

The Status of *Torquigener hypselogeneion* (Bleeker) (Tetraodontiformes: Tetraodontidae) and Some Related Species, including a New Species from Hawaii¹

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ABSTRACT: *Torquigener hypselogeneion* (Bleeker) and *T. florealis* (Cope) are redescribed, and a neotype is proposed for the former. That species differs from *T. florealis* in having smaller eye diameter, shorter caudal peduncle length, usually lower fin ray counts, and different color pattern. *Torquigener randalli* n.sp. is described from six specimens from Oahu, Hawaii, differing from the similar *T. florealis* in shape of dorsal and anal fins, a usually lower dorsal and anal fin ray count, and in color pattern.

IN MARCH 1852 Bleeker published the description of a small pufferfish, which he called *Tetraodon hypselogeneion*, based on specimens from Amboina (Ambon) (Bleeker 1852a). In subsequent descriptions, he extended the known distribution to cover much of the Dutch East Indies (Indonesia), and in 1865 included examples, considered as *hypselogeneion*, reported from the Red Sea as *Tetrodon honckenii* (not of Bloch), by Rüppell (1828). A central Pacific species, described as *Tetrodon florealis* by Cope (1871), was later included in the synonymy of *Sphoeroides hypselogenion* (sic) by Fowler (1928), the latter name having attained something of a "catch-all" status owing to the very considerable overall similarity of the species involved. Examples from the Red Sea, conspecific with those reported by Rüppell, are currently subject to description as a new species (Hardy and Randall 1983), and examinations of other supposed *hypselogeneion* specimens have disclosed the separate identity of *florealis*, along with a hitherto unnamed species from Hawaii.

All of the above species conform to the genus *Torquigener* Whitley, recently revised in a study of Australian representatives by Hardy (1983).

METHODS

Measurements (taken to 2 significant figures) were 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 determined from the embedded base. One example each of *T. florealis* and *T. randalli* was cleared and stained, and all others x-rayed, for examination of their osteology.

The following abbreviations are used: HL, head length; SL, standard length; TL, total length; AMS, Australian Museum, Sydney; ANSP, Academy of Natural Sciences of Philadelphia; BMNH, British Museum (Natural History), London; BPBM, Bernice P. Bishop Museum, Honolulu; NMNZ, National Museum of New Zealand, Wellington; RMNH, Rijksmuseum van Natuurlijke Historie, Leiden; USNM, United States National Museum of Natural History, Washington, D.C.

Torquigener hypselogeneion (Bleeker)

Figure 1, Table 1

Tetraodon hypselogeneion Bleeker, 1852: 24
(type locality, Amboina).

MATERIAL EXAMINED:

Neotype: USNM 236937, 35 mm SL,

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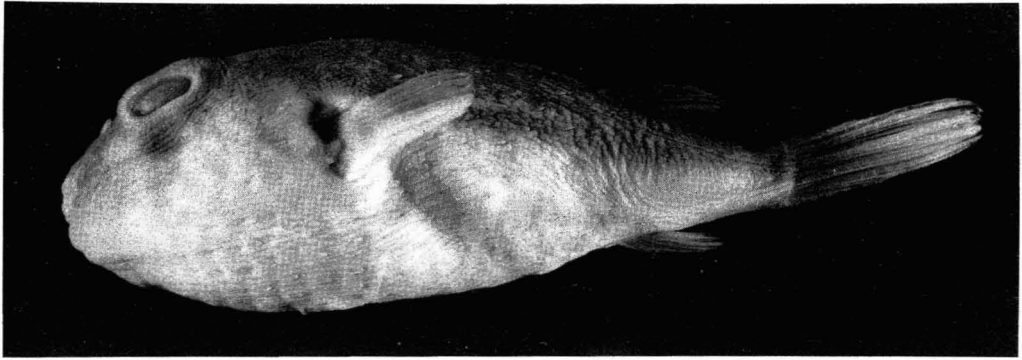


FIGURE 1. *Torquigener hypselogeneion*, neotype, USNM 236937, 35 mm SL.

