# AN UPDATE OF THE HERPETOFAUNA FROM KIM BANG SPECIES AND HABITAT CONSERVATION AREA, HA NAM PROVINCE NORTH VIETNAM

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## SUMMARY

The topography of the Kim Bang Species and Habitat Conservation Area in Ha Nam province includes limestone ranges, interbedded with sandstone hills, schist and narrow valleys. This report is the result of a further investigation into amphibians and reptiles from Kim Bang Species and Habitat Conservation Area in Ha Nam province. The objective of this report is to present the results of the 10-day surveys in the area to record additional species composition, distribution characteristics and identification of rare species. This paper also identifies threats to the area and provides recommendations for future conservation of the area. During the survey, 22 species were recorded, in which 47 specimens belonging to 11 families, three orders including 17 reptiles belonging to seven families, two orders and seven species of amphibians belonging to four families, one order. 16 species were reported for the first time of Ha Nam herpetofauna. Additionally, the data of morphological characters of afore mentioned species are also provided. In terms of conservation concern, two species are listed in the IUCN Red List (2022) and seven species is listed in the Vietnam Red Data Book (2007). Kim Bang biodiversity is heavily threatened by habitat degradation and over harvesting associated with wildlife trade. To preserve the unique biodiversity of Kim Bang limestone mountain, we must not only continue with research, in particular the ecological characteristics of recorded species.

**Keywords: Amphibians, checklist, conservation, distribution, Ha Nam province, reptiles.**

## 1. INTRODUCTION

Kim Bang Species and Habitat Conservation Area in Ha Nam province is about 60 km to the South of Hanoi. The topography of the research area includes limestone ranges, interbedded with sandstone hills, schist and narrow valleys. The folding structure is mainly monolithic, with a longitudinal Northwest - Southeast, so the terrain is sloping in the direction from Northwest to Southeast. This place is full of elements considered the ideal natural laboratory for the study of taxonomy, ecology, evolution and geography of zoology (Clements et al., 2006).

In terms of the herpetofauna diversity, Kim Bang Species and Habitat Conservation Area in Ha Nam province is one of the most poorly studied areas in Vietnam. So far, there have been no data of amphibians and reptiles in this area. In Ha Nam province, Nguyen et al. (2009) reported a total of three species of amphibians and three species of reptiles, Luu et al. (2018) reported Cyrtodactylus soni as new record species from this province. In this paper, we herein provide the first list of amphibians and reptiles from the conservation area and new report additional species of the Ha Nam province' herpetofauna based on newly collected specimens.

## 2. RESEARCH METHODOLOGY

Field surveys in the Kim Bang Species and Habitat Conservation Area (Fig. 1) took place in from 15 May 2018 to 25 May 2018 by Le Trung Dung, Nguyen Quoc Huy and Do Thi Yen. Survey transects were set up along streams, ponds, and forest paths within of the studied area. Surveyed sites are situated at elevations between 100 and 400 m above sea level. Specimens collected during field surveys were deposited in the Museum of Biology, Hanoi National University of Education (HNUE).

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**Figure 1. Map showing the geographical location of Kim Bang Species and Habitat Conservation Area (black circle) in Ha Nam province, North Vietnam**

Taxonomy was identified following Boulenger (1896, 1903), Van Denburgh (1909), Smith (1943), Matsui et al. (1986), Arnold (1997), Inger et al. (1999), Ohler et al. (2006), Fei et al. (2008), Das (2010), Hecht et al. (2013), and Le et al. (2014). Ventral scales of snakes were counted according to Dowling (1951). Systematics nomenclature generally followed Nguyen et al. (2009), Zaher et al. (2009), and Pyron et al. (2013). The gender was identified based on external sexual characters, and if required, from the inspection of the gonads after dissection.

Morphological characteristics of amphibians: Body length (SVL, from tip of snout to anterior margin of cloaca); long head (HL, from the snout to the corner behind the jaw); head width (HW, the widest distance of the head); jaw-nose distance (MN, from corner to jaw); nasal interval (IN, between nostrils); eye-nose distance (EN, from the anterior edge to the nostrils); eye diameter (EL, the widest part of the eye); diaphragm diameter (TYD, the widest part of the eardrum); eye-tympanic membrane (TYE, from the posterior of eye to the eardrum); nose-to-snout (NS, from snout to nostril); long muzzle (SL, distance from the snout to the front of the eye); inferiority (IUE, shortest distance between the eyes); eyelid width (UEW, the widest part of upper eyelid); long sleeves (FLL, elbow joints to neck joints); long hand (HAL, from neck joint to finger sucking III); long finger III (TFL); long legs (TL, knee joints to neck joints); thigh length (FL, from the vent to the knee); long feet (FOL, from the base of the neck to the toes of the IV); long toe IV (FTL); long table (IMT, the longest part of the table); long toe I (ITL); width of foot tube (TW), width of foot tube.

