J. South Asian Nat. Hist., ISSN 1022-0828. May, 2001. Vol. 5, No. 2, pp. 191–199, 11 figs., 1 tab.


# *Polypedates fastigo*, a new tree frog (Ranidae: Rhacophorinae) from Sri Lanka

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**Abstract**

We describe *Polypedates fastigo* sp. nov., the fifth species in this genus to be reported from peninsular India and Sri Lanka. It is distinguished from all other *Polypedates* in this region except *P. longinasus* by its elongate head (head width 73.0–77.8 % of head length, vs. 81.3–102.6 % in *P. eques*, *P. cruciger* and *P. maculatus*) and its greater head length (41.5–44.5 %, vs. 32.8–41.0 % of SVL). It differs from *P. longinasus* by its greater orbit diameter (36.0–40.5 % of head length, vs. 32.5–35.0 %); its lesser eye-to-nostril distance (26.8–29.3 % of head length, vs. 32.8–33.3 %); and lesser snout length (42.0–45.7 % of head length, vs. 47.2–49.7 %). Additionally *P. fastigo* differs from *P. eques* by having a black line on the lower flank, connecting the axilla and groin: in *P. eques* this is either absent or present only as a band of blackish dots. The new species is known only from a small patch of privately-owned forest adjacent to the Sinharaja World Heritage Site.

An examination of its holotype demonstrates that *Polypedates biscutiger* Peters, 1871 is in fact a synonym of *P. cruciger*.

## Introduction

Four species of the rhacophorine genus *Polypedates* Tschudi, 1838 have been reported from Sri Lanka and peninsular India (Dutta, 1997; Dutta & Manamendra-Arachchi, 1996): *P. maculatus* (Gray, 1834) and three Sri Lankan endemic species, *P. cruciger* Blyth, 1852; *P. eques* Günther, 1858; and *P. longinasus* (Ahl, 1931). The Sri Lankan *Polypedates* are distinguished from all the other Rhacophorinae in the island by their relatively large size; the invariable presence of vomerine teeth; and their shared reproductive mode: foam nests overhanging water (all other Sri Lankan rhacophorines are endotrophic and lay terrestrial direct-developing eggs (pers. obs.)). Only a single species in this genus, *P. maculatus* (Gray, 1834), is recognised from peninsular India (Dutta, 1997).

In a long-term survey of the Sri Lankan amphibian fauna (Pethiyagoda & Manamendra-Arachchi, 1998a) we discovered a large number of hitherto-undescribed rhacophorines which, however, included only a single species of *Polypedates*. This is described here as *Polypedates fastigo*, sp. nov.

## Material and methods

The material referred to is deposited at the following institutions: BMNH , Natural History Museum, London; NMSL, National Museum of Sri Lanka, Colombo; WHT , Wildlife Heritage Trust of Sri Lanka, Colombo; ZMB, Universität Humboldt, Zoologisches Museum, Berlin; ZSI, Zoological Survey of India, Calcutta.

Altitudes are given in metres above mean sea level. Sex was determined by dissection, the presence of nuptial pads, and the presence of a vocal sacs or internal openings to a vocal sac. Methods of taking measurements follow Manamendra-Arachchi and Pethiyagoda (1998). Data relating to the holotype are given in square brackets in the description.

**Abbreviations**. ED, horizontal diameter of orbit; EN, distance between anteriormost point of orbit and middle of nostril; ES, snout length, distance between anteriormost point of orbit and tip of snout; FEL, femur length, taken as distance between vent and knee with both femur and tibia flexed; FL, finger length, taken as distance between posterior margin of most proximal subarticular tubercle and tip of finger; FOL, foot length, taken as distance between heel and tip of fourth toe with both tarsus and tibia flexed; HL, head length, taken as distance between angle of jaws and snout tip; HW, head width, measured across angle of jaws; IN, internarial distance, least distance between the inner margins of naris; IO, interorbital width, least distance between the upper margins of orbit; LAL, lower arm length, taken from elbow to wrist; NS, distance between middle of nostril and snout tip; PAL, palm length, taken from wrist to tip of third finger; SVL, snout-vent length, measured from tip of snout to vent; TBL, tibia length, taken as distance between knee and heel with both tibia and tarsus flexed; TL, toe length, taken as distance between posterior margin of most proximal subarticular tubercle and tip of toe; TYH, horizontal diameter of tympanum; TYV, vertical diameter of tympanum; UAL, upper arm length, taken as distance between axilla and elbow; UEW, upper eyelid width, measured from bony edge of supraorbital to outer edge of upper eyelid.

Webbing patterns are shown semidiagramatically (see Fig. 3).

## *Polypedates fastigo* sp. nov.
(Figure 1)

**Holotype.** Male, 37.3 mm SVL, WHT 2352; Morningside Estate (near Rakwana), alt. 1060 m (06°24'N, 80°38'E), Coll. M. M. Bahir & S. V. Nanayakkara, 14 I 1999.

**Paratypes.** (All from type locality.) Females, 63.9 mm SVL, WHT 2027; 59.9 mm SVL, NMSL ARH14(a), Coll. M.M. Bahir & S. Nanayakkara, 05 VIII 1997. Females, 54.8 mm SVL, NMSL ARH14(b); 61.2 mm SVL, WHT 2343, Coll. D. Gabadage & M.M. Bahir, 05 IX 1996. Males, 36.0 mm SVL, WHT 2335; 39.5 mm SVL, WHT 2340; 36.0 mm SVL, WHT 2341, 36.4 mm SVL, WHT 2347; 35.3 mm SVL, WHT 2348; 39.1 mm SVL, WHT 2349, Coll. M. M. Bahir & S. V. Nanayakkara, 12 I 1999.

**Tadpoles.** WHT2902, SVL 17.0 mm, stage 44; WHT 2903, SVL 17.9, stage 43; WHT 2904, SVL 16.9, stage 43; WHT 2905, 17.0 mm SVL, stage 43: coll. K.M.-Arachchi & S. V. Nanayakkara, 30 VI 2000, Morngside FR.

