

**THE FIRST LIST OF AMPHIBIANS AND REPTILES FROM SOC SON
WATERSHED PROTECTION FOREST, HA NOI CITY, VIETNAM**

Tran Thanh Tung¹, Le Trung Dung^{2,*}

¹Vinh Phuc College, Trung Nhi street, Phuc Yen City, Vinh Phuc Province

²Ministry of Education and Training, 35 Dai Co Viet Street, Ha Noi City

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ABSTRACT

Based on a new herpetological collection from four field surveys conducted in the Soc Son Watershed Protection Forest, Ha Noi City, from March 2017 to April 2018. We herein provide the first list of 42 species of amphibians and reptiles, in which, 12 species are newly recorded for the herpetofauna of Ha Noi City. In addition, morphological characters of these species are also provided. In terms of conservation concern, two species are listed in the IUCN Red List (2020), five species are listed in the Vietnam Red Data Book (2007), and two species are listed in the Governmental Decree No 06/2019/ND-CP.

Keywords: Amphibians, checklist, distribution, morphology, reptiles, Ha Noi.

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*Corresponding author email: letrungdung_sp@hnue.edu.vn

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INTRODUCTION

The herpetofauna is not only an important component of the global biodiversity, but also serves as important bioindicators for ecosystem health (e. g., Marsili et al. 2009). They are being predators at the upper end of trophic pyramids and due to their territoriality, and limited locomotion, reptiles and amphibians cannot evade disturbances, and active recolonization after local extinction is very slow. Evergreen forests, rehabilitation forests, and protective forests play an important role in protecting these sensitive organisms.

The Soc Son Watershed Protection Forest (WPF) was established in 2008 by the Decision No. 2100/QD-UB of the People's Committee of Ha Noi with an area of 4557 ha. The major habitat of this area is secondary forest of small hardwoods and shrub (People's Committee of Ha Noi 2008). However, nothing is known about biodiversity of the Soc Son WPF, including the herpetofauna. No list of amphibia or reptile species has been provided for this area in previous studies.

Based on the results of field surveys, photo records, and collected specimens, this article provides a summary of new herpetofaunal records from Soc Son WPF, including six newly recorded species for the herpetofauna of Hanoi City.

MATERIALS AND METHODS

Four field surveys were conducted in Soc Son WPF, Soc Son District, Ha Noi City, Vietnam (Fig. 1), from 27 March 2017 to 4 April 2018 by Tung Thanh Tran, Tinh Xuan Dao, and Anh Tuan Dao (Tran et al.). Survey transects were set up along the streams, pools, small ponds and along the forest paths. Specimens were euthanized in a closed vessel with a piece of cotton wool containing ethyl acetate (Simmons, 2002), fixed in 85% ethanol for 10 hours, and then transferred to 70% ethanol for permanent storage. Frog and snake specimens referred to in this paper have been deposited in the collections of the Vinh Phuc College (VPC), Vinh Phuc Province. Photos of specimens

were taken by Dung Trung Le with Canon 7D camera in the laboratory.

Taxonomic identifications were based on Smith (1943), Campden - Main (1970), Ohler et al. (2002), Nguyen et al. (2005), Nguyen (2007), David et al. (2008), and Das (2010), Hetch et al. (2013), Le et al. (2014), Le et al. (2015), and Le et al. (2018). Species names followed Nguyen et al. (2009), Frost (2020), and Uetz et al. (2019). Sex was identified based on external sexual characters, and if required, from gonad inspection after dissection.

Measurements were taken with dial callipers to the nearest 0.1 mm, except for body and tail lengths of reptiles, which were measured with a measuring tape to the nearest 1 mm.

For amphibians, abbreviations are as follows: SVL: snout-vent length; HL: head length, from posterior corner of mandible to tip of snout; HW: maximum head width, at the angle of jaws; SL: distance from anterior corner of eye to tip of snout; ED: eye diameter, from anterior corner to posterior corner of eye; NEL: distance from anterior corner of eye to posterior edge of nostril; SNL: distance from anterior edge of nostril to tip of snout; IN: internarial distance; IOD: minimum distance between upper eyelids; UEW: maximum width of upper eyelid; TYD: maximum tympanum diameter; TYE: distance between anterior margin of tympanum and posterior corner of eye; FLL: forelimb length, from elbow to base of outer tubercle; HAL: hand length, from base of outer palmar tubercle to tip of third finger; FL: thigh length, from vent to knee; TL tibia length.

For reptiles, abbreviation are as follows: SVL: snout- vent length, from tip of snout to anterior margin of cloaca; TaL: tail length, from posterior margin of cloaca to tip of tail; HL: head length, from tip of snout to posterior margin of parietal; HW: head width, at the widest point of temporal region; FIL: forelimb length, from anterior junction of forelimb and body wall to the tip of fourth finger, with the limb held at right angles to

the body; HIL: hind limb length, anterior junction of hind limb and body wall to the tip of fourth toe, with the limb held at right angle to the body. The number of ventral

scales was counted according to Dowling (1951).

asl: above sea level. Bilateral scale counts were given as left/right.



Figure 1. Map showing the geographical location of Soc Son Watershed Protection Forest (black circle), Ha Noi, Vietnam

RESULTS

A total of 42 species of amphibians and reptiles belonging to 17 families and two orders was recorded from Soc Son WPF, comprising 10 species of amphibians and 32 species of reptiles (Table 1). Colubridae is the

most diverse family with nine recorded species, followed by Elapidae (five species), Microhylidae (four species), Scincidae (four species), and the other families from one to three species each.