Morphological characteristics lizards: Long body (SVL, from tip of snout to anterior margin of cloaca); long tail (TaL, from the vent to tail tip); long head (HL, from the snout to the corner behind the jaw); wide head (HW, the widest part of the head); high head (HH, highest part of head); long armpit (AGL, armpit to groin); number of upper lip scales (SL); lower lip score (IL); chin scales (M); scales behind the chin (PM); scales under the tail (SC); oral scaling (IO); scoliosis (SpO); preopercle scales (PrO); scoliosis (Pso); number of scales between body (SMB); number of abdominal scales (SB); number of prevent holes (PP); number of thigh holes (FP); number of plates under the first index finger (La.fI); number of slips under IV index (La.fIV); number of plates under IV index (La.tIV).

Morphological characteristics solid: Longitudinal body (SVL, from the muzzle to the cleft); long tail (TAL, from the vent to tail tip); body scales ANOTHER; number of scales in the neck (ASR), in the middle of the body (MSR) and in the front of the cleft (PSR); smooth scaly body (sm) or with the ridge (kl). Counting: in oblique or staggered, if the scales are larger than the scales on the side, count V-shape. Number of scales (VEN), scales under the tail (SC) divided (d1) or not divided (d0); scales in front of the grave (CL, 1 scale or 2 scales); number of cheek scales (LR); Upper scleral (SL), left scapular contact luster (l), right lobe scales another, largest scales (m); lower lip scales (IL), lower scales in contact

with chin scales I (s); preopercle (PreOc) and postoperative scales (PostOc).

## 3. RESULTS AND DISCUSSION

### 3.1. Species diversity composition and endangered species

A total of 24 species were recorded from Kim Bang Species and Habitat Conservation Area in Ha Nam province, comprising seven species of amphibians (four families) and 17 species of reptiles (eight families) (Fig. 2A). Among the amphibian families, Rhacophoridae contained the highest number of species (three species), while Colubridae was the most diverse family of reptiles (five species) (Fig. 2B, C). Other evidence of snakes was shown by staff of the conservation area but have not yet been recorded by our survey

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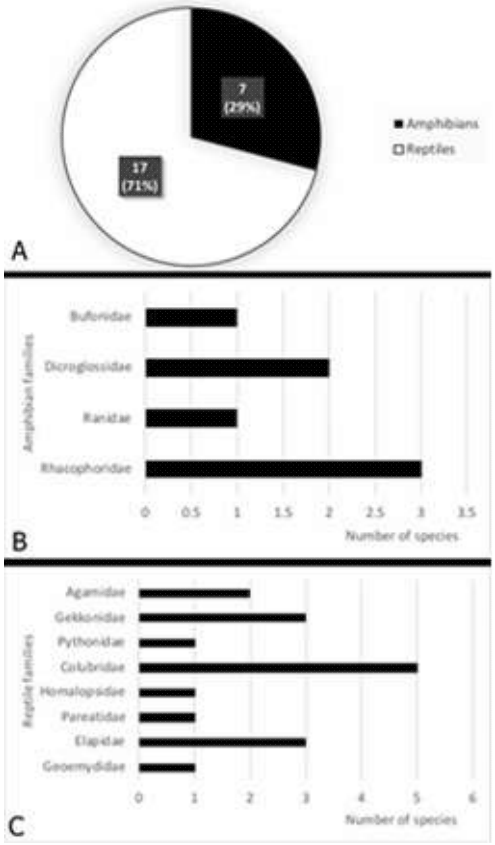


**Figure 2. Species diversity of amphibians and reptiles from Kim Bang Species and Habitat Conservation Area in Ha Nam province: A, Number and percentage of recorded amphibian and reptile species; B, Species diversity of amphibian families; C, Species diversity of reptile families**

Seven species which are listed in the Vietnam Red Data Book (2007) were recorded in Kim Bang Species and Habitat Conservation Area: one species as Critically endangered (*Python molurus*), three species as Endangered (*P. mucosa, B. fasciatus*, *Naja atra*), and three species as Vulnerable (*Gekko reevesii*, *Coelognathus radiatus*, and *Elaphe moellendorffi*). Two species from the IUCN Red List (2022) found in Kim Bang Species and Habitat Conservation Area were one species as Endangered (*Cuora mouhotii*) and one species as Vulnerable (*Naja atra*) (see Table 1).

In Kim Bang Species and Habitat Conservation Area, poaching takes place almost any time during the year and is conducted by local ethnic people and neighborhoods nearby as well as professional hunters. Therefore, uncontrolled hunting was identified as the single most important threat to the larger snakes, turtle and lizards in Kim Bang Species and Habitat Conservation Area. All of eight rare species which are listed in the IUCN (2022) and VNRB (2007) were poached regularly in this area (see Fig. 3).


**Figure 3. Close-up views of the impact of poaching in Kim Bang Species and Habitat Conservation Area: A, *Gecko reevesi*; B, *Python molurus*; C, *Ptyas mucosa*; D, *Elaphe moellendorffi*; E, A bottle of snake wine; F, *Bungarus fasciatus***
*(Photo by Y. T. Do)*

