



Original Article

New Records of Colubridae and Updated List of Snakes (Reptilia: Squamata: Serpentes) in Gia Lai Province, Vietnam

Vu Bao Minh¹, Nhan Nguyen Pham Sy², Nguyen Thien Tao³, Nguyen Quoc Huy^{3,4,5,*}

¹VNU University of Science, 334 Nguyen Trai, Thanh Xuan, Hanoi, Vietnam

²The 108 Military Central Hospital, 1 Tran Hung Dao, Hanoi, Vietnam, Vietnam

³Institute of Genome Research Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam

⁴Chengdu Institute of Biology, Chinese Academy of Sciences, Chengdu, China

⁵University of Chinese Academy of Sciences, Beijing, China

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Abstract: We report six new records of snakes belonging to the Colubridae family based on the reptile collections in Kon Chu Rang Natural Reserve, Gia Lai Province, including: *Boiga bourreti*; *Hebius khasiensis*; *Dryophiops rubescens*; *Lycodon anakradaya*; *L. cf. truongi* and *Oligodon culaochamensis*. Moreover, we further described 14 snake species collected during the field survey, including: *Ahaetulla prasina*; *Boiga quangxiensis*; *Bungarus candidus*; *B. fasciatus*; *Dendrelaphis ngansonensis*; *Lycodon subcinctus*; *Liopeltis pallidonuchalis*; *Pareas hamptoni*; *Psammodynastes pulverulentus*; *Ptyas multicincta*; *Rhabdophis chrysargos*; *Sibynophis collaris*; *Trimerodytes percarinatus* and *Trimeresurus vogeli*. In addition, we also provide an updated list of 63 snake species from Gia Lai Province. The snake fauna of Gia Lai Province contains several species of conservation concern with four species listed in the Governmental Decree No. 84/2021/ND-CP (2021), seven species listed in the Vietnam Red Data Book (2007), six species listed in the IUCN Red List (2024), and four species listed in the CITES (2023).

Keywords: New record, snakes, taxonomy, Kon Chu Rang Nature Reserve, Gia Lai Province.

1. Introduction

Vietnam is a country characterized by a tropical monsoon climate and remarkable biodiversity, with animal species distributed

across plains, midlands, and mountainous regions [[1]]. Regarding reptiles, 192 different snake species have been recorded, the majority of which are belonging to the Colubridae family [[2]].

Kon Chu Rang NR has a surface area of approximately 15,288 ha (No. 28/2004/QD-UB), and is part of an extended region of the Central Annamites Subregion [[3], [4]], hosting the highest diversity of amphibians in

* Corresponding author.

E-mail address: huynguyen17295@gmail.com

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Indochina and a high level of local endemism, making it a hotspot for new species discovery [[3]-[5]].

In the past two decades, several herpetological surveys have been conducted on Kon Chu Rang NR. The reserve's varied terrain and vegetation support 10 species of snakes from three families, contributing to Vietnam's overall species diversity [[6]]. One significant study is the Biodiversity Report on Kon Ka Kinh – Kon Chu Rang in K Bang District, Gia Lai Province, recently endorsed by the Green Viet Water Biodiversity Conservation Center (GreenViet), which listed 13 species of snakes, with 10 species from the Colubridae family, two from the Elapidae family, and one from the Viperidae family [[7]].

Based on the analysis of specimens collected in 2018 and 2023, previously stored at the Institute of Genome Research, four families and around 20 species have been preliminarily identified. Notably, some of these species were recorded for the first time in Gia Lai Province, including *Boiga bourreti* Tillack, Ziegler & Khac Quyet, 2004; *Dryophiops rubescens* (Gray, 1835); *Hebius khasiensis* (Boulenger, 1890); *Lycodon anakradaya* Nguyen, Duong, Wood & Grismer, 2022; *L cf. truongi* Nguyen, Duong, Wood & Grismer, 2022; and *Oligodon culaochamensis* Nguyen, Nguyen, Nguyen, Phan, Jiang & Murphy, 2017.

2. Materials and Methods

Field surveys were conducted in Kon Chu Rang (NR) in 2018 by L. M. Anh, N. D. H. Vu, N. Orlov, and in June 2023 by N. Q. Huy, N. T. Hoa, N. N. Hai, H. V. Chung, N. T. Ngan, N. Orlov, O. B. Moseyko. Specimens were collected by hand or by using a snake hook between 8:00 and 23:00 hrs. Most specimens were photographed in life. Specimens were euthanized in a closed vessel with a piece of cotton wool containing ethyl acetate (Simmons, 2002) [[8]], fixed in 80% ethanol and subsequently stored in absolute ethanol. Tissue samples of some species were kept separately in 90% ethanol. Specimens were

deposited in the collections of the Institute of Genome Research (IGR), Vietnam Academy of Science and Technology (VAST), Hanoi, Vietnam.

Taxonomic identification of the specimens was made based on the following: Pope, Smith, Taylor, Gumprecht, Stuart et al., Nemes et al., [[9]-[14]] and some relevant articles are cited in the description of each species. For common names and locations, we followed Nguyen et al., and Uetz et al., [2, [15]].

2.1. Morphological Characters

Measurements, except body and tail lengths, were taken with a slide-caliper to the nearest 0.1 mm in preserved specimens; all measures on the body were measured to the nearest millimeter. The numbers of dorsal scale rows are given at one head length behind the head, at midbody, and one head before vent, respectively. Scallation was studied by using a binocular.

The abbreviations utilized for morphometric measurements are outlined in detail below: **SVL**: Snout-vent length; **TaL**: Tail length; **TL**: Total length; **ED**: Eye diameter (horizontal diameter of eyes); **VEN**: Ventral plates; **SC**: Subcaudal plates: Single/divided; **Cloacal**: Single/divided; **Sup**: Number of subpralabials; **Lor-(r/l)**: Number of loreal scales; **Nasal**: Entire/Divided; **PreOc**: Number of preoculars; **Subocular**: Absent/Present; **PostOC**: Number of postoculars; **ATem**: Number of anterior temporals; **Ptem**: Number of posterior temporals; Number of infralabials. The number of ventral scales was counted according to Dowling [13]. Bilateral scale counts are given as right/left. About the pattern on the snake: **BDw**: Number of white bands on the body; **BDb**: Number of black bands on the body; **BVw**: Number of white bands on the tail; **BVb**: Number of black bands on the tail; **Bellycol**: Coloration of the belly; **Belly band**: Absent/Present.

