

A New Pufferfish, *Torquigener heemstrai* from South Africa (Acanthopterygii, Tetraodontiformes, Tetraodontidae)

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Abstract A new pufferfish, *Torquigener heemstrai* is described from five specimens collected at depths of 22–30 m on Tugela Bank off KwaZulu-Natal in South Africa. The new species is distinguished from other species of *Torquigener* by the following combination of characters: dorsal surface of body from nasal organs to just before dorsal fin covered by spinules; ventral surface of body from level of nasal organs to anus densely covered by spinules; prebranchial margin with 11–14 long spinules; dorsal-fin rays 8–9, anal-fin rays 7, pectoral-fin rays 14, lateral skin fold running behind anal fin to caudal-fin base, dorsal half of body blackish brown with many short white lines, an irregular white line running along ventrolateral part of body just above a skin fold from dorsal end of gill opening to caudal peduncle, and ventral part of body white. A key to the species of *Torquigener* in South Africa is given.

Key words: taxonomy, *Torquigener*, distribution, Indian Ocean

Introduction

Pufferfishes of the genus *Torquigener* Whitley, 1930, are distinguished from other genera of the Tetraodontidae by the following combination of characters: two lateral lines running on the side of the body; nasal organs covered by small sac with two nostrils; eyes dorsally adnate only; chin prominent; caudal fin truncate to rounded. *Torquigener* is currently represented by 20 species distributed in shallow waters of the Indo-West Pacific (Hardy, 1983a, b, 1984, 1989; Matsuura, 2014, 2022). Three species of the genus have been reported from the east coast of Africa; *T. marleyi* (Fowler, 1929) and *T. hypselogeneion* (Bleeker, 1852) from South Africa and *T. flavimaculosus* Hardy and Randall, 1983 from Zanzibar (Matsuura, 2022). Five specimens collected off KwaZulu-Natal are

described herein as new and is the 21st species of the genus. A key to the species of *Torquigener* in South Africa is given.

Methods

Methods of measurements follow those of Dekkers (1975) but fin ray lengths were determined by measurement from the embedded base to the distal tip of the longest ray. Fin ray counts include all visible rays, both branched and unbranched. Pectoral-fin ray counts do not include a rudimentary uppermost ray. Paratype data are shown in parentheses when different from those of the holotype. Institutional abbreviations are as follows: SAIAB (South African Institute for Aquatic Biodiversity, Makhanda) and ANSP (Academy of Natural Sciences of Drexel University, Philadelphia). Standard length is abbreviated as SL. The spinules on the head

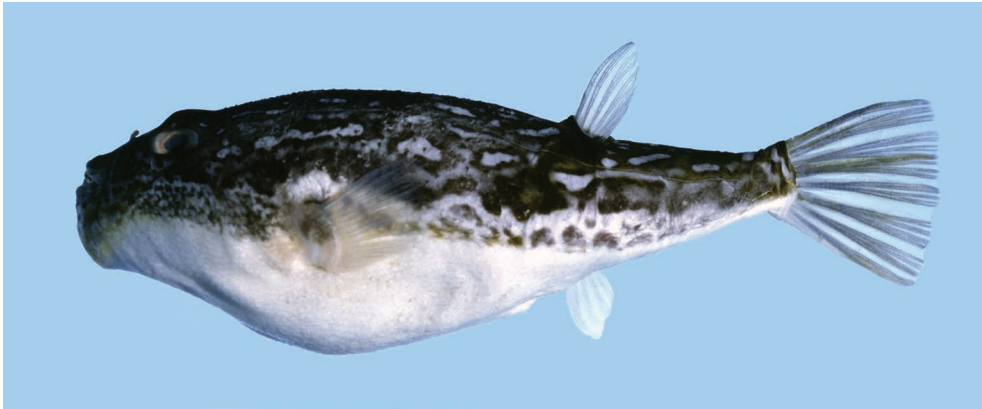


Fig. 1. Holotype of *Torquigener heemstrai* n. sp., SAIAB 60948, 94.8 mm SL, Tugela Bank (29°13'S, 31°29'E), KwaZulu-Natal, South Africa, 30 m depth, October 1999, photo by P. C. Heemstra.

and body surface were observed from three dimensional images constructed from X-ray CT scanning equipment, LCT 100 (Aloka, Tokyo).

***Torquigener heemstrai* n. sp.**

(Figs. 1–3)

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Material examined. Holotype: SAIAB 60948, 94.8 mm SL, Tugela Bank (29°13'S, 31°29'E), KwaZulu-Natal, South Africa, 30 m depth, October 1999. Paratypes: SAIAB 40751, 90.7 mm SL, same locality as holotype, 40 m depth, 16 Aug. 1991; SAIAB 60949, 3 specimens, 74.7–87.0 mm SL, same locality as holotype, 26 Sept. 1999.

