

New records of amphibians from Son La Province, Vietnam

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Abstract. Nine species of amphibians (*Leptobranchella namdongensis*, *Amolops cremnobatus*, *Nidirana chapaensis*, *Odorrana graminea*, *Odorrana tiannanensis*, *Chirixalus doriae*, *Raorchestes parvulus*, *Rohanixalus vittatus*, *Paramesotriton deloustali*) are reported for the first time from Son La Province, Vietnam. Our findings bring the species number of amphibians known from this province to 79. In addition, we provide morphological data and ecological notes for the aforementioned species.

Keywords. Amphibians, new records, taxonomy, Son La Province.

Introduction

In their herpetofaunal list of Vietnam, Nguyen et al. (2009) reported 30 species of amphibians from Son La Province, including members of the Bufonidae (one species), Megophryidae (1), Microhylidae (5), Dicroglossidae (8), Ranidae (10), and Rhacophoridae (5). In recent years, three new taxa were described from this province, namely *Amolops ottorum* by Pham et al. (2019c), *Tylototriton anguliceps* by Le et al. (2015a), and *Tylototriton pasmansi obsti* by Bernardes et al. (2020), and nine new country records (*Bufo*

luchunnicus, *Atympanophrys gigantea*, *Leptobranchium masatakasatoi*, *Leptobranchella minima*, *Leptobranchella eos*, *Sylvirana cubitalis*, *Panophrys daweimontis*, *Amolops vitreus*, *Nidirana lini*) for the herpetofauna of Vietnam were presented (Le et al., 2014, 2015b; Pham et al., 2014a, 2016a, 2020; Luong et al., 2019). In addition, 28 new provincial records have been reported for the amphibian fauna of Son La Province since 2012 (V. Pham et al., 2012, 2014b, 2016b, c, 2017, 2019a, b; Pham and Nguyen, 2018a, b). In this study, we report nine new provincial records of amphibians from Son La Province.

Material and Methods

Sampling. Eight field surveys were conducted in Son La Province, Vietnam over the time period of 2012–2021 (Table 1; Fig. 1). Locality coordinates were recorded using a Garmin 62s handheld GPS (WGS84). Specimens were collected by hand between 03:00 and 23:00 h. After having been photographed in life, specimens were identified to species level, measured, sexed, and released at the collection sites. To obtain a few voucher specimens, some individuals of each species were anaesthetized in a closed vessel using a piece of cotton wool soaked in ethyl acetate (Simmons, 2002), fixed in 80% ethanol for 5 h, and then transferred to 70% ethanol for permanent storage. Voucher specimens were subsequently deposited in the collection of Tay Bac University (TBU), Son La Province, Vietnam.

Morphological characters. Measurements were taken to the nearest 0.1 mm using digital callipers. Abbreviations are as follows: snout–vent length (SVL); head length, from tip of snout to the articulation of the jaw (HL); head width, at greatest width of the jaw (HW); snout length,

