

## A NEW SPECIES OF FROG, *PHILAUTUS ERYTHROPHTHALMUS* (RHACOPHORIDAE) FROM SOUTHWESTERN SABAH, MALAYSIA

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**ABSTRACT.** - A new frog species from the family Rhacophoridae, *Philautus erythrophthalmus*, is described from the submontane locality of Muruk Mio in Southwestern Sabah at approximately 1500m asl. The species is a member of the *P. vermiculatus* group, and possesses distinctive colouration and webbing.

**KEYWORDS.** - Rhacophoridae, *Philautus*, Borneo, Sabah, Asian frogs

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### INTRODUCTION

Under the auspices of the Sabah Museum, a technical field team conducted fieldwork and vertebrate sampling near Mt. Muruk Mio at approximately 1580m, one of the highest peaks in western Sabah, adjacent to the Malaysian border with East Kalimantan, Indonesia. The area consists of extremely rugged terrain, with steep slopes and numerous clear swift streams which descend moderate gradients over sandstone substrates. The hills are covered by mossy submontane oak forests dominated by *Lithocarpus* and *Agathis* spp, and trees of the Leguminosae, Araucariaceae and Loganiaceae.

Between April 16-26, fieldwork was carried out at a site located about halfway up the slopes of Mt. Muruk Mio at approximately 1 500m ASL. The forest was in the process of being selectively logged, but substantial patches of primary habitat remained. A total of 21 species of amphibians was obtained, including a new species of the genus *Philautus* reported here.

### MATERIALS AND METHODS

Sampling was done at the Muruk Mio field site using night transects along streams, night transects along forest trails and recent logging tracks or skid trails, and diurnal searching of quadrats on the forest floor. Streams in the vicinity of the camp site and several kilometers to the northeast were surveyed. Specimens

were preserved in 4% formaldehyde solution and transferred subsequently to 75% ethanol.

We have examined relevant material in the collections of Field Museum of Natural History (FMNH) and the Sabah Museum (SSM). Abbreviations are used for snout-vent length (SVL), head width (HW), head length (HL), interorbital width (IOW) and tibia (T).

### *PHILAUTUS* GISTEL, 1848

Borneo has been a major center of evolution for members of this genus, with at least 14 species currently known, of which nine species have been discovered since 1987 (Dring, 1987; Inger & Tan, 1996; Inger & Stuebing, 1996). Many of these have been found in hilly or mountainous areas of Borneo's interior which became accessible to herpetologists largely because of logging operations. Dring (1987) divided the genus, ten at the time, into four species-groups: the *hosei* group includes *hosei* (Boulenger, 1895) and *ingeri* Dring, 1987; the *vermiculatus* group, *acutus* Dring, 1987 and *kerangae* Dring, 1987; the *tectus*-group, *tectus* Dring, 1987; the *aurifasciatus* group, *amoenus* Smith, 1931, *longicrus* (Boulenger, 1894), *mjobergi* Smith, 1925, *petersi* (Boulenger, 1892) and *umbra* Dring 1987. Species with similar characteristics subsequently added to the *vermiculatus*-group include *aurantium* Inger, 1989 and *disgregus* Inger 1989. Within this *vermiculatus*-group, only one (*vermiculatus*) is found outside Borneo, from

the Main Range of Peninsular Malaysia. Of the Bornean species, three of the four (*acutus*, *aurantium*, *kerangae*) have been collected in northeastern Sarawak or southwestern Sabah, while the remaining species (*disgregus*) was collected from Danum Valley in the lowlands of eastern Sabah.

A specimen of *Philautus* collected from the Muruk Mio area at approx. 1550m ASL in the mountainous area southwest of Sipitang, Sabah resembles *P. aurantium*, a small, slender species with golden yellow flash colors on the inner thighs. However, this frog differs from *aurantium* in coloration, and webbing, and we believe it to be a new species, which is described below.

***Philautus erythrophthalmus*, new species**  
(Plate 1)

**Material examined.** - Holotype: female (SSM AMP 2521; field tag No. A 012951), a mature female collected at Mt. Muruk Mio, Sipitang District, Sabah (GPS: 4° 22.715'N, 115° 50.125E) on 20 April 1999 by Albert Lo. The specimen is deposited in the Sabah Museum, Kota Kinabalu.

Paratypes: None

**Diagnosis.** - *Cutaneous pectoris* muscle absent, lingual papilla present though retracted, female with blunt, truncate snout; fifth toe webbed to distal edge of distal subarticular tubercle; sides with dark reticulate markings, anterior face of thigh and groin golden yellow, eye deep reddish orange, snout abruptly truncate in profile; female 26.2 mm.

**Description.** - Habitus slender; head wider than long, snout broadly rounded in dorsal view, truncate in profile, nostril near end of snout, above symphysis. Canthi rounded but distinct, constricted, lores oblique, concave; eye diameter equal to or slightly longer than the snout, interorbital distance wider than upper eyelid; tympanum slightly obscured but visible, about 1/3 the diameter of the eye. Vomerine teeth absent, lingual papilla present, but retracted. No *m. cutaneous pectoris*; *geniohyoideus pars medialis* free.