Table 1. List of amphibian and reptile species recorded from Soc Son WPF, Hanoi City, Vietnam. Decree 06 (2019) = Governmental Decree No 06/2019/ND-CP by the Government of Vietnam on the management of endangered wild flora and fauna. Group IB: prohibited exploitation and use for commercial purpose and Group IIB: limited exploitation and use for commercial purpose; VNRB (2007) = Vietnam Red Data Book. Part I. Animals. Descriptions of nationally endangered species of wild animals. CR = Critically Endangered, EN = Endangered, VU = Vulnerable; IUCN (2020) = The IUCN Red List of Threatened Species. CR = Critically Endangered, EN = Endangered, VU = Vulnerable

No.	Species	English name	IUCN (2020)	VNRB (2007)	Decree 06 (2019)
	AMPHIBIA Gray, 1825				
	ANURA Fischer von Waldheim, 1813				
	I. Bufonidae				
1	<i>Duttaphrynus melanostictus</i> (Schneider, 1799)	Black- spined toad			
	II. Dicroglossidae				
2	<i>Limnonectes bannaensis</i> Ye, Fei, Xie, and Jiang, 2007	Banna large-headed frog			
	III. Microhylidae				
3	<i>Microhyla berdmorei</i> (Blyth, 1856)	Berdmore's narrow-mouthed frog			
4	<i>M. fissipes</i> (Boulenger, 1884)	Ornate pigmy frog			
5	<i>M. picta</i> Schenkel, 1901	Painted rice frog			
6	<i>M. pulchra</i> (Hallowell, 1861)	Guangdong rice frog			
	IV. Ranidae				
7	<i>Hylarana erythraea</i> (Schlegel, 1837)	Green paddy frog			
	V. Hylidae				
8	<i>Hyla simplex</i> Boettger, 1901*	Annam treefrog			
	VI. Rhacophoridae				
9	<i>Polypedates mutus</i> (Smith, 1940)	Burmese whipping frog			
10	<i>Rhacophorus rhodopus</i> Liu & Hu, 1960*	Red-webbed treefrog			
	REPTILIA Laurenti, 1968				
	SQUAMATA Opperl, 1811				
	SAURIA Macartney, 1803				
	I. Agamidae				

11	<i>Acanthosaura lepidogaster</i> (Cuvier, 1829)	Scale bellied tree lizard			
12	<i>Calotes versicolor</i> (Daudin, 1802)*	Oriental garden lizard			
13	<i>Draco maculatus</i> (Gray, 1845)	Spotted flying lizard			
	II. Gekkonidea				
14	<i>Gekko palmatus</i> Boulenger, 1907 *	Palm gecko			
	III. Scincidae				
15	<i>Eutropis longicaudatus</i> (Hallowell, 1857)	Long tailed mabuya			
16	<i>Sphenomorphus indicus</i> (Gray, 1853)*	Indian forest skink			
18	<i>Tropidophorus baviensis</i> (Bourret, 1939)	Bavi water skink			
	SERPENTES Linnaeus, 1758				
	Xenopeltidae				
19	<i>Xenopeltis unicolor</i> Reinwardt, 1827	Sunbeam snake			
	IV. Colubridea				
20	<i>Calamaria septentrionalis</i> Boulenger, 1890	Hong kong dwarf snake			
21	<i>Cyclophiops multicinctus</i> (Roux, 1907)	Many-banded green snake			
22	<i>Coelognathus radiatus</i> (Boie, 1827)	Copperhead racer		VU	
23	<i>Elaphe taeniura</i> (Cope, 1861)*	Beauty snake			
24	<i>Gonyosoma boulengeri</i> (Mocquardt, 1897)	Rhino rat snake			
25	<i>Lycodon subcinctus</i> Boie, 1827	Malayan banded wolf snake			
26	<i>Oligodon chinensis</i> (Günther, 1888)*	Chinese kukri snake			
27	<i>O. taeniatus</i> (Günther, 1861)*	Striped kukri snake			
28	<i>Ptyas korrer</i> (Shlegel, 1837)	Indochinese rat snake		EN	
	V. Natricidae				
29	<i>Sinonatrix percarinata</i> (Boulenger, 1899)*	Eastern water snake			
30	<i>Xenochrophis flavipunctatus</i> (Hallowell, 1861)	Yellow spotted keelback			
	VI. Pareatidae				
31	<i>Pareas carinatus</i> (Boie, 1828)*	Keeled slug snake			
32	<i>P. margaritophorus</i> (Jan, 1866)	White spotted slug snake			
	IV. Pseudoxenodontidae				
33	<i>Pseudoxenodon bambusicola</i> (Vogt, 1922)	Bamboo snake			
	VII. Homalopsidae				
34	<i>Hypsiglossus plumbeus</i> (Boie, 1827)	Plumbeous water snake			
	VIII. Elapidae				
35	<i>Bungarus candidus</i> (Linnaeus, 1758)*	Blue krait			
36	<i>B. fasciatus</i> (Schneider, 1801)	Banded krait		EN	
37	<i>B. multicinctus</i> Blyth, 1861	Many banded krait			
38	<i>Naja atra</i> Cantor, 1842	Chinese cobra	VU	EN	IIB
39	<i>Ophiophagus hannah</i> (Cantor, 1836)	King cobra	VU	CR	IB
	IX. Viperidae				
40	<i>Protobothrops mucrosquamatus</i> (Cantor, 1839)	Chinese habu			
41	<i>Trimeresurus albolabris</i> Gray, 1842	White lipped pitviper			
42	<i>T. stejnegeri</i> Schmidt, 1925*	Chinese green tree viper			

Note: * = new provincial records.

New records of amphibians and reptiles for the herpetofauna of Hanoi City

AMPHIBIA

Family HYLIDAE

***Hyla simplex* Boettger, 1901/Annam Treefrog (Fig. 2a, 2b)**

Specimens examined ($n = 2$). Two adult males (VPC.2018.80, 81), collected on 25 May 2017 near Dong Lon sector, Soc Son WPF (21.3208°N, 105.8052°E, elevation 285 m asl.).

Description. Morphological characters of the specimens from Hanoi agreed well with descriptions by Orlov *et al.* (2002) and Nguyen *et al.* (2005): SVL 32.7–34 mm in males; head longer than wide (HL 11.3–12.8 mm, HW 11–11.2 mm in males); snout longer

than eye (SL 4.9–5.5 mm, EL 3.2–3.4 mm); interorbital distance broader than internarial distance and upper eyelid (IN 2.5–2.9 mm, IUE 4–4.8 mm, UEW 2.3–2.6); tympanum distinct, smaller than half of eye diameter (TYD 1.9 mm, EL 3.2–3.4 mm); supratympanic fold indistinct. Fingers free of webbing; finger discs larger than those of toes, with circummarginal groove; tibia 5 times longer than wide (TL 15.5–15.6 mm, TW 3–3.4 mm); toes fully webbed; outer metatarsal tubercle absent; inner metatarsal tubercle elongate; dorsal skin smooth; dorsolateral fold absent; lateral sides without tubercles. Coloration in life: dorsum uniform green; sides of head and flanks yellow cream; lips white; tympanum cream; dorsal surface of limbs with white bars; webbing yellow; ventral surface white.

