

2003

The Tadpole of *Phrynobatrachus mababiensis* FitzSimons, 1932 (Anura, Ranidae, Petropedetinae)

Rafael O. de Sá
University of Richmond, rdesa@richmond.edu

Alan Channing

Follow this and additional works at: <http://scholarship.richmond.edu/biology-faculty-publications>



Part of the [Biology Commons](#), [Population Biology Commons](#), [Terrestrial and Aquatic Ecology Commons](#), and the [Zoology Commons](#)

Recommended Citation

de Sá, Rafael O., and Alan Channing. "The Tadpole of *Phrynobatrachus mababiensis* FitzSimons, 1932 (Anura, Ranidae, Petropedetinae)." *Alytes* 20, no. 3-4 (2003): 132-36.

This Article is brought to you for free and open access by the Biology at UR Scholarship Repository. It has been accepted for inclusion in Biology Faculty Publications by an authorized administrator of UR Scholarship Repository. For more information, please contact scholarshiprepository@richmond.edu.

The tadpole of *Phrynobatrachus mababiensis* FitzSimons, 1932 (Anura, Ranidae, Petropedetinae)

Rafael O. DE SÁ* & Alan CHANNING**

* Department of Biology, University of Richmond, Richmond, VA, USA
<rdesa@richmond.edu>

** Department of Zoology, University of the Western Cape,
Private Bag X17, Bellville 7535, South Africa
<achanning@uwc.ac.za>

The tadpole of the poorly known puddle frog *Phrynobatrachus mababiensis* FitzSimons, 1932 from Eastern Africa is described and illustrated.

INTRODUCTION

The puddle frog genus *Phrynobatrachus* Günther, 1862 comprises about 64 currently recognized species (FROST, 1985). Of these, only the tadpoles of *P. natalensis* (Smith, 1849) (POWER, 1927; CHANNING, 2001), *P. guineensis* Guibé & Lamotte, 1961 (RÖDEL, 1998) and *P. alticola* Guibé & Lamotte, 1961 (RÖDEL & ERNST, 2002) have been described. *Phrynobatrachus mababiensis* FitzSimons, 1932 (Dwarf Puddle frog, WAGER, 1986; Mababe River frog, FRANK & RAMUS, 1996) is a small frog that usually calls from low in thick vegetation on flooded terrains close to the water. Very little has been published about the biology of this species. PASSMORE & CARRUTHERS (1979) reported the advertisement call of *P. mababiensis*, and WAGER (1986) provided a few comments about the tadpole (see discussion below). Herein we describe the tadpole of *Phrynobatrachus mababiensis*.

MATERIAL AND METHODS

Tadpoles of *Phrynobatrachus mababiensis* (34 individuals) were collected at Kibebe Farm (08°29'0.5"S, 35°08'50.3"E), Iringa, Tanzania, by the authors on 8 February, 2000. Specimens were fixed in 10 % formalin (commercial grade) at the time of collecting them. One tadpole was at developmental stage 30 (GOSNER, 1960), whereas the remaining tadpoles were at developmental stage 26 or earlier. These specimens were deposited at the National Museum of Natural History, Smithsonian Institution, Washington, USA (USNM 539462-82).

Species identification was based on comparisons of our material with specimens collected by A. Channing on 12 January, 1986, at Katima Mulilo, Caprivi Region, Namibia (17°38'00"S, 24°11'00"E), in a shallow, muddy pool with grasses. The tadpoles collected in Iringa, Tanzania, are identical to those from Katima Mulilo, Namibia. Of the three tadpoles collected at Katima Mulilo, one was preserved whereas the other two were raised to juveniles for identification purposes, and they correspond to *P. mababiensis*. These specimens were deposited at the Transvaal Museum, Pretoria, South Africa (TM 83618). The Katima Mulilo specimens are the closest material available to the type locality; Katima Mulilo is about 120 km north of the type locality of *P. mababiensis* in the Mababe Depression, NW Botswana.

Specimens were staged according to GOSNER (1960). The labial tooth row formula is given according to ALTIG (1970). Terminology of measurements taken follows ALTIG & McDIARMID (1999). Measurements (in millimeters) were made using a Mitutoyo digital calliper and are based on specimens ($n = 19$) at Gosner stage 26 (USNM 539462-539480). Means and standard deviations are given in the description (see tab. 1). The tadpole illustration is based on specimen USNM 539481 (Gosner stage 30), the most advanced stage available in our sample.