TABLE 1
FIN RAY COUNTS

| | DORSAL FIN RAYS | | | | ANAL FIN RAYS | | | PECTORAL FIN RAYS | | | | | |
|--------------------------|-----------------|----|----|----|---------------|----|---|-------------------|----|----|----|----|---|
| | 8 | 9 | 10 | 11 | 7 | 8 | 9 | 13 | 14 | 15 | 16 | 17 | |
| <i>T. florealis</i> | | 2 | 10 | 1 | | 10 | 3 | | | | | 20 | 6 |
| <i>T. hypselogeneion</i> | 8 | 12 | | | 13 | 7 | | 2 | 23 | 15 | | | |
| <i>T. randalli</i> | 1 | 5 | | | 5 | 1 | | | | | | 11 | 1 |

0–10 m, Bootless Bay, ca. 5 mi E of Port Moresby, Papua New Guinea.

Additional: AMS I. 17784-002, 61 mm SL, Solomon Islands; BMNH 1866.1.19.44, 49 mm SL, Zanzibar; BMNH 1867.3.9.641, 63 mm SL, Zanzibar; BMNH 1867.11.28.114, 61 mm SL, East Indian (Indonesian) Archipelago, purchased from Bleeker; BMNH 1871.9.13.158, 61 mm SL, Savay; BMNH 1876.5.19.31, 42 mm SL, Samoa; BMNH 1886.8.30.17, 22 mm SL, Andaman Islands; BMNH 1922.5.5.21, 43 mm SL, Lumbo, Mozambique; BMNH 1938.10.18.11, 54 mm SL, Mombasa, Kenya; BPBM 27139, 68 mm SL, 2 m, Noumea, New Caledonia; RMNH 7332, 35–59 mm SL, (9 specimens), ex Bleeker Collection.

DIAGNOSIS: Caudal peduncle very short, $\geq 4.4 \times$ in SL; eye horizontal diameter ≥ 4.3 in SL; anterior margin of gill opening smooth but for 1–2 papilla-enveloped spines at base; solid yellowish to brown lateral band from above pectoral fin base to caudal fin base; cheek with 4 broad, vertical, brownish bands, 2nd band directly beneath eye.

DESCRIPTION: The following counts and proportions are based on the neotype, and, in parentheses, 9 additional specimens, 35–68 mm SL. Dorsal rays 9(8–9); anal rays 7(7–8); pectoral rays 14(13–15); caudal rays 11(11); vertebrae 9 + 11(8 + 12, 9 + 11).

Body elongate, rounded dorsally and flattened ventrally, tapering to a narrow caudal peduncle; head length 2.3(2.5–2.8) in SL; snout to anterior of vent 1.4(1.4–1.5) in SL, to origin of dorsal fin 1.3(1.4) in SL, to origin of anal fin 1.3(1.3) in SL, to origin of pectoral fin 2.1(2.3–2.5) in SL; width at base of pectoral fin 2.3(2.7–3.6) in SL; depth from dorsal fin origin to anal fin origin 5.0(5.1–6.1) in SL; depth at posterior of dorsal fin 5.9(6.8–7.6) in SL; caudal peduncle length 4.4(4.4–4.7) in SL; least depth of caudal peduncle 12.5(11.9–13.6) in SL.

Mouth small, terminal, width 3.8(3.8–4.0) 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 eye, with 2 moderately separated openings, inner surface with about 4 well-

developed flaps on lower half of circumference; snout to anterior edge of nasal organ 4.3(3.8–4.8) in HL; posterior edge of nasal organ to anterior edge of eye 5.0(4.8–5.6) in HL.

Eye small, elongate, and dorsally adnate, upper border interrupts dorsal profile, lower border well above level of mouth corner, horizontal diameter 5.0(4.3–5.8) in HL; least fleshy interorbital distance 7.1(5.9–7.5) in HL and 16.7(14.8–21.3) in SL; anterior margin of gill opening smooth except for 1 or 2 well-developed spines, contained in fleshy papillae at its base; posterior of eye to dorsal corner of gill opening 2.3(2.0–2.4) in HL.

Pectoral fins rounded, 1st ray very short; maximum length of pectoral fin from base 5.0(5.1–6.1) in SL; top of base well below lower margin of eye; dorsal fin elongate and pointed, anterior end of base just posterior to vertical line through vent, 1st ray 17.5(10.8–34.0) in SL, longest ray 5.6(5.4–6.9) in SL, base 17.5(15.0–21.5) in SL and 3.1(2.5–4.0) in longest ray; anal fin elongate and bluntly pointed, based under posterior of dorsal fin base, 1st ray 19.4(13.0–27.2) in SL, longest ray 6.0(7.5–8.1) in SL, base 25.0(18.0–27.7) in SL and 4.1(2.2–3.7) in longest ray; caudal fin truncate, maximum length 3.9(3.8–4.5) in SL.

