

## *Allenbatrachus meridionalis*, a New Toadfish (Batrachoididae) from Madagascar and Reunion

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**The third species in the genus *Allenbatrachus*, *A. meridionalis*, is described from Madagascar and Reunion, the southernmost occurrence of the genus. It differs from the other two described species, *A. grunniens* and *A. reticulatus*, by having more anal and dorsal-fin rays, differently shaped orbital cirri and maxillary barbels, and being darker in coloration.**

The genus *Allenbatrachus* Greenfield previously included two species, *A. grunniens* (Linnaeus), known from India eastward to the Philippines, and *A. reticulatus* (Steindachner) known from Thailand south to Sumatra (Greenfield 1997, 1999). While examining specimens at the Muséum national d'histoire naturelle, Paris, the first author found several specimens from Madagascar and Reunion that represented an undescribed species of *Allenbatrachus*. Subsequently, the second author with colleagues from the American Museum of Natural History and Wildlife Conservation Society (WCS) collected three additional specimens of the same undescribed *Allenbatrachus* species from the Makira region of Madagascar. These specimens included a single specimen collected from a small freshwater stream just north of Ambodivoanongy, Sanavilory, and two specimens purchased from local fishers in the nearby Maroansetra market. The collection of these specimens confirms the previous report of Kiener (1963) who illustrated a toadfish specimen (identified in that publication as *Batrachoides grunniens*, now *A. grunniens*) from freshwater streams near the town of Maroansetra.

This undescribed species belongs to the genus *Allenbatrachus* because it has the following characters: (1) dorsocranium has a foramen on each side of the head behind the eyes, bordering the sphenotic and frontal bones (MNHN A3777 cleared and stained) (this character is shared only with species in the genera *Batrachomoeus* and *Halophryne*); (2) it lacks the pore (foramen) present in the upper part of the pectoral-fin axil that is present in *Batrachomoeus* species; (3) the lower jaw is terminal, projecting beyond the upper jaw, whereas the upper and lower jaws are about equally terminal in *Halophryne* species; and (4) the interorbital width is equal to or less than the eye diameter and the gill slit is restricted to the upper one-half to two thirds of the pectoral-fin base in *Halophryne* species, whereas the interorbital width is greater than the eye diameter and the gill slit extends from the upper three-fourth to four-fifths of the pectoral-fin base in *Allenbatrachus*, the condition in the new species.

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## MATERIALS AND METHODS

All counts and measurements follow Hubbs and Lagler (1964) except that the last two fin rays are not counted as one unless it is clear that they are joined at the base. Measurements were made to the nearest 0.1 mm using dial calipers. All measurements are expressed as percentage of standard length (SL). Some counts were made with radiographs. Counts and measurements for the holotype are given first, followed by the range and mean or mode in parentheses for all specimens when variable. Institutional abbreviations are listed in Leviton et al. (1985).

## SPECIES DESCRIPTION

*Allenbatrachus meridionalis* Greenfield and Smith, sp. nov.

(Figs. 1–6)