RESULTS AND DISCUSSION

TADPOLE DESCRIPTION

Tadpoles of *Phrynobatrachus mababiensis* have a depressed and elliptical body (fig. 1). In dorsal and lateral views the snout is rounded; in lateral view the snout slopes gradually anteriorly toward the oral disc. The eyes are large and lateral. The external nares are located half way between the eyes and the tip of the snout. The narial aperture is small, rounded, and laterodorsally positioned. Tail fins are low; dorsal and ventral fins almost parallel the tail musculature and are of approximately equal height. The dorsal fin originates at the tail-body junction and the ventral fin originates at the posterior ventral terminus of the body. Tail fins slope gradually posteriorly to a narrowly rounded tip. The tail musculature extends to the tip of the tail. The spiracle is sinistral with a midlateral opening directed dorsally. The vent tube and aperture is dextrally placed relative to the ventral fin. Measurements of the illustrated tadpole (USNM 539481) at Gosner stage 30 are: TL 17.2; BL 5.9; MTH 2.2; TMW 1.0; E 0.8; IOD 2.6. Measurements and summary statistics of additional 19 tadpoles at developmental stage 26 are given in table 1.

The oral disc is anteroventrally positioned, emarginate, and has a uniserial row of conical papillae with rounded tips (fig. 2). The row of marginal papillae has a large dorsal gap occupying most of the upper labium. In addition, two pairs of long papillae project from the lower labium, posterior to the marginal papillae. These are about 2-3 longer than the marginal papillae. A few submarginal papillae are found laterally on the upper labium. The labial tooth row formula is 4(2-4)/4(1). Upper and lower jaw sheaths are wide, pigmented for about one third of their width, and have widely serrated edges.

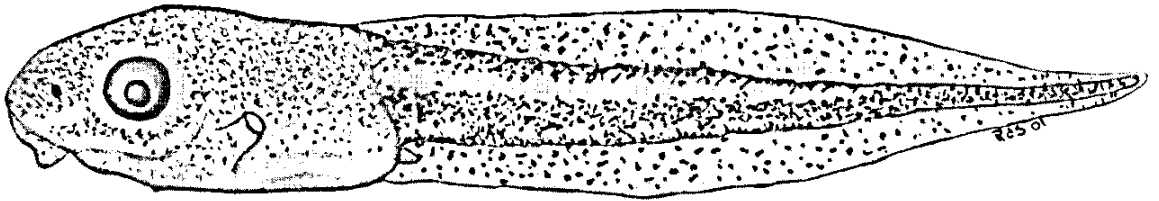


Fig. 1. – Tadpole of *Phrynobatrachus mababiensis* FitzSimons, 1932, stage 30, USNM 539481. Bar: 5.0 mm.

Table 1. – Measurements (in mm) of 19 tadpoles of *Phrynobatrachus mababiensis* FitzSimons, 1932. TL, total length; BL, body length; MTH, maximum tail height; TMW, tail muscle width; E, eye diameter; IOD, interorbital distance.

USNM number	TL	BL	MTH	TMW	E	IOD
539462	17.1	6.0	2.4	0.9	0.8	2.7
539463	18.2	6.8	3.2	1.3	0.9	2.9
539464	16.2	5.7	3.4	1.0	1.0	2.5
539465	15.9	5.9	2.9	1.0	1.0	2.5
539466	16.0	6.1	3.2	1.1	1.0	2.9
539467	16.3	5.9	2.6	0.9	0.8	2.7
539468	16.4	6.1	2.8	1.0	1.0	2.6
539469	16.3	5.8	3.4	1.1	0.8	2.4
539470	15.4	6.2	2.8	1.1	1.0	2.7
539471	16.2	5.8	3.6	1.1	0.8	2.3
539472	16.8	5.9	3.0	1.1	1.0	2.4
539473	17.4	5.9	3.5	1.2	0.9	2.7
539474	16.4	5.8	3.6	1.1	0.9	2.7
539475	16.3	5.6	3.2	1.2	0.9	2.4
539476	16.6	5.7	2.9	0.9	0.8	2.5
539477	16.0	5.8	3.2	1.0	0.8	2.7
539478	15.1	5.5	2.8	1.1	0.8	2.8
539479	16.2	5.6	2.9	1.2	0.9	2.5
539480	16.6	5.8	2.7	1.0	0.9	2.2
Mean	16.40	5.88	3.06	1.07	0.89	2.59
Standard deviation	0.68	0.30	0.34	0.10	0.06	0.19

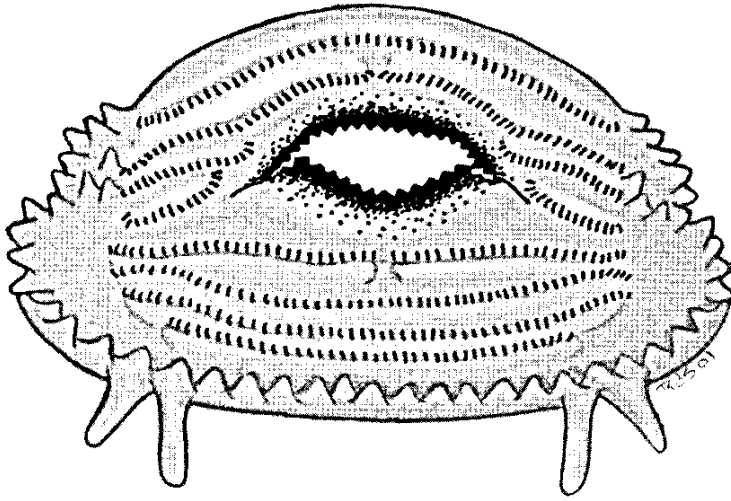


Fig. 2. – Oral disk of *Phrynobatrachus mababiensis* FitzSimons, 1932, stage 30, USNM 539481. Bar: 1.0 mm.

