

New records of amphibians and reptiles from southern Vietnam

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Abstract. We report six new records of poorly known species of amphibians and reptiles on the basis of a new herpetological collection from southern Vietnam: *Ophryophryne gerti* and *Raorchestes gryllus* from Khanh Hoa Province, *Acanthosaura coronata* from Ba Ria – Vung Tau Province, *Gekko grossmanni* from Ninh Thuan Province, as well as *Cylindrophis ruffus* and *Oligodon cinereus pallidocinctus* from Binh Phuoc Province.

Keywords. *Ophryophryne gerti*, *Raorchestes gryllus*, *Acanthosaura coronata*, *Gekko grossmanni*, *Cylindrophis ruffus*, *Oligodon cinereus pallidocinctus*, new records, taxonomy.

INTRODUCTION

Geographic distribution records are crucial for assessing the conservation status and are also evidence to elucidate species' evolution and biology. Based on newly collected specimens of amphibians and reptiles from southern Vietnam, we herein report six new records of poorly known species, comprising two anuran species from Khanh Hoa Province, one agamid species from Ba Ria – Vung Tau, one geckonid species from Ninh Thuan Province as well as one cylindrophiid and one colubrid species from Binh Phuoc Province.

Measurements of specimens were taken with a digital caliper to the nearest 0.1 mm. Abbreviation are as follows: SVL (snout-vent length): from tip of snout to anterior margin of cloacal; TaL (Tail length): from posterior margin of cloacal to tip of tail; TL (total length): SVL + TaL. Terminology of morphological characters followed Nguyen et al. (2012) for amphibians (except for forearm length, FAL: from axilla to elbow and hand length, HAL: from base of outer palmar tubercle to tip of finger III), Phung & Ziegler (2011) for lizards, and David et al. (2012) for snakes.

MATERIAL AND METHODS

Field work was conducted by Trung My Phung in Hon Ba Nature Reserve (Khanh Hoa Province) in July 2010, on Nui Dinh Mountain (Ba Ria – Vung Tau Province) in November 2008, in Ca Na forest (Ninh Thuan Province) in March 2010 and by Trung My Phung and Thang Huu Khuong in Bu Gia Map National Park in September and October 2011 (Fig. 1). After taking photographs, specimens were anaesthetized, fixed in 80–85% ethanol and subsequently stored in 70% ethanol. Specimens were deposited in the collections of the Institute of Ecology and Biological Resources (IEBR) and Vietnam National Museum of Nature (VNMN), Hanoi, Vietnam and the Zoologisches Forschungsmuseum Alexander Koenig (ZFMK), Bonn, Germany.

RESULTS AND DISCUSSION

Taxonomic accounts

Megophryidae

Ophryophryne gerti Ohler, 2003

Gerti's Mountain Toad / Coc nui got (Fig. 2)

Specimens examined: VNMN 983 and ZFMK 94220, males, collected by T. M. Phung on 4 July 2010 from Hon Ba Nature Reserve (ca. 12°10'N, 109°02'E), Dien Khanh District, Khanh Hoa Province.



Fig. 1. Map of sampling sites in southern Vietnam: 1) Khanh Hoa Province, 2) Ninh Thuan Province, 3) Binh Phuoc Province, 4) Ba Ria – Vung Tau Province.

Morphological characters: Size small, SVL 28.2–29.7 mm ($n = 2$); head wider than long (HW 8.5–8.9 mm, HL 8.1–8.7 mm); snout truncate, protruding, shorter than horizontal diameter of eye (SL 2.6–2.7 mm, ED 3.2–3.7 mm); canthus rostralis rounded, loreal region convex; interorbital distance narrower than upper eyelid and internarial distance (IOD 4.0–4.3 mm, UEW 2.6–2.7 mm, IND 2.5–2.7 mm); nostrils closer to the eye than to the tip of snout (EN 1.1–1.4 mm, SN 1.2–1.5 mm); pupil rounded; tympanum oval, greater than half eye diameter and tympanum-eye distance (TD 1.8–2.3 mm, TYE 1.5–1.9 mm); supratympanic fold distinct; vomerine teeth absent; tongue rounded posteriorly.