**Table 1. List of species of amphibian and reptile species found in Ha Nam province**

| Scientific name | English name | Previous record | IUCN (2022) | VNRB (2007) |
|---|---|---|---|---|
| **AMPHIBIA Gray, 1825** | **Amphibians** | | | |
| **ANURA Fischer von Waldheim, 1813** | **Frogs** | | | |
| **I. Bufonidae Gray, 1825** | **Toads** | | | |
| *Duttaphrynus melanostictus* (Schneider, 1799) | Black-spined toad | 1,3 | | |
| **IV. Dicroglossidae Anderson, 1871** | **True frogs** | | | |
| *Fejervarya limnocharis* (Gravenhost, 1829) | Grass frog | 1,3 | | |
| *Occidozyga martensii* (Peters, 1867)* | Martens' oriental frog | 3 | | |
| **V. Ranidae Batsch, 1796** | **Ranids** | | | |
| *Sylvirana guentheri* (Boulenger, 1882) | Guenther's amoy frog | 1,3 | | |
| **VI. Rhacophoridae Hoffman, 1932 (1858)** | **Treefrogs** | | | |
| *Polypedates megacephalus* Hallowell, 1861* | Hong Kong whipping frog | 3 | | |
| *Rhacophorus orlovi* Ziegler and Köhler, 2001 | Orlov's treefrog | 3 | | |
| *Theloderma albopunctatum* (Liu and Hu, 1962)* | Dotted bubble-nest frog | 3 | | |
| **REPTILIA Laurenti, 1768** | **Reptiles** | | | |
| **SQUAMATA Oppel, 1811** | **Lizards and snakes** | | | |
| **I. Agamidae Gray, 1827** | **Agamid lizards** | | | |
| *Acanthosaura lepidogaster* (Cuvier, 1829)* | Scale-bellied tree lizard | 3 | | |
| *Calotes emma* Gray, 1845* | Forest crested lizard | 3 | | |
| **II. Gekkonidae Gray, 1825** | **Geckos** | | | |
| *Cyrtodactylus soni* Le, Nguyen, Le & Ziegler, 2016 | Son's bent-toed gecko | 2,3 | | |
| *Gekko reevesii* (Gray, 1831)* | Reeves' Tokay Gecko | 4 | | VU |
| *Hemidactylus frenatus* Duméril & Bibron, 1836 | Spiny-tailed house gecko | 1,3 | | |
| **III. Pythonidae Fitzinger, 1826** | **Pythons** | | | |
| *Python molurus* (Linnaeus, 1758)* | Asiatic rock python | 4 | | CR |
| **IV. Colubridae Oppel, 1811** | **Colubrids** | | | |

| Scientific name | English name | Previous record | IUCN (2022) | VNRB (2007) |
|---|---|---|---|---|
| *Coelognathus radiatus* (Boie, 1827) | Copperhead racer | 1 | | VU |
| *Elaphe moellendorffi* (Boettger, 1886)* | Moellendorff's rat snake | 4 | | VU |
| *Lycodon futsingensis* (Pope, 1928)* | Futsing wolf snake | 3 | | |
| *Oligodon chinensis* (Günther, 1888)* | Chinese kukri snake | 3 | | |
| *Ptyas mucosa* (Linnaeus, 1758)* | Common rat snake | 4 | | EN |
| **V. Homalopsidae Günther, 1864** | | | | |
| *Hypsiscopus plumbea* (Boie, 1827) | Plumbeous water snake | 1 | | |
| **VI. Pareatidae Romer, 1956** | **Slug snakes** | | | |
| *Pareas hamptoni* (Boulenger, 1905)* | Hampton's slug snake | 3 | | |
| **VII. Elapidae Boie, 1827** | **Kraits** | | | |
| *Bungarus candidus* (Linnaeus, 1758)* | Blue krait | 4 | | |
| *B. fasciatus* (Schneider, 1801)* | Banded krait | 4 | | EN |
| *Naja atra* Cantor, 1842* | Chinese cobra | 4 | VU | EN |
| **TESTUDINES Batsch, 1788** | **Turtles** | | | |
| **VIII. Geoemydidae Theobald, 1868** | | | | |
| *Cuora mouhotii* (Gray, 1862)* | Keeled box turtle | 4 | EN | |

*(*New record in Ha Nam; 1 = Nguyen et al. (2009); 2 = Luu et al. (2018); 3 = This study; 4 = photo from local people inteview)*

### 3.2. Taxonomy acounts

In the following accounts, species names are followed by taxonomic authority and year, as well as common names in English and Vietnamese.

FAMILY DICROGLOSSIDAE

***Occidozyga martensii* (Peters, 1867)**

(Figs. 4 - A, B)


**Figure 4. *Occidozyga martensii* (HNUE HN.2018.19, adult female) A. Dorsal view and B. Ventral view; *Polypedates megacephalus* (HNUE HN.2018.01, adult male): C. Dorsal view and D. Ventral view; *Rhacophorus orlovi* (HNUE HN.2018.02, adult female): E. Dorsal view and F. Ventral view; *Theloderma albopunctatum* (HNUE HN.2018.27, adult male): G. Dorsal view and H. Ventral view** *(Photo by Y. T. Do)*

Martens' oriental frog/Coc nuoc mac-ten

*Specimens examined (n = 2).* Two adult females HNUE HN.2018.19 (SVL 26.6 mm) and HNUE HN.2018.20 (SVL 28.8 mm), collected on 20 May 2018, near Thanh Son commune, Kim Bang district, Ha Nam province (20°29'36'' N 105°51'16'' E, at an elevation of 191 m a.s.l.). Morphological characters of the specimens from Ha Nam agreed with the descriptions of Bourret (1942), Taylor (1962), Manthey & Grossmann (1997), Neang & Jeremy (2008), and Hecht et al. (2013).

