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New country record of *Trimerodytes yapingi* (Guo, Zhu & Liu, 2019) (Squamata: Natricidae) from Laos with the first description of a male specimen and expanded diagnosis

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Abstract. *Trimerodytes yapingi* (Guo, Zhu & Liu, 2019), a species previously known only from Yunnan Province, China, is reported for the first time from Laos based on two specimens from Houaphan Province. The newly collected specimens (a couple) from Laos slightly differ from the female holotype from China in body size, number of ventrals and subcaudals as well as by a low genetic divergence of 1.1% (*Cytb* gene). In addition, we provide the first description of a male specimen and an expanded diagnosis of the species.

Key words. New record, genetic divergence, *Trimerodytes*, Houaphan Province.

INTRODUCTION

Sinonatrix yapingi Guo, Zhu, & Liu, 2019 was originally described from Yunnan Province, China, by Guo et al. (2019) based on the adult female holotype. Subsequently, this species was placed in the genus *Trimerodytes* Cope, 1895 by Ren et al. (2019). The species is characterized by having dorsal scales in 19–19–17 rows, moderately keeled except four outermost rows; prefrontal single; ventral scales 149; subcaudals 55, paired; cloacal plate divided; body with 30 black bands; ventral surface cream; and subcaudal surface gray (Guo et al. 2019). As a result of our field work in 2020, two individuals of a water snake were found in Houaphan Province, Laos. Morphological examination and genetic analysis revealed these snakes to be conspecific with *T. yapingi* Guo, Zhu, & Liu, 2019, a species previously known only from China. Thus, we herein report the first country record of this poorly known species for Laos and provide the first description of a male specimen as well as an expanded morphological diagnosis. Field survey was conducted in Phong Song Village, Xon District, Houaphan Province, Laos in March 2020.

MATERIAL AND METHODS

The specimens were anaesthetized and euthanized with ethyl acetate, subsequently fixed in approximately 85% ethanol, and then transferred to 70% ethanol for permanent storage in the collections of the Vietnam National University of Forestry (VNUF), Hanoi, Vietnam and the National University of Laos (NUOL). A tissue sample was preserved separately in 95% ethanol.

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Measurement and meristic character abbreviations

SVL = snout-vent length
TaL = tail length
TL = total length

Head scales

InN	=	internasal
Pf	=	prefrontal
F	=	frontal
SuprAo	=	supraocular
Lor:	=	loreal scale
PreOc	=	preocular scale
PostOc	=	postocular scales
Atem	=	anterior temporal scales
Ptem	=	posterior temporal scales
SL	=	supralabial scales
SL/orbit	=	scale order of supralabials touching the orbit
IL	=	infralabial scales
IL/ 1st chin shield	=	number of infralabials touching the first chin shield

Body scales

DSR = dorsal scale row
Kl/Sm = keeled or smooth
Ven = ventral scales
Pc = precloacal scale
SC = subcaudal scales

Total genomic DNA was extracted from liver samples using the animal DNA isolation Kit (QIAamp DNA Mini Kit, Germany). The total DNA purity and integrity were tested by Scandrop 3830A-0341 spectrophotometer (Analytik Jena, Germany) and then diluted to a concentration of 20 ng/µl. The mitochondrial cytochrome b (*Cytb*) gene region was amplified using primers L14919/ H16064 (Guo et al. 2012). All double-stranded products were sequenced by 1st BASE (Malaysia), and then edited manually using Bioedit ver. 7.0.5.2 (Hall 1999). The new sequences were added to a dataset including 11 cytb sequences from seven species of *Trimerodytes* for the subsequent analyses. *Natrix natrix* Linnaeus, 1758 was selected as outgroup. Phylogenetic trees were performed using maximum likelihood (ML) on MEGA ver. 7.0 (Kumar et al. 2015) software with 1000 bootstrap replicates. Genetic distances among species were calculated using MEGA ver. 7.0 (Kumar et al. 2015). The *Cytb* nucleotide sequence matrix contained 988 characters without insertions or deletions. The Maximum Likelihood analysis produced identical topologies (Fig. 1). The two newly collected specimens have the same *Cytb* nucleotide sequence (GenBank accession numbers: ON603619-20).