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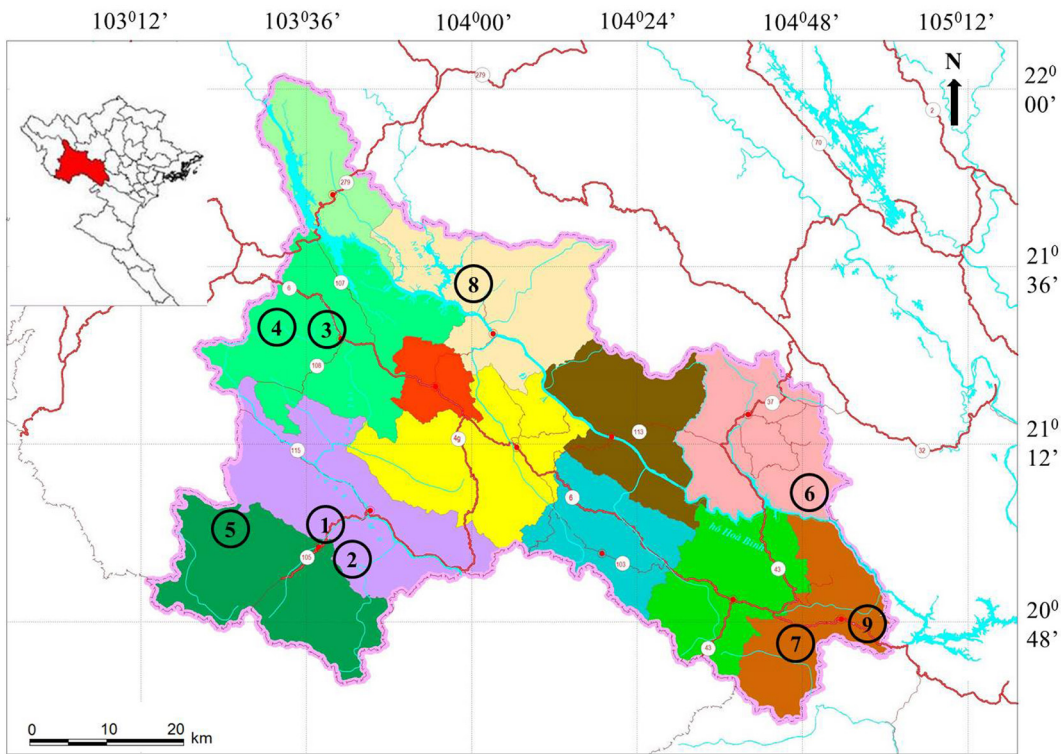


Figure 1. Map showing eight survey sites in Son La Province, northwestern Vietnam. The numbers indicate sites in Song Ma District (1, 2), Thuan Chau District (3, 4), Sop Cop District (5), Phu Yen District (6), Van Ho District (7, 9), and Muong La District (8).

from the anterior portion of the eye to the tip of the snout (SL); distance from anterior edge of nostril to tip of snout (NS); distance from anterior corner of eye to posterior edge of nostril (EN); eye diameter (ED); interorbital distance (IOD); maximum width of upper eyelid (UEW); tympanum diameter (TD); forearm length, from elbow to base of outer palmar tubercle (FLL); hand length, from base of outer palmar tubercle to tip of Finger III (HAL); thigh length, from vent to knee (FL); tibia length (TL); NR: Nature Reserve. For an assessment of toe webbing, we followed the formula of Glaw and Vences (2007). Common names in English and Vietnamese are provided.

Results

In the following species accounts we provide a listing of specimens examined along with relevant collection and identification data. We also provide observations on the ecology of each species based on our encounters.

ANURA

FAMILY MEGOPHYRIIDAE

***Leptobrachella namdongensis* Hoang et al., 2019**

Nam Dong Litter Frog, Cóc mây nam động

Specimens examined (*n* = 4).—Two adult males (TBU.XN.2021.64–65) and two adult females (TBU.XN.2021.66, 2021.73) collected on 2 May 2021, near Lay Village, Tan Xuan Commune within Xuan Nha NR (20.6281°N, 104.6733°E, elevation 1350 m).

Description.—Morphological characters of specimens from Son La Province agree with the description of Hoang et al. (2019). Our data include: SVL 25.0–29.8 mm in males, 30.3–30.5 mm in females; head wider than long (HL 9.2–10.3 mm and HW 9.5–10.4 mm in males, 10.8–11.0 mm and 10.9–11.4 mm in females, respectively); snout short, obtusely pointed in dorsal view (SL 4.0–4.6 mm in males, 5.0 mm in females); loreal region concave; tympanum distinct, round, smaller than eye diameter (TD/ED 0.49–0.50 in males, 0.48–0.49 in females);

Table 1. Sites in Son La Province, northwestern Vietnam, where collections were made during this study.