Forelimbs: FAL 6.5–7.4 mm, HAL 7.5–7.6 mm; fingers free of webbing, relative length of fingers: $I < II = IV < III$; tips of fingers rounded, without discs; dermal fringe along outer finger absent; subarticular tubercles absent; palmar tubercles indistinct. Hindlimbs: femur longer than tibia and

foot length (FML 15.3–18.7 mm, TBL 14.9–15.2 mm, FTL 12.7–13.3 mm); toes long and thin, relative length of toes: $I < II < V < III < IV$; tips of toes rounded; webbing basal; dermal fringe along outer toe absent; subarticular tubercles absent; inner metatarsal tubercle small (IMT 1.4–1.5 mm), outer metatarsal tubercle absent, tarsal fold absent.

Dorsal skin of head, body and limbs granular; dorsum with several skin ridges, forming a X-shape in the middle and two other ridges running from behind tympanum to posterior part of back; lateral sides of head and flank granular, upper part of flank with some glandular warts; orbital horn pointed; dorsolateral fold absent; throat, chest, belly and ventral surface of limbs smooth; pectoral and femoral glands present, small.

Coloration in life: Dorsal surface of head and body dark brown; a dark triangular pattern between eyes present; lower part of flank with some dark brown spots; lateral side of head dark brown; dorsal surface of limbs with dark bars; throat, chest, belly and ventral surface of limbs dark brown with some black spots.

Remarks: Morphological characters of our specimens agreed well with the description of Ohler (2003) but they are a little smaller than the type series (SVL 28.2–29.7 mm vs. 32.0–45.8 mm).

Distribution: In Vietnam, this species is known from Thua Thien – Hue Province southward to Lam Dong Province. Elsewhere, this species has been reported from Laos (Nguyen et al. 2009).

Rhacophoridae

Raorchestes gryllus (Smith, 1924)

Langbian Bubble-nest Frog / Nhai cay Langbian (Fig. 3)

Specimens examined: VNMN 985 (adult female), VNMN 986 and ZFMK 94221–94222 (adult males), collected by T. M. Phung on 4 July 2010 from Hon Ba Nature Reserve (ca. 12°10'N, 109°02'E), Dien Khanh District, Khanh Hoa Province.

Morphological characters: Size small, SVL 21.9–24.2 mm ($n = 4$), head as long as wide (HL 9.2–9.8 mm, HW 9.2–9.8 mm); snout pointed in dorsal view, a bit longer than horizontal diameter of eye (SL 3.6–4.1 mm, ED 3.1–3.5 mm); canthus rostralis distinct; interorbital distance wider than internarial distance and upper eyelid (IOD 2.4–2.7 mm, IND 1.7–2.0 mm, UEW 2.3–2.4 mm); nostril lateral, rounded, nearly midway between tip of snout and eye (SN 1.6–1.8 mm); vomerine teeth absent; tympanum rounded, smaller than half of eye diameter but

