

## The Terrestrial Herpetofauna of the Ile des Pins, New Caledonia<sup>1</sup>

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**ABSTRACT:** The herpetofauna of the Ile des Pins, New Caledonia, is documented on the basis of 269 specimens representing 14 species. Included among new material collected by the authors are all but one of the seven taxa previously reported for the island. The fauna is a subset of that of the New Caledonian mainland, but a lack of elevational and habitat diversity has resulted in a relatively depauperate assemblage. Most of the species are endemic to the New Caledonian region, although several pan-Pacific geckos are also present. The scincid lizard *Marmorosphax euryotis* (Werner), previously regarded as rare, was found to be extremely abundant in rain forest on a pavement of raised reef. This species shares sexual dichromatism with its congener, but unlike *M. tricolor* (Bavay) it is apparently oviparous. The status of specimens of *M. euryotis* from the New Caledonian mainland remains unclear.

THE HERPETOFAUNA of the French island territory of New Caledonia is the richest of any nonarchipelagic island group in the Pacific, and its absolute number and relative percentage of endemic forms is greater than those of any other island in the Pacific region except New Guinea (Bauer and Vindum 1990, Bauer and Sadlier 1993). Despite intensive herpetological work in New Caledonia and the Loyalty Islands (Bavay 1869, Roux 1913, Sadlier 1986, 1989, Bauer 1990), some areas of herpetological interest have remained unsurveyed (Bauer et al. 1992). The Ile des Pins (Figure 1), ca. 50 km off the southern tip of New Caledonia, is one such locality.

The geology of the Ile des Pins is similar to that of the southern part of the New Caledonian mainland, from which it is separated by the Canal de Havannah and Passe de la Sarcelle, with a maximum depth in most places of less than 40 m. The center of the island is dominated by ferallitic soils on ul-

trabasic rocks (Latham et al. 1978, Paris 1981, Sautter 1981). These form a lateritic high plain ca. 60 m above the low-lying coralline rim of the island derived from an elevated fringing reef (Paris 1981, Sautter 1981). The total area of the Ile des Pins is 152 km<sup>2</sup>, and its highest point is Pic Nga (262 m) in the south of the island. The lowland rim is narrowest in the south, but extends for up to 5 km to the east of the plateau. It was raised to its present elevation (2–20 m) largely as a result of the same Pleistocene tectonic activity that produced the Loyalty Islands and the coralline coastal region between Unia and Goro on the mainland (Paris 1981, Sautter 1981). Although the vegetation of much of the island has been disrupted by plantations and clearings, large patches of rain forest remain (Morat et al. 1984). The slightly drier west coast supports a closed-canopy forest dominated by *Intsia bijuga* Kuntze (Leguminosae). The wet east coastal forests are similar in species composition but are more extensive and largely inaccessible by road. Stands of *Araucaria columnaris* (Forster) Hooker, the column pines that give the island its name, are distributed patchily throughout the island (Figure 2A), and coconut palms (*Cocos nucifera* Linnaeus) are typical of most beachfront areas. The island as a whole averages 1200–1300 mm rain per year. The up-

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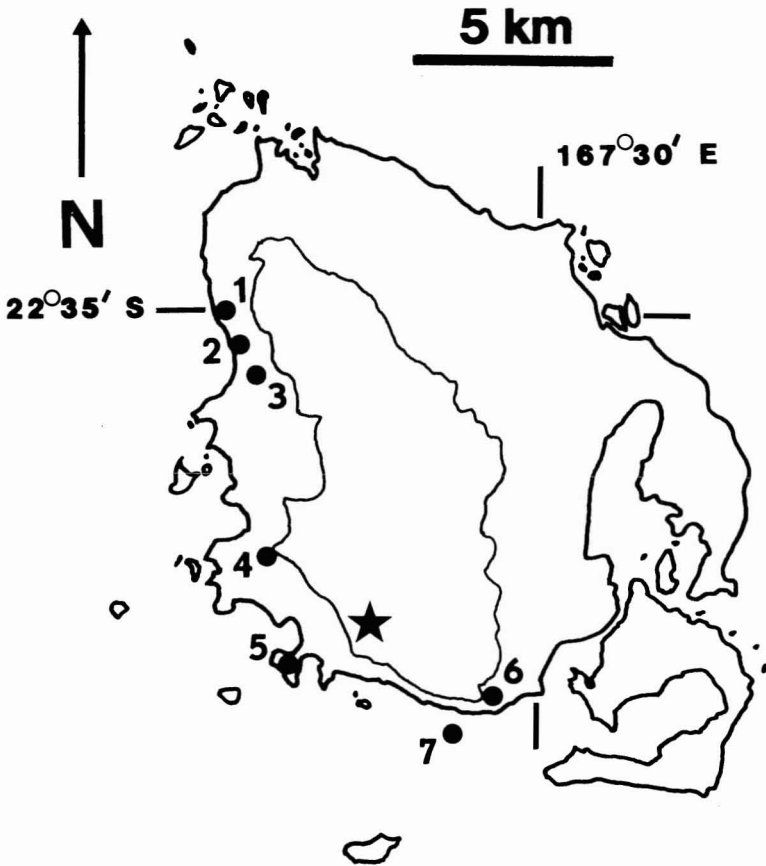