Dates	Localities
6–13 November 2012	Pa Tet A Village, Huoi Mot Commune, Song Ma District within Sop Cop NR
12–16 July 2013	Tuc Pha Village, Huoi Mot Commune, Song Ma District within Sop Cop NR
1–15 August 2013	Chieng Bom and Co Ma communes, Thuan Chau District within Copia NR
1–7 April 2014	Kha Village, Pung Banh Commune, Sop Cop District
25 August–2 September 2015	Kieng Village, Muong Do Commune, Phu Yen District
24–27 June 2016	Kho Hong Village, Chieng Xuan Commune, Van Ho District within Xuan Nha NR
25–29 October 2019	Nam Pam Commune, Muong La District within Muong La NR
29 April–4 May 2021	Chieng Xuan and Tan Xuan communes, Van Ho District within Xuan Nha NR

vomerine teeth absent; tongue notched posteriorly; vocal sacs present in males. Relative length of fingers I < II = IV < III; fingers free of webbing; tips of fingers round, without discs; lateral fringes weak; subarticular tubercles absent; palmar tubercles distinct. Relative length of toes I < II < V < III < IV; tibia longer than thigh (TL 12.5–13.6 mm and FL 11.2–12.8 mm in males, 13.3–14.6 mm and 13.0 mm in females, respectively); toes with rudimentary webbing; tips of toes round; subarticular tubercles absent; inner metatarsal tubercle present, outer metatarsal tubercle absent.

Dorsal surface of head, body, thighs, upper arms, lateral head, and flanks covered by small tubercles; dorsolateral fold absent; ventral surface smooth.

Coloration in life.—Head and dorsum light brown with some dark flecks; upper part of tibia and thigh with dark bars; venter white; outer edges of thighs, arms, and tibiotarsus brownish grey with small whitish spots (Fig. 2A).

Ecological notes.—Specimens were collected between 19:30 and 21:30 h on the ground. The surrounding habitat was evergreen forest, composed of small hardwoods, lianas, and shrub.

Distribution.—This species was previously known only from the type locality in Thanh Hoa Province, Vietnam (Hoang et al., 2019).

FAMILY RANIDAE

***Amolops cremnobatus* Inger & Kottelat, 1998**

Lao Sucker Frog,Ếch bầm đá lầo

Specimens examined ($n = 4$).—Two adult males (TBU.XN.2021.97, 2021.100) and two adult females (TBU.XN.2021.58, 2021.94) collected on 3 May 2021, near Lay Village, Tan Xuan Commune within Xuan Nha NR (20.6288°N, 104.6735°E, elevation 1350 m).

Description.—Morphological characters of specimens from Son La Province agree with the descriptions of

Inger and Kottelat (1998) and Pham et al. (2015). Our data include: SVL 31.2–33.5 mm in males, 38.5–40.0 mm in females; head longer than wide (HL 11.9–12.0 mm and HW 11.0–11.5 mm in males, 13.9–14.0 mm and 13.5–13.7 mm in females, respectively); snout short, almost truncate, weakly projecting (SL 5.0–5.3 mm in males, 5.9–6.1 mm in females); canthus rostralis distinct; loreal region concave; nostril closer to tip of snout than to eye (NS 2.5 mm and EN 2.8–2.9 mm in males, 2.5–3.0 mm and 3.4–3.5 mm in females, respectively); tympanum distinct, round, smaller than half eye diameter (TD/ED 0.40–0.43 in males, 0.37–0.38 in females); vomerine teeth present. First finger much shorter than second, fingers free of webbing; tips of fingers expanded into discs, with circummarginal grooves, disc of Finger III larger than tympanum diameter. Tibia longer than thigh (TL 18.8–19.6 mm and FL 16.0–17.5 mm in males; 23.5–24.3 mm and 20.0–20.2 mm in females, respectively); fully webbed; tips of toes expanded into discs, disc of Toe IV smaller than disc of Finger III.

Dorsal surface of the skin with small, white, spinose tubercles; dorsolateral fold distinct; ventral surface smooth.

Coloration in life.—Head and dorsum dark olive with green reticulated pattern; upper part of limbs light green with transverse bars; venter cream with some slightly greyish spots on throat (Fig. 2B).