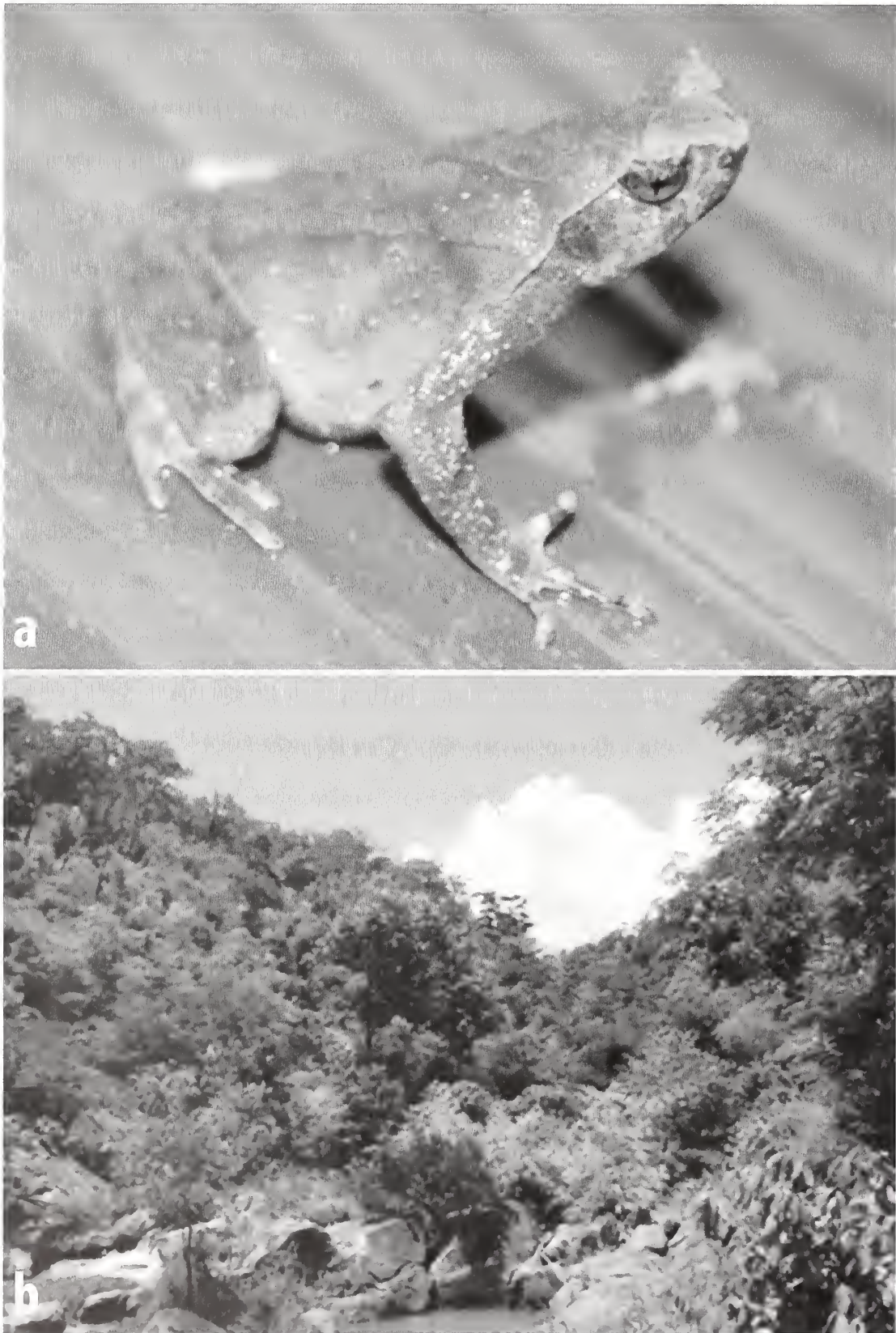


Fig. 2. Gerti's Frog *Ophryophryne gerti* (a) and its habitat (b). Photos: Trung M. Phung.



Fig. 3. Langbian Bubble-nest Frog *Raorchestes gryllus* (a) and its habitat (b). Photos: Trung M. Phung.

greater than tympanum-eye distance (TD 1.2–1.3 mm, TYE 0.4–0.6 mm); supratympanic fold distinct; tongue notched posteriorly.

Forelimbs: FAL 4.0–4.2 mm, HAL 6.6–7.7 mm; finger webbing basal, relative length of fingers: I<II<IV<III; tips of fingers enlarged into round discs, with circummargin-

al grooves; subarticular tubercles rounded and prominent; series of tubercles present along outer side of forearm and finger IV; nuptial pad present in males.

Hindlimbs: femur as long as tibia but longer than foot length (FML 11.3–12.4 mm, TBL 11.2–12.3 mm, FTL 9.5–10.3 mm); relative length of toes: I<II<III<V<IV; tips



Fig. 4. Coronated Tree Lizard *Acanthosaura coronata* (a) and its habitat (b). Photos: Trung M. Phung.

of toes with enlarged discs; subarticular tubercles prominent; inner and outer metatarsal tubercles present; webbing formula: I2-2III1 $\frac{1}{3}$ -2 $\frac{1}{2}$ III1 $\frac{3}{4}$ -2IV2-1V; tubercles present along outer margins of tibia, foot and toe V; tibiotarsal articulation reaching to eye.

Dorsal skin covered by tiny tubercles; throat finely granular; belly and ventral surface of thigh coarsely granular, small tubercle present on heel.

Coloration in life varied among individuals: Background of dorsal surface of head, body and limbs of males light brown with reddish brown or bright green marbling; a bright green triangle patch, covering anterior part of upper eyelid and snout, sometimes the patch combined with the posterior bright green marbling; dorsum with two dark brown stripes, forming a “)” shape, from rear of eye to groin, distinct or indistinct; dorsal surface of limbs with dark brown transverse bars; throat, chest and belly white. Female uniform green above and whitish beneath.