FIGURE 1. Map of the Ile des Pins showing collecting sites and major physiographic features. Numbered collecting sites: 1, 1 km north of Gite Kodjeue; 2, Gite Kodjeue; 3, 1 km southeast of Gite Kodjeue; 4, 3 km north of Kuto; 5, Kuto; 6, Vao; 7, Tje (Cè), Sabots de la Reine Hortense. The fossil locality Kanumera is located at the small bay immediately to the east of the Kuto Peninsula. The approximate edge of the lateritic high plain is indicated by the thin black line. The summit of Pic Nga (262 m) is marked by a star.

land areas support the typical maquis vegetation of the New Caledonian mainland, reflecting shared edaphic conditions (Sautter 1981, Morat et al. 1986). Information summarized by Holloway (1979) suggests that a land connection to the mainland existed during Plio-Pleistocene glacial periods, when sea levels were as much as 100 m lower than at present.

Previous herpetological collections from the Ile des Pins are small and scattered. Boulenger (1878) first mentioned material from the island, describing *Chameleonurus trachycephalus* (a junior synonym of *Rhacodactylus trachyrhynchus* Bocage) from type

material from the Ile des Pins. Subsequently, he reported the occurrence of *Rhacodactylus leachianus* (Cuvier) (Boulenger 1885), *Lioscincus nigrofasciolum* (Peters) (as *Lygosoma nigrofasciolum*) (Boulenger 1887), and *Laticauda colubrina* (Schneider) (Boulenger 1896) on the Ile des Pins. Werner (1909) described *Lygosoma euryotis* (= *Marmorosphax euryotis*) from the island and reported on a specimen of *Lioscincus nigrofasciolum* from the same collection. None of the specimens mentioned up to that point in time were associated with specific localities. Over 70 yr passed before the next mention of additional material from the Ile des

A



B



Figure 2. *A.* View toward the southwest from the edge of the lateritic high plain of the Ile des Pins, showing expanse of lowland forest on coraline pavement and a stand of *Araucaria columnaris*. *B.* Raised coraline pavement at coast, 1 km north of Gite Kodjeue, with *Pandanus* sp. The coral provides the foundation for nearly all of the lowland forest of the Ile des Pins. Interstices in the coral provide retreat sites for *Cryptoblepharus novaecaledonicus* and *Laticauda colubrina*.

Pins. Börner (1980) described the scincid *Leiopisma dorsovittatum bodoi* (= *Caledoniscincus austrocaledonicus* [Bavay]) from the Ile des Pins, but did not mention other material from this locality. Several *Caledoniscincus austrocaledonicus* and a single *Marmorosphax euryotis* collected in October 1940 by F. X. Williams were mentioned and the latter illustrated by Bauer and Vindum (1990). The herpetofauna reported in the literature to date therefore consists of seven species, and three species of reptiles (one considered valid) have been described on the basis of type material from the Ile des Pins. In this paper we report on our own collections totaling almost 250 specimens from the Ile des Pins, as well as on published and unpublished material collected by earlier workers.

#### MATERIALS AND METHODS

We surveyed the herpetofauna of the Ile des Pins during the period 29 February–3 March 1992. Collecting effort was based at Gite Kodjeu on Waa Mé Bay, but several other sites were investigated (Figure 1). Daytime collecting involved capture by hand and rubber band, and nighttime collecting consisted primarily of night spotting with headlamps. In addition, mouse glue traps were used in both terrestrial and arboreal situations to collect both geckos and skinks (Bauer and Sadlier 1992). Specimens collected have been deposited in the collections of the Australian Museum (AMS) and the California Academy of Sciences (CAS). Literature records and specimens deposited in other institutions (American Museum of Natural History [AMNH], British Museum of Natural History [BMNH], Institut Royal des Sciences Naturelles de Belgique [IRSNB], and Queensland Museum [QM]) were also examined. Collection acronyms used herein follow Leviton et al. (1985).

