

# AN UPDATED CHECKLIST OF SNAKES FROM NAM DONG ENDANGERED GYMNOSPERM CONSERVATION AREA, THANH HOA PROVINCE

Ha Van Nghia<sup>1,\*</sup>, Dong Thanh Hai<sup>1</sup>, Ha Van Ngoan<sup>2</sup>,

Do Quoc Tuan<sup>1</sup>, Ngo Anh Son<sup>3</sup>, Luu Quang Vinh<sup>1</sup>, Hoang Thiet Lam<sup>1</sup>, Bui Van Khoan<sup>4</sup>

<sup>1</sup> Faculty of Forest Resources and Environmental Management, Vietnam National University of Forestry

<sup>2</sup> Save Vietnam's Wildlife, Cuc Phuong Commune

<sup>3</sup> Faculty of Forestry, Bac Giang Agriculture and Forestry University

<sup>4</sup> Cuc Phuong National Park, Cuc Phuong Commune

\* Email: nghiahtq@gmail.com

## ABSTRACT

Five field surveys were conducted in the Nam Dong Endangered Gymnosperm Conservation Area, Thanh Hoa province in 2022, 2023 and 2024. As a result of our field work, we identified a total of 40 species of snakes (25 genera, 6 families). Our findings increase the number of snake species recorded in the study area to 43, belonging to 27 genera and 8 families. Seven species were recorded for the first time from this protected area, with three species being new records to Thanh Hoa province, namely Günther's Reed Snake (*Liopeltis frenata*), Fasciolated Kukri Snake (*Oligodon fasciolatus*) and Green Keelback (*Rhabdophis nigrocinctus*). In terms of conservation status, seven species are listed in the IUCN Red List (2024), the Vietnam Red Data Book (2007), and Governmental Decree No. 84/2021/ND-CP.

**Keywords:** Snakes, morphology, Nam Dong, conservation, karst.

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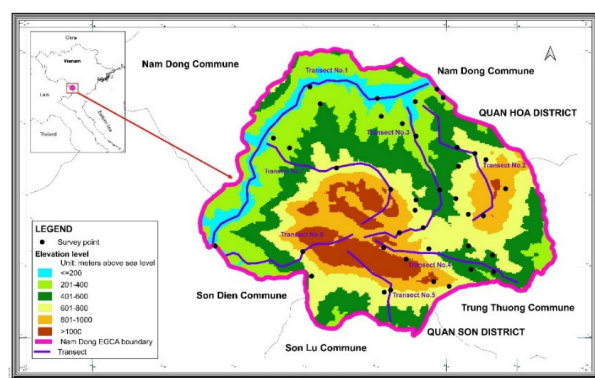
## 1. INTRODUCTION

Nam Dong Endangered Gymnosperm Conservation Area (EGCA) was established by the People's Committee of Thanh Hoa Province according to Decision No. 87/QĐ-UBND issued on 8<sup>th</sup> January 2014 [1]. This conservation area has a total area of 646.4 hectares and is located in Nam Dong Commune, Quan Hoa district, Thanh Hoa province. The topography of EGCA is characterized by limestone karst forest at elevations from 100 meters in the buffer zone to 1100 meters above sea level (masl.) in the core zone. According to Dong *et al.* (2017) [2], there were 15 species of snakes belonging to 6 families distributed within the study area. In 2022, an updated checklist by Luu documented 30 species of 5 families in EGCA. This study aims to investigate the snake fauna in Nam Dong EGCA and assess the conservation status of snake

species in the study area.

## 2. MATERIALS AND METHODS

Five field surveys were conducted in March, April, May, September, and October of 2022, 2023 and 2024. The survey transects were set up in different habitat types and elevations, and field excursions were carried out between 9 AM and 11 PM (Fig. 1). For large and venomous snakes, snake tongs were used, while small and non-venomous species were collected by hand. The captured snakes were placed in cloth bags. After photographed and measured using different morphological characteristics (snout - vent length, tail length), individuals of common species were released back into the wild, while unidentified specimens were retained as specimens. These specimens were anesthetized, labeled, fixed, and preserved in 70% alcohol.



