

**ADDITION OF *LIOPELTIS STOLICZKAЕ* (SCLATER, 1891)  
(SQUAMATA: COLUBRIDAE) TO THE HERPETOFAUNA  
OF THAILAND, WITH NOTES ON ITS DISTRIBUTION AND  
NATURAL HISTORY**

*Sjon Hauser*<sup>1</sup>

ABSTRACT

The colubrid snake *Liopeltis stoliczkae* (Sclater, 1891) is reported for the first time from Thailand. Over the years 2004–2018 more than twenty road-killed and four living specimens of *L. stoliczkae* were spotted at a dozen of localities in six different provinces of northern Thailand. They were photographed, and relatively intact road-killed specimens were collected and preserved as vouchers. The present and past records of *L. stoliczkae* in northeastern India, Myanmar and Indochina are discussed for the long absence of records of the species in northern Thailand in spite of an apparently higher abundance there than in other parts of its range.

Keywords: Colubridae, *Liopeltis stoliczkae*, *Liopeltis tricolor*, northern Thailand, biogeography

INTRODUCTION

The colubrid snake genus *Liopeltis* Fitzinger, 1843 is currently believed to consist of six valid species distributed in South Asia, southern China, and mainland and insular Southeast Asia as far eastwards as the Philippine Archipelago (WALLACH *ET AL.*, 2014). These species have heads that are moderately distinct from the necks, and small cylindrical, slender and elongate bodies and tails, and their total body length rarely exceeds 70 cm. The dorsal scales are smooth and in 15 rows at midbody (BOULENGER, 1894; LEVITON, 1964). Due to their small size, brown color and their secretive habits, little is known about these snakes.

Two species of the genus are known to occur in Thailand, *Liopeltis tricolor* (Schlegel, 1837) and *L. frenatus* (Günther, 1858). *Liopeltis tricolor* is a species widely distributed in insular Southeast Asia and the Malay Peninsula (DE ROOIJ, 1917; TWEEDIE, 1953; LEVITON, 1964; DAS, 2012), but in Thailand it is believed to be restricted to the southern peninsula (COX, 1991, COX *ET AL.*, 1998). In NUTPHAND (2001), a picture of *L. tricolor* was published together with an icon that indicated that the species occurs throughout the country, however, according to DAVID *ET AL.* (2004) only valid records from Thailand's southern region are known. CHUAYNKERN & CHUAYNKERN (2012) listed *L. tricolor* as a species known from South Thailand. COX *ET AL.* (2012) assigned the species to the genus *Gongylosoma* Fitzinger, 1843 and noted that snake specimens in the Chulalongkorn Museum of Natural History in Bangkok were identified as *L. tricolor*, but that their exact sites of collection are unknown. Yet, they believed that this snake inhabits Thailand's southernmost provinces. This belief is also reflected in the distribution map of the species in CHAN-ARD *ET AL.* (2015).

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<sup>1</sup> Mu Ban Inthanurak, Wiang Phing Road, Chiang Mai 50100, Thailand. E-mail: sjonhauser@gmail.com  
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Earlier, *Liopeltis* cf. *tricolor* had been reported from southern Vietnam (ORLOV *ET AL.*, 2003), the first record of the species in mainland Southeast Asia north of the Isthmus of Kra. However, the morphological characteristics of the specimen provided in ORLOV *ET AL.* (2003) did not fully match those of *L. tricolor* from Sundaic localities.

The first record of *Liopeltis frenatus* (Günther, 1858) for Thailand has recently been reported from submontane forest in Nan Province (HAUSER, 2018). *Liopeltis stoliczkae* (Sclater, 1891) is a species closely related to *L. tricolor*. The coloration and color patterns of the two species are strikingly similar (see Figs. 1–3), but, as pointed out below, they differ in head scalation (BOULENGER, 1894). *Liopeltis stoliczkae* had been reported from northeastern India and Myanmar where it was considered rare. SMITH (1943), for example, listed only five specimens for the species from these regions, and no new records have been reported since. However, in the 2000s, it was reported from Cambodia (STUART *ET AL.*, 2006) and Laos (STUART & HEATWOLE, 2008). Following these discoveries, it was believed that *Liopeltis* cf. *tricolor* from South Vietnam had been misidentified, and, in fact, represented *L. stoliczkae* (Stuart in BAIN & HURLEY, 2011). The new identification as *L. stoliczkae* was based on solid evidence. ORLOV *ET AL.* (2003) had reported that in their specimen a distinct loreal was present and that the prefrontals did not contact the supralabials, exactly the characteristics that distinguish *L. stoliczkae* from *L. tricolor* (keys in BOULENGER, 1894). It is hard to understand why ORLOV *ET AL.* (2003) failed to identify the Vietnam-specimen as *L. stoliczkae*, despite their familiarity with BOULENGER (1894), which was cited in the section on *L. tricolor* of their article. In 2012, *L. stoliczkae* was rediscovered in northeastern India. Specimens of the species were collected in Mizoram (ANONYMOUS, 2012), relatively close to the type locality in Nagaland. The forgotten species was back on the map.

In the meantime, I had come across many similar-looking road-killed snakes in northern Thailand. Following examination and consultation of the keys given in BOULENGER (1894) these snakes were identified as *L. stoliczkae*. In this contribution this species is added to the snake fauna of Thailand, with notes on its variation, distribution, behavior and habitat.