### Diagnosis
*Polypedates fastigo* is distinguished from *P. maculatus* by having a shorter femur (101.2–117.5 % vs. 122.7–152.1 % of HL) and a lesser head width (73.0–77.8 % vs. 91.9–100.0 % of HL). It differs from *P. cruciger* by lacking a a co-ossified skull, possessing a shorter femur (101.2–117.5 % vs. 138.2–163.7 % of HL), a lesser head width (73.0–77.8 % vs. 89.0–102.6 % of HL) and a lesser interorbital width (23.2–28.1 % vs. 31.1–40.6 % of HL). It is diagnosed from *P. longinasus* by its greater orbit diameter (36.0–40.5 % of head length, vs. 32.5–35.0 %); its lesser eye-to-nostril distance (26.8–29.3 % of head length, vs. 32.8–33.3 %); lesser snout length (42.0–45.7 % of head length, vs. 47.2–49.7 %). *Polypedates fastigo* differs from the congener it resembles most closely, *P. eques*, by its lesser foot length (144.0–161.7 % of head length, vs. 164.2–187.7 %); its lesser head width (73.0–77.8 % of head length, vs. 81.3–98.8 %); its longer head (head length 41.5–44.5 % of SVL, vs. 35.5–41.0 %). Additionally *P. fastigo* differs from *P. eques* by having a black line on the lower flank, connecting the axilla and groin: in *P. eques* this is either absent or present only as a band of blackish dots.

### Description
(See Table 1 for morphometric data.) Snout–vent length of mature males 35.3–39.5 mm; females 54.8–63.9 mm. Head longer than width (HL 128.6–137.1 % [137.1 %] of HW; HW 31.1–33.1 % [31.1 %] of SVL; HL 41.5–44.5 % [42.6 %] of SVL). Snout pointed in both dorsal and lateral aspects. Canthus rostralis angular. Canthal edges sharp. Loreal region oblique, concave. Nasal capsule prominent. Nostril oval, dorsolaterally orientated. Internarial area concave; interorbital area flat. Pinal ocellus present. Nostril to snout distance less than eye to nostril distance (NS 56.3–64.4 % [57.8 %] of EN). Internarial distance greater than nostril to snout distance (IN 111.1–123.1 % [119.2 %] of NS). Upper eyelid width subequal to interorbital width (UEW 97.7–117.9 % [116.2 %] of IO). Eye to tip-of-snout distance 42.0–45.7 % [44.0 %] of head length. Supratympanic fold distinct. Tympanum horizontally oval (TYH 108.3–131.6 % [114.3 %] of TYV), its outer rim clear. Vomerine teeth in two groups, elongate; the two groups separated from each other by a distance of 27.8 % of the length of right-hand side group (Fig. 2*a*). Choanae suboval, separated from each other by a distance of 4.5 times the length of the right-hand side choana.

Disks well developed; disks on both fingers and toes rounded or oval; disk on first finger smaller than those on others. Lateral ridges and circum-marginal grooves present on both fingers and toes. Subarticular tubercles on both fingers and toes rounded and oval, those on fingers conical and more prominent than those on toes. Supernumerary tubercles present on both palm and tarsus; two oval palmar tubercles. Fingers free. Male with nuptial pad on top and sides of both first and second fingers and metacarpal area.

Palm length greater than lower-arm length (PAL 133.7–149.4 % [144.3 %] of LAL). Third finger longest (FL III 77.1–87.3 % [87.3 %] of LAL). Upper-arm length 89.6–108.9 % [108.9 %] of lower-arm length; UAL 19.2–23.1 % [23.1 %] of SVL and LAL 20.2–22.5 % [21.2 %] of SVL. Inner metatarsal tubercle oval; outer one absent. A pointed calcar on tibiotarsal articulation. Femur shorter than tibia (FEL 86.2–93.3 % [90.9 %] of TBL; FEL 43.5–49.7 % [48.0 %] of SVL). Tibia shorter than foot (TBL 77.9–80.1 % [80.1 %] of FOL, TBL 48.6–53.5 % [52.8 %] of SVL). Foot length 61.9–68.4 % [66.0 %] of SVL. Fourth toe longest (TL IV 31.7–34.6 % [34.6 %] of FOL). Toes webbed (Fig. 3). Digital formulae: fingers 3>4>2>1; toes, 4>5>3>2>1. Skin of dorsum, chin and chest smooth; granular on abdomen and underside of femur. Prominent white tubercles around vent and

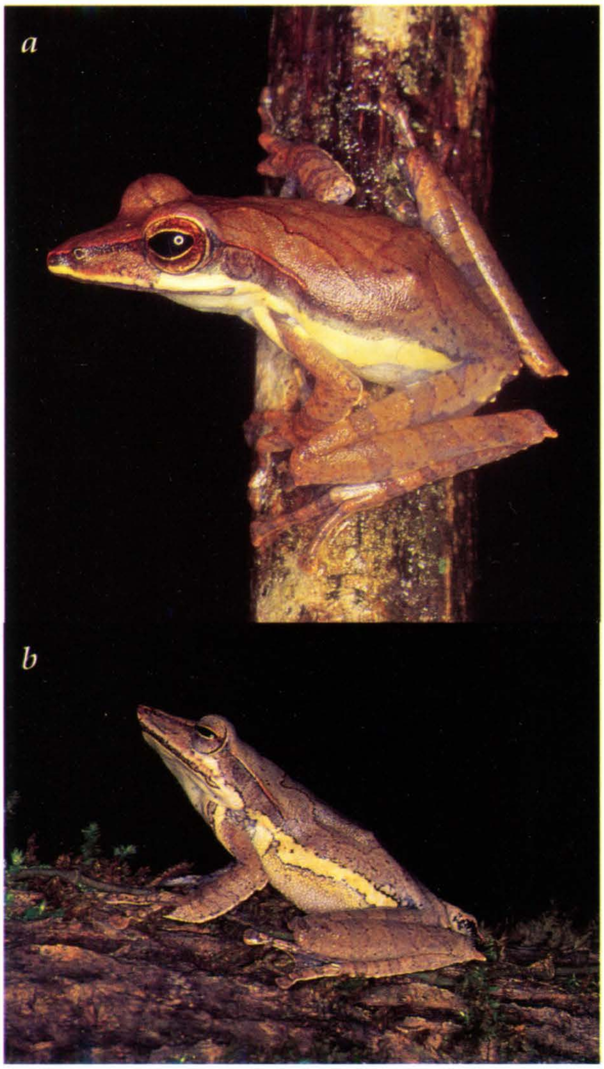


**Figure 1.** *Polypedates fastigo* sp. nov., ***a***, WHT 2352, holotype, male, 37.3 mm SVL, dorsolateral aspect, in life; ***b***, WHT 2027, paratype, female, 63.9 mm SVL, lateral aspect, in life.

