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# First Update to Herpetofaunal Records from Timor-Leste

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**Abstract** Herpetological surveys of locations in six districts of Timor-Leste (Dili, Baucau, Ermera, Liquiça, Manatuto, Viqueque) during 2010 led to the discovery of a new, high-altitude species of *Cryptoblepharus* from Ermera District, a new country record (*Hemidactylus* cf. *tenkatei*), and the recording of two previously unvouchered species (*Python r. reticulatus* and *Liasis m. mackloti*). In this article, we summarize these new records and present numerous new district records for Timor-Leste and four records for road-killed snakes seen in West Timor (Indonesia). With the addition of the results from our 2009 survey, the update presented herein increases the confirmed number of amphibian and reptile species for Timor-Leste to 47.

**Keywords** herpetofauna, biodiversity, Timor-Leste, West Timor, Wallacea, *Cryptoblepharus*, *Hemidactylus* cf. *tenkatei*

## 1. Introduction

Timor-Leste comprises four component land areas (Figure 1), 1) the eastern half of Timor Island in the Outer Banda Arc of the Lesser Sunda Islands, an area of approximately 14,480 km$^2$; 2) the small (10 km$^2$) uninhabited Jaco Island, 750 m east of Timor's easternmost point; 3) the larger (105 km$^2$) inhabited Ataúro Island situated in the Inner Banda Arc, 25 km north of Dili; and 4) the Oecusse exclave (810 km$^2$), on the northern coast of Timor Island, 53 km west of contiguous Timor-Leste and surrounded on its landward sides by Indonesian West Timor. Its position at the southeastern edge of Wallacea makes the country an interesting area for students of biogeography, as it is here that some faunal elements from both the Southeast Asian and Australo-Papuan realms exist in closest proximity. Furthermore, because of the vicissitudes of 500 years of human history, the biodiversity of the eastern part of Timor Island received only very limited attention from field researchers until Timor-Leste achieved independence in 2002. For a more detailed discussion of the geography, geology, and habitats of Timor-Leste and a history of herpetological collecting in the country since the early 19$^{th}$ Century, the reader is referred to our initial report (Kaiser *et al*., 2011).

The Victor Valley College Herpetofaunal Survey of Timor-Leste was initiated in 2009 with fieldwork in seven of Timor-Leste's thirteen districts (Kaiser *et al*., 2011). We here report the results from two more surveys in the contiguous twelve districts of Timor-Leste during 2010. Two additional reports of our fieldwork in 2010, on the herpetofaunas of the Oecusse exclave (Sanchez *et al*.,

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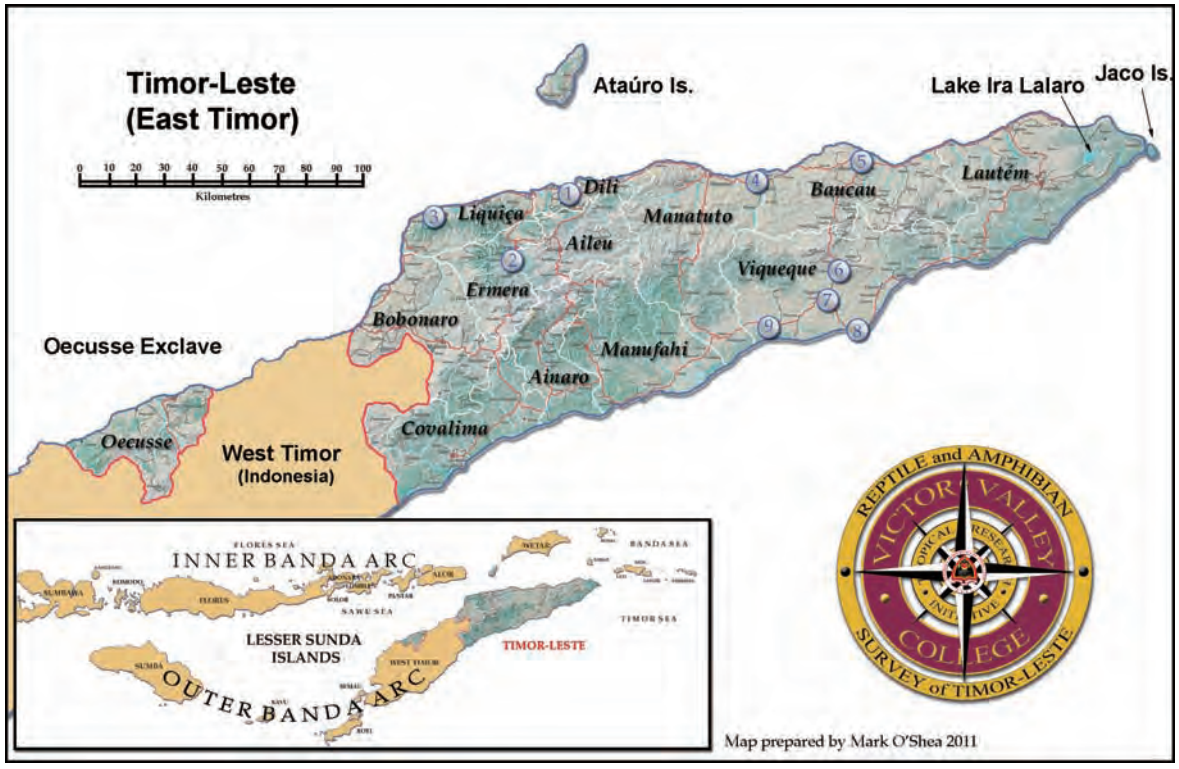


**Figure 1** Map of Timor-Leste and its position in the Lesser Sunda Islands. Numbered localities are listed in Table 1. Map prepared by Mark O'Shea.

2012) and of Ataúro Island (Sanchez *et al*., in prep.), will be presented separately.

## 2. Methods

Surveys were conducted during the wet season (27 January–9 February; Phase II) and dry season (18 June–10 July; Phase III) of 2010 at nine localities (Table 1). Included also are four records of road-killed snakes from the Atambua–Kefamenanu Road (2 July 2010) and the Sakato–Batugade Road (7 July 2010) in West Timor (Indonesia). The general methodology adopted for fieldwork as well as the preparation of voucher specimens and associated scientific tasks follow protocols detailed by Kaiser *et al*. (2011). The live python and most road-kills, depending on their state of decomposition, were skin- and scale-snipped for DNA. All specimens have been deposited in the National Museum of Natural History, Smithsonian Institution, Washington D.C., USA (USNM).

In the species accounts, we provide information to aid in identification, comment on new records in addition to those included in Kaiser *et al*. (2011), and discuss the natural history and circumstances of encountering each species. The recording or collection of taxa during particular phases is indicated in bracketed superscripted Roman numerals, following taxon names.

