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COUNTRY RECORDS OF SNAKES FROM LAOS

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(with 24 text-figures)

ABSTRACT.– The known snake fauna of Laos continues to increase with improved sampling. We report 13 country records of colubrid and viperid snakes from Laos, based on vouchered museum specimens that were obtained during herpetological surveys over the past decade. Species included in this report are: *Amphiesma leucomystax* David, Bain, Nguyen, Orlov, Vogel, Vu & Ziegler, *Calamaria yunnanensis* Chernov, *Elaphe prasina* (Blyth), *Fimbrios klossi* Smith, *Liopeltis stoliczkae* (Sclater), *Psammophis condanarus* (Merrem), *Pseudoxenodon bambusicola* Vogt, *Pseudoxenodon macrops* (Blyth), *Rhabdophis nigrocinctus* (Blyth), *Sinonatrix aequifasciata* (Barbour), *Sinonatrix percarinata* (Boulenger), *Ovophis monticola* (Günther) and *Protobothrops mucrosquamatus* (Cantor).

KEYWORDS.– Laos, Serpentes, geographic distributions, Colubridae, Viperidae.

INTRODUCTION

Largely owing to a monograph by Deuve (1970), snakes are the best-known component of the herpetofauna of Laos (Lao People's Democratic Republic). Nevertheless, much remains to be learned and a number of additions to the snake fauna have been made since Deuve's monograph. Stuart (1999) provided a list of snakes and the general regions and habitats in which they are known to occur in Laos. Hermann et al. (2002) and Stuart (2006) provided country records, expanded descriptions, and natural history data for two poorly known species of snakes, *Triceratolepidophis sieversorum* and *Parahelicops annamensis*. Malhotra and Thorpe (2004) and Malhotra et al. (2004) gave records of *Trimeresurus* from Laos. Teynié et al. (2004) and Teynié and David (2007) reported on recent collections of snakes, primarily from Champasak Province in southern Laos, and Bain et al. (2007a, b) provided historical records of two species (*Calloselasma rhodostoma* and *Lycodon laoensis*) from near the capital city of Vientiane.

Herein, we report country records of 13 species of colubrid and viperid snakes from Laos. These records are based on vouchered specimens that were collected by us during our fieldwork, or by colleagues who made them available to us for the purposes of this work. These species were not reported from Laos by Bourret (1936), Smith (1943), or the authors cited above; an exception is that Stuart (1999) listed some of these records but did not provide voucher numbers, detailed locality information, or justification for the identifications. The present paper provides that information.

MATERIALS AND METHODS

Specimens were caught in the field by hand, preserved in 10% buffered formalin, and later transferred to 70% ethanol. Tissue samples were taken by preserving pieces of liver in 95% ethanol before the specimen was fixed in formalin.

Specimens were deposited at the Field Museum of Natural History (FMNH). Measurements of preserved specimens were made with dial calipers or a soft measuring tape. Ventral scales were counted following the method of Dowling (1951). Coordinates in parentheses are estimates.

SPECIES ACCOUNTS

Family Colubridae

Amphiesma leucomystax David, Bain, Nguyen, Orlov, Vogel, Vu & Ziegler (Figs. 1–2)

FMNH 255236, Laos, Khammouan Province, Nakai District, Phou Hin Poun National Biodiversity Conservation Area, 17°53'N, 104°55' E, 570 m elev., on sandy bank of stream in dry evergreen mixed with dipterocarp and pine forest, coll. Bryan L. Stuart and Tanya Chan-ard, 23 March 1998. FMNH 258667, Laos, Xe Kong Province, Kaleum District, Xe Sap National Biodiversity Conservation Area, along Houay Alung Stream, 16°00'32"N, 106°55'31"E, 920–1,000 m elev., on dirt bank 1.5 m above a small stream pool in evergreen forest, coll. Bryan L. Stuart, 30 June 1999.

Two females fully agree with David et al.'s (2007) original description and with two paratypes (FMNH 252118–19) from Vietnam, which we have examined. The Laos specimens have a single anterior temporal; 19 mid-body dorsal scale rows; 158–161 ventrals; a broad, white stripe extending below the eye from the snout tip to the neck; and a dorsolateral series of transverse spots.

Figure 1. *Amphiesma leucomystax* from Laos.