## MATERIAL AND METHODS

During the years 2004–2018 many days, mostly during the rainy season (May–November), were spent in various provinces of northern Thailand. In early morning and late afternoon hours, roads were searched for fresh road-killed snakes (DORs), while at times living specimens were spotted on the tarmac or in the vegetation at the road edges. At night, selected areas were searched by following forest trails on foot or by screening the vegetation along main roads. Relatively intact DORs of the less common species, including *L. stoliczkae*, were photographed, and collected for later examination and subsequent preservation. Standard preservation consisted of fixating the complete snake in 10% formalin for at least one week, rinsing it in water for 24 hours and subsequently storing it in 70% ethanol. Many of the fresh snakes, however, were skinned (their tails being discarded) and the skins were sealed in plastic. The largest part of the collection is currently deposited in the Queen Saovabha Memorial Institute in Bangkok.

Living specimens were photographed *in situ*, and, were occasionally temporarily captured for photographing in clearer surroundings, but all were eventually released close to the places where they had initially been located. For a detailed description of methodology see HAUSER (2017).

### Abbreviations (Mostly Used in Figures and a Table)

#### *Issues relevant to the state of voucher*

DOR = Dead on Road; pix = photograph; pres. = preserved; QSMI = Queen Saovabha Memorial Institute, Thai Red Cross Society, Bangkok, Thailand; SHPC = Sjon Hauser's Private Collection, Chiang Mai, Thailand; skin = (part of) dried skin.

#### *Localities, habitats and environments*

CMA = Chiang Mai Province; CUL = cultivated areas; EGF = evergreen forest; MHS = Mae Hong Son Province; MDF = mixed deciduous forest; MDF + BB = mixed deciduous forest with bamboo; N. P. = National Park; PBU = Phetchabun Province; W. S. = Wildlife Sanctuary.

#### *Related to morphometrics and meristics*

AS = anal shield; PF–SupL = prefrontal in contact with supralabials; DIV = divided; DSF = dorsal scale formula or the number of rows of dorsals one HL (head length) behind the head : rows of dorsals at midbody : rows of dorsals one HL before the vent; F = female; HL = head length, distance from tip of snout to posterior end of the lower jaw; JUV = juvenile; Lor. = loreal; M = male; PF = prefrontal shield; PV = number of preventral shields; R = ratio TaL/TL in %; SCp = number of pairs of subcaudal shields; SupL = supralabials; TL = total length; TaL = tail length; V = number of ventral shields counted according to DOWLING (1951).

## RESULTS

Twenty-five DORs found in northern Thailand were identified as *Liopeltis stoliczkae*, and four living specimens of the species were spotted and photographed. The localities of these records ranged from Mae Hong Son and Tak provinces in the western part, through Chiang Mai province to Phrae and Phetchabun provinces in the eastern part of the region. One DOR was collected in Loei province in Northeast Thailand.

All animals were small, slender, elongated snakes with long tails and a somewhat depressed head moderately distinct from the neck (Figs. 2 and 3). Their total length ranged from 400–613 mm, with the exclusion of a juvenile measuring 218 mm. Their relative tail length was 38.9–43.1%. The upper sides of the head, body and tail are pale greyish-brown (buff). A distinct black streak runs backwards from the eye and peters out about 1–1½ head length behind the head (Figs. 2, 3 and 7). The snake's underside is whitish or cream with a pale grey lateral stripe along the corners of the ventral shields. The ventral shields were counted according to DOWLING (1951), excluding the anal shield, and ranged from 141–161. There were always 2 or 3 preventrals (the unpaired shields anterior to the most anterior ventral shield). Subcaudal pairs, excluding the terminal scute, ranged from 124–141 (excluding a count of 108 for a tail of which the tip was broken off). DSF could only be determined in a few preserved snakes and skins and was 15(14) : 15 : 13 (see Fig. 7 for the rows of dorsal scales behind the head). In many specimens the head was seriously damaged and much of the scalation was not intact. Yet, most of the head scalation was still intact in 12 DORs, and in the pictures of one of the living specimens the head scalation was perfectly clear (Figs. 4 and 5). Characteristics of the head scalation include a small, squarish loreal that prevents the prefrontal shield from contacting the supralabials. This characteristic discriminates *L. stoliczkae* from *L. tricolor* (BOULENGER, 1894). Other characteristics include long, entire nasal with small nostril, 1 preocular and 2

postoculars, 8 supralabials, of which the 4<sup>th</sup> and 5<sup>th</sup> contact the eye, and the 7<sup>th</sup> being largest (Fig. 5). In three fresh, male DORs the hemipenes were successfully everted by massaging the tail towards the vent. They showed one large, straight spine arising from the center of the distal part surrounded by a whorl of much smaller, slightly curved spines (Fig. 6). All data on scalation and morphometry are in accordance with the description of the species in SCLATER (1891), BOULENGER (1894), WALL (1909), SMITH (1943) and DAS (2012). These data, as well as those on elevation and habitat of the collecting sites, are summarized in Appendix 1. A locality dot map for the listed specimens in northern Thailand is provided in Fig. 8. This suggests that in northern Thailand *L. stoliczkae* predominantly lives at altitudes of 650–1000 m, where mixed forest with bamboo is the common vegetation. All localities in South Asia and mainland Southeast Asia that have been tracked were plotted in Fig. 9.

Printed literature and the internet were searched for localities from which the species has been reported throughout its total range. The results are summarized below.

### Northeastern India

#### *Nagaland*

SCLATER (1891), the original description of the species, was based on two specimens in the Indian Museum in Calcutta, of which one was believed to have originated from “Samagooting” in the Naga Hills (now Nagaland) (1 of Fig. 9), whereas the origin of the other was unknown (DAS *ET AL.*, 1998; WALLACH *ET AL.* 2014). More recently, the species was reported from Tuensang in Nagaland, collected in subtropical vegetation at altitude of 137 m (AO *ET AL.*, 2004). The morphometric data (SVL = 540 mm, TaL = 180 mm), however, cast some doubt upon the identification, as they imply an unusually large total length (720 mm) and an unusually small tail relative to the total length, 25% vs. 40% more usual in northern Thai specimens. Even when assuming that “SVL = 540” is a lapsus for “TL = 540”, then the relative tail length (33.3 %) is still unusually small.