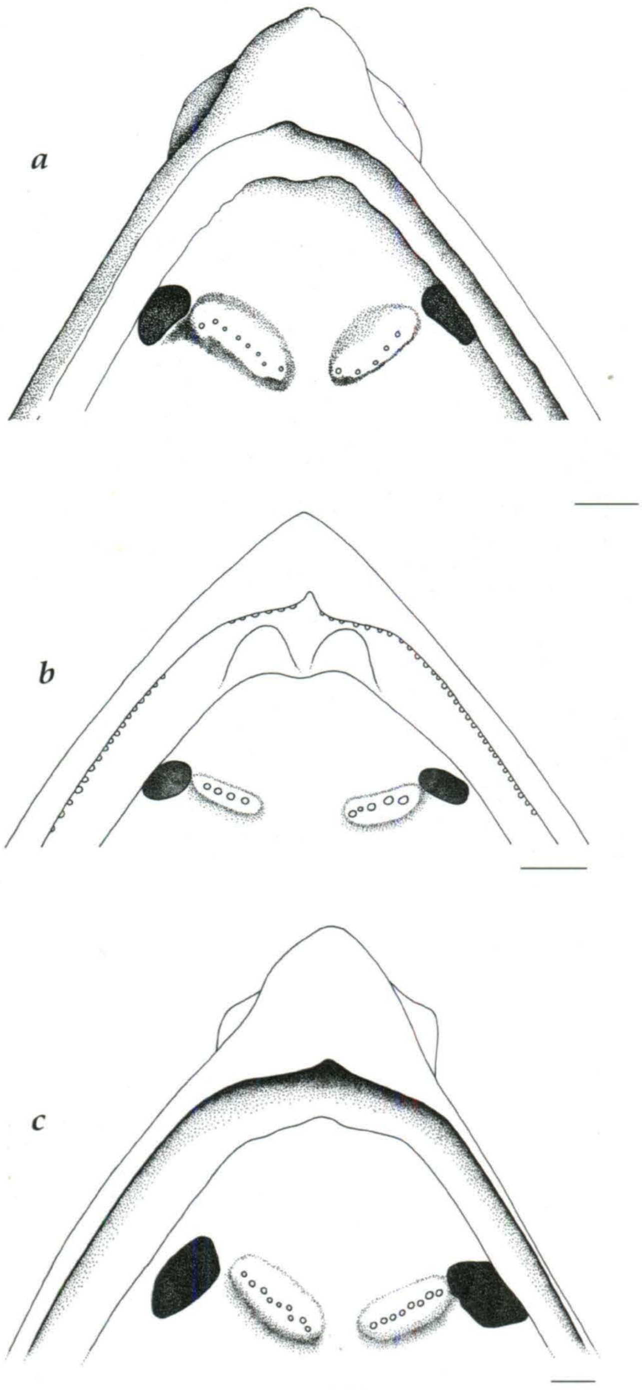


**Figure 2.** Ventral view of palate, showing position of choanae and vomerine teeth of ***a***, *Polypedates fastigo* sp. nov., WHT 2352, holotype, male, 37.3 mm SVL; ***b***, *P. eques*, BMNH 1947.2.27.54, syntype, male, 39.1 mm SVL; and ***c***, *P. longinasus*, BMNH 1947.2.8.61, holotype of *Ixalus nasutus*, female, 58.5, mm SVL. Scale bar = 1 mm.

**Table 1.** Measurements expressed as a percentage of head length of *Polypedates fastigo* sp. nov., holotype, WHT2352, 37.3 mm SVL and 6 paratypes, WHT2335, WHT2340, WHT2341, WHT2347, WHT2348, WHT2349, 35.3–39.5 mm SVL; *Polypedates longinasus*, holotype, BMNH1947.2.8.61, 58.5 mm SVL and 5 topotypes, WHT2304–7, WHT2353, 40.5–45.8 mm SVL; *Polypedates eques*, syntype, BMNH1947.2.27.54, 39.1 mm SVL and 4 topotypes, WHT968, WHT1238 (2 ex.), WHT1313, 32.7–71.0 mm SVL; *Polypedates maculatus*, 6 Sri Lankan specimens, WHT965, WHT969, WHT973, WHT974, WHT1098,WHT1301, 38.6–58.3 mm SVL; and *Polypedates cruciger*, 3 syntypes, ZSI A 10176–78, 53.5–80.1 mm SVL and 4 topotypes, WHT202, WHT1090, WHT1092–3, 59.8–81.0 mm SVL.