Remarks: Our specimens differ from previous descriptions (Smith 1924, Orlov et al. 2012) by having dermal fringe along outside of tarsus less developed (versus well developed in description of Orlov et al. 2012). Iris light golden with brown or reddish mottles posteriorly, pupil horizontal oval and black (not mentioned by Smith 1924 and Orlov et al. 2012). Specimens of *R. gryllus* from Khanh Hoa Province are morphologically similar to *Kurixalus viridescens*, a newly described species from southern Vietnam by Nguyen et al. (2014). However, *R. gryllus* can be distinguished from the latter by the following characters: the presence of a brown Y-shaped marking on dorsum and upper part of flank (versus uniform solid green dorsum in *K. viridescens*), outer metatarsal tubercle present (versus absent in *Kurixalus viridescens*); toe webbing formula I2-2II1 $\frac{1}{3}$ -2 $\frac{1}{2}$ III1 $\frac{3}{4}$ -2IV2-1V (versus I2-2 $\frac{3}{4}$ II1 $\frac{1}{2}$ -2 $\frac{3}{4}$ III1 $\frac{1}{2}$ -3IV2 $\frac{1}{2}$ -1 $\frac{3}{4}$ V in *K. viridescens*), and the iris light golden with brown or reddish mottles posteriorly (versus golden with some black reticulations in *K. viridescens*).

Distribution: In Vietnam, *R. gryllus* was originally discovered from Langbian Plateau, Lam Dong Province by Smith (1924). This species was also reported from northern Vietnam: Lao Cai, Ha Giang, Cao Bang, Tuyen Quang, Lang Son, Vinh Phuc, Thai Nguyen and Thanh Hoa provinces as well as from central provinces: Dak Lak, Gia Lai, Kon Tum (Nguyen et al. 2009). This is the first record of *R. gryllus* from Khanh Hoa Province. Elsewhere, it has been known from Champasak Province of Laos (Frost 2014, and Orlov et al. 2012).

Agamidae

Acanthosaura coronata Günther, 1861

Coronated Tree Lizard / O ro vanh (Fig. 4)

Specimen examined: One adult female, collected by T. M. Phung on 1 November 2011 from Nui Dinh Mountain (ca. 10°30'N, 107°07'E), Tan Thanh District, Ba Ria – Vung Tau Province. This specimen was released after examining of morphological characters.

Morphological characters: SVL 90 mm, TaL 125.9 mm (n=1); forepart of head deeply concave; scales on upper head inhomogeneous, obtusely keeled, much smaller in size in posterior part; canthus rostralis and supraciliary edge distinct; a long spine behind the eye present; another spine on the back of the head present, mid-way between tympanum and nuchal crest; tympanum one-third to one-half the diameter of orbit; 10–13 supralabials.

Dorsal scales small, keeled, intermixed with much larger, strongly keeled scale; scales on upper rows larger in size, pointing upwards, lateral scales pointing backwards and upwards, sometimes downwards; ventrals as large as

the largest dorsal scales, strongly keeled; gular sac absent; gular scales strongly keeled, smaller than the ventrals; a strong oblique fold present in front of shoulder; nuchal crest with triangular spines; dorsal crest continuous with the nuchal crest, reduced as a prominent ridge, composed of broad scales; hind limb extending to the tip of the snout. Tail compressed, subtriangular at base, covered with keeled scales above, strongly keeled and elongated scales below.

Coloration in life: Dorsal surface of head and body dark grey; dorsum and tail base with four light bands, edged by black posteriorly; head light green or yellow; a dark cross-bar present between eyes; some dark lines radiating from eyes; belly cream (identification after Smith 1935).

Distribution: In Vietnam, this species has been known from Dak Lak, Lam Dong, and Dong Nai provinces. Elsewhere, it was reported from Cambodia (Nguyen et al. 2009).

Gekkonidae

Gekko grossmanni Günther, 1994

Grossman's gecko / Tac ke g-ro-s-man (Fig. 5)

Specimens examined: VNMN 960 (male), VNMN 959 and ZFMK 94125-94126 (females), collected by T. M. Phung on 27 March 2010 from Ca Na forest (ca. 11°19'N, 108°49'E), Ninh Phuoc District, Ninh Thuan Province.

Morphological characters: SVL 71–86 mm, TaL 84.8–101.6 mm (n=4); head longer than wide (HL 20–23.9 mm, HW 13.1–17.2 mm), axillary-groin distance 29.2–34.4 mm.