In the phylogenetic tree, all samples of the genus *Trimerodytes* clustered in a monophyletic group, and can be divided into four clades (A–D). *Trimerodytes percarinatus* (Boulenger, 1899) formed a mono-typic clade (clade C), this clade was supported by a bootstrap value of 100. *Trimerodytes annularis* (Hallowell, 1856) and *T. balteatus* (Cope, 1895) were grouped in clade D (Bootstrap 76). Clade B included *Trimerodytes yunnan-*

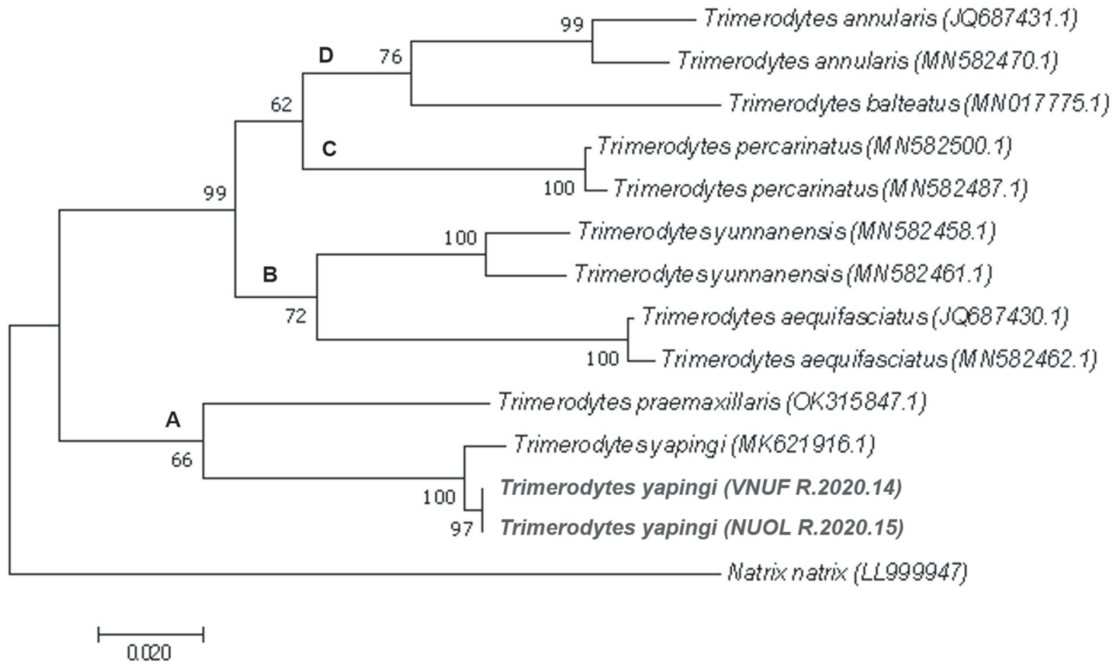

Fig. 1. Maximum Likelihood phylogeny of the genus *Trimerodytes* Cope, 1895. The numbers at the branches are confidence values based on Felsenstein's bootstrap method (based on 1000 bootstrap replicates).

Fig. 2. *Trimerodytes yapingi* (Guo, Zhu & Liu, 2019) (NUOL R.2020.15), adult male (preserved) from Laos. **A**. Dorsal view. **B**. Ventral view. Photos: Tuong S. Dinh.

ensis Rao & Yang, 1998 and *T. aequifasciatus* (Barbour, 1908) with a bootstrap value of 72. Within clade A, *Trimerodytes praemaxillaris* Angel, 1929 and *T. yapingi* Go, Zhu & Liu, 2019 were placed together with a bootstrap value of 66. The two new samples from Laos were placed with *T. yapingi* from China with a high bootstrap value of 100, and a small genetic distance (1.1%).