#### *West Bengal*

Two specimens from the Darjeeling Museum, supposed to have originated from the surroundings of Darjeeling (now: Darjiling, in West Bengal) (2 of Fig. 9) were reported by WALL (1909).

#### *Mizoram*

In 2012, news reported four records of the species in Aizawl, the capital of Mizoram (3 of Fig. 9) at altitudes of 1100–1150 m by H. T. Lalremsanga, a zoologist at Mizoram University (ANONYMOUS, 2012). One of Lalremsanga’s pictures illustrates the species’ description in DAS (2012). The latest record from Mizoram is the picture of a road-killed snake taken on 27 August 2017 and posted on the website Herp Mapper (<https://herpmapper.org/record/198487> last accessed 30 November 2017).

#### *Sikkim*

The species is listed in an overview of the herpetofauna of Sikkim (4 of Fig. 9) (CHETTRI *ET AL.* 2011). Sikkim is mentioned in two handbooks on India’s snakes (SHARMA 2003; 2007) as a locality where the species has been recorded.



Figure 1. A living specimen of *Liopeltis tricolor* from Santubong Peninsula, Sarawak, East Malaysia. Photograph by Johan van Rooijen.



Figure 2. QSMI 1548, a living specimen of *Liopeltis stoliczkae* from Umphang District, Tak Province, Thailand. Photograph by Sjon Hauser.



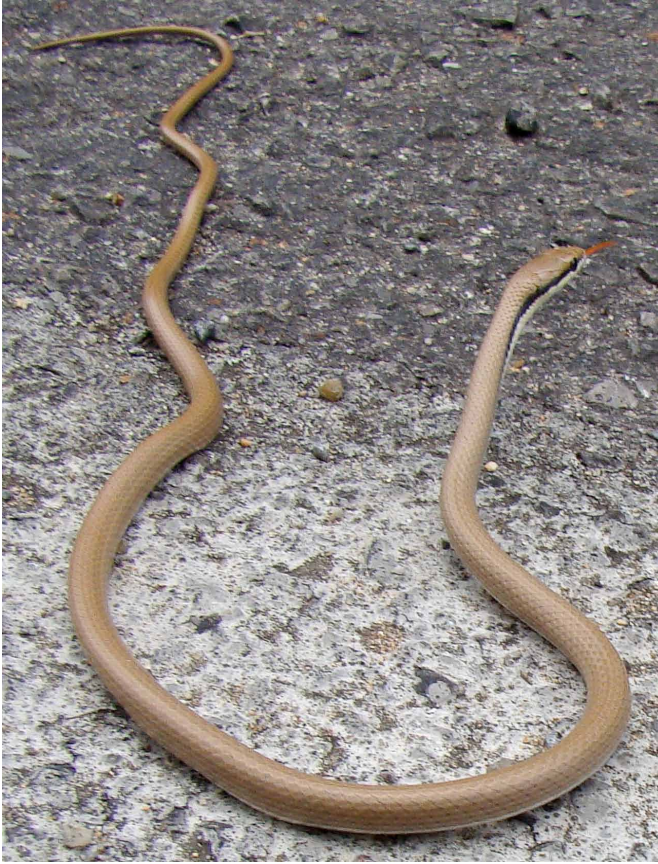


Figure 3. QSMI 1545, a living specimen of *Liopeltis stoliczkae* from Mae Taeng District, Chiang Mai Province, Thailand. Photograph by Sjon Hauser.



Figure 4. Head and neck of QSMI-13.05.20-11, a fresh and intact road-killed specimen of *Liopeltis stoliczkae* from Umphang District, Tak Province, Thailand. Photograph by Sjon Hauser.

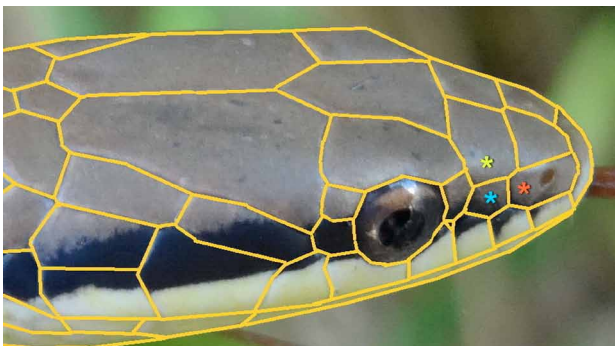


Figure 5. Head sculation of QSMI 1548, a living specimen of *Liopeltis stoliczkae* from Umphang District, Tak Province, Thailand, showing a single (undivided) nasal (red asterisk), 1 preocular, 2 postoculars (both in contact with parietal shield), and 8 supralabials of which the 4<sup>th</sup> and 5<sup>th</sup> are in contact with the eye and the 7<sup>th</sup> is the largest. The prefrontal (yellow asterisk) is paired (divided), separated from the supralabials by a loreal (blue asterisks). Photograph by Sjon Hauser.



Figure 6. Partly everted hemipenes of *Liopeltis stoliczkae* (QSMI-12.06.12-23) from Mueang District, Phrae Province, Thailand. Photograph by Sjon Hauser.

