

**A NEW SPECIES OF FROG OF THE GENUS  
LEPTOBRACHELLA SMITH (ANURA: PELOBATIDAE),  
WITH A KEY TO THE SPECIES FROM BORNEO**

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**ABSTRACT.** - New samples of *Leptobrachella* from Borneo reveal a new species, *L. palmata*, and the first Bornean locality for a second species, *L. serasanae* Dring, 1983. The range of intraspecific variation in other Bornean species is also extended and a key to Bornean species presented.

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**INTRODUCTION**

The genus *Leptobrachella* Smith, 1925 includes the smallest adult forms in the family Pelobatidae and is as yet known only from Borneo and the Bunguran (= Natuna) Islands, 100 km off the western tip of Borneo on the Sunda Shelf. Smith (1925) noted two unique characters of the genus: a very reduced sternum and pointed expansions at the tips of the digits. The reduction of the sternum may represent a pedomorphism as the species of *Leptobrachella* are smaller (snout-vent < 23 mm) than any other known pelobatid. Another distinctive feature of the genus is the absence of denticles on the oral disk of the tadpole (Inger, 1983). Otherwise the oral disk is much like those of larval *Leptolalax* and *Leptobrachium*. Most of the adults collected so far have been caught on the banks of small, rocky, clear streams, and larvae only in gravel and rock at the bottom of riffles in such streams. However, we have found adults in forest floor litter in sufficient numbers to indicate that adults are at stream banks primarily for breeding.

Dring (1983) recently reviewed this genus, describing several new species, two from Borneo and one from the Bunguran Islands, and redefining two previously known species. In the interval between 1984 to 1989, we have obtained large samples of *Leptobrachella* from a number of localities in Sarawak and Sabah at elevations from 175 to 1370 m above sea level. These samples enable us to expand on Dring's work, describe a new species, and prepare a key to the Bornean species.

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## MATERIALS AND METHODS

Specimens were preserved in formalin and later transferred to ethanol. Standard measurements were made with electronic calipers: snout-vent length (SVL), head width (HW), and tibia length (TL). Specimens examined are in the collections of the Field Museum of Natural History (FMNH), Chicago, U.S.A.

**Material examined** - (all in FMNH, in addition to those listed by Dring, 1983) (numbers in parenthesis denote the number of specimens examined) - *Leptobrachella baluensis*: - Sabah: Sipitang District, Mendolong, Mt. Lumaku, 1180-1370 m (12); Tambunam District, Sunsuron, 1300 m (59). *Leptobrachella mjobergi* - Sarawak: Seventh Division, Belaga District, Sungai Segaham, 175 m (160). *Leptobrachella palmata* - Sabah: Labuk and Sugut District, Lipaso Forest Reserve, 310 m (5). *Leptobrachella parva* - Sabah: Lahad Datu District, Danum Valley Field Centre, 170 m (2); Ranau District, Poring Station, Mt. Kinabalu Park 600 m (2); Sipitang District, Mendolong, 700-760 m (43); Tenom District, Sungai Purulon, Crocker Range National Park, 350 m (15). *Leptobrachella serasanae* - Sarawak: Seventh Division, Belaga District, Sungai Segaham, 175 m (4); Kapit District, Nanga Tekalit, 170 m (1).

## RESULTS

*Leptobrachella serasanae* - Five adult frogs, two females and three males, from the Seventh Division, Sarawak, at 175-230 m, fit Dring's (1983) description of *L. serasanae* very closely except for their larger size. Dring gave 16.9 mm as SVL of the unique holotype. The three males from Sarawak measure 16.9-18.5 mm and the two females 20.1 mm. There are no other differences from Dring's description.

*Leptobrachella baluensis* and *L. parva* - Variation in size may be common in the genus. Dring (1983) gave SVL for males of *L. baluensis* Smith from Mt. Mulu, Sarawak, as 15.0-16.0 mm (n=4). Our new sample of *baluensis* from Sunsuron (1300 m), Crocker Range, Sabah, measure 16.9-19.6 mm; six males from Mt. Lumaku (1180-1370 m), Sipitang District, Sabah measure 16.7-17.8 mm. A new sample of 22 males of *L. parva* Dring from Mendolong (750 m), Sipitang District extends the SVL range of that species from 15.0-16.9 to 14.8-17.7 mm.

Our samples of *L. baluensis* show significant geographic variation in relative limb length. In 19 males from Sunsuron, TL/SVL has a range of 0.44-0.52 (median=0.49), whereas in the six from Lumaku the range is 0.53-0.56 (median=0.54). Both ranges differ from that given by Dring for four males from Mt. Mulu, 0.50-0.53.

Dring (1983) stated that on Mt. Mulu, *parva* and *baluensis* could be distinguished solely on the basis of call and by the presence in *baluensis* of some elongated lateral glands. Our new samples of both species from the Mendolong-Lumaku region and the Crocker Range show differences in coloration, with *baluensis* invariably having a few (1-4) large black spots laterally and a distinct dark supratympanic spot or streak. In the samples of *parva*, the supratympanic area is sometimes darker than the surrounding skin but is not sharply demarcated. Also in these *parva*, the sides may have small black dots or narrow black areas surrounding whitish glands, but they do not have black spots.

Five frogs representing a new form of *Leptobrachella* were collected in the Lipaso Forest Reserve, Sabah, and are described here:

***Leptobrachella palmata*, new species**

**Diagnosis.** - A small species, males 14.4-16.8 mm SVL; distinguished from all other known *Leptobrachella* in having toes more than half webbed, and from most species of the genus in having no visible dark dorsal markings (in preservative) and in having the throat and most of the belly devoid of melanophores.