*Description:* Head longer than wide (HL 10.3–12.4 mm, HW 9.9–10.3 mm); snout obtusely pointed, longer than horizontal diameter of eye (SL 3.2–3.7 mm, EL 3.1–3.2 mm); canthus rostralis absent; internarial distance broader than interorbital distance and upper eyelid (IN 2.1–2.7 mm, IUE 2.3–2.8 mm, UEW 1.9–2.4 mm); tympanum distinct, as wide as one-half of eye diameter (TYD 1.4–1.9 mm, EL 3.1–3.2 mm); supratympanic fold indistinct; vomerine teeth present. Fingers free of webbing; finger I longer than II; finger with small discs; tibia 5 times longer than wide (TL 12.9–14.6 mm, TW 4.4–5.3 mm); webbing formula I0–1II0–1III½ –2IV2–1V; outer metatarsal tubercle absent; inner metatarsal tubercle elongate. Dorsal skin smooth; dorsolateral fold present; external gular sacs absent; nuptial pads present. Coloration in life: dorsum and head greyish green with yellow spots, a darker stripe between eyes; sides of head and flanks brownish yellow; lips whitish brown with dark bars; tympanum yellow; limbs greyish green with dark bars; ventral surface white, gular region marbled with black.

*Ecological notes:* The specimens were found between 19:00 and 23:00 in mud at the puddle in the forest edges. The surrounding habitat was at small shrubs around the water. The air temperature was 28–32°C at night and the relative humidity was 72–88%.

*Distribution:* In Vietnam, this species has been recorded from from Lao Cai province in the North to Dong Nai and Ba Ria-Vung Tau provinces in the South. However, this is the first record of O. martensii from Ha Nam province. Elsewhere, O. *martensii* has been recorded from Southern China, Laos, Thailand and Cambodia (Nguyen et al., 2009).

*Remarks:* Specimens from Ha Nam province differ from descriptions of Taylor (1962) and Hecht et al. (2013) in having a larger size (SVL 26.6–28.8 mm versus 14.95–25.5 mm).

FAMILY RHACOPHORIDAE

***Polypedates megacephalus* Hallowell, 1861** (Figs. 4 - C, D)

Hong Kong whipping frog/Ech cay hong kong

*Specimens examined (n = 2).* An adult male HNUE HN.2018.01 (SVL 54.5 mm), collected on 16 May 2018, near Thanh Son commune, Kim Bang district, Ha Nam province (20°31'28'' N 105°51'10'' E, at an elevation of 230 m a.s.l.) and an adult female HNUE HN.2018.26 (SVL 79.3 mm) collected on collected on 20 May 2018, near Thanh Son commune, Kim Bang district, Ha Nam province (20°32'55'' N 105°51'19'' E, at an elevation of 260 m a.s.l.). Morphological characters of the specimens from Ha Nam agreed with the descriptions of Dubois (1986), Matsui et al. (1986), and Le et al. (2014).

*Description:* Head longer than wide (HL 19.8 mm, HW 17.4 in the male; HL 28.3 mm, HW 27.1 mm in the female); snout obtusely pointed, longer than horizontal diameter of eye (SL 9.7 mm, EL 6.1 mm in the male; SL 14.8 mm, EL 8.6 mm in the female); canthus rostralis distinct; internarial distance broader than interorbital distance and upper eyelid (IN 4.1 mm, IUE 7.0 mm, UEW 4.2 mm in the male; IN 5.2 mm, IUE 9.1 mm, UEW 7.0 mm in the female); tympanum distinct, as wide as two thirds of eye diameter (TYD 4.1 mm, EL 6.1 mm in the male; TYD 6.2 mm, EL 8.6 mm in the female); supratympanic fold indistinct; vomerine teeth present. Fingers free of webbing; finger I shorter than II; finger discs expanded with circummarginal groove; tibia 4-6 times longer than wide (TL 30.3 mm, TW 4.5 mm in the male; TL 42.1 mm, TW 10.2 mm in the female); toes almost fully webbed; outer metatarsal tubercle absent; inner metatarsal tubercle oval. Dorsal skin smooth; dorsolateral fold present; external gular sacs absent; nuptial pads present. Coloration in life: dorsum yellowish brown with dark X-shaped partern on neck; dorsolateral fold and canthus

rostralis whitish-brown; sides of head and flanks brownish yellow with black marks; lips whitish brown; tympanum lighter yellowish brown; upper surface of hind limbs orange brown with dark bars; ventral surface white.

*Ecological notes:* The specimens were found at night on branches located close to the ground about 5 m away from the small waterhole. The surrounding habitat was at small trees near the pond. The air temperature was 28–29°C at night and the relative humidity was 68–70%.

*Distribution:* In Vietnam, this species has been recorded widespread distribution in the Northern. However, this is the first record of *O. martensii* from Ha Nam province. Elsewhere, P. *megacephalus* has been recorded from Northeastern India, China, Myanmar, Taiwan, Laos, Thailand and Japan (Nguyen et al., 2009).

