

## A NEW SPECIES OF *RHACOPHORUS* (ANURA: RHACOPHORIDAE) FROM GUNUNG GADING, SARAWAK

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**ABSTRACT.** – A new species of rhacophorid of the genus *Rhacophorus* is described from Gunung Gading National Park, Sarawak, western Borneo. *Rhacophorus gadingensis*, new species, is compared with congeners from Borneo and other parts of southeast Asia. The new species is diagnosable in showing the following combination of characters: SVL 29.5 mm in the larger of the two specimens known; snout obtuse, slightly projecting beyond mandible; head wider than long; fingers and toes webbed; lacking nuptial pads (in males) and a dermal flap along forearm; a weak supracloacal fold; spinose calcar present; skin not co-ossified to forehead, median lingual process absent; supratympanic fold weak; dorsum brown, with a dark interorbital bar; dark brown blotches on dorsum and flanks with blue blotches.

**KEY WORDS.** – *Rhacophorus*, new species, *Rhacophorus gadingensis*, Rhacophoridae, systematics, Borneo.

### INTRODUCTION

The genus *Rhacophorus* Kuhl & van Hasselt, 1822 (Anura: Rhacophoridae), as defined by Brown & Alcala (1994), is known to contain over 60 nominal species of which at least 41 occur in southeast Asia alone (Frost, 1985; Harvey et al., 2002; Inger et al., 1999; Iskandar & Colijn, 2000; Ohler et al., 2000; Vasudevan & Dutta, 2000). The members of the genus are distributed from southern China, Sri Lanka & southwestern and northeastern India south to Indo-China and Indo-Malaya (Frost, 1985). Of these, as many as 14 species have been reported from Borneo (Inger & Stuebing, 1997; Inger & Tan, 1996).

The herpetofauna of Gunung Gading, a granite massif in Sarawak, western Borneo, was subject to the attention of the Italian nobleman, the Marquis Giacomo Doria of Genoa (1840–1913) and the botanist Odoardo Beccari (1843–1920), in the 1860s, incidental to their botanical collections. Herpetological material collected during this expedition were described in a series of papers by the German zoologist, Wilhelm Carl Hartweg Peters (1815–1883) of the Zoologisches Museum Humboldt-Universität, Berlin. No new rhacophorids, however, were described on the basis of these collections.

We report here a new species of *Rhacophorus*, which does not match any of the described species of the genus from Borneo and from any other part of southeast Asia, and is here described as new to science. The species is allocated to *Rhacophorus* for showing the following characters considered diagnostic for the genus, according to the concept of Brown and Alcala (1994; see also, Inger, 1966; Wilkinson & Drewes, 2000; Wilkinson et al., 2002): fingers webbed; tips of digits disk-like, with circummarginal grooves; vomerine teeth present; and eyes large. For a critique of other concepts of the genus, where character states are not explicitly stated (e.g., Dubois, 1986; 1992; Iskandar & Colijn, 2000), see Harvey et al. (2002).

### MATERIALS AND METHODS

The holotype and paratype were collected at ca. 0200–0230 hrs. photographed in life, fixed in formalin ca. four hours after collection, and subsequently washed in water and transferred to 70% ethanol about two weeks after collection. The following measurements were taken with Mitutoyo™ dial vernier callipers (to the nearest 0.1 mm) ca. four months after collection: snout-vent length (SVL, from tip of snout to vent); tibia length (TBL, distance between surface of knee to surface

of heel, with both tibia and tarsus flexed); head length (HL, distance between angle of jaws and snout-tip); head width (HW, measured at angle of jaws); head depth (HD, greatest transverse depth of head, taken posterior of the orbital region); eye diameter (ED, horizontal diameter of the eyes); interorbital distance (IO, least distance between upper eyelids; internarial distance (IN, distance between nostrils); eye to snout distance (E-S, distance between anterior-most point of eyes and tip of snout); eye to nostril distance (E-N, distance between anterior-most point of eyes and nostrils); axilla to groin distance (A-G, distance between posterior edge of forelimb at its insertion to body to anterior edge of hind limb at its insertion to body); body width (BW, greatest width of body); and tympanum diameter (TD, vertical and horizontal). Colour notes were taken from Fujichrome Velvia 50 ASA 35 mm slide transparency film, and compared with colour swatches of F. B. Smith (1975; 1981). Sex was determined through dissection to examine the gonads.