#### SPECIES ACCOUNTS

Unless otherwise specified, AMS and CAS specimens were collected during the period

29 February–3 March 1992 at Gite Kodjeu on Waa Mé Bay on the northwest coast of the Ile des Pins. Keys and diagnoses for most species, as well as mainland New Caledonian localities for the species listed below, may be found elsewhere (Sadlier 1986, 1989, Bauer 1990, Bauer and Vindum 1990). Complete citations of type descriptions and type data are presented only for those names based on Ile des Pins type material.

#### Family GEKKONIDAE Subfamily DIPLODACTYLINAE

##### *Bavayia crassicolis* Roux, 1913

MATERIAL EXAMINED. (1 specimen) AMS 138597.

REMARKS. This species is a New Caledonian regional endemic, occurring at numerous lowland sites on the New Caledonian mainland and on Maré and Lifou in the Loyalty Islands. The single individual obtained from the Ile des Pins is large (73 mm snout-vent length [SVL]) and heavy-bodied, and there is little definition to the body markings. The dorsum is light brown to midbrown and is marked only by four dark, narrow, transverse bars. In life the specimen had an obvious yellow flush to the venter and a bright orange flush to the underside of the tail. It was collected from roof thatch of a beachfront shelter located among mature palms.

##### *Bavayia cyclura* (Günther, 1872)

MATERIAL EXAMINED. (16 specimens) AMNH 81772 (Vao); AMS 138590–138593 (3 km N of Kuto), 138626, 138633–138634; CAS 182158–182161 (3 km N of Kuto), 182164, 182180–182182.

REMARKS. This species is endemic to New Caledonia and adjacent islands. It is widely distributed at low and middle elevations on the mainland and on the Loyalty Islands. The AMS and CAS specimens listed were collected at two localities: low forest bordering the road ca. 3 km north of Kuto and slightly inland from the coast; and the partially cleared strandline vegetation and cleared edges of adjacent coastal lowland forest at

and within a 1-km radius of Gite Kodjeue. All specimens were collected by day from under bark or in tree hollows. At the inland locality north of Kuto, both *B. cyclura* and *B. sauvagii* (Boulenger) (see below) were collected from beneath the exfoliating bark of dead trees. Strict syntopy of these species has otherwise been reported only from the Forêt de Yahoué near Nouméa (Bauer and Vindum 1990). The habitat preferences of these species around Gite Kodjeue, however, appeared to be mutually exclusive; *B. cyclura* was not collected within closed forest, whereas this was the only situation in which *B. sauvagii* was located.

Among the specimens examined are two large individuals (AMS 138590 and 138633) that approach the size and coloration of adult *B. crassicolis*. The size (67 mm and 65 mm SVL, respectively) of these specimens is marginally larger than that of most *B. cyclura* previously reported (Sadlier 1989), although it is exceeded by one exceptional specimen (72 mm SVL) from the west coast of New Caledonia (Bauer and Vindum 1990). The pale body blotches are obscure or indiscernible in these specimens; however, they lack the robustness of build and obvious orange flush to the underside of the tail so obvious in the *B. crassicolis* individual identified above.

*Bavayia sauvagii* (Boulenger, 1883)

**MATERIAL EXAMINED.** (41 specimens) AMS 138581–138589, 138594 (3 km N of Kuto), 138603–138610, 138629; CAS 182148–182157, 182162–182163 (3 km N of Kuto), 182171–182179, 182198.

**REMARKS.** *Bavayia sauvagii* is endemic to greater New Caledonia and has been recorded from many sites on the main island as well as on Maré. This species was recorded from near-coastal low forest ca. 3 km north of Kuto (see account of *B. cyclura* above) and coastal lowland forest at Gite Kodjeue. At the latter locality the vast majority of specimens were captured on mouse glue traps placed on the trunks of living forest trees (Bauer and Sadlier 1992). At that locality the geckos apparently spend daylight hours in the interstices of the coral pavement

of the lowland forest belt and emerge at night to climb the forest trees to forage. This pattern of activity mirrors that seen in mainland populations, in which geckos spend daylight hours under rocks on the forest floor, but forage on vegetation at night (Bauer and Devaney 1987a, Bauer 1990, Bauer and Vindum 1990).

In size and coloration, specimens from the Ile des Pins are most similar to populations from lowland New Caledonia. Adult size ranges between 38 and 47 mm SVL, comparable with that of specimens from the Yaté area of the southeastern New Caledonian mainland, but much smaller than the largest west-coast specimens (maximum 62 mm SVL [Bauer and Vindum 1990]). The typical ground color is gray to midbrown with an obvious, pale, longitudinal nape bar on either side and four to five pale, transverse blotches on the body, each with a dark edge posteriorly. Each pale nape bar may or may not be broken posteriorly to form what appears as a relatively singular pale blotch anterior to the level of the forelimbs. The ventral color of each individual is generally a shade lighter than the base color of the dorsum.