***Rhacophorus orlovi* Ziegler & Köhler, 2001** (Figs. 4 - E, F)

Orlov's treefrog/Ech cay ooc-lop

*Specimens examined (n = 2).* Two adult females HNUE HN.2018.02 (SVL 51.9 mm) and HNUE HN.2018.03 (SVL 55.3 mm) collected on collected on 16 May 2018, near Thanh Son commune, Kim Bang district, Ha Nam province (20°31'28'' N 105°51'10'' E, at an elevation of 230 m a.s.l.). Morphological characters of the specimens from Ha Nam agreed with the descriptions of Ziegler & Köhler (2001), Ostroshabov et al. (2013), and Pham et al. (2017).

*Description:* Head longer than wide (HL 20.3–22.1 mm, HW 18.2–20.7 mm); snout round, longer than horizontal diameter of eye (SL 8.1–8.5 mm, EL 5.9–6.7 mm); canthus rostralis distinct; internarial distance smaller than interorbital distance and larger upper eyelid (IN 4.7–5.4 mm, IUE 6.5–6.6 mm, UEW 4.4–5.2 mm); tympanum distinct, round, as wide as two thirds of eye diameter (TYD 4.0–4.1 mm, EL 5.9–6.7 mm); supratympanic fold indistinct; vomerine teeth present. Forelimbs: forearm shorter than hand (FLL 12.1–12.7 mm, HAL 14.3–14.9 mm); relative length of fingers: I<II<IV<III; tip of fingers enlarged into discs; disc on finger III narrower than tympanum diameter; webbing formula: I2½–2½II1½–2½ III2–2IV; subarticular tubercles distinct, formula 1, 1, 2, 2; inner metatarsal tubercles indistinct. Hindlimbs: shanks about six times longer than wide (TL 17.2–20.3 mm, TW 3–3.1 mm); relative length of toes: I<II<III<V<IV; webbing formula: I1–1½ II1–2III1–2IV2–1V; tip of fingers enlarged into discs; subarticular tubercles present, formula 1, 1, 2, 3, 2; inner metatarsal tubercle distinct; outer metatarsal tubercle absent. Dorsal skin smooth; chin and chest smooth; belly and underside of thighs slightly granular. Coloration in life: dorsum dark brown with black patterns; dorsolateral and canthus rostralis whitish brown; sides of head dark brown with yellow spots; lips dark grey; tympanum dark brown; limbs with dark bars; ventral surface light brown.

*Ecological notes:* Specimens were found between 20:00h and 21:00h while sitting on tree branches near a stream, about 2-3 m above the pond in the evergreen forest.. The air temperature was 26.5°C at night and the relative humidity was 85–90%.

*Distribution:* In Vietnam, *R. orlovi* has been recorded from Lao Cai, Ninh Binh and Thanh Hoa provinces in the North Southwards to Gia Lai province (Nguyen et al. 2009, Pham et al., 2017). Elsewhere, this species is known from Laos and Thailand (Frost, 2022).

*Remarks:* The specimens from Ha Nam province differ from the type series of *R. orlovi* (see Ziegler & Köhler 2001) in having a larger size (SVL 51.9–55.3 mm versus 36.6–48.4 mm in females). The specimens of *R. orlovi* from Ha Nam province are also morphologically similar to *R. hoanglienensis* but they differ from the latter by having light spots in the temporal region (vs. absent in *R. hoanglienensis*) and the snout round (vs. pointed in *R. hoanglienensis*).

***Theloderma albopunctatum* (Liu & Hu, 1962)** (Figs. 4 - G, H)

Dotted bubble-nest frog/Ech cay san van trang

*Specimens examined (n = 2).* Two adult males HNUE HN.2018.27 (SVL 23.5 mm) and HNUE HN.2018.28 (SVL 25.7 mm) collected on 21 May 2018, near Thanh Son commune, Kim Bang district, Ha Nam province (20°32'55'' N 105°51'19'' E, at an elevation of 260 m a.s.l.). Morphological characters of

the specimens from Ha Nam agreed with the descriptions of Bourret (1942), Taylor (1962), Neang & Jeremy (2008), and Hecht et al. (2013).

*Description:* Head longer than wide (HL 10.2–10.4 mm, HW 8.2–9.7 mm); snout round, longer than eye (SL 3.9–4.1 mm, EL 2.4 mm); canthus rostralis distinct; internarial distance smaller than interorbital distance and as upper eyelid (IN 2.4 mm, IUE 3.7–4.4 mm, UEW 2.4 mm); tympanum round, as wide as three fifths of eye diameter (TYD 1.4–1.5 mm, EL 3.7–4.3 mm); supratympanic fold absent; vomerine teeth present. Forelimbs: forearm shorter than hand (FLL 4.7–5.8 mm, HAL 6.7–7 mm); relative length of fingers: I<II<IV<III; tip of fingers enlarged into discs; disc on finger III narrower than tympanum diameter; no webbing; subarticular tubercles distinct, formula 1, 1, 2, 2; inner metatarsal tubercles indistinct. Hindlimbs: shanks about six times longer than wide (TL 12–12.2 mm, TW 2.2–2.4 mm); relative length of toes: I<II<III<V<IV; webbing formula: I1–2II1–2III1–2IV2–2V; tip of fingers enlarged into discs; subarticular tubercles present, formula 1, 1, 2, 3, 2; inner metatarsal tubercle distinct; outer metatarsal tubercle absent. Colouration in life: dorsal surface blackish with large white blotches covering head, loreal regions, anterior parts of dorsum, upper part of flanks and hip; dark transverse bars on limbs present; head with short transverse grey line between eyes; ventrally body and limbs blackish with whitish marbling; iris pinkish brown.