Comparative materials examined are listed in Appendix I. Sources of additional data on character states and distribution of congeneric species of *Rhacophorus* include the following works: Alcala & Brown (1998), Berry (1975), Boulenger (1882; 1912), Bourret (1942), Brown & Alcala (1994), Hoffmann (1995), Inger (1954; 1966), Inger & Stuebing (1989; 1997), Iskandar (1998), Malkmus et al. (2002), Manthey & Steiof (1998), Ohler et al. (2000), Taylor (1962), van Kampen (1923) and Ziegler & Köhler (2001). Museum abbreviations, where available (indicated with an asterisk), follow Leviton et al. (1985). These include:

Natural History Museum, London, U.K. (BMNH\*)  
 Zoological Museum of the Department of Wildlife and National Parks, Kuala Lumpur, Malaysia (DWNP)  
 Forest Research Institute Malaysia, Kepong, Malaysia (FRIM)  
 Philippines National Museum, Manila, Philippines (PNM\*)  
 Sarawak Biodiversity Centre, Semenggoh, Sarawak, Malaysia (SBC)  
 Sarawak Museum, Kuching, Sarawak, Malaysia (SM\*)  
 Sabah Parks Zoological Museum, Gunung Kinabalu Park, Sabah, Malaysia (SP)  
 Zoological Museum of the Department of Biology, Universiti Brunei Darussalam, Bandar Seri Begawan, Brunei Darussalam (UBD)  
 Raffles Museum of Biodiversity Research, National University of Singapore, Singapore (ZRC; the abbreviation used in Leviton et al., 1985, is USDZ\*).

Specimens with ID-field numbers are being accessioned with this collection, apart from the types of the present species.

## SYSTEMATICS

### *Rhacophorus gadingensis*, new species (Figs. 1–2)

**Material examined.** – Holotype: Adult female (ZRC 1.11532)(field number ID-7831) from Gunung Gading (03°42'2"N 115°32'06"E), Lundu Division, Sarawak, East Malaysia (Borneo), coll. I. Das, 13 Aug. 2004.

Paratype: Adult male (ZRC)(field number ID-7832), paratotype; same data as for holotype.

**Diagnosis.** – A small (SVL 29.5 mm in the larger of two specimens) species of *Rhacophorus*, diagnosable from congeneric species in showing the following combination of characters: snout obtuse, slightly projecting beyond mandible; head wider than long; fingers and toes webbed; lacking nuptial pads (in males) and dermal flap along forearm; a weak supracloacal fold; spinose calcar present; skin not co-ossified to forehead, median lingual process absent; supratympanic fold weak; dorsum brown, with a dark interorbital bar; dark brown blotches on dorsum and flanks with blue blotches.

**Description of holotype (adult female).** – A small species of *Rhacophorus*, SVL 29.5 mm; body elongate, with a narrow waist; head broader than long (HW/HL ratio 1.9); snout slopes slightly beyond mandible in lateral view and obtuse in dorsal view; nares oval, laterally positioned, nearer tip of snout than to orbit of eye (E-N/E-S ratio 0.71); internarial distance slightly less than distance from anterior margin of eye to nostril (IN/E-N ratio 0.97); eye large (ED/HL ratio 0.56); pupil vertical; its diameter greater than eye to nostril distance (ED/E-N ratio 1.55); skin not co-ossified to forehead; pinal ocellus absent; interorbital width greater than upper eyelid width (IO/UE ratio 1.82); canthus rostralis distinct; loreal region vertical; maxillary teeth present; a weak 'W'-shaped notch (= symphyial knob) on anterior edge of mandible; mouth extends to posterior corner of eye; tongue subtriangular, smooth, bifid apically, lacking a median lingual process, free posteriorly for a third its length; choanae located close to anterior of palate; vomerine ridge reduced, in two oblique series, beginning at inner front edge of choana, and closer to choanae than to each other; pupil horizontal; no rictal gland at posterior corner of mouth; tympanum distinct; its horizontal diameter slightly larger than the vertical diameter, and a third of the eye diameter; supratympanic fold weak; no dermal flap along forearm; weak supracloacal fold and postcloacal tubercles absent; dorsum, including upper eyelids and upper surfaces of limbs smooth; abdomen and inner side of thighs with weak glandular structures.



