

A Small Collection of Skinks and Geckos from the Northwestern Islands of Fiji (Yasawa and Mamanuca Groups)¹

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ABSTRACT: Three species of geckos and six species of skinks are recorded from the small islands of the Yasawa and Mamanuca groups of Fiji. All are common, widespread species occurring throughout Fiji. Habitat and other ecological data for these species are provided.

IN A RECENT MONOGRAPH, Zug (1991) documented the available data on the distribution, morphology, and ecology of the lizard fauna of Fiji, supplemented by the results of his own field observations. Zug's fieldwork was concentrated on the central and eastern islands, including the major islands of Viti Levu and Taveuni and the Lau and Moala groups to the east, together with Rotuma to the far north. Almost no records were cited for the extensive chain of small islands to the northwest of Viti Levu, the Yasawa and Mamanuca groups, although the Crested Iguana, *Brachylophus vitiensis* Gibbons, has been reported from several islands in these groups and is endemic to these islands and tiny Yadua Taba near Vanua Levu (Gibbons 1985). Between 16 and 19 April 1990, as part of a preliminary survey of the terrestrial vertebrates of the Yasawas led by Jim Juvik of the University of Hawai'i, I had the opportunity to visit several islands in the Yasawa and Mamanuca groups and make small collections of the skinks and geckos. On a second visit, between 4 and 9 October 1993, I was able to visit three additional islands in the Mamanuca group and observed but did not collect reptiles. In this paper, I document the collections and provide field observations on the fauna. A list of the species recorded from each island is provided in Table 1. All specimens collected are in the Australian Museum, Sydney (AMS).

Thirteen sites on 12 islands were visited (Figure 1; from north to south): Sawa-I-Lau

(16° 51' S, 177° 28' E), Matacawa Levu (two sites, one on the northwest side of the island, 16° 56' S, 177° 20' E; one at Matacawa Levu village, 16° 57' S, 177° 22' E), Nanuya Levu (Turtle Island resort, 16° 58' S, 177° 23' E), Yaqeta (Navakata Bay, 17° 00' S, 177° 20' E), Kuata (N end, 17° 22' S, 177° 08' E), Vanua Levu (17° 28' S, 177° 03' E, not to be confused with the very much larger island of the same name to the north of Viti Levu), Kadomo (17° 30' S, 177° 03' E), Yaduya (17° 36' S, 177° 04' E), Moneriki (17° 37' S, 177° 02' E), Qalito (17° 44' S, 177° 08' E), Malolo (17° 45' S, 177° 10' E), and a small uninhabited islet to the north of the west end of Malolo, locally known as Honeymoon Island (17° 43' S, 177° 09' E), labeled A in Figure 1. The first nine islands were visited in 1990, for periods ranging from 15 min to ca. 3 hr, and the last three islands were visited in 1993, for 15 min, 6 days, and 1 hr, respectively. In most cases, fieldwork was concentrated around the foreshore and in near-coastal closed forest vegetation.

Although described by Zug (1991:3) as of "coral and sand origin," most of these islands have an igneous rock core, with basalt and other igneous outcrops around the foreshore, alternating with beaches of white sand and coral rubble. Sawa-I-Lau is apparently unique in consisting entirely of limestone (J. Juvik, pers. comm.).

ANNOTATED SPECIES LIST

Family GEKKONIDAE

Gehyra oceanica (Lesson)

Zug (1991) examined specimens from Malolo Lailai (California Academy of Science

¹ Manuscript accepted 1 April 1994.

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TABLE 1
SKINKS AND GECKOS RECORDED FROM THE YASAWA AND MAMANUCA ISLANDS DURING 1990 AND 1993

ISLAND	<i>Gehyra oceanica</i>	<i>Hemidactylus frenatus</i>	<i>Lepidodactylus lugubris</i>	<i>Cryptoblepharus eximius</i>	<i>Emoia concolor</i>	<i>Emoia cyanura</i>	<i>Emoia impar</i>	<i>Emoia</i> spp. ^a	<i>Lipinia noctua</i>
Sawa-I-Lau	X			X				X	
Matacawa Levu	X			X				X	
Nanuya Levu				X	X	X	X		
Yaqeta				X	X				
Kuata	X		X	X					X
Vanua Levu	X		X	X		X	X		
Kadomo	X			X		X			
Yaduya				X					
Moneriki	X			X					
Qalito				X					
Malolo	X	X	X	X	X	X			X
Honeymoon				X					

^a Unidentified members of the *Emoia cyanura* complex.

