

Redescription of the Pufferfish *Torquigener brevipinnis* (Regan) (Tetraodontiformes: Tetraodontidae), with Description of a New Species of *Torquigener* from Indonesia¹

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ABSTRACT: *Torquigener brevipinnis* (Regan) is redescribed. The species differs from the very similar *T. flavimaculosus* Hardy and Randall primarily in color, having clearly defined whitish bands on the side of the head, a solid lateral stripe along the body, and fewer vertical bands on the caudal fin. *Torquigener gloerfelti* n. sp. is described from four specimens from Indonesian waters. It differs from *T. altipinnis* (Ogilby) in color pattern and in the higher number of spines that overlap the anterior margin of the gill opening, and from *T. vicinus* Whitley in having a larger eye diameter and shorter caudal peduncle length.

IN A RECENT REVIEW OF THE status of specimens thought to include syntypes of the pufferfish *Torquigener hypselogeneion* (Bleeker) (Hardy 1983b), I referred two of Bleeker's specimens to a second, at that time undetermined, species. Subsequent examination of additional material has revealed that the two Bleeker fishes are referable to *Torquigener brevipinnis* (Regan, 1902). Described from a single specimen from the Celebes, *T. brevipinnis* is a very poorly known, tropical species, which in view of its similarity to a number of related species now warrants redescription.

In addition, a new species of *Torquigener* is described, from four specimens taken in Indonesian waters.

METHODS

Measurements were taken by dial caliper in a manner similar to that outlined by Dekkers (1975). All measurements are from preserved specimens. Fin ray counts include all visible rays, both branched and unbranched, and fin ray lengths were measured from the embedded base. All specimens were x-rayed for vertebral counts.

The following abbreviations are used: HL,

head length; SL, standard length; BM(NH), British Museum (Natural History), London; BPBM, Bernice P. Bishop Museum, Honolulu; KFSL, Kanudi Fisheries Research Laboratory, Port Moresby, Papua New Guinea; NMNZ, National Museum of New Zealand, Wellington; NTM, Museums and Art Galleries of the Northern Territory, Darwin; PMBC, Phuket Marine Biological Center, Phuket, Thailand; PJPW, P. J. P. Whitehead Collection; RMNH, Rijksmuseum van Natuurlijke Historie, Leiden; TGT, T. Gloerfelt-Tarp Collection.

Torquigener brevipinnis (Regan, 1902)

Figure 1

Tetraodon hypselogeneion. Bleeker, 1865: 61 (part); *Tetraodon hypselogenion* Day, 1888: 702, pl. clxxxiii (part); *Tetraodon brevipinnis* Regan, 1902: 300; *Amblyrhynchotes brevipinnis*. Fraser-Brunner, 1943: 11; *Torquigener brevipinnis*. Hardy, 1984; (Abbreviated synonymy).

Material Examined

HOLOTYPE: BM(NH) 1872.4.6.87, 47 mm SL, N. of Celebes, Coll. Meyer.

ADDITIONAL: BPBM 19406, 32 mm SL, Ambon; KFSL F.4411-06, 58 mm SL, S of Yule Is., Gulf of Papua; NTM S.10992-001, 51.7 mm SL, SE of Lombok, 60-80 m (ex. TGT 3087); NTM S.10747-003, 58.1 mm SL, Sumba

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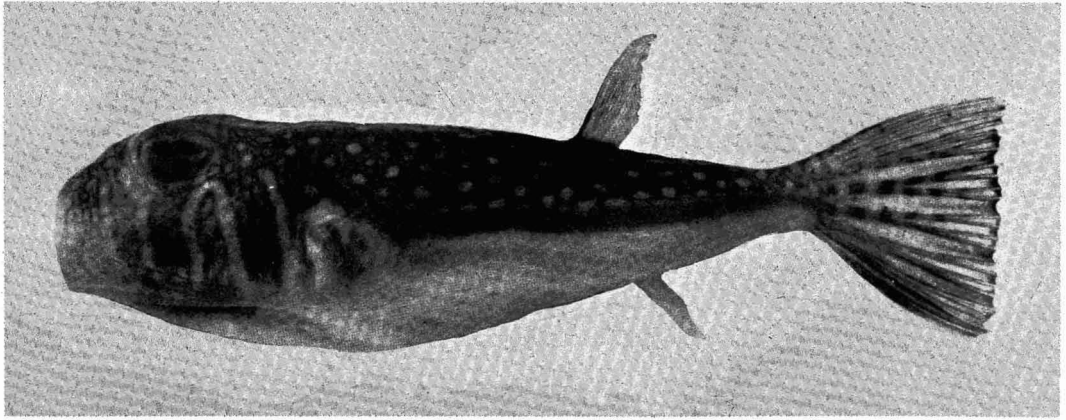


