



A new species of *Polypedates* Tschudi (Amphibia: Anura: Rhacophoridae) from southern Western Ghats, Kerala, India

ANIL ZACHARIAH¹, K.P. DINESH², C. RADHAKRISHNAN², E. KUNHIKRISHNAN³,
MUHAMED JAFER PALOT² & C.K. VISHNUDAS¹

¹Malabar Natural History Society, Susheela Mandir, B.G. Road, Nadakkavu Post, Calicut- 673 011

²Zoological Survey of India, Western Ghat Regional Centre, Eranhipalam, Calicut- 673 006

³Department of Zoology, University College, Thiruvananthapuram- 695 034

ABSTRACT. A new species of the genus *Polypedates* under the family Rhacophoridae is described from Western Ghats, India. The new species is compared with *Polypedates maculatus*, *P. pseudocruciger* and *P. occidentalis*, congeners in Western Ghats.

KEYWORDS. *Polypedates*, New species, Western Ghats.

Introduction

The genus *Polypedates* Tschudi (Amphibia: Anura: Rhacophoridae) is represented in Western Ghats by three species, *Polypedates maculatus* Gray, *P. pseudocruciger* Das and Ravichandran (1998) and *P. occidentalis* Das and Dutta (2006). Among the three species, *P. maculatus* is known to have a wide distribution in India, whereas the remaining two are endemic to Western Ghats (Dinesh *et al.*, 2009).

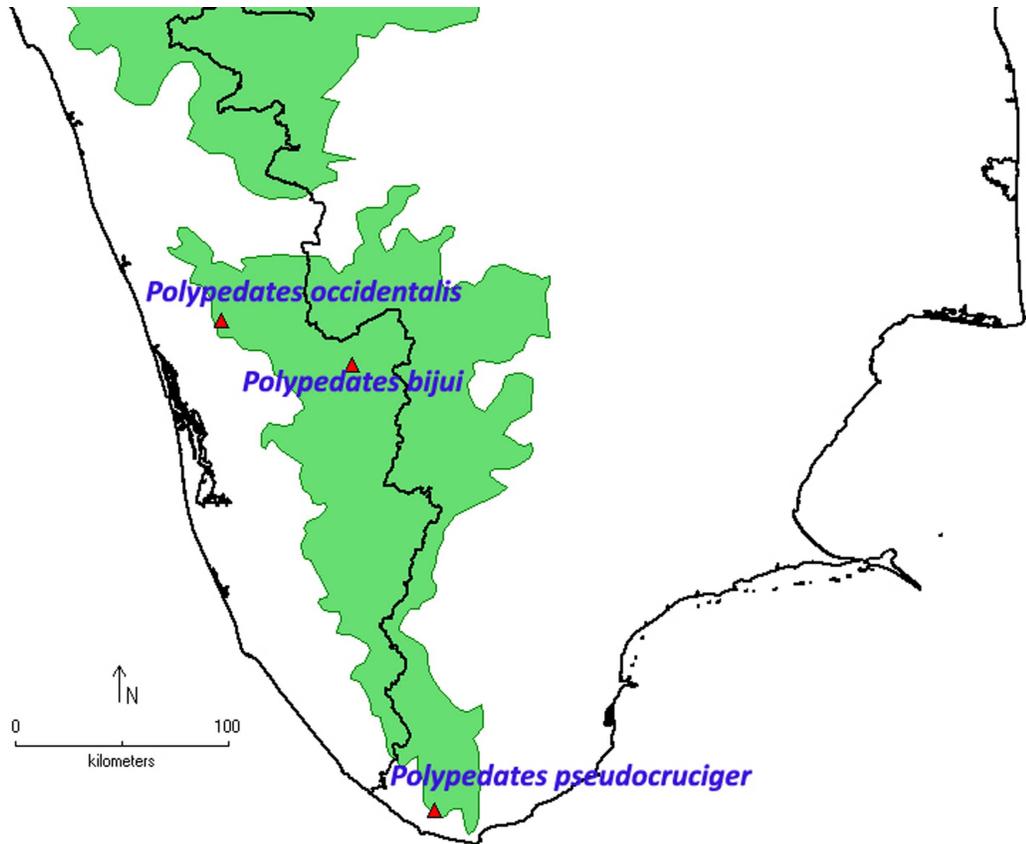
During one of our field expeditions in Western Ghats, we collected a species of tree frog from the Kadalar estate, Idukki district, Kerala, tallying with the diagnosis of *Polypedates* by Das and Dutta (2006). The same is compared with all the species of *Polypedates* known from Western Ghats. However, our placement of the new species in the genus *Polypedates* is provisional since there are no precise characters to differentiate morphologically the genera, *Rhacophorus*, *Polypedates* and *Ghatixalus* in Western Ghats, particularly after the erection of the new genus *Ghatixalus*, based on molecular studies by Biju *et al.*, (2008).