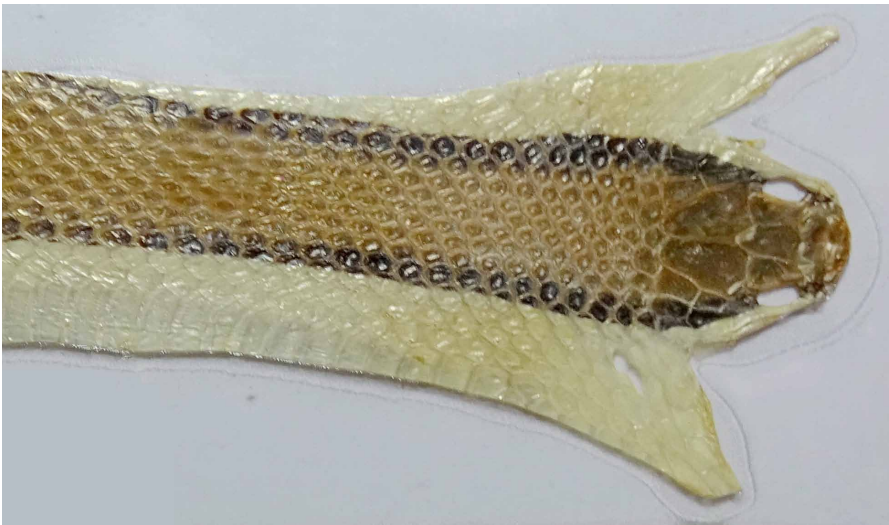


Figure 7. The skin of head and neck of *Liopeltis stoliczkae* (QSMI 1544) from Hang Dong District (Chiang Mai Province, Thailand) showing the black postocular streak petering out one to one-and-half head lengths behind the head, and 15 rows of dorsal scales one head length behind the head. Using a magnifying glass, a small loreal could be distinguished on each side although they were punctured by pins that were used to span the fresh skin (not distinct in the picture). Photograph by Sjon Hauser.

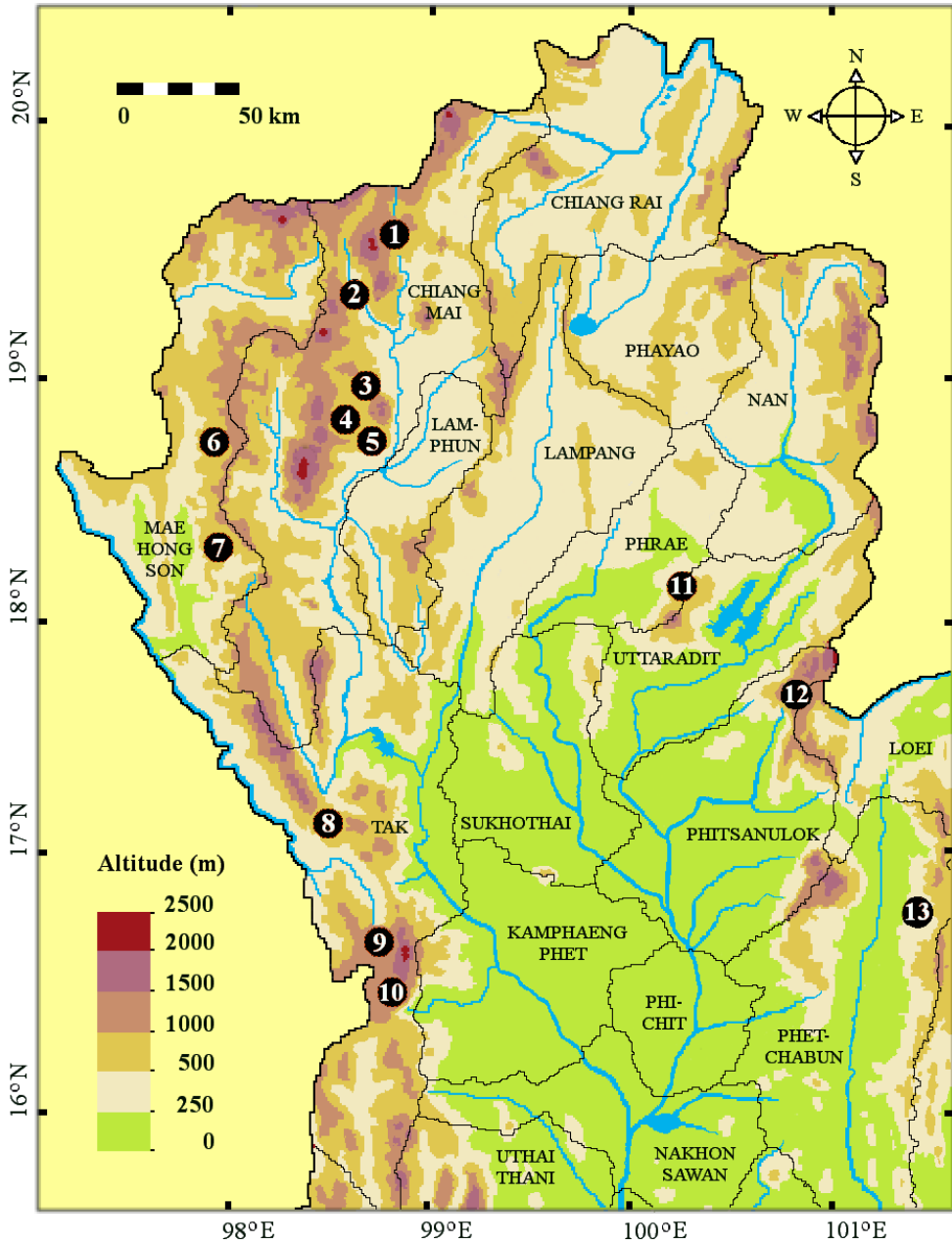


Figure 8. A locality dot map for *Liopeltis stoliczkae* in northern Thailand. Thin black lines indicate provincial boundaries. Rivers, streams and waterbodies including reservoirs are shown in blue. *Chiang Mai Province*: (1) Chiang Dao District; (2) Mae Taeng District; (3) Mae Rim District; (4) Samoeng District; (5) Hang Dong District. *Mae Hong Son Province*: (6) Khun Yuam District; (7) Mae Sariang District. *Tak Province*: (8) Mae Ramat District; (9) Phop Phra District; (10) Umphang District. *Phrae Province*: (11) Mueang District. *Loei Province*: (12) Na Haeo District. *Phetchabun Province*: (13) Nam Nao District.