**Material examined.** - Holotype - Adult male (FMNH 236820), bank of a small tributary of Sungai Liwagu, 310 m above sea level, Lipaso Forest Reserve, Labuk and Sugut District, Sabah, coll. R.B. Stuebing, 28.iii.1989.

Paratypes - Four adult males (FMNH 236817-19), same data as holotype.

**Description.** - Habitus moderately slender; snout obtusely pointed in plan view, rounded in profile, not projecting; canthus distinct, rounded; lores weakly concave, nearly vertical; diameter of eye slightly shorter than distance to tip of snout; interorbital wider than upper eyelid; tympanum distinct, less than half eye diameter.

Tips of fingers and toes expanded into small triangular disks, pointed distally; disks of fingers less than half of tympanum; subarticular tubercles inconspicuous; two palmar tubercles, outer about half size of inner; finger lengths  $1 < 2 < 4 < 3$ . Toes with full web to base of disks of toes 1 and 2, to just below disks of toes 3 and 5, leaving two phalanges of fourth toe free; a long, low inner metatarsal tubercle, no outer; no tarsal gland visible.

Skin smooth dorsally and ventrally; sides with rounded glands, scattered or aligned; a distinct, curved supratympanic fold; ventral surfaces smooth.

Colour in alcohol medium brown dorsally, without markings; side of head darker; no supratympanic dark area; sides of torso with dark reticulation enclosing white glands; ventral surface of head and torso white; chin heavily dusted with melanophores; chest and sides of belly invaded by dark reticulation from sides; legs brown dorsally, with dark crossbars, ventrally dusky; lower eyelid with dark margin.

Lineae masculinae thin, indistinct, pinkish.

SVL 14.4-16.8 mm, TL 0.52-0.57 of SVL, HW 0.25-0.28 of SVL. All with subgular vocal sacs.

**Remarks.** - The webbing sets *palmata* apart from all known species of *Leptobrachella*, all the others having rudimentary webbing confined to the bases of the toes. The absence of a thick, black, lateral stripe and the small size also distinguish this species from *serasanae*. The complete absence of melanophores from the center of the belly separates *palmata* from *baluensis*, *mjobergi*, *brevicrus*, and *parva*, all of which have a dark belly or at least a faint dark network of melanophores midventrally. A distinct or faint dark, scapular, W-shaped mark appears in all

the other species, though not in all individuals, but in none of the *palmata*. The small, round ventrolateral glands of *palmata* are similar to those of *parva* but differ from the elongate ones of *mjobergi*.

The following key highlights the differences among the Bornean species.

#### KEY TO BORNEAN SPECIES OF *LEPTOBACHELLA*

1. Third and fifth toes webbed to terminal discs ..... *palmata*
  - Toes with only rudimentary webbing ..... 2
2. Dark lateral stripe continuous from eye to groin ..... *serasanae*
  - With or without small, isolated, dark lateral spots ..... 3
3. Belly dark with many small, irregular light spots; a dark streak on the supratympanic fold ..... *baluensis*
  - Belly light, with or without a faint dark network; no supratympanic streak ..... 4
4. An aligned ventrolateral row of elongated, slightly separated whitish glands from axilla to groin ..... *mjobergi*
  - Ventrolateral glands round, isolated, not aligned ..... 5
5. Adult males 15-17.5 mm; no tarsal gland ..... *parva*
  - Adult males 19-21 mm; tarsal gland present ..... *brevicrus*

#### DISCUSSION

The Bornean species show partial altitudinal stratification. On Mt. Mulu in Sarawak, Dring (1983) recorded *parva* and *mjobergi* at 150-500m, *baluensis* at 900 m, and *brevicrus* at 1800 m. In the Seventh Division, Sarawak, we found *mjobergi* and *serasanae* at 175-230 m. In southwestern Sabah in the Mendolong-Lumaku area, we found *parva* at 700-750 m and *baluensis* at 1180-1370 m. The type locality of *baluensis* is at 2500 m on Mt. Kinabalu. Both *parva* and *palmata* were caught at 310 m, to the southeast of Mt. Kinabalu. Sympatry is apparently pervasive among the species occurring below 1000 m, but has not been observed as yet above that level.

Frogs of this genus have been characterized as ground and herb level dwellers of stream banks (Inger, 1966; Dring, 1983). Although that description applies to the majority we have seen, we have also found adults of *baluensis*, *mjobergi*, *parva*, and *serasanae* in and under leaf litter at some distance from streams in Sarawak and Sabah. We cannot yet say whether the webbed feet of *palmata* denote a shift in behavior.

Larvae have been collected on the slopes of Mt. Kinabalu, in the Crocker Range National Park, and in the Mendolong-Lumaku area (unpublished data), but without differentiation into species.

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#### LITERATURE CITED

- Dring, J. C. M., 1983. Frogs of the genus *Leptobrachella* (Pelobatidae). *Amphibia-Reptilia*, **4**: 89-102.
- Inger, R. F., 1966. The Systematics and Zoogeography of the Amphibia of Borneo. *Fieldiana: Zool.*, **52**: 1-402.
- Inger, R. F., 1983. Larvae of Southeast Asian species of *Leptobrachium* and *Leptobrachella* (Anura: Pelobatidae). pp. 13-32. In: Rhodin, A. & K. Miyata, eds. *Advances in Herpetology and Evolutionary Biology*. Museum of Comparative Zoology, Cambridge, Massachusetts.
- Smith, M. A., 1925. Contributions to the herpetology of Borneo. *Sarawak Mus. J.*, **3**: 15-34.