Diagnosis. A species of *Torquigener* with the following combination of characters: dorsal-fin rays 8 (9); anal-fin rays 7; pectoral-fin rays 14; prebranchial margin with 14 (11–12) long spinules; 12 (14) spinules on back between just behind mid-dorsal branches of lateral line; dorsal half of body blackish brown with many short white lines, an irregular white line running along ventrolateral part of body just above a skin fold from dorsal end of gill opening to caudal peduncle, and ventral part of body white.

Description. Body moderately elongate, rounded dorsally and flattened ventrally in cross section, tapering posteriorly to laterally compressed caudal

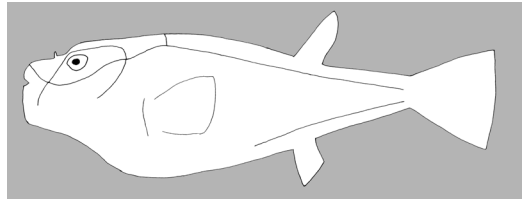


Fig. 2. Schematic illustration of lateral line system of *Torquigener heemstrai* n. sp.

peduncle. A longitudinal skin fold extending on ventrolateral corner of body from just behind pectoral fin to ventral part of caudal-fin base. Mouth small, terminal; lips thin, covered with many short papillae; chin prominent. Nasal organ a short, erect papilla well before eye, with two well-separated openings. Eye large, 4.8 (4.1–4.6) in head length, elliptical, and dorsally adnate, ventral rim at level slightly above upper jaw. Gill opening a slightly curved slit just anterior to pectoral-fin base.

Dorsal fin slightly rounded, its origin just above anal-fin origin; anal fin slightly rounded, smaller than dorsal fin; pectoral fin rounded, 1st pectoral-fin ray rudimentary and nubbin-like, dorsal end of pectoral-fin base at level slightly below mouth; caudal fin slightly rounded.

Two lateral lines on head and side of body (Fig. 2). The dorsalmost lateral line encircles the eye, with a preopercular branch terminating at level of dorsal end of pectoral-fin base and a posteriorly directed branch coursing along the mid-lateral side

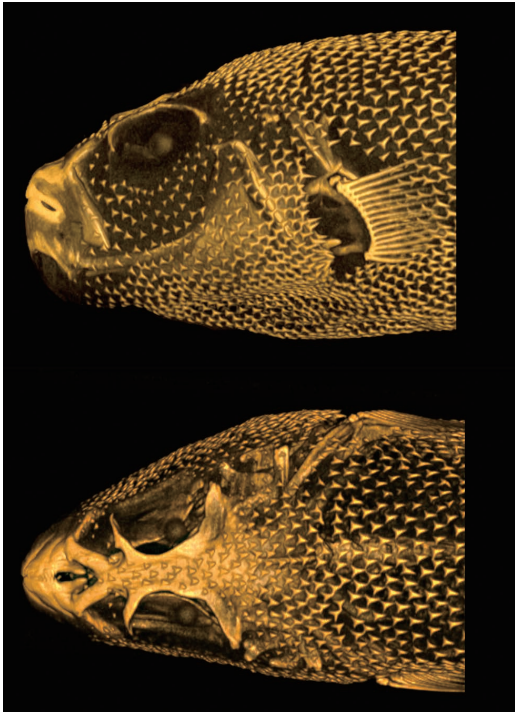


Fig. 3. X-ray CT scanning photographs showing the two-rooted spinules of the holotype of *Torquigener heemstrai* n. sp. Top, lateral view; bottom, dorsal view.

of body from just behind ventroposterior part of eye to caudal-fin base, with a dorsally directed branch just above pectoral fin almost meeting in midline with its counterpart from the other side of the body. A short transverse element of lateral line in front of nasal organ almost meeting in midline with its counterpart from the other side of the snout; another short branch running ventrally on lower jaw. The ventral lateral line originates at midpoint between pectoral and anal fins and courses along the ventrolateral edge of body to caudal-fin base.

Two-rooted spinules present on head and body, extending on dorsal surface from nasal organs to the region anterior to dorsal-fin origin (Fig. 3); two-rooted spinules also densely developed on ventral surface from just behind chin to vent.