Fig. 1. Lateral view of holotype of *Rhacophorus gadingensis*, new species, in life (ZRC 1.11532).

Arm moderately long and thin; fingers long and thin, webbing on finger I, none; on finger II, none (inner) and to basal subarticular tubercle (outer); on finger III, to basal subarticular tubercle (inner) and to distal subarticular tubercle (outer), and on finger IV, to distal subarticular tubercle; relative length of fingers:  $3 > 4 > 2 > 1$ ; finger tips dilated, with circummarginal grooves; width of disk on finger III greater than tympanum diameter; subarticular tubercles prominent, rounded, numbering one on first and second fingers, two on third and fourth fingers; palmar tubercles indistinct; hind limbs relatively long and thin, meeting each other but not overlapping when folded right angle to body; toes long and thin; webbing on toe I, to base of disk; toe II, to distal subarticular tubercle (inner) and base of disk (outer); toe III, to distal subarticular tubercle (inner) and base of disk (outer); toe IV, to distal subarticular tubercle (both outer and inner); and toe V, to base of disk; relative length of toes (longest to shortest):  $4 > 3 > 5 > 2 > 1$ ; toe tips rounded; subarticular tubercles weakly developed, rounded, numbering one on first and second toes; two on third and fifth toes; and three on fourth toe; inner and outer metatarsal tubercles absent; disks on fingers wider than those on toes; heel bears a weak postaxial fold, with a spinous calcar proximally.

**Colour.** In life, tawny (# 38) dorsally, with a thin antique brown interorbital band that extends across the eyelids; large blotches of the same color on torso, including a transversely widened one at nuchal region, two paired oval ones on midbody and a single median one on sacral region; throat

and rest of venter unpigmented yellow-cream, flanks of body with sky blue (# 168D) blotches enclosing irregular brown (# 129) areas; upper surfaces of limbs with light brown cross-bars; and lower surfaces of thighs and tibia yellow-cream coloured; digits of arms and webbing pale yellow cream; those of the feet, including webbing, greyish-yellow; pupil black; surrounding iris gem ruby (# 110), lightening to buff (# 124) peripherally.

**Measurements (in mm; holotype, followed by paratype in parentheses).** – SVL 29.5 (23.7); HL 8.1 (7.1); HW 9.6 (8.3); HD 5.0 (4.0); BW 7.8 (5.5); TBL 16.7 (13.3); TD (vertical) 1.6 (1.3); TD (horizontal) 1.5 (1.9); ED 4.5 (3.7); UE 3.3 (3.2); IN 2.8 (3.0); IO 6.0 (5.1); E-S 4.1 (3.8); E-N 2.9 (2.0); E-T 0.6 (0.6); A-G 15.8 (12.5).

**Variation.** – The paratype, a male, is smaller in size than the female holotype. It lacks nuptial pads or external vocal pouches.

**Etymology.** – The new species is named for Gunung Gading, the type locality of the new species.

**Ecological notes.** – The holotype and paratype were found on vegetation, ca. 3 m and 1 m, respectively, overhanging granite boulders at the edge of a torrential forest stream,  $> 8$  m in width. They were collected ca. 0200-0230 h. The call and larval stages of the new species remain unknown. The following species of frogs were found sympatric with the new species: *Chaperina fusca*, *Limnonectes laticeps*, *L. leporinus*, *L. kuhlii*, *Meristogenys poecilus*, *Rana hosii*, *R. picturata*, *R. raniceps*, *Staurois guttatus*, *Nyctixalus pictus*, *Philautus tectus*, *Polypedates colletti*, *Rhacophorus appendiculatus*, *R. pardalis*, *Rhacophorus kajau*, *Leptolalax hamidi*, *Megophrys nasuta* and *Ansonia spinulifer*.