FIGURE 1. *Torquigener brevipinnis*, 53 mm SL, NMNZ P. 14787 (from a color transparency by T. Gloerfelt-Tarp).

Is. (ex. TGT 3317); NMNZ P.14786, 56 mm SL, SSW of Sumatra; NMNZ P.14787, 53 mm SL, S of Sumatra (6°07' S, 104°39' E), 34 m (ex. TGT 2267); NMNZ P.14788, 81 mm SL, S of Sumbawa, 40–60 m (ex. TGT 1346); NMNZ P.14789, 79 mm SL, NE of Lombok, 100 m (ex. TGT 3247); PMBC 2835, 81 mm SL, Phuket fish market; RMNH 7332 (2), 35–43 mm SL (ex. Bleeker Collection).

Diagnosis

A moderate-sized *Torquigener*, with dorsal and anal fins somewhat pointed and with a short base; several spines overlapping anterior margin of gill opening; a solid, yellowish-brown band laterally from behind pectoral fin to caudal fin base; fresh specimens (particularly) with three slightly oblique, narrow, creamy-white bands traversing cheek and just anterior to gill opening, with a similar inverted U-shaped band below posterior of eye.

Description

The following counts are based on the holotype (47 mm SL). In parentheses are counts for 11 nontype specimens, 32–81 mm SL. Proportions are based on the eight nontype, adult specimens (51.7–81.0 mm SL), which are in a good state of preservation.

Dorsal rays 9 (8–9); anal rays 7(7–8); pectoral rays 16(15–16); caudal rays 11(11); vertebrae 9 + 11(9 + 11).

Body elongate, rounded dorsally and flattened ventrally, tapering to a narrow caudal peduncle; head length 2.6–2.9 in SL; snout to anterior of vent 1.4–1.5 in SL, to origin of dorsal fin 1.4–1.5 in SL, to origin of anal fin 1.3–1.4 in SL, to origin of pectoral fin 2.3–2.7 in SL; width at base of pectoral fin 3.3–4.4 in SL; depth from dorsal fin origin to anal fin origin 5.4–6.6 in SL; depth at posterior of dorsal fin 7.0–7.9 in SL; caudal peduncle length 3.6–4.5 in SL; least depth of caudal peduncle 11.8–14.1 in SL.

Mouth small, terminal, width 3.4–4.4 in HL; lips thin, covered with numerous short papillae; chin prominent; nasal organ a short erect papilla set in a low depression well forward of the eye, with two moderately separated openings, posterior opening equal in size or slightly larger than anterior, inner surface with small, close, well-developed flaps around circumference; snout to anterior edge of nasal organ 3.2–3.9 in HL; posterior edge of nasal organ to anterior edge of eye 4.8–6.6 in HL.

Eye moderate size, elongate, and dorsally adnate, upper border level with dorsal profile, lower border well above level of mouth corner, horizontal diameter 3.1–3.8 in HL; least fleshy interorbital distance 6.1–7.1 in HL and 16.5–18.8 in SL; anterior margin of gill opening with four to seven short spines protruding from fleshy papillae; posterior of eye to dorsal corner of gill opening 2.5–3.0 in HL.

