

NOTES ON A COLLECTION OF AMPHIBIANS AND REPTILES FROM SOUTHERN LAOS, WITH A DISCUSSION OF THE OCCURRENCE OF INDO-MALAYAN SPECIES

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(with eight text-figures)

ABSTRACT.— Investigations of herpetological biodiversity were conducted at two adjacent localities of southern Laos. Our surveys focused on the Boloven Highlands and the adjacent lowland area of Xepian National Biodiversity and Conservation Area. A preliminary list of 75 species (22 amphibians, 1 chelonian, 25 lizards, and 27 snakes) is established, of which two are undescribed, and 17 are new records for Lao PDR (five amphibians, 12 reptiles), including a snake species collected in Vientiane. Two species recorded from southern Laos belong to the Indo-Malayan fauna (*Kaloula baleata* and *Gonocephalus grandis*). A brief comparison is made with other areas of South-east Asia.

KEYWORDS.— Amphibia, Reptilia, Laos, Boloven Highlands, Xepian National Biodiversity and Conservation Area.

INTRODUCTION

The herpetofauna of the Lao Popular Democratic Republic (hereafter merely referred to as Laos) probably ranks among the least known in mainland South-east Asia. Although Angel (1929), Bourret (1934, 1936a-b, 1939, 1942) and especially Deuve (1961a-b, 1962, 1963, 1970 [non-exhaustive list]) published specialized or general reviews of the herpetofauna of this country, very few regions have been subject to detailed reports on their herpetofauna prior to Stuart (1999). Most recent investigations bear either on Upper Laos or on the lowlands of Central Laos, or on mountain tracts of the Annamite Range.

In this paper, we describe a collection of amphibians and reptiles of southern Laos obtained during a short stay in May-June 2003 by Alexandre Teynié and the team of the Association “Société d’Histoire Naturelle Alcide d’Orbigny”, and during a visit by Thomas Cal-

ame and Benjamin Calmont, of the same team, in November-December 2003. Specimens were obtained from two adjacent areas of Champasak Province, selected as representatives of the lowland and montane herpetofaunas respectively. For the lowland fauna, we investigated mainly the vicinity of Ban Kiatgong (14° 34’N; 106° 12’E), Pathomphon District, a village located between 90 et 300 m a.s.l. in Xepian National Biodiversity and Conservation Area (hereafter referred to as Xepian NBCA) between 24 and 30 May, and between 24 November and 4 December. During this latter trip, collections were also made at Ban Taong, Xepian NBCA (14° 18’N; 106° 22’E), at elevations between 150 and 250 m asl.

Our efforts in the montane fauna were aimed at Ban Sepian, Paksong District, at 1200-1250 m a.s.l. in Boloven Highlands (15° 08’N; 106° 16’E; referred hereafter as Sepian, Boloven Highlands), investigated from 1 to 7 June 2003. This

mountain range has seemingly been neglected by herpetologists but is possibly of great biogeographical importance due to its isolated position between the plateaus of eastern Thailand and Cambodia and the Annamite Range. Some specimens collected in Vientiane, Pakse and Si Phan Don (The Four Thousand Islands) are also mentioned.

Xepian NBCA can be described as a region of lowland monsoon evergreen and lowland monsoon semi-evergreen forests (Collins et al., 1991), although some parts of the region are covered with open dry monsoon forest or have been converted to agricultural activities. Much of the vegetation of the park is composed of moist mixed deciduous forest (88%) and dry mixed deciduous forest (about 11%). This protected area, which was established in 1993, spans over 240,000 ha and lies between about 90 and 450 m a.s.l. It is situated at the extreme south of Laos, near the border with Cambodia, covering parts of the provinces of Champasak and Attapu (or Attapeu).

The Boloven Highlands, or Boloven Plateau (sometimes spelt as Bolaven, from Lao *Phu Phieng Bolaven*) are a broadly circular isolated basaltic mountain range 20 km to the east of Pakse, spanning over the provinces of Attapu, Champasak, Sekong and a small part of Salavan. It is regarded as an outlier of the Annamite Range. Its easternmost slopes are separated from the western foothills of the Annamite Range by the valley of the Kong River, which is 20 km wide at its narrowest point. This plateau has a mean elevation of approximately 1050 m and a maximum of 1716 m a.s.l. It is directly in the path of south-west monsoon rains and receives more than 4,000 mm of rain per year, one of the highest amounts in Laos. The main vegetation of the Boloven Highlands is montane rainforests and monsoon evergreen forests. Mixed broadleaf (*Quercus*, *Dipterocarpus*) and coniferous forests (genus *Podocarpus*) are widespread. However, the plateau, due to its fertile soil, is heavily cultivated to the north of Pakse and largely dissected by plantations of coffee, bananas, durians, cabages, potatoes, maize, tomatoes and other crops). Some savannahs are also

present. Slash-and-burn cultivation is largely used south-east of Pakse.

MATERIAL AND METHODS

The following list is based on preserved specimens for most species, although sight records were considered to be suitable for common, unquestionable species. No locally protected species were collected by the authors in the course of this study. Most specimens were photographed in life or freshly killed. Interesting specimens are described in detail. New records for Laos are preceded by an asterisk (*) in bold. Their status of new record for the country is derived from the list provided by Stuart (1999). Biological notes are exclusively based on our own field data and not on the literature.

Measurements, except body and tail lengths of reptiles, were taken with a slide-caliper to the nearest 0.1 mm; measurements of the body (all in millimetres) were taken to the nearest millimetre. Ventral scales were counted according to Dowling (1951). The terminal scute is excluded from the number of subcaudals. The number of dorsal scale rows at midbody is counted at the level of the ventral plate corresponding to half of the total ventral number. Values for symmetric head characters are given in left/right order.

Abbreviations. Measurements and morphometry. - SVL: Snout-vent length; TaL: Tail length; TaL/TL: ratio tail length/total length; TL: total length.

Scalation characters. - C3SL: number of scale(s) separating the 3rd SL from the subocular; C4SL: number of scale(s) separating the 4th SL from the subocular (left/right); Cep: number of cephalic scales on the shortest line separating the middle of supraoculars; DSR: dorsal scale rows; IL: infralabials; MSR: number of dorsal scale rows at midbody; SC: subcaudals; SL: supralabials; VEN: ventrals; Tem: temporals.

Museum abbreviations. - BMNH: The Natural History Museum, London; FMNH: Field Museum of Natural History, Chicago; MNHN: Muséum National d'Histoire Naturelle, Paris.

TAXONOMY**AMPHIBIA****ANURA**

Bufonidae Gray, 1825

Bufo melanostictus (Schneider, 1799)

Material examined. – Several specimens from the following localities: Vientiane, Vientiane Province; Sepian, Boloven highlands, Champasak Province, not preserved but photographed; other observed specimens: Ban Kiatngong and Xepian NBCA, both in Champasak Province.

Biology. – A common species, observed in various habitats, including in forest. Some melanistic or submelanistic specimens were seen around ponds on dark volcanic soils. Amplexus was photographed in Vientiane Province on 24 November.

Megophryidae Bonaparte, 1850

* *Leptobrachium* sp.

Material examined. – MNHN 2003.1167 (adult female; SVL 49.8 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – This specimen and another adult, not collected, were discovered in two different places under stones in disturbed areas, a road embankment and a grassfield in a pine plantation respectively. One specimen moved backwards at surprisingly high speed into its burrow. The members of this genus usually live in forests and reproduce in small streams.

Note. – This specimen belongs to a new species and will be described in another paper (Ohler et al., in prep.) Stuart (1999) recorded *Leptobrachium pullum* from the Annamite Foot-hills of Centre Laos and *Leptobrachium banae* Lathrop et al., 1998 from southern Laos.

Microhylidae Günther, 1858

Glyphoglossus molossus Günther, 1859

Material examined. – MNHN 2003.1168 (adult male), Pakse market, Champasak Province.

Biology. – This specimen was sold in the market among numerous specimens of the *Feljervarya limnocharis* group.

* *Kalophrynus interlineatus* (Blyth, 1855)

Material examined. – MNHN 2003.1169 (adult female; SVL 38.0 mm), Xepian NBCA, Champasak Province.

Biology. – This species was common in two localities, where it was observed on dark volcanic soil near a pond.

Note. – *Kalophrynus interlineatus* was not mentioned by Stuart (1999). It is otherwise known from southern Cambodia, China, Myanmar, Thailand and Vietnam. *Kalophrynus* are explosive breeders (Ohler, personal observation), being typically rather numerous but usually rare in collections.

* *Kaloula baleata* (Müller, 1836)

Material examined. – MNHN 2003.1170 (juvenile; SVL 30.7 mm), Kiatngong, Xepian NBCA, Champasak Province.

Biology. – Collected near the mouth of a stream leading into Kiatngong marsh.

Note. – This species was previously known only from South Thailand and West Malaysia, its northernmost locality being Phangnga Province (Pauwels et al., 2000). The discovery of this Indo-Malayan species in southern Laos extends its range by more than 1000 airline kilometers, but its distribution might be discontinuous due to the lack of suitable habitats and favourable climatic conditions in most of Thailand and Cambodia.

Kaloula pulchra Gray, 1831

Material examined. – Several specimens, Pakse, vicinity of the stadium, Champasak Province.

Biology. – These specimens were seen in flooded ditches around the stadium built in an urbanized area with, between human dwellings, wet lawns used occasionally as cow pastures. Several specimens were observed and / or identified by their call, a loud, sharp “honk” during a heavy rainshower at night.

Microhyla berdmorei (Blyth, 1856)

Material examined. – MNHN 2003.1171 (adult female; SVL 39.4 mm), MNHN 2003.1172 (adult male; SVL 31.7 mm), MNHN 2003.1173

(adult male; SVL 36.0 mm), Xepian NBCA, Champasak Province.

Biology. – Specimen MNHN 2003.1171 was collected in the forest on the bank of Huay Say (Say Stream). Specimen MNHN 2003.1173 was obtained near the mouth of a stream leading into Kiatngong marsh.

Microhyla butleri Boulenger, 1900

Material examined. – MNHN 2003.1174-1175 (adult males; both SVL 18.1 mm), between Phu San [Mt. San] and Phu Say [Mt. Say], Kiatngong, Xepian NBCA, Champasak Province.

Biology. – Collected by day under a stump near a forest pond.

Ranidae Raffinesque-Schmaltz, 1814

Chirixalus doriae Boulenger, 1893

Material examined. – MNHN 2003.1176 (adult male ? [poorly preserved]; SVL 18.4 mm), Nong Him Kao, Boloven Highlands, Champasak Province.

Biology. – Collected on a short tree on the bank of a small river.