Materials and methods

The specimens collected were sighted with the help of torchlights during the night hours in pre-monsoon season. Notes on body colour were noted in the field. Specimens were euthanized and fixed in 10% formalin, subsequently preserved in 70% alcohol. Morphological measurements were made using Mitutoyo Digimatic Caliper, taken to the nearest 0.1 mm. Measurements and terminology follows Biju and Bossuyt (2009). All the types in the present study are deposited in the national collections of Zoological Survey of India, Western Ghat Regional Centre, Calicut (ZSI/WGRC).

Polypedates bijui sp. nov.
(Figs. 1 and 2; Table 1; Map 1)

Holotype: V/A/842, an adult male (SVL 40.11 mm), collected by E. Kunhikrishnan and party on 15th May



Map 1: Type localities of the species of *Polypedates* in Western Ghats (*P. maculatus* not represented since precise type locality of the species is unknown).

Table 1: Morphometric measurements (in mm) of the new species of *Polypedates bijui*

Reg. No	Sex	SVL	HW	HL	IUE	UEW	SL	EL	FLL	HaL	TL	ShL	TaL	FoL
V/A/842	Male	40.11	14.10	12.00	4.70	3.57	5.70	5.00	9.00	11.60	20.00	20.04	11.00	17.17
V/A/843	Male	42.01	14.40	12.00	4.70	3.90	5.60	5.00	8.90	12.00	20.00	21.40	11.00	17.27
V/A/844	Male	40.34	14.30	11.90	4.40	3.84	5.70	5.00	8.90	12.10	20.00	20.11	11.00	17.23
Average		40.82	14.26	11.96	4.60	3.77	5.66	5.00	8.93	11.90	20.00	20.51	11.00	17.22
Standard deviation		1.03	0.15	0.05	0.17	0.17	0.05	0	0.05	0.26	0	0.76	0	0.05
V/A/849	Female	60.85	24.44	21.58	7.29	5.32	8.10	6.52	13.78	18.81	32.14	32.32	17.74	28.51

Abbreviations follow Biju and Bossuyt (2009)