[CAS] 156048) and Tavarua (AMS R116250–51) at the extreme south of the Mamanuca Group and also included a record from Viwa on his distribution map. I collected the following specimens: on Nanuya Levu, one adult (AMS R132707) inactive by day among the rafters in a hut; at Matacawa Levu village, one (AMS R132760) inactive by day under loose bark on a large tree in open grassland, and two (one taken [AMS R132706]) active at night on a fissured fig trunk in open forest; at Kuata, two juveniles (AMS R132754, R132761) inactive by day under bark on a small dead tree on the foredune, and a communal clutch of seven eggs loose under a rock on soil in a deep rock overhang (eggs large, round, calcareous-shelled and nonadhesive); on Kadomo, four adults (two taken [AMS R132735–36]) under small curls of bark at the base of buttress-rooted figs (two were together in one curl barely large enough to fit both in); on Moneriki, one adult (AMS R132716) active by night on the trunk of a fig at the edge of a rocky scree slope in closed forest. One adult was observed, but eluded capture, under bark on a tree on Vanua Levu. On Malolo, many adults and occasional subadults were observed at night around lights outside bures. Although generally solitary, on one occasion three adults were seen within a radius of 0.5 m of a light.

The three smallest individuals collected in April had snout–vent lengths (SVL) = 29, 30.5, and 34 mm, respectively; the former two were slightly smaller than the minimum size reported by Zug (1991) and were probably hatchlings. Of the adult specimens collected in April, three males (SVL = 71–78 mm) had turgid testes and opaque deferent ducts, and the sole female (SVL = 73 mm) had small ovarian follicles.

Hemidactylus frenatus Duméril & Bibron

On Malolo, several subadults and juveniles were found under bark on dead casuarinas by day, and three adults were seen active around lights outside bures by night. Zug (1991) reported two specimens (W. Beckon collection) from Malolo Lailai, immediately east of Malolo.

Lepidodactylus lugubris Duméril & Bibron

One hatchling was found inside a bure by night on Malolo. Zug (1991) also reported a