Chirixalus nongkhorensis (Cochran, 1927)

Material examined. – MNHN 2003.1194 (adult female; SVL 36.1 mm), Xepian NBCA, Champasak Province.

Biology. – The specimen was collected by day on a spawn glued at about two meters above the ground under a broad leaf of a tree growing on the bank of a pond. Such a behaviour has been observed in *Chirixalus vittatus* (Boulenger, 1887) (Ohler, unpublished observation) and in treefrogs from Africa (Amiet, 1991) where it has been interpreted to be parental care behaviour. The present specimen was displaced and carried on its branch for more than half an hour, without changing its position on the spawn, even when it was disturbed by sunshine or ants.

Note. – This specimen is very similar in size and color pattern to the specimen No. 1076 figured by Taylor (1962: 532).

Fejervarya limnocharis group

Material examined. – MNHN 2003.1177 (adult female; SVL 36.9 mm), Xepian NBCA,

Champasak Province. – MNHN 2003.1179 (adult female; SVL 46.5 mm), Sepian, Boloven Highlands, Champasak Province. – MNHN 2003.1178 (juvenile; SVL 37.8 mm), near Kiatngong, Xepian NBCA, Champasak Province. – MNHN 2003.1197 (juvenile female; SVL 49.1 mm), Pakse market, Champasak Province.

Biology. – Common in various types of waterbodies, such as ponds, flooded ricefields and grassfields and marshes.

Note. – The systematics of this genus is very complicated because of the great similarity of recognized species (Dubois and Ohler, 2000). As no revision of this group is available for the Indochinese Region, no specific allocation can be made.

Limnonectes sp.

Material examined. – MNHN 2003.1180 (adult male? SVL 33.9 mm), Nong Him Kao, Boloven Highlands, Champasak Province. – MNHN 2003.1181 (juvenile female; SVL 29.4 mm), near Kiatngong, Xepian NBCA, Champasak Province.

Biology. – These specimens were collected by day.

Polypedates leucomystax group

Material examined. – Several specimens (not preserved), Xepian NBCA, Champasak Province; several specimens, not preserved, Sepian, Boloven Highlands, Champasak Province; one specimen (not preserved), Pakse, vicinity of the stadium, Champasak Province.

Biology. – Often collected at night in various habitats. The specimen from Paksé was collected at night on the bank of a ditch near the stadium, in the same conditions as *Kaloula pulchra*. In Kiatngong, many specimens were observed, most commonly perched at night on branches at 3-4 m above the ground near forest edges. Specimens from Sepian were often found close to streams and in the same habitats than in Kiatngong.

Note. – Until taxonomic revision including specimens from the whole of its large range has been conducted, specific allocation of population of this group will not be possible.

* *Philautus gryllus* Smith, 1924

Material examined. – MNHN 2003.1182 (adult male; SVL 18.9 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – A single specimen was collected at night at more than five meters above the ground at the edge of a forest.

Note. – This species was not mentioned by Stuart (1999). It is otherwise known from Vietnam.

* *Philautus odontotarsus* Ye & Fei, 1993

Material examined. – MNHN 2003.1183 (adult female; SVL 36.5 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – This species is common in various habitats. Specimens were observed during the night, usually located by their song, perched on trunks and branches between 2 and 5 m above the ground, either along banks of streams or in cultivated areas, especially around burned fields or near human dwellings.

Note. – This species belongs to a group of rhacophorine frogs that includes various nominal species which need revision (Ohler et al., 2002). Specimens belonging to this group were mentioned by Stuart (1999) as *Rhacophorus baliogaster* Inger et al., 1999. Pending for revision we apply the first available name. Frogs of this species are otherwise known from southern China and Vietnam.

Phrynoglossus martensii Peters, 1867

Material examined. – MNHN 2003.1184 (adult male; SVL 22.7 mm), Xepian NBCA, Champasak Province. – MNHN 2003.1185 (juvenile male; SVL 19.9 mm), MNHN 2003.1186 (juvenile male; SVL 20.8 mm), between Phu San [Mt. San] and Phu Say [Mt. Say], Kiatngong, Xepian NBCA, Champasak Province.

Biology. – Fairly common in various habitats. Our specimens were seen in open areas, such as in flooded ditches, ponds and marshes. Some were trapped in a well, others were observed in small forest ponds, on rocky or loose soils usually poorly covered in vegetation.

Note. – The genus *Phrynoglossus* also needs systematic revision (Stuart 1999). The specimen from Xepian NBCA has been allocated to *Phrynoglossus martensii* as it does not show the large warts and horny spinules present in some populations from Thailand, Laos and China which have been described in *Phrynoglossus magnapustulosus* (Taylor & Elbel, 1958). *P. martensii* is otherwise known from Thailand, southern China, Cambodia and Vietnam.

Rana erythraea (Schlegel, 1837)

Material examined. – MNHN 2003.1187 (adult female; SVL 46.4 mm), plus several not preserved specimens, Xepian NBCA, Champasak Province.

Biology. – Abundant, both by day and night, near a marsh, often perched on bushes and bamboos up to 2.5 m above the ground.

Note. – This specimen is smaller than adult females mentioned by Ohler and Mallick (2002) but it clearly belongs to *Rana erythraea* on the basis of its external morphology.

Rana macrodactyla (Günther, 1859)

Material examined. – MNHN 2003.1188 (adult female; SVL 35.5 mm), Xepian NBCA, Champasak Province.

Biology. – Abundant at night in the vicinity of a marsh.

* *Rana morafkai* Bain, Lathrop, Murphy, Orlov & Ho, 2003

Material examined. – MNHN 2003.1189-1190 (adult males; SVL 35.9 mm and SVL 42.8 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – Collected at night in a grassland bordering a stream at the edge of a forest.

Note. – This species was previously known only from its type locality, the Tay Nguyen Plateau of Vietnam's Central Highlands (Bain et al., 2003).

Rana nigrovittata (Blyth, 1855)

Material examined. – MNHN 2003.1191-1192 (both juveniles; SVL 27.1 mm and 27.4 mm), Xepian NBCA, Champasak Province.

Biology. – This species was obtained by day at the edge of a forest bordering a marshland.

Rana taipehensis Van Denburgh, 1909

Material examined. – MNHN 2003.1193 (adult female; SVL 44.2 mm), Xepian NBCA, Champasak Province.

Biology. – Collected at night in the low vegetation bordering a marshland.

Note. – This female is slightly larger than specimens allocated to *Rana taipehensis* by Ohler and Mallick (2002).

Gymnophiona

Ichthyophiidae Taylor, 1968

Ichthyophis cf. *kohtaoensis* (Taylor, 1960)

Material examined. – MNHN 2003.1195 (TL 252 mm), Sepian, Boloven Highlands, Champasak Province. - MNHN 2003.1196 (juvenile; TL 141 mm), Kiatngong, Xepian NBCA, Champasak Province.

Biology. – Specimen MNHN 2003.1195 was found during day time under a stone in a coffee plantation at the edge of a forest. The other animal was discovered under a board in a disturbed forest.

Note. – Our specimens are morphologically similar to the animal depicted in Stuart (1999: 44, Pl. 8), from the Annamite Mountains of Central Laos. For many years, the name *Ichthyophis glutinosus* (Linnaeus, 1758) has been used for south-east Asian specimens of *Ichthyophis* Fitzinger, 1826 with a brown body color and yellow lateral stripe. This name is now only applied to South Indian populations. There is no consensus on the taxonomy of Indochinese *Ichthyophis*. Gower et al. (2002) conducted molecular studies that included various populations from Southeast Asia and found minor genetic differentiation between populations. The specific allocation of striped *Ichthyophis* awaits a generic revision.

REPTILIA

CHELONII

Trionychidae Fitzinger, 1826

Amyda cartilaginea (Boddaert, 1770)

Material examined. – 1 specimen (juvenile; subsequently released; TL 142 mm), near Pakse, Champasak Province.

Biology. – Collected in a fish breeding pond, near a canal in a disturbed area.

LACERTILIA

Gekkonidae Gray, 1825

Cosymbotus platyurus (Schneider, 1797)

Material examined. – MNHN 2003.3369 (female; SVL 58 mm, TaL 41 mm), Pakse, vicinity of the stadium, Champasak Province. - 1 specimen (photographed only), Vientiane, Vientiane Prefecture.

Biology. – Collected active by day on the wall of a gas station.

* *Cyrtodactylus* sp.

Material examined. – MNHN 2003.3301 (juvenile male; SVL 33.3 mm, Tal 30.6 mm), northwest of Kiatngong, Xepian NBCA, Champasak Province.

Biology. – This animal was collected under a stone on the ground of an evergreen forest.

Note. – This specimen belongs to a new species that is being described in a separate paper (David et al., submitted.)

Dixonius siamensis (Boulenger, 1898)

Material examined. – MNHN 2003.3323 (sex unknown, tail truncated; SVL 35 mm), MNHN 2003.3324 (male; SVL 35 mm, tail truncated), MNHN 2003.3325 (sex unknown; SVL 34 mm), Xepian NBCA, Champasak Province. - MNHN 2003.3326 (sex unknown, tail truncated; SVL 40 mm), near Kiatngong, Xepian NBCA, Champasak Province.

Biology. – Common in primary and secondary forests, under stones and decayed vegetation, sometimes in disturbed areas. Specimen MNHN 2003.3326 was collected under a stone in a forest.

Note. – Cited by Stuart (1999) as *Phyllodactylus siamensis*.

Gekko gecko (Linnaeus, 1758)

Material examined. – 3 specimens (not preserved), Xepian NBCA, Champasak Province. - 1 specimen (photographed), Vientiane, Vientiane Prefecture.

Biology. – Xepian specimens were observed at night on a large tree trunk at the edge of a for-

est. No vocalization was heard during the period of investigation.

Hemidactylus frenatus Duméril & Bibron, 1836

Material examined. – Several specimens (not preserved), Pakse, vicinity of the stadium, Champasak Province. - Several specimens (not preserved), Vientiane, Vientiane Prefecture.

Biology. – This species, active by day and night, is very common on human dwellings.

Agamidae Spix, 1825

Acanthosaura lepidogaster (Cuvier, 1829)

Material examined. – MNHN 2003.3312 (male; SVL 80 mm, TaL 111 mm), Xepian NBCA, Champasak Province.

Biology. – This specimen was collected in the afternoon in a forest.

Note. – This specimen has dark colored throat and neck and a barely visible diamond-shaped black mark on the nape. Among the specimens deposited in the collections of the MNHN, we found this condition only in a male (MNHN 1997.4353) from Bana Nature Reserve, Na Hang, Tatke Sector, Vietnam.