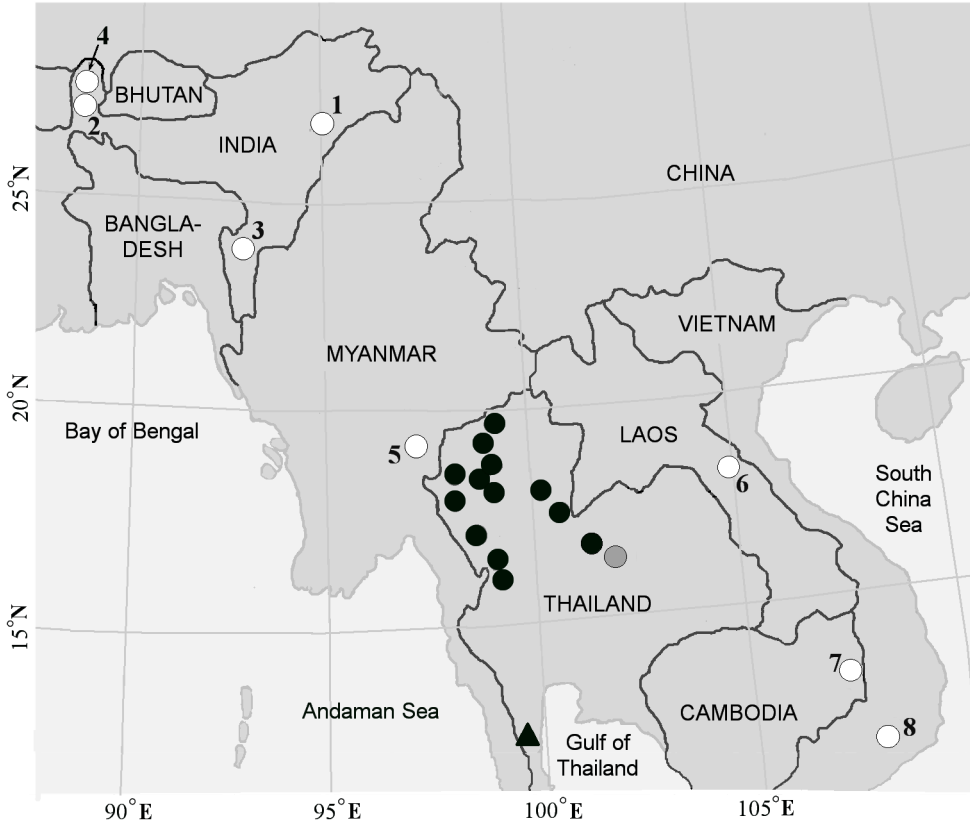


Figure 9. Locality dot map for *Liopeltis stoliczkae* in its total range in South and Southeast Asia. Black lines indicate national boundaries. White dots: (1) Nagaland; (2) Darjiling, West Bengal; (3) Aizawl, Mizoram; (4) Sikkim; (5) Karen Hills, Myanmar; (6) Bolikhamxay Province, central Laos; (7) Mondolkiri Province, eastern Cambodia; (8) Lam Dong Province, southern Vietnam. The grey dot represents a possibly valid record in Phu Khieo W. S., Chaiyaphum, Northeast Thailand that needs confirmation (see discussion). Black dots represent the localities in northern Thailand reported in this study (see also Figure 8). The black triangle refers to the Kaeng Krachan N. P., Phetchaburi Province, the most northern locality where *L. tricolor* has been recorded (see discussion).

## Mainland Southeast Asia

### Myanmar

Samaguting and Bia-po in the Karen Hills (5 of Fig. 9) were mentioned by WALL (1909) as localities for *L. stoliczkae* in the central part of the country. Neither name could be found on modern maps, but anyway, it is highly likely that the species occurs in the Karen Hills of northern Kayin State. *Liopeltis stoliczkae* is listed in DOWLING & JENNER (1988) probably on the basis of these records.

### Laos

A road-killed specimen was reported from near Ban Lak, Central Laos, in the Annamite foothills at 600 m (DUCKWORTH *ET AL.*, 1999). STUART & HEATWOLE (2008) reported a specimen from Khamkeut District, Bolikhamxay Province (6 of Fig. 9), in Central Laos. A single male DOR specimen was collected in August 1996. Both reports probably refer to the same record.

### Cambodia

STUART *ET AL.* (2006) reported a single male from Phnom Nam Lyr W. S., Pichrada District, Mondolkiri Province (7 of Fig. 9), in eastern Cambodia. In June 2000, around 1200 hrs, it was spotted on bamboo 2 m above the ground at the edge of a dirt road in deciduous forest with a grassy understory at 700 m in altitude.

### Vietnam

The species has not been (officially) reported from Vietnam. However, *Liopeltis cf. tricolor* (Schlegel, 1837) was reported from Bai Lam District in Lam Dong Province (8 of Fig. 9), southern Vietnam, by ORLOV *ET AL.* (2003). The specimen, however, was misidentified by these authors (see introduction), and all its data were in fact in accordance with features of *L. stoliczkae*. The report of *L. tricolor* in NGUYEN *ET AL.* (2009) probably refers to the same record. In a distribution note on *L. stoliczkae* in BAIN & HURLEY (2011, p.125), it is also concluded that the specimen from Lam Dong Province is *L. stoliczkae*.