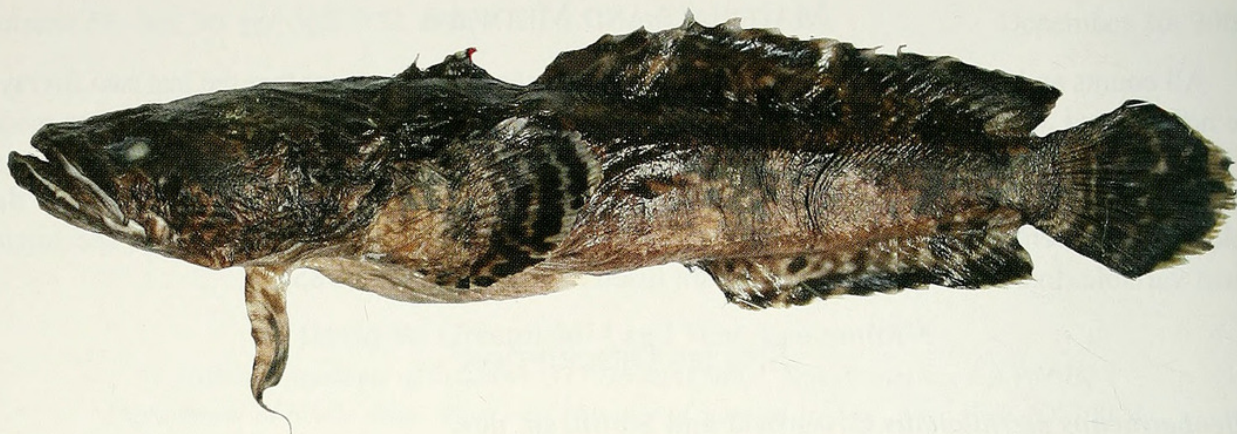
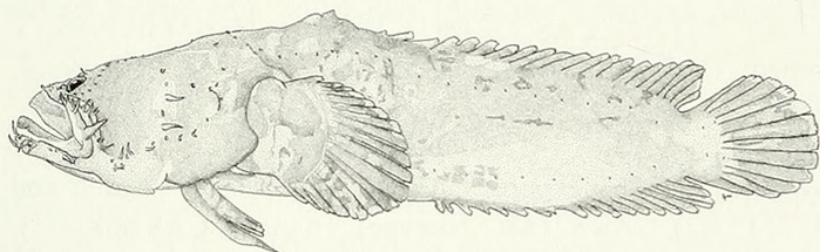
**MATERIAL EXAMINED.**—HOLOTYPE: AMNH 233686, 147.2 mm SL, Malagasy Republic, Madagascar, Market at Maroantsetra, October 2003, P. V. Loiselle. PARATYPES: CAS 220508, 169.0 mm SL, same locality as holotype. AMNH 234024, 90.7 mm SL, Malagasy Republic, Madagascar, small tributary of Antainambalana River, just north of Ambodivoanongy, Sanavilory, November 8, 2003, J.S. Sparks, W.L. Smith, K.L. Tang, and party. MNHN 1992-0670, 189.0 mm SL, Madagascar, Toliara, Tuléar, Andavadanova, 23°20'00"S; 43°30'0"E, Mauge. MNHN 1962-0197, 118.7 mm, 144.0 mm, 165.5 mm SL, Madagascar, Maroantsetra, Antainambalana estuary (listed as Antenambalana), Kiener. USNM 379463, 122.2 mm SL, same locality as MNHN 1962-0197.

**ADDITIONAL MATERIAL EXAMINED.**—*Allenbatrachus meridionalis* (non-types): MNHN A-3777, 109.6 mm SL, Reunion, 21°7'0"S; 55°35'0"E, cleared and stained. MNHN 1966-0912, about 180 mm and 194 mm SL, Madagascar, 20°0'0"S; 42°30'0"E, specimens bent, Kiener, Therezien. *Allenbatrachus grunniens*: Thailand: CAS 75217(2), CAS 75218(1). Vietnam: USNM 047986(1). Malaysia: AMS I.27634008(1). Borneo: CAS-SU 32944(2), CAS-SU 27732(4). Philippines: ANSP 48783(1), ANSP 77373(1), CAS-SU 26909 (1 cleared and stained), CAS-SU 38261(1), CAS-SU 38262(1), USNM 148493(1). India: CAS-SU 41321(1), AMS B.8319(1), ZSI 2099 (1 cleared and stained). *Allenbatrachus reticulatus*: Singapore: CAS-SU 30658(20, 1 cleared and stained), CAS-SU 33701(1), CAS-SU 35153(2), CAS 82188(1 neotype). Thailand: CAS 66821(1), CAS 75216(1), CAS 17652(1), CAS 88690(7), AMS I.21036003(2). Burma: ZSI 10741(1), ZSI 10957(1). Sumatra: USNM 333283(5).

**DIAGNOSIS.**—A generally dark colored species of *Allenbatrachus* with 19 anal-fin rays, 22 dorsal-fin rays, usually a single, simple, pointed orbital cirrus, a simple, pointed barbel at the end of the maxilla, and pointed teeth.