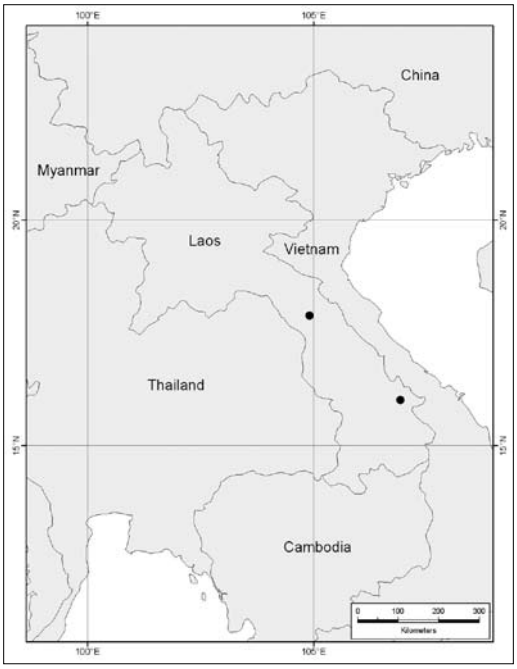

Figure 2. *Amphiesma leucomystax* localities in Laos.

Calamaria yunnanensis Chernov (Fig. 3)

FMNH 258666, Laos, Phongsaly Province, Phongsaly District (21º29'N, 102º12'E), dead on the mountainous road to Udomxai about 25 km from Phongsaly city, coll. Bounthavy Phommachanh, 6 October 1999.

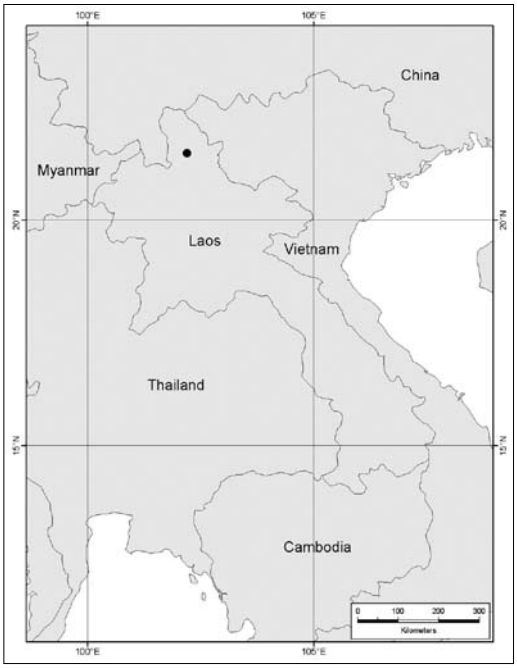

Figure 3. *Calamaria yunnanensis* locality in Laos.

A single female closely agrees with Chernov's (1962) original description of the species based on a single male from Jingdong County, Yunnan Province, China. Inger and Marx (1965) treated *C. yunnanensis* as a "doubtful form" because they were not able to examine the type and deficiencies in the original description cast doubt on its distinctiveness from two species known to occur in China, *C. septentrionalis* Boulenger and *C. pavimentata* Duméril & Bibron. Zhao and Adler (1993) listed *C. yunnanensis* as a valid species. The Laos specimen differs from *C. pavimentata* and *C. septentrionalis* by the absence of a preocular, higher number of ventrals, dorsals reducing only to six rows on the tail, in colouration, and further from *pavimentata*, by having a thick, non-tapering tail. No records of *C. yunnanensis* have been reported since Chernov (1962), and so the Laos specimen is described in detail, as follows.