**Figure 1. Map showing the survey sites and transects in Nam Dong EGCA**

Measurements were taken after preservation with a measuring tape. The number of ventral scales was counted according to Dowling (1951) [3]. The numbers of dorsal scale rows were given at one head length behind head, at midbody and at one head length before vent, respectively. Scalation was examined by using stereo microscopes (Leica S6E; Swift SM102). Bilateral scale counts were given as left/right. Abbreviations used for morphometry 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 the tip of the snout to the angle of the jaws); HW: Head width (widest part of the head); DSR: Formula of dorsal scale rows reduction; VEN: Ventrals (number of ventral plates); SC: Subcaudals (number of subcaudal scales); SL: Supralabials (number of supralabial

scales); IL: Infralabials (number of infralabial scales).

Taxonomic identifications of the specimens were determined based on the following studies: Smith (1943) [4], Dowling (1951) [3], Nguyen (2007) [5], Nguyen *et al.* (2009) [6], Das (2010) [7], Pham *et al.* (2014) [8], Nguyen *et al.* (2016) [9], Dong *et al.* (2017) [2], Dau *et al.* (2019) [10], Luu *et al.* (2020) [11], David and Vogel (2021) [12], Smart *et al.* (2021) [13], Luu (2022) [14]. For common names, we followed Nguyen *et al.* (2009) [6] and Uetz *et al.* (2024) [15].

Assessing the conservation status of snake species found in Nam Dong EGCA was based on Vietnam Red Data Book (2007) [16], IUCN Red List (2024) [17], Governmental Decree No. 64/2019/ND-CP [18], and Governmental Decree No. 84 /2021/ND-CP [19].

### 3. RESULTS

#### 3.1. The updated list of snakes

Based on collected specimens and captured individuals, we identified 40 snake species belonging to 25 genera and 6 families. Combined with records documented in previous studies in the study area [2], [14], the list of snake species in Nam Dong EGCA is updated to 43 species of 27 genera, 8 families. Among them, the Colubridae family is the most diverse with 29 species and 16 genera, accounting for 67.4% and 59.3% of the total number of species and genera, respectively, recorded in Nam Dong EGCA (Table 1).

**Table 1. Updated list of snake species recorded in Nam Dong EGCA**

| No.                     | Scientific name                            | English name         | Source  | IUCN 2024 | VRDB 2007 | De.84 |
|-------------------------|--------------------------------------------|----------------------|---------|-----------|-----------|-------|
| I. Family Pythonidae    |                                            |                      |         |           |           |       |
| 1                       | <i>Python bivittatus</i> Kuhl, 1820        | Burmese Python       | 2       | VU        | CR        | IIB   |
| II. Family Xenopeltidae |                                            |                      |         |           |           |       |
| 2                       | <i>Xenopeltis unicolor</i> Reinwardt, 1827 | Sunbeam Snake        | 2       |           |           |       |
| III. Family Colubridae  |                                            |                      |         |           |           |       |
| 3                       | <i>Ahaetula prasina</i> (Boie, 1827)       | Gunther's whip snake | 1, 2, 3 |           |           |       |