Calotes versicolor (Daudin, 1802)

Material examined. – MNHN 2003.3308-3309 (females; SVL 76 mm, TaL 219 mm; SVL 73 mm, TaL 203 mm), Huay Say [Say Stream], south of Kiatngong, Xepian NBCA, Champasak Province. - MNHN 2003.3311 (juvenile; SVL 38 mm, TaL 88 mm), southwest of Kiatngong, Xepian NBCA, Champasak Province. - MNHN 2003.3307, MNHN 2003.3318 (females; SVL 82 mm, TaL >137 mm; SVL 76 mm, TaL >101 mm), Sepian, Boloven Highlands, Champasak Province. - Several specimens (not preserved but photographed), Vientiane, Vientiane Prefecture.

Biology. – This species is common in forests and along forest edges, in gardens and along lanes of cities. Specimens MNHN 2003.3308-3309 were collected in forest on the bank of Say Stream, while MNHN 2003.3311 was obtained in a ricefield. Specimen MNHN 2003.3318 was collected at dusk in a gallery forest.

Draco maculatus (Gray, 1845)

Material. – MNHN 2003.3305-3306 (males; SVL 77 mm, TaL 112 mm; SVL 76 mm, TaL 121 mm), Xepian NBCA, Champasak Province.

Biology. – Several specimens were observed in primary and secondary forests.

* *Gonocephalus grandis* (Gray, 1845)

Material examined. – MNHN 2003.3368 (female; SVL 62 mm, TaL 148 mm), near Kiatngong, Xepian NBCA, Champasak Province.

Biology. – This specimen was found asleep on a branch at 2 m above the ground, in a rocky part of the evergreen forest bordering Kiatngong marsh.

Note. – The occurrence in southern Laos of this Indo-Malayan species represents a major extension of range of about 1050 airline kilometers across the Gulf of Siam. Its previously northernmost known localities were in the provinces of Satun and Songkhla, in extreme southern Thailand (Taylor, 1963). This species, widely distributed in Malaysia and Western Indonesia, is otherwise unknown from other parts of the Indochinese Peninsula.

Pseudocalotes poilani (Bourret, 1939)

Material examined. – MNHN 2003.3319 (female; SVL 78.8 mm, TaL 124 mm) and 1 specimen (photographed but not collected), Sepian, Boloven Highlands, Champasak Province.

Biology. – Both specimens were observed at night perched on branches above a small stream.

Note. – We identified this specimen on the basis of Bourret (1939) and Hallermann and Böhme (2000). The type locality of this rare species was given by Bourret (1939) as “Bas Laos, entre Pak Song et Pak Sé” [Lower Laos, between Paksong and Pakse], namely at the northern edge of the Boloven Highlands. A casual scanning of the literature suggests that the present specimens are the second and third known for this species. Specimen MNHN 2003.3319 has 54 scale rows at midbody vs. 60 rows for the specimen described by Bourret (1939); other characters agree well.

This species was not mentioned by Stuart (1999), although he recorded *Pseudocalotes microlepis* (Boulenger, 1888) from the Annamite



FIGURE 1: *Kalophrynus interlineatus* (Blyth, 1855) in life, Xepian NBCA, Champasak Province (Photo A. Pourchon).

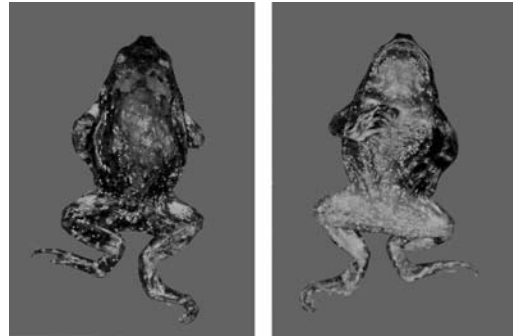


FIGURE 2: *Kaloula baleata* (Müller, 1836) MNHN 2003.1170, Kiatngong, Xepian NBCA, Champasak Province (Photo A. Ohler).



FIGURE 3: *Chirixalus nongkorensis* (Cochran, 1927) in life, Xepian NBCA, Champasak Province (Photo A. Pourchon).



FIGURE 4: *Pseudocalotes poilani*, in life, Sepian, Boloven Highlands (Photo A. Pourchon).

Range in southern Laos. This latter species is known from South Myanmar, South Thailand, southern Laos and from Langbian Plateau in South Vietnam. We could not compare Stuart's material with our own specimen.

Scincidae Gray, 1825

Eutropis longicaudata (Hallowell, 1857)

Material examined. – MNHN 2003.3317 (female; SVL 112 mm, TaL 184 mm), Xepian NBCA, Champasak Province.

Biology. – This specimen was collected at the edge between a forest and a marsh, while it was active at 11 AM on a ricestraw bundle.

Note. – We follow Mausfeld et al. (2002) and Mausfeld and Schmitz (2003) in referring to the genus *Eutropis* Fitzinger, 1843 Asian species formerly placed in the genus *Mabuya*.

Eutropis macularia (Blyth, 1853)

Material examined. – MNHN 2003.3316 (male; SVL 50 mm, TaL 66 mm [broken]), near Kiatngong, Xepian NBCA, Champasak Province. - MNHN 2003.3353 (male; SVL 67 mm, TaL 97 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – In Xepian NBCA, MNHN 2003.3316 and several other specimens were observed in primary and secondary forests. This species is more common in Boloven Highlands along forest edges and especially in disturbed areas.

Eutropis multifasciata (Kuhl, 1820)

Material examined. – Several specimens (not preserved), Xepian NBCA, Champasak Province. - Several specimens (not preserved), Sepian, Boloven Highlands, Champasak Province.



FIGURE 5: *Riopa corpulenta* (MNHN 2003.3322) in life, Sepian, Boloven Highlands, June 2003 (Photo A. Pourchon).



FIGURE 6: *Oreophis porphyraceus vaillanti* (MNHN 2003.3337) in life, Sepian, Boloven Highlands, June 2003 (Photo A. Pourchon).

- Several specimens (not preserved), Pakse, vicinity of the stadium, Champasak Province.

Biology. – All specimens were observed during the day. This species is fairly common in Xepian NBCA, especially in disturbed areas, but is much more scarce in surveyed places of the Boloven Highlands, where it was also seen in disturbed habitats.



FIGURE 7: *Trimeresurus macrops* (male) in life, Xepian NBCA, May 2003 (Photo A. Pourchon).

Lipinia vittigera (Boulenger, 1894)

Material. – 1 specimen (not preserved but photographed), Xepian NBCA, Champasak Province.

Biology. – This specimen was observed by day on the floor of an open forest.

Lygosoma quadrupes (Linnaeus, 1758)

Material examined. – MNHN 2003.3327 (sex unknown; SVL 45 mm, TaL 23 mm), Xepian NBCA, Champasak Province. - 1 specimen



FIGURE 8: *Trimeresurus vogeli* (juvenile male) in life, Sepian, Boloven Highlands, June 2003 (Photo A. Pourchon).

(not preserved), Sepian, Boloven Highlands, Champasak Province.

Biology. – In Xepian NBCA, this species has been found close to rice paddies bordered by forest. In the Boloven Highlands, it has been seen at the edge of forests and fields.

Note. – This wide ranging species was not mentioned by Stuart (1999), but it was cited from Laos by Welch et al. (1990).

* *Riopa angeli* Smith, 1938

Material examined. – MNHN 2003.3304 (male; SVL 100 mm, TaL 88 mm), Xepian NBCA, Champasak Province.

Biology. – Collected under the bark of a stump in a forest on the edge of a riparian area.

Note. – This species was previously known from its holotype and paratype, collected at Trang Bom, near Bien Hoa, Dong Nai Province, Vietnam (Smith, 1938), and from another specimen from Ma Da, in same province (Bobrov, 1992). We examined the holotype (MNHN 1937.0021), and it is identical in scalation and pattern to our specimen. Contrary to Smith's description, both the holotype and our specimen show a pair of slightly enlarged nuchals on each side.

* *Riopa bowringii* (Günther, 1864)

Material examined. – MNHN 2003.3320 (male; SVL 41 mm, TaL >12 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – A species common among volcanic boulders bordering a pond in an open forest.

Note. – This species was not mentioned by Stuart (1999).

Riopa corpulenta (Smith, 1921)

Material examined. – MNHN 2003.3322 (male; SVL 164 mm, TaL 140 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – This large specimen and another adult were found inside a large fallen trunk at the edge of a coffee plantation.

Note. – This species seems to be very scarce. Smith (1935) mentioned only two specimens known at his time. We examined both of them (BMNH 1946.8.3.66, from “Dalat, South Annam” and MNHN 1897.0416, from “Ban Taxeng, Pays des Khas”, now Ban Tasseng, Attapu Province, Laos), which are very similar in coloration and scalation. Our specimen has 34 scale rows at midbody, 6 supralabials, supranasals entire and in contact, and 2 frontoparietals behind the frontal. The discovery of this species in the Boloven Highlands extends the range of this species only slightly northwestwards, but would suggest that it is restricted to wet montane areas.

Scincella rufocaudata (Darevsky & Nguyen, 1983)

Material examined. – MNHN 2003.3314 (female; SVL 46, Tal > 49 mm), Sepian, Boloven Highlands, Champasak Province. - MNHN 2003.3315 (male; SVL 45 mm, Tal 87 mm), near a stream between Phu San [Mt. San] and Phu Say [Mt. Say], Xepian NBCA, Champasak Province.

Biology. – Specimen MNHN 2003.3314 was removed from beneath a wet stone in the stream, while MNHN 2003.3315 was collected on a rock in a dry area near human dwellings.

Note. – There is still considerable confusion in the taxonomy of Indochinese species of the

genus *Scincella*. Both specimens cited in this account agree very well with the description of *Sphenomorphus rufocaudatus* (Darevsky & Nguyen, 1983), a species placed in the genus *Scincella* by Bobrov (1993), and not considered by Ouboter (1986). We compared our specimens with three of the syntypes of *Lygosoma melanostictum* Boulenger, 1887, now *Scincella melanosticta*. Although these species are morphologically very close, our specimens agree better with the description of *Scincella rufocaudata*, a taxon cited from Central Laos by Stuart (1999), than with *Scincella melanosticta*. They are characterized by limbs barely in contact when adpressed, 32-34 dorsal scale rows and the presence of vivid pale red tail on lower surface of the male. It is possible that specimens cited by Stuart (1999) as *Scincella reevesii* (Gray, 1839) are indeed referable to *Scincella melanosticta*. This latter species has not yet been cited from Laos.

* *Scincella rupicola* (Smith, 1916)

Material examined. – MNHN 2003.3310 (sex unknown; SVL 45 mm, TaL 61 mm), near Kiatngong, Xepian NBCA, Champasak Province.