Rostral wider (2.4 mm) than high (1.9 mm), portion visible from above (1.0 mm) shorter than prefrontal suture (1.7 mm). Prefrontal (2.3 mm) shorter than frontral (2.7 mm), touching first two supralabials, broadly entering orbit. Frontal hexagonal, almost twice length of supraocular (1.4 mm), about two-thirds length of parietal (4.0 mm). Parietal about 1.7 times length of prefrontal. Paraparietal surrounded by six shields and scales. Nasal smaller than postocular. No preocular. Single postocular, higher than wide, not as high (0.9 mm) as eye diameter (1.2 mm). Eye diameter about equal to eye-mouth distance (1.1 mm). Distance from anterior margin of eye to nostril 1.9 mm, to tip of snout 3.0 mm. Four supralabials, second and third entering orbit, fourth (2.6 mm) longest, third (1.1 mm) about two-thirds length of second (1.7 mm), first (1.3 mm) slightly longer than third and about three-fourths length of second. Mental triangular, not touching anterior chin shields. Five infralabials, three touching anterior chin shield. Anterior pair of chin shields meeting in midline, posterior pair diverging and only in contact anteriorly. Three gulars in midline between posterior pair of chin shields and first ventral. Maxillary teeth modified *sensu* Inger & Marx (1965). All scales smooth, 13 dorsal rows at mid-body, 179 ventrals, 22 divided subcaudals. Dorsal scales reduced to six rows on tail opposite 12th subcaudal posterior to cloaca. Snout-vent length ca. 330 mm, tail length ca. 32 mm. Mid-body diameter ca. 7 mm, base of tail diameter ca. 6 mm. Tail thick, not tapered, tip rounded with conical terminal scale. Tail/total length ratio 0.088. Colouration in ethanol bluish-brown above with five weakly-visible dark longitudinal stripes (under epidermis, brown with five dark brown longitudinal stripes) from behind eye to tip of tail, outermost stripe strongly demarcating dark dorsal colouration from yellowish ventral colouration; lower three-fourths of supralabials, side of head, lower half of third dorsal scale row anteriorly, shifting ventrally to lower half of second dorsal scale row about two head-lengths behind head, first dorsal scale row, ventrals, and subcaudals uniformly yellowish.

Elaphe prasina (Blyth) (Figs. 4–5)

FMNH 258760, Laos, Champasak Province, Pakxong District, Dong Hua Sao National Biodiversity Conservation Area, Bolaven Plateau, near 15°05'N, 106°10'E, 1,000 m elev., on trail in disturbed, wet evergreen forest, coll. Bryan L. Stuart and Harold F. Heatwole, 20 September 1999.

A single male has snout length twice the eye diameter; loreal scale present; 10 supralabials, the fourth, fifth and sixth touching the eye; 20: 19: 15 dorsal scale rows, first and second rows smooth, remaining rows weakly keeled; 195 ventrals, with lateral keel; 106 paired subcaudals; single anal plate; and uniform green colouration above.

Fimbrios klossi Smith (Figs. 6–7)

FMNH 258639, Laos, Champasak Province, Pakxong District, Dong Hua Sao National Bio-

Figure 4. *Elaphe prasina* from Laos.

Figure 5. *Elaphe prasina* locality in Laos.

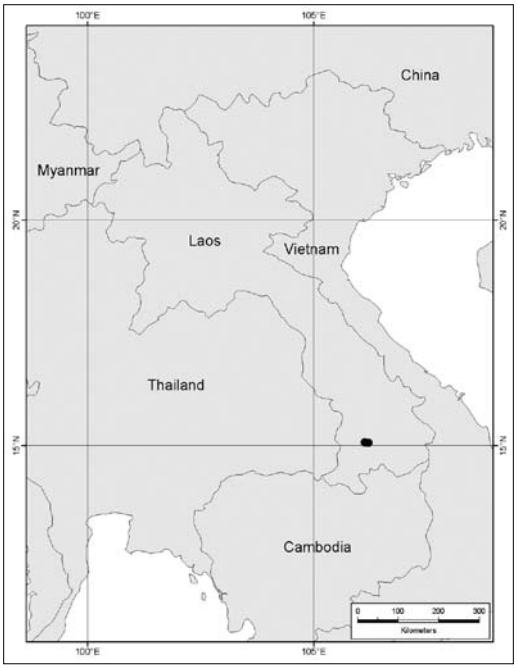

Figure 7. *Fimbrios klossi* localities in Laos.

diversity Conservation Area, Bolaven Plateau, near 15°04'37"N, 106°08'15"E, 1,000 m elev., swimming in emergent grass in slow-moving muddy stream in wet evergreen forest, coll. Bryan L. Stuart and Harold F. Heatwole, 10 September 1999. FMNH 258640–41, Laos, Champasak Province, Pakxong District, Dong Hua Sao National Biodiversity Conservation Area, Bolaven Plateau, near 15°03'55"N, 106°13'03"E, 1,200 m elev., under leaf litter in wet evergreen forest, coll. Bryan L. Stuart and Harold F. Heatwole, 22 September 1999.

