

Description of the larval stages and notes on the reproduction of *Polypedates longinasus* (Ahl, 1927) (Amphibia, Rhacophoridae)

Prithiviraj Fernando,¹ Nihal Dayawansa²,

Abstract

The tadpole stage of *Polypedates longinasus* can be differentiated from those of *P. eques* and *P. cruciger* by *P. longinasus* having a tooth formula of 6/3 (vs. 5/3 in *P. eques* and *P. cruciger*). The reproductive behaviour of *P. longinasus* was found to be similar to that of the other members of the genus in Sri Lanka.

Keywords: Amphibia, *Polypedates*, Rhacophoridae, Sri Lanka, tadpole.

Introduction

Four species of *Polypedates* are presently known from Sri Lanka: *P. cruciger* Blyth, 1852, *P. eques* Günther, 1858, *P. longinasus* Ahl, 1927 and *P. maculatus* Gray, 1834 (Kirtisinghe, 1957; Dutta, 1985). The larval stages of all except *P. longinasus* have been described (Kirtisinghe, 1957; Senanayake, 1967). Here we describe the larvae and reproductive behaviour of *P. longinasus*.

Materials and methods

Ovipositing adults of *P. longinasus* were observed in the Sinharaja Man and Biosphere Reserve (SMBR), Sri Lanka. After oviposition was complete, the nest was collected and the tadpoles reared up to metamorphosis in glass aquaria at 28-30°C in water of pH 7. The tadpoles were fed cooked rice grains, pieces of chopped raw meat and commercially available freeze dried *Tubifex* worms.

Staging of tadpole growth was categorised according to Gosner, 1960. Three specimens from which measurements were made in stages 31, 35 and 38 are lodged in the collection of the Wildlife Heritage Trust of Sri Lanka (WHT1017-WHT1019).

Results

Description of tadpole stage

Head and body of tadpole (3 ex.) oval (Fig. 1), 1.7 times longer than wide (s.d., 0.12), 2.7 in total length (s.d., 0.04). Nares small. Distance from eye to naris 1.4 times distance from naris to tip of snout (s.d., 0.35). Interorbital 1.7 times

¹Department of Biology, University of Oregon, Eugene, OR 97403, U.S.A.

²Department of Zoology, University of Aberdeen, Scotland, U.K.

internarial (s.d., 0.01). Orbitonasal ridge distinct. Spiraculum barrel-shaped, retrorse, directed slightly upwards. Anus positioned to the right of midventral line, opening flush with the body (no anal spout).

Dental formula 6/3 (Fig. 2). The first of the upper rows of horny teeth marginal and uninterrupted. Second row interrupted with medial ends overlapping each other. Third row interrupted. Fourth to sixth rows well separated. Lower rows uninterrupted. Mandibles edged with black. Pappillae present along the lateral edges of the upper lip and margins of the lower lip.

Tail pointed, lanceolate, the crests subequal. Head and body dark brown. Ventral surface lighter. Metamorphosing tadpoles have dorsal markings similar to those of adults.

Developmental stages

The mean diameter of the eggs (10 ex.) was 2.0 mm (s.d., 0.12). The total number of eggs in the two nests examined were 28 and 42. The tadpoles commenced wriggling movements and fell into the water on the third or fourth day after oviposition. At this time they were in stage 21 (external gills well developed, gill