Pectoral fins slightly dorsally elongate and

rounded, first ray very short; maximum length of pectoral fin from base 5.6–6.4 in SL; top of base well below lower margin of eye; dorsal fin elongate and pointed, origin just posterior to vent, 1st ray 16.5–24.2 in SL, longest ray 4.8–5.6 in SL, base 14.9–23.2 in SL and 3.1–4.4 in longest ray; anal fin elongate and pointed, origin under posterior of dorsal fin base, first ray 16.5–25.4 in SL, longest ray 6.7–7.9 in SL, base 21.5–28.3 in SL and 3.0–3.8 in longest ray; caudal fin truncate, maximum length 3.2–4.0 in SL.

Ventrolateral skinfold extends from behind chin to caudal fin, except directly beneath pectoral fin; lateral line distinct, encircling eye with an anterodorsal branch almost meeting in midline anterior to nasal organ and a preopercular branch dropping to lateral limit of belly, extends along body barely rising over pectoral fin and gently dropping under dorsal fin to base of caudal fin; mid-dorsal branch of lateral line above pectoral base not meeting in midline; second lateral line drops from behind mouth corner, extending along lateral region of belly except for a break ventral to pectoral fin, closely associated with ventrolateral skinfold from anal base; a few small papillae associated with lateral line systems.

Body spines two-rooted, small, moderately sparse dorsally (five to six spines across dorsum immediately posterior to mid-dorsal branches of lateral lines, between upper lateral lines on each side) from level of nasal organs to just before dorsal fin base; spines extending laterally from cheek almost to limit of dorsal spines, extending ventrally from behind chin to anterior of vent; ventral spines moderately dense, ca. 18–19 across the belly on a line between pectoral fin bases. Color when fresh (from color transparency of NMNZ P.14787): dorsum with many small, round or oval, pale yellowish spots, delicately outlined by small brownish dots, which also form a reticulate network against a pale brownish background; lateral yellowish-brown band from behind pectoral fin to caudal fin base forms lower boundary to spotted region; lower sides and belly creamy-white; top of head and snout with similar though less regular markings as dorsum; side of head and cheek with somewhat mottled brownish

background; three slightly oblique, narrow, creamy-white bands traverse cheek from below nostril, below anterior corner of eye, and just forward of gill opening from mid-eye level, respectively; a similar marking, in the form of an inverted U, crosses cheek beneath posterior half of eye; dorsal, anal, and pectoral fins colorless; caudal fin rays with regular dark brown blotches, producing the effect of six vertical bands; posteroventral webbing of caudal fin brownish grey, posterior margin of fin webbing edged with black. (The cheek markings, highly diagnostic in fresh specimens, are readily lost in preservative.)

Distribution

A tropical species primarily known from Indonesian waters. One record is from Yule Is., Gulf of Papua, Papua New Guinea. Most capture records indicate a moderately deep distribution (34–100 m), although BPBM 19406 (a juvenile of 33 mm SL) was taken in 0–2 m at Ambon.

Remarks

Torquigener brevipinnis is very similar to *Torquigener flavimaculosus*, recently described from the Red Sea and adjacent waters by Hardy and Randall (1983). Together with *Torquigener pleurogramma*, the former two species appear to have been included by Day (1875–1878) in his concept of *Tetrodon hypselogenion*. Day's description of the caudal fin as having "about seven vertical bands most distinct in its upper lobe," which was repeated by Regan (1902) in his description of *brevipinnis*, is seemingly more applicable to the latter than to *T. flavimaculosus*. In *T. flavimaculosus* the caudal fin markings are less regular and more numerous on each ray. *Torquigener brevipinnis* further differs from *T. flavimaculosus* in having a solid lateral stripe along the body, instead of many small, yellowish spots, well-defined whitish bands on the side of the head, instead of broad bands of small irregular, brownish spots, and a shorter dorsal fin base, which is just posterior to the vent. In *T.*