A male and two females fully agree with Smith's (1921) original description by having the rostral separated from the internasals by a horizontal ridge of tissue; the nostril in the anterior part of a large, concave nasal; rostral, nasal, and labials with strongly raised edges; a single, large pair of chin shields; and keeled body scales with visible interstitial skin.

Figure 6. *Fimbrios klossi* from Laos.

Liopeltis stoliczkae (Sclater) (Fig. 8)

FMNH 254780, Laos, Bolikhamxay Province, Khamkeut District, Lac Xao (18º11'N, 104º58'E), dead on road, coll. David Davenport, August 1996.

A single male has the head distinct from neck; snout length twice the eye diameter; a small nostril in a long, undivided nasal; a square loreal; eight supralabials, fourth and fifth entering orbit; 150 ventrals; 128 subcaudals; brown dorsum with a broad black stripe on the side of head that extends onto the anterior part of body before gradually disappearing; and a grey stripe on the outer margins of the ventrals.

Psammophis condanarus (Merrem) (Figs. 9–10)

FMNH 255234, Laos, Champasak Province, Mounlapamok District, Dong Khanthung National Biodiversity Conservation Area, 14°09'N, 105°39'E, 100 m elev., in tree 1.5 m above the ground in a rice paddy adjacent to a grassland

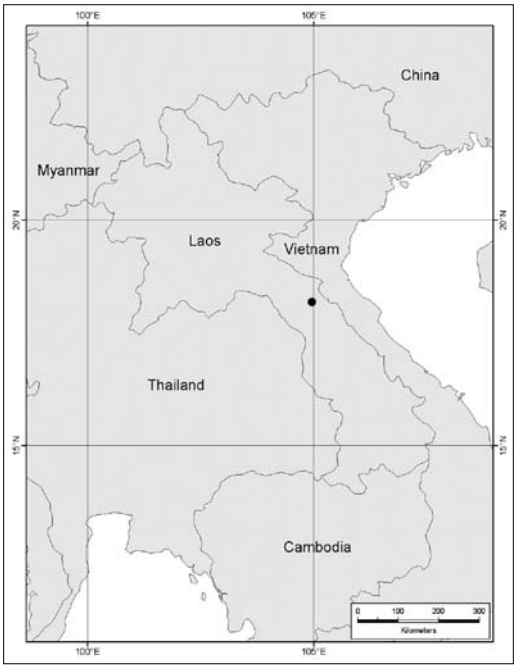

Figure 8. *Liopeltis stoliczkae* locality in Laos.

with dry dipterocarp forest, coll. Bryan L. Stuart, 9 July 1998.

A single male has the nasal incompletely divided; frontal longer than its distance from the tip of the snout, anterior end less than twice as broad as the middle; divided anal plate; and four dark brown longitudinal stripes edged with black, continuing onto the head as longitudinal markings.

Pseudoxenodon bambusicola Vogt (Figs. 11–12)

FMNH 256423, Laos, Khammouan Province, Nakai District, Nakai-Nam Theun National Biodiversity Conservation Area, along Houay Dreng Stream, 17°50'N, 105°35'E, 600 m elev., on leaf

Figure 9. *Psammophis condanarus* from Laos.

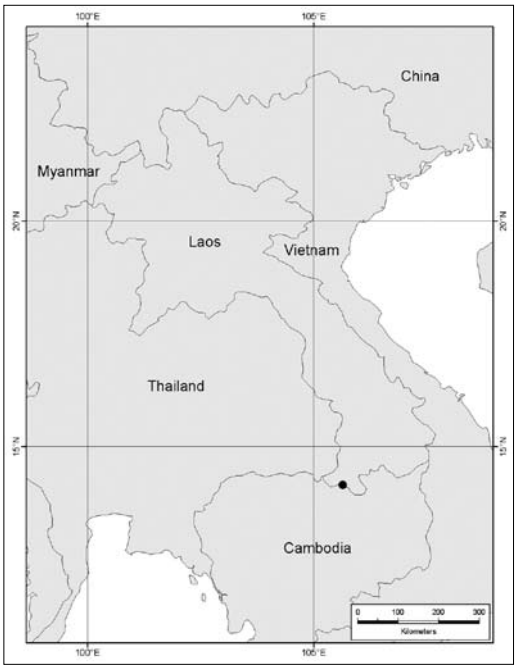

Figure 10. *Psammophis condanarus* locality in Laos.