| | *Polypedates fastigo* | | | *P. longinasus* | | *P. eques* | | *P. maculatus* | | *P. cruciger* | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | h'type | mean | range | mean | range | mean | range | mean | range | mean | range |
| Orbit diameter | 38.4 | 38.4 | 36.0 – 40.5 | 34.2 | 32.5 – 35.0 | 39.1 | 35.1 – 44.4 | 38.9 | 37.7 – 40.3 | 37.6 | 34.8 – 45.0 |
| Eye-nostril distance | 28.3 | 28.2 | 26.8 – 29.3 | 33.0 | 32.8 – 33.3 | 28.1 | 26.9 – 28.9 | 25.1 | 24.4 – 25.8 | 30.8 | 28.8 – 32.6 |
| Snout length | 44.0 | 44.2 | 42.0 – 45.7 | 48.4 | 47.2 – 49.7 | 44.4 | 41.3 – 47.2 | 41.3 | 37.6 – 45.7 | 45.9 | 41.9 – 51.1 |
| Femur length | 112.6 | 109.2 | 101.2 – 117.5 | 115.8 | 107.7 – 136.1 | 123.9 | 110.6 – 133.3 | 138.3 | 122.7 – 152.1 | 157.1 | 138.2 – 163.7 |
| Length of 1st finger | 17.0 | 17.0 | 15.7 – 18.3 | 17.2 | 16.4 – 18.0 | 19.9 | 16.9 – 23.4 | 23. 5 | 21.2 – 24.7 | 24.5 | 20.4 – 27.4 |
| Length of 2nd finger | 24.5 | 22.6 | 20.7 – 24.5 | 22.0 | 19.8 – 24.0 | 24.38 | 23.0 – 27.0 | 26.6 | 23.8 – 28.2 | 30.8 | 28.8 – 32.3 |
| Length of 3rd finger | 43.4 | 41.5 | 39.0 – 44.2 | 41.1 | 39.0 – 43.7 | 45.9 | 43.0 – 53.2 | 45.7 | 43.0 – 49.3 | 54.2 | 48.7 – 59.3 |
| Length of 4th finger | 35.8 | 34.7 | 33.5 – 36.4 | 34.7 | 33.3 – 35.5 | 38.6 | 35.8 – 46.0 | 38.8 | 34.9 – 41.1 | 47.5 | 39.3 – 51.9 |
| Foot length | 154.7 | 154.7 | 144.0 – 161.7 | 156.9 | 148.9 – 165.5 | 173.6 | 164.2 – 187.7 | 176.7 | 137.8 – 189.3 | 195.2 | 176.3 – 203.8 |
| Head width | 73.0 | 74.9 | 73.0 – 77.8 | 73.6 | 71.4 – 79.7 | 88.6 | 81.3 – 98.8 | 97.0 | 91.9 – 100.0 | 97.6 | 89.0 – 102.6 |
| Internarial width | 19.5 | 19.7 | 19.5 – 20.4 | 18.9 | 17.5 – 19.8 | 22.4 | 21.1 – 24.4 | 24.5 | 22.1 – 26.5 | 20.5 | 18.1 – 22.6 |
| Interorbital width | 23.3 | 25.5 | 23.2 – 28.1 | 23.7 | 21.5 – 26.4 | 30.3 | 28.9 – 32.9 | 30.6 | 28.2 – 32.6 | 36.4 | 31.1 – 40.6 |
| Nostril–snout dist. | 16.4 | 16.9 | 16.4 – 17.5 | 16.3 | 14.6 – 18.6 | 16.2 | 13.9 – 18.7 | 16.1 | 14.1 – 18.1 | 13.6 | 11.5 – 16.2 |
| Snout–vent length | 234.6 | 234.7 | 224.8 – 240.9 | 242.6 | 230.8 – 257.1 | 263.6 | 244.0 – 281.7 | 271.7 | 259.1 – 280.1 | 289.9 | 262.3 – 304.8 |
| Tibia length | 123.9 | 122.2 | 113.1 – 126.0 | 131.6 | 125.6 – 137.2 | 131.8 | 125.2 – 140.1 | 144.2 | 133.3 – 154.2 | 160.2 | 143.0 – 174.5 |
| Length of 1st toe | 16.4 | 16.2 | 14.9 – 17.8 | 17.0 | 15.9 – 18.6 | 19.5 | 16.3 – 23.8 | 21.9 | 19.8 – 23.2 | 24.8 | 17.3 – 33.7 |
| Length of 2nd toe | 20.1 | 20.4 | 19.0 – 22.1 | 20.6 | 19.2 – 22.0 | 23.8 | 20.4 – 28.2 | 25.6 | 22.2 – 27.4 | 29.0 | 23.6 – 33.0 |
| Length of 3rd toe | 34.0 | 32.9 | 31.5 – 34.0 | 32.7 | 30.9 – 35.0 | 38.2 | 35.2 – 43.3 | 41.6 | 38.9 – 45.1 | 45.7 | 38.7 – 48.6 |
| Length of 4th toe | 53.5 | 50.8 | 48.8 – 53.5 | 50.8 | 47.6 – 53.7 | 58.3 | 53.3 – 65.9 | 65.2 | 59.3 – 68.8 | 66.3 | 58.6 – 70.9 |
| Length of 5th toe | 38.4 | 36.1 | 34.4 – 38.4 | 34.8 | 32.1 – 37.3 | 41.3 | 38.1 – 48.0 | 43.9 | 41.3 – 47.2 | 48.4 | 40.8 – 52.0 |
| Horizontal tympanum f | 15.1 | 15.0 | 13.9 – 15.9 | 14.5 | 12.1 – 15.4 | 16.6 | 16.2 – 17.2 | 18.9 | 18.5 – 19.2 | 20.3 | 18.5 – 21.9 |
| Vertical tympanum f | 13.2 | 12.7 | 11.3 – 14.6 | 13.7 | 11.5 – 15.9 | 17.3 | 15.5 – 21.1 | 17.1 | 16.3 – 17.4 | 19.3 | 17.8 – 21.9 |

undersurface of thigh.

Measurements of holotype (WHT 2352) (in mm): ED, 6.1; EN, 4.5; ES, 7.0; FEL, 17.9; FL I, 2.7; FL II, 3.9; FL III, 6.9; FL IV, 5.7; FOL, 24.6; HL, 15.9; HW, 11.6; IN, 3.1; IO, 3.7; LAL, 7.9; NS, 2.6; PAL, 11.4; SVL, 37.3; TBL, 19.7; TL I, 2.6; TL II, 3.2; TL III, 5.4; TL IV, 8.5; TL V, 6.1; TYH, 2.4; TYV, 2.1; UAL, 8.6; UEW, 4.3.

### Description of tadpole

Measurements (all in mm), WHT 2902, Gosner stage 44: SVL, 17.0; total length, 39.9; body depth, 5.9; body width, 7.0; femur length, 7.3; tibia length, 7.1; foot length, 8.6; interorbital width, 3.1; internarial width, 1.7.

Dorsal and anal fins not re-aborbed; toes webbed as in metamorphs; lateral-line system distinct (see Fig. 4*a*,*b*); both upper and lower lips fringed with papillae (Fig. 4*d*); notrils distinct, oval; muscular region of tail fleshy; anal tube invisible; body depressed (dorsally flattened); mouth inferior; well-developed discs on both fingers and toes; circummarginal grooves of digit-tips distinct; subarticular tubercles distinct; inner-metatarsal tubercle well developed and oval-shaped; two well developed palmar tubercles; body and tail smooth.

**Coloration.** In life (Fig. 1), metamorphs dorsally brown or olive green. An incomplete dark-brown hourglass-shaped marking on the dorsum, its outline darker. Canthal ridge and supratympanic fold red, edges of lips black; venter white or pale yellow. Chin and gular area with or without black markings; base of upper arm with a black oval marking. Calcar on tibiotarsal articulation orange, limbs with cross bars. The larger

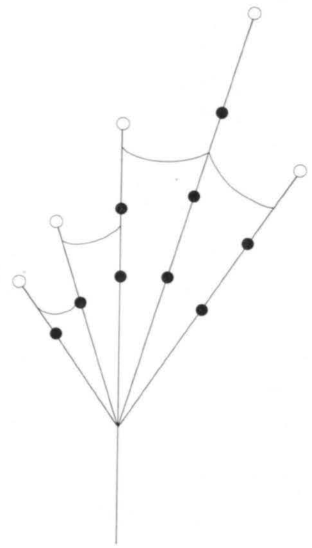

**Figure 3.** Semi-diagrammatic representation of the left-foot webbing pattern of *Polypedates fastigo* sp. nov., WHT 2352, holotype, male, 37.3 mm SVL (the nodes represent subarticular tubercles).

tubercles around the vent orange or yellow.

In alcohol, metamorphs dorsally ashy brown, the hourglass-shaped marking a darker brown; limbs with cross-bars; venter dull white.

In alcohol of tadpole (stage 44, WHT 2902, 17.0 mm SVL). Head and body dark olive green. A darker hourglass-shaped pattern between interorbital and base of tail (see Fig. 4*b*); three dark spots on dorsum; limbs ashy brown dorsally with dark-brown cross-bars; tail yellow, with dark-brown patches; head and body ventrally pale ash; both dorsal and anal fins hyaline.

**Etymology.** The specific epithet *fastigo* (Latin, meaning 'sharpened') is a reference to the pointed snout of this species.