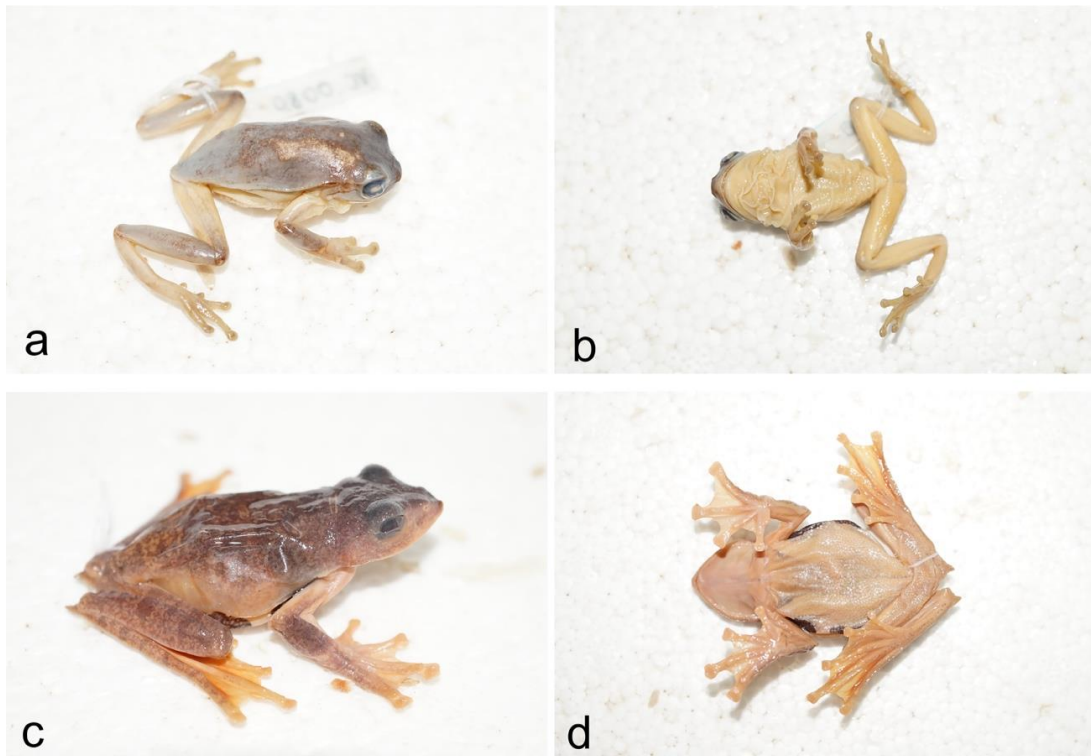


Figure 2. *Hyla simplex* (VPC.2018.80, adult female): a, Dorsal view and b, Ventral view; *Rhacophorus rhodopus* (VPC.2018.77, adult female): c, Dorsal view and d, Ventral view. [Photos by D.T. Le]

Natural history. Specimens were found between 19:00 and 20:00 on the ground. The

surrounding habitat was mixed secondary forest consisting of small hardwood and shrub.

Distribution. In Vietnam, this species has been recorded from Lang Son and Vinh Phuc in the North, southwards to Da Nang and Quang Nam provinces. Elsewhere, the species is found in northeastern Laos and southern China (Nguyen *et al.* 2009). This is the first record of *H. simplex* from Ha Noi City.

Family RHACOPHORIDAE

***Rhacophorus rhodopus* Liu & Hu, 1960/Red-webbed treefrog (Fig. 2c, 2d)**

Specimens examined ($n = 3$). Three adult males (VPC.2018.77–79) collected on 25 May 2017 near Tho Son Village, Soc Son WPF (21.3174°N, 105.8094°E, elevation 184 m).

Description. Morphological characters of the specimens from Ha Noi agreed with the description by Hecht *et al.* (2013) : SVL 37.3–40.9 mm; head longer than wide (HL 13.1–15.3 mm, HW 12.3–13.8); snout pointed, longer than eye (SL 5.5–6.5 mm, EL 3.2–3.4 mm); canthus rostralis distinct; internarial distance wider than interorbital distance and upper eyelid (IN 3.5–4 mm, IUE 4.1–6.6 mm, UEW 3.2–4.1 mm); tympanum distinct, about half of eye diameter (TYD 1.9–2.6 mm, EL 3.7–4.3 mm); supratympanic fold indistinct; vomerine teeth present. Fingers almost fully webbed; finger I shorter than II; subarticular tubercles distinct; tibia 6 times longer than wide (TL 17.2–20.3 mm, TW 3–3.1 mm); toes fully webbed; tarsal fold present; outer metatarsal tubercle absent; inner metatarsal tubercle present; dorsal skin smooth; supratympanic fold distinct; cloacal dermal fringe present. Coloration in life: dorsum reddish brown with or without small black spots; large black blotches on axilla and flanks present; transverse bands on hind limbs absent or indistinct; ventral yellowish white; webbing of fingers and toes reddish orange.

Natural history. Specimens were collected at 20:30–23:00 on the ground. The surrounding habitat was mixed secondary forest consisting of small hardwood and shrub.

Distribution. In Vietnam, this is a widespread species, known from Lao Cai

Province in the North to Thua Thien - Hue Province in the Central. Elsewhere, *R. rhodopus* has been recorded from Northeastern India to Myanmar, northern Thailand, Laos, Vietnam, and southern China (Nguyen *et al.* 2009). This is a new record for Ha Noi City.

REPTILIA

Family AGAMIDAE

***Calotes versicolor* (Daudin, 1802/Oriental garden lizard (Fig. 3a, 3b)**

Specimen examined ($n = 1$). One adult female (VPC.2018.1T), collected on 25 May 2017 near Dong Lon sector, Nam Son Protective Forest (21.1889°N, 105.4798°E, at an elevation of 341 m).

