles.

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