Figure 11. *Pseudoxenodon bambusicola* from Laos.

litter 30 m from a stream in wet evergreen forest, coll. Bryan L. Stuart, 3 December 1998.

A single male has a large nostril between two nasals; large eye with round pupil; one preocular; three postoculars; eight supralabials, fourth and fifth entering orbit; 19: 17: 15 dorsal scale rows; 136 ventrals; 59 subcaudals; a dark bar across the prefrontals, continuing as dark stripe through the eye to corner of jaw; approximately 20 brown bands across the body, the first connected to the neck by a narrow black dorsolateral stripe on each side; and anterior part of venter with large quadrangular dark spots.

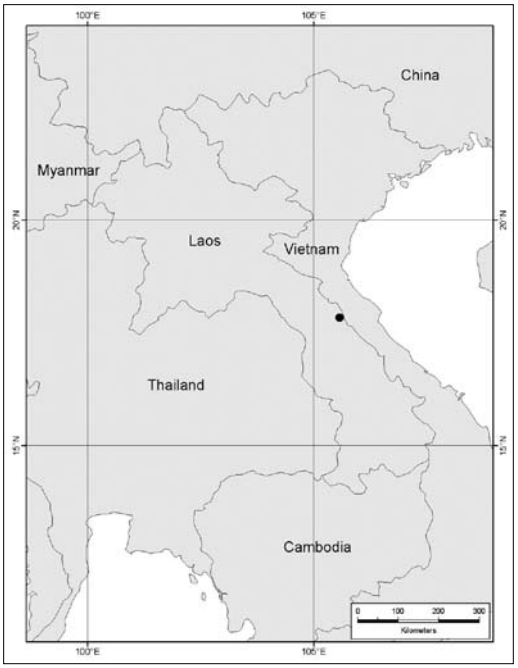

Figure 12. *Pseudoxenodon bambusicola* locality in Laos.

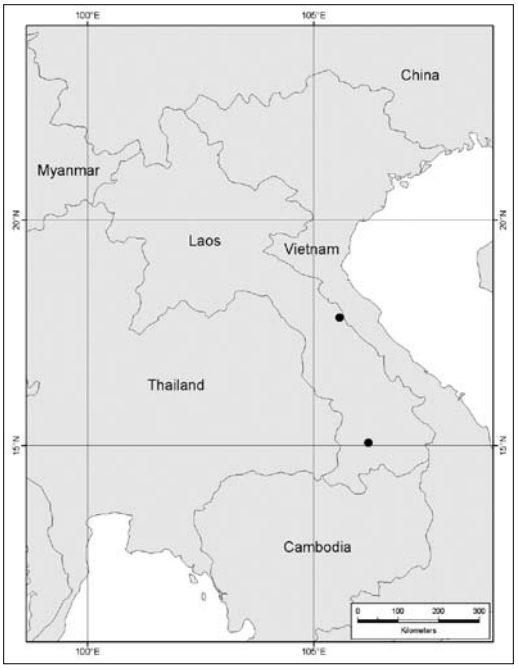

Figure 14. *Pseudoxenodon macrops* localities in Laos.

Pseudoxenodon macrops (Blyth) (Figs. 13–14)

FMNH 258649, Laos, Champasak Province, Pakxong District, Dong Hua Sao National Biodiversity Conservation Area, Bolaven Plateau, near 15°03’55”N, 106°13’03”E, 1,200 m elev., on leaf litter in wet evergreen forest, coll. Bryan L. Stuart and Harold F. Heatwole, 21 September 1999. FMNH 258762, Laos, Khammouan Province, Nakai District, Nakai-Nam Theun National Biodiversity Conservation Area, Navang (17º50’N, 105º35’E), coll. David Davenport, 2 March 1997.