Description. The morphological characters of the specimens agreed with the descriptions of Das (2010) and Gray (1845): Body moderate-sized. SVL 70.1 mm; TaL 101.5 + mm. Head distinct from neck; longer than wide (HL 22.4 mm, HW 12.9 mm); eyes and mental large; upper head scales larger than body scales; snout round; tympanum exposed; 2 spines above tympanum; supralabials 10; infralabials 10; scales between supraoculars 15, between nostril 7; one spine behind the eye; neck spines longer than dorsum spines; length of biggest thorn in the neck 1.9 mm. Dorsal scales, venter scales and limbs scales strongly keeled; hind limbs longer than fore limbs; lamellae 9 under finger I, 11(12) under finger IV; femoral pores absent; tail compressed; incomplete. The coloration of the preserved specimens is dorsum brownish above, upper side of head darker flecks, cheeks brighter, eye with radially directed dark lines, venter light, tail light brown.

Natural history. Specimens were found moving on the ground between 21:00 and 22:00. The surrounding habitat was mixed secondary forest consisting of small hardwood and shrub.

Distribution. In Vietnam, *C. emma* has previously been reported as occurring from Bac Giang and Thai Nguyen provinces southwards to Ba Ria-Vung Tau Province.

Elsewhere, this species is found in India, southern China, Myanmar, Laos, norther

Thailand, Cambodia and Malaysia (Nguyen et al., 2009; Uetz et al., 2019).

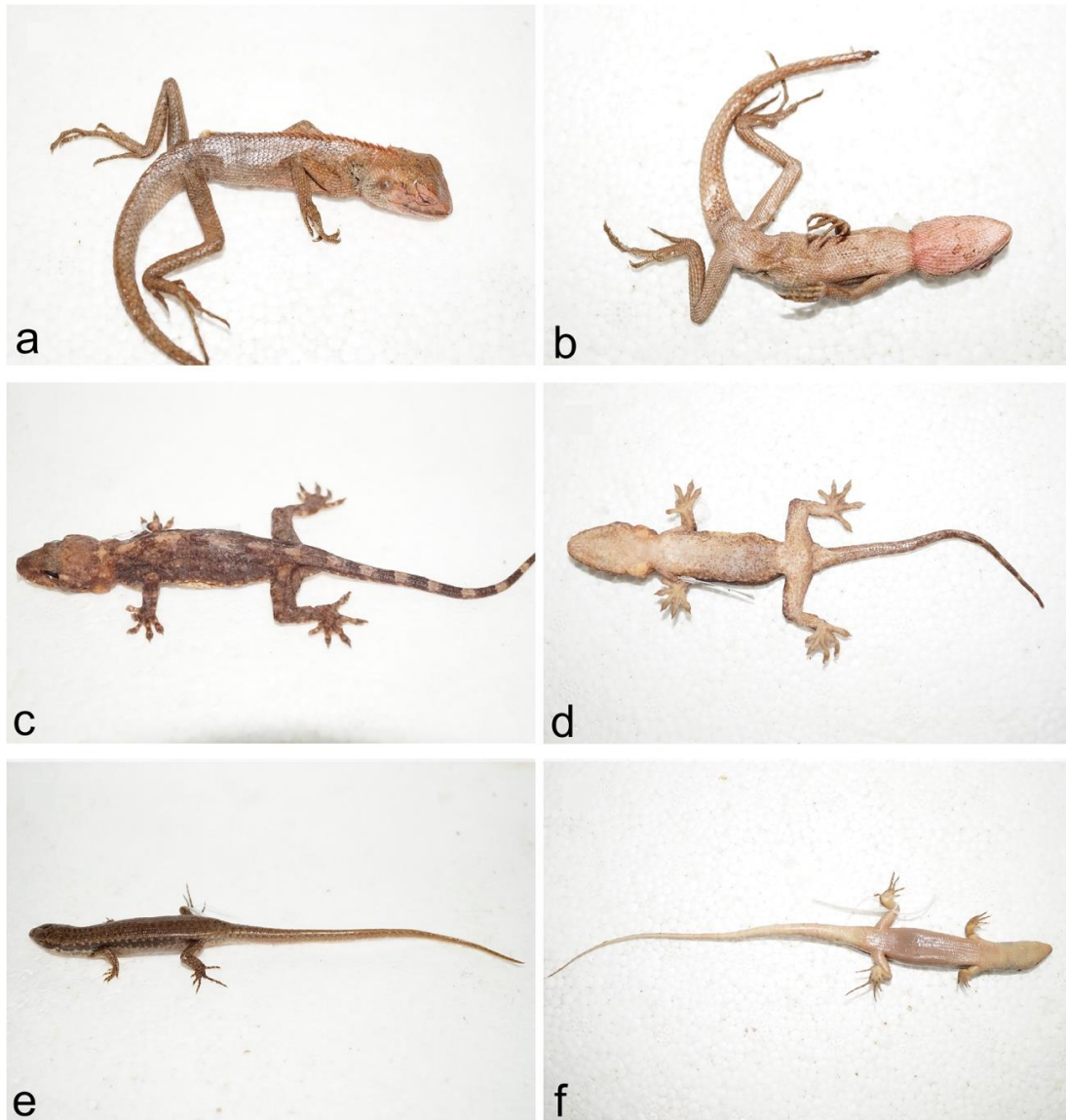


Figure 3. *Calotes versicolor* (VPC.2018.1T, adult female): a, Dorsal view and b, Ventral view; *Gekko palmatus* (VPC.2018.0048, adult male): c, Dorsal view and d, Ventral view; *Sphenomorphus indicus* (VPC.2018.0066, adult male): e, Dorsal view and f, Ventral view. [Photos by D.T. Le]

Family GEKKONIDAE

***Gekko palmatus* Boulenger, 1907/Palm gecko (Fig. 3c, d)**

Specimen examined (n = 1). One adult female (VPC.2018.0048), collected on 25

May 2017 near Dong Lon sector, Nam Son Protective Forest (21.1924°N, 105.4831°E, at an elevation of 291 m).