Figure 2. Nine species documented for the first time from Son La Province, Vietnam. (A) Adult male *Leptobranchella namdongensis* (TBU.XN.2021.64). (B) Adult male *Amolops cremnobatus* (TBU.XN.2021.97). (C) Adult male *Nidirana chapaensis* (TBU.XN.2021.19). (D) Adult female *Odorrana graminea* (TBU.PAE.2012.241). (E) Adult female *Odorrana tiannanensis* (TBU.SL.2016.142). (F) Adult male *Chirixalus doriae* (TBU.PAE.390). (G) Adult male *Raorchestes parvulus* (TBU.XN.2021.23). (H) Adult male *Rohanixalus vittatus* (TBU.PAE.553). (I) Adult male *Paramesotriton deloustali* (TBU.ML.2019.2). Photos by A.V. Pham.



Ecological notes.—Specimens were collected between 20:00 and 21:00 h on rocks in streams. The surrounding habitat was secondary forest, composed of small hardwoods, lianas, and shrubs. Air temperatures ranged from 25–30°C and relative humidity from 75–85%.

Distribution.—In Vietnam, this species has previously been recorded from Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, and Thua Thien - Hue Provinces (Nguyen et al., 2009; Pham et al., 2015). Elsewhere, this species is known from Laos and Thailand (Frost, 2022).

***Nidirana chapaensis* (Bourret, 1937)**

Chapa Frog, Chàng sa pa

Specimens examined ($n = 2$).—One adult male (TBU.XN.2021.19) collected on 30 April 2021, near Kho Hong Village, Chieng Xuan Commune within Xuan Nha NR (20.7091°N, 104.7046°E, elevation 1200 m) and one adult female (TBU.MD.2015.142) collected on 29 August 2015, near Kieng Village, Muong Do Commune, Phu Yen District (21.1914°N, 104.7482°E, elevation 640 m).

Description.—Morphological characters of specimens from Son La Province agree with the descriptions of Chuaynkern et al. (2010), Luu et al. (2013), Ziegler et al. (2014), and Yuan et al. (2019). Our data include: SVL 44.5 mm in the male, 50.6 mm in the female; head longer than wide (HL 18.2 mm and HW 17.0 mm in the male, 19.5 mm and 17.7 mm in the female, respectively; snout short, obtusely pointed in dorsal view (SL 7.2 mm in the male, 7.8 mm in the female); canthus rostralis distinct; loreal region concave; nostril closer to tip of snout than to eye (NS 3.3 mm and EN 4.0 mm in the male, 3.6 mm and 3.8 mm in the female, respectively); tympanum distinct, round, smaller than eye diameter (TD/ED 0.63 in the male, 0.71 in the female); vomerine teeth present; tongue notched posteriorly; vocal sacs present in males. Relative length of fingers $II < I < IV < III$; fingers free of webbing; tips of fingers round, without discs; lateral fringes absent; subarticular tubercles distinct; palmar tubercles distinct; nuptial pad absent in the male. Relative length of toes $I < II < V < III < IV$; tibia longer than thigh (TL 26.8 mm and FL 23.5 mm in the male, 27.7 mm and 24.5 mm in the female, respectively); toes webbed, webbing formula: $II-III\frac{1}{2}-2III1-2IV2-\frac{1}{2}V$; tips of toes round; subarticular tubercles distinct; inner metatarsal tubercle present, outer metatarsal tubercle indistinct.

Dorsal surface of head and body, lateral head and flanks smooth; dorsolateral fold distinct; small granular tubercles present near cloaca and hindlimbs; ventral surface smooth.

Coloration in life.—Head and dorsum light brown with a cream vertebral stripe, running from between the eye to vent; posterior part of dorsum with some dark spots; upper jaw with a white stripe, from below the nostril to axilla; dorsolateral fold yellowish; the region around tympanum dark brown; upper part of tibia and thigh with dark bars; venter cream (Fig. 2C).

Ecological notes.—Specimens were collected between 21:00 and 22:00 h on the ground. The surrounding habitat was secondary forest, composed of small hardwoods, lianas, and shrubs. Air temperatures ranged from 25–30°C and relative humidity from 75–85%.