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|    |                                                      |                                   |         |    |    |  |
|----|------------------------------------------------------|-----------------------------------|---------|----|----|--|
| 4  | <i>Boiga bourreti</i> Tillack, Ziegler & Le, 2004    | Bourret's Cat Snake               | 1, 3    | EN |    |  |
| 5  | <i>Boiga guangxiensis</i> Wen, 1998                  | Guangxi Cat Snake                 | 1, 2, 3 |    |    |  |
| 6  | <i>Boiga multomaculata</i> (Boie, 1827)              | Many-spotted Cat Snake            | 1, 3    |    |    |  |
| 7  | <i>Calamaria septentrionalis</i> Boulenger, 1890     | Hong Kong Dwarf Snake             | 1, 3    |    |    |  |
| 8  | <i>Coelognathus radiatus</i> (Boie, 1827)            | Radiated Ratsnakes                | 1, 2    |    | VU |  |
| 9  | <i>Dendrelaphis ngansonensis</i><br>(Gmelin, 1789)   | Nganson Bronzeback                | 1, 3    |    |    |  |
| 10 | <i>Dendrelaphis pictus</i> (Gmelin, 1789)            | Common Bronze-back                | 1, 3    |    |    |  |
| 11 | <i>Fowlea flavipunctata</i> (Hallowell, 1860)        | Yellow-Spotted Keelback           | 1, 2    |    |    |  |
| 12 | <i>Gonyosoma boulengeri</i> (Mocquard, 1897)         | Rhinoceros Snake                  | 1, 3    |    |    |  |
| 13 | <i>Gonyosoma coeruleum</i> (Blyth, 1854)             | Green tree snake                  | 1, 3    |    | VU |  |
| 14 | <i>Hebius khasiense</i> (Boulenger, 1890)            | Khasi Hills Keelback              | 1, 3    |    |    |  |
| 15 | <i>Liopeltis frenata</i> (Günther, 1858)             | Günther's Reed Snake**            | 1       |    |    |  |
| 16 | <i>Lycodon flavaxonatus</i> (Pope, 1928)             | Yellow-Banded Big Tooth Snake     | 1, 3    |    |    |  |
| 17 | <i>Lycodon futsingensis</i> (Pope, 1928)             | Futsing Wolf Snake                | 1, 3    |    |    |  |
| 18 | <i>Lycodon meridionalis</i> (Bourret, 1935)          | Vietnamese Big-toothed Wolf Snake | 1, 3    |    |    |  |
| 19 | <i>Lycodon chapaensis</i><br>(Angel & Bourret, 1933) | Namdong Wolf Snake                | 1, 3    |    |    |  |
| 20 | <i>Lycodon ruhstrati</i> (Fischer, 1886)             | Mountain Wolf Snake*              | 1       |    |    |  |
| 21 | <i>Lycodon subcinctus</i> Boie, 1827                 | Malayan Banded Wolf Snake         | 1, 3    |    |    |  |
| 22 | <i>Oligodon cyclurus</i> (Cantor, 1839)              | Cantor's Kukri Snake              | 1, 3    |    |    |  |
| 23 | <i>Oligodon fasciolatus</i> (Günther, 1864)          | Fasciolated Kukri Snake**         | 1       |    |    |  |
| 24 | <i>Ptyas korros</i> (Schlegel, 1837)                 | Chinese Ratsnake                  | 1, 2, 3 | NT | EN |  |
| 25 | <i>Ptyas multicincta</i> (Roux, 1907)                | Many-banded Green Snake           | 1, 2, 3 |    |    |  |
| 26 | <i>Rhabdophis helleri</i> (Schmidt, 1925)            | Heller's Red-necked               | 1       |    |    |  |