Fingers with small, weakly rounded discs about twice the width of the terminal phalanges; the disc of the first finger about half the width of the third; Width of the discs of second, third and fourth fingers subequal to the width of the tympanum. First finger shorter than second; webbing only at the base of fingers three and

four. A large middle subarticular tubercle on each finger; a large palmer tubercle at the bases of the first and fourth fingers, with a smaller palmer tubercle at the base of the third; small supernumary tubercles on the metacarpals. Largest discs of toes slightly smaller than those of the two outer fingers.

Third toe longer than fifth; webbing only at base of first and second, and the inside of the third toe, reaching middle subarticular tubercle on the outer side of the third toe, the middle subarticular tubercle of the fourth toe, and the distal subarticular tubercle of the fifth toe, continuing as a narrow fringe to the discs; distal subarticular tubercles conspicuous, the others weak; inner metatarsal tubercle elongated, weak; outer one absent, ventral surface (sole) of foot smooth.

Skin on top of the head, back and sides smooth; . A weak supratympanic fold from eye to shoulder; eyelid finely granular without tubercles; no fringes, or accessory flaps of skin on outer margins of limbs; ventral surface covered with coarse, flat granules.

Enlarged oviduct white.

**Color in life.** - Dorsal surfaces light green, tympanum greyish white; top of inner fingers light green with fine



Fig.1. *Philautus erythrophthalmus*, new species, Holotype female.

Table 1. Key characters for species of *Philautus* from Borneo<sup>1</sup>.

Species	Size, male (mm)	Vomerine teeth	Cutaneous pectoris	Nuptial pad	Snout	Lingual papilla	Heel tubercle	Eyelid tubercle	Markings
<i>P. hosei</i>	41-50	+	+	o	pointed	o	o	o	-
<i>P. ingeri</i>	35-40	+	+	o	pointed	o	+	+	Dark stripe on head between eye and nostril
<i>P. tectus</i>	21-25	+/-o	o	+	pointed	o	o	o	Groin pale, no markings
<i>P. petersi</i>	21-23	o	+	+	pointed	+	+	+	Groin with light & dark network
<i>P. mjobergi</i>	19-21	o	-	+	-	o	o	+/-o	Groin plain, no network
<i>P. longicrus</i>	15-18	o	+	+	pointed	o	o	o	Groin light with grey markings
<i>P. rhopophilus</i>	15-18	O	+	+	pointed	o	+	++	Ant. thigh barred; post. thigh reddish brown
<i>P. kerangae</i>	33-35	+	o	o	rounded	o	+	-	-
<i>P. aurantium</i>	24-28	o	o	o	rounded	o	o	+/-o	Rear of thigh, groin orange
<i>P. disgregus</i>	21-23	o	o	o	rounded	o	o	+	Groin light & dark
<i>P. erythrophthalmus</i>	-	o	o	-	rounded	+(retracted)	o	+/-o	Ant. thigh & groin golden yellow

<sup>1</sup> Comparative data from Division of Amphibians and Reptiles, Field Museum of Natural History kindly provided by Dr. R. F. Inger, and from Inger & Stuebing 1996.

brown reticulation; tips of fingers and toes pinkish; sides whitish with dark reticulate pattern; upper arm, groin and anterior and posterior faces of thigh golden yellow; undersides of thigh yellowish; abdomen cream; iris deep reddish orange with dark network.

**Color in preservative.** - Dorsal surfaces purplish brown, with extremely fine mottling; throat, abdomen and rear of thigh cream colored, immaculate.

Measurements (mm) of holotype: SVL 26.2, HW 10.0, HL 8.4, IOW 3.7, diameter of eye 4.2, diameter of tympanum 1.4, disc of third finger 1.5, T 13.5, W <lg.

**Habitat notes.** - The type specimen was perched 2m above ground on the green leaf of a shrub growing on the bank of a small (1-2 m wide) rocky stream in recently logged montane oak forest at 1550 mASL.

**Comparisons.** *Philautus erythrophthalmus* is the only *Philautus* so far obtained from Borneo which has reddish eyes. Based on characteristics within subdivisions of the genus made by Dring (1987), *P. erythrophthalmus* is a member of the *vermiculatus*-group (Table 1). Although similar in size to *P. aurantium* and having similar flash colors, the new species has no dark spots either dorsally or ventrally, and reduced webbing reaching only to the mid-subarticular tubercle of the fourth toe. *P. erythrophthalmus* differs from *P. acutus* in possessing the tympanum clearly visible, green color in life, golden yellow flash colors on the inner thigh and groin, the absence of an interorbital bar and other dark

markings on the dorsum, and a whitish unmarked venter. These differences also apply to *P. kerangae*, which is also a much larger species than *P. erythrophthalmus*. Differences between *P. erythrophthalmus* and *P. disgregus* include a truncate vs. a pointed snout in *disgregus*, which also possesses a stockier habitus and is not green in life and moderately to densely pigmented on the venter. *P. disgregus* also is known only from elevations below 300m. *Philautus vermiculatus* has never been recorded from Borneo, and has a dark network on the dorsum, and a series of large, black blotches on the thighs (Boulenger, 1912).

**Etymology.** - Specific name the masculine nominative singular of *erythros* (Gr.) meaning reddish, and *ophthalmos* (Gr.) meaning eye, referring to the deep reddish-orange eyes of this species.

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