**Habitat and distribution.** We have recorded this species only at the type locality, Morningside Estate (Fig. 5) (06º24'N, 80º38'E, alt. 1060m), Rakwana, adjoining the Sinharaja World Heritage Site. Morningside is a tea plantation around which is an area of private forest underplanted with cardamom. *Polypedates fastigo* was observed in the vicinity of small, shaded pools and patches of marsh within the forest.

Tadpoles were found in the thick leaf-litter substrate of small, shallow (< 15 cm deep), stagnant, heavily shaded forest pools. Adults of *P. fastigo* occurred always in the vicinity of these pools, leading us to conclude that the tadpoles were indeedthose of *P. fastigo*. The only other anuran larvae occurring in the same pools were those of *Limnonectes corrugatus* and *Rana temporalis* (Ranidae).

**Discussion**

Dutta and Manamendra-Arachchi (1996) distinguished Sri Lankan species of *Polypedates* from those of *Rhacophorus* Kuhl & Van Hasselt, 1822 by their allegedly distinct reproductive mode: '...all Sri Lankan *Rhacophorus* have direct development on land, whereas *Polypedates* lay eggs in foam nests and have aquatic larvae.' As pointed out by Dubois (1999) however, while this distinction may well be true for the Sri Lankan species previously assigned to these genera, it does not provide the basis for sound taxonomy especially given that the type species of *Rhacophorus* is a foam nester.

Despite Liem's (1970) diagnosis and validation of the genera *Polypedates* and *Rhacophorus*, there is doubt that the species at present included in each of them belong to distinct lineages (Dubois, 1987, 1999; see also Inger, 1985: 69). Dubois (1999; 2001) proposed that pending a revision of the rhacophorinae, it would be conservative to treat

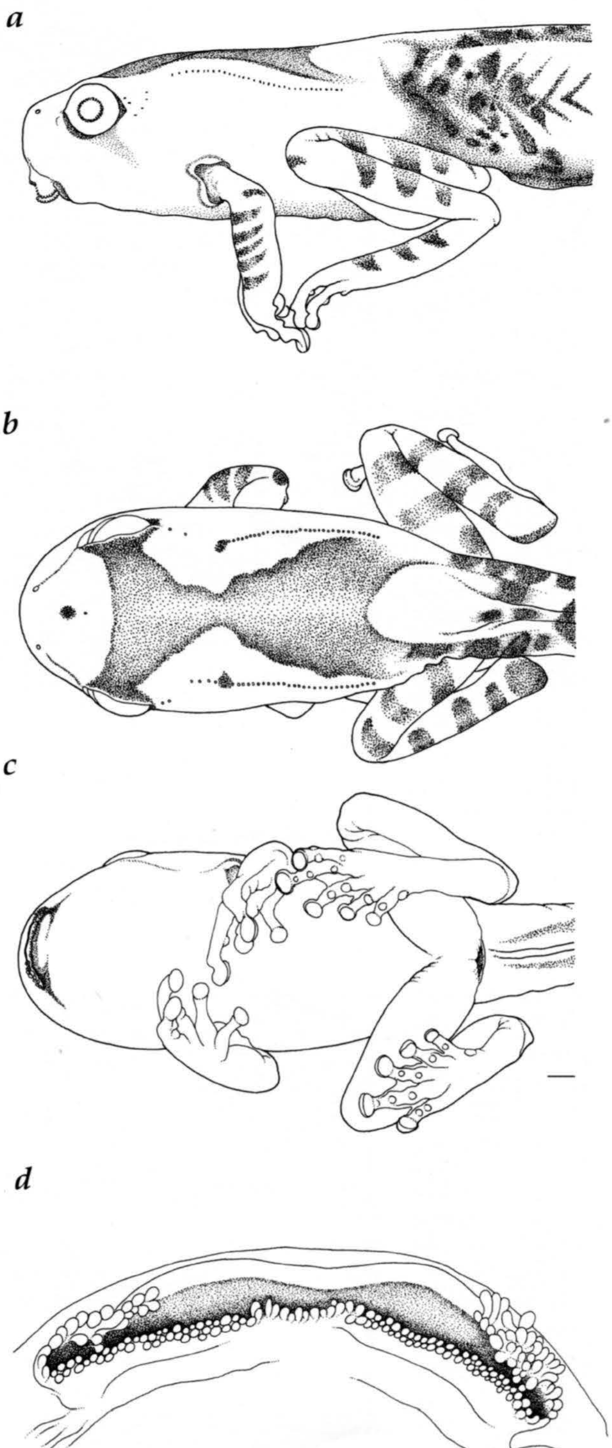


**Figure 4.** Tadpole of *Polypedates fastigo* sp. nov., (WHT 2902, 17.0 mm SVL, 39.9 mm total length, Gosner stage 44): ***a***, lateral aspect; ***b***, dorsal aspect; ***c***, ventral aspect; ***d***, oral disc. Scale bar = 1 mm.

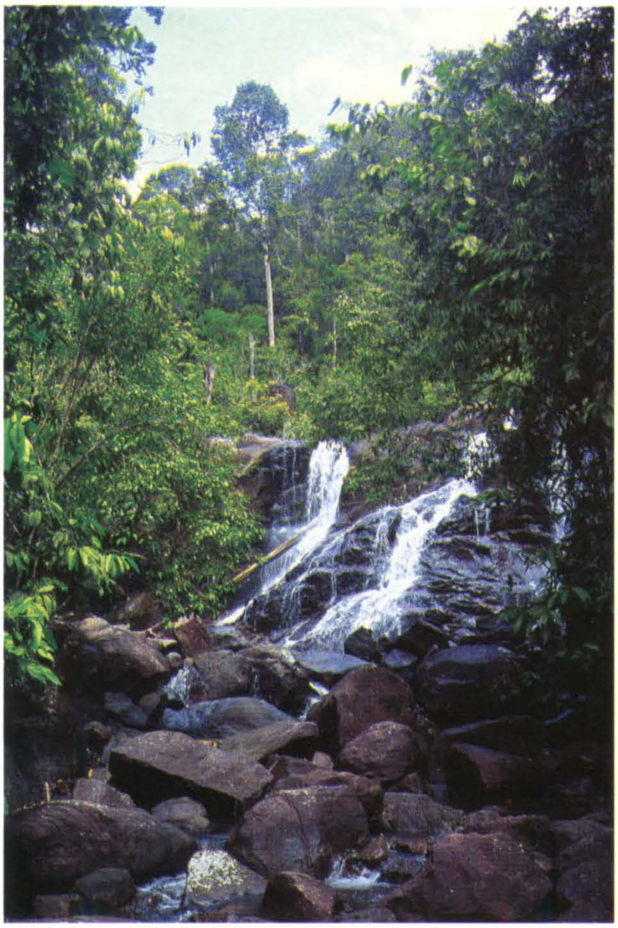

**Figure 5.** Type locality of *Polypedates fastigo*: margins of a stream running through Morningside Estate.

**Figure 6.** *Polypedates eques*, WHT 2937, male, 42.5 mm SVL, Moray Estate, Maskeliya, alt. 1370 m, dorsal aspect, in life (photograph courtesy of Andreas Nöllert).