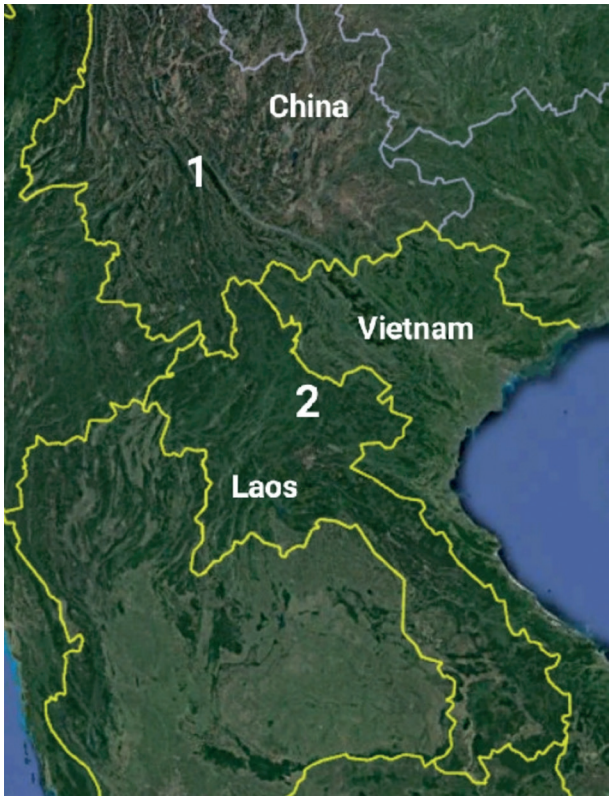

Fig. 3. Distribution of *Trimerodytes yapingi* (Guo, Zhu & Liu, 2019). 1 = type locality in Yunnan Province, China; 2 = new record from Houaphan Province, Laos.

Redescription of *Trimerodytes yapingi* (Guo, Zhu & Liu, 2019) with the first record of the male specimen
Jingdong Water Snake (Fig. 2)

Specimens examined (n=2). One adult female, VNUF R.2020.14 (field number: HP.14) and one adult male, NUOL R.2020.15 (field number: HP.15), collected on March 22th 2020 in a stream (20°18’142” N/ 103°20’322” E, at an elevation of 1,086 m a.l.s.) of Phon Song Village within Nam Et – Phou Louey National Protected Area by Vilay Phimpasone and Oanh Van Lo (Fig. 3). Expanded diagnosis: As the original description of *Trimerodytes yapingi* was based on one adult female only (Guo et al. 2019) we herein expand the diagnosis of this species as follows: 1) Body size large (TL from 635 to 795 mm); 2) dorsal scales in 19–19–17 rows, moderately keeled except outer two to four scale rows; 3) prefrontal single; 4) ventral scales 149–156, subcaudals 55–65, paired; 5) cloaca divided; 6) body with 30 black bands; 7) belly milk-white, without speckles or bands; 8) reduction of dorsal scale rows from 19 to 17 anterior to 87th ventral scale in the male, and to the 90–97th ventral scale in females; 9) reduction of caudodorsal scale rows from 8 to 6 anterior to 20th subcaudal in the male, and anterior to 12–24th subcaudals in females; as well as from 6 to 4 anterior to 34th subcaudal in the male, and 31–38th subcaudals in females. Description of the male specimen: Body stout, cylindrical. SVL 485 mm, TaL 150 mm, TL

Fig. 4. Habitat of *Trimerodytes yapingi* (Guo, Zhu & Liu, 2019) in Phon Song Village, Xon District, Houaphan Province, northeastern Laos. Photo: V. Phimpasone.