*Rhacodactylus leachianus* (Cuvier, 1829)

**MATERIAL EXAMINED.** (2 specimens) BMNH 53.8.16.13 (Isle of Pines); CAS 182197.

**REMARKS.** *Rhacodactylus leachianus* is endemic to New Caledonia, the Ile des Pins, and perhaps the Îles Belep. This species, the largest living gecko, attains lengths of 245 mm SVL or more (Bauer 1990). The CAS specimen, a female (194 mm SVL), was collected at night in closed forest from ca. 5 m up the trunk of a moderate-sized tree. One other individual was observed at a height of ca. 4 m in the enveloping buttresses of a large fig in the same habitat. As adults, members of this species are strictly arboreal, although egg-laying sites have been found on the ground as well as in trees, and juveniles have been collected on the ground and in low vegetation (Henkel 1991; pers. obs.).

*Rhacodactylus leachianus* is relatively common in humid forests throughout New Caledonia (Bauer 1990, Bauer and Sadlier 1993), and its presence in the Îles Belep to the



north of New Caledonia has been implied (Jouan 1864). Bauer (1990) questioned the Ile des Pins locality of the BMNH specimen, but considered it plausible given the geological and vegetational similarity to appropriate habitats on the adjacent New Caledonian mainland. Henkel (1991) noted geographic variation of possible systematic significance in this taxon and identified a color pattern found only in specimens from southern New Caledonia. The specimen from Gite Kodjeue is referable to this form. In life the dorsum was gray green with scattered black flecks and small white spots. The lateral surfaces bore bold, broken white bands that were continued on the dorsum as less distinct pale chevrons.

*Rhacodactylus trachyrhynchus* Bocage, 1873

*Chameleonurus trachycephalus* Boulenger, 1878, Bull. Soc. Zool. Fr. 3:68, pl. 2.

Lectotype (designated by Bauer 1990): IRSNB 2.532, "Ile des Pins, Nouvelle-Calédonie." Paralectotype: IRSNB 2.533, same data as lectotype.

MATERIAL EXAMINED. (2 specimens) IRSNB 2.532–2.533 (Ile des Pins).

REMARKS. This species is known with certainty only from the New Caledonian mainland. The types of *Chameleonurus trachycephalus* are the only known specimens of this taxon from the Ile des Pins. We neither collected nor observed any individuals on the island, although there is appropriate habitat. The mainland distribution of this species includes a number of localities in central and southern New Caledonia (Bauer 1990). Like *R. leachianus*, this species is arboreal and is often found at great heights in humid forest trees (Meier 1979, Henkel 1991). It is the only viviparous member of the New Caledonian gekkonid fauna (Bartmann and Minuth 1979).

#### Subfamily GEKKONINAE

*Hemidactylus frenatus* Duméril & Bibron, 1836

MATERIAL EXAMINED. (2 specimens) AMS 138598; CAS 182170.

REMARKS. This species is widely, though patchily, distributed throughout Southeast Asia and the islands of the Pacific and occurs throughout the territory of New Caledonia in disturbed lowland habitats. These specimens were captured around human habitations. Additional individuals were heard calling. The species apparently was introduced into New Caledonia during World War II (Bauer and Vindum 1990), and its arrival on the Ile des Pins probably dates from the same period. This aggressive sexual species is known to affect the spacing of the parthenogenetic forms *Hemidactylus garnotii* Duméril & Bibron and *Lepidodactylus lugubris* (Petren et al. 1993) and has excluded the former species from certain habitats on the New Caledonian mainland (Bauer and Vindum 1990).

*Lepidodactylus lugubris* (Duméril & Bibron, 1836)

MATERIAL EXAMINED. (10 specimens) AMS 138599–138602, 138625, 138628; CAS 182166–182169, 182195.

REMARKS. This species has a pan-Pacific distribution and occurs throughout New Caledonia, principally at lower elevations. All but one of the specimens of this species were captured around lights at human habitations. The remaining individual was taken on a glue trap from a *Casuarina* along the beachfront at Gite Kodjeue. All specimens of this parthenogenetic form were gravid at the time of capture.

*Nactus pelagicus* (Girard, 1858)

MATERIAL EXAMINED. (1 specimen) CAS 182196.

REMARKS. *Nactus pelagicus* (sensu lato) has a broad distribution across the western and central Pacific and is widely distributed at lower elevations in New Caledonia and the Loyalty Islands. The single individual from the Ile des Pins was captured at night on a mouse glue trap placed under a pile of coconut fronds. The New Caledonian popu-

lations of this gecko appear to be entirely parthenogenetic (Moritz 1987, Bauer and Vindum 1990). Elsewhere in New Caledonia this species shelters under rocks or ground debris by day and climbs the bases of tree trunks while foraging at night (Bauer and Devaney 1987a, Bauer and Vindum 1990).