*Ecological notes:* Specimens were discovered found at between 20:00 and 23:00 on the large leaves about 3–5 m above the small waterhole. The surrounding habitat was medium shrubs in secondary forest. The humidity was approximately 72–76% and the air temperature ranged from 30–34˚C.

*Distribution:* In Vietnam, this is a widespread species, known from Lai Chau province in the North to Dong Nai province in the South. It is a new record for Ha Nam province. Elsewhere, T. *asperum* has been recorded from India, China, Myanmar, Laos, Thailand, Cambodia and Malaysia (Nguyen et al., 2009 and Hecht et al., 2013).

**Family AGAMIDAE**

***Acanthosaura lepidogaster* (Cuvier, 1829)** (Figs. 5 - A, B)

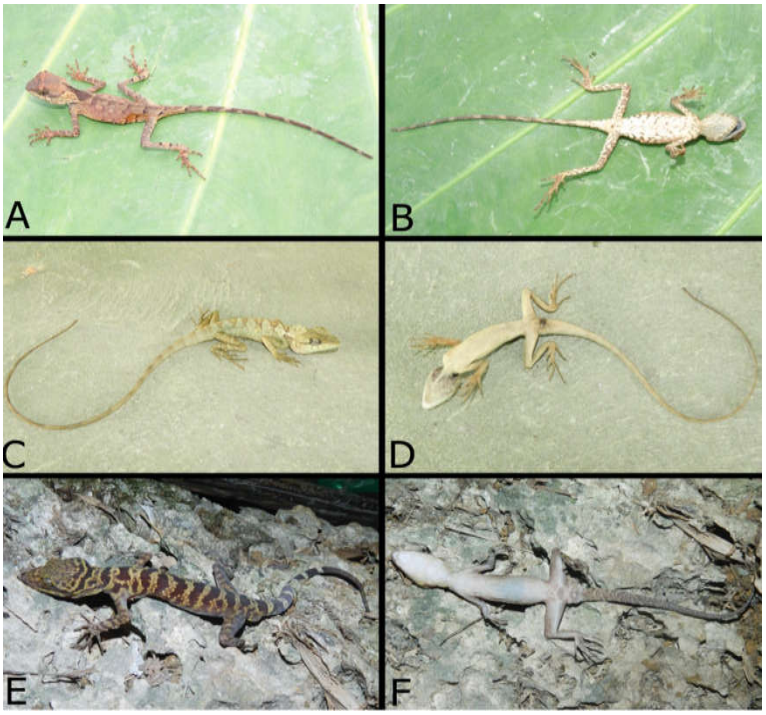


**Figure 5. *Acanthosaura lepidogaster* (HNUE HN.2018.31, subadult female): A. Dorsal view and B. Ventral view; *Calotes emma* Gray, 1845 (HNUE HN.2018.15, adult male): C. Dorsal view and D. Ventral view; *Cyrtodactylus soni* (HNUE HN.2018.32, adult male): C. Dorsal view and D. Ventral view**

*(Photo by Y. T. Do)*

Scale-bellied tree lizard/O ro vay

*Specimen examined* (n = 1). One subadult female HNUE HN.2018.31 (SVL 95 mm; TaL 268 mm), collected on 21 May 2018, near Thung Trong village, Thanh Son commune, Kim Bang district, Ha Nam province (20°32'49'' N 105°51'32'' E, at an elevation of 260 m a.s.l.). The morphological characters of the specimens agreed with the descriptions of Smith (1935), Ziegler (2002), and Hecht et al. (2013).

*Morphological characters*: Head large; longer than wide (HL 30 mm; HW 17 mm); eyes large; mental small; scales on top of head small; on orbital 1 small spines; snout shorter; postorbital spine small; spines on the back of the neck large; tympanum exposed; two spines present above tympanum; supralabials 9; infralabials 11; scales between supraoculars 19, between nostril 7; length biggest thorn in the neck 2.7 mm. Dorsal scales keeled; hind limbs long; lamellae 11 under finger I, 22 under finger IV; femoral pores absent; tail slender, lengthy. Colouration in life: Dorsum greyish brow above, venter light, a large dark triangle – shaped patch on the neck. Tail have crosses dark alternately light crosses.

*Ecological notes:* The specimen was discovered found at 22:00 on the large leave about 2–3 m above the ground. The surrounding habitat was shrubs and small trees in secondary forest. The humidity was approximately 72% and the air temperature ranged from 31˚C.

*Distribution:* In Vietnam, *A. leppidogaster* has previously been reported as occurring from Lao Cai and Ha Giang provinces southwards to Binh Phuoc and Dong Nai provinces. Elsewhere, the species is known from China, Myanmar, Laos, Thailand, and Cambodia (Nguyen et al., 2009).