Ventrolateral skinfold extends from behind chin to caudal peduncle, except directly beneath pectoral fin; lateral line distinct, with a few small, associated papillae, encircles 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 to caudal fin, barely rising over pectoral fin and gently dropping under dorsal fin; mid-dorsal branch of lateral line above pectoral fin base may meet 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 fin base.

Body spines 2-rooted, small and projecting from short, normally recessed papillae, moderately sparse dorsally from level of nasal organs to just before level of vent, extending laterally from cheek almost to limit of dorsal spines, extending ventrolaterally and ven-

trally from behind chin to anterior of vent; ventral spines moderately dense.

Color of neotype in alcohol (Figure 1): dorsum dark brown with small, scattered, pale spots; a solid, slightly darker lateral band from above pectoral fin base to base of caudal fin; sides below lateral band, and belly, colorless; cheek with 4 broad, vertical, evenly spaced, faint brown bands, the 1st barely distinguishable, the 2nd directly below eye; fins colorless.

Color of species in life (BPBM 27139, from J. E. Randall field notes): a dark brown reticulum on back, the spots pale greenish; belly white, a zone of light yellow separating it from darker dorsal coloration.

DISTRIBUTION: Examples of *T. hypselogeneion* examined here indicate a distribution range in tropical waters from the east coast of Africa to the central Pacific Ocean (Samoa). Many literature records must be considered suspect owing to confusion in identification of specimens.

PROPOSAL OF A NEOTYPE FOR *Torquigener hypselogeneion* (BLEEKER): Bleeker's original description of *Tetraodon hypselogeneion* was based on three specimens, whose total length fell within the range 44–63 mm (Bleeker 1852a). A second description of the species, published only one month later (Bleeker 1852b), referred to 12 specimens, and extended the species' known distribution and maximum recorded total length to 71 mm. By the time of publication of his *Atlas Ichthyologique* (Bleeker 1865) a total of 25 specimens, of total length range 44–88 mm, had been acquired. Clearly, however, the three specimens first referred to are the syntypes for *Tetraodon hypselogeneion*.

Although many plectognath type specimens were purchased by the British Museum from Bleeker (reported in the preface and subsequent pages of Günther 1870), those of *T. hypselogeneion* were not included. The single British Museum example of that species obtained from Bleeker was not listed as having type status, which was Günther's practice where appropriate, and in any case, at 76 mm TL, it is far too long to be considered.

At the disposal of Bleeker's fish collec-

tion by auction after his death, the Leiden Museum purchased the major part, containing his type specimens (Boesman 1973). This apparently included 21 examples of *T. hypselogeneion*. These are currently registered as RMNH 7332, along with a 22nd specimen of unknown origin, though precisely which one is the last-mentioned cannot now be determined. It can only be suggested that up to three of the specimens now held of total length 44–63 mm (11 specimens in all) may be Bleeker's syntypes, and it is perhaps significant that the Leiden Museum Series is exactly three short of Bleeker's 1870 total of 25 specimens. (Of the 11 specimens mentioned above, two have now been determined to represent a second species, which appears to be undescribed. Lack of material in good condition precludes further treatment of the latter in this paper.)

The "rules" of nomenclature do not cover the foregoing situation. Nevertheless, clarification is necessary. In particular, the identity of *Torquigener hypselogeneion* as distinct from *T. florealis* and other closely related and easily confused species must be confirmed. Because inclusion of Bleeker's syntypes in the Leiden Museum series (RMNH 7332) is at most circumstantial, because pertinent documentation is lacking, and importantly, because individual specimens cannot be identified from Bleeker's description, I consider that proposal of a neotype is necessary. Such a proposal recognizes that syntypes may still exist, but they must be considered at this stage as being "lost." Should such status later be found inappropriate, the case might then be referred to the International Commission on Zoological Nomenclature under Article 75(f). For the present, USNM 236937, 35 mm SL (46 mm TL), is proposed as neotype of *Tetraodon hypselogeneion* Bleeker = *Torquigener hypselogeneion* (Bleeker).