## DISCUSSION

The distribution maps show that *L. stoliczkae* ranges from Darjiling, Nagaland and Mizoram in northeastern India through Myanmar and northern Thailand to Laos, Cambodia and Vietnam. The paucity of records in large areas within this range may reflect some discontinuities in its distribution. However, this paucity may also be due to underexploration of large areas and the difficulty of finding this species. The present study shows that *L. stoliczkae* has a wide range in northern Thailand with no or few discontinuities with the exception of extensive river valleys (Fig. 8). The snake seems to prefer moderately high mountains with a cover of mixed deciduous forest with bamboo, a forest type that stretches over large parts of northern Thailand's mountains at about 600–900 m in altitude (ELLIOTT *ET AL.*, 1989; MAXWELL, 2004; WEBB *ET AL.*, 2011). This seasonal tropical forest shows much variation in composition and structure, with bamboo having a great influence on its structure and dynamics (MAROD *ET AL.*, 1999; BULT & GREIJMANS, 2006). In the past, teak (*Tectona grandis*) was the dominant tree of the forest canopy, but due to extensive logging, large teak trees have now largely disappeared (MAXWELL *ET AL.*, 1997). Human impact on the forest has probably been significant since prehistoric times (ROBERTS *ET AL.*, 2017). Though bamboo is naturally common in mixed deciduous forests, it often becomes a dominating feature as a result of human-caused degradation and frequent forest fires (BULT & GREIJMANS, 2006). My field data suggest a strong association of *L. stoliczkae* with this forest type, for most of the collecting sites were located in, or close to, bamboo-dominated vegetation. In Cambodia, the only recorded specimen was spotted in bamboo at 2 m above the ground (STUART *ET AL.*, 2006). The association with bamboo was also noted by DAS (2010; 2012). In Phop Phra and Umphang, the snake was also found at 900–1150 m in altitude where evergreen forest is the natural vegetation. However, much of the surveyed area

was disturbed with clearings for agriculture and clumps of bamboo abounding. Anecdotal information on the species' behavior suggest that it is typically arboreal. When a specimen from Umphang District, Tak Province, was captured on a road and taken to the motor bike of the author in order to bag it, its tail brushed the handlebar and instantly wound around it, gaining a strong grip. When the snake later escaped from captivity, it climbed into a ventilator. Similarly, for the related *L. tricolor* from Sarawak, Malaysia, it was reported that a captured individual had escaped, and was later found at the ceiling of a room (VAN ROOIJEN & VAN ROOIJEN, 2007). This behavior reflects arboreal nature, although *L. stoliczkae*, as well as *L. tricolor*, has been described as terrestrial (COX ET AL. [1998] and COX ET AL. [2012] for *L. tricolor*). Its small size, slender shape and pale brown color make *L. stoliczkae* difficult to find in dense vegetation, in particular in bamboo clumps where it possibly spends the night. This may explain why the species hitherto has seldom been recorded, even in nighttime surveys. Even so, however, in Thailand individuals actually representing *L. stoliczkae* might have possibly been obtained as early as 2003 or earlier, when *L. tricolor* was listed in a report on the herpetofauna of Phu Khieo W. S., Chaiyaphum Province, Northeast Thailand (ANONYMOUS, n.d.). As Phu Khieo W. S. is just 50–100 km southeast of a locality in Phetchabun Province where *L. stoliczkae* was recorded in this study (Appendix 1), the occurrence of the species in Phu Khieo W. S. is likely. A locality in Tak's Umphang District (25 km north of Umphang Town) is so far the southernmost spot where *L. stoliczkae* has been reported in Thailand. As Uthai Thani and Kanchanaburi, south of Umphang, abound in mixed deciduous forest with bamboo (MAROD ET AL., 1999; WEBB ET AL., 2011), the species is expected also to occur there. However, how far southwards its range may stretch is yet to be investigated through further field surveys. Interestingly, a picture of *L. tricolor* originating from Kaeng Krachan N. P. in Phetchaburi Province, western Central Thailand, has been posted on the website NORTH THAILAND BIRDING (2017). In the picture, the contact of the prefrontal shield with the second and third supralabial is distinct, whereas the loreal is absent, i.e., the specimen had been correctly identified. The occurrence of *L. tricolor* in Phetchaburi is not surprising, as the herpetofauna of the province shows strong Sundaic affinities (PAUWELS ET AL., 2003). If Kaeng Krachan as the locality for this specimen is not an error, Phetchaburi Province, more than 1000 km north of the southern provinces where the species is supposed to occur (COX ET AL., 2012), is the only precise locality in Thailand from which *L. tricolor* has been reported, possibly representing the northernmost extremity of the species' range. A good number of recent additions to northern Thailand's snake fauna originated from relatively rare and restricted habitats at high elevations, such as *Plagiopholis blakewayi* Boulenger, 1893 (TILLACK ET AL., 2006), *Ptyas nigromarginata* (Blyth, 1854) (VOGEL & HAUSER, 2013), *Parafimbrios lao* Teynié, David, Lottier, Le, Vidal et Nguyen, 2015 (TEYNIÉ & HAUSER, 2017) and *Liopeltus frenatus* (Günther, 1858) (HAUSER, 2018). It is unlikely that these species are widespread in northern Thailand. In contrast, *L. stoliczkae* occurs throughout the region within a nearly continuous forest type. Its late discovery in Thailand somewhat resembles the late country record of *Hebius khasiense* (Boulenger, 1890) from two localities in northern Thailand (PAUWELS ET AL., 2009).