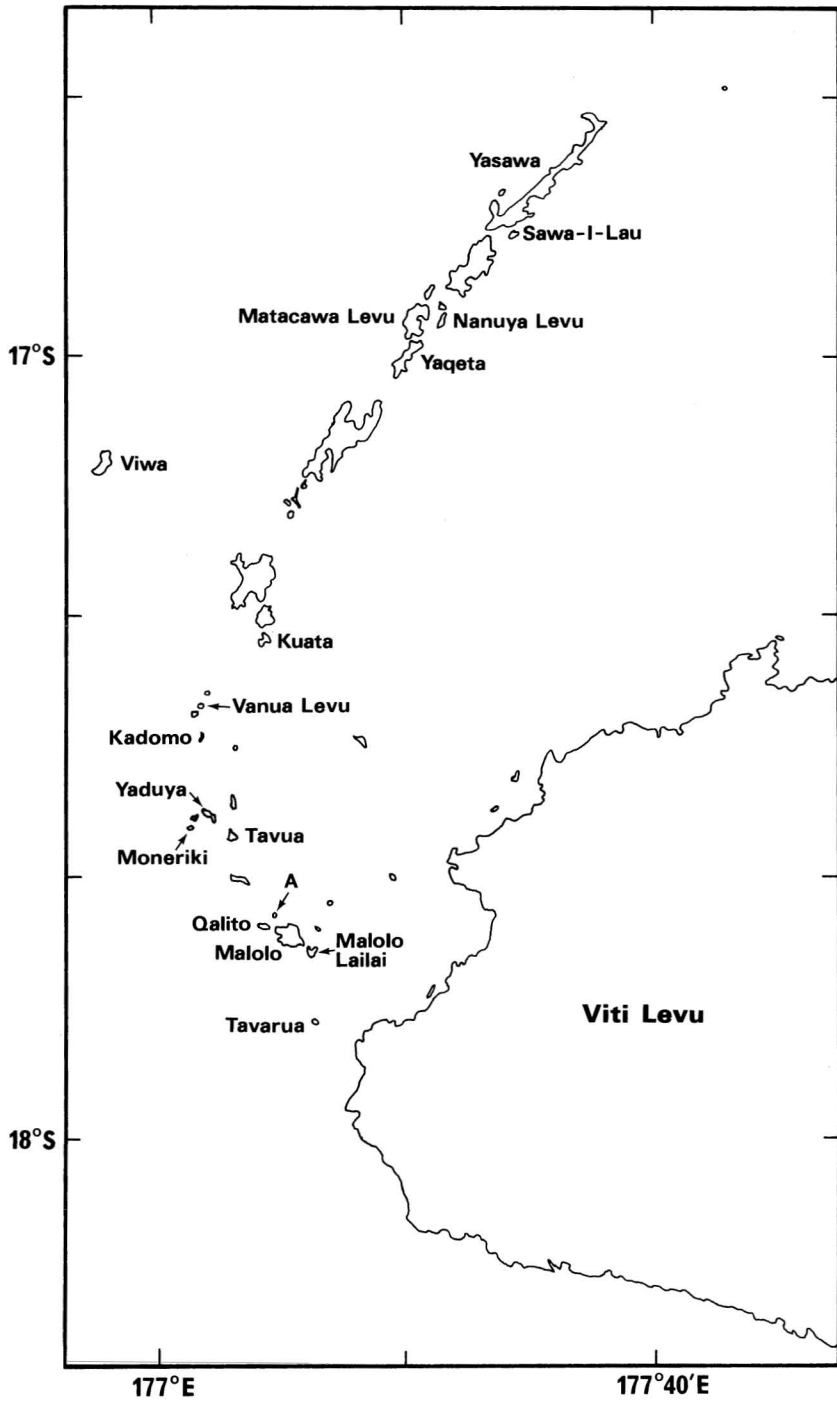


FIGURE 1. Map of the Yasawa and Mamanuca groups. Islands mentioned in the text are named. A is the small islet locally known as Honeymoon Island.

single specimen from Malolo (CAS 156049), together with two specimens from Malolo Lailai (Watling collection F556–57). An additional dot (indicating a specimen examined) is placed over Tavarua on his distribution map, although no specimen is listed from that island. I collected five specimens (AMS R132750–53, R132762) and saw many others by day under loose bark on dead stumps and trees along the foreshore on Kuata. As with other populations, the Kuata population was associated with human habitation (an abandoned plantation).

Two small, ovoid adherent eggs found together with several broken eggshells under loose bark on a small dead tree on Vanua Levu in April were assumed to belong to this species, although positive identification was impossible.

Family SCINCIDAE

Cryptoblepharus eximius Girard

Zug (1991) recorded this species from Malolo Lailai on his distribution map, although no specimen was listed. This species was common to abundant in foreshore habitats on every island visited, especially in and on strand vegetation, coral rubble, and rock outcrops on beaches. On Nanuya Levu (AMS R132708, several seen), Vanua Levu (AMS R132726–30, many seen), and Yaduya (AMS R132723–25, several seen), the species was observed only in those habitats. On Sawa-I-Lau (AMS R132695–97, R132756), the species was also seen in closed forest on a steep rocky slope. On the northwest side of Matakawa Levu, three (AMS R132709–10, R132759) were seen active in the early morning on dark basalt rocks on the coast. At Yaqeta (AMS R132711–13), several were seen on rocks and low branches in sunny patches on the fringe of a patch of dense coastal closed forest on a very steep limestone slope. On Kuata (AMS R132744–48), the species was abundant (several individuals per square meter) along the strand line, in nearby low vegetation (creepers, grasses, coconut husks), under bark on small dead trees and stumps, on rock outcrops and the walls of an abandoned concrete-block house, and even on bare sand. On Kadomo (AMS R132742–43, R132764), sev-

eral were active in sunny patches of deep leaf litter in coastal closed forest. On Moneriki (AMS R132717–22), many were found inactive at dusk under bark on stumps, under coral rubble, and in strand vegetation along the beachfront. On Honeymoon Island and Qalito, several individuals were observed active by day in sunny patches in coastal scrub abutting beaches and rocky headlands. On Malolo, the species was found in almost every habitat examined, from sandy beaches to dry open casuarina scrub with a sparse grassy understory on the highest parts of the island. The only habitat in which it was not found was closed forest. Activity was observed from ground level up to 3 m above ground on coconut palm trunks.