3. Result and Discussion

Taxonomi account

Family Colubridae

Ahaetulla prasina (Boie, 1827)

Oriental whip snake/Rắn roi thường (Figure 1)

Synonym:

Coluber Nasutus Shaw 1802

Specimen examined (n = 10): Five males (KCR.2023. 175, 215, 216, 217, 218) and four females (KCR.2023. 174, 197, 248; VNMN 07011). One subadult female (KCR.2023. 147).

Description: The morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of Pope and Nemes et al., [[9], [14]]. TL 1062–1097 mm in adult males, (SVL: 715–740 mm, TaL: 363–368 mm); TL 1062–1197 mm in adult females, (SVL: 699–774 mm, TaL: 346–386 mm). TL 787 mm in subadult female, (SVL: 528 mm, TL: 259 mm). Head long and narrow, pupil horizontal, snout pointed, eyes are large (ED: 4.20–4.55 mm); loreal 2/2, not in contact with eyes; preocular single, suboculars absent; postocular 2/2; anterior temporal 1/1, posterior temporal scale 2/2; subpralabials 9/9, largest scales 7/7; infralabials 8/8; dorsal scale rows 15–15–15, scales equal; ventral 187–200; cloacal single; subcaudal 151, divided.

Coloration in life: Dorsum gray/green/yellow with small dark and light spots; forehead with light streak; light postocular streak; light labials; venter gray/green/yellow.

Notes: There is one specimen (KCR.2023. 248) that has 11 scales of subpralabials and appears subocular on the left side of the head.

Distribution: This is a widespread species known from Lai Chau and Cao Bang provinces in the North southwards to Kien Giang and Ca Mau provinces. [[2]]. Elsewhere: India, Bhutan Myanmar, Thailand, Cambodia, Laos, Vietnam, Malaysia, Singapore, China, Indonesia, Bangladesh, Bhutan, Brunei Darussalam, Hong Kong; Philippines [[15]].

Boiga bourreti Tillack, Ziegler & Le, 2004

Bourret's cat snake/Rắn rào Bourret (Figure 2).

Specimen examined (n = 1): One subadult female (KCR.2023. 196).

Description: The morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of Tillack et

al., and Ziegler et al., [[17], [18]]. TL 414 mm in subadult female, (SVL: 317 mm, TaL: 97 mm). Head distinct from neck; nasal entire; eyes are medium in size (ED: 2.87 mm); round pupils; loreal 1/1, not in contact with eyes; preocular 2/2, suboculars absent; postocular 3/3; anterior temporal scale 1/1; posterior temporal scale 2/2; subpralabials 8/8, largest scale 7/7; infralabials 7/7; dorsal scale rows 15–17–11, scales equal; ventral 208; cloacal single; subcaudal 95, divided.



Figure 1. Oriental whip snake/*Ahaetulla prasina*.

Coloration in life: Dorsum brown–white with 60 brown bands and 61 white bands, 19 brown bands and 19 white bands on the tail; forehead white; dark postocular streak; labials with dark spots; venter yellow.

Distribution: In Vietnam, this species is known from Quang Binh and Kon Tum provinces [[2]]. This species is endemic to Vietnam.



Figure 2. Bourret's cat snake/*Boiga bourreti*.

Boiga guangxiensis Wen, 1998.

Guangxi cat snake/Rắn rào Quảng Tây (Figure 3).

Specimen examined (n = 8): Six females (KCR.2023. 41, 173, 195, 249, 250, 251) and two subadult females (KCR.2023. 249, 251).

Description: The morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of Ziegler et al., and Luu et al., [[18], [19]]. TL 920–1728 mm in adult females, (SVL: 662–1300 mm, TaL: 258–428 mm); TL 597–781 mm in subadult females, (SVL: 456–447 mm, TaL: 141–166 mm). Head distinct from neck; nasal entire; eyes are large in size (ED: 5.32–6.099 mm); loreals 1/1; subpralabials 8/8, largest scale 7/7; preocular 1/1; postocular 2/2; anterior temporal scale 1/1; posterior temporal scale 2/2; infralabials 11/11; dorsal scale rows 19–19–19, scales equal; ventral 238–266; cloacal single; subcaudal 138–143, divided.

Coloration in life: Dorsum brown/gray with 60 gray bands and 61 black bands, 19 gray bands and 19 black bands on the tail; forehead brown/gray; light labials; venter white/yellow. Distribution: This is a widespread species known from Lao Cai and Cao Bang provinces in the North southwards to Tay Ninh and Dong Nai provinces [[2], [20]]. Elsewhere: China and Laos [[15]].



Figure 3. Guangxi cat snake/*Boiga guangxiensis*

Dendrelaphis ngansonensis (Bourret, 1935).

Common nganson bronzeback snake/Rắn leo cây Ngân Sơn (Figure 4).

Synonym:

Dendrophis pictus ngansonensis Bourret 1935.

Specimen examined (n = 1): One female (VNMN 07012).

Description: The morphological characters of the specimen from Kon Chu Rang NR

agreed well with the description of Ziegler et al., and Geissler et al., [[21], [22]]. TL 1367mm, (SVL: 937 mm, TaL: 430 mm). Head indistinct from neck; nasal divided; eyes are large

(ED: 7.32 mm); round pupils; loreal 1/1, not in contact with eyes; preocular 1/1, suboculars absent; postocular 2/2; anterior temporal scale 2/2; posterior temporal scale 2/2; subpralabials 10/10, largest scales 7/7; infralabials 11/11; dorsal scale rows 17–15–13, scales equal; ventral 186; cloacal single; subcaudal 134, divided.