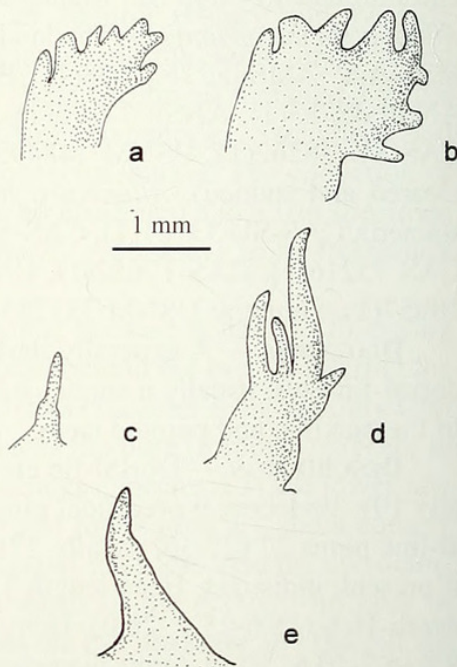
**DESCRIPTION.**—Dorsal-fin elements III-22. Anal-fin rays 19. Pectoral-fin rays 21 (19-22, usually 19). Vertebrae 9 precaudal plus 19 (18-19) caudal (including terminal centrum). Upper lateral-line pores 27 (22-30, usually 27), lower lateral-line pores 18 (17-23), middle lateral-line pores, if present, indistinct. Head length 33.6 (33.1-39.9; 36.3). Head width 25.2 (25.2-31.6; 27.7). Head depth 16.6 (16.6-25.1; 20.0). Bony interorbital width 5.8 (4.8-7.2; 6.0). Fleshy interorbital width 9.8 (6.7-10.8; 10.1). Orbit diameter 5.4 (4.5-9.8; 6.2). Snout length 8.0 (5.9-9.2; 7.5). Upper jaw length 17.0 (17.0-18.6; 17.9). Width of mouth at rictus 17.9 (17.9-23.1; 20.2). First predorsal-fin distance 38.8 (38.7-41.7; 40.0). Second predorsal-fin distance 50.1 (50.1-54.7; 52.0). Preanal-fin distance 61.6 (58.5-64.2; 61.6). Prepelvic-fin distance 24.0 (21.2-26.8; 23.4). Greatest body depth 18.1 (18.1-28.4; 22.0). Caudal-peduncle depth 7.8 (6.5-8.8; 7.9). Length of second dorsal-fin base 43.5 (43.5-56.0; 49.4). Length of anal-fin base 33.1 (33.1-41.6; 37.7). Caudal-fin length 22.2 (20.4-24.0; 22.4). Pectoral-fin length 23.9 (22.9-28.7; 25.9). Pelvic-fin length 21.7 (19.7-23.8; 22.3).



FIGURE 1. Holotype of *Allenbatrachus meridionalis*, AMNH 233686.FIGURE 2. Paratype of *Allenbatrachus meridionalis*, AMNH 234024, from fresh water.FIGURE 3. Drawing of paratype of *Allenbatrachus meridionalis*, MNHN 1992-0670.

Distance between pelvic-fin bases 6.1 (6.1-10.8; 8.6). A single, simple orbital cirrus, tip pointed (fig. 4e) (one specimen has three simple cirri on one side and two on the other, the central always the largest, and a second specimen had three on one side and one on the other with the central cirrus the largest; usually a single, simple orbital cirrus). Largest barbel at end of maxilla simple and pointed (Fig. 5c). All teeth in jaws pointed; vomer and palatines with a single row; dentary with single row on sides and triple row at symphysis; premaxilla with a double row on side and triple row at front.

Color in alcohol of holotype: Overall coloration of preserved specimens is dark, almost black, much darker than other species in the genus. Background color dark brown, with black color pattern. Sides of body

FIGURE 4. Orbital cirri. *Allenbatrachus reticulatus*: (a) anterior; (b) posterior. *Allenbatrachus grunniens*: (c) anterior; (d) posterior. *Allenbatrachus meridionalis*: (e) single cirrus.



with irregular black blotches forming a band centered on the middle of the sides, the areas above and below this lighter. Ventral surface of head and body light brown, a distinct white area around the anus. Top and sides of head dark brown, overlaid with a heavy, irregular mottling of black. Pupil of eye white, iris black. Inside of mouth white. Pectoral-fin base dark brown with two black blotches, fin rays and membranes white, crossed by four distinct black bars, the distal margin of the fin white. Pelvic fin light brown, mottled with black blotches. Caudal fin light tan, covered with large, round black spots that form bars across fin, distal margin light tan. Second dorsal fin dark brown, with two black bands running the length of the fin, one along the base and the other along the distal margin, with a few brown tips on some of the membranes. Basal half of anal fin dark brown with black mottling, outer half a black band, white tips on the fin membranes.