Most samples conformed to the coloration description provided by Zug (1991) (Figure 2A), but the three specimens from basalt rocks on Matakawa Levu were heavily melanized; one (AMS R132764 [Figure 2B]) of the Kadomo series was almost patternless and had a much paler brown dorsum than any other individual seen on that island. None of these atypically colored specimens differed from other material in scalational characters.

Fmoia concolor (Duméril)

Zug (1991) and Brown (1991) reported this species from Viwa. I recorded this species from four islands. On Nanuya Levu (AMS R132702–05, R132758), the species was common on tree trunks by day among the resort gardens, either basking in a head-down position or with just the head protruding from holes in the trunk. They appeared to be very territorial, with usually only one animal per trunk. On the few occasions when two were seen, one was rapidly chased away by the other. When individuals were approached to attempt capture, they usually stayed close to the ground (within 2 m) and circled horizontally around the trunk to escape observation, only ascending the trunk when actively pursued. All five animals collected in April were male; four (SVL = 63–85.5 mm) were apparently mature with enlarged turgid testes and opaque deferent ducts. On Yaqeta, a single adult was seen, but eluded capture. This individual initially was observed bask-



FIGURE 2. *A*, Normally patterned individual of *Cryptoblepharus eximius* from Malolo; *B*, Atypically patterned individual from Kadomo.

ing on a trunk and then moved to a rock face at the edge of a patch of coastal rain forest on a very steep limestone slope. On Kadomo, two (one taken [AMS R132734]) were seen on the same large fig in coastal closed forest. The collected specimen (SVL 68.5 mm) was an apparently mature but nongravid female. On Malolo, four individuals were observed: two basking in the morning on coconut palm trunks in a garden in a head-down position, one basking in midafternoon at the edge of a crevice on a rocky headland near a patch of dense scrub, and the fourth active at mid-morning among the canopy in a patch of dry closed forest.

Emoia cyanura (Lesson)

This widely distributed taxon was recently shown to consist of two broadly sympatric species, *E. cyanura* and *E. impar* (Werner) (Ineich 1987, Ineich and Zug 1991, Zug 1991). Terrestrial blue-tailed *Emoia* were seen on every island visited except Yaduya, Qalito, Honeymoon Island, and Moneriki (where collections were limited by the habitat visited [beachfront on the former two islands], weather conditions [overcast], and the time of day [dusk to night], respectively). On Sawa-I-Lau and Matakawa Levu, I was unable to catch the few individuals seen to positively identify the species involved. On Sawa-I-Lau, two individuals were seen, one in closed forest on the side of the central peak, and the other in coastal scrub. On the west side of Matakawa Levu, a single animal was active in the early morning at the edge of dense low scrubby vegetation overgrowing the edge of a coastal rock outcrop.

Of the five islands where voucher specimens were collected or individuals positively identified in the field, *E. cyanura* was present on Nanuya Levu (AMS R132698–701), Kadomo (AMS R132737–38), Kuata (AMS R132749), and Malolo (specimens examined in hand). At the former two localities, both *E. cyanura* and *E. impar* were collected syntopically. On Nanuya Levu, large numbers of blue-tailed *Emoia* were active by day in the resort gardens. On Kadomo, all lizards seen (both species) were active by day in largely

shaded patches of deep leaf litter (especially around the bases of trees) in closed forest behind the beach. On Kuata, three individuals were seen in association with an abandoned plantation and buildings: two active on the cinder-block walls of a house (moving up to 2 m above the ground) in bright sunshine, and one among ground creepers. On Malolo, the species was observed in settlement gardens and among strand-line debris and rocks behind a mangrove swamp.

The three largest female *E. cyanura* (SVL = 48.5–54.5 mm) collected in April had grossly dilated oviducts, but small ovarian follicles, suggesting recent oviposition. The single adult male (SVL = 42 mm) had enlarged turgid testes in April.

A single specimen of *E. cyanura* (National Museum, New Zealand [NMNZ] R1092) was previously reported from Tavua (Zug 1991).