Biology. – This specimen was active by day in a rocky clearing crossed by a stream.

Note. – The morphology of this specimen agrees well with the characters of *Lygosoma rupicola* Smith, 1916 as given in Taylor (1963) and Ouboter (1986). It has 32 dorsal scale rows and one pair of slightly enlarged nuchals. This poorly known taxon has previously been recorded from eastern Thailand and southern Vietnam.

Sphenomorphus maculatus (Blyth, 1853)

Material examined. – MNHN 2003.3302-3303 (males; SVL 37 mm, TaL 58 mm; SVL 41 mm, TaL > 72 mm), Xepian NBCA, Champasak Province.

Biology. – Both specimens were collected while they were foraging in the morning on rocky soil among bushes on the edge of a dry ricefield.

* *Sphenomorphus tridigitus* (Bourret, 1939)

Material examined. – MNHN 2003.3367 (sex unknown; SVL 35 mm, TaL 29 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – This specimen was collected by day, hidden inside a log laying on grass near a small creek in an open forest.

Note. – This specimen is the second known of this very rare species, previously known only from the holotype (MNHN 1948.0060). Its description and generic allocation will be treated elsewhere (Greer et al., submitted.)

* *Tropidophorus microlepis* Günther, 1861

Material examined. – MNHN 2003.3321 (male; SVL 67 mm, TaL 79 mm), Huay Saoe [Saoe Stream], near Taong, Xepian NBCA, Champasak Province. - 1 specimen (not preserved), Huay Say [Say Stream], near Kiatngong, Xepian NBCA, Champasak Province.

Biology. – Specimen MNHN 2003.3321 was removed from a stone in the water of the stream.

Note. – This specimen agrees well with the description appearing in Smith (1935). It is definitely not *Tropidophorus laotus* Smith, 1923, a species cited by Stuart (1999).

Lacertidae Batsch, 1788

Takydromus sexlineatus ocellatus Cuvier, 1829

Material examined. – MNHN 2003.3313 (female; SVL 44 mm, TaL >116 mm), southwest of Kiatngong, Xepian NBCA, Champasak Province.

Biology. – This specimen was collected in a ricefield. Another adult specimen, not collected, was observed once in an open area.

Note. – The authorship of the family Lacertidae follows Dubois (2004).

Varanidae Gray, 1827

Varanus salvator (Laurenti, 1768)

Material examined. – 5 specimens (not collected, offered for sale by native people), Xepian NBCA, Champasak Province. - 1 specimen seen in Pakse market, Champasak Province.

Note. – A species regarded as “Potentially at risk” in Laos by Stuart (1999).

SERPENTES

Typhlopidae Gray, 1825

Ramphotyphlops braminus (Daudin, 1803)

Material examined. – MNHN 2003.3349-3350 (TL 62 mm; TL 104 mm [SVL 101 mm, TaL 3 mm]), Xepian NBCA, Champasak Province.

Biology. – Specimens seen under stones and decayed wood in forest or at forest edge.

Xenopeltidae Bonaparte, 1845

Xenopeltis unicolor Boie, 1827

Material examined. – MNHN 2003.3335 (juvenile; SVL 202 mm, TaL 26 mm), Xepian NBCA, Champasak Province.

Biology. – This specimen, with a bright white-pink nuchal collar (turning to pure white in preservative), was collected at the limit between a marsh and a forest while it was active at night after a heavy rainshower.

Note. – This species was not listed from southern Laos by Stuart (1999), although Deuve (1970) cited it from this part of the country.

Cylindrophiiidae Fitzinger, 1843

Cylindrophis ruffus (Laurenti, 1768)

Material examined. – MNHN 2003.3333 (SVL 205 mm, TaL 7 mm) and 2 specimens (adult; not preserved), Xepian NBCA, Champasak Province.

Biology. – One adult was found dead on the road, whereas the second one was discovered under a large stone at the edge of a marsh. The juvenile specimen was collected at night at the border of a marsh and a forest after a rainshower.

Note. – This species was not cited from southern Laos by Stuart (1999), although Deuve (1970: 69) suggested that it was often met with in the southern part of this country.

Pythonidae Fitzinger, 1826

Python molurus bivittatus Kuhl, 1820

Material examined. – 1 specimen (freshly prepared skin of a subadult specimen, TL slightly above 2 m), an isolated hamlet on the bank

of a tributary of Kong River, on the road from Paksong to Attapu, Champasak Province.

Note. – This specimen was obviously recently killed in the vicinity of the village.

Colubridae Opperl, 1811

Ahaetulla prasina (Boie, 1827)

Material examined. – MNHN 2003.3352 (SVL 806 mm, TaL 474 mm), Xepian NBCA, Champasak Province.

Biology. – Collected by day, perched at about 1.5 m above the ground on a bush in a clearing of an evergreen forest.

Note. – This beautiful specimen was in life bright golden yellow speckled with black on the first half of the body (as depicted in Stuart, 1999: Plate 10), turning to mid-grey on the posterior half of the body and tail after a short area of transition.

Calamaria pavementata Duméril, Bibron & Duméril, 1854

Material examined. – MNHN 2003.3340 (SVL 160 mm, TaL 12 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – This adult specimen was collected under a stone in a small banana groove.

Note. – This species had not been previously reported from southern Laos. It was not cited from Laos by Stuart (1999), but was mentioned from North Laos by Inger and Marx (1965) and Deuve (1970).

Chrysopelea ornata (Shaw, 1802)

Material examined. – MNHN 2003.3365 (female; SVL 598 mm, TaL 249 mm) and 1 specimen (not collected), Th Na, Kiatngong, Xepian NBCA, Champasak Province.

Biology. – Specimen MNHN 2003.3365 was collected by day perched at 1.5 m above the ground on a bush on the edge of a cultivated area. The other specimen was seen perched in same conditions in a plantation of teak.

Coelognathus radiatus (Boie, 1827)

Material examined. – MNHN 2003.3336 (female; SVL 321 mm, TaL 77 mm), Sepian, Boloven Highlands, Champasak Province. - 1 specimen (juvenile; photographed), Si Phan

Don [= Four Thousand Islands], Champasak Province.

Biology. – Specimen MNHN 2003.3336 was collected while it crossed a road by day near a coffee plantation. The second animal was observed swimming between two islands of the Mekong at more than 100 m from the shore.

Note. – We follow Helfenberger (2001) and Utiger et al. (2002), who placed this species into the genus *Coelognathus* Fitzinger, 1843.

Dendrelaphis cyanochloris (Wall, 1921)

Material examined. – MNHN 2003.3328 (female; SVL 889 mm, TaL 431 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – This snake was collected by day foraging on the ground in a coffee plantation.

Note. – Our specimen, with a total length of 1320 mm is close to the maximal total length (1330 mm) reported by Manthey and Grossmann (1997). This species has not been previously reported from southern Laos. Stuart (1999) recorded it from Annamite foothills of central Laos.

Dendrelaphis pictus (Gmelin, 1789)

Material examined. – MNHN 2003.3354-3356 (males; SVL 573 mm, TaL 297 mm; SVL 546 mm, TaL 271 mm; SVL 394 mm, TaL 179 mm), Xepian NBCA, Champasak Province. - MNHN 2003.3357 (female; SVL 719 mm, TaL 318 mm), Kiatngong, Xepian NBCA, Champasak Province.

Biology. – A common species, active by day or often at night, between 2 and 4 m above the ground on bushes and bamboo clumps at the edge of marshes. Specimen MNHN 2003.3357 was crossing a ricefield.

Enhydris jagorii (Peters, 1863)

Material examined. – MNHN 2003.3347-3348 (females; SVL 353 mm, TaL 70 mm; SVL 155 mm, TaL 33 mm), Xepian NBCA, Champasak Province.

Biology. – This species is common in the vicinity of marshes and rice paddies. It is active at night, more rarely during day time.

Enhydris plumbea (Boie, 1827)

Material examined. – MNHN 2003.3341 (male; SVL 295 mm, TaL 37 mm), MNHN 2003.3342 (female; SVL 135 mm, TaL 20 mm), Xepian NBCA, Champasak Province. - MNHN 2003.3346 (male; SVL 241 mm, TaL 38 mm), Kiatngong, Xepian NBCA, Champasak Province.

Biology. – A species commonly seen in the vicinity of marshes and paddies. Specimen MNHN 2003.3346 was collected under a stone near a pond.

* *Oligodon barroni* (Smith, 1916)

Material examined. – MNHN 2003.3329 (male; see Table 1), Xepian NBCA, Champasak Province. - MNHN 2003.3330 (female; see Table 1), Huay Saoe [Saoe Stream], near Taong, Champasak Province.

Biology. – The specimen from Xepian NBCA was collected during day time at the edge of a forest. The other snake was removed from beneath a stone laying on wet sand on the bank of Saoe Stream.

Note. – This species was not mentioned by Stuart (1999), and Deuve (1970) listed it only as a potential Laotian species. It is otherwise known from Thailand, Cambodia and South Vietnam.

Oligodon cinereus (Günther, 1864)

Material examined. – MNHN 2003.3332 (female; see Table 1), Xepian NBCA, Champasak Province.

Biology. – This specimen was collected during day time at the edge of a forest.

Note. – This juvenile was brightly coloured in life, with a reddish-brown background with white, black-edged crossbars. It belongs to Form IV of Smith (1943: 217), known from central and southern Vietnam. This species was not cited from southern Laos by Stuart (1999).

* *Oligodon fasciolatus* (Günther, 1864)

Material examined. – MNHN 2003.3344 (female; see Table 1), Vientiane, Vientiane Prefecture.

Biology. – This juvenile specimen was collected at night in the room of a hotel in the city of Vientiane.

Note. – We follow Wagner (1975) in referring Indochinese populations with 21 or 23 scale rows at midbody, long identified in the literature as *Oligodon cyclurus*, to *Oligodon fasciolatus* (Günther, 1864). As a result, *Oligodon fasciolatus* is known from eastern Myanmar, Thailand, Cambodia, Laos and Vietnam, whereas *O. cyclurus* (Cantor, 1839) is restricted to India, Bangladesh, and western, central and northern Myanmar. More information on this synonymy appeared in Pauwels et al. (2002). This species was cited, from North Laos only, by Stuart (1999: 59; Pl. 10) as *Oligodon cyclurus*. Deuve (1970: 153) mentioned it as *Holarchus purpurascens* (Schlegel, 1837).

* *Oligodon inornatus* (Boulenger, 1914)

Material examined. – MNHN 2003.3331 (female; see Table 1), Xepian NBCA, Champasak Province.

Biology. – This specimen was collected by day while crossing a forest path.