## COMPARISONS

The only congeners from Borneo with a calcar are *Rhacophorus angulirostris* (Ahl, 1927) (Borneo and possibly Sumatra), which differs from the new species in showing a short, pointed snout; two outer fingers webbed to pads; flanks and inner surfaces of legs yellow with several large spots; and colour variable but with one or several subocular light spots (see Malkmus, 1993; 1995); *R. baluensis* Inger, 1954 (a Borneo endemic), which differs from the new species in its smooth dermal ridge from outer fingers to elbow, and another from outer toe to heel; and dorsum light or dark brown, with either dark transverse marks or irregular light blotches; *R. dulitensis* Boulenger, 1892 (Peninsular Malaysia, Sumatra, Borneo), which shows a sharp, pointed snout; toes webbed to base of disks; edge of webbing of outer toes red; and dorsum green, with or without small white dots; and *R. pardalis* Günther, 1858 (Philippines, Borneo, Sumatra), which differs from the new species in showing a head longer than broad; tympanum half eye diameter; nuptial pad on finger I; iris orange; and webbing on hand and feet orangish-red. Additionally, in the last two nominal species, the appendage at the heel is a rounded narrow or broad flap.

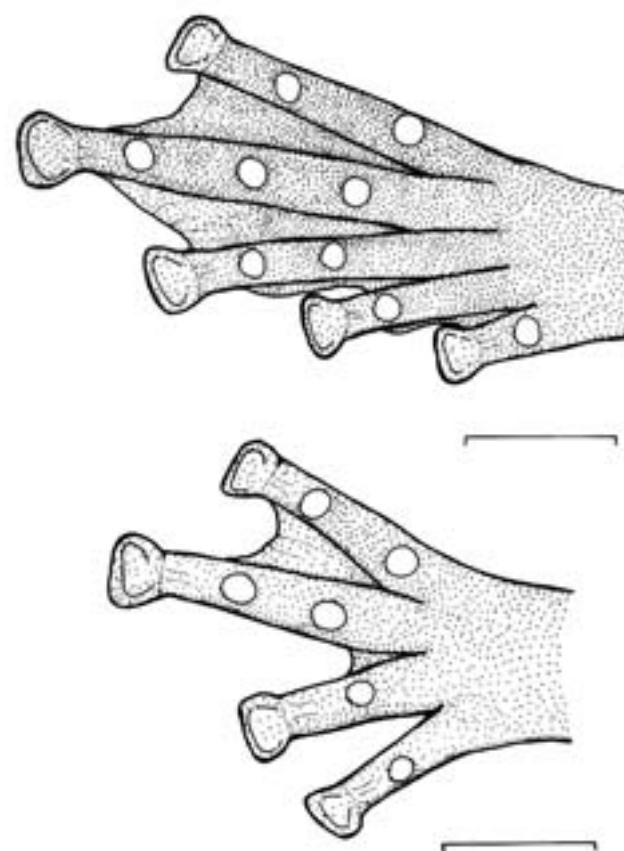


Fig. 2. Hand and feet of the holotype of *Rhacophorus gadingensis*, new species, (ZRC 1.11532). Markers = 5 mm.