Emoia impar (Werner)

Zug (1991) reported this species from the Yasawas on his distribution map, but did not list the basis for this record. I collected specimens from Yaqeta (AMS R132714–15), Vanua Levu (AMS R132731–33), Kadomo (AMS R132739–41), and Nanuya Levu (AMS R132757). On Yaqeta, several blue-tailed *Emoia* were seen active in dense undergrowth and closed forest on a steep limestone slope. On Vanua Levu, all lizards seen were in shaded situations, in leaf litter in closed forest along the foreshore. The preference for shaded situations at these localities and on Kadomo (see above) is in agreement with the observations of Zug (1991) for this species.

The three largest individuals collected (SVL = 37.5, 38, 47.5 mm) in April were mature males with enlarged turgid testes. The former two specimens are a little smaller than the smallest mature males reported by Zug (1991).

Emoia trossula Brown & Gibbons

Although Zug (1991) reported a single specimen (American Museum of Natural History [AMNH] 40507) from Yasawa Island, I did not find this species on any of the islands examined.

Lipinia noctua (Lesson)

Zug (1991) reported this species from Malolo Lailai, but did not list any specimen. A single gravid female (AMS R132763; SVL = 47 mm) carrying 1L/1R scaled embryos was collected under a log on the foredune on Kuata in April, and five individuals were found among piles of coconut husks in an abandoned plantation on Malolo.

DISCUSSION

Eight of the nine gecko and skink species recorded from the Yasawa and Mamanuca groups are common, widely distributed species in Fiji. Only *Hemidactylus frenatus* was reported from fewer than five Fijian islands by Zug (1991). This species is a human commensal elsewhere and was first reported from Fiji from the Nadi area in 1980 (Zug 1991). Its known distribution in the Yasawa and Mamanuca groups is restricted to two resort islands, close to Nadi, and it is probably a recent colonist. Similarly, *Lepidodactylus lugubris* is a human commensal and probably a recent colonist (Zug 1991).

The only two Fijian species known from more than six islands, and occurring on small islands, but not yet known from the Yasawa or Mamanuca groups, are *Emoia nigra* (Jacquinot & Guichenot) and *Nactus pelagicus* (Girard). The former species is mostly restricted to the larger islands in Fiji and may not occur in the Yasawa and Mamanuca groups. *Nactus pelagicus* likewise is apparently most common on the larger islands and only reaches the smaller islands in the east. However, Zug (1991) did not find it to be common anywhere in Fiji, and it may have been overlooked in the Yasawas.

Gehyra oceanica, *Emoia concolor*, *E. cyanura*, *E. impar*, *E. trossula*, and *Lipinia noctua*, together with *Nactus pelagicus*, were considered to form a "core" herpetofaunal assemblage on Fijian islands by Zug (1991). To these, I add *Cryptoblepharus eximius*, which is now known from over 30 islands of all sizes. All of these core species are considered to be good over-water colonists and are likely to have dispersed to the Yasawa

and Mamanuca groups following isolation (Zug 1991:101). This is in contrast to the vicariance pattern of speciation proposed for the sympatric *Brachylophus vitiensis* by Gibbons (1985).

The poor species diversity of the Yasawa and Mamanuca herpetofauna, with a lack of endemic skinks and geckos, is likely to have resulted from two factors. First, the islands in both groups are small. With the exception of *Leiopisma alazon* Zug, restricted to tiny Ono-I-Lau Island in the Lau group (Zug 1985), endemic species of skinks and geckos with limited distribution are mostly restricted to the larger islands (Viti Levu, Vanua Levu, Kadavu, Ovalau, Taveuni). Second, the climate of the Yasawa and Mamanuca islands is dry; both groups, together with the northern parts of Viti Levu and Vanua Levu, lie in a rain shadow (Gibbons 1985, Zug 1991). Consequently, only ecologically less specialized species are likely to have colonized them successfully.

ACKNOWLEDGMENTS

I thank Hal Cogger for inviting me to participate in the 1990 expedition and Susan Brown, Jim Juvik, Birandra Singh, Terry Boylan, Sandy Ingleby, and the crew of the *Paj* for their company and assistance. Collecting permits were organized by Birandra Singh.

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