A male and female have a large nostril between two nasals; large eye with round pupil; one preocular; three postoculars; eight supralabials, fourth and fifth entering orbit; 19: 17: 15 dorsal scale rows; 155–160 ventrals; 62–63 subcaudals; dark bar from behind eye to corner of jaw; vertebral series of dark-edged spots; and anterior part of venter with large quadrangular dark spots, sometimes united to form crossbars.

Figure 13. *Pseudoxenodon macrops* from Laos.

Rhabdophis nigrocinctus (Blyth) (Figs. 15–16)

FMNH 255237, Laos, Khammouan Province, Boualapha District, Hin Namno National Biodiversity Conservation Area, Phou Khaonok Mountain, 17°23’N, 105°45’E, 545 m elev., on rocks 2 m from a stream in evergreen forest, coll. Bryan L. Stuart, 19 February 1998. FMNH 258646, Laos, Phongsaly Province, Phongsaly District, Phou Dendin National Biodiversity Conservation Area, near confluence of Nam Ou and Nam Sa Rivers, near 22°05’31”N, 102°06’19”E, 600 m elev., swimming at night across 3 m wide stream in hill evergreen forest, coll. Bryan L. Stuart and Harold F. Heatwole, 20 October 1999.

Two males have the nostril lateral; single preocular; 2+2 temporals; nine supralabials, fourth, fifth and sixth entering orbit; 17 or 19 dorsal scale rows at mid-body; olive-green above, becoming browner posteriorly, with narrow, black crossbars; two black oblique stripes on the side

Figure 15. *Rhabdophis nigrocinctus* from Laos.

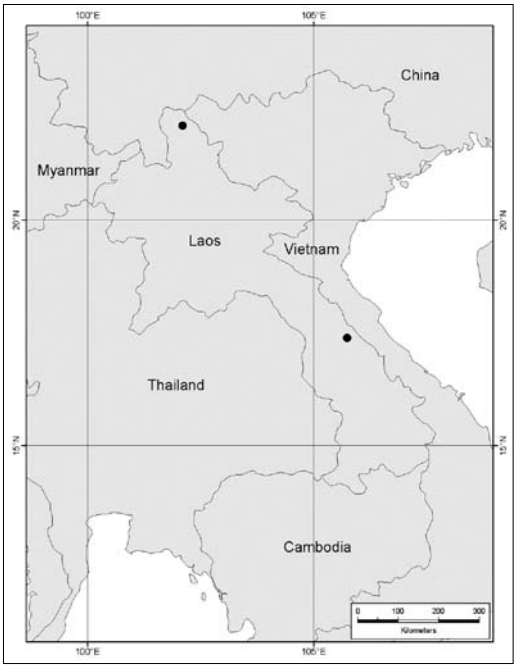

Figure 16. *Rhabdophis nigrocinctus* localities in Laos.

of head, one below eye, the other from rear of the eye to corner of jaw; and black chevron on neck.

Sinonatrix aequifasciata (Barbour) (Figs. 17–18)

FMNH 256420, Laos, Khammouan Province, Nakai District, Nakai-Nam Theun National Biodiversity Conservation Area, 17°57'N, 105°34'E, along Houay Duen Stream, 700 m elev., swimming in shallow water of a rocky stream in evergreen forest, coll. Bryan L. Stuart, 11 November 1998. FMNH 256421, Laos, Khammouan Province, Nakai District, Nakai-Nam Theun National Biodiversity Conservation Area, 17°58'N, 105°34'E, along Houay Ting Tou Stream, 700 m elev., on rocky bank 4 m from a stream, coll. Bryan L. Stuart, 6 November 1998. FMNH 258670, Laos, Bolikhamxay Province, Khamkeut District, Nape (18º15'N, 105º07'E), wet evergreen forest, coll. David Davenport, 16 March 1997.

An adult female and two juveniles have nine supralabials, none or only one entering orbit; 19 dorsal scale rows at mid-body; 147–153 ventrals; 18–21 dark bands encircling the body, constricted on sides, those in the adult double on back and belly; and 8–9 dark bands encircling tail.

Figure 17. *Sinonatrix aequifasciata* from Laos.