Family SCINCIDAE  
Subfamily LYGOSOMINAE

*Caledoniscincus atropunctatus* (Roux, 1913)

MATERIAL EXAMINED. (4 specimens) AMS 138555–138556, 138636; CAS 182209.

REMARKS. This is the only species in the genus to occur outside the territory of New Caledonia. It is widespread on the mainland and also occurs in Vanuatu, from Efate southward (Bauer et al. 1992). All specimens from Gite Kodjeue were collected within, or at the edge of, closed forest habitat.

*Caledoniscincus austrocaledonicus* (Bavay, 1869)

*Leiolopisma dorsovittatum bodoi* Börner, 1980, Misc. Art. Saurolog. 5:8, figs. 2, 3.

Holotype: BSRC Scinc 17 SC; "unter einem Baumstamm auf einer trockenen Wiese bei Kutio auf der Ile des Pins südlich von Neukaledonien," coll. A.-R. Börner, 31 December 1979. Paratypes: BSRC Scinc 15–16 SC, 18 SC; same data as holotype.

MATERIAL EXAMINED. (89 specimens) AMNH 81773–81782, 131973–131987 (Vao); AMS 138549–138554, 138557–138568, 138578–138580, 138595 (3 km N of Kuto), 138615–138617, 138622, 138637–138642; CAS 80887–80888, 182109–182117, 182128–182138, 182146–182147, 182165 (3 km N of Kuto), 182182–182185, 182204–182208.

REMARKS. This is the most widely distributed scincid in New Caledonia and has been collected from throughout the New Caledonian mainland, as well as all of the Loyalty Islands (Sadlier 1986) and Ile Surprise in the D'Entrecasteaux Reefs (Bauer et al. 1992). As elsewhere in its range, this species is commonly encountered in forest clearings and

edges and in open grassy areas (Sadlier 1986, Bauer and Devaney 1987a, Bauer and Vindum 1990).

Sadlier (1986) placed *Leiolopisma dorsovittatum bodoi* in synonymy because it appears to be identical with typical *C. austrocaledonicus*. Additional systematic and nomenclatural problems exist in this taxon, and more than one species probably exists on the mainland. *Caledoniscincus austrocaledonicus* from the Ile des Pins is most similar to those skinks from southern New Caledonia. They are relatively small (maximum SVL of 44 mm for males and 43 mm for females versus maximum SVL of 55 mm for northern specimens [Sadlier 1986]), lack any indication of a white midlateral stripe, and have small clutch sizes. The average number of enlarged yolked ovarian follicles or shelled oviducal eggs revealed by dissection was two, with a maximum of four recorded in one individual. A specimen of this species from Kuto was illustrated by Sadlier (1986: fig. 49).

*Cryptoblepharus novaecaledonicus* Mertens, 1928

MATERIAL EXAMINED. (14 specimens) AMS 138611–138614, 138630–138632; CAS 182189–182193, 182200–182201.

REMARKS. This species is endemic to coastal areas throughout greater New Caledonia. All specimens were collected from coastal outcropping limestone pavement within the spray zone (see Figure 2B). The habitat preferences of this species are quite restrictive, and known localities throughout the range are strikingly similar (see Sadlier 1986: fig. 74).

*Lioscincus nigrofasciolum* (Peters, 1869)

MATERIAL EXAMINED. (6 specimens) AMS 138596 (3 km N of Kuto), 138621, 138624, 138627; CAS 182139; IRSNB 821 (fide Werner 1909).

REMARKS. *Lioscincus nigrofasciolum* is a regional endemic and has been recorded from localities throughout New Caledonia and the Loyalty Islands. In recognition of the paraphyly of the genus *Leiolopisma*, to

which this and several other New Caledonian species have continued to be assigned (see Sadlier 1986), the generic name *Lioscincus* Bocage has been resurrected (Bauer and Sadlier 1993).

*Lioscincus nigrofasciolatum* is primarily an arboreal species (Meier 1979, Sadlier 1986) and was collected or observed in most wooded habitats with sufficient vegetation, including disturbed and partially cleared coastal situations and closed forest at coastal and inland locations. Two individuals were captured using glue traps.

*Marmorosphax euryotis* (Werner, 1909)

*Lygosoma euryotis* Werner, 1909, Zool. Jahrb. Syst. 28:271.

Holotype: IRSNB 2.025 "Ile des Pins, Nouvelle Calédonie," coll. Baron de Selys-Longchamps, 1 June 1880.