Coloration in the preserved specimen: Dorsum brown with small dark and light spots; forehead brown; dark postocular streak; light labials; venter yellow.

Distribution: This is a widespread species known from Ha Giang and Vinh Phuc provinces in the North southwards to Dong Nai provinces [[2], 20, [22]]. Elsewhere: Laos, Thailand, China, Cambodia [[15]].



Figure 4. Common Nganson Bronzeback snake/*Dendrelaphis ngansonensis*.

Dryophiops rubescens (Gray, 1835).

Red whip snake/Rắn roi đỏ (Figure 5).

Synonym:

Dendrophis sumatrana Bleeker 1857.

Specimens examined: Specimens were photographed and released.

Description: In our research, we identified the loreal, however in the descriptions by Holden et al., [[24]]. Body slender, compressed; head distinct from neck; loreal present; single preocular; postoculars 2–3; supralabials 9, 4th–6th contact orbit; eyes are large in size; pupil

horizontal; tail long, slender; dorsals smooth; anal divided.

Coloration in life: Dorsum reddish-brown with small dark and pale spots; forehead with dark streaks; dark postocular streak; labials with dark spots; venter yellow or olive.

Distribution: In Vietnam, this species is known from Cat Tien National Park, Dong Nai Province. Elsewhere: Indonesia, Singapore, Thailand, Cambodia, Philippines, Malaysia, Pulau Pangkor, Pulau Tioman [[15]].



Figure 5. Red whip snake/*Dryophiops rubescens*

Hebius khasiensis (Boulenger, 1890)

Khasi keelback snake/Rắn sãi khasi (Figure 6).

Synonym:

Tropidonotus khasiensis Boulenger 1890

Natrix khasiensis Bourret 1935

Amphiesma khasiensis Malnate 1960

Specimen examined (n = 1): One female (KCR. 2023. 334)

Description: The morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of David et al., and Phan et al., [[25], [26]]. TL 529 mm in female, (SVL: 369 mm, TaL: 170 mm). Head distinct from neck; nasal entire; eyes are medium in size (ED: 2.49 mm); round pupils; loreal 1/1, not in contact with eyes; preocular 2/2, suboculars absent; postocular 2/2; anterior temporal scale 1/1; posterior temporal scale 2/2; subpralabials 9/9, largest scales 7/7; infralabials 8/8; dorsal scale rows 19–19–15; scales equal; ventral 151; cloacal single; subcaudal 84, divided.

Coloration in life: Dorsum reddish-brown with small dark and pale spots; forehead brown; light postocular streak; light labials; venter yellow.

Distribution: This is a widespread species known from Lao Cai and Cao Bang provinces in the North southwards to Kon Tum and Lam Dong provinces [[2]]. Elsewhere: India, Myanmar, Laos, Vietnam, Thailand, China [[15]].



Figure 6. Khasi keelback snake/*Hebius khasiensis*.

Liopeltis pallidonuchalis Poyarkov, Nguyen & Vogel, 2019.

Pale-necked ringneck snake/Rắn đai gáy nhạt màu (Figure 7).

Specimens examined: Specimens were photographed and released.

Morphological features: Morphological measurements, scalation, and color pattern observed from our records match well the original description by Poyarkov et al., [[27]]. Head indistinct from neck; nasal entire; eyes are large in size, round pupils; loreal 1/1, not in contact with eyes; preocular 2/2, suboculars absent; postocular 2/2; anterior temporal scale 1/1; posterior temporal scale 2/2; subpralabials 8/8, largest scale 6/6; infralabials 8/8; 15 dorsal mid-body scale rows.

Coloration in life: Dorsum light brown with small yellow spots; forehead brown; dark postocular streak; light labial; venter yellow.

Distribution: In Vietnam, this species is known from Gia Lai, Thua Thien-Hue, Da Nang [[27]].



Figure 7. Pale-necked ringneck snake/*Liopeltis pallidonuchalis*.

Lycodon anakradaya Nguyen, Duong, Wood & Grismer, 2022

Rhade wolf snake/Rắn khuyết ê đê (Figure 8).

Specimens examined: Specimens were photographed and released.

Morphological features: The morphological measurements, scalation, and color pattern observed from our records match well the original description by Nguyen et al., [[28]]. Adult male; head indistinct from neck; nasal entire; round pupils; loreal 1/1, not in contact with eyes; preocular 1/1, suboculars absent; postocular 2/2; anterior temporal scale 2/2; posterior temporal scale 3/3; subpralabials 8/8, largest scale 6/6; infralabials 8/8; dorsal scale rows 19–17–15; scales equal; ventral 225; cloacal single, subcaudal 87, divided.

Coloration in life: Dorsum black–orange with 12 orange bands, six orange bands on the tail. Forehead black; orange labials; venter orange. Distribution: In Vietnam, this species is known from Song Giang River Valley, Khanh Trung Commune, Khanh Vinh District, Khanh Hoa Province [[28]] and this is the first record of the species for Gia Lai Province.



Figure 8. Rhade wolf snake/*Lycodon anakradaya*.

Lycodon cf. truongi Nguyen, Duong, Wood & Grismer, 2022

Truong's wolf snake/Rắn khuyết trường (Figure 9).

Specimens examined: Specimens were photographed and released.

Morphological features: The morphological measurements, scalation, and color pattern observed from our records match well the original description by Nguyen et al., [[28]]. Head indistinct from neck; nasal entire; round pupils; loreal 1/1, not in contact with eyes; preocular 2/2, suboculars absent; postocular 2/2; anterior temporal scale 2/2; posterior temporal scale 2/2; subpralabials 8/8; dorsal scale rows 17–17–15, all smooth.

Coloration in life: Dorsum black–white with 19 white bands, nine white bands on the tail. Forehead black; yellow labials; venter white.

Distribution: In Vietnam, this species is known from Khanh Hoa Province [[28]] and this is the first record of the species for Gia Lai Province.



Figure 9. Truong's wolf snake/*Lycodon cf. truongi*.

Lycodon subcinctus (Boie, 1827).

Malayan banded wolf snake/Rắn khuyết đai (Figure 10).