ETYMOLOGY AND SPELLING OF *hypselogeneion*: The name *hypselogeneion* is formed from the Greek "hypselos," meaning "high," and "geneion," meaning "chin," and refers to the prominent, raised chin in this species. (This condition is in fact characteristic of the genus *Torquigener* and some other related genera.)

Günther (1870) introduced an emended spelling of *hypselogeneion*, namely *hypselogenion*, and while the majority of subsequent authors have retained Bleeker's original spelling, I am aware of over 40 publications in which the emended spelling is used. Such practice is without justification and should be discontinued.

Torquigener florealis (Cope)

Figures 2 and 3; Table 1

Tetraodon florealis Cope, 1871, 479 (type locality, Sandwich Islands).

MATERIAL EXAMINED:

Lectotype: ANSP 1109, 101 mm SL, Sandwich Islands (Hawaii), J. K. Townsend, 1851?

Paralectotype: ANSP 1110, 81 mm SL, data as for lectotype.

Additional: ANSP 90993(2), 53–54 mm SL, Laysan Island, Hawaiian chain; BPBM 10525 (6 + 1 skeletonized), 111–149 mm SL, Oahu, Hawaii; BPBM 13984, 75 mm SL, Oahu, Hawaii; BPBM 23725, 121 mm SL, 100–119 m, Lanai, Hawaii; BPBM 24088, 130 mm SL, 124 m, Molokai, Hawaii.

DIAGNOSIS: Dorsal and anal fins somewhat rounded; several spines overlapping anterior margin of gill opening; many small whitish spots on dorsum, delineated by rosette of smaller brown spots; lateral band of brownish-orange blotches, some just in contact; cheek with small yellowish-brown spots; D.9–11 (usually 10), A.8(usually)–9.

DESCRIPTION: The following counts and proportions are based on the lectotype and in parentheses, the paralectotype and 11 non-type specimens of 53–149 mm SL. Dorsal rays 10(9–11); anal rays 8(8–9); pectoral rays 16(16–17); caudal rays 11(11); vertebrae 8 + 11(8 + 11, 9 + 11).

Body elongate, rounded dorsally and flattened ventrally, tapering to a narrow caudal peduncle; head length 2.9(2.6–2.9) in SL; snout to anterior of vent 1.5(1.4–1.6) in SL, to origin of dorsal fin 1.4(1.4–1.5) in SL, to origin of anal fin 1.4(1.4) in SL, to origin of pectoral fin 2.6(2.4–2.6) in SL; width at base of pectoral fin 4.4 (specimen flattened) (3.1–3.8) in SL; depth from dorsal fin origin to anal

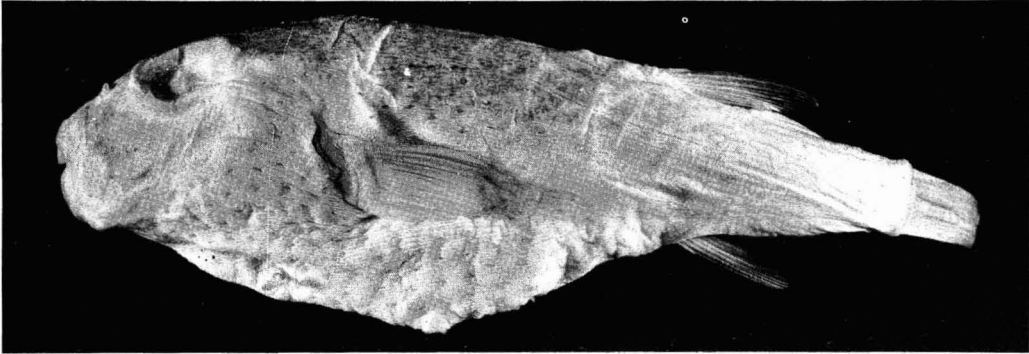


FIGURE 2. *Torquigener florealis*, lectotype, ANSP 1109, 101 mm SL.