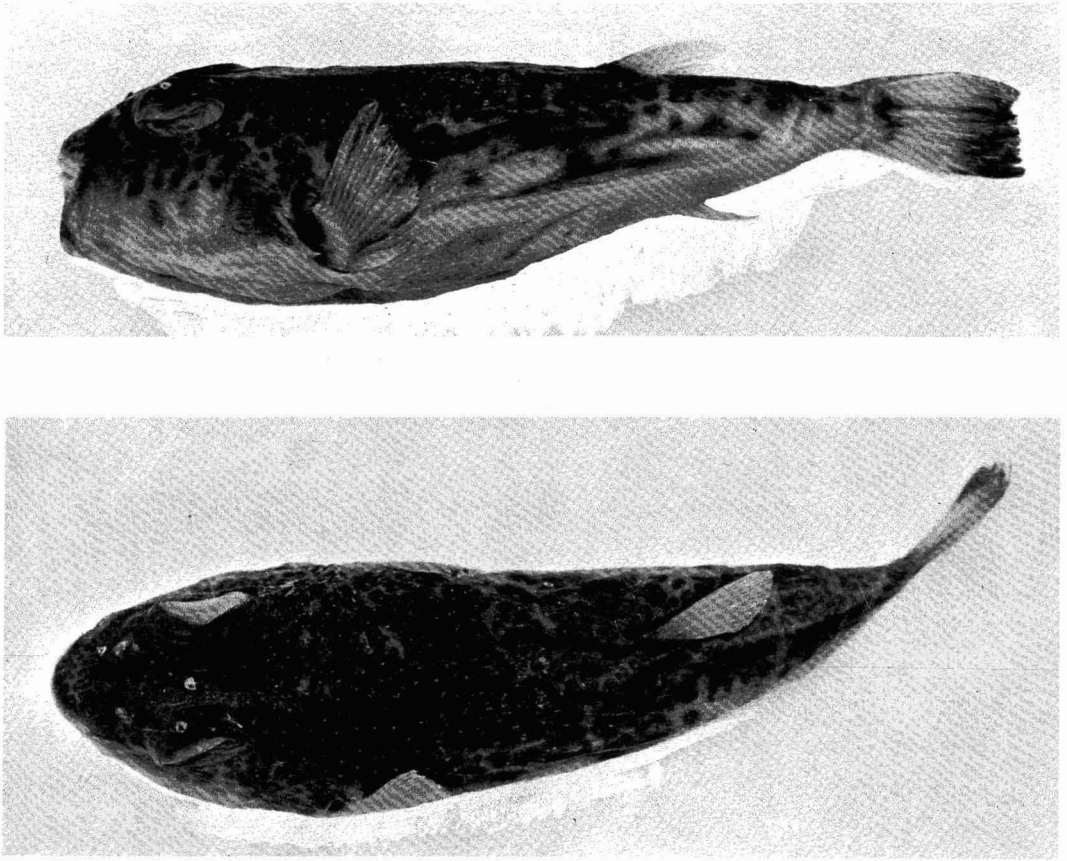


FIGURE 2. *Torquigener gloerfelti*, 146 mm SL, BM(NH) 1984.1.2.6. Paratype. *top*, lateral view; *bottom*, dorsal view.

flavimaculosus the dorsal fin arises above the vent. Both species differ from *T. hypselogeneion* in relative eye diameter, caudal peduncle length (smaller dimensions in *T. hypselogeneion*), and in having more dense ventral spination.

Because there is no way of knowing when Bleeker acquired the 2 examples of *Torquigener brevipinnis*, now included in the RMNH 7332 series, along with 20 examples of *T. hypselogeneion*, I have refrained from referring his early descriptions of *hypselogeneion* to the partial synonymy of *brevipinnis*. Bleeker's (1865) description of *hypselogeneion* in his *Atlas Ichthyologique* is treated thus, however, as at least one example of *brevipinnis* appears to have been in his collection at that time (see Hardy 1983b).

Torquigener gloerfelti n. sp.

Figure 2, Table 1

HOLOTYPE: NMNZ P.14790, 154 mm SL, Bali Strait, 50–60 m, March 1981 (ex. TGT 1392).

PARATYPES: BM(NH) 1984.1.2.6, 146 mm SL, Bali (ex. PJPW 533); NTM S.10747–004, 113 mm SL, Sumba Is., August 1981 (ex. TGT 3313); NMNZ P.14791, 94 mm SL, South Java.