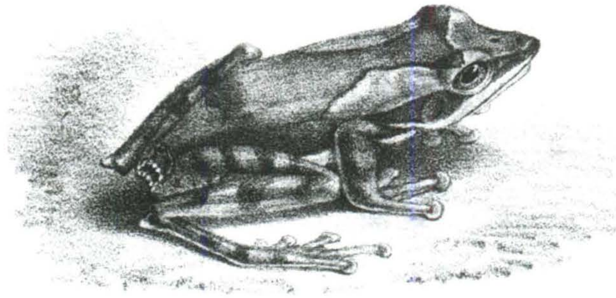

**Figure 7.** Facsimile of Günther's (1858: pl. 6, B) drawing accompanying the original description of *Polypedates eques*.

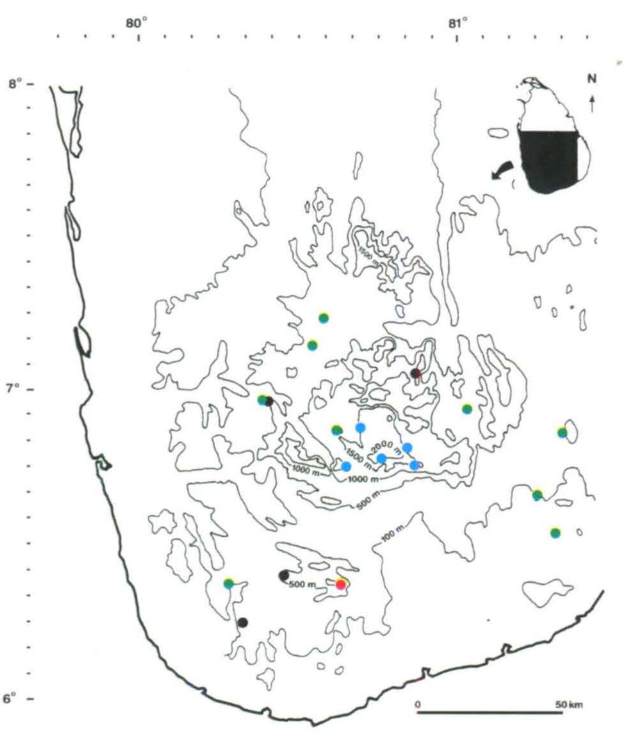


**Figure 8.** Distribution of *Polypedates fastigo* (red circle), *P. eques* (blue circles), *P. longinasus* (black, solid circles) and *P. cruciger* (green circles) in Sri Lanka.

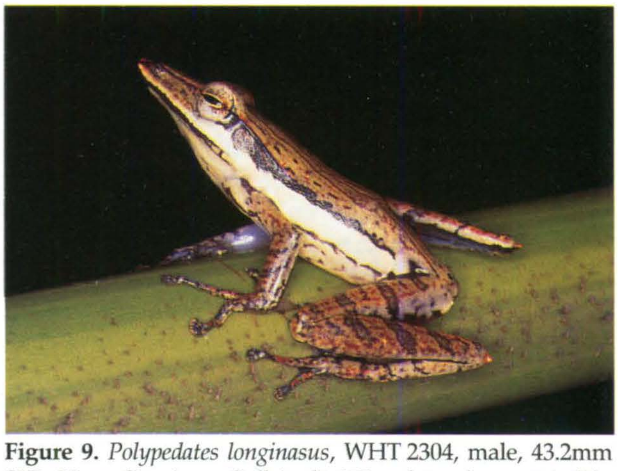

**Figure 9.** *Polypedates longinasus*, WHT 2304, male, 43.2mm SVL, Kanneliya (near Galle), alt. 150 m, lateral aspect, in life.

*Polypedates* as a subgenus of *Rhacophorus*.

We have nevertheless for the present retained *Polypedates* as the genus-name for the Sri Lankan foam-nesting rhacophorines in view of the prevailing uncertainty mentioned above; because mtDNA sequences from parts of the 12S and 16S rRNA genes support their monophyly (Meegaskumbura, pers. comm; and work in progress); and because this usage provides stability through consistency with the current literature for the south Asian region (e.g. Dutta, 1997; Dutta & Manamendra-Arachchi, 1996; Inger, 1999), pending a future revisional treatment.

Because of the overall similarity of their colour patterns, *Polypedates fastigo* has for long been confused with *P. eques* (Fig. 6)— even the specimen of *P. eques* illustrated in Dutta & Manamendra-Arachchi (1996: 174, fig. 204) turns out to be a specimen of *P. fastigo*. Despite this resemblance, *P. fastigo* can readily be distinguished from *P. eques* by its narrower head (head width 73.0–77.8 % of head length, vs. 81.3–98.8 % in *P. eques*), greater head length (41.5–44.5 %, vs. 35.5 %–41.0 % of SVL) and distinctive colour pattern (see Diagnosis). The diagnostic dorsal colour pattern in *P. eques* is clear in the illustration that accompanied the original description of the species (Günther, 1858: plate 6, fig. B, reproduced here as Fig. 7) and is still visible in the syntypes examined, now more than 140 years old. We note that four years after preservation in alcohol, the dorsal colour pattern is distinct in *P. fastigo* (WHT 2343).