MATERIAL EXAMINED. (77 specimens) AMNH 81783 (Vao); AMS 138528–138548, 138569–138577, 138618–138620; CAS 80889 (Isle of Pines, without specific locality), 182089–182108, 182118–182127, 182140–182145, 182181, 182186–182188, 182199; IRSNB 2.025 (Ile des Pins, no specific locality).

REMARKS. This species is known only from the Ile des Pins and from a small area of northeastern New Caledonia (see below). Börner (1980) mistakenly regarded this taxon as closely allied to the species now placed in *Caledoniscincus*. Before the collections made by the authors, this species was known from only four specimens: the type (IRSNB 2.025) collected from the Ile des Pins (Werner 1909), a recent specimen collected from "Ouaième via Hienghène" in the northeast of the New Caledonian mainland (QM J37441 [Sadlier 1986]), a specimen collected from the Isle of Pines in 1940 (CAS 80889 [Bauer and Vindum 1990]), and a previously unreported specimen from "near Tao" on the northeastern coast of the mainland (AMNH 62685). The recent redescription of this species by Sadlier (1986) was based on the first two of these specimens, and the color description was a composite of color notes given in the original type description (the type is now completely faded) and what fea-

tures could be determined from the poorly preserved QM specimen. Subsequently, Bauer and Vindum (1990) compared the recently discovered CAS specimen with the description given by Sadlier and noted several differences. Our collections provide the opportunity to present an account of variation in body form and coloration, reproductive mode, and habitat preference and to comment on the differences identified by Bauer and Vindum (1990).

*Size and reproduction:* Maximum adult size was similar for both sexes; the largest male examined measured 42 mm SVL and the largest female, 41 mm. The size range of reproductively active individuals of either sex was also similar, 31–42 mm SVL for males with moderately large and obvious testes and 33.5–41 mm SVL for females with shelled oviducal eggs or enlarged yolked ovarian follicles. Subadult males ( $n = 3$ ) ranged in size from 31 to 32 mm and females ( $n = 4$ ) from 29 to 33 mm. Juveniles ( $n = 11$ ) formed a discrete size class of individuals 20–24 mm SVL. Examination of preserved adult females showed most (82%,  $n = 33$ ) were reproductively active, having two to three shelled oviducal eggs or enlarged yolked ovarian follicles. A clutch size of three was only observed in 50% ( $n = 20$ ) of the larger individuals ( $> 36$  mm SVL).

*Coloration:* Adult males—Dorsal and lateral surface tan to light brown (57%,  $n = 21$ ) or midbrown, with a few scattered dark flecks on the anterior lateral surface. In life the ventral surface has a prominent orange to russet flush on the basal portion of the tail and hind limbs and a moderate yellow flush on the posterior half of the abdomen, underside of hind limbs, and tail. Dark, transverse markings occur on the outer chin shields and throat scales, and a variably defined, narrow, dark, longitudinal streak may be present on the throat.

Adult females—Body usually two-toned, but the degree of differentiation between the dorsal and lateral surfaces varies. Dorsal surface usually a dull light brown (61%,  $n = 28$ ) or midbrown. Lateral surface light to midgray, usually with scattered dark flecking overall; boldly marked individuals with



darker markings overall and contrasting markedly with the paler dorsal color. Dorsolateral margin with a concentration of dark longitudinal flecks anteriorly forming a continuous (51%,  $n = 33$ ) or variably broken, narrow, dark line, and posteriorly with a narrow, pale, dark-edged hip stripe over the hind limbs and basal portion of tail. Ventral markings similar to those of adult males.

Subadults and juveniles—Overall body coloration usually darker, with dark lateral flecking extending over most of the lateral surface. Subadult males have features of coloration otherwise typical of adult females and juveniles, including a weak to obvious pale hip stripe and a continuous concentration of dark flecks along the dorsolateral margin in the shoulder region.

The features of color and pattern described above correspond broadly with those given by Werner (1909) for the type of *Lygosoma euryotis* and to a photograph of the single CAS specimen figured by Bauer and Vindum (1990). The variation encompassed by the now extensive collection of *M. euryotis* from the Ile des Pins does not, however, correspond wholly to the color description given by Sadlier (1986), which includes features of the specimen from Ouiaème on the northeastern coast of mainland New Caledonia (QM J37441). The most obvious differences between this specimen and those from the Ile des Pins are the presence of scattered fine pale flecks on the dorsal surface, a single row of pale spots laterodorsally down the body, and a pale dorsolateral stripe extending the full length of the body and bordered anteriorly by a fine black stripe that contacts its partner across the rostral. Although these features apply to the only other mainland specimen (AMNH 62685), none of the specimens from the Ile des Pins exhibits them. Although the disjunct nature of their distributions and apparent differences in coloration indicate that the Ile des Pins and mainland specimens of *M. euryotis* may not be conspecific, the specimens all share a unique combination of scalation characteristics including a complete subocular row and several undifferentiated nuchal scales bordering each parietal. Until further specimens

from the Ouaième/Tao region are obtained, we tentatively follow Sadlier (1986) in assigning these mainland skins to *M. euryotis*.