Diagnosis

A large sized *Torquigener* with a relatively short caudal peduncle (contained 3.4–4.1 times in SL); large eye horizontal diameter (contained 3.4–3.6 times in HL); 8–10 well-developed spines overlapping anterior margin of gill opening; dorsal color pattern formed

TABLE 1
MEASUREMENTS IN MM AND FIN RAY COUNTS OF TYPE SPECIMENS OF *Torquigener gloerfelti*

	HOLOTYPE NMNZ P. 14790	PARATYPES		
		BM (NH) 1984.1.2.6	MAGNT S.10747-004	NMNZ P. 14791
Standard length	154	146	113	94
Head length	52	50	37	32
Snout vent length	100	95	69	59
Snout to origin of dorsal fin	104	97	74	61
Snout to origin of anal fin	111	106	81	65
Snout to origin of pectoral fin	57	54	41	35
Dorsal fin origin to anal fin origin	28	25	20	17
Depth at posterior of dorsal fin	20	19	15	12
Caudal peduncle length	38	38	33	26
Caudal peduncle least depth	11	10	8.0	7.0
Mouth width	17	17	10	8.4
Snout to anterior of nasal organ	15	14	10	9.8
Posterior edge of nasal organ to eye	6.4	8.4	5.5	6.0
Eye horizontal diameter	15	14	11	9.5
Least fleshy interorbital width	8.0	6.1	5.0	3.2
Posterior of eye to dorsal corner of gill opening	21	19	15	14
First dorsal ray length	7.2	8.0	4.5	6.0
Longest dorsal ray length	24	24	19	16
Base of dorsal fin	9.8	9.0	7.0	6.0
First anal ray length	9.5	6.0	3.8	7.0
Longest anal ray length	21	18	15	13
Base of anal fin	8.0	5.7	5.0	4.9
Maximum pectoral fin length	25	21	20	17
Maximum caudal fin length	34	30	24	21
Dorsal ray count	9	9	8	8
Anal ray count	7	7	6	7
Pectoral ray count	16/16	15/15	15/16	15/15

from open, irregularly-shaped, dark brown circles and ovals on a pale background; lateral surface with scattered brown blotches; no lateral stripe or interconnected spots.

Description

The following counts and proportions are based on the holotype, 154 mm SL, and on three paratypes, 94–146 mm SL (the range for paratypes appears in parentheses). Measurements and counts of these specimens are presented in Table 1.

Dorsal rays 9(8–9); anal rays 7(6–7); pectoral rays 16(15–16); caudal rays 11(11); vertebrae 9 + 12(9 + 12).

Body elongate, rounded dorsally and flattened ventrally, tapering to a narrow caudal peduncle; head length 3.0(2.9–3.1) in SL; snout to anterior of vent 1.5(1.5–1.6) in SL, to origin of dorsal fin 1.6(1.5) in SL, to origin of

anal fin 1.4(1.4) in SL, to origin of pectoral fin 2.7(2.7–2.8) in SL; width at base of pectoral fin 3.3(3.2–4.2) in SL; depth from dorsal fin origin to anal fin origin 5.5(5.5–5.8) in SL; depth at posterior of dorsal fin 7.7(7.5–7.8) in SL; caudal peduncle length 4.1(3.4–3.8) in SL; least depth of caudal peduncle 14.0(13.4–15.4) in SL.

Mouth small, terminal, width 3.1(2.9–3.8) in HL; lips thin, covered with numerous short papillae; chin prominent; nasal organ a short, erect papilla, set in a low depression well forward of the eye, with two moderately separated openings, posterior opening equal in size or slightly larger than anterior, inner surface with small, close, well-developed flaps around circumference; snout to anterior edge of nasal organ 3.5(3.3–3.7) in HL; posterior edge of nasal organ to anterior edge of eye 8.1(5.3–6.7) in HL.

Eye moderate size, elongate and dorsally

adnate, upper border level with dorsal profile, lower border well above level of mouth corner, horizontal diameter 3.5(3.4–3.6) in HL; least fleshy interorbital distance 6.5(7.4–10.0) in HL and 19.3(22.6–29.4) in SL; anterior margin of gill opening with 8–10 well-developed spines, protruding from fleshy papillae; posterior of eye to dorsal corner of gill opening 2.5(2.3–2.6) in HL.