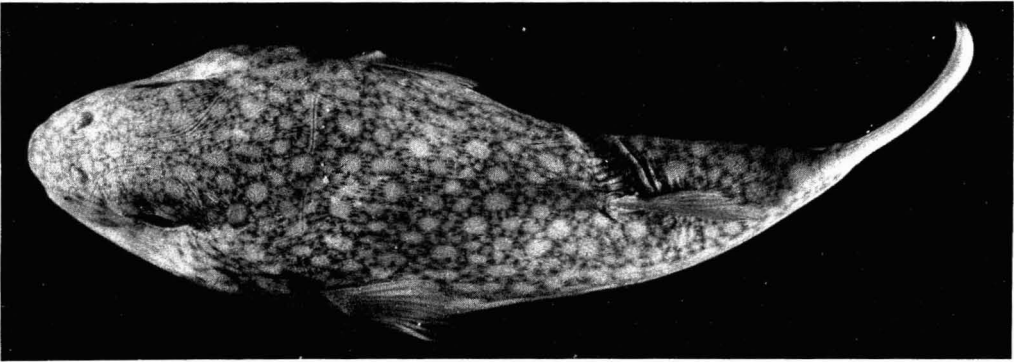
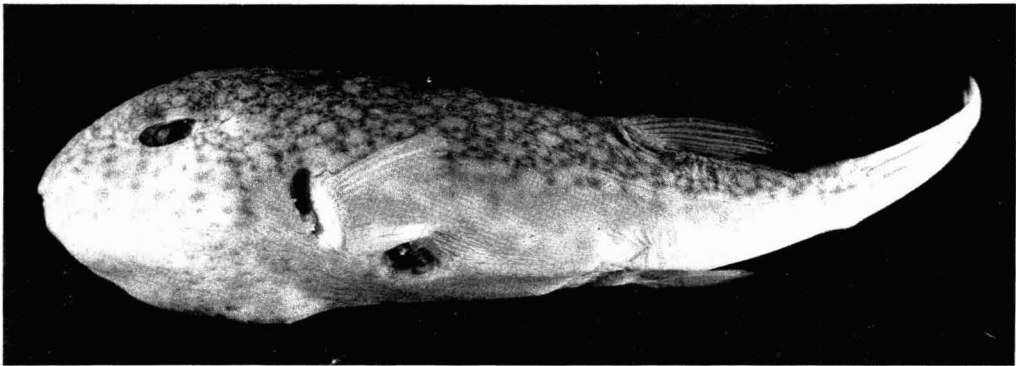


FIGURE 3. *Torquigener florealis*, BPBM 13984, 75 mm SL (dorsal and lateral views).

TABLE 2

MEASUREMENTS IN MM AND FIN RAY COUNTS OF TYPE SPECIMENS OF *Torquigener randalli*

| | HOLOTYPE | | | PARATYPES | | |
|---|---------------|--------------|---------------|----------------|---------------|----------------|
| | BPBM 24387 | BPBM 5093 | BPBM 24387 | USNM 247235 | BPBM 24387 | ANSP 150281 |
| Standard length | 82 | 83 | 82 | 82 | 75 | 63 |
| Head length | 29 | 31 | 29 | 29 | 27 | 23 |
| Snout vent length | 55 | 58 | 53 | 54 | 50 | 42 |
| Snout to origin of dorsal fin | 56 | 58 | 57 | 56 | 52 | 44 |
| Snout to origin of anal fin | 58 | 61 | 59 | 58 | 54 | 46 |
| Snout to origin of pectoral fin | 32 | 34 | 32 | 31 | 29 | 24 |
| Dorsal fin origin to anal fin origin | 14 | 16 | 14 | 15 | 14 | — |
| Depth at posterior of dorsal fin | 10 | 12 | 11 | 13 | 11 | — |
| Caudal peduncle length | 21 | 21 | 20 | 21 | 20 | 15 |
| Caudal peduncle least depth | 6.0 | 6.5 | 6.0 | 6.1 | 6.0 | 4.9 |
| Mouth width | 7.5 | 9.0 | 8.2 | 8.3 | 7.8 | 6.1 |
| Snout to anterior of nasal organ | 8.8 | 8.0 | 8.1 | 8.4 | 8.0 | 6.0 |
| Posterior edge of nasal organ to eye | 5.0 | 5.0 | 4.8 | 4.5 | 4.8 | 3.8 |
| Nasal organ length | 1.1 | 1.0 | 0.9 | 1.0 | 1.0 | — |
| Eye horizontal diameter | 8.0 | 8.3 | 7.5 | 8.7 | 8.0 | 7.1 |
| Least fleshy interorbital width | 4.1 | 4.6 | 4.8 | 5.0 | 4.0 | 3.7 |
| Posterior of eye to dorsal corner of gill opening | 10 | 12 | 10 | 11 | 10 | 8.4 |
| First dorsal ray length | 4.7 | 4.1 | 5.0 | 5.0 | 3.0 | 3.8 |
| Longest dorsal ray length | 15 | 16 | 15 | 15 | — | 12 |
| Base of dorsal fin | 4.9 | 5.0 | 5.0 | 5.2 | 3.7 | 4.0 |
| First anal ray length | 4.9 | 5.0 | 5.0 | 5.0 | 4.0 | 3.1 |
| Longest anal ray length | 11 | 13 | 12 | 12 | 10 | 9.1 |
| Base of anal fin | 4.2 | 5.0 | 4.2 | 4.1 | 3.0 | 2.7 |
| Maximum pectoral fin length | 14 | 13 | 14 | 14 | 14 | 11 |
| Maximum caudal fin length | 22 | 21 | 22 | 22 | 20 | 17 |
| Dorsal ray count | 9 | 9 | 9 | 9 | 9 | 8 |
| Anal ray count | 7 | 7 | 8 | 7 | 7 | 7 |
| Pectoral ray count | 16/16 | 16/16 | 16/16 | 16/16 | 16/17 | 16/16 |