Synonym:

Ophites subcinctus Wagler 1830

Specimens examined: Specimens were photographed and released.

Description: The morphological character of the specimen from Kon Chu Rang NR agreed well with the description of Smith, Taylor and Wang et al., [[10], [11], [29]]. Adult female; head indistinct from neck; nasal entire; round pupils; loreal 1/1, not in contact with eyes; preocular 2/2, suboculars absent; postocular 2/2; anterior temporal scale 2/2; posterior temporal scale 2/2; subpralabials 8/8; dorsal scale rows 17–19–15, all smooth.

Coloration in life: Dorsum black–gray with five gray bands. Forehead black, dark postocular streak; light labials; venter gray.

Distribution: This is a widespread species known from Lai Chau and Vinh Phuc provinces in the North southwards to Tay Ninh and Dong Nai provinces [[2], [22]]. Elsewhere: Brunei Darussalam; Cambodia, China, Indonesia, Timor–Leste, Laos, Thailand, Malaysia, India, Singapore [[15]].



Figure 10. Malayan banded wolf snake/*Lycodon subcinctus*.

Oligodon culaochamensis Nguyen, Nguyen, Nguyen, Phan, Jiang & Murphy, 2017.

Culaocham kukri snake/Rắn khiếm cù lao chàm (Figure 11).

Specimens examined (n = 1): One female (KCR.2023.101).

Description: The morphological character of the specimen from Kon Chu Rang NR agreed well with the description of Nguyen et al., [[30]]. Medium size in adults TL 508 mm, (SVL: 409 mm, TaL: 99 mm). Head small and elongate, faintly distinct from neck; nasal divided; eye small (ED: 2.44 mm); round pupil; loreal 1/1, not in contact with eyes; preocular 1/1; presubocular 1/1; postoculars 2/2; temporals 2+2/2+2, anterior 1/1 elongated; prefrontal wider than long and larger than internasal; frontal large and hexagonal, longer than wide; subpralabials 8/8, largest scales 6/6; infralabials 9/9, 1st – 4th bordering chin shields; dorsal scale rows 19–19–15, smooth; scales equal; ventral 182; cloacal single; subcaudal 48, divided.

Coloration in life: Dorsal surface brown to pinkish brown with 13 darker blotches on the body and 3 on the tail; head with two dark

brown bands, one between the eye, from frontal to internasals; another dark brown arrow-shaped marking, from the posterior part of frontal, backward obliquely crossing neck and nearly reaching the 8th ventrals; The belly is cream to pink or reddish with black rectangular blotches, almost dark in the back; ventral surface of tail white with black spots.

Distribution: In Vietnam, this species is known only from Cu Lao Cham Islands, Quang Nam Province [[30]].



Figure 11. Culaocham kukri snake/*Oligodon culaochamensis*.

Ptyas multicincta (Roux, 1907).

Many–banded green snake/Rắn nhiều đai (Figure 12).

Synonym:

Ablabes multicinctus Roux 1907

Zamenis moi Smith 1921

Eurypholis multicinctus Pope 1936

Liopeltis major multicinctus Deuve 1961

Opheodrys multicinctus Smith 1943

Cyclophiops multicinctus Zhao & Adler 1993

Specimens examined (n = 2): One male (KCR.2023. 171), one subadult female (KCR.2023. 34).

Description: The morphological character of the specimen from Kon Chu Rang NR agreed well with the description of Smith, Hauser et al., [[10], [31]]. TL 1041 mm in adult male, (SVL: 755 mm, TaL: 286 mm). TL 324 mm, (SVL: 235 mm, TaL: 89 mm) in subadult female. Head indistinct from neck; nasal divided; eyes are large in size (ED: 4.39 mm); round pupils; loreal 1/1, not in contact with eyes; preocular 1/1, suboculars absent; postocular 2/2; anterior temporal scale 1/1;

posterior temporal scale 2/2; subpralabials 8/8, largest scales 2/2; infralabials 6/6, first to fourth bordering chin shields; dorsal scale rows 15–15–15, smooth and scales equal; ventral 170–172; cloacal single; subcaudal 86–98, divided.

Coloration in life: The entire head and body are green but darker towards the tail. The lower half of the body is gray. The color of the scales on both sides of the abdomen is bright green. There are white horizontal stripes with narrow black borders. The belly is white and greenish in the front, and almost gray in the back.

Distribution: This is a widespread species known from Lai Chau and Cao Bang provinces in the North southwards to Quang Nam and Lam Dong provinces [[2], [20], [32]]. Elsewhere: Indonesia, Brunei Darussalam, Malaysia, Philippines, Singapore, Thailand [[15]].



Figure 12. Many-banded green snake/*Ptyas multicinctus*.

Sibynophis collaris (Gray, 1853)

Common many-tooth snake/Rắn rònng cỏ đen (Figure 13).

Synonym:

Psammophis collaris Gray 1853.

Specimen examined (n = 1): One female (KCR.2023.39).

Description: The morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of Pope 1935, Smith, Taylor, Kim et al., [[9]-[11], [33]]. TL 384 mm, (SVL: 256 mm, TaL: 128 mm). Body cylindrical; head moderately distinct from neck; nasal entire; eye large, pupil round; loreal 1/1, small; preocular 1/1, postoculars 2/2;

subpralabials 10/10, 4th – 6th supralabials entering orbit, eight largest; infralabials 9/9, 1st – 4th bordering chin shields; temporals 1 + 2, lower posterior one divided vertically; parietal touching upper postocular only; dorsal scales 17–17–17, smooth; ventral 156; cloacal undivided; subcaudal 94, divided.

Coloration in life: Dorsal surface brown with a vertebral series of small black spots; head with two black transverse bars, one behind the eyes, the other across the occiput, a black-edged white horizontal line present along the supralabials. Ventral cream to yellowish, side of each ventral shield with an outer black spot, anterior ventrals with a pair of median dots in addition.

Distribution: This is a widespread species known from Dien Bien and Ha Tinh provinces in the North southwards to Gia Lai and Lam Dong provinces [[2], 11, [34]]. Elsewhere: India, Nepal, China, Taiwan, Myanmar, Laos, Thailand, Cambodia, and Malaysia [[15]].