Common names are provided in English (E) and the country's indigenous language, Tetun (T). We have debated the merit of creating common names for each species we encounter in local languages, particularly Tetun. Given the complexity of applying such names in cases of morphologically very similar organisms (e. g., *Hemidactylus* geckos, *Carlia* and *Sphenomorphus* skinks) we concluded that in the interest of clarity we should refrain from creating a potentially confusing array of names with limited utility. Instead, we recommend that those needing to use Tetun names for species whose field identification is difficult do so in conjunction with part of their Latin binomial. For example, the common house gecko (*Hemidactylus frenatus*) can thus be known as "teki uma baibain frenatus".

## 3. Results

### Frogs and Toads (Order Amphibia)

**Family Bufonidae—True Toads**

***Duttaphrynus melanostictus*** [Phases II, III]

**Common names:** (E) Black-spined Toad, Common Asian Toad, Common Sunda Toad. (T) Manduku Interfet (manduku = frog, Interfet = International Force for East Timor).

**Table 1** List of localities surveyed by the Victor Valley College Herpetofaunal Survey of Timor-Leste during 2010[a]. Each locality includes a superscripted Roman numeral to indicate during which phase they were surveyed. Phase I took place in 2009 (results reported by Kaiser *et al.*, 2011), Phase II took place in the wet season of 2010 (January–February), and Phase III took place in the dry season of 2010 (June–July 2010). Locality numbers correspond to the locality indicators on the map (Figure 1).

| Locality No. | District | Locality | Elevation (m) | GPS coordinates[b] |
|---|---|---|---|---|
| 1[I, II, III] | Dili | Area of Dili Town and surrounds | 1–255 | S 08°33' E 125°32' |
| 2[I, II] | Ermera | Meleotegi River and Sta. Bakhita Mission, Eraulo | 1100–1250 | S 08°47' E 125°27' |
| 3[II] | Liquiça | 10 km W Maubara | 10 | S 08°36' E 125°15' |
| 4[III] | Manatuto | Area of Laleia Town | 42 | S 08°32' E 126°10' |
| 5[I, II, III] | Baucau | Area of Baucau Town and surrounds | 5–500 | S 08°28' E 126°28' |
| 6[I, III] | Viqueque | Timor Village Hotel and surrounds, Loihuno | 285 | S 08°47' E 126°23' |
| 7[III] | Viqueque | Area of Viqueque Town | 50–70 | S 08°50' E 126°23' |
| 8[III] | Viqueque | Beaçu Village | 30 | S 08°56' E 126°26' |
| 9[III] | Viqueque | Uma Boot Village | 12 | S 08°56' E 126°12' |

[a] We surveyed two additional areas, the northeastern portion of the Oecusse District and Ataúro Island (Dili District). The results of these surveys will be reported elsewhere (Oecusse District: Sanchez *et al*., 2012; Ataúro Island: Sanchez *et al.*, in prep).
[b] GPS coordinates are approximate to define the area in which the survey work was carried out. Exact localities are not provided to protect some of the unique and fragile habitats in Timor-Leste.

**Collection and natural history:** As the Tetun common name "Interfet" indicates, it is believed that this species arrived in Timor-Leste through the agency of the peacekeeping forces that entered in 1999, at the beginning of the United Nations administration of the country (see Kaiser *et al*., 2011 for a more detailed explanation). Whereas we only recorded this invasive species in the area of Same Town (Manufahi District) during the summer of 2009, we now report additional voucher material from the Meleotegi River (near Eraúlo, Ermera District: Locality 2), from Dili District (near Hera: east of Locality 1), and from Uma Boot Village (Viqueque District: Locality 9).

In addition to an unvouchered adult specimen found in a rock pile by the Meleotegi River, we encountered toadlets and tadpoles (Figure 2, top) for the first time at two localities. The locality near Hera along the main north coast road consists of an active buffalo wallow (Figure 2, bottom) in which schools of tadpoles coexist with a herd of domestic Asian water buffalos (*Bubalus bubalis*). We consider this locality noteworthy for two reasons. The first is the tadpoles' proximity to the busiest road in the country. Given the presumption that Asian toads were introduced onto Timor Island at some time during the last two decades, thriving populations along major traffic veins lend credence to the hypothesis that humans continue to drive the spread of the species (see Trainor, 2009 for a more complete assessment). Secondly, it is remarkable that amphibian larvae survive in this viscous environment of mud and fecal matter. The survival of any amphibian species in such condition is testament to extraordinary adaptive plasticity, which must include a superlative immune system.

The toadlet in Uma Boot Village (USNM [CMD 634]) was found next to a small pond (diameter < 4 m) with no other individuals seen. Even though neither the Uma Boot pond nor the buffalo wallow are in close proximity to centers of trade, they are evidently able to support a breeding population of this invasive species.

**Figure 2** An unexpected locality for tadpoles of *Duttaphrynus melanostictus* (top) was this buffalo wallow (bottom). The aquatic environment of buffalo wallows is thick and viscous, yet appears to provide suitable conditions for *D. melanostictus*. Photographs by Mark O'Shea (top) and Hinrich Kaiser (bottom).

**Family Dicroglossidae—Fork-tongued Frogs**
**Genus *Fejervarya*** [II, III]

**Common names:** (E) Rice Paddy Frogs. (T) Manduku natar (manduku = frog, natar = rice paddy).

**Collection and natural history:** Recorded widely during the summer of 2009 (from Dili, Ermera, Baucau, Manufahi, Viqueque, and Lautém Districts), we here document additional specimens from Eraúlo (Ermera District: Locality 2; USNM 579003), Baucau Town (Baucau District: Locality 5; USNM 578990), and Loihuno (Viqueque District: Locality 6; USNM 579018). We also record new voucher-based records for this complex from the Comoro River (Dili District: Locality 1; USNM [CMD 611]), and around Beaçu Village (Viqueque District: Locality 8; USNM 579014).

As their common name indicates, the distribution of rice paddy frogs is expected to parallel human agricultural activities to some degree and it is thought that the broad distribution of frogs in the genus *Fejervarya* in South and Southeast Asia may be related to the spread of rice agriculture (Kaiser *et al*., 2011). Our findings for the species occurring in Timor-Leste may indicate some degree of taxonomic distinctiveness, which is still unresolved, as well as very broad habitat use. We encountered these frogs in rice paddies (e. g., near the towns of Baucau and Viqueque), roadside and countryside swamps that appeared unrelated to any human agricultural activity (e. g., Baucau–Venilale Road, Eraúlo Village), roadside streams (near Beaçu Village), residential roadside cement drainage canals (Baucau Town), and next to a sandy beach in scrubby vegetation (near Beaçu Village). Such habitat diversity indicates considerable physiological plasticity. We documented tadpoles (Figure 3) and froglets in multiple size cohorts from rice paddy sites as well as from temporary puddles in grassy areas inundated by heavy rains.