Fig.1. *Polypedates bijui* sp. nov. (a). Male. (b). Female

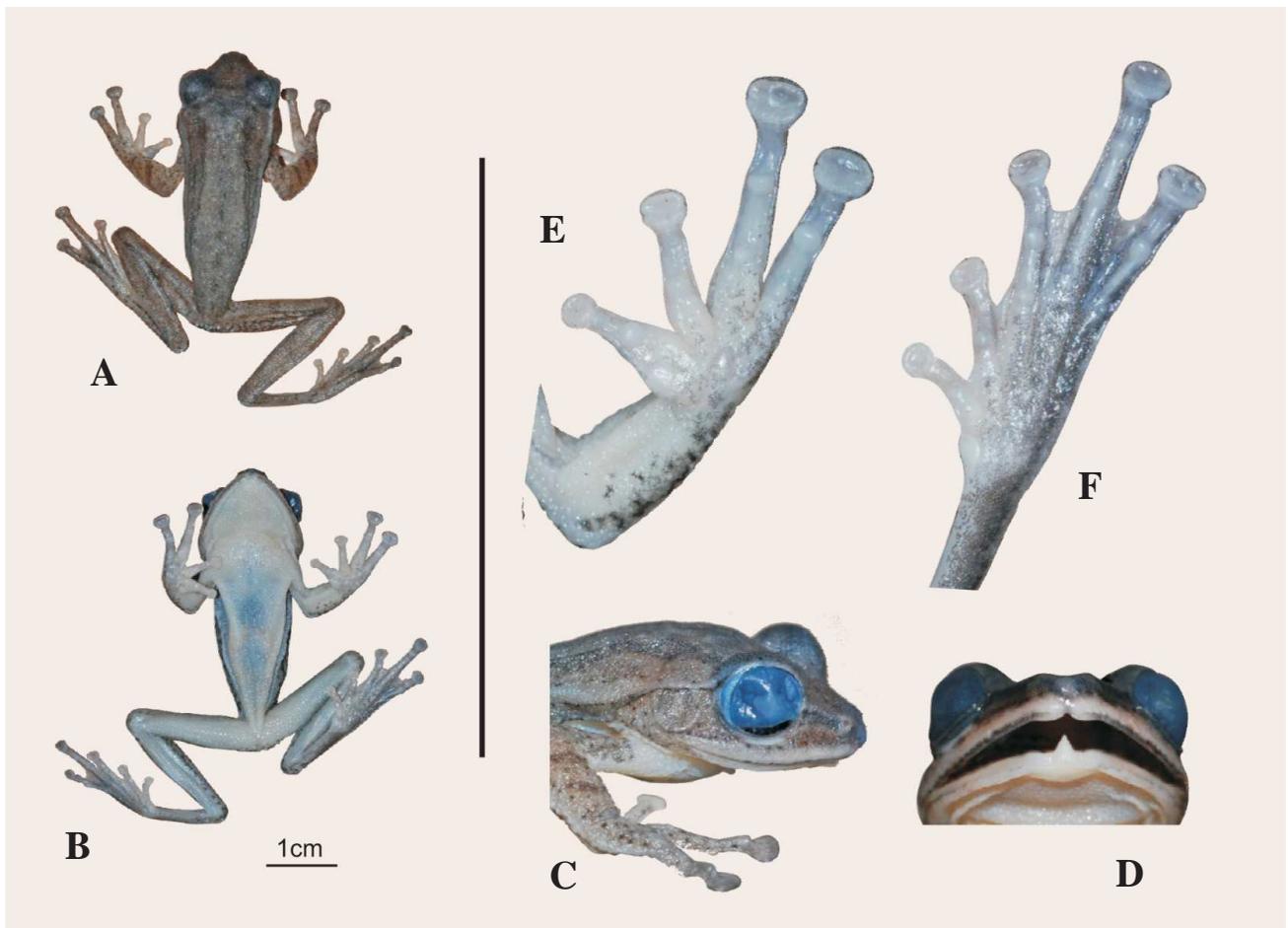


Fig.2. Holotype of *Polypedates bijui* sp. nov. A. Dorsal view. B. Ventral view. C. Lateral view of head
D. Frontal view of head. E. Ventral view of hand. F. Ventral view of foot.

2010 from the tea plantations of Kadalar tea estate (N 10°07'; E 77°01', Alt. 1393m.a.s.l.) near KFDC plantation Idukki district Kerala, India.

Paratypes: V/A/843 and V/A/844 two adult males collected by Sandeep Das and party on 20th May 2010 from the type locality and V/A/849 an adult female collected by Anil Zachariah and party on 30th June 2010 from the type locality.

Diagnosis: *Polypedates bijui* sp. nov. can be distinguished from known congeners by the following combination of characters. (1) adult size medium (SVL 40.11-60.85, N=4), body slender; (2) head width larger than head length (HW 14.10-24.44 & HL 11.90-21.58); (3) snout acutely pointed, sub equal to eye length (SL 5.60-8.10 & EL 5.00-6.52); (4) tympanum distinct, rounded, flanked between distinct supratympanic fold and joint of mouth commissure, near to eye; (5) forelimb smaller than hand (FLL 8.90-13.78 & HaL 11.60-18.81), with a lateral dermal fringe; (6) shank sub equal to thigh length (ShL 20.04-32.32 & TL 20.00-32.14); (7) subarticular tubercles prominent on hand and foot; (8) disc well developed and distinct; (9) dorsum yellowish buff coloured with distinct two cream coloured parallel longitudinal stripes extending from supratympanic fold to the vent region on either side of the body; iris golden brown coloured with fine black reticulations.

Comparison:

Because of its slender body and light brown dorsum, *Polypedates bijui* can be confused with *P. maculatus*, *P. pseudocruciger* and *P. occidentalis*. However, *Polypedates bijui* differs from *P. maculatus* in having medium to large size up to 60.85 mm (vs. large size, SVL up to 79 mm); dorsum with distinct stripes (vs. dorsum without any distinct pattern of stripes, but with black spots); lateral side of the body, anterior and posterior side of thighs cream white with black reticulations (vs. lateral side of the body brownish, hinder side of thighs with yellow round spots with a brown network).

Differs from *P. pseudocruciger* in not having nuptial pad on fingers (vs. nuptial pad on first finger); presence of dermal fold on forearm (vs. absence of dermal fold on forearm); absence of hour glass pattern on the dorsum (vs. presence of distinct of hour glass pattern on the dorsum).

Differs from *P. occidentalis* in having medium to large size up to 60.85 mm (vs medium to large size SVL up to 55.1 mm); nuptial pad absent on fingers (vs. nuptial pad between fingers I and II); absence of webbing between fingers (vs. webbing between fingers I and II); presence of dermal fold on forearm (vs. absence of dermal fold on forearm); absence of hour glass pattern on the dorsum (vs. presence of distinct of hour glass pattern on the dorsum).

Description of holotype (all measurements in mm):

Medium sized *Polypedates* (SVL 40.11) with slender elongated body, skin granular at the dorsum and lateral sides. Ventral region glandular and more granular at the region of throat, belly and thighs. Head width (HW 14.10) larger than head length (HL 12.00). Snout acutely pointed in dorsal view. Snout (SL 5.70) sub equal to eye length (EL 5.00); canthus rostralis concave (Fig. 2C); loreal region angular; interorbital space (IUE 4.70) sub-equal to upper eye-lid (UEW 3.57). Tympanum distinct, rounded (2.70), large, placed between distinct supratympanic fold and joint of mouth commissure; supratympanic fold well developed extending from the region of forearm continuing with the upper eyelid. Lingual papilla absent. Symphyseal knob much prominent and 'W' shaped (Fig 2D).