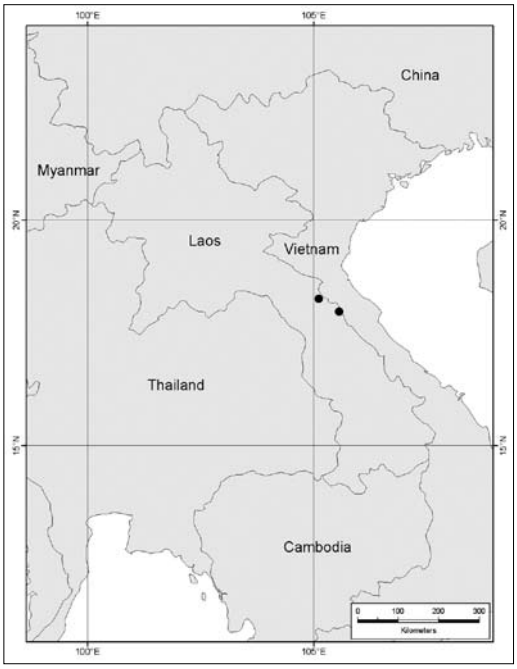

Figure 18. *Sinonatrix aequifasciata* localities in Laos.

Sinonatrix percarinata (Boulenger) (Figs. 19–20)

FMNH 255239–40, Laos, Huaphahn Province, Vieng Tong District, Phou Louey National Biodiversity Conservation Area, near Nam Poung River, 20°14'N, 103°16'E, 985 m elev., under submerged rock or log in a stream in hill evergreen forest, coll. Bryan L. Stuart, 27 April 1998. FMNH 258671, 258763–66, Laos, Bolikhamxay Province, Khamkeut District, Nape (18º15'N, 105º07'E), wet evergreen forest, coll. David Davenport, 15–20 March 1997. FMNH 258680, Laos, Phongsaly Province, Phongsaly District, Phou Dendin National Biodiversity Conservation Area, near Nam Ou River, near 22°05'38"N, 102°12'50"E, 600 m elev., being eaten by a *Bungarus fasciatus* (FMNH 258654) on a stream bank in hill evergreen forest, coll. Bryan L. Stuart and Harold F. Heatwole, 11 October 1999.

These have nine supralabials, two entering orbit, without black sutures; 19 dorsal scale rows at mid-body; 28–36 dark bands on body, broad dorsally, becoming narrow laterally, distinct in juveniles, indistinct or absent in larger specimens; bands on lateral and ventral surfaces of tail, distinct in juveniles, indistinct or absent in larger specimens.

Figure 19. *Sinonatrix percarinata* from Laos.

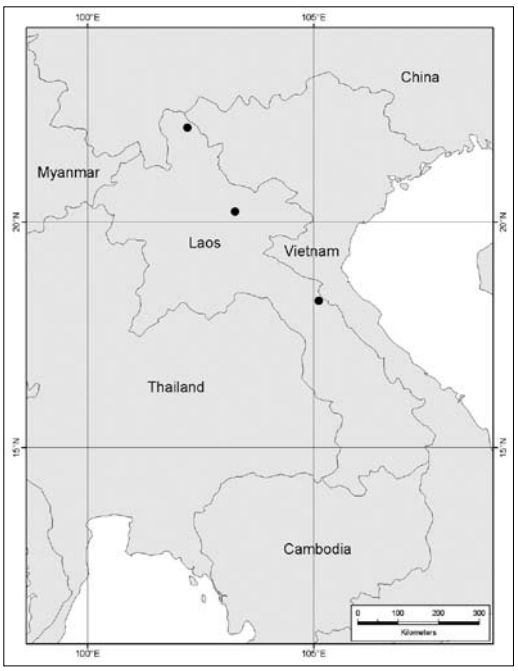

Figure 20. *Sinonatrix percarinata* localities in Laos.

Family Viperidae

Ovophis monticola (Günther) (Figs. 21–22)

FMNH 258632, Laos, Xe Kong Province, Kaleum District, Xe Sap National Biodiversity Conservation Area, near 16°04'10"N, 106°58'45"E, 1200 m elev., under 40 cm diameter rock 1 m from a small rocky stream in wet evergreen forest, coll. Bryan L. Stuart, 7 July 1999. FMNH 258633–34, Laos, Champasak Province, Pakxong District, Dong Hua Sao National Biodiversity Conservation Area, Bolaven Plateau, near 15°04'37"N, 106°08'15"E, 1,000 m elev., on or under leaf litter in wet evergreen forest, coll. Bryan L. Stuart and Harold F. Heatwole, 11–13 September 1999. FMNH 258635, Laos, Champasak Province, Pakxong District, Dong Hua Sao National Biodiversity Conservation Area, Bolaven Plateau, near 15°03'55"N, 106°13'03"E, 1,200 m elev., under leaf litter in wet evergreen forest, coll. Bryan L. Stuart and Harold F. Heatwole, 22 September 1999.