**Family Rhacophoridae—Afro-Asian Foam-nest Treefrogs**
***Polypedates* cf. *leucomystax*** [II, III]

**Common names:** (E) Striped Treefrog, Four-lined Treefrog, Golden Treefrog. (T) Manduku ai-riskadu (manduku = frog, ai = tree, riskadu = striped) or manduku loron (manduku = frog, loron = sunlight).

**Collection and natural history:** Also reported widely, from Ainaro, Ermera, Manufahi, Viqueque, and Lautém Districts, during the summer of 2009, we here report additional specimens from the Comoro River (Dili District: Locality 1; USNM 578930) and from south of Baucau Lown (Baucau District: Locality 5; USNM 578950).

**Figure 3** Tadpole of a frog in the genus *Fejervarya* from an active rice paddy near Viqueque, Viqueque District, Timor-Leste (Locality 7). Photo by Mark O'Shea.

We encountered individuals of *P*. cf. *leucomystax* in very diverse habitat types during both the wet season and the dry season surveys of 2010. These included pristine swampy areas (e. g., south of Baucau) and inundated meadows (e. g., along the Viqueque–Ossu Road; USNM 578952), but also much drier localities (e. g., Comoro River near Dili). In drier areas, a common refuge for the species is provided by banana trees (*Musa*). These plants collect water in their leaf axils, and peeling back these leaves often reveals a treefrog in a small pool of water at the base of the leaf. In an extreme case, frogs were still found in these refuges even after local farmers had burnt off the undergrowth and the banana plant had been externally charred.

**Taxonomic comments:** *Polypedates leucomystax sensu stricto* is one of the most widely distributed frog species in Southeast Asia. It also poses a taxonomic conundrum where the Lesser Sunda populations are concerned. Not only are very few specimens available in museum collections from the region to the east of Lombok Island, the recent molecular analysis by Brown *et al*. (2010) places the single Lesser Sunda sample (from Lombok) as the sister group to samples from a monophyletic Philippine island grouping. Clearly, the integration of samples from Timor Island may provide an interesting new perspective.

Given the experience of MOS and HK with the species in locales outside the Lesser Sunda region, the morphological appearance and vocalizations of these treefrogs in Timor-Leste were already puzzling after our first survey in 2009. We have previously reported (Kaiser *et al*., 2011) a series of female specimens that by their noteworthy maximum size (SVL up to 70 mm) compared with males appeared to indicate a sexual size dimorphism greater than reported elsewhere (e. g., Inger, 1954). Should it be determined that taxonomic distinction is warranted, the name *P. sexvirgata* (Gravenhorst, 1829) might be available.

**Lizards (Order Lacertilia)**

**Family Agamidae—Agamas and Dragons**

***Draco timoriensis*** [II, III]

**Common names:** (E) Timor Flying Dragon, Timor Flying Lizard. (T) Teki liras (teki = gecko, liras = winged). In direct translation, the Tetun name means "flying gecko". We believe that this local name is not an indication that local residents are unable to tell a gecko from an agamid lizard but reflects instead the lack of an opportunity to have more than a fleeting glance at an individual because of the *Draco* lifestyle.

**Collection and natural history:** During 2009, *Draco timoriensis* was collected from locations in the south-central and eastern regions of the county, in Viqueque and Lautém Districts. Here we report additional specimens collected from Viqueque Town (Viqueque District: Locality 7; USNM 579037), near Timor-Leste's south coast, and from near Maubara (Liquiça District: Locality 3; USNM 579035) in the northwest of the country.

The locality near Maubara was a somewhat unexpected habitat for *Draco* because of its extremely dry nature and the near-absence of trees. We found one individual in a small tree surrounded by scrub vegetation along the main road. Two individuals were collected in the vicinity of the first, one from a single large tree in the middle of an expansive, seasonally dry riverbed with no additional trees nearby, and the other from a relatively small tree surrounded by scrub vegetation. In the Viqueque locality we collected an individual from a palm tree, the one and only time we have seen the species associated with a palm.

**Family Gekkonidae —True Geckos**

***Gekko gecko gecko*** [II, III]

**Common names:** (E) Tokay Gecko. (T) Toke.

**Collection and natural history:** During the summer survey of 2009 we collected or documented *Gekko g. gecko* from locations in Manufahi, Viqueque, and Lautém Districts. In this report we include additional locations from Beaçu (southern coastal Viqueque District: Locality 8; USNM 579057) and Maubara (Liquiça District: Locality 3; not vouchered) in the northwest. Due to the ease of this gecko's identification, by its size, unique physical attributes, and distinctive vocalization, we have been reluctant to collect numerous vouchers. As a consequence, several of our records are observations in the field, some of which have been documented photographically. The only gecko with which *G. g. gecko* could feasibly be confused is the morphologically distinct palm gecko (*G. vittatus*), a species which has been historically reported for Timor, but whose presence we have not yet verified.

One large adult was captured and released from the same solitary tree in the dry riverbed near Maubara from which we collected a specimen of *Draco*. In Beaçu Village, we observed a series of eggs (n = 8) in a tree stump, which we were able to identify as four clutches belonging to *G. g. gecko*. Identification was possible because resident children broke two eggs that had not yet hatched, revealing two nearly fully developed *G. g. gecko* embryos.

**Conservation comment:** With the emergence of false information regarding the healing properties of *G. gecko* tongues in traditional Chinese medicine (there are no documented medicinal uses for animal tongues in general and gecko tongues in particular, but relief of asthma, diabetes, cancer, and even HIV infection has been ascribed to them; Bauer, 2009; Caillabet, 2011), Timor-Leste, with its ethnic Chinese minority, must be considered a potential source of specimens for the Chinese market through trade via Indonesia. As a legacy of the violent Indonesian occupation of East Timor (1975–99), there is still a considerable amount of clandestine cross-border traffic and trade, with a strong possibility for the illegal trade in wildlife supported by demand from the Chinese market. We support the recently proposed inclusion of *G. gecko* under the CITES Treaty.

***Hemidactylus frenatus*** [II, III]

**Common names:** (E) Common Indo-Pacific House Gecko. (T) Teki uma baibain frenatus (teki = small gecko, uma = house, baibain = common).