The presence of a calcar at the heel separates *Rhacophorus gadingensis*, new species, from the following Bornean congeners (additional characters at variance to that seen in the new species follow): *R. appendiculatus* (Günther, 1859) (Thailand, Peninsular Malaysia, Sumatra, Borneo, southern Philippines), head longer than wide; tympanum half eye diameter; a cutaneous fringe along edge of jaws and along, inner edge of tarsus and forearm; and dorsum green with darker variegations; *R. cyanopunctatus* (Manthey & Steiof, 1998) (Thailand, Vietnam, Peninsular Malaysia, Sumatra, Borneo); vomerine teeth rows absent; fingers with narrow dermal fringe; hind limbs long, overlapping when folded right angle to body; a white spot below eye; flanks and inner side of lower thigh and shank dark brown with blue spots; and dorsum sandy brown; *R. fasciatus* Boulenger, 1895 (Borneo), vomerine teeth in two long oblique series; fingers and toes webbed to base of disks; and dorsum pale reddish-brown, with brown specklings and dark brown cross-bars; *R. gauni* (Inger, 1966) (Borneo), a conical dermal tubercle in middle of upper eyelid; vomerine teeth absent; and a row of tubercles on edge of lower arm; *R. everetti* Boulenger, 1894 (Palawan, Borneo), a small inner metatarsal tubercle; dorsal surface with widely scattered tubercles with pointed projections; and dorsum green red and yellow variegations; *R. harrissoni* Inger & Haile, 1960 (Borneo), toes webbed to base of disks; dorsum reddish-brown, flanks greenish-yellow; SVL of males 50-56 mm; of females 60-70 mm; *R. kajau* Dring, 1983 (Borneo), a narrow dermal ridge along arm and along hind limb; dorsum green, with small white spots; and webbing black; *R. nigropalmatus* Boulenger, 1895 (Thailand, Peninsular Malaysia, Sumatra, Borneo), snout rounded, not projecting; tympanum half to two-thirds eye diameter; webbing reaches disk of finger IV as a broad sheet; dorsum green; webbing on hand and feet marked with black; *R. reinwardtii* (Schlegel, 1837) (Borneo, Java, Thailand, Peninsular Malaysia and Vietnam), tympanum three-fourths eye diameter; fingers and toes webbed to disks; cutaneous fringe along forearm; and dorsum green, with a black axillary spot; large black area in webbings of fingers and toes; and *R. rufipes* Inger, 1966 (Borneo), tympanum three-fourths eye diameter; webbing on hand and feet orangish-red.

The new species from Gunung Gading is compared with other congeners from southeast Asia, listing only opposing suite of characters. *Rhacophorus achantharrhena* Harvey et al., 2002 (Sumatra), male SVL to 40.55 mm; thick smooth dermal flaps along margins of forearm and tarsus; dorsum weakly spiculate in males; supratympanic fold thick and conspicuous; and dorsum green; *R. annamensis* Smith, 1924 (southern Vietnam), snout rounded; tympanum half eye diameter; webbing on fingers and toes reaching the base of disks; and dorsum with irregular black, red or green spots; *R. baliogaster* Inger et al., 1999 (Vietnam), dorsum dark brown, with small, irregular dark spots; ventral surface of head and body white with black spots; and females with a distinct rostral cone; *R. barisani* Harvey et al., 2002 (Sumatra), male SVL to 53.16 mm; nares about equidistant between eye and snout-tip; low dermal ridge or tubercles along ulna and tarsus; dermal flap with long triangular calcar present at tibio-tarsal articulation; dorsum diffusely covered with rounded tubercles; and dorsum