fin origin 5.1(4.8–5.5) in SL; depth at posterior of dorsal fin 7.2(6.4–7.8) in SL; caudal peduncle length 4.0(3.7–4.4) in SL; least depth of caudal peduncle 12.1(11.6–14.4) in SL.

Mouth small, terminal, width 3.9(3.4–3.9) 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 2 moderately separated openings, posterior opening only slightly larger than anterior, inner surface with small, close, well-developed flaps around circumference, length (18.0–23.3) in HL; snout to anterior edge of nasal organ 3.5(3.2–3.6) in HL; posterior edge of nasal organ to anterior edge of eye 5.6(4.9–5.8) in HL.

Eye moderate size, elongate, and dorsally adnate, upper border interrupts dorsal profile; lower corner well above level of mouth corner, horizontal diameter 3.8(3.5–4.5) in

HL; least fleshy interorbital distance 6.7(5.9–7.7) in HL and 19.4(16.3–21.4) in SL; anterior margin of gill opening with 7(5–9) short, evenly spaced spines, protruding from fleshy papillae; posterior of eye to dorsal corner of gill opening 2.5(2.5–2.7) in HL.

Pectoral fins slightly dorsally elongate and rounded, 1st ray very short; maximum length of pectoral fin from base 5.8(5.4–6.2) in SL; top of base well below lower margin of eye; dorsal fin elongate and somewhat rounded, based just above the vent, 1st ray 16.8(13.5–20.1) in SL, longest ray 5.3(4.8–5.6) in SL, base 14.4(11.0–14.4) in SL and 2.7(2.0–3.0) in longest ray; anal fin elongate and somewhat rounded, based under posterior of dorsal fin base, 1st ray 19.4(14.4–27.2) in SL; longest ray 6.7(5.8–7.0) in SL, base 14.4(11.0–14.4) in SL and 2.7(2.0–3.0) in longest ray; caudal fin truncate, maximum length 4.0(3.7–4.7) in SL.



FIGURE 4. *Torquigener randalli*, new species, holotype, BPBM 24387, 82 mm SL.

Ventrolateral skinfold extends from behind chin to caudal fin, except directly beneath pectoral fin; lateral line distinct, with a few small, associated papillae, encircles 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 to caudal fin, barely rising over pectoral fin and gently dropping under dorsal fin; mid-dorsal branch of lateral line above pectoral fin base not meeting in midline; 2nd lateral line occasionally indistinct, 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 fin base. Body spines 2-rooted, small, and projecting from short, normally recessed papillae, moderately sparse dorsally from level of nasal organs almost to dorsal fin base, extending laterally from cheek almost to limit of dorsal spines, extending ventrolaterally and ventrally from behind chin to anterior of vent; ventral spines dense.