Proportional measurements expressed as percentage of SL. Head length 34.9 (32.2–38.3), snout length 14.6 (13.8–14.7), snout to dorsal-fin origin 69.2 (67.6–71.0), snout to anal-fin origin 67.3

(67.7–71.8), body width at pectoral-fin base 27.8 (25.7–27.6), body depth at anal-fin origin 19.9 (16.4–21.1), depth of caudal peduncle 8.4 (8.2–10.0), length of caudal peduncle 28.6 (24.9–27.8), gill-opening length 11.1 (7.9–12.1), eye diameter 6.6 (7.1–9.4), bony interorbital width 6.2 (5.4–6.7), snout to anterior edge of nasal organ 8.1 (7.0–11.1), posterior edge of nasal organ to anterior edge of eye 6.1 (4.9–6.3), length of dorsal-fin base 6.4 (6.1–8.7), length of anal-fin base 5.1 (3.9–5.5), longest dorsal-fin ray 15.6 (17.7–21.0), longest anal-fin ray 12.9 (14.4–16.3), longest pectoral-fin ray 18.1 (16.9–20.0), caudal-fin length 24.7 (25.4–29.2).

Color of freshly dead specimens (Fig. 1). Dorsal half of head and body blackish brown covered by many short white lines; ventral half of head and body white; an irregular white line running along ventrolateral part of body just above a skin fold from dorsal end of gill opening to caudal peduncle; many small irregular blackish brown spots along a skin fold; edge of eye dark yellow; dorsal, anal and pectoral fins transparent with slightly grayish rays; dark brown smudge on dorsal part of pectoral-fin base; caudal fin transparent with dark gray rays.

Distribution. *Torquigener heemstrai* n. sp. is currently known only from the type locality.

Etymology. The specific name, *heemstrai*, refers to the late Phillip C. Heemstra in honor of his great contribution to ichthyology in South Africa.

Remarks. The new pufferfish is classified in the genus *Torquigener* by having the following combination of characters: eye dorsally adnate only; chin well developed; two openings on nasal organ; ventrolateral skin fold extending behind pectoral fin to caudal-fin base. The revision of 12 Australian species of *Torquigener* (Hardy, 1983a) was followed by descriptions of additional eight new species from various regions of the Indo-Pacific (Hardy, 1983a, b, 1984, 1989; Hardy and Randall 1983; Matsuura, 2014). *Torquigener heemstrai* brings the total number of species of *Torquigener* to 21.

Major characters distinguishing *Torquigener heemstrai* n. sp. from all other species of the genus are provided in the *Diagnosis* above. The most helpful characters in separating the new species from the other species of *Torquigener* are

coloration of the head and body: no solid, dark, longitudinal stripe nor longitudinal rows of dark spots on the mid-side of body from behind pectoral fin to caudal-fin base; no vertical markings on

cheek; dorsal half of head and body blackish brown covered with many short white lines; and ventral half of head and body white.

Key to the Species of *Torquigener* in South Africa

- 1a. Spinules restricted to region above and forward of pectoral-fin bases *T. marleyi*
- 1b. Spinules present from nasal organs to just before dorsal-fin origin.....2

- 2a. No solid longitudinal dark brown stripe nor longitudinal row of yellow spots on body from pectoral-fin base to caudal-fin base; dorsal half of body blackish brown with many short white lines *T. heemstrai* n. sp.
- 2b. Solid longitudinal dark brown stripe or longitudinal row of yellow spots on body from pectoral-fin base to caudal-fin base3

- 3a. Solid longitudinal dark brown stripe from above pectoral-fin bases to caudal-fin base*T. hypselogeneion*
- 3b. Longitudinal row of ~20 small yellow spots from pectoral-fin bases to caudal-fin base*T. flavimaculosus*



Fig. 4. Holotype of *Torquigener marleyi* (Fowler, 1929). ANSP 51293, 8.0 cm SL, Tugela River mouth, KwaZulu-Natal, South Africa. Top, lateral view; middle, dorsal view; bottom, ventral view. Photographs courtesy of ANSP.

Comments on Torquigener marleyi. Although Hardy (1989) described *Torquigener balteus* as a new species on the basis of three type specimens collected from South Africa off Natal, he overlooked Fowler (1929), who reported *Sphoeroides marleyi* (= *Torquigener marleyi*) as a new species based on a single specimen collected from Tugela River mouth, KwaZulu-Natal, South Africa. My examination of the holotype of *T. marleyi* (Fig. 4) showed that *T. marleyi* is a senior synonym of *T. balteus* (see, Matsuura, 2022: 474). On the other hand, *Sphoeroides marleyi* Fowler, 1929 was put in a synonym list of *Amblyrhynchotes honckenii* (Bloch, 1785) by *lapsus calami* (Matsuura, 2022: 456).

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of the holotype of *Sphoeroides marleyi*. Eri Katayama of the National Museum of Nature and Science took X-ray CT scanning photographs of the holotype of *Torquigener heemstrai* n. sp.

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