Description. The morphological characters of the specimen agreed with the

descriptions of Nguyen et al. (2013), Hecht et al. (2013): Moderate-sized (SVL 69.6 mm, TaL 73.1 mm). Head large, distinct from neck; longer than wide (HL 20 mm, HW 15.2 mm); internasal single, in contact with rostral; supralabials 13; infralabials 11; postcloacal tubercles 1; small scales contact chin shields 4. Dorsal scales small, midbody scales in rows 138, granules surrounding dorsal tubercles 10, scales in a line from mental to the front of cloacal slit 178; hind limbs longer than fore limbs; lamellae 12 under finger I, 13 under finger IV; 15 under toe I; tubercles present on upper surface of dorsum, hind limbs and tail base, absent on upper surface of fore limbs; subcaudals no enlarged; femoral pores and precloacal pores absent. The coloration of the preserved specimens is dorsal surface of head and dorsum greyish dark, with small light on neck areas and shoulder, dorsal tail with 8 light bands; tail, compressed, has light bands alternately with dark bands, 10 bands light on upper surface tail.

Natural history. The specimen was collected at 20:40, on a rock branch. The surrounding habitat was mixed secondary forest consisting of small hardwood and shrub.

Distribution. *G. palmatus* has previously been reported from Yen Bai, Lang Son, Bac Giang, Vinh Phuc, Quang Ninh, and Quang Binh provinces (Nguyen et al., 2009, 2013; Hecht et al., 2013). Elsewhere, the species is found in China (Luu, 2015; Uetz et al., 2019).

Family SCINCIDAE

Sphenomorphus indicus (Gray, 1853)/Indian forest skink (Fig. 3e, 3f)

Specimens examined (n=5). One subadult female (VPC.2018.0066), collected on 25 May 2017 near Dong Lon sector, Nam Son Protective Forest (21.1904°N, 105.4856°E, at an elevation of 191 m) and four adult females (VPC.2018.0051, 0052, 0065, 0067) collected on 25 May 2017 near Dong Lon sector, Nam Son Protective Forest (21.1889°N, 105.4798°E, at an elevation of 346 m).

Description. The morphological characters of the specimens agreed with the descriptions by Smith, 1935; Ziegler, 2002;

Nguyen et al., 2011; and Hecht et al. (2013): Body moderate-sized (SVL 57.6 mm, TaL 103.1 mm in the male and SVL 50.3–72.6 mm, TaL 19.1*–116.7 mm in the females). Head smaller, distinguishable from neck; longer than wide (HL 9.9 mm, HW 6.4 mm in the male and HL 9.8–17.5 mm, HW 5.5–10.3 mm in the females); eyes and ear-opening oval, present; snout small, obtuse; tympanum round, slightly to deeply sunk; loreals 2; supralabials 7; infralabials 7. Dorsal scales large, smooth, midbody scales in 25 rows, median rows of dorsal scales distinctly widened; paravertebral scales 68 rows; 10 rows between two dark stripes on the sides; hind limbs longer than fore limbs; lamellae 7 under finger I, 9 under finger IV, 20 under toe IV; femoral pores and precloacal pores absent; tail strong. The coloration of the preserved specimens is dorsum dark above, neck and shoulders with light dorsolateral spots. The head has two black stripes on the sides from eyes to tail base. Tail compressed, venter, and under tail greyish black.

Natural history. The specimen was collected at 22:15, while resting on a rock near a small stream. The surrounding habitat was mixed secondary forest consisting of small hardwoods and shrub.

Distribution. *S. indicus* is a common species in Vietnam (Nguyen et al., 2009). However, this is the first record of the species from Soc Son WPF and from Hanoi City. Elsewhere, the species is found in India, Bhutan, China, Taiwan, Myanmar, Laos, Thailand, Cambodia, Malaysia, and Indonesia (Nguyen et al., 2009).

Family COLUBRIDAE

Elaphe taeniura Cope, 1861/Beauty snake (Fig. 4a, 4b)

Specimens examined (n = 2). One adult female (VPC.2017.004) collected on 21 June 2017 and one adult female (VPC.2017.005) collected on 22 June 2017, near Hung Lon sector, Soc Son WPF (21.1889°N, 105.4798°E, at an elevation of 341 m). The morphological characters of the specimens agreed with the descriptions by Smith (1943), Nguyen (2007), and Das (2010).