brown with cross-bands; *R. bifasciatus* van Kampen, 1923 (Sumatra), tympanum half to two-thirds eye diameter; toes (except toe IV) webbed to base of disks; and dorsum purple with two irregular white dorsolateral bands; *R. bimaculatus* (Peters, 1867) (Mindanao in the Philippines), tympanum half eye diameter; head with a small, dermal process; dorsum green, with a large white or blue subocular spot; *R. bipunctatus* Ahl, 1927 (southern China, northeastern India, Myanmar, Thailand and Vietnam), webbing on toes (except toe IV) to base of disks; dermal fringe along forearm and tarsus; and dorsum green or grey, with black spots; *R. bisacculus* Taylor, 1962 (northeastern India, Thailand), a row of tubercles on undersurface of arm and another on tarsus; large nuptial pads; and dorsum brown with a darker, subtriangular area on occiput; *R. calcaneus* Smith, 1924 (Vietnam), webbing on outer fingers not reaching base of disks; toes webbed to base of disks; a glandular supratympanic fold; and dorsum pale green with numerous pale yellow spots; *R. catamitus* Harvey et al., 2002 (Sumatra), snout slopes to a low, swollen rostral tubercle; webbing on hand reduced to basal tubercles of fingers I and II; a row of tubercles present along antebrachium and tarsus; tubercle present at tibio-tarsal articulation; dorsum of body shagreened with low tubercles; supratympanic fold thick; and dorsum brown with dark cross-bars; *R. dorsoviridis* Bourret, 1937 (Vietnam), tympanum half eye diameter; webbing on toe IV to penultimate subarticular tubercle; and dorsum green; *R. duboisi* Ohler et al., 2000 (Vietnam), SVL to 65.7 mm; dorsum with small granules; dermal ridge along toe V; canthus rostralis with a brown band; and dorsum green and brown, with spots arranged in bands; venter grey-white with small grey spots; *R. edentulus* Müller, 1894 (Sulawesi), dorsum green, unpattered or with black spots; *R. exechopygus* Inger et al., 1999 (Vietnam), outer fingers webbed to base of disks; weakly crenulated dermal ridges on forearm and tarsus; and dorsum grey to brown, uniform or with obscure dark blotches at back of head; *R. georgii* Roux, 1904 (Sulawesi), head as long as broad; fingers two-third webbed; a small inner metatarsal tubercle; and dorsum pale green with lighter spots; *R. margaritifer* (Schlegel, 1837) (Java), tympanic annulus somewhat indistinct; numerous white tubercles present below vent; and dorsum greyish-white (in preservative; live coloration unknown), finely dotted with black; *R. maximus* Günther, 1859 (southern China, northeastern India, Thailand), tympanum greater than half eye diameter; fingers and toes webbed to disks; large inner metatarsal tubercle; and dorsum blue-green or violet; *R. modestus* Boulenger, 1920 (Sumatra), head as broad as long; snout rounded; tympanum half to two-thirds eye diameter; and dorsum grey or brown, with a white streak or a series of white spots along flanks; *R. monticola* Boulenger, 1896 (Sulawesi), tympanum half eye diameter; finely shagreened above; and dorsum greyish-green, with scattered yellow spots; *R. notater* Smith, 1924 (Vietnam), snout rounded; tympanum indistinct, about half eye diameter; toes webbed to base of disks; a feeble dermal ridge along fore- and hind limbs; and dorsum pale grey with large, irregular blotches; *R. orlovi* Ziegler and Köhler, 2001 (northern Vietnam), calcar absent; webbing complete on feet; and dorsum reddish-brown; *R. poecilonotus* Boulenger, 1920 (Sumatra), head strongly depressed; tympanum two-thirds eye

diameter; and toes webbed to base of disks; *R. prominanus* Smith, 1924 (Thailand, Peninsular Malaysia, Sumatra), tympanum subequal to eye diameter; toes webbed to disks; and dorsum green, with or without dark spots; *R. rhysocephalus* Wolf, 1936 (Sangihe Island) large size, SVL to 85 mm; vomerine teeth separated from each other by a gap almost as broad as length of row; snout rounded; snout longer than eye diameter; tympanum slightly over half eye diameter; subarticular tubercles distinct; heels overlap when hind limbs are placed at right angle to body; skin finely granular, specially at posterior of head and on scapular region; several distinct bone crests on dorsal surface of head, including two short, V-shaped ones above tympanum that diverge distally; three more distinct crests form a U-shape in interorbital region; and dorsally light violet, with dense, dark marbling; *R. robinsoni* Boulenger, 1903 (Thailand), tympanum two-thirds eye diameter; vomerine teeth touching inner edge of choanae; toes webbed to base of disks; a strong supratympanic fold; and dorsum pinkish-brown or pale brown, bluish-grey on flanks; *R. taroensis* Smith, 1940 (Myanmar), head depressed; tympanum adjacent to orbit of eye and subequal in size; toes webbed to base of disks; a dermal fringe on outer side of forearm and hind limbs; and dorsum green with small black spots; *R. turpes* Smith, 1940 (Myanmar), head as broad as long, depressed; toes webbed to base of disks; supratympanic fold glandular; and dorsum pale pinkish-brown, with small black spots in males; and *R. verrucosus* Boulenger, 1893 (Myanmar, Thailand and Vietnam), SVL to 57 mm; body relatively robust; vomerine teeth in two oblique rows from anterior-median margin of choana, the rows only a little shorter than their lengths; snout as long or slightly longer than interorbital distance; toe V > III; tarsal fold present, formed by a broken line of skin folds; tibio-tarsal articulation with spur-like flap; skin dorsally with numerous warts, especially on flanks; tip of snout with small flap; and dorsum brownish-grey above, with lighter and darker lichenous or bark-like blotches.