|    |                                                     |                             |         |    |    |     |
|----|-----------------------------------------------------|-----------------------------|---------|----|----|-----|
|    |                                                     | Keelback*                   |         |    |    |     |
| 27 | <i>Rhabdophis nigrocinctus</i> (Blyth, 1856)        | Green Keelback**            | 1       |    |    |     |
| 28 | <i>Rhabdophis siamensis</i> (Mell, 1931)            | Siamese red-necked keelback | 1, 3    |    |    |     |
| 29 | <i>Sibynophis chinensis</i> (Günther, 1889)         | Chinese Many-tooth Snake    | 1, 3    |    |    |     |
| 30 | <i>Trimerodytes percarinatus</i> (Boulenger, 1899)  | Olive Annulate Keelback     | 1, 3    |    |    |     |
| 31 | <i>Xenochrophis trianguligerus</i> (Boie, 1827)     | Triangle Keelback           | 1, 2    |    |    |     |
|    | IV. Family Elapidae                                 |                             |         |    |    |     |
| 32 | <i>Bungarus fasciatus</i> (Schneider, 1801)         | Banded Krait                | 1, 2, 3 |    | EN |     |
| 33 | <i>Bungarus multicinctus</i> Blyth, 1861            | Many-banded Krait           | 1, 2, 3 |    |    |     |
| 34 | <i>Naja atra</i> Cantor, 1842                       | Chinese Cobra*              | 1       | VU | EN | IIB |
| 35 | <i>Sinomicrurus maccllellandi</i> (Reinhardt, 1844) | MacClelland's Coral Snake*  | 1       |    |    |     |
|    | V. Family Homalopsidae                              |                             |         |    |    |     |
| 36 | <i>Hypsiscopus plumbea</i> (Boie, 1827)             | Boie's Mud Snake            | 1, 2    |    |    |     |
|    | VI. Family Pareidae                                 |                             |         |    |    |     |
| 37 | <i>Pareas carinatus</i> (Boie, 1828)                | Keeled Slug Snake           | 1, 3    |    |    |     |
| 38 | <i>Pareas hamptoni</i> (Boulenger, 1905)            | Hampton's Slug Snake        | 1, 3    |    |    |     |
| 39 | <i>Pareas margaritophorus</i> (Jan, 1866)           | Mountain Slug Snake         | 1, 2, 3 |    |    |     |
|    | VI. Family Typhlopidae                              |                             |         |    |    |     |
| 40 | <i>Indotyphlops braminus</i> (Daudin, 1803)         | Flowerpot Snake             | 1, 3    |    |    |     |
|    | VIII. Family Viperidae                              |                             |         |    |    |     |
| 41 | <i>Ovophis tonkinensis</i> (Bourret, 1934)          | Tonkin pitviper             | 1, 2, 3 |    |    |     |
| 42 | <i>Protobothrops mucrosquamatus</i> (Cantor, 1839)  | Brown spotted pitviper      | 1, 3    |    |    |     |
| 43 | <i>Trimeresurus albolabris</i> Gray, 1842           | White-lipped Tree Viper     | 1, 3    |    |    |     |
|    | Total                                               |                             |         | 4  | 6  | 2   |

Note: \*\* New record for Thanh Hoa province; \* New record for Nam Dong EGCA; Source: 1- This study, 2 - Dong et al. (2017) [2], 3 - Luu (2022) [14]; Conservation status: VRDB 2007: Vietnam Red Data Book (2007) [16], IUCN 2024: IUCN Red List (2024) [17], De. 84: Decree No. 84/2021/NĐ-CP [19]. NT: Near Threatened; VU: Vulnerable; EN: Endangered; CR: Critically Endangered.

We recorded seven species for the first time, and three of them represent new records for Thanh Hoa province. Morphological and ecological characteristics of newly recorded species are described as follows:

**3.1.1. *Liopeltis frenata* (Günther, 1858)**

English name: Günther's Reed Snake.

Vietnamese name: Rắn đại má.

Specimen examined (n=1): A female HVN.23.056 (SVL 375 mm, TaL 174 mm) collected by HVN *et al.* on 28 March 2023 in Nam Dong EGCA, Quan Hoa district (20°19'47"N/104°55'03"E, elevation 718 meters above sea level (masl.)).

Description: Morphological characters of the specimen agreed well with the descriptions of Smith (1943) [4], Nguyen (2007) [5], Das (2010) [7], Pham *et al.* (2014) [8]: Body slender and cylindrical; head distinct from neck; HL 15.9 mm; HW 8.9 mm; single internasal 1.55 mm; prefrontals 1.59 mm; DSR 15-15-15; 158 VEN; 102 SC, paired; single rostral; 1 loreal; 7 SL, third and fourth in contact with the eye, fifth longest; 8 IL, first four infralabials in contact with the first pair of chin shields; 1 preocular; 2 postoculars; temporals 2 + 2 (left), 3 + 2 (right); anal divided.