**Collection and natural history:** During our 2009 survey we collected *Hemidactylus frenatus* from locations in Baucau, Viqueque, and Lautém Districts. During the wet and dry season surveys of 2010 we obtained additional vouchers from the Comoro River (Dili District: Locality 1; USNM 579088), south of Baucau Town (Baucau District: Locality 5; USNM 579082), locations around Viqueque Town (Viqueque District: Locality 7; USNM 579093) and Beaçu Village (Viqueque District: Locality 8; USNM 579092), and from near Maubara (Liquiça District: Locality 3; USNM 579077).

We collected voucher specimens of *H. frenatus* from a variety of natural habitats in both Liquiça and Viqueque Districts (Localities 3 and 7, respectively), and we noted that the species was abundant in all human habitations we surveyed. Noteworthy in terms of the health of individual geckos was the incidence of mite parasitism. Nearly 25% (3/13) of voucher specimens collected during Phases II and III were infected with small red mites (Acari: Pterygosomatidae). Interestingly, in our collections we

have encountered no individuals of *H. platyurus* or *H.* cf. *tenkatei* to date that were similarly afflicted.

***Hemidactylus platyurus*** [II, III]

**Common names:** (E) Common Flat-tailed Gecko. (T) Teki ikun belar (teki = small gecko, belar = flat, ikun = tail).

**Collection and natural history:** During the first survey in 2009 we obtained *Hemidactylus platyurus* in Viqueque and Lautém Districts, sometimes in sympatry with its congener *H. frenatus*. During the 2010 surveys this species was again collected alongside *H. frenatus* near Viqueque Town (Viqueque District: Locality 7; USNM 579113) and near Maubara (Liquiça District: Locality 3; USNM 579111). A single specimen was obtained in the hills above Dili (Dili District: Locality 1; USNM 579112).

***Hemidactylus* cf. *tenkatei*** [II] (Figure 4)

**Common names:** (E) Roti House Gecko. (T) Teki uma baibain Roti (teki = small gecko, uma = house, baibain = common).

**Identification:** *Hemidactylus* cf. *tenkatei* can be distinguished from *H. frenatus* by the presence of 16-20 longitudinal rows of large, strongly keeled tubercles, as opposed to the numerous scattered, small conical tubercles of its more common congener. It also lacks the broad, flattened, filamentous-edged tail and strongly webbed toes of *H. platyurus*. *Hemidactylus* cf. *tenkatei* may be distinguished from *Gehyra mutilata* (a species recorded from Lautém District during the 2009 survey) by the medial emergence of the claw from the distal digit in that species, and from *H. garnotii* (a parthenogenetic species not yet recorded from Timor-Leste) by the presence of enlarged keeled tubercles on its dorsum.

**Collection and natural history:** We collected six specimens of what we initially believed to be *Hemidactylus frenatus* from trees and rocks in the center of a seasonally dry riverbed, west of Maubara (Liquiça District: Locality 3; USNM 579064) on 6 February 2010. Upon later examination, one of these was reidentified as *H.* cf. *tenkatei* (A. M. Bauer, pers. comm.), the first specimen of the perianthropic *H. brookii* complex recorded from Timor-Leste. With a distribution ranging from Pakistan and Indian Ocean islands to the Philippines and south into the Lesser Sunda archipelago (Bauer *et al*., 2010), ancestors of *H. tenkatei* most likely found their way onto Roti Island, the type locality of the species, and later on to Timor Island by stowing away with neolithic human migrants and their chattels.

**Taxonomic comments:** Geckos called *Hemidactylus brookii* exist in museum collections from throughout South and Southeast Asia, and this broad distribution and the likely influence of historical human trading patterns has led to an inconsistent taxonomic treatment of these forms. Recently, Bauer *et al*. (2010) completed a molecular analysis, in which they restricted the distribution of true *H. brookii* to Borneo, Peninsular Malaysia, Burma, and Karnataka State in India. However, their analysis conspicuously lacked data from islands of the Indonesian Archipelago (Bauer *et al*., 2010).

The species *H. tenkatei* was described by van Lidth de Jeude (1895) based on three specimens from Roti, a small (1200 km$^2$) island off the extreme southwestern corner of Timor. Two decades later, de Rooij (1915) placed this species into the synonymy of *H. brookii* after a limited study of specimens from Flores and Wetar, presumably with literature accounts then available, but without the presentation of data. In two recent revisions of the *H. brookii* group, of which *H. tenkatei* is a member, Rösler and Glaw (2010) and Mahony (2011) removed *H. tenkatei* from the synonymy of *H. brookii*, but without studying the type material. Until these important specimens are included in an analysis, we conservatively refer to the species we observe in Timor-Leste (including the Oecusse exclave; Sanchez *et al*., 2012) as *H.* cf. *tenkatei*.

**Figure 4** *Hemidactylus* cf. *tenkatei* from the center of a seasonally dry riverbed, west of Maubara, Liquiça District, Timor-Leste (Locality 3). Photo by Mark O'Shea.

**Family Scincidae—Skinks**

**Genus *Carlia*** [II, III]

**Common names:** (E) Four-fingered Skinks. (T) Mamór liman-fuan haat (mamór = skink, haat = four, liman fuan = finger).

**Collection and natural history:** During 2009 we collected two potential montane forms of *Carlia* (referred to as sp. 1 and sp. 2) from Ainaro, Ermera, and Manufahi Districts, with both species occurring in sympatry along the Meleotegi River (Ermera District: Locality 2). In addition, we encountered two lowland forms (referred to as sp. 3 and sp. 4) in Lautém (Loré; Kaiser *et al*., 2011) and Baucau Districts (Locality 5), respectively. During the wet season of 2010 we collected additional specimens of

sp. 2 on the Meleotegi River (Locality 2; USNM 579130) while further vouchers of *Carlia* sp. 3 were collected from south of Baucau Town (Baucau District: Locality 5; USNM 579168). Additional specimens of sp. 3 were vouchered from Beaçu (Viqueque District: Locality 8; USNM 579092) during the dry season of 2010.

Whereas the montane forms sp. 1 and sp. 2 appear to be facultatively perianthropic, neither sp. 3 nor sp. 4 displayed similar characteristics. Whereas the former were most frequently seen in heavily or moderately disturbed habitats, the latter may instead thrive in moderately or lightly disturbed habitats. In all instances, sp. 3 was found in relatively dry vegetation, whereas sp. 4 appeared to be observed in more mesic situations. At the site south of Baucau (Locality 5), we captured sp. 4 in banana forest adjacent to small ponds. At the Beaçu site (Locality 8), sp. 4 was not seen, whereas sp. 3 occurred in dry vegetation right along the beach. Whether these microhabitat divisions are exclusive and truly characterize each putative species will require a more detailed study of the ecology of these forms.