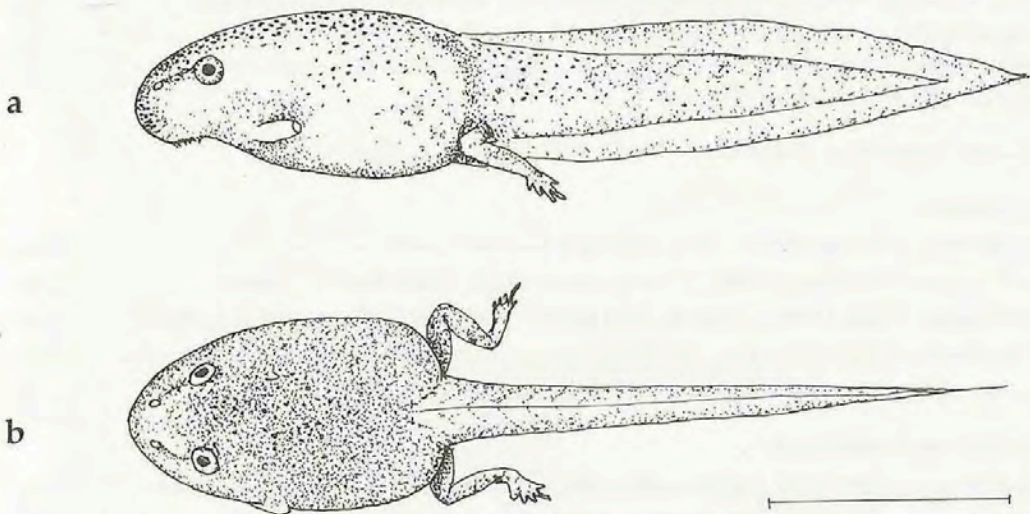


Figure 1. *Polypedates longinasus* tadpole, a) lateral aspect; b) dorsal aspect. Scale bar 10 mm.

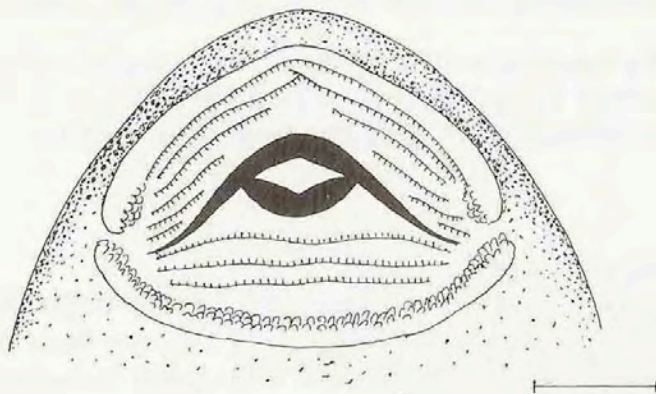


Figure 2. *Polypedates longinasus*, mouth disc of tadpole. Scale bar 1 mm.

circulation and heartbeat present, cornea transparent). A single specimen examined at this stage was 9.0 mm long with a body diameter of 3.0 mm (Fig. 3).

By the fifth day after oviposition the tadpoles were in stage 22 (tail fin circulation present, fins transparent, spiraculum developing, external gills present and one row of labial teeth visible). One specimen examined at this stage had a total length of 13.0 mm and a body diameter of 4.0 mm (Fig. 4).

By the seventh day the tadpoles were in stage 25 (external gills completely regressed, operculum well developed and labial teeth rows present). One specimen examined at this stage had a total length of 16.0 mm and a body diameter of 5.0 mm (Fig. 5). Stage 26 was reached after about four weeks, with the appearance of limb buds (total length 32 mm; body diameter 10 mm). The front limbs were free at about nine weeks (stage 42) (Fig. 6) and metamorphosis complete about one week later.

We observed adult *P. longinasus* (Figs. 7 and 8) only in close proximity to their breeding sites. Although both males and females were observed at these sites, both separately and in amplexus, no vocalisations were heard. The breeding sites were permanent collections of water of a few litres each, in depressions on rocks in close proximity to forest streams. Three breeding locations were found in SMBR: a rock pool in upper Halmandiya Stream; two pools in close proximity to each other on Camp Stream; and one on the Uturana Dola (=stream).