Note. – We follow Wagner (1975) for the definition of this species. It was not mentioned by Stuart (1999). It is otherwise known from eastern Thailand and Cambodia.

* *Oligodon ocellatus* (Morice, 1875)

Material examined. – MNHN 2003.3343 (female; see Table 1), Xepian NBCA, Champasak Province.

Biology. – The sole observed specimen was seen during day time at the edge of a primary forest.

Note. – We follow Wagner (1975) for the definition of this species, long confused with *Oligodon cyclurus*. In pattern and scalation, our specimen is typical of *Oligodon ocellatus*. This species has not previously been cited under this name from Laos. It is otherwise known from Cambodia and Vietnam.

Oreophis porphyraceus vaillanti (Sauvage, 1876)

Material examined. – MNHN 2003.3337 (female; SVL 502 mm, TaL 105 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – This adult was collected while active at night at the limit between a cultivated area and a forest.

Note. – We follow Utiger et al. (2002), who placed this species, long known as *Elaphe porphyracea*, into their new genus *Oreophis*. Although *Oreophis porphyraceus* has previously been cited from North Laos by Deuve (1970), Schulz (1996), Schulz and Helfenberger (1998) and Stuart (1999), its occurrence in the Boloven Highlands represents a southeastwards range extension of about 550 airline kilometers from the previously southernmost known locality. Following Schulz and Helfenberger (1998) and on the basis of its scalation and pattern, the present specimen is referable to *Oreophis porphyraceus vaillanti* (Sauvage, 1876), a taxon otherwise known from southeastern China, northern Vietnam and northern Laos.

Pareas hamptoni (Boulenger, 1905)

Material examined. – MNHN 2003.3338 (male; SVL 331 mm, TaL 105 mm), 1 specimen (adult, not preserved but photographed), Sepian, Boloven Highlands, Champasak Province.

Biology. – Both specimens were seen at night near a forest stream. One was coiled on a fern overhanging water, the other one was active in foliage at about 2.5 m above the ground.

Note. – This species has been recorded from Laos, but was not cited from the South by Stuart (1999).

Pareas margaritophorus (Jan, 1866)

Material examined. – MNHN 2003.3339 (female; SVL 351 mm, TaL 63 mm), Sepian, Boloven Highlands, Champasak Province.

Biology. – This snake was discovered inside a burned trunk along with six eggs.

Psammodynastes pulverulentus (Boie, 1827)

Material examined. – MNHN 2003.3334, MNHN 2003.3370 (females; SVL 282 mm, TaL 67 mm; SVL 385 mm, Tal 87 mm), Xepian NBCA, Champasak Province.

Biology. – Specimen MNHN 2003.3334 was collected on a forest path during day time. The other one was obtained by day while it was perched at about 1.5 m on a branch over a dry stream in an open forest.

Note. – This species has been recorded from Laos, but was not cited from the South by Deuve (1970) and Stuart (1999).

Ptyas korros (Schlegel, 1837)

Material examined. – 1 specimen (not preserved), Xepian NBCA, Champasak Province.

Note. – Several specimens were seen offered for sale on Pakse market, Champasak Province. This species was regarded as “Potentially at risk” in Laos by Stuart (1999).

Ptyas mucosa (Linnaeus, 1758)

Material examined. – Several specimens (not preserved), offered for sale in Pakse market, Champasak Province.

Note. – A species regarded as “Potentially at risk” in Laos by Stuart (1999).

Rhabdophis subminiatus subminiatus (Schlegel, 1837)

Material examined. – MNHN 2003.3351 (head and anterior part of body only), 1 specimen (not preserved), Sepian, Boloven Highlands, Champasak Province. – MNHN 2003.3366 (female; SVL 513 mm, TaL 183 mm), Kiatngong, Xepian NBCA, Champasak Province.

Biology. – Specimens from the Boloven Highlands were found dead on the road near the village of Ban Sepian. Specimen MNHN 2003.3366 was collected by day near a small river bordering grassland and cultivated areas.

Xenochrophis flavipunctatus (Hallowell, 1860)

Material examined. – MNHN 2003.3345 (female; SVL 441 mm, TaL 173 mm), Kiatngong, Xepian NBCA, Champasak Province. – 1 specimen (kept alive), Xepian NBCA, Champasak Province.

Biology. – MNHN 2003.3345 was collected in a ricefield between the village and a marshland. The other specimen, an adult female, was collected during day time by a native.

Note. – Contrary to Deuve (1970) and Stuart (1999), we regard *Xenochrophis flavipunctatus* and *Xenochrophis piscator* (Schneider, 1799) as distinct species. These taxa are identifiable with the key provided by Taylor (1965: 832).

Crotalidae Opperl, 1811

Trimeresurus macrops Kramer, 1977

Material examined. – MNHN 2003.3358-3360 (male; juvenile female; juvenile male; see Table 2), Xepian NBCA, Champasak Province.

Biology. – A locally common species in evergreen forest. We observed five adult or subadult males and three juvenile specimens, all in the vegetation of forest rocky outcrops, both during day and night.

Note. – This species was previously known from Thailand (Centre, North and East), Cambodia and Vietnam (David and Ineich, 1999). Main morphological characters of our specimens are given in Table 2. It should be noted that specimen MNHN 2003.3360 has 19 dorsal scale rows at midbody, a rare condition in this species. Specimen MNHN 2003.3358 is depicted alive on Fig. 7. We examined another Laotian specimen of this species (FMNH 254800; from Lac Xao, Bolikhamxay Province), in Centre Laos, which was previously identified as *Trimeresurus popeiorum* Smith, 1937 (possibly one of the two specimens of this latter species cited by Stuart [1999] from central Laos). *Trimeresurus macrops* has long been confused with *Trimeresurus albolabris* (Gray, 1842), a species of open vegetation, which was not encountered during the present survey.

Trimeresurus vogeli David, Vidal & Pauwels, 2001

Material examined. – MNHN 2003.3361-3364 (2 males, 2 females; see Table 2) and 1 specimen (juvenile, alive at the time of writing this paper), Sepian, Boloven Highlands, Champasak Province.

Biology. – One specimen was collected during day time in a coffee plantation, one at a

Table 1: Primary morphological characters of specimens of *Oligodon*.

Number	Sex	SVL	TaL	TaL/TL	VEN	SC	MSR	PSR	SL	IL	Tem
<i>Oligodon barroni</i>											
MNHN 2003.3329	M	262	62	0.191	143	42	17	15	7/7	9/9	1+2/1+2
MNHN 2003.3330	F	312	51	0.140	152	34	17	15	7/7	9/9	1+2/1+2
<i>Oligodon cinereus</i>											
MNHN 2003.3332	F	144	17	0.106	167	31	15	15	8/8	8/8	1+2/1+2
<i>Oligodon fasciolatus</i>											
MNHN 2003.3344	F	148	22	0.129	181	40	21	17	8/8	9/9	1+2/1+2
<i>Oligodon inornatus</i>											
MNHN 2003.3331	F	144	17	0.106	161	31	15	15	8/7	7/7	1+2/1+2
<i>Oligodon ocellatus</i>											
MNHN 2003.3343	F	339	56	0.142	165	41	19	15	8/9	10/10	2+2/2+2

Table 2: Primary morphological characters of specimens of *Trimeresurus*.

Number	Sex	SVL	TaL	TaL/TL	VEN	SC	MSR	SL	C3SI	C4SL	Cep
<i>Trimeresurus macrops</i>											
MNHN 2003.3358	M	322	81	0.201	164	72	21	10/9	0/0	1/1	7
MNHN 2003.3359	F	176	31	0.150	167	54	21	10/11	1/0	1/1	9
MNHN 2003.3360	M	168	40	0.192	164	70	19	10/10	0/0	0/0	8
<i>Trimeresurus vogeli</i>											
MNHN 2003.3361	F	670	141	0.174	158	61	20	10/10	0/1	1/1	11
MNHN 2003.3362	M	508	117	0.187	160	68	21	10/9	0/0	1/1	14
MNHN 2003.3363	F	633	124	0.163	157	61	21	10/10	0/0	1/1	13
MNHN 2003.3364	M	400	90	0.184	160	71	21	9/9	0/0	1/1	12

Table 3: List of reptiles and amphibians recorded from Xepian NBCA, Sepian, and other localities of southern Laos. *Abbreviations.* XEP: Xepian NBCA; SEP: Sepian, Boloven Highlands; SLa: Other localities in southern Laos. For these three columns, data come from this paper and cited references.

Taxa	XEP	SEP	SLa	References
AMPHIBIA				
GYMNOPIHONA				
Ichthyophidae				
<i>Ichthyophis cf. kohtaoensis</i> (Taylor, 1960 [1])	X	X	X	Stuart (1999); this paper
ANURA				
Bufonidae				
<i>Bufo galeatus</i> Günther, 1864	-	-	X	Stuart (1999)
<i>Bufo macrotis</i> Boulenger, 1887	-	-	X	Stuart (1998, 1999)
<i>Bufo melanostictus</i> (Schneider, 1799)	X	X	X	Stuart (1998, 1999); this paper
Megophryidae				
<i>Leptobrachium banae</i> Lathrop, Murphy, Orlov & Ho, 1998	-	-	X	Stuart (1999)
<i>Leptobrachium</i> sp.	-	X	-	This paper
<i>Leptolalax pelodytoides</i> (Boulenger, 1893)	-	-	X	Stuart (1999)
Microhylidae				
<i>Calluella guttulata</i> (Blyth, 1855)	-	-	X	Stuart (1999)
<i>Glyphoglossus molossus</i> Günther, 1859	-	-	X	Stuart (1999); this paper
<i>Kalophrynus interlineatus</i> (Blyth, 1855)	X	-	X	Stuart (1999 [2]); this paper
<i>Kaloula baleata</i> (Müller, 1836)	X	-	-	This paper