***Calotes emma* Gray, 1845** (Figs. 5 - C, D)

Forest crested lizard/Nhong emma

*Specimen examined* (n = 1). One adult male HNUE HN.2018.15 (SVL 95 mm; TaL 187 mm), collected on 18 May 2018, near C village, Thanh Son commune, Kim Bang district, Ha Nam province (20°31'12'' N 105°50'57'' E, at an elevation of 246 m a.s.l.). The morphological characters of the specimens agreed with the descriptions of Smith (1935) and Das (2010).

*Description*: Body moderate sized. Head distinct from neck; longer than wide (HL 28 mm, HW 18.5 mm); eyes and mental large; upper head scales larger than body scales; snout round; tympanum exposed; 2 spines above tympanum; supralabials 11; infralabials 11; scales between supraoculars 21, between nostril 7; one spine behind the eye; neck spines longer than dorsum spines; length biggest thorn in the neck 2.2 mm. Dorsal scales, venter scales and limbs scales strongly keeled; hind limbs longer than fore limbs; lamellae 10 under finger I, 17 under finger IV; femoral pores absent; tail compressed; incomplete. The colouration 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.

*Ecological notes:* The specimen was discovered found at 20:30 on the large branch about 5 m above the ground. The surrounding habitat was small trees in secondary forest. The humidity was approximately 67% and the air temperature ranged from 27˚C.

*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 known from peninsular Thailand south to Perak in Malaysia, Southern China, Laos and Cambodia (Nguyen et al., 2009 and Uetz et al., 2022).

FAMILY GEKKONIDAE

FAMILY COLUBRIDAE

***Lycodon futsingensis* (Pope, 1928)** (Figs. 6A, B)

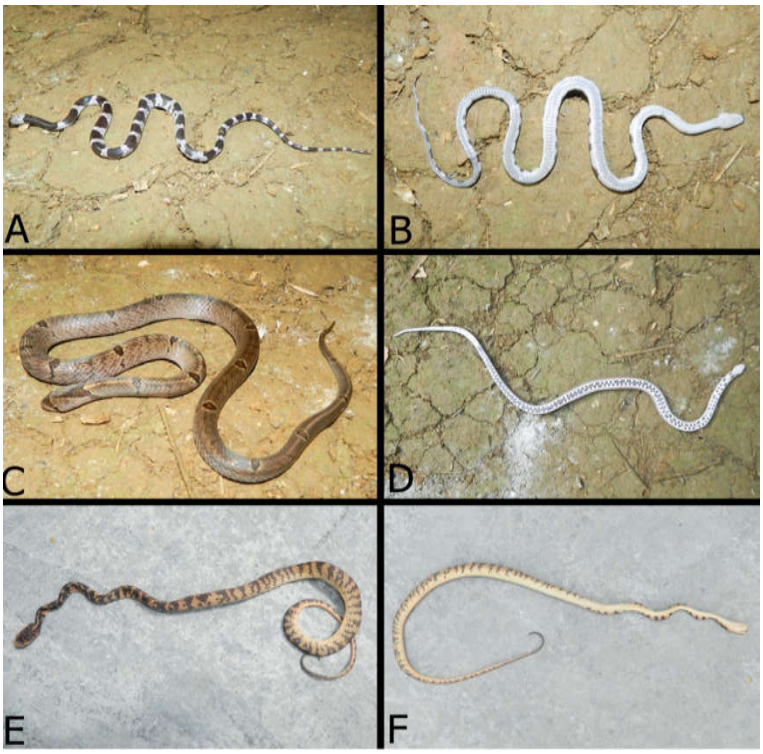


**Figure 6.** ***Lycodon futsingensis*** **(HNUE HN.2018.11, juvenile): A. Dorsal view and B. Ventral view;** ***Oligodon chinensis*** **(HNUE HN.2018.09, adult female): C. Dorsal view and D. Ventral view;** ***Pareas hamptoni*** **(HNUE HN.2018.29, adult female): E. Dorsal view and F. Ventral view**

*(Photo by Y. T. Do)*

Futsing Wolf Snake/Ran khuyet fut-sing

*Specimens examined (n = 1).* One juvenile HNUE HN.2018.11 (SVL 209 mm, TaL 107 mm) collected by HNQ and YTD, May 18th 2018 near Thanh Son, Kim Bang commune, Ha Nam District (20°31'17.2"N, 105°51'7.1"E, at an elevation 181 m a.s.l).. The morphological characters of the specimen agreed with the descriptions of Bourret (1936), Vogel et al. (2009), Hecht et al. (2013), and Le et al. (2014).

*Description:* Body slender; head longer than wide, distinct from neck; snout long; nostril lateral; eye small, pupil vertical. Head scalation complete, including paired internasals, prefrontals, and parietals, supraocular 1/1, and one frontal; supralabials 8/8, 4th–5th in contact with the eye, the 7th scale largest; infralabials 9/9, 1st–4th bordering chin shields. Dorsal scale rows 17–17–15, smooth; ventrals 203; subcaudals 82, divided; cloacal undivided. Coloration in life: Dorsal surface of head brownish-black bands interleaved whitish-grey bands with 24 white bands on body, 13 light bands on tail; head grey with a lighter band, from eye to neck; belly not band, cream.