**Genus *Cryptoblepharus*** [II] (Figure 5)

**Common names:** (E) Snake-eyed skink. (T) Mamór matan samea (mamór = skink, matan = eye, samea = snake). In the case of the known species *Cryptoblepharus leschenault* and *C. schlegelianus* we recommend the Tetun use of mamór matan samea leschenault and mamór matan samea schlegelianus, respectively.

**Collection and natural history:** During our initial survey in 2009 four specimens of the snake-eyed skink *Cryptoblepharus leschenault* were collected from lowland localities in Lautém and Baucau Districts. During the 2010 wet season a single specimen of *Cryptoblepharus* (USNM 579181) was collected alongside the Meleotegi River (Ermera District: Locality 2), at an altitude of almost 1180 m.

The single specimen (Figure 5) stood out not only by its presence at a montane elevation (both the described congeners *C. leschenault* and *C. schlegelianus* are coastal in their distribution) but also by a very different dorsal pattern. Whereas *C. leschenault* possesses a conspicuous fork in its pattern, which divides the medial line into two paravertebral lines beyond the head and resolves a three-lined pattern into a four-lined pattern (Horner, 2007: Figure 171), *C. schlegelianus* does not have a vertebral line, and its two dorsolateral lines form the border of a diffused lighter colored mid-dorsal area (Horner, 2007: Figure 188). The specimen we collected has three lines that run without convergence from the snout to mid-body, where they begin to become diffuse and merge into a lighter colored mid-dorsal stripe.

The individual was seen at a height of over 7 m above ground on the vertical trunk of a dead tree (diameter > 2 m), where it appeared to be foraging under loose bark. At the same time, six other snake-eyed skinks were observed on the same tree but at a greater height. The location of the tree itself was unremarkable, ca. 20 m distant from the riverbed of the Meleotegi River amongst other trees in open forest that lacked undergrowth. Just before capture via dislodging the individual with a blow-pipe, it was seen to feed on an insect.

**Taxonomic comments:** Since the Meleotegi River specimen differs from both *C. leschenault* and *C. schlegelianus*, we believe it to represent an undescribed highland taxon within the genus *Cryptoblepharus* (Kaiser *et al*., in prep.).

**Figure 5** The single specimen of a putative new species of *Cryptoblepharus* from a high-altitude habitat near the Saint Bakhita Mission in Eraúlo, Ermera District, Timor-Leste (Locality 2). Photo by Mark O'Shea.

**Genus *Eremiascincus*** [II]

**Common names:** (E) Night Skinks. (T) Mamór kalan (mamór = skink, kalan = night).

**Collection and natural history:** During the 2009 summer survey we recorded one wide-ranging highland species of *Eremiascincus* from Ainaro, Ermera, and Manufahi Districts, and one lowland form from a single locality in Lautém District. During the 2010 wet season survey a further series of the highland form were vouchered from the Ermera District locality (Locality 2; USNM 579203–08).

***Eutropis* cf. *multifasciata*** [II]

**Common names:** (E) Common Sun Skink, Many-lined Sun Skink. (T) Mamór loro (mamór = skink, loro = sun).

**Collection and natural history:** During 2009 specimens of *Eutropis* were collected at altitude from Ermera District (just to the south of Locality 2) and observed,

but not captured, in Lautém District (Loré, Kaiser *et al*., 2011). An additional specimen (USNM 579209) from the Ermera locality, discovered while basking on a concrete basketball court, was added to the series during the wet season of 2010.

***Lamprolepis* cf. *smaragdina*** [II, III]

**Common names:** (E) Emerald Tree Skink. (T) Mamór modok (mamór = skink, modok = green).

**Collection and natural history:** All the specimens of *Lamprolepis* vouchered during June–July 2009 came from a single locality in Lautém District. In January–February 2010 the series was expanded with a specimen from south of Baucau (Baucau District: Locality 5; USNM 579212), and in June–July 2010 by specimens from Viqueque Town and Beaçu on the south coast (Viqueque District: Localities 7 and 8, respectively; USNM 579213–14 and USNM 579215–16, respectively). All specimens came from lowland localities below 320 m.

Collection of *L. smaragdina* invariably occurred during the daytime and relied heavily on blow-piping. In all instances, individuals were on tree trunks > 5 m off the ground.

**Genus *Sphenomorphus*** [II]

**Common names:** (E) Wedge skinks. (T) Mamór ai laran (mamór = skink, ai laran = forest).

**Collection and natural history:** In 2009 four potential species of *Sphenomorphus* were collected. One, a lowland form, was common in coastal southeastern Lautém District (Loré; Kaiser *et al*., 2011), while the other three, highland forms (spp. 2–4) were known from two, one, and one specimens respectively. One of these (sp. 2) was collected in Ainaro (Maubisse; Kaiser *et al*., 2011) and Manufahi Districts (Same; Kaiser *et al*., 2011), while the other two were found in sympatry on the Meleotegi River (Ermera District: Locality 2). The small series of highland *Sphenomorphus* was expanded only slightly during the 2010 wet season with the collection of an additional specimen (sp. 3) from the Meleotegi River (Locality 2; USNM 579234).

**Family Varanidae—Monitor Lizards**

***Varanus timorensis*** [III]

**Common names:** (E) Timor Tree Monitor, Spotted Tree Monitor. (T) Lafaek rai-maran (lafaek = crocodile or large lizard, rai = dirt, maran = dry).

**Collection and natural history:** During our initial survey in 2009 we observed, photographed, and identified seven *Varanus timorensis* from three locations in Lautém District. During the 2010 dry season we were able to photographically voucher a recently road-killed female *V. timorensis* from near the road access to a bridge on the main northern coastal highway, at Lifau in Manatuto District.

While traveling along the north coast road east of Dili during all three surveys, we observed monitor lizards as they rapidly crossed the road in front of our vehicles. Whereas it was not usually possible to document these encounters, we noted that their frequency was greatest as the road traversed rice paddies. The road-killed specimen was found on the bridge approach, less than 100 m before the bridge head and as the road traverses an expanse of rice paddies. The specimen contained several mature ova, indicating that the female was close to egg deposition. Close examination of the carcass revealed three ticks (Acari: Ixodidae) attached to either axilla.

**Snakes (Order Serpentes)**

**Family Colubridae—Typical Snakes**

***Coelognathus subradiatus*** [III]

**Common names:** (E) Timor Racer, Lesser Sunda Racer, Lesser Sunda Trinket Snake. (T) Samea laho (samea = snake, laho = rat).

**Collection and natural history:** During 2009 a single specimen of *Coelognathus subradiatus* was collected from Baucau Town (Baucau District: Locality 5). During the summer of 2010 we obtained a further voucher specimen from Viqueque Town (Viqueque District: Locality 7; USNM 579240). The female individual (snout–vent length = 1097 mm, total length = 1321 mm) was spotted while it crossed the road in the outskirts of Viqueque, heading towards the Cuha River at dusk.