Polypedates longinasus lays its eggs in a foam nest smaller than those of the other Sri Lankan congeners (Hejmadi & Dutta, 1986; pers obs.). The brownish-

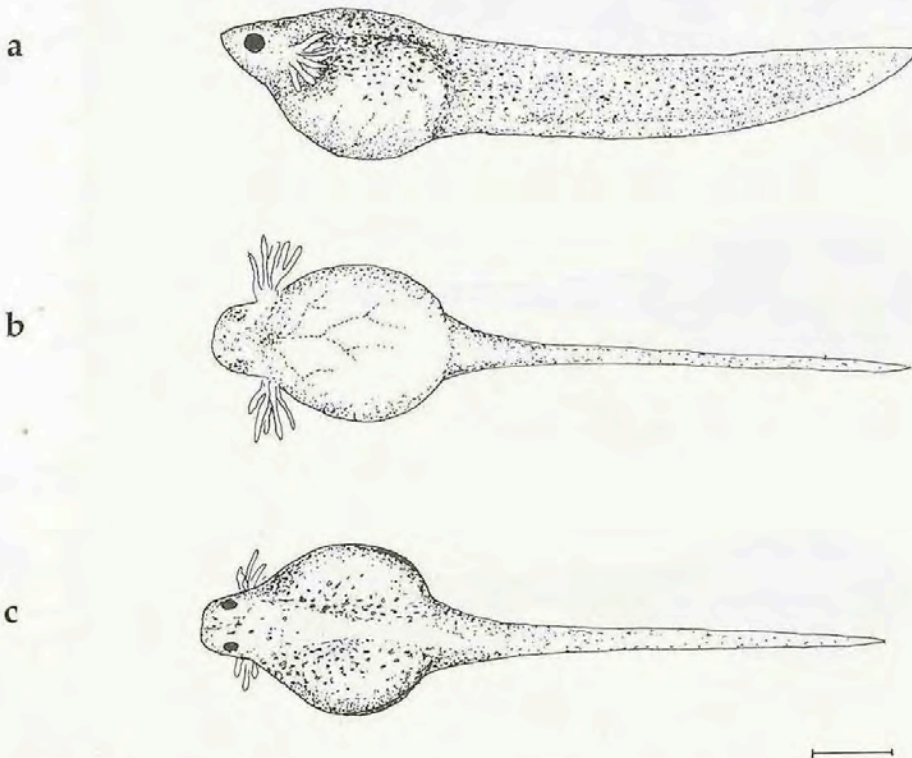


Figure 3. *Polypedates longinasus* tadpole, stage 21. a) lateral aspect; b) ventral aspect; c) dorsal aspect. Scale bar 1 mm.