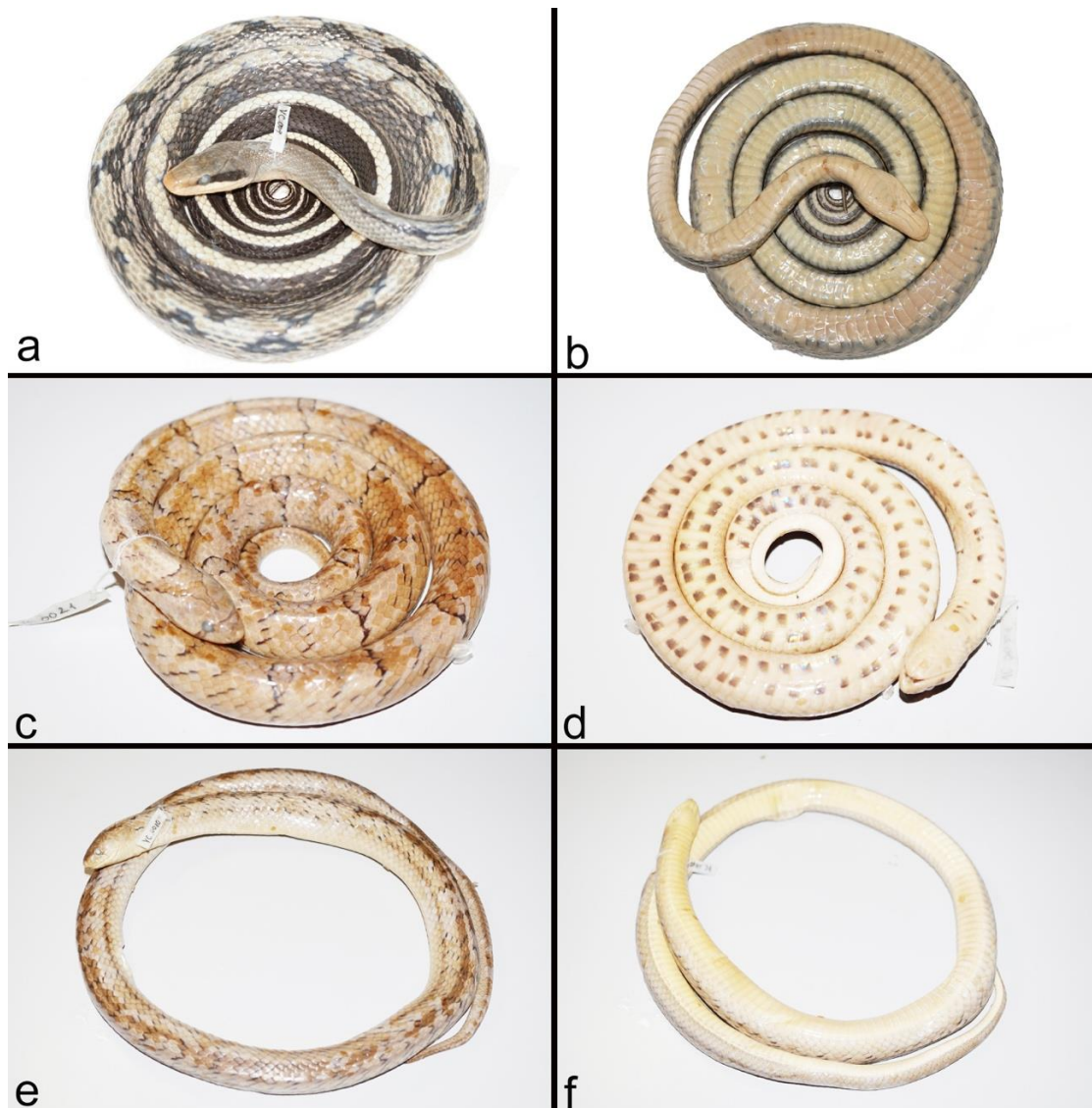


Figure 4. *Elaphe taeniura* (VPC.2017.004, adult female): a, Dorsal view and b, Ventral view; *Oligodon chinensis* (VPC.2018.0023, adult male): c, Dorsal view and d, Ventral view; *O. taeniatus* (VPC.2017.0010, adult female): e, Dorsal view and f, Ventral view. [Photos by D.T. Le]

Description. Body robust, subcylindrical (SVL 1350–1500 mm and TaL 372–424 mm in females). Head distinct from neck; snout obtuse; nostril lateral; eye large, pupil vertical. Head scalation complete, including paired internasals, prefrontals, and parietals, 1/1 supraocular, and one frontal; 9/9 supralabials, 5th and 6th in contact with the eye, the 8th scale largest; 10/10 infralabials,

1st–6th bordering chin shields. Dorsal scale rows 25–23–19, weakly keeled; scales of the outer dorsal scale row slightly enlarged; ventrals 261–270; subcaudals 108–121, paired; cloacal divided. Two black stripes from eye to angles of jaws; dorsum brownish above, four large blackish brown stripes, in H-shape, on the anterior part of body; four black greyish stripes on tail.

Natural history. The specimens were found between 21:00 and 22:00 while moving on the ground. The surrounding habitat was mixed secondary forest consisting of small hardwood and shrub.

Distribution. In Vietnam, *E. taeniura* had previously been reported from Lao Cai and Son La provinces in the north southwards to Gia Lai Province (Nguyen et al., 2009). Elsewhere, this species is found in Russia, China, Myanmar, Thailand, Laos, Malaysia, Japan (Nguyen et al., 2009; Uetz et al., 2019).

Remark. The specimens from Hanoi differ from the description of Das (2010) in having fewer ventrals (261–270 versus 271–305).

***Oligodon chinensis* Günther, 1888/Chinese kukri snake (Fig. 4c, 4d)**

Specimens examined (n = 3). Two adult males (VPC.2018.0023, 0024) collected on 15 May 2018, near Dong Den Lake, Soc Son WPF (21.1635°N, 105.4911°E, at an elevation of 115 m) and one adult female (VPC.2018.0021) collected on 14 May 2018, near Dong Lon sector, Soc Son WPF (21.1924°N, 105.4831°E, at an elevation of 285 m). The morphological characters of the specimen agreed with the descriptions of Smith (1943) and Das (2010).

Description. Body robust, subcylindrical (SVL 530.2–559.2 mm and TaL 116.2–150 mm in males; SVL 498.4 mm and TaL 119.8 mm in the female). Head not distinct from neck; snout obtuse; nostril lateral; eye small, pupil vertical. Head scalation complete, including paired internasals, prefrontals, and parietals, 1/1 supraocular, and one frontal; 8/8 supralabials, 4th and 5th in contact with the eye, the 7th largest; 8/8 infralabials, 1st–4th bordering chin shields. Dorsal scale rows 17–17–15, smooth; ventrals 174–186; subcaudals 53–62, paired; cloacal single. Dorsum greyish brown and 12 spots constantly narrow, elongated dark brown, edged with black.

Natural history. The specimens were found moving on the ground between 19:00 and 20:30. The surrounding habitat was mixed secondary forest consisting of small hardwood and shrub.

Distribution. In Vietnam, *O. chinensis* had previously been reported from Lao Cai and Bac Kan provinces in the North southwards to Gia Lai Province (Nguyen et al., 2009). Elsewhere, this species is found in China (Nguyen et al., 2009; Uetz et al., 2019).

***Oligodon taeniatus* Günther, 1861/Striped kukri snake (Fig. 4e, 4f)**

Specimen examined (n = 1). An adult female (VPC.2017.0010) collected on 23 June 2017 near Tho Son Village, Soc Son WPF (21.1904°N, 105.4856°E, at an elevation of 184 m). The morphological characters of the specimen agreed with the descriptions by Smith (1943), David et al. (2008), Das (2010), and Campden - Main (1970).

Description. Body larger, subcylindrical (SVL 788 mm; TaL 166 mm). Head not distinct from neck; snout obtuse; nostril lateral; eye large, pupil vertical. Head scalation complete, including paired internasals, prefrontals, and parietals, 1/1 supraocular, and one frontal; 9/9 supralabials, 4th and 5th in contact with the eye, the 8th largest; 9/9 infralabials, 1st–4th bordering chin shields. Dorsal scale rows 19–19–17, smooth; ventrals 171; subcaudals 54, paired; cloacal single. Dorsum brownish grey; dorsal scales edged with dark brown posteriorly; with four dark brown longitudinal stripes and a light paravertebral I stripe.