Figure 13. Common Many-tooth snake/*Sibynophis collaris*.

Subfamily Natricidae

Rhabdophis chrysargos (Schlegel, 1837)

Specklebelly keelback/Rắn hoa cỏ vàng (Figure 14).

Synonym:

Tropidonotus chrysargos Schlegel 1837

Tropidonotus junceus Cantor 1847

Natrix chrysarga Taylor 1922

Rhabdophis chrysarga Malnate 1960

Specimen examined (n = 2): One male (KCR.2023.214) and one female (VNMN 07961).

Description: The morphological characters of the specimen from Kon Chu Rang NR

agreed well with the description of Pope, Smith [[9], [10]]. TL 628–636 mm (SVL: 460–537 mm, TaL: 99–168 mm). Head indistinct from neck; nasal divided; eyes are large in size (ED 3.62–3.75 mm); round pupils; loreals 1/1, not in contact with eyes; preoculars 1/1, suboculars absent; postocular 3/3; anterior temporal scale 2/2; posterior temporal scale 2/3; subpralabials 9/9, largest scale 8/8; infralabials 10/10; dorsal scale rows 21–17–19, scales equal; ventral 155–160; cloacal single; subcaudal 78, divided.

Coloration in life: Dorsum black/brown with small dark and pale spots; forehead brown with dark streaks, light labials with black lines in each scale; neck yellow; venter white.

Notes: The specimen's KCR.2023. 214 tail was cut, but the wound healed.

Distribution: This is a widespread species known from Son La and Thanh Hoa provinces in the North southwards to Gia Lai and Dong Nai provinces [[2], [23]]. Elsewhere: Brunei, Indonesia, Philippines, Laos, Myanmar, Thailand, Cambodia, Malaysia, China [[15]].



Figure 14. Specklebelly keelback/*Rhabdophis chrysargos*.

Trimerodytes percarinatus (Zhao & Jiang, 1986).

Earsten water snake/Rắn hoa càn vằn đen (Figure 15).

Synonym:

Tropidonotus percarinatus Boulenger 1899

Natrix annularis percarinata Bourret 1935

Sinonatrix percarinata Rossman & Eberle 1977.

Specimen examined (n = 1): One female (KCR.2023. 102).

Description: The morphological characters of the specimen from Kon Chu Rang NR

agreed well with the description of Pope, Stuart et al., Nemes et al., and Hecht et al., [[9], [13], [14], [35]Error! Reference source not found.]. TL 343 mm, (SVL: 237 mm, TaL: 106 mm). Head indistinct from neck; nasal divided; round pupils; loreal 1/1, not in contact with eyes; preocular single, suboculars absent; postocular 3/3; anterior temporal scale 1/1; posterior temporal scale 2/2; subpralabials 9/9, largest scale 8/8; infralabials 9/9; dorsal scale rows 17–19–17, scales equal; ventral 130; cloacal single; subcaudal 63, divided.

Coloration in life: Dorsum reddish–brown with 21 orange bands, five orange bands on the tail; forehead brown with dark streaks; orange labials; venter yellow or olive.

Distribution: This is a widespread species known from Lao Cai and Lang Son provinces in the North southwards to Gia Lai and Dong Nai provinces [[2], [36]]. Elsewhere: Myanmar, Thailand, India, China, Taiwan [[15]].



Figure 15. Earsten water snake/*Trimerodytes percarinatus*.

Family Psammodynastidae

Psammodynastes pulverulentus (Boie, 1827).

Mock viper/Rắn hổ đất nâu (Figure 16).

Synonym:

Psammophis pulverulenta H. Boie in F. Boie 1827.

Dipsas ferruginea Cantor 1839

Lycodon bairdii Steindachner 1867

Specimen examined (n = 2): Two females (KCR.2023. 334; VNMN 07957).

Description: The morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of Pope, Smith,

Hecht et al., [[9], [10], [35]]. TL 416–452 mm in adult females, (SVL: 327–365 mm, TaL: 87–89 mm). Head indistinct from neck; nasal entire; eyes are medium in size (ED: 3.22–3.44 mm); vertical pupils; loreal 1/1, not in contact with eyes; preocular 2/2, suboculars absent; postocular 3/3; anterior temporal scale 1/1; posterior temporal scale 2/2; subpralabials 8/8; infralabials 8/8; dorsal scale rows 13–13–13, scales equal; ventral 165; cloacal single; subcaudal 52–57, divided.

Coloration in life: The head is distinctly triangular. On the top of the head, there are characteristic white and brown mottled patterns, extending to the neck. The jaw is highlighted by a white line running from the eye to the muzzle. The body and tail are dark brown, with interwoven light brown, gray, and white patterns extending to the tip of the tail. The belly is creamy brown.



Figure 16. Mock Viper/*Psammodynastes pulverulentus*.

Distribution: This is a widespread species known from Bac Kan and Quang Ninh provinces in the North southwards to Khanh Hoa province and Ho Chi Minh City [[2], [23]]. Elsewhere: Bangladesh, Myanmar, Cambodia, China, Hong Kong, India, Bhutan, Indonesia, Laos, Nepal, Bhutan, Philippines, Taiwan, Thailand, Malaysia [[15]].

Family Elapidae

Bungarus candidus (Linnaeus, 1758)

Blue krait snake/Rắn cạp nia nam (Figure 17).

Synonym:

Coluber candidus Linnaeus 1758

Specimen examined (n = 1): One male (KCR.2023. 38)

Description: Morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of Smith, Nguyen et al., [[10], [37]]. TL 1296 mm, (SVL: 1150 mm, TaL: 146 mm). Head indistinct from neck; nasal entire; eyes are medium in size (ED: 2.72 mm); round pupils; preocular 1/1, suboculars absent; postocular 2/2; anterior temporal scale 1/1; posterior temporal scale 2/2; subpralabials 7/7, largest scale 5/5; infralabials 7/7; dorsal scale rows 17–15–17, scales equal; ventral 221; cloacal single; subcaudal 50, divided.