**Family Homalopsidae—Oriental and Australasian Mudsnakes**

***Cerberus* cf. *rynchops*** [II]

**Common names:** (E) Bockadam, Dog-faced Watersnake. (T) Samea natar (samea = snake, natar = rice paddy).

**Collection and natural history:** During our initial survey, a single specimen of *Cerberus* was collected from a rice paddy 5 km east of Baucau (Baucau District: Locality 5). A return to the same locality during heavy rain and a period of flooding along the road during the 2010 wet season resulted in the collection of a series of four more specimens (USNM 579235–38).

At the locality, the main road crosses a series of lowland rice paddies. At the time of the encounter, rains had caused several of the rice paddies to overflow, which inundated the road itself in places. Two of the specimens were seen crossing the road at the flooded section, using undulatory locomotion in their attempt to traverse the hard surface; two additional individuals were observed

among the rice plants. One of these was seen with its head visible at surface level while its body was hidden below the muddy water of the paddy. Upon approach, the snake withdrew its head below the surface, but was subsequently captured.

**Family Pythonidae—Pythons**

***Liasis mackloti mackloti*** [III] (Figure 6)

**Common names:** (E) Macklot's Water Python. (T) Fohorai-atan (fohorai = python, atan = slave). We have been unable to learn the origin of the peculiar Tetun common name.

**Identification:** *Liasis mackloti* is a much smaller species than *Python reticulatus*, achieving a maximum length of under 2.0 m. This is an almost unicolor brown snake with patterning confined to a few darker brown scales scattered over the entire body, while the underside, the chin and the throat and infralabials are white or cream. It has a moderately elongate head but the heat-sensitive labials pits are less conspicuous than in *P. reticulatus* or *P. timoriensis*, being most obvious on the posterior infralabials. The pupil of the eye is vertically elliptical and the iris grey to grey-brown.

**Collection and natural history:** Upon our arrival in Dili at the start of the summer 2010 survey we were presented with a live Macklot's water python captured by AR a few days earlier. The python was found in a UN container depot on the seafront of Dili. The property is located adjacent to a canalized drainage ditch. These ditches, which crisscross the city, are often full of water, dense vegetation, trash, and presumably also rodents, and they could therefore provide a suitable habitat for small to medium-sized large-bodied snakes preying on a wide variety of prey.

In addition to this live specimen we also encountered two road-killed *L. mackloti* during the same survey. These were found at Vemasse (Baucau District) and near Obrato (Manatuto District), both on the busy northern-coastal road that runs between Dili and the second largest city of Baucau. Both these snakes were found adjacent to the rice paddies that fringe the road throughout much of the route, indicating an apparent preference for semi-aquatic habitats.

**Taxonomic comment:** The genus *Liasis* is a paraphyletic Australo-Papuan genus comprising an Australian species (*L. olivaceus*), an Australopapuan species (*L. fuscus*), and a Lesser Sunda species (*L. mackloti*) with its sister taxon, the Papuan python genus *Apodora* (Rawlings *et al*., 2004). At one time the range of *L. mackloti* was considered to extend as far as New Guinea (McDowell, 1975; Parker, 1982) but those populations are now treated as *L. fuscus* (O'Shea, 1996). However, Rawlings *et al*. (2004) considered the lines between these two water python species somewhat blurred and indicated the possibility of the presence of *L. mackloti* on the coast of northwestern Australia. The taxonomy of these four species remains largely unresolved.

Subspecies are recognized for *L. mackloti* with the nominate subspecies described from Timor Island and also present on Semau Island, southwest of Timor, and Babar Island to the east. Stull (1932) described *L. mackloti dunni* from Wetar Island to the northeast, while Brongersma (1956) described *L. m. savuensis* from Sawu Island to the southwest, while simultanously placing *L. m. dunni* into the synonymy of *L. m. mackloti*. Rawlings *et al*. (2004) found phylogenetic evidence to support the continued recognition of all three taxa.

***Python reticulatus reticulatus*** **(Schneider, 1801)** [III] (Figure 7)

**Common names:** (E) Reticulated Python. (T) Fohorai-boot (fohorai = python, boot = big).

**Identification:** The reticulated python is the world's longest snake, achieving a historical length of up to 8.5 m (Tweedie, 1957), although most specimens encountered are considerably smaller. It is easily recognized by its size, patterning, and a series of distinctive heat-sensitive pits on the supralabials, infralabials, and the rostral scale. The pupil of the eye is vertically elliptical and the iris is orange.

**Collection and natural history:** We did not record pythons during our first two surveys, but we observed six captive pythons during the summer of 2010. Two were juveniles held as pets by villagers at Beaçu and Uma Boot villages (Viqueque District: Localities 8 and 9, respectively), while the third was a 2.0 m captive at Pante Macassar, Oecusse District (Sanchez *et al*., 2012). The remaining three specimens were large (2.6–3.6 m) specimens held in captivity on the outskirts of Dili and were later relocated to a suitable protected area.

In contrast to *Liasis mackloti* (see below), no reticulated python road-kills were observed during any of our surveys, leading us to conclude that *P. r. reticulatus* prefers forested habitats removed from the main thoroughfares

[1] *Python timoriensis* is often mistakenly known as the "Timor python." Although the type locality was given as Kupang in Indonesian West Timor, the species has not been recorded from Timor Island and people in Timor-Leste are unfamiliar with the snake when shown photographs. The species is known to occur on Flores and neighboring islands, to the north of Timor. It seems likely that the type specimen simply passed through Kupang, the main Dutch East Indian port in the region, on its way to Europe. More suitable common names would therefore be Lesser Sunda python or Flores python.

**Figure 6** Whole body (top left panel) and close-up of the head (bottom left panel) of a specimen of *Liasis m. mackloti* from Dili, Dili District, Timor-Leste (Locality 1). The locality where this specimen was captured (at the right on the right panel) is a heavily fenced United Nations container storage lot along the coast road in Dili. Photos by Mark O'Shea.

**Figure 7** Captive juvenile individual of *Python r. reticulatus* from Uma Boot Village, Viqueque District, Timor-Leste (Locality 9). Photo by Mark O'Shea.

and highways, and the wet rice paddies (favored by *L. m. mackloti*). Based on information from the residents, these snakes were captured near the locations where they were being kept as pets. A juvenile python from Beaçu Village (total length = 1015 mm) was captured as it attacked a family's chickens at night.