Color of fresh, small, freshwater specimen (AMNH 234024): Background color light tan with straw tinge, head and body overlaid with black markings. Head with black area in front of and under anterior half of eye, a black blotch behind eye with a line from it extending back across side of head. Another black blotch above eye and across interorbital area. Lower side of cheek, lower jaw, and underside of head cream. Area over opercle with black blotches running up across nape. Sides of body with irregular black blotches forming a band centered on the middle of the sides, wider on posterior quarter of body. Area below band light tan, with small, black spots. Pectoral fin light tan with black blotches forming indistinct bands, distal margin of fin white. Anal fin cream with some black blotches distally on posterior half. Base of caudal fin cream with black blotches on distal half. Distinct black blotch around base of first dorsal fin. Three black blotches along second dorsal-fin base. Second dorsal fin light tan with black mottling.

**ETYMOLOGY.**—The specific epithet is the Latin adjective *meridionalis*, meaning southern, referring to the fact that this is the southernmost known species of the genus.

**COMPARISONS.**—*Allenbatrachus meridionalis* differs from both other species of *Allenbatrachus*, *A. grunniens* and *A. reticulatus*, by having both orbital cirri and maxillary barbels that are simple and pointed rather than with multiple tips that are either rounded or pointed. It also differs from both by having more anal-fin rays, 19 versus 16–17. *Allenbatrachus meridionalis* has 22 dorsal-fin rays, whereas the other two species usually have 19. The new species is most similar to *A. grunniens* in having sharp, pointed teeth, rather than the rounded teeth found in *A. reticulatus*.

**DISCUSSION.**—The description of this species from Madagascar and Reunion considerably extends the range of the genus *Allenbatrachus*, previously known from the Ganges River area in India eastward to the Philippines. The capture of a specimen of *A. meridionalis* from a small fresh-

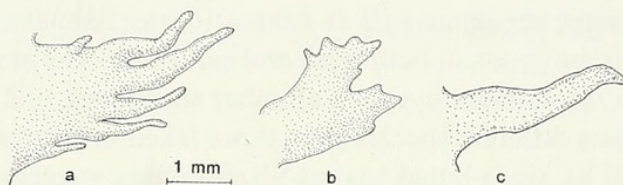


FIGURE 5. Largest barbel at end of maxilla: (a) *Allenbatrachus grunniens*; (b) *Allenbatrachus reticulatus*; (c) *Allenbatrachus meridionalis*.

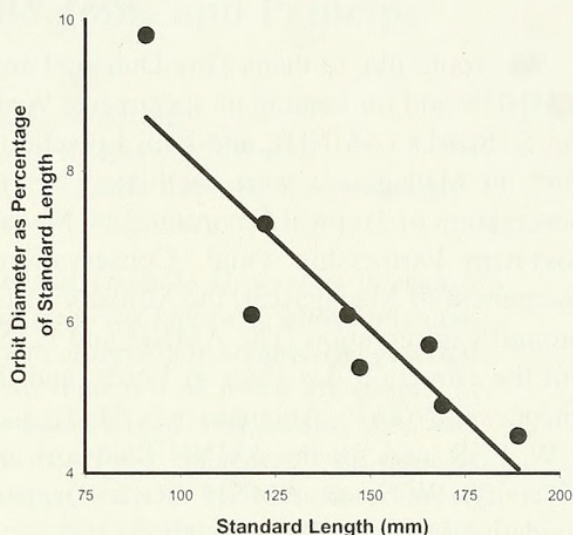


FIGURE 6. Orbit diameter as percent standard length versus standard length for *Allenbatrachus meridionalis* type specimens.



water stream as well as from saltwater habitats, concurs with the capture of the other two species in the genus in both fresh and salt water. The single, small (90.7 mm SL) freshwater specimen has a much larger eye than all other specimens, and at first we considered the possibility that it might be a different species from those taken in salt water; however, when orbit diameter as a percentage of SL was plotted against SL, it became evident that extreme allometric growth in eye size occurs in this species (Fig. 6). It also is lighter in color, with fin markings not as distinct as in larger specimens from saltwater habitats.

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