Taxa	XEP	SEP	SLa	References
<i>Kaloula pulchra</i> Gray, 1831	-	-	X	Stuart (1998, 1999); this paper
<i>Kaloula mediolineata</i> Smith, 1917	-	-	X	Stuart (1999)
<i>Microhyla annamensis</i> Smith, 1923	-	-	X	Stuart (1999)
<i>Microhyla berdmorei</i> (Blyth, 1856)	X	-	X	Stuart (1998, 1999); this paper
<i>Microhyla butleri</i> Boulenger, 1900	X	-	X	Stuart (1998, 1999); this paper
<i>Microhyla heymonsi</i> Vogt, 1911	-	-	X	Stuart (1998, 1999)
<i>Microhyla ornata</i> (Duméril & Bibron, 1841)	-	-	X	Stuart (1998, 1999)
<i>Microhyla pulchra</i> (Hallowell, 1861)	-	-	X	Stuart (1998, 1999)
<i>Micryletta inornata</i> (Boulenger, 1890)	-	-	X	Stuart (1999)
Ranidae				
<i>Chirixalus doriae</i> Boulenger, 1893	-	X	X	Stuart (1999); this paper
<i>Chirixalus nongkhorensis</i> (Cochran, 1927)	X	-	X	Stuart (1998, 1999); this paper
<i>Fejervarya limnocharis</i> (Gravenhorst, 1829)	X	X	X	Stuart (1998, 1999); this paper
<i>Hoplobatrachus chinensis</i> (Osborn, 1765)	-	-	X	Stuart (1998, 1999 [3])
<i>Limnonectes</i> sp.	X	X	X	Stuart (1999 [4]); this paper
<i>Paa microlineata</i> (Bourret, 1937)	-	-	X	Stuart (1999)
<i>Polypedates leucomystax</i> group	X	X	X	Stuart (1998, 1999); this paper
<i>Philautus gryllus</i> Smith, 1924	-	X	-	This paper
<i>Philautus odontotarsus</i> Ye & Fei, 1993	-	X	-	This paper
<i>Occidozyga lima</i> (Gravenhorst, 1829)	-	-	X	Stuart (1998, 1999 [5])
<i>Phrynoglossus martensii</i> Peters, 1867	X	-	X	Stuart (1998, 1999); this paper
<i>Rana attigua</i> Inger Orlov & Darevsky, 1999	-	-	X	Stuart (1999)
<i>Rana erythraea</i> (Schlegel, 1837)	X	-	X	Stuart (1998, 1999); this paper
<i>Rana johnsi</i> Smith, 1921	-	-	X	Stuart (1999)
<i>Rana lateralis</i> Boulenger, 1887	-	-	X	Stuart (1998, 1999)
<i>Rana macrodactyla</i> (Günther, 1859)	X	-	X	Stuart (1998, 1999); this paper
<i>Rana morafkai</i> Bain, Lathrop, Murphy, Orlov & Cuc, 2003	-	X	X	Stuart (1999 [6]); this paper
<i>Rana nigrovittata</i> (Blyth, 1855)	X	-	X	Stuart (1998, 1999) ; this paper
<i>Rana taipehensis</i> Van Denburgh, 1909	X	-	X	Stuart (1998, 1999) ; this paper
<i>Rhacophorus baliogaster</i> Inger, Orlov & Darevsky, 1999	-	-	X	Stuart (1999 [7])
<i>Rhacophorus exechopygus</i> Inger, Orlov & Darevsky, 1999	-	-	X	Stuart (1999)
TOTAL AMPHIBIA	15	10	37	

REPTILIA**CHELONII**

Platysternidae

Platysternon megacephalum Gray, 1831 - - X Stuart (1999)

Trionychidae

Amyda cartilaginea (Boddaert, 1770) - - X Stuart (1998, 1999); this paper

Pelochelys cantorii Gray, 1864 - - X Stuart (1998 [8], 1999)

Bataguridae

Cuora amboinensis (Daudin, 1801) X - X Stuart (1998, 1999)

Cyclemys dentata (Gray, 1831) - - X Stuart (1999)

Heosemys grandis (Gray, 1860) X - X Stuart (1998, 1999)

Hieremys annandalii (Boulenger, 1903) X - X Stuart (1998, 1999)

Malayemys subtrijuga (Schlegel & Müller, 1844) X - - Stuart (1998, 1999)

Taxa	XEP	SEP	SLa	References
Testudinidae				
<i>Indotestudo elongata</i> (Blyth, 1853)	X	-	X	Davidson et al. (1997); Stuart (1998, 1999)
<i>Manouria impressa</i> (Günther, 1882)	-	-	X	Stuart (1999)
CROCODYLIA				
Crocodylidae				
<i>Crocodylus siamensis</i> Schneider, 1801	-	-	X ?	Stuart (1999); probably extinct
LACERTILIA				
Gekkonidae				
<i>Cosymbotus platyurus</i> (Schneider, 1799)	-	-	X	Stuart (1999); this paper
<i>Cyrtodactylus</i> sp.	X	-	-	This paper
<i>Dixonius siamensis</i> (Boulenger, 1898)	X	-	X	Stuart (1998, 1999 [9]) ; this paper
<i>Gekko gecko</i> (Linnaeus, 1758)	X	-	X	Stuart (1998, 1999); this paper
<i>Gekko petricolus</i> Taylor, 1962	-	-	X	Stuart (1999)
<i>Hemidactylus frenatus</i> Duméril & Bibron, 1836	-	-	X	Stuart (1999) ; this paper
<i>Hemidactylus gamotii</i> Duméril & Bibron, 1836	-	-	X	Stuart (1999)
Agamidae				
<i>Acanthosaura capra</i> Günther, 1861	-	-	X	Stuart (1999)
<i>Acanthosaura lepidogaster</i> (Cuvier, 1829)	X	-	X	Stuart (1999); this paper
<i>Calotes emma</i> Gray, 1845	-	-	X	Stuart (1999)
<i>Calotes versicolor</i> (Daudin, 1802)	X	X	X	Stuart (1998, 1999); this paper
<i>Draco maculatus</i> (Gray, 1845)	X	-	X	Stuart (1999); this paper
<i>Gonocephalus grandis</i> (Gray, 1845)	X	-	-	This paper
<i>Physignathus cocincinus</i> Cuvier, 1829	X	-	X	Stuart (1998, 1999)
<i>Pseudocalotes microlepis</i> (Boulenger, 1888)	-	-	X	Stuart (1999)
<i>Pseudocalotes poilani</i> (Bourret, 1939)	-	X	-	This paper
Uromastycidae				
<i>Leiolepis belliana</i> (Gray, 1827)	-	-	X	Stuart (1999)
<i>Leiolepis rubritaeniata</i> Mertens, 1961	-	-	X	Stuart (1998 [10], 1999)
Scincidae				
<i>Eutropis longicaudata</i> (Hallowell, 1857)	X	-	X	Stuart (1998, 1999); this paper
<i>Eutropis macularia</i> (Blyth, 1853)	X	X	X	Stuart (1998, 1999); this paper
<i>Eutropis multifasciata</i> (Kuhl, 1820)	X	X	X	Stuart (1998, 1999); this paper
<i>Lipinia vittigera</i> (Boulenger, 1894)	X	-	X	Stuart (1999); this paper
<i>Lygosoma quadrupes</i> (Linnaeus, 1758)	X	X	-	This paper
<i>Riopa angeli</i> Smith, 1938	X	-	-	This paper
<i>Riopa bowringii</i> (Günther, 1864)	-	X	-	This paper
<i>Riopa corpulenta</i> (Smith, 1921)	-	X	X	Smith (1935); This paper
<i>Scincella rufocaudata</i> (Darevsky & Nguyen, 1983)	X	X	-	This paper
<i>Scincella rupicola</i> (Smith, 1916)	X	-	-	This paper
<i>Sphenomorphus indicus</i> (Gray, 1853)	-	-	X	Stuart (1999)
<i>Sphenomorphus maculatus</i> (Blyth, 1853)	X	-	X	Stuart (1999); this paper
<i>Sphenomorphus tridigitus</i> (Bourret, 1939)	-	X	-	This paper
<i>Tropidophorus microlepis</i> Günther, 1861	X	-	-	This paper
Lacertidae				
<i>Takydromus sexlineatus ocellatus</i> (Cuvier, 1829)	X	-	-	This paper
Varanidae				
<i>Varanus bengalensis nebulosus</i> (Gray, 1831)	-	-	X	Davidson et al. (1997); Stuart (1998, 1999)

Taxa	XEP	SEP	SLa	References
<i>Varanus salvator</i> (Laurenti, 1768)	X	-	X	Davidson et al. (1997); this paper
SERPENTES				
Typhlopidae				
<i>Ramphotyphlops braminus</i> (Daudin, 1803)	X	-	X	Stuart (1998, 1999); this paper
Uropeltidae				
<i>Cylindrophis ruffus</i> (Laurenti, 1768)	X	-	-	This paper
Xenopeltidae				
<i>Xenopeltis unicolor</i> Boie, 1827	X	-	X	Deuve (1970); this paper
Pythonidae				
<i>Python reticulatus</i> (Schneider, 1801)	-	-	X	Davidson et al. (1997); Stuart (1998, 1999)
<i>Python molurus bivittatus</i> Kuhl, 1820	-	-	X	Stuart (1998, 1999); this paper
Colubridae				
<i>Ahaetulla nasuta</i> (Lacépède, 1789)	-	-	X	Stuart (1998, 1999)
<i>Ahaetulla prasina</i> (Boie, 1827)	X	-	X	Stuart (1999); this paper
<i>Boiga cyanea</i> (Duméril, Bibron & Duméril, 1854)	-	-	X	Stuart (1998, 1999)
<i>Boiga ocellata</i> Kroon, 1973	-	-	X	Stuart (1998 [11], 1999)
<i>Boiga multomaculata</i> (Boie, 1827)	-	-	X	Stuart (1999)
<i>Calamaria pavimentata</i> Duméril, Bibron & Duméril, 1854	-	X	-	This paper
<i>Chrysopelea ornata</i> (Shaw, 1802)	X	-	X	Stuart (1998, 1999); this paper
<i>Coelognathus radiatus</i> (Boie, 1827)	-	X	X	Stuart (1999); this paper
<i>Dendrelaphis cyanochloris</i> (Wall, 1921)	-	X	-	This paper
<i>Dendrelaphis pictus</i> (Gmelin, 1789)	X	-	X	Stuart (1998, 1999); this paper
<i>Enhydris jagorii</i> (Peters, 1863)	X	-	X	Stuart (1998, 1999); this paper
<i>Enhydris plumbea</i> (Boie, 1827)	X	-	-	Stuart (1998, 1999); this paper
<i>Gonyosoma prasinum</i> (Blyth, 1854)	-	-	X	Stuart (1999)
<i>Homalopsis buccata</i> (Linnaeus, 1758)	-	-	X	Stuart (1999)
<i>Oligodon barroni</i> (Smith, 1916)	X	-	-	This paper
<i>Oligodon cinereus</i> (Günther, 1864)	X	-	-	This paper
<i>Oligodon inornatus</i> (Boulenger, 1914)	X	-	-	This paper
<i>Oligodon ocellatus</i> (Morice, 1875)	X	-	-	This paper
<i>Oreophis porphyraceus vaillanti</i> (Sauvage, 1876)	-	X	-	This paper
<i>Pareas hamptoni</i> (Boulenger, 1905)	-	X	-	This paper
<i>Pareas margaritophorus</i> (Jan, 1866)	-	X	X	Stuart (1999); this paper
<i>Psammodynastes pulverulentus</i> (Boie, 1827)	X	-	-	This paper
<i>Psammophis indochinensis</i> Smith, 1943	-	-	X	Stuart (1998, 1999 [12])
<i>Pseudoxenodon macrops</i> (Blyth, 1854)	-	-	X	Stuart (1999)
<i>Ptyas korros</i> (Schlegel, 1837)	X	-	X	Stuart (1998, 1999); this paper
<i>Ptyas mucosa</i> (Linnaeus, 1758)	-	-	X	Stuart (1998, 1999); this paper
<i>Rhabdophis chrysargos</i> (Schlegel, 1837)	-	-	X	Stuart (1999)
<i>Rhabdophis subminiatus</i> (Schlegel, 1837)	X	X	X	Stuart (1998, 1999); this paper
<i>Sibynophis collaris</i> (Gray, 1853)	-	-	X	Stuart (1999)
<i>Xenochrophis flavipunctatus</i> (Hallowell, 1860)	X	-	X	Stuart (1998, 1999 [13]); this paper
Elapidae				
<i>Bungarus candidus</i> (Linnaeus, 1758)	-	-	X	Stuart (1998, 1999)
<i>Naja siamensis</i> Laurenti, 1768	-	-	X	Stuart (1999)
<i>Ophiophagus hamah</i> (Cantor, 1836)	-	-	X	Davidson et al. (1997); Stuart (1998, 1999)