Pectoral fins slightly dorsally elongate and rounded, first ray very short; maximum length of pectoral fin from base 6.2(5.5–7.0) in SL; top of base well below lower margin of eye; dorsal fin elongate and somewhat rounded, origin just posterior to vent, first ray 21.4(15.7–25.1) in SL, longest ray 6.4(5.9–6.2) in SL, base 15.8(15.7–16.2) in SL and 2.4(2.6–2.7) in longest ray; anal fin elongate and pointed, origin under posterior of dorsal fin base, first ray 16.2(13.4–30.0) in SL, longest ray 7.3(7.5–8.2) in SL, base 19.3(19.2–25.6) in SL and 2.6(2.7–3.1) in longest ray; caudal fin truncate, maximum length 4.5(4.5–4.9) in SL.

Ventrolateral skinfold extends from behind chin to caudal fin, except directly beneath pectoral fin; lateral line system as described for *Torquigener brevipinnis*.

Body spines two-rooted, small, moderately sparse dorsally from level of nasal organs to just before dorsal fin base (7–9 spines across dorsum immediately posterior to mid-dorsal branches of lateral lines, between upper lateral lines on each side); spines extending laterally from cheek almost to limit of dorsal spines, extending ventrally from behind chin to anterior of vent; ventral spines moderately dense, ca. 18–20 across the belly on a line between pectoral fin bases. Color when fresh (from color transparency of BM[NH] 1984.1.2.6): dorsum with a dense pattern of irregularly shaped, open-sided, medium brown circles and ovals, on a pale yellowish-white background; pattern especially dense on head, interspersed with small, solid, brownish dots; background color extends to ventrolateral skinfold and chin; sides and cheek with irregularly spaced yellowish-brown blotches (not forming an interconnecting linear series); indistinct, yellowish-brown smudge above ventrolateral skinfold anterior to gill opening,

and behind pectoral fin to about level with anal fin; belly and lips creamy-white; caudal fin greyish distally; all other fins and proximal portion of caudal fin colorless.

Distribution

A tropical species, known only from a restricted area of Indonesia, between south Java and Sumba Is.

Remarks

Torquigener gloerfelti is similar in appearance to *T. altipinnis*, known from the east coast of Australia to the Kermadec Is., and to *T. vicinus*, uncommonly recorded from southwest Western Australia (Hardy 1983a). All three species have been taken in moderately deep water (33–79 m) and have a similar mottled appearance. However, *T. gloerfelti* differs from the other species in having the dorsal color pattern comprised of dark markings on a pale background, whereas the latter, particularly *T. altipinnis*, are characterized by pale markings on a dark background. The irregular brownish blotches on the sides of *T. gloerfelti* are comparable with *T. vicinus*, whereas *T. altipinnis* has a linear series of interconnecting, sometimes pale centered blotches along the side of the body. Both *T. gloerfelti* and *T. altipinnis* differ from *T. vicinus* in relative caudal peduncle length (longer in *T. vicinus*). *T. gloerfelti* has a relatively larger horizontal eye diameter than *T. vicinus*, and a greater number of spines overlapping the anterior margin of the gill opening (8–10 well-developed spines), compared with *T. altipinnis* (up to 3 poorly developed spines).

T. gloerfelti is named for Thomas Gloerfelt-Tarp, who has labored for some years compiling an extensive and well-documented account of Indonesian fishes, and who has provided me with many tetraodontid specimens in the course of that work.

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I am especially grateful to Thomas Gloerfelt-Tarp, FAO, Denpasar, Indonesia,

who provided me with much of the material used in this study, and with color transparencies of *Torquigener brevipinnis* and *T. gloerfelti*. The curators of ichthyology at the institutions listed under the Methods section also assisted in the loan of material. J. C. Yaldwyn and G. R. F. Hicks and C. D. Paulin, National Museum of New Zealand, gave some useful comments on the manuscript. P. H. J. Castle, Victoria University of Wellington, made available radiographic facilities. My wife Marilyn continued in giving much appreciated encouragement.

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