An adult male, adult female, and two juveniles have the first labial separated from the nasal; large internasals separated by a single scale; large, non-erect supraoculars separated by 6–7

Figure 21. *Ovophis monticola* from Laos.

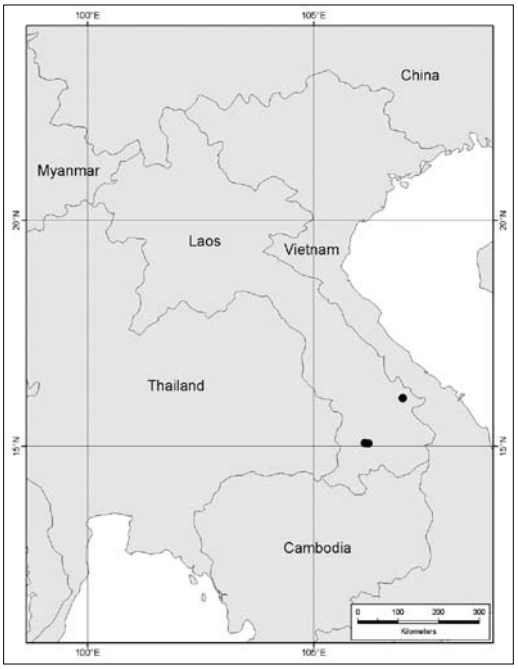

Figure 22. *Ovophis monticola* localities in Laos.

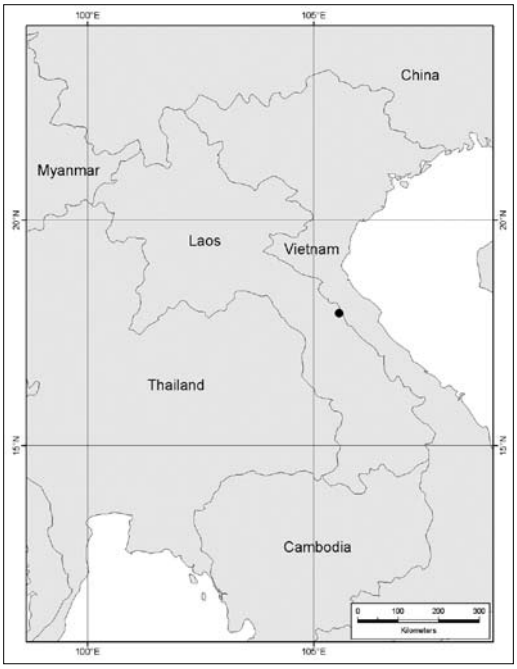

Figure 24. *Protobothrops mucrosquamatus* locality in Laos.

scales; subocular broken up into smaller scales; 23–25 dorsal scale rows at mid-body; 132–142 ventrals; 36–47 subcaudals; brown colouration above with dorsal series of squarish, dark brown spots and lateral series of smaller, dark brown spots; and venter heavily powdered with brown.

Protobothrops mucrosquamatus (Cantor) (Figs. 23–24)

FMNH 256418, Laos, Khammouan Province, Nakai District, Nakai-Nam Theun National Biodiversity Conservation Area, 17°56'N, 105°34'E, along Houay Balong Stream, 600 m elev., on pebble substrate of intermittent stream bed 3 m from a stream pool in evergreen forest, coll. Bryan L. Stuart, 16 November 1998.

A single male has the first labial separated from the nasal; small internasals separated by 4–6 small scales; long, narrow, non-erect supraoculars separated by 15–17 scales; 25 dorsal scale rows at mid-body; 213 ventrals; 96 subcaudals; and brown colouration above with dorsal series of irregular, dark brown spots and lateral series of smaller, dark brown spots.

Figure 23. *Protobothrops mucrosquamatus* from Laos.

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