Color in life (from color transparency): dorsum with many small, irregularly sized, whitish spots, delineated by a rosette of smaller brown spots; a broad lateral stripe comprising about 14 brownish-orange blotches, some of which may barely be in contact; cheek yellowish to white, with a number of small, irregularly spaced brownish-yellow spots, becoming more yellow ventrally; sides below lateral band white with several brownish-gold spots, not quite reaching ventrolateral skinfold; chin and belly immaculate white; caudal fin del-

icately cross-banded with pale brown, other fins colorless.

DISTRIBUTION: *Torquigener florealis* is best known from the Hawaiian Islands, where it is recorded from depths in excess of 100 m. The species is also known from Laysan Island, further west along the Hawaiian chain.

REMARKS: Cope (1871) described *Torquigener florealis* (as *Tetrodon florealis*) from two examples from Hawaii. These specimens, now held in the Academy of Natural Sciences of Philadelphia (ANSP 1109–10), have both been examined in this study, the larger of the two (ANSP 1109, 101 mm SL) being nominated as lectotype.

Torquigener florealis is clearly distinct from *T. hypselogeneion*, under which name the former was synonymized by Fowler (1928). Not only are fin ray counts generally lower, with the pectoral fin ray count consistently so in *T. hypselogeneion* (Table 1), but also several body proportions differ. The caudal peduncle is significantly shorter in *hypselogeneion*, as are the snout-nostril distance and eye horizontal diameter. Whereas *T. florealis* has ca. 20–23 ventral spines between the pectoral fin bases, and ca. 6–7 spines overlapping the prebranchial margin, *T. hypselogeneion* has ca. 14–17 ventral spines and only 1–2 spines overlapping the prebranchial margin. I am not aware of any overlap in distribution of *T. florealis* and *T. hypselogeneion*.

***Torquigener randalli*, new species**

Figure 4; Tables 1,2

HOLOTYPE: BPBM 24387, 82 mm SL, Hawaiian Islands, Oahu, off Haleiwa (21°40' N, 158°07' W), 101–104 m, shrimp trawl, *Townsend Cromwell*, cruise 40, station 112, 30 Nov. 1968.

PARATYPES: ANSP 150281, 63 mm SL, same data as for holotype; BPBM 24387 (2 specimens), 75–82 mm SL, same data as for holotype; BPBM 5093, 83 mm SL, Hawaiian Islands, Oahu, off Honolulu, J. W. Thompson, 1910; NMNZ P. 13167, cleared and stained, same data as for holotype; USNM 247235, 82 mm SL, same data as for holotype.

DIAGNOSIS: Dorsal and anal fins somewhat pointed; several spines overlapping anterior margin of gill opening; distinctly edged pale spots on dorsum, on darker background; dark lateral band comprising interconnected blotches; dark brown smudge under eye to halfway on cheek; further smudges behind mouth corner and before gill opening, remainder of cheek speckled; D.8–9 (usually), A.7 (usually)–8.

DESCRIPTION: The following counts and proportions are based on the holotype and 5 paratypes, 63–83 mm SL (the range for paratypes appears in parentheses). Measurements and counts of these specimens are presented in Table 2.

Dorsal rays 9(8–9); anal rays 7(7–8); pectoral rays 16(16–17); caudal rays 11(11); vertebrae 9 + 11(9 + 11).

Body elongate, rounded dorsally and flattened ventrally, tapering to a narrow caudal peduncle; head length 2.8(2.7–2.8) in SL; snout to anterior of vent 1.5(1.4–1.5) in SL, to origin of dorsal fin 1.5(1.4–1.5) in SL, to origin of anal fin 1.4(1.4) in SL, to origin of pectoral fin 2.6(2.4–2.6) in SL; width at base of pectoral fin 3.9(3.3–3.9) in SL; depth from dorsal fin origin to anal fin origin 5.9(5.2–5.9) in SL; depth at posterior of dorsal fin 8.2(6.3–7.5) in SL; caudal peduncle length 3.9(3.8–4.2) in SL; least depth of caudal peduncle 13.7(12.5–13.7) in SL.