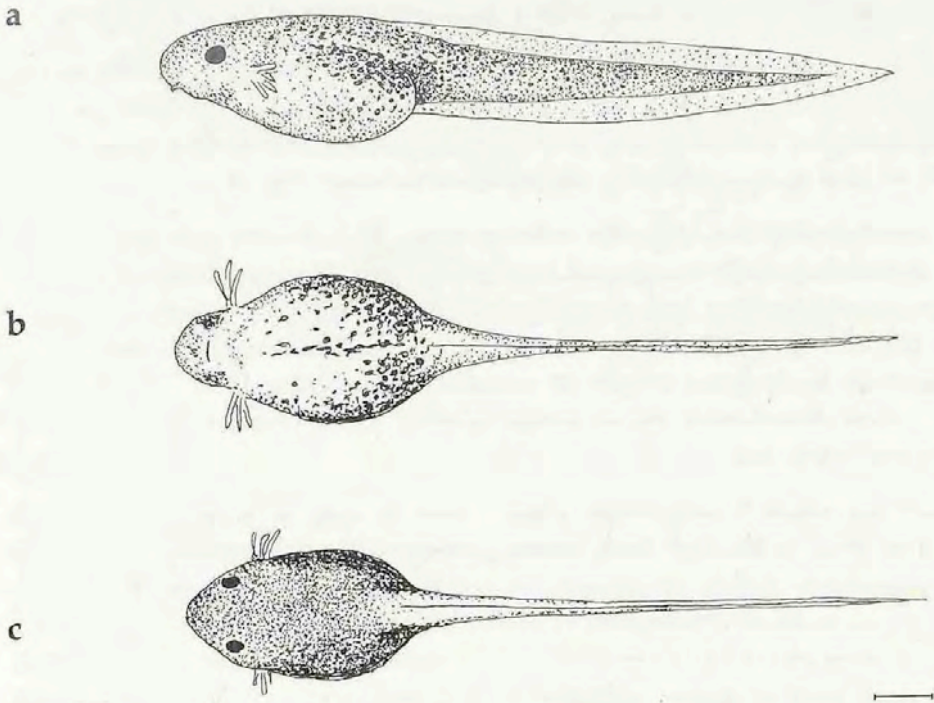


Figure 4. *Polypedates longinasus* tadpole, stage 22, a) lateral aspect; b) ventral aspect; c) dorsal aspect. Scale bar 1 mm.

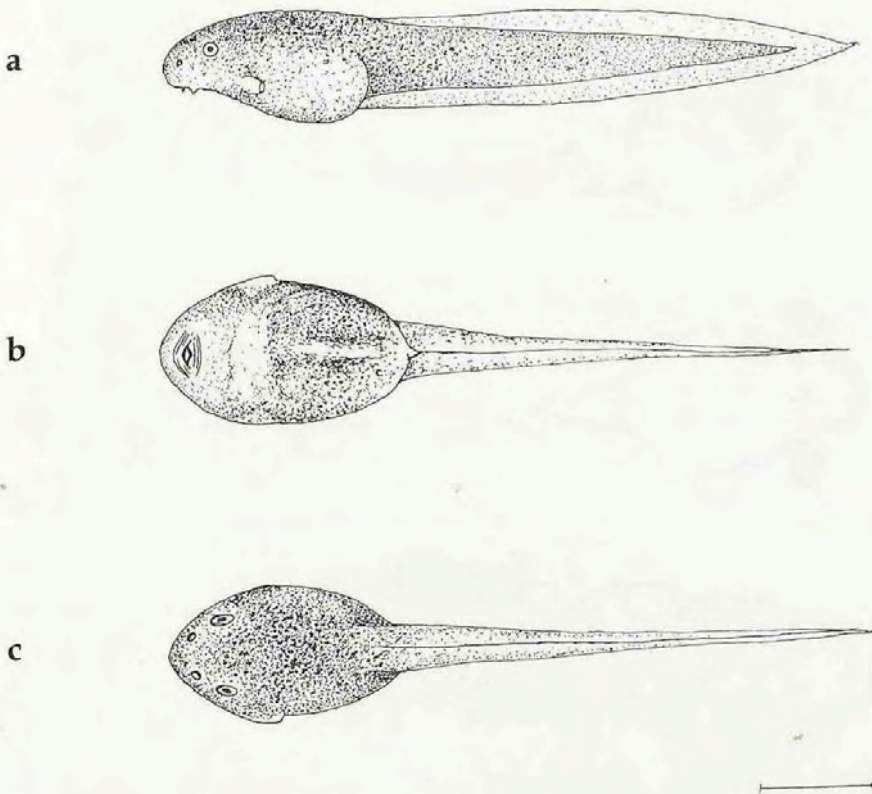


Figure 5. *Polypedates longinasus* tadpole, stage 25. a) lateral aspect; b) ventral aspect; c) dorsal aspect. Scale bar 5 mm.