Natural history. The specimen was collected at 20:30 while resting on the ground, in the second forest.

Distribution. In Vietnam, *O. taeniatus* had previously been reported from Ha Giang and Cao Bang provinces in the North southwards to Kien Giang Province (Nguyen et al., 2009). Elsewhere this species is found in Laos, Thailand and Cambodia (Nguyen et al., 2009; Uetz et al., 2019).

Remarks. The specimen from Hanoi differs from the descriptions of David et al. (2008) and Das (2010) in having more ventrals (171 versus 146–165) and subcaudals (54 versus 31–48).

Family NATRICIDAE

***Sinonatrix percarinata* Boulenger, 1899/Eastern water snake (Fig. 5a, 5b)**

Specimens examined (n = 2). One adult male (VPC.2018.0025) collected on 16 May 2018, near Dong Den Lake, Soc Son WPF (21.1635°N, 105.8185°E, at an elevation of 115 m) and one adult female

(VPC.2018.0022) collected on 14 May 2018 near Dong Lon sector, Soc Son WPF (21.1923°N, 105.4836°E, at an elevation of 243 m). The morphological characters of the specimen agreed with the descriptions by Smith (1943), Nguyen (2007), Das (2010), Le et al. (2015), and Le et al. (2018).

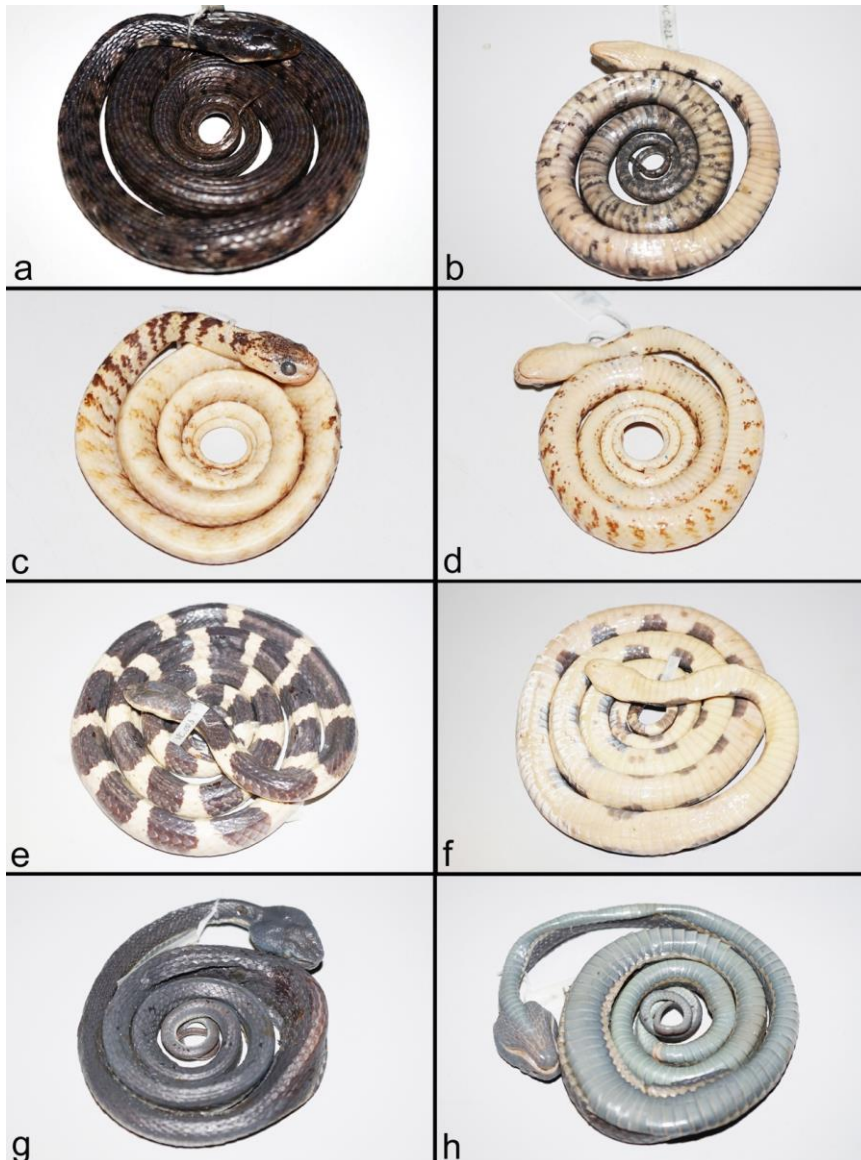


Figure 5. *Sinonatrix percarinata* (VPC.2018.0022, adult female): a, Dorsal view and b, Ventral view; *Pareas carinatus* (VPC.2018.0034, a juvenile): c, Dorsal view and d, Ventral view; *Bungarus candidus* (VPC.2017.0003, adult female): e, Dorsal view and f, Ventral view; *Trimeresurus stejnegeri* (VPC.2017.0017, a juvenile): g, Dorsal view and h, Ventral view.

[Photos by D.T. Le]

Description. Body robust; SVL 492 mm female, 512.6 mm male; TaL 197.4 mm female, 174.9 mm male. Head distinct from neck; snout obtuse; nostril lateral; eye large, pupil round. Head scalation complete, including paired internasals, prefrontals, and parietals, 1/1 supraocular, and one frontal; rostral wider than high; 9/9 supralabials, 4th and 5th in contact with the eye, the 7th largest; 10 infralabials, 1st–5th bordering chin shields. Dorsal scale rows 19–19–17, keeled, the first scale row smooth, scales of the outer scale row enlarged; ventrals 130–135; subcaudals 77–97, all paired; cloacal divided. Dorsal surface of head, body and tail olive grey, with light-edged black bars on flanks, broad dorsally, becoming narrower laterally, venter yellowish cream anteriorly, with small black speckles posteriorly; subcaudals dark grey with black spots.

Natural history. The specimens were collected between 17:00 and 19:00, while resting or foraging on trees above small streams. The surrounding habitat was mixed secondary forest consisting of small hardwoods and shrub.