#### ACKNOWLEDGEMENTS

We would like to thank Datuk Cheong Ek Choon, Controller of National Parks and Nature Reserves, Sarawak Forestry Corporation, for permit (No. 5/2004, dated 06.07.2004) to conduct research on the amphibians of Gunung Gading National Park, and for export of specimens (permit number 04635). We are also grateful to our respective institutions, the Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak and Biozentrum Grindel und Zoologisches Museum, Universität Hamburg, for supporting our research on the amphibian fauna of Borneo, which was supported by a grant from Volkswagen-Stiftung, Germany (grant I/79 405). The second author acknowledges the Economic Planning Unit, at the Prime Minister's Office, Kuala Lumpur, for issuing him a research permit. Curators of the following institutions permitted us to examine comparative material under their care: Colin John McCarthy (BMNH), Lim Boo Liat (DWNP), Norsham Suhaina binti Yaakob (FRIM), Arvin Cantor Diesmos (PNM), Eileen Yen and Margarita Naming (SBC), Charles Leh Moi Ung (SM),

Jamili Nais, Maklarin Lakim and Paul Yambun (SP), Kamariah Abu Salim, Joseph K. Charles, David Edwards and Helen Pang Yoke Yew (UBD) and Kelvin Kok Peng Lim, Peter Kee Lin Ng and Chang Man Yang (ZRC). Finally, we thank Robert F. Inger and Tzi-Ming Leong for helpful comments on the manuscript.

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## APPENDIX I

### List of comparative material examined

*Rhacophorus angulirostris* (Ahl, 1927): Gunung Kinabalu, Sabah, Malaysia (ID-7309; PNM 7951); 16<sup>th</sup> mile, Crocker Range National Park, Sabah, Malaysia (ID-7388; SP 20110; ZRC 1.9085-86); Gunung Trus Madi, Sabah, Malaysia (SP 02913).

*R. appendiculatus* (Günther, 1859): Gn. Podam, Bau, Sarawak, Malaysia (SBC A.00297); Gunung Gading, Sarawak, Malaysia (PNM 7977); Niah National Park, Sarawak, Malaysia (ZRC 1.9021); Sungai Seran, Labang, Sarawak, Malaysia (ZRC 1.2721); Linumumsut Lake, Maliau Basin, Sabah (SP 02817).

*R. baluensis* Inger, 1954: Reked Maligan, Church Camp, Gunung Murud, Sarawak, Malaysia (ZRC 1.9029-32); Gunung Kinabalu, Sabah, Malaysia (ID-7727-28; 7751).

*R. bipunctatus* Ahl, 1927: Genting Highlands, Selangor, Peninsular Malaysia (ZRC 1.8061-65; ZRC 1.9090); Cameron Highlands, Pahang, Peninsular Malaysia (ZRC 1.4077).

*R. cyanopunctatus* (Manthey & Steiof, 1998): Lakum Forest Reserve, Raub, Pahang, Peninsular Malaysia (ZRC 1.10533); Sungai Kinchin, Rompin, Pahang, Peninsular Malaysia (ZRC 1.1684-85); Tawau Hills Park, Sabah, Malaysia (ID 8277).

*R. dulitensis* Boulenger, 1892: Batu Apoi, Brunei Darussalam (UBD 550), Tasek Merembun, Brunei Darussalam (UBD 658; ZRC 1.3162); Tasek Merembun, Brunei Darussalam (UBD 658-59); Baram, Sarawak, Malaysia (ZRC 1.900); Lower Segama, Lahad Datu, Sabah, Malaysia (SP 20377); Tawau Hills Park, Sabah, Malaysia (SP 00637; 01264).