Distribution.—In Vietnam, this species has been recorded from Lao Cai, Lai Chau, Bac Giang, Hoa Binh, Ha Tinh, Kon Tum, Gia La, and Dak Lak Provinces (Nguyen et al., 2009; Luu et al., 2013; Pham et al., 2018). Elsewhere, this species is known from China and Laos (Frost, 2022).

***Odorrana graminea* (Boulenger, 1900)**

Large Odorous Frog, Éch gra-mi-nê

Specimens examined ($n = 2$).—One adult male (TBU.PAE.2012.167) and one adult female (TBU.PAE.2012.241) collected on 11 November 2012, near Pa Tet A Village, Huoi Mot Commune within Sop Cop NR (21.0039°N, 103.6744°E, elevation 1112 m).

Description.—Morphological characters of specimens from Son La Province agree with the descriptions of Bain et al. (2003), T. Pham et al. (2017), and Luong et al. (2019). Our data include: SVL 46.0 mm in the male, 90.0 mm in the female; head longer than wide (HL 16.8 mm, HW 14.8 mm, HL/HW 1.14 in the male, 34.0 mm, 31.7 mm, HL/HW 1.07 in the female, respectively); snout round (SL 7.4 mm in the male, 15.0 mm in the female); nostril closer to tip of snout than to eye (NS 3.0 mm and EN 3.8 mm in the male, 7.2 mm and 8.6 mm in the female); tympanum distinct, round, smaller than eye diameter (TD/ED 0.65 in the male, 0.50 in the female); vomerine teeth present; tongue notched posteriorly; vocal sacs present in male. Relative length of fingers $II \leq I < IV < III$; fingers free of webbing; tips of fingers expanded into discs, with circummarginal grooves, disc of Finger III smaller than tympanum diameter; lateral fringes absent; subarticular tubercles distinct; palmar tubercles distinct. Relative length of toes $I < II < V < III < IV$; tibia longer than thigh (TL 27.6 mm, FL 23.9 mm, TL/SVL 0.6 in the male, 63.4 mm, 56.9 mm, 0.7 in the female, respectively); toes webbed, webbing formula: $10-0II0-0III0-\frac{1}{2}IV\frac{1}{2}-0V$; tips of toes expanded into discs, with circummarginal grooves; subarticular tubercles distinct.

Dorsal surface of head, body, thighs and arms smooth; lateral head and flanks with tubercles; weak dorsolateral folds present; ventral surface smooth.

Coloration in life.—Dorsal surface green, with black spots; sides of head and flanks grey; hindlimbs with distinct dark bars; ventral surface white (Fig. 2D).

Ecological notes.—Specimens were collected between 19:30 and 20:30 h on the ground next to a stream. The surrounding habitat was secondary forest, composed of small hardwoods, lianas, and shrubs.

Distribution.—In Vietnam, this species has been recorded from Dien Bien, Bac Kan, Bac Giang, Lang Son, and Lam Dong Provinces (Nguyen et al., 2009; Hecht et al., 2013; Luong et al., 2019). Elsewhere, this species is known from China (Frost, 2022).

Remarks.—Specimens from Son La Province differ from those in the description of Bain et al. (2003) in having smaller HL/HW values in both sexes (1.14 vs. 1.32–1.65 in males, 1.07 vs. 1.14–1.38 in females) and a smaller ratio of TD/ED in females (0.50 vs. 0.52–0.60).

Odorrana tiannanensis (Yang & Li, 1980)

Tiannan Odorous Frog,Ếch ti-án-nan

Specimens examined ($n = 2$).—One adult male (TBU.PAE.2012.214) collected on 11 November 2012, near Pa Tet A Village, Huoi Mot Commune within Sop Cop NR (21.0040°N, 103.6742°E, elevation 1112 m) and one adult female (TBU.SL.2016.142) collected on 26 April 2016, near Kho Hong Village, Chieng Xuan Commune within Xuan Nha NR (20.7089°N, 104.7040°E, elevation 1100 m).