Forelimb (FLL 9.00) shorter than hand (HAL 11.6), lateral dermal fringe distinct; webbing between fingers absent with distinct dermal fringes on either side of all the fingers; subarticular tubercles prominent, rounded; supernumerary tubercles present; palmar tubercles distinct; disc well developed (Fig. 2E).

Hind limbs moderately long, shank (ShL 20.04) sub-equal to thigh (TL 20.00); webbing moderate; thick dermal fringe present on all toes; inner metatarsal tubercle weakly developed; subarticular tubercles prominent; supernumerary tubercles weakly developed

(Fig. 2F). Prominent tubercles on the heels and dorsal surface of vent.

Colour of holotype:

In life (Fig. 1a), dorsum yellowish buff coloured with distinct two cream coloured parallel longitudinal stripes extending from supratympanic fold to the vent region on either side of the body; brown line connecting the two upper eyelids; tip of nostril, canthus rostralis and upper region of supratympanic fold brown; fore and hind limbs faintly cross barred; lateral side of the body, anterior and posterior side of thighs cream white with black reticulations; black spot at the region of vent; ventral region pale coloured with fine faint black granulations; iris golden brown coloured with fine black reticulations.

In preservative, dorsum brownish with two lateral parallel stripes extending from upper eyelid to vent, an incomplete mid-dorsal band; a brown stripe connecting the two upper eyelids (Fig. 2A); faint, irregular cross bars on limbs with fine black granulations; ventrally cream white with fine black granulations (Fig. 2B).

Etymology: This elegant species of tree frog is named after Dr. S.D. Biju, University of Delhi, India for his outstanding contribution to the modern amphibian systematics in India.

Distribution and natural history: The species is primarily found inhabiting the vicinity of tea plantations in the type locality; adult individuals were collected from the bushes adjoining the tea plantations at a height of about 2 meters from ground level. Females are larger than males and are more reddish compared to males (Fig. 1b).

Discussion

To solve the problems involved in the identification of *Polypedates variabilis* Jerdon group, Biju *et al.*, (2008) erected a new genus *Ghatixalus*, with the description of a new species, *G. asteropus*, based on molecular studies. With the new species described here, the total number of

species under *Polypedates* known till date from Western Ghats is four and eleven from India.

Acknowledgements

The authors are grateful to T.M. Manoharan, Principal Chief Conservator of Forests, Kerala and Dr. K. Venkatraman, Director, Zoological Survey of India for facilities and encouragement. Special thanks to Sandeep Das, David V. Raju and Ansil Basheer for assisting in the field and providing excellent photographs. Thanks are also due to, C.A. Abdul Basheer, Divisional Manager, KFDC, Gavi; N.C. Induchoodan, Divisional Forest Officer, Nature Study Centre, Kalady; A..P. Sunil Babu, Wildlife Warden, Eravikulam National Park; P.V. Sreenivasan, Divisional Manager, KFDC, Munnar; Jose Boniface, Manager, KFDC, Kadar; G. Jayachandran, Range Officer, Anakkulam range; Sethumadavan, Rtd. PWD superintendent and Prasadana P.K, Kannur University campus, Mananthavady for the various support rendered.

References

- Biju, S.D. and F. Bossuyt. 2009. Systematics and phylogeny of *Philautus* Gistel, 1848 (Anura: Rhacophoridae) in the Western Ghats of India, with descriptions of 12 new species. *Zoological Journal of the Linnean Society*, **155**: 374-444.
- Biju, S.D., K. Roelants and F. Bossuyt. 2008. Phylogenetic position of the montane treefrog *Polypedates variabilis* Jerdon, 1853 (Anura: Rhacophoridae), and description of a related species. *Organisms, Diversity and Evolution*, **8**: 267-276.
- Das, I and M.S. Ravichandran. 1998. A new species of *Polypedates* (Anura: Rhacophoridae) from the Western Ghats, India, allied to the Sri Lankan *P. cruciger* Blyth, 1852. *Hamadryad*, **22**:88-94.
- Das, I and S. Dutta. 2006. New Species of *Polypedates* (Anura: Rhacophoridae) from the Western Ghats, Southwest India. *Journal of Herpetology*, Vol. **40** (2): 214-220.
- Dinesh, K.P., C. Radhakrishnan, K.V. Gururaja and G. Bhatta. 2009. An annotated checklist of Amphibia of India with some insights into the patterns of species discoveries, distribution and endemism. *Records of Zoological Survey of India, Occasional Paper No. 302*: 1-152pp.