**Taxonomic comment:** Since its description (Schneider, 1801), the reticulated python was placed in the Afro-Asian genus *Python* yet, with the exception of *Python timoriensis* from Flores[1], the species is morphologically quite distinct from all other members of this genus. Rawlings *et al*. (2008) determined that *reticulatus* and *timoriensis* were sufficiently phylogenetically distinct from other species in the genus *Python* to warrant separate generic recognition. However, we believe that the generic name assigned to these two species by Rawlings *et al.* (2008) is taxonomically unavailable and therefore follow the more conservative decision by Zug *et al.* (2011) to retain the genus name *Python.* These two Python species are more closely related to the Australopapuan pythons, especially *Morelia amethistina* with which they bear a resemblance, than to Afro-Asian members of the genus *Python sensu stricto* (Lawson *et al*., 2004; McDowell, 1975; Rawlings *et al*., 2008).

*Python reticulatus* is the most widely distributed python species, occurring from Timor Island in the south, northwest through the entire Indo-Malayan Archipelago to the Southeast Asian mainland, where it ranges as far as Burma, and north to the Philippine island of Itbayat in the Batanes Group, a mere 170 km southeast of Taiwan (O'Shea and Lazell, 2008), comprising a total range from almost 10° 30' S to almost 21° 00' N. The recognition of subspecies is also a recent occurrence for *P. reticulatus,* despite efforts to split the species into numerous geographical populations. Auliya *et al*. (2002) described two isolated subspecies (*P. r. jampeanus* and *P. r. saputrai*) from the small islands of Tanahjampea and Selayar respectively, south of Sulawesi, but at the present time all other populations belong to the nominate subspecies (Schleip and O'Shea, 2010).

**Family Viperidae—True Vipers and Pitvipers**

***Trimeresurus* (*Trimeresurus*) *insularis*** [II, III]

**Common names:** (E) Lesser Sunda Island Pitviper, Island Pitviper, Lesser Sunda White-lipped Pitviper. (T) Samodok.

**Collection and natural history:** During 2009 we obtained four specimens of this frequently encountered pitviper from four locations in three districts (Baucau, Viqueque, Lautém). During the 2010 surveys this trend continued, with three specimens each recorded during wet season and dry season survey. During the wet season we obtained three specimens (one live, two road-killed) from roadside localities between Baucau and Venilale (Baucau District: Locality 5; USNM 579242), while during the dry season survey we collected a small specimen at Loihuna (Viqueque District: Locality 6; USNM 579243), while two road-killed specimens were documented in West Timor (see below). At the end of our third survey in Timor-Leste, *T. insularis* remained the most frequently encountered snake species.

The live specimen from the 2010 wet season was found at the edge of a dry rice paddy by night, in an area in which several geckos and a rodent were observed. The small specimen from Loihuna found during the 2010 dry season was encountered by night during a sweep of an inundated grassy meadow, where it lay in ambush alongside puddles with *Fejervarya* tadpoles. One of the road-killed specimens was found in June 2010 on a narrow dirt road, where it had been killed as a result of being struck by a machete.

**Taxonomic comment:** Until recently, we referred to this species as *Cryptelytrops insularis* (Kaiser *et al*., 2011). We here follow the more correct taxonomy as proposed by David *et al*. (2011), in that *Trimeresurus viridis* Lacépède, 1804 (= *Trimeresurus albolabris insularis* Kramer, 1977) is the true type species of the genus *Trimeresurus*, and not *Coluber gramineus* Shaw, 1802. Rearrangement of the nomenclature requires that the species *insularis* bear the generic name *Trimeresurus*, with the optional use of the subgeneric name *Trimeresurus* to preserve added taxonomic information. The genus *Cryptelytrops* is now considered a synonym of *Trimeresurus*.

**Records from West Timor (Indonesia):** On our drive to and from the Oecusse exclave of Timor-Leste (for a full report of our survey there see Sanchez *et al*., 2012) we encountered six road-killed snakes worthy of note. On 2 July 2010 we found a recently killed specimen of the Lesser Sunda racer (*Coelognathus subradiatus;* total length = 1571 mm) on the road between Atambua and Kefamenanu in eastern central West Timor (S 09°24' E 124°39'). The snake had been killed while crossing the wet road in the late afternoon, and was run over once more by a motorcyclist just after we had stopped to investigate. The other specimens were a *Liasis m. mackloti* and a *Trimeresurus insularis*, both in poor condition and advanced stage of decomposition.

On 7 July 2010 we found three road-killed snakes, representing three species, along the Sakato–Batugade road in northeastern West Timor. The first of these was a fairly fresh male specimen of *Liasis m. mackloti* (snout–vent length 1370 mm, total length 1650 mm; Figure 8),

**Figure 8** VLC with a dead male specimen of *Liasis m. mackloti* on the Sakato–Atambua road, West Timor. The specimen was killed by residents using a machete. Its sex could be determined from a hemipenis that had been everted by the pressure of tires on the body. Photo by Mark O'Shea.

whose body had been run over multiple times after having been killed with a machete near a resident's house, then thrown on the road (S 09°12' E 124°22').

The second specimen (S 09°04' E 124°47') was a *Lycodon capucinus* in an advanced state of decomposition. Identification of this individual was accomplished by scale counts. The third specimen (S 09°05' E 124°46') was a completely dried section of a green snake, tentatively identified as *Trimeresurus (Trimeresurus) insularis*. Based on the scalation and the overall size of the ventrals, this specimen was unusually large. We expect to confirm our identification with molecular data in the near future.

## 4. Discussion

The 2010 wet season and dry season surveys of the Victor Valley College herpetofaunal survey of contiguous Timor-Leste significantly expanded our knowledge of the distribution of Timor-Leste herpetofauna, most notably by the discovery of a new snake-eyed skink (genus *Cryptoblepharus*) and the addition of *Hemidactylus* cf. *tenkatei* to the list of species for the country. The number of amphibians and reptiles recorded for Timor-Leste now stands at 47, which is nearly double the number reported prior to the first survey in 2009. The herpetological species diversity is now approaching what might be expected for such a large, topographically complex island. Our work also reveals a considerable amount of single-island and regional endemism, as is commonly encountered throughout the Indo-Malayan biogeographic realm (e. g., Grismer, 2011).

Even though many of the species records described herein and by Kaiser *et al*. (2011) are not new to Timor Island and were reported by earlier authors, particularly by van Kampen (1923: frogs) and de Rooij (1915: lizards; 1917: snakes), we provide fresh material for comparative studies, in some cases for the first time since the 1820s. Furthermore, our collection of tissues along with whole specimens provides an opportunity to apply molecular analysis to questions of taxonomy and biogeography for the first time.