Description.—Morphological characters of specimens from Son La Province agree with the descriptions of Bain et al. (2003), Ohler (2007), and Fei et al. (2012). Our data include: SVL 54.1 mm in the male, 106.8 mm in the female; head longer than wide (HL 20.0 mm, HW 17.5 mm, HL/SVL 0.37 in the male, 40.0 mm, 37.0 mm, 0.37 in the female, respectively); snout round (SL 8.1 mm in the male, 17.6 mm in the female); nostril closer to tip of snout than to eye (NS 3.0 mm and EN 4.0 mm in the male, 7.9 mm and 9.9 mm in the female, respectively); tympanum distinct, round, smaller than eye diameter (TD/ED 0.67 in the male, 0.47 in the female); vomerine teeth present; tongue notched posteriorly; vocal sacs present in male. Relative length of fingers II < I < IV < III; fingers free of webbing; tips of fingers expanded into discs, with circummarginal grooves; lateral fringes absent; subarticular tubercles distinct; palmar tubercles distinct. Hindlimbs: relative length of toes I < II < V < III < IV; tibia longer than thigh (TL 31.6 mm, FL 28.5

mm, TL/SVL 0.58 in the male, 67.0 mm, 61.5 mm, 0.63 in the female, respectively); toes webbed, webbing formula: I0–0II0–0III0–1IV1–0V; tips of toes expanded into discs, with circummarginal grooves; subarticular tubercles distinct.

Dorsal surface of head, body, thighs and arms smooth; lateral head and flanks with tubercles; dorsolateral fold indistinct; ventral surface smooth.

Coloration in life.—Dorsal surface of head, body, thighs and arms light brown, with some dark spots on thighs and arms; upper jaw with a cream stripe, from below the nostril to axilla; venter white (Fig. 2E).

Ecological notes.—Specimens were collected between 20:00 and 21:00 h on the ground near a large stream. The surrounding habitat was secondary forest, composed of small hardwoods, lianas, and shrubs.

Distribution.—In Vietnam, this species has been recorded from Ha Giang, Tuyen Quang, Nghe An, Ha Tinh, Quang Binh, and Quang Nam Provinces (Nguyen et al., 2009). Elsewhere, this species is known from China and Laos (Frost, 2022).

FAMILY RHACOPHORIDAE

Chirixalus doriae Boulenger, 1893

Doria's Tree Frog, Nhái cây dô rín

Specimens examined ($n = 5$).—Three adult males (TBU.PAE.390, 393, 397) collected on 13 July 2013, near Tup Pha Village, Huoi Mot Commune within Sop Cop NR (20.9934°N, 103.7226°E, elevation 1260 m); two adult males (TBU.PAE.521, 522), collected on 12 August 2013, near Huoi Pu Village, Chieng Bom Commune within Copia NR (21.3607°N, 103.6439°E, elevation 1370 m).

Description.—Morphological characters of specimens from Son La Province agree with the descriptions of Taylor (1962) and Nguyen et al. (2020). Our data include: SVL 22.5–26.7 mm; head longer than wide (HL 7.6–8.9 mm, HW 6.8–7.9 mm); snout pointed (SL 2.5–4.0 mm); canthus rostralis distinct; loreal region slightly concave; tympanum distinct, round; vomerine teeth absent; tongue notched posteriorly; vocal sacs present in males. Relative length of fingers I < II < IV < III; Fingers I and II oppose Fingers III and IV; tips of fingers expanded into discs. Relative length of toes I < II < III < V < IV; tibia longer than thigh (TL 11.4–12.8 mm, FL 10.0–12.1 mm); toes webbed, webbing formula: I1–2III1–2III1½–2IV1–½V; tips of toes expanded into discs.

Dorsal surface of the skin smooth; ventral and around cloaca smooth, becoming shagreened on the belly and underside of thigh.

Coloration in life.—Dorsum brown-greyish with brownish longitudinal stripes from tip of snout and eyes to vent; tympanum brown yellow; flanks yellowish; belly and underside of forelimbs white; underside of thigh and tibia cream (Fig. 2F).

Ecological notes.—Specimens were collected at night between 20:00 and 22:00 h in a swamp next to a stream. The surrounding habitat was mixed secondary forest with small bamboo stands and shrubs.