Coloration in life: The back of the head is black. The head has no pattern. The main color of the body is dark brown with wide white bands interwoven to the end of the tail. The total number of black tapes is usually equal to that of white tapes. On the body, there are 20 gray bands and 21 black bands intertwined. At the tail, there are seven gray bands and nine black bands alternating. The belly is creamy yellow, without patterns.

Distribution: This is a widespread species in Central and Southern Vietnam, from Hoa Binh to Dong Nai provinces [[2]]. Elsewhere: Cambodia, Laos, Indonesia, Malaysia, Thailand [[2]].



Figure 17. Blue krait snake/*Bungarus candidus*.

Bungarus fasciatus (Schneider, 1801)

Banded krait/Rắn cạp nong (Figure 18).

Synonym:

Pseudoboa fasciata Schneider 1801

Bungarus annularis Daudin 1803

Specimen examined (n = 1): VNMN 07958

Description: The morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of Pope, Smith, Biakzual et al., [[9], [10], [38]]. TL

1515 mm (SVL: 1360 mm, TaL: 155 mm). Head indistinct from neck; nasal divided; eyes are medium in size (ED: 3.96 mm), round pupils; preocular 1/1, suboculars absent; postocular 2/2; anterior temporal scale 1/1; posterior temporal scale 2/2; subpralabials 7/7, largest scale 6/6; infralabials 7/7; dorsal scale rows 15–15–13, scales equal; ventral 214; cloacal single; subcaudal 36, single.

Coloration in the preserved specimen: The body has characteristic black and yellow bands (24 black and 13 yellow) that intertwine with each other, extending to the tip of the tail. The top of the head has a black pattern that extends down the body, creating the first black band for the body. The chin and infralabials are bright yellow. The belly has 22 black bands and 22 yellow bands interwoven.

Distribution: This is a widespread species known from Lao Cai and Lang Son provinces in the North southwards to Gia Laiu and Ca Mau provinces [[2]]. Elsewhere: Bangladesh, Brunei, Burma, Cambodia, China, India, Bhutan, Nepal, Indonesia, Laos, Macau, Malaysia, Singapore, Thailand [[15]].



Figure 18. Banded krait/*Bungarus fasciatus*.

Family Pareatidae

Pareas hamptoni (Boulenger, 1905)

Synonym:

Amblycephalus hamptoni Boulenger 1905

Amblycephalus tonkinensis Deuve 1961

Hampton's slug snake/Rắn ăn sên hampton (Figure 19).

Specimen examined (n = 4): Two males (KCR.2023. 104, 192) and one female (KCR.2023. 103)

Description: The morphological characters of the specimen from Kon Chu Rang (NR) agreed well with the description of Smith and Ziegler et al., [[10], [39]]. TL 585–618 mm in adult males (SVL: 430–449 mm, TaL: 155–169 mm), TL 558 mm (SVL: 429 mm, TaL: 129 mm) in adult female. Head distinct from neck; nasal entire; eyes are medium in size (ED: 2.62–2.7 mm); loreals 2/2; preocular 1/1; postoculars 1/1; anterior temporal scale 2/2; posterior temporal scale 2/3; subpralabials 8/8, largest scale 8/8; infralabials 7/7; dorsal scales rows 11–15–11, scales equal; ventrals 184–187; cloacal single; subcaudal 55–65, divided.

Coloration in life: Dorsum brown with 52 black bands, 15 brown bands on the tail; forehead brown with a dark streak, brown labials; venter white/yellow.

Notes: The specimen (KCR.2023. 192)'s tail was cut, but the wound healed.

Distribution: This is a widespread species known from Lao Cai and Thai Nguyen provinces in the North southwards to Gia Lai and Dong Nai provinces [[2], [20], [34]–[36]]. Elsewhere: Burma, China [[15]].



Figure 19. Hampton's slug snake/*Pareas hamptoni*.

Family Viperidae

Trimeresurus vogeli (David, Vidal & Pauwels, 2001)

Volgel's pit viper/Rắn lục vogel (Figure 20).

Specimen examined (n = 7): Four males (KCR.2023. 30, 36, 37, 61) and three females (KCR.2023. 32, 35, 149).

Description: The morphological characters of the specimen from Kon Chu Rang NR agreed well with the description of David et al., (2001, 2002) [[41]; [42]]. TL 669–755 mm (SVL: 540–615 mm, TaL: 119–145 mm) in

adult males, TL 629–735 mm (SVL: 525–590 mm, TaL: 104–145 mm) in adult female. Rostral visible from above, 1.5 times broader than high, triangular; nasal subrectangular, 2.1 times as long as high, undivided, with nostril in its middle; one pair of distinctly enlarged, curved (“bean-shaped”) internasal, 1.6 times as wide as deep, being about 1.8 times as long and about 1.2 times as wide as adjacent upper snout scales and separated by 2 small, triangular scales; 4/4 canthal scales bordering the canthus rostralis between the internasal and corresponding supraocular, slightly larger than adjacent snout scales; head distinct from neck; an elongated snout covered with rather small scales; eyes large with straight pupils; loreals pit between nostril and eyes; subpralabials 10/10; preocular 2/2; postoculars 3/3; infralabials 10/10; dorsal scales rows 21–17–13; scales equal; ventrals 160; cloacal single; subcaudal 55–69, divided.



Figure 20. Volgel's pit viper/*Trimeresurus vogeli*.

Coloration in life: Dorsum green with small light and pale spots; red-brick color on the top of the tail; triangular-shaped forehead; white postocular streak; light green labials with dark spots; two white lines across the body; venter green. Distribution: In Vietnam, this species is known from Ha Tinh, Quang Binh, Quang Tri, Thua Thien-Hue, Quang Nam, Kon Tum, Gia Lai, Dak Lak, Lam Dong [[2]]. Elsewhere: Thailand, Cambodia, Laos [[15]].