Taxa	XEP	SEP	SLa	References
Crotalidae				
<i>Calloselasma rhodostoma</i> (Boie, 1827)	-	-	X	Gloyd & Conant (1990)
<i>Ovophis monticola</i> (Günther, 1864)	-	-	X	Stuart (1999)
<i>Trimeresurus albolabris</i> (Gray, 1842)	-	-	X	Stuart (1998 [14], 1999)
<i>Trimeresurus macrops</i> Kramer, 1977	X	-	-	This paper
<i>Trimeresurus vogeli</i> David, Vidal & Pauwels, 2001	-	X	-	Malhotra & Thorpe (2004); this paper
TOTAL REPTILIA	41	17	64	

Notes. [1] all Indochinese specimens of *Ichthyophis* with a yellow lateral band are currently considered to belong to this species; [2] as *Kalophrynus pleurostigma*; [3] as *Hoplobatrachus rugulosus*; [4] as *Limnonectes kuhlii* group; [5] as *Phrynoglossus lima*; [6] as *Rana livida* (Blyth, 1856); [7] should be the same taxon as *Philautus odontotarsus*; [8] as *Pelochelys bibroni*; [9] as *Phyllodactylus siamensis*; [10] as *Leiolepis belliana*; [11] as *Boiga cynodon*; [12] as *Psammophis condanarus*. *Psammophis indochinensis*, formerly considered a subspecies of *P. condanarus*, was raised to full species status by Hughes (1999); [13] as *Xenochrophis piscator*; [14] as *Trimeresurus stejnegeri*.

TABLE 4: Comparison between the amphibian and reptile fauna of southern Laos and adjacent areas. *Abbreviations.* - LaS: Southern Laos (as defined above); LaC: Central Laos (Provinces of Bolikhamxai, Khammouan and Savannakhet); LaN: Northern Laos (All provinces north of Bolikhamxai Province, including Vientiane Prefecture); ViS: South Vietnam (Provinces of Gia Lai and Binh Dinh, and all provinces further south); ViC: Central Vietnam (Ha Tinh Province and provinces between Ha Tinh and “ViS”); ViN: North Vietnam and China (Nghe An Province and all provinces further north, China); Cam: Cambodia; TaN: North and West Thailand (Provinces of Kanchanaburi and Tak, Provinces of Sukhothai, Phitsanulok and Loei and all provinces further north); TaC: Central and Eastern Thailand (All provinces east of Provinces of Ratchaburi, Kanchanaburi and Tak, and south of TaN); TaS: South Thailand (Ratchaburi Province and all provinces further south), West Malaysia.

Sources. - Smith (1931, 1935, 1943), Bourret (1936b, 1939, 1942), Taylor (1962, 1963, 1965), Saint-Girons (1972), Bobrov (1992, 1993), Iverson (1992), Wagner (1975), Cox (1991), Nguyen & Ho (1996), Szyndlar & Nguyen (1996), Wüster et al. (1997), Inger et al. (1999), Chan-ard et al. (2000), Daltry & Dany (2000), Ohler et al. (2002), Chan-ard (2003), Bain et al. (2003), Orlov et al. (2003).

Taxa	LaS	LaC	LaN	ViS	ViC	ViN	Cam	TaN	TaC	TaS
AMPHIBIA										
GYMNOPHONA										
Ichthyophidae										
<i>Ichthyophis cf. kohtaoensis</i> (Taylor, 1960)	X	X	-	X	X	X	X	X	X	X
ANURA										
Bufonidae										
<i>Bufo galeatus</i> Günther, 1864	X	X	-	X	-	-	X	-	-	-
<i>Bufo macrotis</i> Boulenger, 1887	X	-	-	X	-	-	X	X	X	X
<i>Bufo melanostictus</i> (Schneider, 1799)	X	X	X	X	X	X	X	X	X	X
Megophryidae										
<i>Leptobrachium banae</i> Lathrop, Murphy, Orlov & Ho, 1998	X	-	-	-	X	-	-	-	-	-
<i>Leptobrachium</i> sp.	X	-	-	-	-	-	-	-	-	-
<i>Leptolalax pelodytoides</i> (Boulenger, 1893)	X	X	X	-	-	X	-	X	-	-
Microhylidae										
<i>Calluella guttulata</i> (Blyth, 1855)	X	-	X	X	-	-	-	X	X	X
<i>Glyphoglossus molossus</i> Günther, 1859	X	-	-	X	-	-	X	X	X	-
<i>Kalophrynus interlineatus</i> (Blyth, 1855)	X	X	-	-	-	X	X	X	X	-
<i>Kaloula baleata</i> (Müller, 1836)	X	-	-	-	-	-	-	-	-	X
<i>Kaloula pulchra</i> Gray, 1831	X	X	X	X	X	X	X	X	X	X
<i>Kaloula mediolineata</i> Smith, 1917	X	-	-	-	-	-	-	-	X	-
<i>Microhyla annamensis</i> Smith, 1923	X	X	-	X	-	-	X	-	X	-

Taxa	LaS	LaC	LaN	ViS	ViC	ViN	Cam	TaN	TaC	TaS
<i>Microhyla berdmorei</i> (Blyth, 1856)	X	X	X	X	X	-	X	X	X	X
<i>Microhyla butleri</i> Boulenger, 1900	X	X	X	X	X	X	X	X	X	X
<i>Microhyla heymonsi</i> Vogt, 1911	X	X	X	X	X	X	X	X	X	X
<i>Microhyla ornata</i> (Duméril & Bibron, 1841)	X	X	X	X	X	X	X	X	X	X
<i>Microhyla pulchra</i> (Hallowell, 1861)	X	X	X	X	X	X	X	X	X	-
<i>Micryletta inornata</i> (Boulenger, 1890)	X	X	X	X	X	X	X	X	X	X
Ranidae										
<i>Chirixalus doriae</i> Boulenger, 1893	X	-	X	X	-	X	X	X	-	-
<i>Chirixalus nongkhorensis</i> (Cochran, 1927)	X	-	-	X	-	-	X	X	X	-
<i>Fejervarya limnocharis</i> (Gravenhorst, 1829)	X	X	X	X	X	X	X	X	X	X
<i>Hoplobatrachus chinensis</i> (Osborn, 1765)	X	X	X	X	X	X	X	X	X	X
<i>Paa microlineata</i> (Bourret, 1937)	X	-	-	-	-	X	-	-	-	-
<i>Polypedates leucomystax</i> group	X	X	X	X	X	X	X	X	X	X
<i>Philautus gryllus</i> Smith, 1924	X	-	-	-	X	X	-	-	-	-
<i>Philautus odontotarsus</i> Ye & Fei, 1993	X	-	-	-	-	X	-	-	-	-
<i>Occidozyga lima</i> (Gravenhorst, 1829)	X	X	X	X	X	X	X	X	X	X
<i>Phrynoglossus martensii</i> Peters, 1867	X	X	X	X	X	X	X	X	X	X
<i>Rana attigua</i> Inger Orlov & Darevsky, 1999	X	-	-	-	-	-	-	-	-	-
<i>Rana erythraea</i> (Schlegel, 1837)	X	X	X	X	X	-	X	X	X	X
<i>Rana johnsi</i> Smith, 1921	X	X	X	X	-	X	-	X	-	-
<i>Rana lateralis</i> Boulenger, 1887	X	X	X	-	-	X	X	X	-	-
<i>Rana macrodactyla</i> (Günther, 1859)	X	X	X	X	X	X	X	X	X	X
<i>Rana morafkai</i> Bain, Lathrop, Murphy, Orlov & Cuc, 2003	X	-	-	X	-	-	-	-	-	-
<i>Rana nigrovittata</i> (Blyth, 1855)	X	X	X	X	X	X	X	X	X	X
<i>Rana taipehensis</i> Van Denburgh, 1909	X	X	-	X	X	X	X	-	X	-
<i>Rhacophorus baliogaster</i> Inger, Orlov & Darevsky, 1999	X	-	-	X	-	-	-	-	-	-
<i>Rhacophorus exechopygus</i> Inger, Orlov & Darevsky, 1999	X	-	-	X	-	-	-	-	-	-
TOTAL AMPHIBIA	40	24	21	29	20	24	26	26	25	19
% / SOUTHERN LAOS	-	60.0	52.5	72.5	50.0	60.0	65.0	65.0	62.5	47.5

REPTILIA**CHELONII**

Platysternidae

Platysternon megacephalum Gray, 1831

X X X X X X - X X X

Trionychidae

Amyda cartilaginea (Boddaert, 1770)

X X X X X - X X X X

Pelochelys cantorii Gray, 1864

X - - - X X X X X X

Bataguridae

Cuora amboinensis (Daudin, 1801)

X - - X X - X X X X

Cyclemys dentata (Gray, 1831)

X X X X X X X X X X

Heosemys grandis (Gray, 1860)

X X - X - - - X X

Hieremys annandalii (Boulenger, 1903)

X - - X - - X - X X

Malayemys subtrijuga (Schlegel & Müller, 1844)

X X X X - - - X X X

Testudinidae

Indotestudo elongata (Blyth, 1853)

X X X X X X X X X X

Manouria impressa (Günther, 1882)

X X X - X X X X X X

Taxa	LaS	LaC	LaN	ViS	ViC	ViN	Cam	TaN	TaC	TaS
Crotalidae										
<i>Calloselasma rhodostoma</i> (Boie, 1827)	X	X	X	X	X	-	X	X	X	X
<i>Ovophis monticola</i> (Günther, 1864)	X	-	-	X	X	X	X	X	-	X
<i>Trimeresurus albolabris</i> (Gray, 1842)	X	X	X	X	X	X	X	X	X	X
<i>Trimeresurus macrops</i> Kramer, 1977	X	X	-	X	-	-	X	X	X	-
<i>Trimeresurus vogeli</i> David, Vidal & Pauwels, 2001	X	-	-	X	X	-	X	-	X	X
TOTAL REPTILIA	89	51	47	78	61	49	65	64	69	63
% / SOUTHERN LAOS	-	57.3	52.8	87.6	68.5	55.1	73.0	71.9	77.5	70.8

forest edge, while the other two animals were obtained during the night near a forest stream. Specimen MNHN 2003.3364 was collected while it was foraging on a short tree on the bank of a stream about 2-3 km from human dwellings. Two more females were observed in the same area.