Distribution.—In Vietnam, this species has been recorded from Tuyen Quang, Kon Tum, Gia Lai, Dak Lak, and Dong Nai Provinces (Nguyen et al., 2009). Elsewhere, this species is known from India, China, Myanmar, Laos, Thailand, and Cambodia (Frost, 2022).

***Raorchestes parvulus* (Boulenger, 1893)**

Karin Bubble-nest frog, Nhái cây tí hon

Specimens examined ($n = 2$).—Two adult males (TBU.XN.2021.23–24) collected on 30 April 2021, near Kho Hong Village, Chieng Xuan Commune within Xuan Nha NR (20.7090°N, 104.7044°E, elevation 1200 m).

Description.—Morphological characters of specimens from Son La Province agree with the descriptions of Boulenger (1893), Taylor (1962), Inger et al. (1999), and Jiang et al. (2020). Our data include: SVL 18.8–19.0 mm; head wider than long (HL 6.7–6.8 mm; HW 7.0 mm); snout pointed (SL 3.2–3.4 mm); canthus rostralis distinct; loreal region slightly concave; interorbital space larger than upper eyelid width (IOD 2.5–2.6 mm; UEW 1.8–2 mm); tympanum distinct, round; vomerine teeth absent; tongue notched posteriorly; vocal sacs present in males. Relative length of fingers $I < II < IV < III$; tips of fingers expanded into discs; nuptial pad present on the dorsal surface of first finger; dermal fringe on inside of all fingers. Relative length of toes: $I < II < III < V < IV$; tibia as long as thigh (TL 9.5–9.8 mm, FL 9.5–9.7 mm); toes with rudimentary webbing; dermal fringe on the inside of all fingers; tips of toes expanded into discs.

Dorsal surface of the skin with small tubercles; flanks smooth; ventral smooth, becoming shagreened on the belly and underside of thigh.

Coloration in life.—Dorsum brown-greyish with brownish longitudinal stripes from tip of snout and eyes to vent; tympanum brown yellow; flanks yellowish; belly and underside of forelimbs white; underside of thigh and tibia cream (Fig. 2G).

Ecological notes.—Specimens were collected in the morning from 03:00–04:00 h on tree leaves, about 2–3 m above the forest floor. The surrounding habitat was mixed secondary forest with small bamboo stands and shrubs.

Distribution.—In Vietnam, this species has been recorded from Lao Cai, Lai Chau, Ha Giang Provinces in the north, and south to Quang Tri Province (Nguyen et al., 2009). Elsewhere, this species is known from Myanmar, Laos, Cambodia, Thailand, and Malaysia (Frost, 2022).

***Rohanixalus vittatus* (Boulenger, 1887)**

Striped Asian treefrog, Nhái cây sọc

Specimens examined ($n = 2$).—One adult male (TBU.PAE.553) and one adult female (TBU.PAE.555) collected on 2 April 2014, near Kha Village, Pung Banh Commune within Sop Cop NR (20.9767°N, 103.4352°E, elevation 1350 m).

Description.—Morphological characters of specimens from Son La Province agree with the descriptions of Taylor (1962), Aowphol et al. (2013), and Hecht et al. (2013). Our data include: SVL 20.5 mm in the male, 25.5 mm in the female; head longer than wide (HL 7.1 mm and HW 6.0 mm in the male, 8.0 mm and 6.5 mm in the female, respectively); snout pointed (SL 3.3 mm in the male, 3.7 mm in the female); canthus rostralis distinct; loreal region slightly concave; tympanum distinct, round; vomerine teeth absent; tongue notched posteriorly; vocal sacs present in males. Relative length of fingers $I < II < IV < III$; tips of fingers expanded into discs; a small web between two outer, vague remnant of web between second and third. Relative length of toes $I < II < III < V < IV$; tibia longer than thigh (TL 10.6 mm and FL 10.2 mm in the male, 12.0 mm and 11.8 mm in the female, respectively); webbing present on toes, formula: $II-2III-2III1-2IV2-1/2V$; tips of toes expanded into discs.