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## References

**Auliya M., Mausfeld P., Schmitz A., Böhme W.** 2002. Review of the reticulated python (*Python reticulatus* Schneider, 1801) with the description of new subspecies from Indonesia. Naturwissenschaften, 89: 201–213

**Bauer A. M.** 2009. Geckos in traditional medicine: forensic implications. Appl Herpetol, 6: 81–96

**Bauer A. M., Jackman T. R., Greenbaum E., de Silva A., Giri V. B., Das I.** 2010. Molecular evidence for the taxonomic status of *Hemidactylus brookii* group taxa (Squamata: Gekkonidae). Herpetol J, 20: 129–138

**Brongersma L. D.** 1956. On two species of boid snakes from the Lesser Sunda Islands. Proc Koninkl Nederl Akad Wetensch Amsterdam, 59: 290–300

**Brown R. M., Linkem C. W., Siler C. D., Sukumaran J., Esselstyn J. A., Diesmos A. C., Iskandar D. T., Bickford D., Evans B. J., McGuire J. A., Grismer L., Supriatna J., Andayani N.** 2010. Phylogeography and historical demography of *Polypedates leucomystax* in the islands of Indonesia and the Philippines: Evidence for recent human-mediated range expansion? Mol Phylog Evol, 57: 598–619

**Caillabet O. S.** 2011. Malaysia at centre of tokay gecko trade boom. Traffic Bull, 23 (3): 83–84

**David P., Vogel G., Dubois A.** 2011. On the need to follow rigorously the Rules of the *Code* for the subsequent designation of a nucleospecies (type species) for a nominal genus which lacked one: the case of the nominal genus *Trimeresurus* Lacépède, 1804 (Reptilia: Squamata: Viperidae). Zootaxa, 2992: 1–51

**de Rooij N.** 1915. The reptiles of the Indo-Australian Archipelago. I. Lacertilia, Chelonia, Emydosauria. Leiden, The Netherlands: E. J. Brill Ltd. 384 pp

**de Rooij N.** 1917. The reptiles of the Indo-Australian Archipelago. II. Ophidia. Leiden, The Netherlands: E. J. Brill Ltd. 334 pp

**Grismer L. L.** 2011. Lizards of Peninsular Malaysia, Singapore and their adjacent archipelagos. Frankfurt, Germany: Edition Chimaira. 728 pp

**Horner P.** 2007. Systematics of the snake-eyed skinks, *Cryptoblepharus* Wiegmann (Reptilia: Squamata: Scincidae)–an Australian-based review. The Beagle, Rec Mus Art Gallery Northern Terr Suppl, 3: 21–198

**Inger R. F.** 1954. Systematics and zoogeography of Philippine Amphibia. Fieldiana Zool, 33: 181–531

**Kaiser H., Lopes Carvalho V., Ceballos J., Freed P., Heacox S., Lester B., Richards S. J., Trainor C. R., Sanchez C., O'Shea M.** 2011. The herpetofauna of Timor-Leste: A first report. ZooKeys, 109: 19–86

**Lawson R., Slowinski J. B., Burbrink F. T.** 2004. A molecular approach to discerning the phylogenetic placement of the enigmatic snake *Xenophidion schaeferi* among the Alethinophidia. J Zool, 263: 285–294

**Mahony S.** 2011. Taxonomic revision of *Hemidactylus brookii* Gray: a re-examination of the type series and some Asian synonyms, and a discussion of the obscure species *Hemidactylus subtriedrus* Jerdon (Reptilia: Gekkonidae). Zootaxa, 3042: 37–67

**McDowell S. B.** 1975. A catalogue of the snakes of New Guinea and the Solomons, with special reference to those in the Bernice P. Bishop Museum. Part II. Pythoninae. J Herpetol, 9: 1–80

**O'Shea M.** 1996. A guide to the snakes of Papua New Guinea. Port Moresby, Papua New Guinea: Independent Publishing. 239 pp

**O'Shea M., Lazell J. D.** 2008. *Python reticulatus* (Reticulated Python) Philippines, Batanes. Herpetol Rev, 39: 486

**Parker F.** 1982. Snakes of Western Province. Port Moresby, Papua New Guinea: Division of Wildlife, Department of Lands and Environment

**Rawlings L. H., Barker D. G., Donnellan S. C.** 2004. Phylogenetic relationships of the Australo-Papuan *Liasis* pythons (Reptilia: Macrostomata) based on mitochondrial DNA. Austral J Zool, 52: 215–227

**Rawlings L. H., Rabosky D. L., Donnellan S. C., Hutchinson M. N.** 2008. Python phylogenetics: Inference from morphology and mitochondrial DNA. Biol J Linn Soc, 93: 603–619

**Rösler R., Glaw F.** 2010. Morphological variation and taxonomy of *Hemidactylus brookii* Gray, 1845, *Hemidactylus angulatus* Hallowell, 1854, and similar taxa (Squamata, Sauria, Gekkonidae). Spixiana, 33: 139–160

**Sanchez C., Lopes Carvalho V., Kathriner A., O'Shea M., Kaiser H.** 2012. First report on the herpetofauna of the Oecusse District, an exclave of Timor-Leste. Herpetol Notes, 5: 137–149

**Schleip W. D., O'Shea M.** 2010. Annotated checklist of the recent and extinct pythons (Serpentes, Pythonidae), with notes on nomenclature, taxonomy, and distribution. ZooKeys, 66: 29–79

**Schneider J. G.** 1801. Historiae amphibiorum naturalis et literariae. Fasciculus secundus continens Crocodilos, Scincos, Chamaesauras, Boas. Pseudoboas, Elapes, Angues, Amphisbaenas et Caecilias. Jena, Germany: Frommani. 374 pp

**Stull O. G.** 1932. Five new subspecies of the family Boidae. Occas Pap Boston Soc Nat Hist, 8: 25–30

**Trainor C. R.** 2009. Survey of a population of black-spined toad *Bufo melanostictus* in Timor-Leste: Confirming identity, distribution, abundance and impacts of an invasive and toxic toad. Report by Charles Darwin University to AusAID, contract agreement no. 52294. 46 pp

**Tweedie M. W. F.** 1957. The snakes of Malaya. Singapore: Government Printers. 143 pp

**van Kampen P. N.** 1923. The Amphibia of the Indo-Australian Archipelago. Leiden, The Netherlands: E. J. Brill. 304 pp

**van Lidth de Jeude T. W.** 1895. Reptiles from Timor and neighboring islands. Notes Leiden Mus, 16: 119–127

**Zug G. R., Gotte S. W, Jacobs J. F.** 2011. Pythons in Burma: Short-tailed python (Reptilia: Squamata). Proc Biol Soc Washington, 124(2): 112–136