In preservative, specimens are dark brown. The fins and tail musculature are speckled with dark melanophores. These melanophores are more dense on the dorsal and ventral edges of the tail musculature; melanophores also are dense along and immediately below the main axis of the tail musculature. Visually, this accumulation of melanophores outlines a distinct, pale, whitish band that extends along the epaxial muscles for about two thirds of the tail. A second, but shorter and less distinct, band is present on the hypaxial muscles. The posterior third of the tail musculature is homogeneously dark and the myotomes are poorly defined. Melanophores are abundant on the dorsal and lateral surfaces of the body where they are homogeneously distributed; ventrally they are present only on the anterior half of the body.

TADPOLE COMPARISONS

WAGER (1986) provided greatly oversimplified descriptions, including outline illustrations, of tadpoles of *Phrynobatrachus mababiensis* and *P. natalensis*. These descriptions do not agree with the previously reported tadpole of *P. natalensis* (POWER, 1927) nor with the present description of *P. mababiensis*.

WAGER (1986) reported the oral disk of *P. mababiensis* as having a labial tooth row formula of 1/2 and possessing a double row of marginal papillae in the lower labium, with the outer row consisting of elongated papillae. CHANNING (2001) included Wager's description in his section of tadpoles. A row of elongated papillae on the lower labium for early stages (total length 6.0 mm) of *P. natalensis* was reported by POWER (1927). It is possible that WAGER (1986) may have misidentified the larvae; alternatively, a row of long papillae on the lower row may be present in early stages of *P. mababiensis*, however we have not seen it.

In contrast to those of *P. mababiensis*, the tadpoles of *Phrynobatrachus guineensis* and *P. alticola* (RÖDEL, 1998; RÖDEL & ERNST, 2002) have morphological characteristics and modifications typical of phytotelmic anuran larvae.

ACKNOWLEDGMENTS

Funds for RdS were provided by the Faculty Research Committee, University of Richmond, Grant # F99513. We are thankful to the Tanzanian Commission for Science of Technology (COSTECH) for scientific research permits (numbers 99-55-NA-99-40 and 99-287-NA-99-66, to AC and RdS respectively). We thank Jenny Channing for her companionship and help during the fieldwork. This manuscript benefited from the comments of two anonymous reviewers.

LITERATURE CITED

- ALTIG, R. 1970. – A key to the tadpoles of the continental United States and Canada. *Herpetologica*, **26**: 180-207.
- ALTIG, R. & MCDIARMID, R. W., 1999. – Body plan: development and morphology. In: R. W. MCDIARMID & R. ALTIG (ed.), *Tadpoles: the biology of anuran larvae*, Chicago, Univ. Chicago Press: 24-51.
- CHANNING, A., 2001. – *Amphibians of central and southern Africa*. Ithaca, Cornell Univ. Press: 1-470.
- FRANK, N. & RAMUS, E., 1996. – *A complete guide to scientific and common names of reptiles and amphibians of the world*. Pottsville, NG Publ., Inc: 1-377.
- FROST, D. R., (ed.), 1985. – *Amphibian species of the world: a taxonomic and geographical reference*. Lawrence, Allen Press & The Association of Systematics Collections: i-v + 1-732.
- GOSNER, K. L., 1960. – A simplified table for staging anuran embryos and larvae with notes on identification. *Herpetologica*, **16**: 183-190.
- PASSMORE, N. I. & CARRUTHERS, V. C., 1979. – *South African frogs*. Johannesburg, Witwatersrand Univ. Press: i-xviii + 1-270.
- POWER, J. H., 1927. – Notes on the habits and life histories of South African Anura with descriptions of the tadpoles. *Trans. r. Soc. South Africa*, **14**: 237-247.
- RÖDEL, M.-O., 1998. – A reproductive mode so far unknown in African ranids: *Phrynobatrachus guineensis* Guibé & Lamotte, 1961 breeds in tree holes (Anura: Ranidae). *Herpetozoa*, **11** (1-2): 19-26.
- RÖDEL, M.-O. & ERNST, R., 2002. – A new reproductive mode for the genus *Phrynobatrachus* Günther, 1862: *Phrynobatrachus alticola* Guibé & Lamotte, 1961 has non-feeding, non-hatching tadpoles. *J. Herp.*, **36** (1): 121-125.
- WAGER, V. A., 1986. – *Frogs of South Africa: their fascinating life stories*. Craighall, Delta Books: 1-183.

Corresponding editor: W. Ronald HEYER.