Dorsal surface of the skin smooth; ventral smooth, becoming shagreened on the underside of thigh.

Coloration in life.—Dorsal and loreal region brown-yellowish with small dark spots; dorsolateral fold white running from snout to near groin; tympanum brown yellow; flanks yellowish; throat, chest, anterior parts of belly and underside of forelimbs yellow; posterior part of belly and underside of thigh and tibia cream-yellow (Fig. 2H).

Ecological notes.—Specimens were found sitting on a banana leaf at 20:30 h. The surrounding habitat was evergreen forest.

Distribution.—In Vietnam, this species has been recorded from Lang Son Province in the north to Dong Nai and Ba Ria-Vung Tau Provinces in the south (Nguyen et al., 2009). Elsewhere, this species has been reported from India, China, Myanmar, Laos, Thailand, and Cambodia (Frost, 2022).

CAUDATA

FAMILY SALAMANDRIDAE

Paramesotriton deloustali (Bourret, 1934)

Tam Dao Newt, Cá cóc tam đảo

Specimens examined ($n = 2$).—One adult male (TBU.ML.2019.2) and one adult female (TBU.ML.2019.1) collected on 26 October 2019, Nam Pam Commune within Muong La NR (21.5269°N, 104.0677°E, elevation 1680 m).

Description.—Morphological characters of specimens from Son La Province agree with the description of Bourret (1942). Our data include: SVL 63.3 mm in the male, 69.8 mm in the female; head large, much wider than neck; head longer than wide (HL 15.4 mm and HW 14.8 mm in the male, 16.5 mm and 15.9 mm in the female, respectively); snout truncate; nostrils close to snout tip; corner of mouth located posterior to posterior margin of eye; labial fold well developed on lateral side of upper jaw; parotoid gland prominent; vertebral ridge conspicuous. Forelimb long, when extended rostrally reaches posterior margin of eye; palm and soles of forelimb and hindlimb overlap when adpressed against flank; four fingers and five toes with lightly developed velum and webbing. Tail long (TAL 56.3 mm in the male, 74.1 mm in the female), wide, depth of tail gradually narrows from tail base to tail tip; tail laterally compressed. Cloaca swollen, with transverse wrinkles.

Coloration in life.—Dorsal and lateral surfaces of head, body, and tail darker brown; ventral surfaces slightly brown, with large orange-red spots on venter, chin, underside of the four limbs, cloaca, and tail (Fig. 2I).

Ecological notes.—Specimens were found in a stream in a valley of a broadleaf forest. The surrounding habitat was evergreen forest with shrubs and vines.

Distribution.—In Vietnam, this species has been recorded from Vinh Phuc, Ha Giang, Tuyen Quang, Bac Kan, Quang Ninh, and Lao Cai Provinces (Nguyen et al., 2009). Elsewhere, this species is known from China (Frost, 2022).

Discussion

Our new findings bring the total number of amphibian species from Son La Province to 79, including species from six frog and one salamander families (Bufonidae—2, Megophryidae—16, Microhylidae—7, Dicroglossidae—11, Ranidae—21, Rhacophoridae—19, Salamandridae—3). Nine species were recorded for

the first time in Son La Province (Megophryidae—1, Ranidae—4, Rhacophoridae—3, Salamandridae—1). *Leptobrachella namdongensis* was recently described by Hoang et al. (2019) from Thanh Hoa Province. The new record in Son La Province is approximately 30 km distant from the type locality. *Paramesotriton deloustali* was originally described from Tam Dao National Park, Vinh Phuc Province, northern Vietnam, by Bourret (1934). This species is listed in the Red Data Book of Vietnam as Endangered (Dang et al., 2007), on CITES Appendix II, and in Government Decree No. 06/2019/ND-CP. In Vietnam, this species is known from Lao Cai, Tuyen Quang, Bac Kan, Quang Ninh, and Ha Giang Provinces (Nguyen et al., 2009). Recently, this species was recorded for the first time from Yunnan Province, China (Zhang et al., 2018). The new record in Son La Province is approximately 200 km distant from Tam Dao National Park.

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