*Marmorosphax euryotis* was collected only within and at the edge of low coastal, closed forest habitat. Although a forest-dwelling skink, it prefers drier, more well-lit microhabitats than its mainland congener, *M. tricolor* (Bavay) (Sadlier 1986, Bauer and Devaney 1987a, Bauer and Vindum 1990). It is diurnal and could best be described as a shuttling heliotherm, tending to move through and over the leaf litter and broken rock on both sunlit and shaded patches of the forest floor. It was noticeably less abundant during overcast periods.

#### Family LITICAUDIDAE

##### *Laticauda colubrina* (Schneider, 1799)

MATERIAL EXAMINED. (4 specimens) AMNH 117775 ("Tje" Islet [=Sabot de la Reine], near Kuto Peninsula); AMS 138623, 138635; CAS 182194.

REMARKS. Laticaudids are very common in southern New Caledonian waters (Saint Girons 1964, Bauer and Devaney 1987b) and are well known to residents of the Ile des Pins, where these snakes figure prominently in local folktales (Anonymous 1985). The AMS and CAS specimens were taken from interstices of eroded coastal limestone platform bordering the tidal zone (Figure 2B).

##### *Other Marine Reptiles*

In addition to those terrestrial or semi-terrestrial species listed above, the waters of the Ile des Pins harbor a number of truly marine species. Mialeret (1897) signaled the presence of sea snakes in the waters of the Ile des Pins. Gail and Rageau (1958) subsequently reported two hydrophiids, *Hydrophis gracilis* (Shaw) and *Hydrophis caeruleus* (Shaw), from the Baie de Kuto. Bauer and Vindum (1990) suggested that the latter record was in error for *H. ornatus* (Gray). We have not examined New Caledonian specimens of these species, nor were localities near

New Caledonia reported by Cogger (1975). However, a total of nine hydrophiid species (six represented by specimens) has been recorded from New Caledonian waters (Bauer and Vindum 1990), and a recently obtained large collection of sea snakes from the area is currently under study (I. Ineich, pers. comm.). It seems highly likely that several, if not all of these, are present around the Ile des Pins. The same is true of the other laticaudid, *Laticauda laticaudata* (Linnaeus), which has been collected in the extreme southeast of the New Caledonian mainland (Bauer and Vindum 1990).

Pritchard (1982) reported that *Caretta caretta* (Linnaeus) nests on the Ile des Pins and that it is the most common sea turtle there. As with sea snakes, it is probable that the other cheloniids occurring in New Caledonian waters (*Chelonia mydas* [Linnaeus], *Eretmochelys imbricata* [Linnaeus], *Lepidochelys olivacea* [Eschscholtz]) are at least occasional visitors to the Ile des Pins.

#### DISCUSSION

The paleobiogeographic history of the New Caledonian region indicates that connections between the southern part of the main island and the Ile des Pins have existed intermittently at least since the mid-Tertiary and that the most recent separation of the two is no more than 10,000 to 20,000 yr old (Balouet and Olson 1989). Because of the limited diversity of habitats on the Ile des Pins in comparison with New Caledonia itself, the composition of the herpetofauna is generally predictable, consisting only of those taxa occurring in humid lowland forests and strand vegetation. Most of these are widely distributed on the adjacent southern New Caledonian mainland, although one species, *Marmorosphax euryotis*, occurs elsewhere only in northeastern New Caledonia. Levels of terrestrial plant and animal endemism are generally low on the Ile des Pins (Jaffré et al. 1987), and no strictly endemic reptile taxa have been identified.

All of the species previously reported for

the Ile des Pins were confirmed to be present except *Rhacodactylus trachyrhynchus*. The distribution of this species is poorly known (Bauer 1990), but its occurrence in southern New Caledonia suggests that the Ile des Pins record, now more than a century old, may indeed be valid. The seven species recorded for the first time here are generally widespread throughout New Caledonia or in the southern lateritic block of the mainland. The most important result of our recent work on the Ile des Pins has been the collection of data pertaining to the skink *Marmorosphax euryotis*. This species had been recorded from only four specimens (three reported in the literature) before our 1992 collection and had been considered rare (Bauer and Vindum 1990). In the lowland humid forest on coral substrate, however, this was found to be the most abundant lizard. It appears likely that the apparent rarity of this species in collections was caused by the fact that the few collections made on the Ile des Pins were small and probably taken near Vao or Kuto, where this habitat type is not common, in part because of extensive human activity.