The present records of *L. stoliczkae*, along with these recent records of other snakes, emphasize the importance of widespread and intensive field surveys in northern Thailand for our appropriate appreciation of diversity of snake fauna in this region.

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## REFERENCES

- ANONYMOUS, n.d. Checklist of Vertebrate species in Phu Khieo Wildlife Sanctuary, Chaiyaphum Province.
- ANONYMOUS, 2012. Rare snake species ‘rediscovered’ by zoologist in Mizoram. *The Times of India*, February 21, 2012.
- AO, J. M., P. DAVID, S. BORDOLOI, AND A. OHLER. 2004. Notes on a collection of snakes from Nagaland, northeast India, with 19 new records for this state. *Russ. J. Herp.* 11(2): 155–162.
- BAIN, R. H., AND M. M. HURLEY. 2011. A biogeographic synthesis of the amphibians and reptiles of Indochina. *Bull. Amer. Mus. Nat. Hist.* no. 360. 138 pp.
- BOULENGER, G. A. 1894. *Catalogue of the Snakes in the British Museum (Natural History), Vol. 2, Containing the Colubridae (Aglyphae)*. Taylor and Francis, London. xi + 382 pp.
- BULT, M. VAN DE, AND M. GREJMANS. 2006. Vegetation types and the deciduous-evergreen forest continuum along an elevation gradient in Mae Wong National Park, western Thailand. *Nat. Hist. Bull. Siam Soc.* 54(1): 27–74.
- CHAN-ARD, T., J. W. K. PARR, AND J. NABHITABHATA. 2015. *A Field Guide to the Reptiles of Thailand*. Oxford Univ. Press, New York. 344 pp.
- CHETTRI, B., B. K. ACHARYA, AND S. BHUPATHY. 2011. An overview of the herpetofauna of Sikkim with emphasis on the elevational distribution pattern and threats and conservation issues. Pages 233–254 in M. L. Arrawatia, and S. Tambe (eds.), *Biodiversity of Sikkim: Exploring and Conserving a Global Hotspot*. Information and Public Relations Department, Government of Sikkim, Gangtok.
- CHUAYNKERN, Y., AND C. CHUAYNKERN. 2012. Checklist of Reptiles in Thailand. *J. Wildlife Thail.* 19(1): 75–162.
- COX, M. J. 1991. *The Snakes of Thailand and their Husbandry*. Krieger, Malabar, Florida. 526 pp.
- COX, M. J., P. P. VAN DIJK, J. NABHITABHATA, AND K. THIRAKHUPT. 1998. *A Photographic Guide to Snakes and other Reptiles of Thailand and South-East Asia*. Asia Books, Bangkok. 144 pp.
- COX, M. J., M. F. HOOVER, L. CHANHOME, AND K. THIRAKHUPT. 2012. *The snakes of Thailand*. Chulalongkorn Univ. Mus. Nat. Hist., Bangkok. 845 pp.
- DAS, I. 2010. *A field guide to the reptiles of Thailand and South-East Asia*. Asia Books, Bangkok, 376 pp.
- DAS, I. 2012. *A naturalist's guide to the snakes of Thailand and Southeast Asia*. Asia Books, Bangkok, 160 pp.
- DAS, I., B. DATTAGUPTA, AND N. C. GAYEN. 1998. History and catalogue of reptile types in the collection of the Zoological Survey of India. *J. South Asian Nat. Hist.* 3(2): 121–172.
- DAVID, P., M. J. COX, O. S. G. PAUWELS, L. CHANHOME, AND K. THIRAKHUPT. 2004. Book review. When a book review is not sufficient to say all: an in-depth analysis of a recent book on the snakes of Thailand, with an updated checklist of the snakes of the kingdom. *Nat. Hist. J. Chulalongkorn Univ.* 4(1): 47–80.
- DOWLING, H. G. 1951. A proposed standard system of counting ventrals in snakes. *Brit. J. Herp.* 1: 97–99.
- DOWLING, H. G., AND J. V. JENNER. 1988. *Snakes of Burma. Checklist of reported species and bibliography*. Smithsonian Herp. Inf. Service No. 76. 19 pp.
- DUCKWORTH, J. W., R. E. SALTER, AND K. KHOUNBOLINE (eds.). 1999. *Wildlife in the Lao PDR: 1999 Status Report*. IUCN–The World Conservation Union / Wild life Conservation Society / Centre for Protected Areas and Watershed Management, Vientiane. xiv + 275 pp.
- ELLIOTT, S., J. F. MAXWELL, AND O. P. BEAVER. 1989. A transect survey of monsoon forest in Doi Suthep-Pui National Park. *Nat. Hist. Bull. Siam Soc.* 37(2): 137–171.
- HAUSER, S. 2017. On the validity of *Pareas macularius* Theobald, 1868 (Squamata: Pareidae) as a species distinct from *Pareas margaritophorus* (Jan in Bocourt, 1866). *Trop. Nat. Hist.* 17(1): 147–174.