Coloration in life: Dorsum brownish - olive with scales edged with black and sometimes also with white, forming longitudinal stripes on anterior half of body. There are a total of 6 black stripes, of which 2 lines start from the eyes down to the middle of the body; 2 lines start from the edge of the 4<sup>th</sup> and 5<sup>th</sup> ventral scales run along both sides down to the middle of the body; the other 2 lines start from both sides of the neck between the 11<sup>th</sup> and 13<sup>th</sup> ventral scales and run down the middle of the body and gradually fade; 2 small black lines originate from the 25<sup>th</sup> and 26<sup>th</sup> ventral scales down the middle of the body. Supralabials and venter cream.

Ecological notes: The specimen was collected at 19:11 on ground. The surrounding habitat was limestone forest with environment temperature of 26.9°C and air humidity of 70.9%.

Distribution: In Vietnam, this species has been reported from Lao Cai, Quang Binh, Da Nang, Gia Lai and Dong Nai provinces. This is the first

record of *Liopeltis frenata* from Thanh Hoa province. Elsewhere, the species has been reported from India, China, Myanmar and Laos [6].

Remark: The specimen from Nam Dong EGCA has 158 VEN and 102 SC, different from those in description of Pham *et al.* (2014) [8], which have 144 - 149 VEN and 94 - 100 SC.

**3.1.2. *Lycodon ruhstrati* (Fischer, 1886)**

English name: Mountain Wolf Snake.

Vietnamese name: Rắn khuyết ấn.

Specimen examined (n=1): A juvenile female HVN.23.025 (SVL 199 mm, TaL 29 mm) collected by HVN *et al.* on 25<sup>th</sup> March 2023 in Nam Dong EGCA, Quan Hoa District (20°19'52"N/104°54'38"E, 554 masl.).

Description: Morphological characters of the specimen agreed well with the descriptions of Das (2010) [7], Luu *et al.* (2020) [11]: Head flattened, distinct from neck; HL 9.82 mm; HW 5.57 mm; 8 SL, III-V contact orbit, seventh longest; 9 IL, first four infralabials in contact with the first pair of chin shields; DSR 19-19-15; 207 VEN, smooth; 112 SC, paired; anal entire.

Coloration in life: Dorsum black with large, non-uniform white bands. One white band on the head, starting from the anterior temporal scales and extending to the posterior corner of the jawbone. The body has 24 white bands that become gradually narrower on the dorsum and wider on the venter. From the sixth band onwards, black dots appear on the white bands. Thirteen white bands are located on the tail, starting from the vent to the tip, which also have black dots. Twenty - five wide black bands are present on the body and 12 on the tail. These bands are not closed on the upper body but nearly closed on the lower body and tail. Venter gray.

Ecological notes: The specimen was collected at 22:08 on ground. The surrounding habitat was limestone forest with environment temperature of 28.8°C and air humidity of 76.8%.

Distribution: In Vietnam, this species has been reported from Lao Cai province southwards to Da Nang city. This is the first record of *L. ruhstrati* from Nam Dong EGCA. Elsewhere, the species

has been reported from China, Myanmar, Laos, Japan [6].

### 3.1.3. *Oligodon fasciolatus* (Günther, 1864)

English name: Fasciolated Kukri Snake.

Vietnamese name: Rắn khiếm đuôi vòng.

Specimens examined (n=2): A female HVN.23.050 (SVL 742 mm, TaL 145 mm) and a female HVN.23.052 (SVL 659 mm, TaL 132 mm) collected by HVN *et al.* on 27<sup>th</sup> March 2023 in Nam Dong EGCA, Quan Hoa district (20°19'45"N/104°55'01"E, 665 masl. and 20°19'46"N/104°54'55"E, 653 masl.).