The collection of a large series of *M. euryotis* confirms that the species is sexually dichromatic, as is the mainland species *M. tricolor* (Sadlier 1986). However, unlike its congener, *M. euryotis* is apparently oviparous. The timing of reproduction may also differ between the species. Neonates of the viviparous *M. tricolor* have been found chiefly in December and January (Sadlier 1986, Bauer and Vindum 1990), whereas the majority of *M. euryotis* had not yet oviposited in March. It is possible that this species may have multiple clutches, but the high percentage (82%) of adult females with oviducal eggs or enlarged follicles suggests that breeding is seasonal. Along with the reproductive data provided by Sadlier (1986), this information allows the construction of a more complete picture of the reproductive biology of New Caledonian skinks than has been available (Shea 1987). Clearly, oviparity is the dominant mode of reproduction among New Caledonian lygosomines, and possible environmental correlates of viviparity in *Marmorosphax tricolor* should be examined.

The two mainland records apparently attributable to *M. euryotis* are problematic. We have never encountered this species on the mainland despite intensive collecting effort in the Hienghène area. It is tempting to dismiss the locality information as incorrect, but the presence of two specimens from nearby localities (ca. 6 km apart), collected at different times, by different collectors, and housed in different museums is compelling. As mentioned above, there are some apparent differences in coloration between these specimens and our series from the Ile des Pins. The possibility exists that the mainland animals represent a new taxon, but if so, it must certainly be the immediate sister species to *M. euryotis* sensu stricto. Evaluation of this issue must await the collection of additional mainland material.

Our sampling on the Ile des Pins was intensive but not extensive, and it is probable that the list of terrestrial reptiles is incomplete. *Rhacodactylus auriculatus*, the most common member of its genus on the southern mainland, may be expected from the same forested areas that support *R. leachianus*. *Hemidactylus garnotii* may also be present in undisturbed habitats, although it is possible that the introduction of *H. frenatus* may have caused its extirpation from the island. *Hemiphyllodactylus typus* Bleeker, another small gecko, might be expected from either disturbed or undisturbed habitats, although it is seldom encountered on the mainland. The skinks *Tropidoscincus rohssii* (Andersson) and *Sigaloseps deplanchei* (Bavay), now regarded as southern New Caledonian endemics (Sadlier 1986, Bauer and Sadlier 1993), might also be expected on the Ile des Pins. However, the first of these is a conspicuous lizard and, if present in the western lowlands of the Ile des Pins, would probably have appeared in our sample. The second skink is far more cryptic in its habits, but nonetheless occurs in high densities on the mainland (Sadlier 1986, Bauer and Vindum 1990). It is possible that this species occurs in unsampled habitats on the lateritic high plain of the island. Skinks of the genus *Nannoscincus* may also be present on the high plain, although they generally occur in more mesic

habitats than those of the Ile des Pins (Sadlier 1986, Bauer and Devaney 1987a, Bauer and Vindum 1990).

Collections have never been made on the lateritic high plain, but experience on the New Caledonian mainland suggests that the maquis habitat is depauperate with respect to reptiles. The only putative maquis endemic, the skink *Lioscincus tillieri* (Ineich & Sadlier), is known from a single specimen from Rivière Bleu on the mainland (Ineich and Sadlier 1991). If this, or a similar species, were present on the Ile des Pins, extensive pit trapping would likely be necessary to obtain specimens.

In addition to those extant elements of the herpetofauna not yet sampled, there are a number of terrestrial reptiles that may have become extinct or extirpated from the Ile des Pins as a result of human activity (Balouet 1990, 1991). Such prehistoric extinctions are known to have decimated the avifaunas of many Pacific Island groups (e.g., Steadman 1988, 1989, 1993) and have recently been shown to have contributed to the extinction of a large lizard in Tonga (Pregill and Dye 1989). Fossil reptiles, as well as birds, have been recovered from Quaternary sites near Kanumera in the south of the Ile des Pins (Rich et al. 1981, Balouet 1991). The taxa recovered include the 2-m-long eosuchian crocodilian *Mekosuchus inexpectatus* described by Balouet and Buffetaut in 1987 and a variety of as yet unidentified gekkonid and scincid remains.

Although the material now available from the Ile des Pins provides at least a coarse-grained view of the herpetofauna of the island, it is probable that future work will refine this picture. Only after this has been accomplished, and the prehistoric herpetofauna of the island adequately characterized, will meaningful interpretations of the details of the historical and ecological biogeography of the Ile des Pins be possible.

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