*Ecological notes:* The specimen was found at 21:10 on the tree branch about 1.5 m above the ground. The surrounding habitat was small shrub and bamboo tree forest. The humidity was approximately 80% and the air temperature 29.7°C

*Distribution:* In Vietnam, this species has been recorded from Lao Cai and Cao Bang provinces Southwards to Quang Binh and Da Nang provinces. Elsewhere, the species is known from China (Nguyen et al. 2009).

***Oligodon chinensis*** **Günther, 1888** (Figs. 6 - C, D)

Chiensis kukri snake/Ran khiem trung quoc

*Specimens examined (n = 2).* Two adult females HNUE HN.2018.09 (SVL 429 mm, TaL 101 mm) and HNUE HN.2018.10 (SVL 480 mm, TaL 111 mm), collected by HQN and YTD, May 17th 2018 near Thanh Son village, Kim Bang commune, Ha Nam district (20°31'16.8"N, 105°51'6"E, at an elevation 188 m a.s.l). The morphological characters of the specimen agreed with the descriptions of Smith (1943) and Hecht et al. (2013).

*Description:* Body robust, subcylindrical;

head longer than wide, indistinct from neck; snout obtuse; nostril lateral; eye small, pupil vertical. Head scalation complete, including paired internasals, prefrontals, and parietals, supraocular 1/1, and one frontal; supralabials 8/8, 4th and 5th in contact with the eye, the 7th scale largest; infralabials 8/8, 1st–4th bordering chin shields. Dorsal scale rows 17–17–15, smooth; ventrals 178–198; subcaudals 54–63, divided; cloacal single. Coloration in life: Dorsal surface of head, body and tail yellowish brown with dark brown blotches; sides of head cream; dorsal head with two dark brown marking in Λ-shape, one between the eyes and anotherr one on the nape; venter cream with black square spots.

*Ecological notes:* Specimens were found between 19:00 and 23:00 on the ground. The surrounding habitat was shrubs and bamboo on the mountain slope. The humidity was approximately 70–80% and the air temperature ranged from 26 to 28˚C

*Distribution:* In Vietnam, this is a widespread species known from Lao Cai and Lang Son provinces in the North Southwards to Quang Binh and Gia Lai provinces (Nguyen et al. 2009). Elsewhere, this species is also known from China (Nguyen et al., 2009).

FAMILY PAREATIDAE

***Pareas hamptoni* (Boulenger, 1905)** (Figs. 6 - E, F)

**Hampton's Slug Snake/Ran ho may hamton**

*Specimen examined (n = 1).* One adult female HNUE HN.2018.29 (SVL 318 mm, TaL 82 mm), collected by HNQ and YTD, May 23th 2018 near Thanh Son village, Kim Bang commune, Ha Nam district (20˚31'17.1"N, 105˚51'06.2"E, at an elevation 162 m a.s.l.). The morphological characters of the specimen agreed with the descriptions of Boulenger (1905), Smith (1943), and Le et al. (2014).

*Description:* Body slender, subcylindrical; head longer than wide, distinct from neck; snout obtuse; nostril lateral; eye large, pupil vertical. Head scalation complete, including paired internasals, prefrontals, and parietals, supraocular 1/1, and one frontal; supralabials 8/8, in not contact with the eye, the 8th scale largest; infralabials 8/8, 1st–4th bordering chin shields. Dorsal scale rows 15–15–15, smooth; ventrals 189; subcaudals 103, divided; cloacal undivided. Coloration in life: Dorsal surface of head, body and tail light, with vertical black cross-bars; venter and lower surface of tail white with black spots on outer edges.

*Ecological notes:* The specimen was found between at 19:30 on the tree branche about 3 m above the small waterhole. The surrounding habitat was small trees in the limestone mountain. The humidity was approximately 76% and the air temperature ranged from 29.5˚C

*Distribution:* This is a widespread species in Vietnam, known from Lao Cai and Ha Giang provinces in the North Douthwards to Lam Dong and Dong Nai provinces (Nguyen et al. 2009). Elsewhere, it is known from China, Myanmar, Laos, Cambodia. However, the taxonomic status of *P. hamptoni* in different regions remains a controversial issue, and populations might represent a species complex with a pronounced geographic structure (You et al., 2015).

## 4. CONCLUSION

Based on our field work in 2018 and the previously papers, a total of 24 species were recorded from the Kim Bang Species and Habitat Conservation Area in Ha Nam province, comprising 7 species of amphibians and 17 species of reptiles. Recorded an additional 24 new distributes for this conservation area in Ha Nam province. Remarkably, 16 of the recorded species are new records for Ha Nam herpetofauna. The high level of species diversity and endemism of the herpetofauna underscores the biodiversity conservation potential of the Kim Bang Species and Habitat Conservation Area. Although this nature reserve has two species are listed in the IUCN Red List (2022) and seven species is listed in the Vietnam Red Data Book (2007). However, biodiversity is heavily threatened by habitat degradation and over harvesting associated with wildlife trade. To preserve the unique biodiversity of Kim Bang limestone mountain, we must not only continue with research, in particular the ecological characteristics of recorded species.

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# CẬP NHẬT ĐA DẠNG CÁC LOÀI LƯỠNG CƯ, BÒ SÁT Ở KHU BẢO TỒN LOÀI VÀ SINH CẢNH KIM BẢNG, TỈNH HÀ NAM

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## TÓM TẮT

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