Rostral wider than high, rarely with X- or Y-shaped suture, touching nostril; supranasals 2 (rarely 3); internasals 0–1; interorbital scales between anterior corners of eyes 40–45; supralabials 11–12, infralabials 9–10; dorsum covered by small, unequal granular scales interspersed, flat or slightly keeled tubercles; midbody scales rows 118–122; tubercles surrounded by 9 scales, in 11–13 rows at midbody; tubercles absent on upper surface of limbs and tail; lateroventral fold distinct; ventral scale rows between lateral folds 29–31; ventral scales along underside of body from mental to the cloacal slit 156–162; subcaudals 86–91, enlarged; precloacal pores 13 (in male), femoral pores absent; finger and toe webbing basal; subdigital lamellae 10–14 under the first finger, 16–18 under the fourth finger, 11–15 under the first toe, 17–18 under the fourth toe.



Fig. 5. Grossmann's Gecko *Gekko grossmanni* (a) and its habitat (b). Photos: Trung M. Phung.

Coloration in life: Dorsal surface of head, body and tail grey intermixed with yellow dots and dark brown marbling; dorsum with several rows of 7–8 light grey spots: one along vertebral and two others on each side; light bands present on upper surface of tail (identification after Günther 1994, in comparison with Ngo & Gamble 2011).

Distribution: This species has been known only from the type locality in Khanh Hoa Province, Vietnam (Nguyen et al. 2009).

Cylindrophiiidae

Cylindrophis ruffus (Laurenti, 1768)

Red-tailed Pipe Snake / Ran trun (Fig. 6a)

One specimen was photographed by T. H. Khuong in October 2011 in Bu Gia Map National Park (ca. 12°10'N, 107°12'E), Binh Phuoc Province.

Identification is based on the characteristic body shape and colour pattern (after Smith 1943): head depressed, snout round; tail very short. Coloration in life: dorsal head



Fig. 6. Red-tailed Pipe Snake *Cylindrophis ruffus* (a) and Guenther's Kukri Snake *Oligodon cinereus pallidocinctus* (b) and its habitat (c). Photos: Thang H. Khuong.

and body blackish brown, iridescent, with narrow light cross-bars, extending to the middle of the back; an orange ring present near the tip of tail; venter black with white bars; ventral surface of tail with orange bars.

Distribution: In Vietnam, this species is known from Vinh Phuc Province in the North southwards to Ca Mau Province. Elsewhere, it has been recorded from China, Myanmar, Thailand, Laos, Cambodia, Malaysia, Singapore, and Indonesia (Nguyen et al. 2009).

Colubridae

Oligodon cinereus pallidocinctus (Bourret, 1934)

Guenther's Kukri Snake / Rán khiem xam (Fig. 6b,c)

Specimens examined: IEBR A.2012.8, adult female, collected by T. M. Phung and T. H. Khuong on 12 September 2011 from Bu Gia Map National Park (ca. 12°10'N, 107°12'E), Binh Phuoc Province.

Morphological characters: SVL 540 mm, TaL: 72 mm; maxillary teeth 12/12; loreal 1/1; supralabials 8/8, fourth and fifth entering orbit; infralabials 8/8; preocular single; postoculars 2; temporals 1+2; dorsal scale rows 17-17-15, smooth; cloacal entire; ventral scales 183, subcaudals 34, divided.

Coloration in life: Dorsal head with a grey chevron; dorsal surface of body reddish brown with 26 grey, black-edged bands on body, 4 bands on tail; ventral surface cream with dark spots (identification after Bourret 1936 and Smith 1943).

Remarks: The female specimen differs from the description of Bourret (1936) in having more ventrals (183 versus 176), fewer subcaudals (34 vs. 40). Smith (1943) mentioned the number of light bands of this subspecies to be varying from 27–34 on body and 3–4 on tail. Because the intraspecific taxonomy of *Oligodon cinereus* remains unresolved (David et al. 2011), we provisionally considered *pallidocinctus* as a subspecies of this species.

Distribution: In Vietnam, this subspecies is known from Thua Thien – Hue and Ba Ria – Vung Tau provinces, and Ho Chi Minh City (“Form IV” in Smith 1943). Elsewhere, *Oligodon cinereus* has a wide range from India and China throughout the Indochina region southward to Thailand (Nguyen et al. 2009).

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