635 mm, TaL/TL 0.23; HL 20.38 mm, HW 10.43 mm; elongated and narrow head, longer than twice its width, snout blunt; internasals much longer than wide, posteriorly wider, shorter than prefrontal; prefrontal single, nearly two times as wide as long, extending downward on both sides and in contact with loreals, preoculars, and nasals; frontal shield-like, 1.5 × as long as wide; loreal 1/1, separated from the eye; preocular 1/1, postoculars 3/3; anterior temporals 2/2, posterior temporals 3/3; supralabials 8/8, fourth touching the eye, sixth largest; infralabials 9/10, first to fifth (both sides) in contact with chin shields; dorsal scales in 19–19–17 rows, 11 rows moderately keeled except two or four outermost scale rows at each side which are smooth; ventrals 151; cloacal plate divided; subcaudals 65, paired. Coloration in life: Dorsal surface of body grayish brown, with many black irregular bands on vertebral line. There are many V-shaped speckles on both sides of the body flank, nearby ventral scales, connecting and constituting W-shaped speckles. Dorsal surface of head dark gray without marking, ventral head white, infralabials dark anteriorly and white posteriorly. Ventral side yellowish white, ventral surface of tail dark white. Coloration in preservative: Dorsal surface dark-brown. Ventral side white cream, ventral surface of tail dark white. Ecological notes: The specimens were found at 13h10 in a stream within the evergreen forest at an elevation of 1,086 m a.s.l. The relative temperature was about 27.8°C and the humidity 44%. The surrounding habitat was mixed evergreen forest of hardwoods and shrub and vines (Fig. 4). Distribution. This is the first country record of *Trimerodytes yapingi* for Laos. Elsewhere, this species is known from Yunnan, China (Fig. 3). The specimens from Laos slightly differ from the the original description by having more ventrals (156 versus 149+1), more subcaudals (62–65 versus 55), body length shorter than reported for the holotype (SVL 485 versus 635 mm; TaL 150–155 mm versus 160 mm). The first discovered male of the species has more subcaudals (65) compared with the females (55 and 62). Our record of *Trimerodytes yapingi* from Laos is approximately 500 km distant from the type locality in Yunnan, China. It is probable that the species will also be reported from northern Vietnam in the future. The new record in Laos was reported from lower elevation (1,086 m a.s.l.) compared with that in the original description (1,500 m a.s.l.). Whereas the type specimen was collected in a rice field near the evergreen forest, the specimens from Laos were found within disturbed evergreen forest.

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REFERENCES

Angel F (1929) Liste des reptiles et batraciens du Haut-Laos recueillis par M. Delacour. Descriptions d'un genere de especes et d'une variete d'ophidiens. Bulletin du Muséum National d'Histoire Naturelle 2: 75–81

Barbour T (1908) Some new reptiles and amphibians. Bulletin of the Museum of Comparative Zoology at Harvard College 51 (12): 315–325

Boulenger GA (1899) On a collection of reptiles and batrachians made by Mr. J.D. La Touche in N.W. Fokien, China. Proceedings of the Zoological Society of London 1899: 159–172

Cope ED (1895) On a collection of Batrachia and Reptilia from the island of Hainan. The Proceedings of the Academy of Natural Sciences of Philadelphia 46: 423–428

Guo P, Liu Q, Xu Y, Jiang K, Hou M, Ding L, Pyron RA, Burbrink FT (2012) Out of Asia: Natricine snakes support the Cenozoic Beringian Dispersal Hypothesis. Molecular Phylogenetics and Evolution 63: 825–833

Guo P, Zhu F, Liu Q (2019) A new member of the genus *Sinonatrix* (Serpentes: Colubridae) from western China. Zootaxa 4623 (3): 535–544

Hall TA (1999) BioEdit: A User-Friendly Biological Sequence Alignment Editor and Analysis Program for Windows 95/98/NT. Nucleic Acids Symposium Series 41: 95–98

Hallowell E (1857) Notes on the reptiles in the collection of the museum of the Academy of Natural Sciences. The Proceedings of the Academy of Natural Sciences of Philadelphia 8 (4): 146–153

Kumar S, Stecher G, Tamura K (2015) MEGA7: Molecular Evolutionary Genetics Analysis version 7.0. Molecular Biology and Evolution 30: 2725–2729

Linnaeus C (1758) Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Editio decima, reformata. Laurentius Salvius, Holmiae

Rao DQ, Yang DT (1998) A new species of *Sinonatrix* (Serpentes: Colubridae) of China with preliminary survey on *Sinonatrix*. Russian Journal of Herpetology 5 (1): 70–73

Ren JL, Wang K, Guo P, Wang YY, Nguyen TT, Li JT (2019) On the generic taxonomy of *Opisthotropis balteata* (Cope,1895) (Squamata: Colubridae: Natricinae): Taxonomic revision of two natricine genera. Asian Herpetological Research 10 (2): 105–128