We have recorded *Polypedates eques* only from the higher regions of the central hills, between altitudes of approximately 1,265 and 2,135 m a.s.l. The ranges of *P. eques* and *P. fastigo* are separated by a distance of

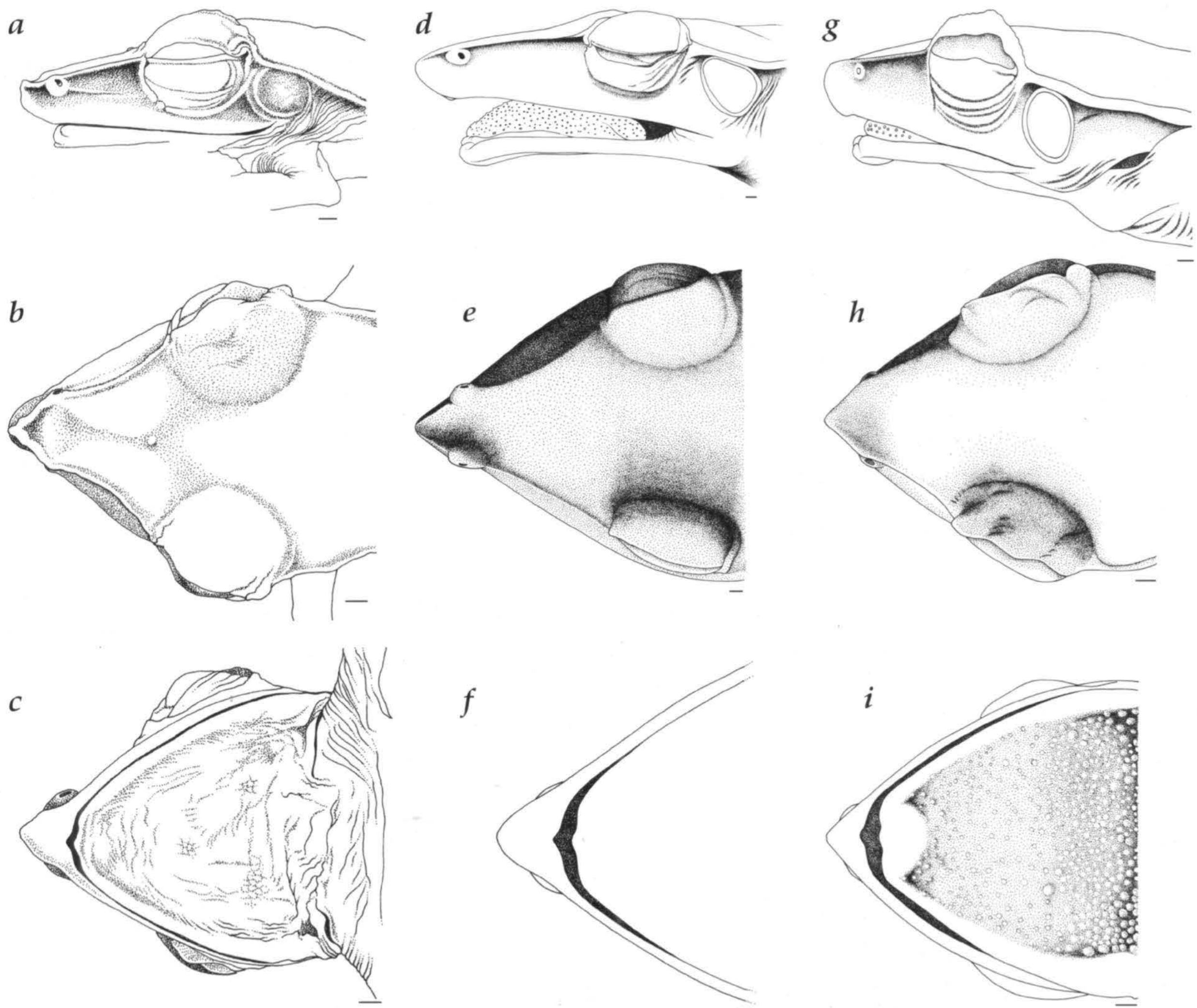


**Figure 10.** Head-shapes of *Polypedates fastigo* (holotype, WHT 2352, 37.3 mm SVL) (***a***, lateral; ***b***, dorsal; ***c***, ventral aspects); *P. longinasus* (holotype, BMNH 1947.2.8.61, 58.5 mm SVL) (***d***, lateral; ***e***, dorsal; ***f***, ventral aspects); and *P. eques* (syntype, BMNH 1947.2.27.54, 39.1 mm SVL) (***g***, lateral; ***h***, dorsal; ***i***, ventral aspects). Scale bar = 1 mm.

**Figure 11.** Holotype of *Polypedates biscutiger* Peters, 1871, ZMB 3049, 55.2 mm SVL, showing the dorsal hour-glass marking characteristic of *P. cruciger*. (Photograph courtesy of Günther Rainer, ZMB.)

*ca.* 50 km, Sinharaja being separated from the central massif by the Kalu (river) valley lowlands (Fig. 8).

*Polypedates fastigo* is distinguished from *P. longinasus* (Fig. 9) by several characters including its larger orbit (36.0–40.5 % in head length, vs. 32.5–35.0 % in *P. longinasus*); its lesser eye-to-nostril distance (26.8–29.3 %, vs. 32.8–33.3 %); and its lesser snout length (42.0–45.7 %, vs. 47.2–49.7 %). It also differs from both *P. eques* and *P. longinasus* by the shape of its head (Fig. 10).

We have not observed the call of *Polypedates fastigo*. However, we did collect some of its tadpoles (Fig. 4) at the type locality, and suspect that its reproductive behaviour is similar to that of other Sri Lankan species we refer to *Polypedates*— the building of foam nests overhanging water (Fernando & Dayawansa, 1995).

*Polypedates fastigo* has the most restricted distribution of all its Sri Lankan congeners, which enjoy relatively large ranges in the island (Dutta & Manamendra-Arachchi, 1996: 168–182). It becomes the fourth species of *Polypedates* endemic to Sri Lanka, only *P. maculatus*, as presently understood, being shared with India. We note incidentally that the holotype of *Polypedates biscutiger* Peters, 1871, ZMB 3049, 55.2 mm SVL, synonymised with *P. maculatus* by Wolf (1936: 181) and treated as a subspecies of *P. maculatus* by Dubois (1986: 84), is in fact a male *P. cruciger* Blyth, 1852: it is readily diagnosed by its co-ossified skull and dorsal hour-glass shaped marking, both of which are invariably absent in Sri Lankan *P. maculatus*. *Polypedates maculatus* has been assumed by all recent authors (e.g. Dutta, 1997) to be widely distributed across pensinsular India and Sri Lanka. We suspect however, that this name applies to a diversity of taxa whose identity can be established only after the nominal species has been stabilised through the designation of a neotype.

*Polypedates fastigo* is also the fourth recently-described vertebrate species from the Morningside Forest: it joins the microhylid frog *Microhyla karunaratnei* Fernando & Siriwardhane, 1996; and the agamid lizards *Ceratophora karu* and *Ceratophora erdeleni* Pethiyagoda & Manamendra-Arachchi, 1998b, all of which have come to light as a result of a renewed interest in biodiversity exploration in Sri Lanka during the past decade.