Description: Morphological characters of two specimens agreed well with the descriptions of Smith (1943) [4], Das (2010) [7], Nguyen (2007) [5]: head distinct from neck; HL 23.11 - 37.56 mm; HW 17.68 - 19.20 mm; 8 SL, fourth and fifth in contact with the eye, sixth longest; 9 IL, first four infralabials in contact with the first pair of chin shields; DSR 21-21(19)-17; 178 VEN; 51 - 53 SC, paired; anal entire.

Coloration in life: Dorsum yellowish-olive with darker stripe along body; two darker brown stripes along the dorsum to the end of the tail, the nape section is connected to form a U shape, one strip extending to the parietal scale to form a Y shape, two stripes on the sides are thinner and lighter, extending over the body and ending at the anal. One dark strip extends from supralabials V-VI, through orbit, supraocular to frontal scales.

Ecological notes: The specimen was collected at 20:01 - 20:39 on ground. The surrounding habitat was limestone forest with environment temperature of 26.3 - 26.8°C and air humidity of 78.8 - 80.3%.

Distribution: In Vietnam, this species has been reported from Lai Chau to Ca Mau provinces. This is the first record of *O. fasciolatus* from Thanh Hoa province. Elsewhere, the species has been reported from Myanmar, Laos, Thailand and Cambodia [6].



**Figure 2. New records of snake species for Thanh Hoa province and Nam Dong EGCA**

a: Günther's Reed Snake (*Liopeltis frenata*); b: Mountain Wolf Snake (*Lycodon ruhstrati*); c: Fasciolated Kukri Snake (*Oligodon fasciolatus*); d: Heller's Red-necked Keelback (*Rhabdophis helleri*); e: Green Keelback (*Rhabdophis nigrocinctus*); f: Chinese Cobra (*Naja atra*); g: MacClelland's Coral Snake (*Sinomicrurus macclellandi*).

### 3.1.4. *Rhabdophis helleri* (Schmidt, 1925)

English name: Heller's Red-necked Keelback.

Vietnamese name: Rắn hoa cỏ heller.

Specimens examined (n=2): A female HVN.23.043 (SVL 625 mm, Tal 209 mm) collected by HVN *et al.* on 27th March 2023 (20°20'34"N/ 104°53'57"E, 246 masl.) and a female HVN.23.090 (SVL 625 mm, Tal 209 mm) collected on 20<sup>th</sup> September 2023 (20°20'20"N/ 104°53'24"E, 268 masl.) in Nam Dong EGCA, Quan Hoa district.

Description: Morphological characters of two specimens agreed well with the descriptions of Das (2010) [7], David and Vogel (2021) [12]: Body moderate; head distinct from neck; HL 23.14 - 28.24 mm; HW 11.89 - 16.07 mm; single loreal, incontact with eyes; one preocular; three postocular; temporal 2 + 3/4; 8 - 9 SL, supralabials III - IV - V or IV, V, VI in contact with eyes, sixth or seventh longest; 10 IL, first five infralabials in contact with the first pair of chin shields; DSR 17 - 19 (17) - 17 (15), smooth; 158 - 160 VEN; 85 SC, paired; anal entire.

Coloration in life: Dorsum olive - brown; the nape, top and sides down to the venter are dark blue or dark green; the back of the neck, the top and sides of the neck are red; venter cream; throat light cream.

Ecological notes: One specimen was collected while crawling on the ground, and the other specimen was found sleeping on a tree branch 2.1 meters above the ground. The surrounding habitat was plantation adjacent to the natural forest. Temperature and humidity were between 27.2 - 28.1°C and 71.7 - 78.2%, respectively.

Distribution: In Vietnam, this species has been reported from Bac Giang, Bac Kan, Bac Ninh, Cao Bang, Ha Giang, Hai Duong, Hoa Binh, Lang Son, Lao Cai, Phu Tho, Quang Ninh, Son La, Thanh Hoa, Vinh Phuc, Yen Bai provinces and Ha Noi city. This is the first record of *R. helleri* from Nam Dong EGCA. Elsewhere, the species has been reported from Nepal, India, Bangladesh, China, Myanmar and Laos [6], [12].