Mouth small, terminal, width 3.9(3.4–3.8) in HL; lips thin, covered with numerous short papillae; chin prominent; nasal organ a short, erect papilla, set in a low depression well for-

ward of the eye, with 2 moderately separated openings, posterior opening equal in size or slightly larger than anterior, inner surface with small, close, well-developed flaps around circumference, length 26.4(27.0–32.2) in HL; snout to anterior edge of nasal organ 3.3(3.4–3.9) in HL; posterior edge of nasal organ to anterior edge of eye 5.8(5.6–6.4) 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 3.6(3.2–3.9) in HL; least fleshy interorbital distance 7.1(5.8–6.8) in HL and 20.0(16.4–18.8) in SL; pre-branchial margin with 6–10 short, equally spaced spines, protruding from fleshy papillae; posterior of eye to dorsal corner of gill opening 2.9(2.6–2.9) in HL.

Pectoral fins slightly dorsally elongate and rounded, 1st ray very short; maximum length of pectoral fin from base 5.9(5.4–6.5) in SL; top of base well below lower margin of eye; dorsal fin elongate and pointed, based just posterior to vent, 1st ray 17.4(16.4–25.0) in SL, longest ray 5.5(5.2–5.5) in SL, base 16.7(15.8–20.3) in SL and 3.1(2.9–3.2) in longest ray; anal fin elongate and pointed, based under posterior of dorsal fin base, 1st ray 16.7(16.4–20.3) in SL, longest ray 7.5(6.4–7.5) in SL, base 19.5(19.5–25.0) in SL and 2.6(2.6–3.4) in longest ray; caudal fin truncate, maximum length 3.7(3.7–4.0) in SL.

Ventrolateral skinfold extends from behind chin to caudal fin, except directly beneath pectoral fin; lateral line distinct, with a few small, associated papillae, encircles 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 to caudal fin, barely rising over pectoral fin and gently dropping under dorsal fin; mid-dorsal branch of lateral line above pectoral fin base not meeting in midline; second lateral line may be somewhat indistinct, 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 fin base. Body spines 2-rooted, small and projecting from short, normally recessed papillae, moderately sparse dorsally from

level of nasal organs almost to dorsal fin base, extending laterally from cheek almost to limit of dorsal spines, extending ventrolaterally and ventrally from behind chin to anterior of vent; ventral spines dense.

Color of holotype in alcohol (Figure 4): dorsum with a scattering of small, distinctly edged, pale spots on a darker greyish-brown background; a lateral, dark brown band extending from above pectoral fin base to base of caudal fin, comprising for the most part rounded, interconnected blotches, each with a slightly paler brown center; a number of small brown flecks below band, from posterior to pectoral fin base to base of dorsal fin; a darker brown smudge immediately under eye to half-way down cheek; further smudges immediately behind mouth corner and anterior to gill opening; rest of cheek speckled with brown, fewer specks ventrally; belly and chin whitish; caudal rays with a series of brown specks, remaining fins colorless.

DISTRIBUTION: *Torquigener randalli* is known only from localities off Oahu, Hawaii, the only recorded depth being 101–104 m.

ETYMOLOGY: The species is named after J. E. Randall, B. P. Bishop Museum, in gratitude for his interest and cooperation in both this and other studies undertaken by the author.

REMARKS: While Cope's (1871) description of body proportions of *T. florealis* does not enable specific distinction from *randalli*, his color notes are more helpful, and indeed, positive distinction on external features between these two species relies mainly on color.

The only consistent morphological difference between *T. randalli* and *T. florealis* lies in the shape of the dorsal and anal fins, these being more pointed in *T. randalli* and coming from a more restricted base, giving a higher ratio of fin base in SL for that species. Table 1 shows the albeit limited overlap in dorsal and anal fin ray counts for the two species. (Cope's (1871) figures of 8 and 7 for dorsal and anal fin ray counts respectively for *T. florealis* were in error.)

Osteological comparison of *T. florealis* and *T. randalli*, based on limited cleared and

stained material, served mainly to confirm the similarity of the two species. Differences in the number of teeth on the 2nd and 3rd pharyngo-branchials (16/16, 12/12 in *T. florealis*, and 11/12, 8/9 in *T. randalli*, respectively) may not be significant, in light of the variability seen in some other *Torquigener* species. The frontals of both species are similarly shaped, being medially concave at the interorbit; however, those of *T. florealis* are somewhat wider at the interorbit, relative to the width of the dorsal surface of the ethmoid. In addition, the posterolateral wings of the frontals are somewhat more expanded in *T. florealis* than in *T. randalli*.

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