**Comparative material** (all from Sri Lanka).

***Polypedates eques.*** syntypes (6 ex.). All males, 39.1 mm SVL, BMNH 1947.2.27.54; 36.9 mm SVL, BMNH 1947.2.27.55; 36.7 mm SVL, BMNH 1947.2.27.56; 36.6 mm SVL, BMNH 1947.2.27.57; 36.0 mm SVL, BMNH 1947.2.27.58; 35.1 mm SVL, BMNH 1947.2.27.59, Ceylon; H. Cuming. Female, 71.0 mm SVL, WHT 968, Horton Plains, alt. 2135 m (06º46'N, 80º47'E), Coll. D. Gabadage & J. Karunaratne, 04 III 1995. Two ex. males, 32.7 mm SVL; 33.8 mm SVL, WHT 1238, Haputale, alt. 1525 m (06º46'N, 80º52'E), Coll. D. Gabadage, 01 V 1996. Female, 59.2 mm SVL, WHT 1313, Pattipola, alt. 1890 m (06º51'N, 80º50'E), Coll. D. Gabadage, 24 VI 1996. Two ex. males, 36.0 mm SVL; 37.5 mm SVL, WHT 1707, Hakgala (near Nuwara Eliya), alt. 1830 m (06º55'N, 80º49'E), coll. M.M. Bahir & D. Gabadage, 11 VI 1996. Female, 61.4 mm SVL, WHT 2316, Agra Arboretum, Agarapatana, alt. 1555 m (06º51'N, 80º41'E), Coll. M.M. Bahir & S.V. Nanayakkara, 05 X 1998. Nine ex., 33.1–38.3 mm SVL, NMSL ARH 3 (a), Lindula, alt. 1265 m (06º55'N, 80º41'E). Male, 42.5 mm SVL, WHT 2937, Moray Est., Maskeliya, alt. 1370 m (06º48'N, 80º31'E), coll. K. Manamendra-Arachchi & A. Nöllert, 4 V 2000.

***Polypedates longinasus.*** Holotype (holotype of *Ixalus nasutus* Günther, 1868), female, 58.5 mm SVL, BMNH 1947.2.8.61, Southern Ceylon; coll. Higgins. Female, 55.2 mm SVL, WHT 778, Parawalatenna (Kitulgala), alt. 150 m (06º59'N, 80º24'E), Coll. M.M. Bahir & D. Gabadage, 21 XII 1995. Two ex. male, 44.0 mm SVL; female, 58.6 mm SVL, WHT 1176, Koskulana (near Panapola), alt. 460 m (06º25'N, 80º27'E), Coll. M.M. Bahir & D. Gabadage, 23 V 1996. Female, 57.7 mm SVL, WHT 1743, Kudawa (near Weddagala), alt. 460 m (06º26'N, 80º25'E), Coll. M. Wijesinghe, 04 VIII 1997. Four ex., males, 43.2 mm SVL, WHT 2304; 45.8 mm SVL, WHT 2305; 42.0 mm SVL, WHT 2306; 40.5 mm SVL, WHT 2307: Kanneliya (near Galle), alt. 150 m (06º15'N, 80º20'E), Coll. M.M. Bahir, M.M. Bopage & S. Udayanga, 20 X 1998. Male, 45.5 mm SVL, WHT 2353, Kanneliya (near Galle), alt. 150 m (06º15'N, 80º20'E), Coll. S. Batuwita & M.M. Bopage, 13 VII 1998.

***Polypedates maculatus.*** Female, 38.6 mm SVL, WHT 965, Mahiyangana, alt. 90 m (07º19'N, 80º59'E), Coll. D. Gabadage, 22 III 1995. Female, 52.9 mm SVL, WHT 969, Ritigala, alt. 200 m (08º07'N, 80º40'E), Coll. D. Gabadage & S. Dharmasiri, 06 X 1994. Female, 58.3 mm SVL, WHT 973, Piliyandala, alt. 12 m (06º48'N, 79º55'E), Coll. S. Dharmasiri, 06 XII 1994. Male, 42.3 mm SVL, WHT 974, Palatupana (Kirinda), alt. 3 m (06º16'N, 81º24'E), Coll. R.

Pethiyagoda, 1994. Female, 38.6 mm SVL, WHT 1098, Kottawa (Galle), alt. 60 m (06º06'N, 80º20'E), Coll. M.M. Bahir, 07 V 1995. Female, 46.6 mm SVL, WHT 1301, Polonnaruwa, alt. 55 m (07º56'N, 81º00'E), Coll. D. Gabadage &, M.M. Bahir, 02 I 1996. Female, 62.7 mm SVL, WHT 2350, Yakkala, alt. 30 m (07º05'N, 80º02'E), Coll. M.M. Bahir, 1999.

***Polypedates cruciger***. Syntypes (4 ex.), male, 53.5 mm SVL, ZSI A 10178; female, 78.1 mm SVL, ZSI A 10179; female, 78.9 mm SVL, ZSI A 10177; female, 80.1 mm SVL, ZSI A 10176, Ceylon; E. F. Kelaart. Male, 59.8 mm SVL, WHT 202, Lihinigala–Yattapatha (Moragala near Agalawatta), alt. 150 m (06º23'N, 80º17'E); Coll. K. M.-Arachchi, 24 XI 1993. Female, 73.1 mm SVL, WHT 1090, Monaragala, alt. 150 m (06º52'N, 81º20'E); Coll. K. M.-Arachchi & D. Gabadage, 17 X 1994. Female, 81.0 mm SVL, WHT 1092, Navinna (Galle), alt. 15 m (06º04'N, 80º12'E); Coll. M.M. Bahir & M.M. Bopage, 6 IX 1995. Female, 75.6 mm SVL, WHT 1093, Galge (between Kataragama and Buttala), alt. 90 m (06º33'N, 81º19'E); Coll. M.M. Bahir, May 1995. Male, 54.3 mm SVL, WHT 2351, Ambalangoda, alt. 15 m (06º14'N, 80º03'E); Coll. A.I. Alagiyawadu, 1999.

***Polypedates biscutiger***. Holotype, male, 55.2 mm SVL, ZMB 3049; from Ceylon.

## Acknowledgements

We are grateful to M. Meegaskumbura and C. S. Schneider for making available to us mt DNA sequences of Sri Lankan rhacophorines in their possession. We thank B. T. Clarke and C. McCarthy (BMNH ); G. Rainer (ZMB); P. T. Cherian, K. Rama Devi, M. S. Ravichandran, S. K. Chanda and K. Deuti (ZSI); and D. S. Kandamby (NMSL) for making material under their care available to us for examination. We are specially greateful for the hospitality and many discussions with Alain Dubois and Annemarie Ohler while at MNHN, Paris. This research was funded by the Nagao Natural Environmental Foundation, Japan, and a seed-money allocation from the Global Environmental Facility of the Department of Wildlife Conservation (DWC), Sri Lanka. We are grateful to DWC, the Forest Department and J. M. Paul for permission to carry out exploratory work connected with this research in properties under their care.

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