### 3.1.5. *Rhabdophis nigrocinctus* (Blyth, 1856)

English name: Green Keelback.

Vietnamese name: Rắn hoa cỏ đại.

Specimen examined (n=1): One juvenile male HVN.23.121 (SVL 340 mm, Tal 131 mm) collected by HVN *et al.* on 23<sup>rd</sup> October 2023 in Nam Dong EGCA, Quan Hoa district (20°20'40"N/ 104°54'28"E, 295 masl.).

Description: Morphological characters of the specimen agreed well with the descriptions of Smith (1943) [4], Das (2010) [7], Nguyen (2007) [5]: Body moderate, cylindrical; head distinct from neck; loreal present; single preocular; 3 postoculars; temporals 2/3 + 2/2; TL 471 mm; Tal/TL 0.28; HL 15.12 mm; HW 9.20 mm; internasal 1.36 mm; prefrontal 1.65 mm; 9 SL, IV, V, VI in contact with eyes, seventh longest; 10 IL, first five infralabials in contact with the first pair of chin shields; DSR 19-19-17, keeled; 165 VEN; 92 SC, paired; anal divided.

Coloration in life: Dorsum olive - green, turning browner posteriorly. The sides of the body and tail have indistinct, narrow black cross - bars that may connect to the edge of the venter. Head dark brown with black lines. The chin, throat, and venter white, turning grayish towards the rear and the undertail is dark gray with white margins.

Ecological notes: The specimen was collected at 14:25 on ground. The surrounding habitat was mixed bamboo - wood forest on soil mountain with environment temperature of 24.1°C and air humidity of 75.5%.

Distribution: In Vietnam, this species has been reported from Dien Bien, Son La, to Nghe An provinces. This is the first record of *R. nigrocinctus* from Thanh Hoa province. Elsewhere, the species has been reported from China, Myanmar, Laos, Thailand, Cambodia [6].

### 3.1.6. *Naja atra* (Cantor, 1842)

English name: Chinese Cobra.

Vietnamese name: Rắn hổ mang trung quốc.

Specimen examined (n=1): A female HVN.22.003 (SVL 1,106 mm, Tal 159 mm) on 25 September 2023 in Nam Dong EGCA, Quan Hoa district (20°20'18"N/104°53'56"E, 170 masl.).

Description: Morphological characters of the specimen agreed well with the descriptions of Nguyen (2007) [5], Das (2010) [7]: Body moderate; head large, distinct from neck; hood short; single preocular; two postoculars; TL 1,265 mm; TaL/TL 0.13; internasal 3.70 mm; prefrontals 5.64 mm; HL 40.43 mm; HW 25.74 mm; 7 SL, third and fourth in contact with the eye, seventh longest; 8 IL, first four infralabials in contact with the first pair of chin shields; temporals 3/2 + 8/7; DSR 23-21-15, smooth; 193 VEN; 48 SC, paired; anal entire.

Coloration in life: Dorsum dark brown. The neck has a black circle, in the middle are 2 black spots, clearly visible when stretching the neck (horizontally, to the sides). Edges of the ventral scales pale yellow; 1<sup>st</sup> - 15<sup>th</sup> ventrals yellow, 21<sup>st</sup> - 27<sup>th</sup> ventrals yellow with a few scattered black dots, 20<sup>th</sup> - 26<sup>th</sup> and 28<sup>th</sup> - 57<sup>th</sup> ventrals lighter black, from the 58<sup>th</sup> ventral scale to the subcaudals black.

Ecological notes: The specimen was collected at 16:30 on ground. The surrounding habitat was plantation forest with environment temperature of 25.9°C and air humidity of 80.7%.

Distribution: In Vietnam, this species has been reported from Lao Cai, Tuyen Quang to Quang Tri and Thua Thien Hue provinces. This is the first record of *N. atra* from Nam Dong EGCA. Elsewhere, the species has been reported from China and Laos [6].