*R. everetti* Boulenger, 1894: Palawan, Philippines (BMNH 94.6.3.126-27; syntypes of *R. everetti*); Kinabalu, Sabah, Malaysia (BMNH 94.6.3.126; syntype of *Rhacophorus everetti macrosceles*); Gunung Kinabalu, Sabah, Malaysia (ID-7720; 7814-7817); 16<sup>th</sup> mile, Crocker Range National Park, Sabah, Malaysia (ID-7422).

*R. fasciatus* Boulenger, 1895: Gunung Mulu, Sarawak, Malaysia (ID-7784); Gunung Penrisen, Sarawak, Malaysia (ZRC 1.901).

*R. gauni* (Inger, 1966): Kilapan, Crocker Range National Park, Sabah, Malaysia (SP 02177); Tawau Hills Park, Sabah, Malaysia (SP 00645); Maliau Basin, Sabah (SP 20244; 20281).

*R. harrissoni* Inger & Haile, 1960: Batu Apoi, Brunei Darussalam (UBD 214).

*R. kajau* Dring, 1983: Gunung Gading, Sarawak, Malaysia (ID-7598); Batu Apoi, Brunei Darussalam (UBD 39, 216, 474, 482, 491, 492, 569; ZRC 1.3154; ZRC 1.8663).

*R. margaritifer* (Schlegel, 1837): Pengalengan, Java, Indonesia (ZRC 1.902).

*R. nigropalmatus* Boulenger, 1895: Batu Apoi, Brunei Darussalam (UBD 366); Silensing, Pahang, Peninsular Malaysia (ZRC

1.1068); Lata Berkoh, Taman Negara, Pahang, Peninsular Malaysia (ZRC 1.10160); Tambunan, Gunung Trus Madi, Sabah, Malaysia (SP 0223).

*R. pardalis* Günther, 1858: Salleh Trail, Sungai Relau, Taman Negara, Pahang, Peninsular Malaysia (DWNP A.1029–30); Interpretive Trail, Sungai Relau, Taman Negara, Pahang, Peninsular Malaysia (DWNP A.1013–14); Poring, Sabah, Malaysia (ID–7351); Gunung Meraja, Bau, Sarawak, Malaysia (SBC A.00008, SBC A.00237); Gunung Podam, Bau, Sarawak, Malaysia (SBC A.00296, A.00300); Pa’Umor, Bario, Kelabit Highlands, Sarawak, Malaysia (ID–7483–84); Lambir Hills, Sarawak, Malaysia (ID–7470–71); Kuala Belalong Field Studies Centre, Temburong District, Brunei Darussalam (ZRC 1.8664–68); Inambacon Caves, Bohol, Philippines (ZRC 1.10831); Mount Maquiling, Laguna, Luzon, Philippines (ZRC 1.10822).

*R. prominanus* Smith, 1924: Cat Snake Trail, middle elevation of Genting Highlands, Selangor, Malaysia (FRIM 0072; 0260–61); Genting Highlands, Selangor, Peninsular Malaysia (ZRC 1.9044–45); Fraser’s Hill, Pahang, Peninsular Malaysia (ZRC 1.3273); Sungai Relau, Taman Negara, Pahang, Peninsular Malaysia (DWNP A.1008).

*R. reinwardtii* (Schlegel, 1837): Sungai Relau, Taman Negara, Pahang, Peninsular Malaysia (DWNP A.0995); Sukabumi, Java, Indonesia (ZRC 1.3640–44); also, “Java” (ZRC 1.5273–75); Interpretive Trail, Sungai Relau, Taman Negara, Pahang, Peninsular Malaysia (DWNP A.0995).

*R. tunkui* Kiew, 1987: Panti Bunker Trail, Johor, Peninsular Malaysia (ZRC 1.10363–74); Taman Negara, Pahang, Peninsular Malaysia (ZRC 1.10162).