- HAUSER, S. 2018. Addition of *Liopeltis frenatus* (Günther, 1858) and *Cyclophiops multicinctus* (Roux, 1907) to the herpetofauna of Thailand (Squamata: Colubridae). *Trop. Nat. Hist.* 18(1): 54–67.
- HERP MAPPER. 2017. Available from: <https://herpmapper.org/record/198487> (accessed 30 November 2017)
- LEVITON, A. E. 1964. Contributions to a review of Philippine snakes, II. The snakes of the genera *Liopeltis* and *Sibynophis*. *Philip. J. Sci.* 92(3): 367–381.
- MAROD, D., U. HUNTINTARA, C. YARWUDHI, H. TANAKA, AND T. NAKASHISURA. 1999. Structural dynamics of a natural mixed deciduous forest in western Thailand. *J. Vegetation Sci.* 10: 777–786.
- MAXWELL, J. F. 2004. A synopsis of the vegetation of Thailand. *Nat. Hist. J. Chulalongkorn Univ.*, 4(2): 19–29.
- MAXWELL, J. F., S. ELLIOTT, AND V. ANUSARNSUNTHORN. 1997. The vegetation of Jae Sawn National Park, Lampang Province, Thailand. *Nat. Hist. Bull. Siam Soc.* 45: 71–97.
- NGUYEN, V. S., T. C. HO AND Q. T. NGUYEN. 2009. *Herpetofauna of Vietnam*. Frankfurt am Main, Editions Chimaira. 761 pp.
- NORTH THAILAND BIRDING. 2017. Available from: [http://www.norththailandbirding.com/pages/galleries/reptiles\\_c/th/snakes.html](http://www.norththailandbirding.com/pages/galleries/reptiles_c/th/snakes.html) (accessed 24 December, 2017)
- NUTPHAND, W. 2001. *Lai Ngu Thai / Snakes in Thailand*. Amarin Publishing, Bangkok. 320 pp. (in Thai)
- ORLOV, N. L., S. A. RYABOV, V. S. NGUYEN, AND Q. T. NGUYEN. 2003. New records of poorly known snakes of Vietnam. *Russ. J. of Herp.* 10(3): 217–240.
- PAUWELS, O. S. G., P. DAVID, C. CHIMSUNCHART, AND K. THIRAKHUP. 2003. Reptiles of Phetchaburi Province, Western Thailand: a list of species, with natural history notes, and a discussion on the biogeography at the Isthmus of Kra. *Nat. Hist. J. Chulalongkorn Univ.* 3(1): 23–53.
- PAUWELS, O. S. G., K. KUNYA, P. DAVID, S. WAENGSOOTHORN, AND M. SUMONTHA. 2009. On the occurrence of *Amphiesma khasiense* (Serpentes: Natricidae) in Thailand. *Hamadryad* 34(1): 75–79.
- ROBERTS, P., C. HUNT, M. ARROYO-KALIN, D. EVANS, AND N. BOIVIN. 2017. The deep human prehistory of global tropical forests and its relevance for modern conservation. *Nature Plants* 3: 17093.
- ROOIJ, N. DE. 1917. *The Reptiles of the Indo-Australian Archipelago. 2. Ophidia*. E. J. Brill, Leiden. 334 pp.
- ROOIJEN, J. VAN, AND M. VAN ROOIJEN. 2007. The land snakes of the Santubong Peninsula, Sarawak, Borneo: A preliminary list of species with natural history notes. *Russ. J. Herp.* 14(1): 27–38.
- SCLATER, W. L. 1891. Notes on the Collection of Snakes in the Indian Museum with descriptions of several new species. *J. Asiat. Soc. Bengal* 60(2): 230–250.
- SHARMA, R. C. 2003. *Handbook Indian Snakes*. Zoological Survey of India, Kolkata. 292 pp.
- SHARMA, R. C. 2007. *Fauna of India and the adjacent countries. Reptilia Volume-III (Serpentes)*. Zoological Survey of India, Kolkata. 410 pp.
- SMITH, M. A. 1943. *The fauna of British India, Ceylon and Burma, including the whole of the Indo-Chinese subregion. Reptilia and Amphibia. Vol. III, Serpentes*. Taylor & Francis, London. 583 pp.
- STUART, B. L., K. SOK, AND T. NEANG. 2006. A collection of amphibians and reptiles from hilly eastern Cambodia. *Raffles Bull. Zool.* 54(1): 129–155.
- STUART, B. L., AND H. HEATWOLE. 2008. Country records of snakes from Laos. *Hamadryad* 33(1): 97–106.
- TEYNIÉ, A., AND S. HAUSER. 2017. First record of *Parafimbrios lao* Teynié, David, Lottier, Le, Vidal et Nguyen, 2015 (Squamata: Caenophidia: Xenodermatidae) for Thailand. *Russ. J. Herp.* 24(1): 41–48.
- TILLACK, F., U. SCHEIDT, AND T. IHLE. 2006. First record of Blakeway's mountain snake, *Plagiopholis blakewayi* Boulenger, 1893 from Thailand, with remarks on the distribution of *Plagiopholis nuchalis* Boulenger, 1893 (Reptilia: Squamata: Colubridae, Pseudoxenodontinae). *Veröffentlichungen des Naturkundemuseums Erfurt* 25: 181–186.
- TWEEDIE, M. W. F. 1953. *The snakes of Malaya*. Government Printing Office, Singapore. 139 pp.
- VOGEL, G., AND S. HAUSER. 2013. Addition of *Ptyas nigromarginata* (Blyth, 1854) (Squamata: Colubridae) to the Snake Fauna of Thailand with Preliminary Remarks on Its Distribution. *Asian Herp. Res.* 4(3): 166–181.
- WALL, F. 1909. Notes on snakes from the neighbourhood of Darjeeling. *J. Bombay Nat. Hist. Soc.* 19: 337–357.
- WALLACH, V., K. L. WILLIAMS, AND J. BOUNDY. 2014. *Snakes of the World. A Catalogue of Living and Extinct Species*. CRC Press, Boca Raton (Florida). 1227 pp.
- WEBB, E. L., R. STEINMEITZ, N. SEUATURIAN, W. CHUTIPONG, AND M. VAN DE BULT. 2011. Structure and diversity of seasonal mixed evergreen-deciduous tropical forest, western Thailand. *Nat. Hist. Bull. Siam Soc.* 57: 19–34.