Note. – This species was previously known from Thailand and Vietnam (David et al., 2001; David et al., 2002). Recently, it has been mentioned from Boloven Highlands by Malhotra and Thorpe (2004). Specimen MNHN 2003.3361 has exactly 20 scale rows at mid-body, due to a scale row reduction. The ventrolateral line of the adult male exhibits a lower red component (as also found in Vietnamese specimens [unpublished data]), in contrast to Thai specimens in which the ventrolateral stripe is mostly white. The white dorsal dots and yellow eyes in males, the yellowish-green ventrolateral stripe of females and meristic characters are otherwise typical of *Trimeresurus vogeli*.

DISCUSSIONS

As explained above, this survey is preliminary, inasmuch as little attention could be given to the hilly, densely forested and protected areas of the western part of Champasak Province. Nevertheless, the collection described in this paper includes 75 species, comprising 22 amphibians (21 Anura, 1 Gymnophiona) and 53 reptiles (1 Chelonian, 25 Lacertilians and 27 Serpentes). Among these species, 17 are new records for the country, including two new species (*Leptobranchium* sp. and *Cyrtodactylus* sp.) that will

be discussed elsewhere (Ohler et al., submitted; David et al. submitted):

Amphibians (5): *Kalophrynus interlineatus*, *Kaloula baleata*, *Leptobranchium* sp., *Philautus gryllus* and *Rana morafkai*.

Reptiles (12): *Cyrtodactylus* sp.; *Gonocephalus grandis*, *Riopa angeli*, *Riopa bowringii*, *Scincella rupicola*, *Sphenomorphus tridigitus*, *Tropidophorus microlepis*, *Oligodon barroni*, *Oligodon fasciolatus*, *Oligodon inornatus*, *Oligodon ocellatus*, *Trimeresurus macrops*.

As far as the amphibians are concerned, among the new records, a species with large distribution in south-east Asia, *Kalophrynus interlineatus*, has been confirmed for Laos. This species has fossorial behaviour and thus is rarely observed, but should not be uncommon as it has no particularly restrictive habitat demands. For *Philautus gryllus* the apparent rarity might be due to small adult size and cryptic habit. This species also might be confused with other small sized *Philautus*, but none of them have been recorded to Laos previously. *Rana morafkai* has been recently described (Bain et al., 2003) and was until then part of a species complex (*Rana livida*) largely distributed in south-east Asia. Its type locality is in adjacent central Vietnam. The new species of *Leptobranchium* Tschudi, 1838 is known only from the Boloven Highlands. The species described from Vietnam and Thailand can easily be distinguished by the colouration of their iris, which has a unique colour in the Boloven *Leptobranchium* species. The most interesting new record is *Kaloula baleata* which was only recently confirmed from southern Thailand. This species has a characteristic colour pattern

and is easily recognised. Its presence in southern Laos is of great biogeographical interest as it confirms a link between peninsular Malaya and more northern parts of the Indochinese region across the Gulf of Siam (see also Pauwels et al., 2003).

Among the 12 reptile records new for Laos, one is an undescribed member of the genus *Cyrtodactylus*, the affinities of which seem to be with the Thai taxa *Cyrtodactylus angularis* (Smith, 1921) and *C. papilionoides* Ulber and Grossmann, 1991. The occurrence of *Gonocephalus grandis* is especially noteworthy, as this species is typically Indo-Malayan, its northernmost known locality being in southern Thailand. Along with *Kaloula baleata* discussed above, this is the second Indo-Malayan species absent from most of Thailand and reappearing in southern Laos. A similar case occurs in several areas of southern Vietnam, both in lowlands and highlands, where purely Indo-Malayan snake species have been recorded (*Python brongersmai* Stull, 1938, *Coelognathus flavolineatus* (Schlegel, 1837), *Liopeltis tricolor* (Schlegel, 1837), *Sibynophis melanocephalus* (Gray, 1834), *Calliophis intestinalis lineata* Gray, 1834, and *Tropidolaemus wagleri* Wagler, 1830; see Orlov et al. 2003). A hypothesis to explain the occurrence of Indo-Malayan species in Laos and Vietnam, based on climatological variation that affected the region of the Gulf of Siam, was suggested in Pauwels et al. (2003).

The other taxa new for Laos can be divided into two groups that we define as “Vietnamese” and “Thai” respectively. In the first group, we include *Riopa angeli*, previously known from three specimens from Vietnam, *Scincella ruficaudata*, *Sphenomorphus tridigitus*, of which we have here the second known specimen, and *Oligodon ocellatus*. The “Thai” group contains *Riopa bowringii*, *Scincella rupicola*, *Oligodon barroni*, *Oligodon inornatus*, and *Trimeresurus macrops*, all more or less widespread in northern Thailand and Cambodia. *Oligodon fasciolatus* is widespread in the region, but was previously confused with *Oligodon cyclurus* (Cantor, 1839). Among other interesting records, *Pseudocalotes poilani* is still known only from the Boloven Highlands. We encountered two speci-

mens (one collected) of this species, previously known from the holotype. The large skink *Riopa corpulenta* is also a rare species, as it was known from the two specimens mentioned in Smith (1935). It was previously recorded from the south of the Annamite Mountains, Attapu Province and Dalat, in South Vietnam. Lastly, the presence in Boloven Highlands of *Oreophis porphyraceus vaillanti* (Sauvage, 1876), a taxon otherwise known from southeastern China, northern Vietnam and northern Laos, shows the presence of “northern” taxa in Boloven Highlands.

The poor state of our knowledge of the herpetofauna of Champasak Province precludes the establishment of a list of amphibians and reptiles. Nevertheless, on the basis of this collection and of references listed in Tables 3 and 4 below, especially Stuart (1999), we can propose a preliminary discussion on the herpetofauna of southern Laos. We arbitrarily define this geographical term as the area encompassing the provinces of Champasak, Attapu, Xekong and Salavan. Our definition is broadly similar to Stuart’s (1999) definition of the “South”. This area includes the lowlands of the Mekong River and the Boloven Highlands, but also the southern part of the Annamite Mountains. Major protected areas included are (from north to south) Xebang-Nouan NBCA, Xesap NBCA, Xepian NBCA and Dong Khantung PNBCA (see Duckworth et al., 1999 for a complete list). In Table 3, we list species recorded from Xepian NBCA, Boloven Highlands (Sepian), and from other localities of southern Laos, respectively. With such a definition, the herpetofauna of southern Laos is currently composed of 41 amphibian species (40 Anura, 1 Gymnophiona) and a total of 89 reptile species, divided into 10 Chelonii, 1 Crocodylia, 35 Lacertilia and 43 Serpentes.

The amphibian fauna shows affinities to the fauna of southern Vietnam and northern Thailand if measured by the number of species in common. If measured by unique shared species the south Laotian amphibian fauna has elements that are only present in southern Vietnam (*Rana morafkai*), Peninsular Thailand (*Kaloula baleata*) and also northern Vietnam (*Paa microlineata*), but allocation may be wrong as this species

was known only from the types and it is considered to be a synonym of *Paa delacouri*, which is phylogenetically more close to *Limnonectes* than to *Paa*; see Dubois and Ohler, submitted). Several taxa of amphibians will require the collection of series to be identified with confidence and many groups still need revision to have a proper estimate of species range and diversity in Southeast Asia. Our finding confirms biogeographic relationships found between eastern continental and southernmost peninsular Thailand through a route over the present Gulf of Siam as proposed for *Rana nigrovittata* group by Matsui et al. (2001).

Based on the number of species in common, the reptile fauna of southern Laos shows that its strongest affinity with that of South Vietnam (87.6%), followed by the faunas of Central and Eastern Thailand (77.5 %), and Cambodia, North Thailand and South Thailand, with nearly similar values between these three regions (between about 71 and 73 %). The affinities of the reptile fauna hence are identical with those noted for amphibians. It is noteworthy that the affinities with the fauna of Central and North Laos are rather low (57.3 and 52.8 % respectively). This fact may be the result of a poor knowledge of the fauna of these parts of the country. If the comparison is established on the basis of uniquely shared species, excluding wide ranging, ubiquitous species, the south Laotian reptile fauna also contains members restricted to the faunas of South Vietnam (*Riopa angeli*, *Riopa corpulenta*, *Oligodon ocellatus*), Central Vietnam (*Sphenomorphus tridigitus*), North Vietnam and China (*Oreophis porphyraceus vaillanti*), and, as noted for amphibians, of Peninsular Thailand (*Gonocephalus grandis*). Most of these species were obtained in the Boloven Highlands, a wet montain range that seems to act as a refuge for taxa either usually associated with elevated areas in other parts of their range, or restricted to wet forested areas. The presence of species from geographically adjacent areas may be due either to a common biogeographic history, or to a secondary introduction, whereas the presence of species from

geographically distant regions should indicate a common biogeographic history. The common presence of species is a consequence of secondary fragmentation of the area by habitat changes due to human activity, such as the deforestation due to the advancement of agriculture from prehistorical times onwards in the flooded plains of central Thailand, or to climatic changes due to natural phenomena. The presence of southern tropical elements in southern Laos is a witness of more extended areas of wet tropical forests in south-east Asia. A hypothesis on the modifications of climatic conditions around the Gulf of Siam appears in Pauwels et al. (2003).

Knowledge of the herpetological fauna of southern Laos will be largely completed by further collections both in lowland and montane areas. It is noteworthy that only one species of chelonian and no species of Elapidae was collected during this study. As a consequence, it should still be considered as highly preliminary. However, this collection gives a limited, although significant, glimpse on the high herpetological richness of Southern Laos.

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