4. Result and Discussion

Our new record of six snake species brings the total number of snake species in Gia Lai Province to 63 (Table 2). The most diverse family is Colubriade with 49 recorded species, followed by Viperidae (five species), Elapidae (four species), Pareatinae (three species), Psammodynastidae and Xenodermidae (one species). The diversity of terrain, along with the hot and humid climate, creates good conditions for snakes to live and develop [[6]]. In addition to Kon Chu Rang NR, we also have statistics of species in protected areas in Gia Lai Province along with neighboring provinces that also receive a lot of attention. According to Hoang et al., [[43]] recorded 21 snake species (17 species belonging to Colubridae) in Kon Ka Kinh NP, Gia Lai Province. According to Jestrzanski et al., [[23]] recorded 16 snake species (12 species of Colubridae) in Chu Mon Ray NR, Kon Tum Province.

In addition, in the research, a new *Oligodon* species *Oligodon culaochamensis* was discovered and described by Nguyen et al., [[30]] based on samples collected in Cu Lao Cham island, Quang Nam Province. Two new *Lycodon* species *Lycodon anakradaya* and *L. cf. truongi* was discovered and described by Nguyen et al., [[28]] based on samples collected in Khanh Vinh district, Khanh Hoa Province. Research results have recorded the above species appearing for the first time in Gia Lai Province, thereby updating more information about the species distribution area for future research. Our observation of *Dryophiops rubescens* represents the second time record of the genus and species for Vietnam [[24]]. The discovery of *D. rubescens* in Kon Chu Rang NR is unexpected given that its herpetofaunal diversity is considered to be one of the best-known in southern Vietnam. Concerning the endemic species: *Boiga bourreti* in Vietnam, was so far only known from Quang Binh and Kon Tum. Pale-necked ringneck snake *Liopeltis pallidonuchalis* was discovered and described by Poyarkov et al., this species is only known from Gia Lai, Thua Thien-Hue, Da Nang Province, and is endemic in Vietnam. The new locality in Kon Chu Rang NR currently

represents the easternmost distributional limit of the species in the highlands, and the ecosystem and geographical location of Kon Chu Rang NR are closely related to the location where this species was first recorded. This

further underlines the role of Kon Chu Rang NR as a key territory for the preservation of herpetofaunal diversity in Vietnam.

Table 2. List of snake species recorded from Gia Lai Province, Vietnam

No.	Species name	English Name	Previous Record	IUCN (2024)	RBVN (2007)	Decree 84/2021	CITES 2023
	Family Pythonidae						
1.	<i>Python molurus</i> (Linnaeus, 1758)	Indian python	1, 2	NT	CR	IIB	I
2.	<i>Malayopython reticulatus</i> (Schneider, 1801)	Reticulated python	1		CR	IIB	II
	Family Colubridae						
3.	<i>Ahaetulla nasuta</i> (Lacepède, 1789)	Long-nosed whip snake	1				
4.	<i>A. prasina</i> (Boie, 1827)	Asian vine snake	1, 2, 3, 4, 6				
5.	<i>Boiga bourreti</i> Tillack, Ziegler & Khac Quyet, 2004*	Bourret's cat snake	1, 6	EN			
6.	<i>B. cyanea</i> (Duméril, Bibron & Duméril, 1854)	Green cat snake	1, 2, 3				
7.	<i>B. dendrophila</i> (Boie, 1827)	Gold-ringed cat snake	1				
8.	<i>B. drapiezii</i> (Boie, 1827)	White-spotted cat snake	1				
9.	<i>B. guangxiensis</i> Wen, 1998	Guangxi cat snake	1, 4, 6				
10.	<i>B. multomaculata</i> (Boie, 1827)	Many-spotted cat snake	1				
11.	<i>Calamaria gialaiensis</i> Ziegler, Nguyen & Nguyen, 2008	Gia lai reed snake	2				
12.	<i>C. lovii</i> Boulenger, 1887	Lowi's reed snake	1				
13.	<i>C. pavimentata</i> (Duméril, Bibron & Duméril, 1854)	Collared reed snake	3				
14.	<i>Coelognathus flavolineatus</i> (Schelegel, 1837)	Black copper rat snake	1				
15.	<i>C. radiatus</i> (Boie, 1827)	Radiated rat snakes	1, 2, 3, 4		VU		
16.	<i>Chrysopelea ornata</i> (Shaw, 1802)	Golden flying snake	1, 2				
17.	<i>Dendrelaphis ngansonensis</i> (Bourret, 1935)	Common nganson bronzeback snake	1, 2, 6				
18.	<i>D. pictus</i> (Gmelin, 1789)	Common bronzeback snake	1				
19.	<i>Dryophiops rubescens</i> (Gray, 1835)*	Red whip snake	6				
20.	<i>Elaphe taeniura</i> Cope, 1861	Beauty snake	1, 2	VU			
21.	<i>Gonyosoma oxycephalum</i> (Boie, 1827)	Red-tailed green ratsnake	1, 2				
22.	<i>G. prasinum</i>	Green trinket	1, 3				