Distribution. In Vietnam, *S. percarinata* had previously been reported from Lao Cai Province in the North southwards to Dong Nai Province (Nguyen et al., 2009; Le et al., 2018). Elsewhere, this species is found in India, China, Taiwan, Myanmar, Laos, and Thailand (Nguyen et al., 2009; Uetz et al., 2019).

Family PAREATIDAE

***Pareas carinatus* Boie, 1828/Keeled slug snake (Fig. 5c, 5d)**

Specimen examined (n = 1). One juvenile (VPC.2018.0034) collected on 19 May 2018, near Tho Son Village, Soc Son WPF (21.1904°N, 105.4856°E, at an elevation of 184 m). The morphological characters of the specimen agreed with the descriptions of Smith (1943), Nguyen (2007), Das (2010), and Le et al. (2014).

Description. Body slender (SVL 271.8 mm; TaL 85.1 mm). Head distinct from neck; snout obtuse; nostril lateral; eye small, pupil round. Head scalation complete, including

paired internasals, prefrontals, and parietals, 1/1 supraocular, and one frontal; rostral wider than high; 7/7 supralabials, separated from the eye, the 7th largest; 8/8 infralabials, 1st–4th bordering chin shields. Dorsal scale rows 15–15–15, smooth, vertebral scales not enlarged; ventrals 186; subcaudals 93, all paired; cloacal single. Dorsum bright brown, with small transverse black bars; head grey; ventral light cream; tail dark grey.

Natural history. The specimen was collected at 21:15, while resting on a tree near a small stream. The surrounding habitat was mixed secondary forest consisting of small hardwoods and shrub.

Distribution. In Vietnam, *P. carinatus* had previously been reported from Vinh Phuc Province in the North southwards to Tay Ninh Province (Nguyen et al., 2009). Elsewhere, this species is found in China, Myanmar, Laos, Thailand, Cambodia, Malaysia, and Indonesia (Nguyen et al., 2009; Uetz et al., 2019).

Family ELAPIDAE

***Bungarus candidus* Linnaeus, 1758/Blue Krait (Fig. 5e, 5f)**

Specimen examined (n = 1). An adult female (VPC.2017.003) collected on 21 June 2017, near Hung Lon sector, Soc Son WPF (21.1889°N, 105.4798°E, at an elevation of 341 m). The morphological characters of the specimen agreed with the descriptions by Smith (1943), Nguyen (2007), and Das (2010).

Description. Body robust; SVL 1082.4 mm; TaL 169.6 mm. Head distinct from neck; snout obtuse; nostril lateral; eye small. Head scalation complete, including paired internasals, prefrontals, and parietals, 1/1 supraocular, and two frontals; rostral wider than high; loreal absent; 7/7 supralabials, 3rd and 4th in contact with the eye, the 5th and 6th largest; 7/7 infralabials, 1st–3rd bordering chin shields. Dorsal scale rows 16–15–15, smooth, vertebral scales enlarged; ventrals 216; subcaudals 51, undivided; cloacal single.

Ecological notes. The specimen was collected at 20:30, while moving on the ground, near the residential area.

Distribution. In Vietnam, *B. candidus* had previously been reported from Hoa Binh Province in the North southwards to Tay Ninh Province (Nguyen et al., 2009). Elsewhere, this species is found in Laos, Thailand, Cambodia, Malaysia, Singapore and Indonesia (Nguyen et al., 2009; Uetz et al., 2019).

Family VIPERIDAE

***Trimeresurus stejnegeri* Schmidt, 1925/Bamboo pit viper (Fig. 5g, 5h)**

Specimen examined (n = 1). One juvenile (VPC.2017.0017) collected on 26 June 2017 near Dong Lon sector, Soc Son WPF (21.1924°N, 105.4831°E, at an elevation of 285 m). The morphological characters of the specimen agreed with the descriptions of Smith (1943), Campden–Main (1970), and Nguyen (2007).

Description. Size small; SVL 407.9 mm; TaL 52.5 mm. Head in triangle shape, distinct from neck; snout obtuse; nostril dorsolateral; eye large. Upper head scales smooth, irregular, scarcely increasing in size anteriorly, loreal absent; 1/1 preocular; 1/1 postocular; 10/10 supralabials; 12/12 infralabials; dorsal scale rows 21–21–15, feebly keeled; ventrals 168; cloacal single; subcaudals 74, paired. Dorsum green above, ventral is the lighter than dorsum; a distinct whitish yellow stripe on the lower part of flank; tail black.

Ecological notes. The specimen was collected at 22:00, while resting on a tree branch near a small stream. The surrounding habitat was mixed secondary forest consisting of small hardwood and shrub.

Distribution. In Vietnam, *T. stejnegeri* had previously been reported from Lao Cai and Ha Giang provinces in the North southwards to Da Nang Province (Nguyen et al., 2009). Elsewhere, this species is found in China, Taiwan, and Myanmar (Nguyen et al., 2009; Uetz et al., 2019).

DISCUSSION

Based on our field work in 2017 and 2018, 10 species of amphibians and 32 species of reptiles were recorded from Soc Son WPF, in

which, two species of amphibians (*Hyla simplex*, *Rhacophorus rhodopus*) and ten species of reptiles (*Calotes versicolor*, *Gekko palmatus*, *Sphenomorphus indicus*, *Elaphe taeniura*, *Oligodon chinensis*, *O. taeniatus*, *Sinonatrix percarinata*, *Pareas carinatus*, *Bungarus candidus*, and *Trimeresurus stejnegeri*) are recorded for the first time from Hanoi City. Among 42 recorded species, two species (*Naja atra* and *Ophiophagus hannah*) are listed in the IUCN Red List (2020), five species (*Coelognathus radiatus*, *Ptyas korrora*, *Bungarus fasciatus*, *Naja atra*, and *Ophiophagus hannah*) are listed in the Vietnam Red Data Book (2007), and two species (*Naja atra*, and *Ophiophagus hannah*) are listed in the Governmental Decree No 06/2019/ND-CP. Although the forest in Soc Son WPF harbors a considerable number of endemic and rare species, its biodiversity is currently threatened due to conversion of forest land for other uses. Additional surveys are required to obtain further data about the actual biodiversity of this forest.

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