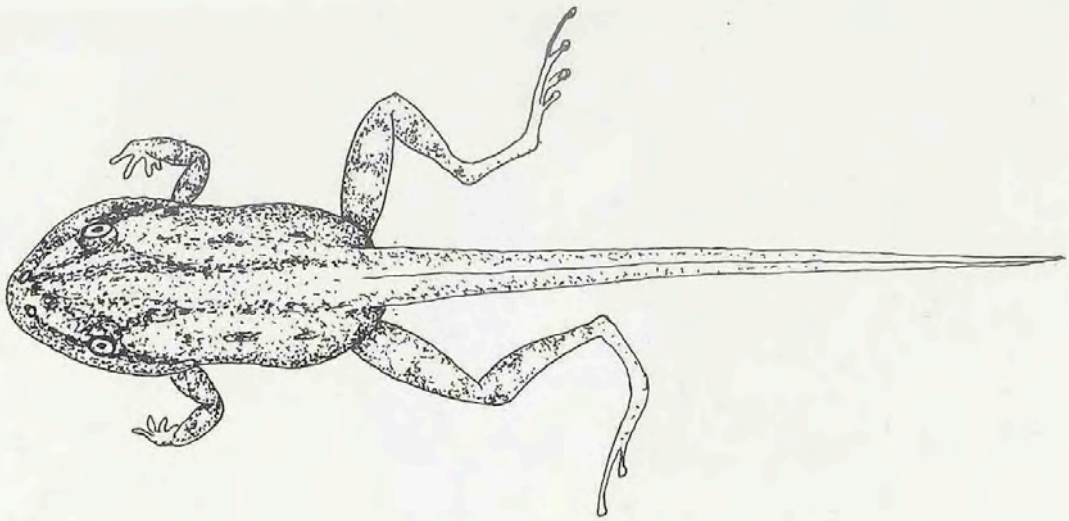


Figure 6. *Polypedates longinasus* tadpole, stage 42.

white foam is attached to leaf debris, a branch or rock above the water so that on emergence the tadpoles fall into the water below. The nests we observed were located 15-200 cm above the surface of the water. Mating and egg-laying is in axillary amplexus and occurred at night. We have observed tadpoles in all stages of development in these pools throughout the year (SMBR records rainfall in all months of the year, De Zoysa, 1990). Under laboratory conditions, the tadpoles were highly susceptible to attack by a *Trichodyna* sp. exoparasite. Affected tadpoles became progressively emaciated and died about one week after the attack was first noticed. In one instance, the entire laboratory population was lost as a result of parasite attack.



Figure 7. *Polypedates longinasus*, living specimen, lateral aspect. Photograph: Rahula Perera.



Figure 8. *Polypedates longinasus*, living specimen, dorsal aspect. Photograph: Rahula Perera.

Acknowledgements

We thank Sarath W. Kotagama (who supervised our SMBR amphibian research project), Rohana P. Subasinghe who initiated this study, March for Conservation for funding it in 1990-91, the Forest Department, K.P. Sri Bharathie, K. Vivekanandan and H.M. Bandaratileke for their support of this work; Martin Wijesinghe for his help at the research station; Mahendra Siriwardena for assistance with field work and rearing of tadpoles; Rahula Perera and Vimukthi Weeratunga for their photographs and field assistance; and Lakshitha Jayasinghe for identifying the exoparasite. Ravi Algama and Kumudu Rajapakse assisted with preparation of the manuscript and two anonymous reviewers provided valuable suggestions for its improvement.

Literature cited

- Dutta, S.K. 1985. Amphibians of India and Sri Lanka. Unpubl. PhD thesis, Univ. Kansas, U.S.A.
- Gosner, K.L. 1960. A simplified table for staging anuran embryos and larvae with notes on identification. *Herpetologica*, 6: 183-190.
- Hejmadi, M.P. & S.K. Dutta. 1986. Life history of the common Indian tree frog, *Polypedates maculatus* (Gray, 1834) (Anura: Rhacophoridae). *J. Bombay Nat. Hist. Soc.*, 85: 512-517.
- Kirtisinghe, P. 1957. The amphibians of Ceylon. Publ. by the author, Colombo, Ceylon. 112 pp.
- Senanayake, F.R. 1967. The status of the Ceylon frog *Rhacophorus nasutus* (Günther). *J. Bombay Nat. Hist. Soc.*, 64: 565-570.