	(Blyth, 1854)	snake					
23.	<i>Hypsiscopus plumbea</i> (Boie, 1827)	Boie's mud snake	1				
24.	<i>Liopeltis pallidonuchalis</i> (Günther, 1858)	Pale-necked ringneck snake	1, 4, 6				
25.	<i>Lycodon anakradaya</i> Nguyen, Duong, Wood & Grismer, 2022*	Rhade wolf snake	6				
26.	<i>L. cf. truongi</i> Nguyen, Duong, Wood & Grismer, 2022*	Truong's wolf snake	6				
27.	<i>L. fasciatus</i> (Anderson, 1879)	Banded wolf snake	1, 2, 4				
28.	<i>L. laonensis</i> (Günther, 1864)	Laotian wolf snake	1, 3				
29.	<i>L. subcinctus</i> (Boie, 1827)	Malayan banded wolf snake	5, 6				
30.	<i>Oligodon catenatus</i> (Blyth, 1855)	Assam kukri snake	1, 3				
31.	<i>O. cinereus</i> (Günther, 1864)	Günther's kukri snake	1				
32.	<i>O. culaochamensis</i> Nguyen, Nguyen, Nguyen, Phan, Jiang & Murphy, 2017*	Culaocham kukri snake	6				
33.	<i>O. chinensis</i> (Günther, 1888)	Chinese kukri snake	1				
34.	<i>O. fasciolatus</i> (Günther, 1864)	Fasciolated kukri snake	1				
35.	<i>Oreocryptophis porphyraceus</i> (Cantor, 1839)	Red bamboo snake	1, 2, 3		VU		
36.	<i>Pseudoxenodon macrops</i> (Blyth, 1855)	Big-eyed bamboo snake	1, 3, 4				
37.	<i>Ptyas korros</i> (Schlegel, 1837)	Javan rat snake	1, 3	NT	EN		
38.	<i>P. mucosa</i> (Linnaeus, 1758)	Oriental ratsnake	1		EN	IIB	II
39.	<i>P. multicineta</i> (Roux, 1907)	Many-banded green snake	1, 6				
40.	<i>Sibynophis collaris</i> (Gray, 1853)	Common many-tooth snake	1, 6				
41.	<i>S. geminatus</i> (Boie, 1826)	Boie's many-tooth snake	1				
	Subfamily Natricinae						
42.	<i>Amphiesma stolatum</i> (Linnaeus, 1758)	Buff striped keelback snake	1, 3				
43.	<i>Hebius khasiensis</i> (Boulenger, 1890)*	Khasi hills keelback snake	6				
44.	<i>H. modestus</i> (Günther, 1875)	Modest keelback snake	1				
45.	<i>H. boulengeri</i>	Boulenger's	1, 2, 4				

	(Gressitt, 1937)	keelback snake					
46.	<i>Opisthotropis daovantieni</i> (Orlov, et al., 1998)	Tien's mountain stream snake	1	NT			
47.	<i>Rhabdophis chrysagos</i> (Schlegel, 1837)	Specklebelly keelback snake	1, 6				
48.	<i>R. subminiatus</i> (Schlegel, 1837)	Red-necked keelback	1, 2, 3				
49.	<i>Trimerodytes percarinatus</i> (Boulenger, 1899)	Olive annulate keelback snake	1, 6				
	Psammodynastidae						
50.	<i>Psammodynastes pulverulentus</i> (Boie, 1827)	Common mock viper	1, 2, 3, 4, 6				
	Family Elapidae						
51.	<i>Bungarus candidus</i> (Linnaeus, 1758)	Blue krait snake	1, 3, 4, 6				
52.	<i>B. fasciatus</i> (Schneider, 1801)	Banded krait snake	1, 2, 3, 4, 6		EN		
53.	<i>Calliophis intestinalis</i> (Laurenti, 1768)	Banded malaysian coral snake	1				
54.	<i>Naja siamensis</i> (Laurenti, 1768)	Indo-chinese spitting cobra	1	VU		IIB	II
	Family Pareidae						
55.	<i>Pareas carinatus</i> (Wagler, 1830)	Keeled slug snake	1, 3				
56.	<i>P. hamptoni</i> (Boulenger, 1905)	Hampton's slug snake	1, 2, 4, 6				
57.	<i>P. margaritophorus</i> (Jan, 1866)	Mountain slug snake	1				
	Family Viperidae						
58.	<i>Calloselasma rhodostoma</i> (Kuhl, 1824)	Malayan pit viper	1				
59.	<i>Protobothrops mucrosquamatus</i> (Cantor, 1839)	Brown spotted pit viper	1				
60.	<i>Ovophis monticola</i> (Günther, 1864)	Chinese mountain pit viper	1, 2, 3				
61.	<i>Trimeresurus albolabris</i> (Gray, 1842)	White-lipped tree viper	1				
62.	<i>T. vogeli</i> (David, Vidal & Pauwels, 2001)	Vogel's pit viper	1, 6				
	Family Xenodermidae						
63.	<i>Fimbrios klossi</i> Smith, 1921	Bearded snake	1				

Data sources: 1: Nguyen et al., [[2]]; 2: Hoang et al., [[43]]; 3: Cuong et al., [[44]]; 4: Nguyen et al., [[6]]; 5: Do et al., [[45]]; 6: This study. Decree 84 (2021) = Governmental Decree No 84/2021/ND-CP dated 22 September 2021 by the Government of Vietnam on the management of endangered wild flora and fauna. Group IB: prohibited exploitation and use for commercial purposes and Group IIB: limited exploitation and use for commercial purposes; RBVN (2007) = Vietnam Red Data Book. Part I. Animals. Descriptions of nationally endangered species of wild animals. CR = Critically Endangered, EN = Endangered, VU = Vulnerable; IUCN (2024) = The IUCN Red List of Threatened Species. CR = Critically Endangered, EN = Endangered,

VU = Vulnerable, LR/NT = Lower Risk/Near Threatened, CITES (2023) = Convention on International Trade in Endangered Species of Wild Fauna and Flora. Appendice I = Species that are threatened with extinction and are prohibited from international trade, except under exceptional circumstances, Appendice II = Species that are not necessarily threatened with extinction but may become so unless trade is strictly regulated. Trade is allowed but is subject to controls and monitoring; * new provincial record.

The province also contains several species of conservation concern. Six species are listed in the IUCN Red List [[46]]: *Python molurus*, *Boiga bourreti*, *Elaphe taeniura*, *Opisthotropis daovantieni*, *Naja siamensis*, *Ptyas korros*; seven species are listed in the Red Data Book of Vietnam [[47]]: *Python molurus*, *Malayopython reticulatus*, *Coelognathus radiatus*, *Bungarus fasciatus*, *Oreocryptophis porphyraceus*, *Ptyas korros*, and *P. mucosa*; four species are listed in the Vietnam Governmental Decree No. 84/2021/ND-CP [[48]]: *Python molurus*, *Malayopython Reticulatus*, *Ptyas mucosa*, and *Naja siamensis*; four species are listed in the CITES [[49]]: *Python molurus*, *Malayopython reticulatus*, *Ptyas mucosa*, and *Naja siamensis* (see Table 2).

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