### 3.1.7. *Sinomicrurus macclellandi* (Reinhardt, 1844)

English name: MacClelland's Coral Snake.

Vietnamese name: Rắn lá khô thường.

Specimen examined (n=1): A female HVN.23.122 (SVL 365 mm, TaL 47 mm) collected by HVN et al. on 20<sup>th</sup> May 2023 in Nam Dong EGCA, Quan Hoa district (20°20'15"N; 104°54'3"E, 334 masl.).

Description: Morphological characters of the specimen agreed well with the descriptions of Smith (1943) [4], Nguyen (2007) [5], Das (2010) [7], Smart et al. (2021) [13]: Body slender,

cylindrical; head short and rounded; single preocular; two postoculars; midbody scale rows 13, smooth; 7 SL, supralabials II-III contact orbit, IV longest; 6 IL, first three infralabials in contact with the first pair of chin shields; 209 VEN; 33 SC, paired; anal divided.

Coloration in life: Top of head black; one white strip from postoculars to the nape of the neck. Dorsum reddish - brown with 30 narrow black bands on body, 3 bands on tail, the bands wider on venter (from 2 - 3 ventral scales). Venter light yellow, shiny with 27 wide black stripes alternating with 27 black bands on body. Three black strips between 3 bands on tail and 1 strip after anal.

Ecological notes: The specimen was collected at 13:49 on ground, under dry leaves. The surrounding habitat was agricultural area with environment temperature of 23.0°C and air humidity of 68.0%.

Distribution: In Vietnam, this species has been reported from Lao Cai southwards to Quang Binh provinces. This is the first record of *S. macclellandi* from Nam Dong EGCA. Elsewhere, the species has been reported from India, Nepal, Bangladesh, Bhutan, Thailand, Myanmar, China, Japan [6], [13].

### 3.2. Conservation status of snake species in the Nam Dong EGCA

Among 43 recorded species, four species are listed in the IUCN Red List (2024) [17]: *Boiga bourreti* (Endangered), *Python bivittatus* (Vulnerable), *Naja atra* (Vulnerable) and *Ptyas korros* (Near Threatened); six species are listed in the Vietnam Red Data Book (2007) [16]: *Python bivittatus* (Critically Endangered), *Ptyas korros* (Endangered), *Bungarus fasciatus* (Endangered), *Naja atra* (Endangered), *Coelognathus radiatus* (Vulnerable), *Gonyosoma coeruleum* (Vulnerable); and two species are listed in the Governmental Decree No. 84/2021/ND-CP [19]: *Python bivittatus* and *Naja atra* (Group IIB), see Table 1. In addition, two species, *Boiga bourreti* and *Gonyosoma coeruleum* are endemic to Vietnam.

#### 4. DISCUSSION

The Red-necked Keelback (*Rhabdophis subminiatus*) previously recorded in Vietnam has been re-identified as the Siamese red-necked keelback (*Rhabdophis siamensis*) [12]. According to Dong *et al.* (2017) [2], the Jasper Cat Snake *Boiga jaspidea* (Duméril, Bibron & Duméril, 1854) and Chinese Mountain Pit Viper *Ovophis monticola* (Günther, 1864) were recorded in the area. However, our examination of preserved specimens in Nam Dong EGCA showed that they are actually *Boiga multomaculata* (Boie, 1827) and *Ovophis tonkinensis* (Bourret, 1934). Therefore, we excluded *B. jaspidea* and *O. monticola* from the list of snakes of Nam Dong EGCA.

#### 5. CONCLUSION

Our research has updated the checklist of snake fauna in Nam Dong EGCA to 43 species belonging to 8 snake families, including an addition of seven snake species (three new records for Thanh Hoa Province and four for Nam Dong EGCA). Among 43 recorded snake species, four species are listed in the IUCN Red List (2024), six species listed in the Vietnam Red Data Book (2007), and two species listed in the Governmental Decree No. 84/2021/ND-CP. Two species in the checklist are endemic to Vietnam.

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