

An underwater photograph showing a large school of fish, likely a species of snapper or similar, swimming in clear blue water. The fish are silvery with a yellowish-brown stripe along their sides and blue-tinted fins. They are swimming in a loose formation. In the background, there is a dense school of smaller, similar fish. In the foreground, a coral reef is visible, with various types of coral and other marine life. The lighting is bright, suggesting a shallow depth.

VOLUME 4

COASTAL FISHES OF THE
**WESTERN
INDIAN
OCEAN**

EDITED BY

Phillip C Heemstra • Elaine Heemstra • David A Ebert • Wouter Holleman • John E Randall

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..... **see separate PDF**

FAMILY PEMPHERIDAE

Sweepers

John E Randall and Benjamin C Victor

Body compressed, of variable depth, with large eyes and very short snout; mouth strongly oblique; jaws with tiny, conical to recurved teeth, and smaller curved teeth on vomer and palatines. Dorsal fin single, its height greater than its length, with 6 slender spines, 9 (rarely 10) rays; anal fin long and low, with 3 spines and numerous rays; caudal fin slightly to moderately forked. Branchiostegal rays 7; GR 24–34. Scales ctenoid or cycloid, both types present in all species (with their location on the body important in classification); LL pored scales 43–75 for WIO species. Vertebrae 10 + 15.

Sweepers typically form aggregations in caves or below ledges in coral or rocky reefs by day; a single spacious cave may harbour aggregations of more than one species (a single collection from southern Mozambique in 1995 resulted in 126 specimens of *Parapriacanthus*: 78 of *P. argenteus* and 48 of *P. punctulatus*). They emerge from shelter at night to feed near the surface on zooplankton, for which their large eyes and short snout are well-adapted. Two adjacent aggregations of different species of *Pempheris* may maintain the integrity of their school while leaving a cave to spawn, but there is also the chance that the sperm of one species will fertilise the ova of another in an adjacent spawning aggregation. Randall & Victor (2015) described the hybrid *Pempheris malabarica* × *P. russellii*, from a reef off Karachi, Pakistan. Species of *Parapriacanthus* are unique in possessing luminescent organs in the anal region (Haneda & Johnson 1958); although no explanation has been given for the function of these organs, they might facilitate schooling at night.

Pempherids attain sexual maturity at a surprisingly small size; routine sex determination of individual fish (by dissecting the abdomen) has revealed an unusually high percentage of mature or nearly mature gonads, indicating frequent and probable year-round spawning. Larvae settle out at <6 mm SL, indicating a probable short larval life (Leis & Carson-Ewart 2000), an obvious limitation to attaining a broad distribution in the sea.

The usual mode of swimming is sculling with the pectoral fins, the apparent origin of the common name sweeper. We propose that species of *Parapriacanthus* be given the common name pygmy sweepers, in reference to their smaller size on

average than species of *Pempheris*. The family is represented in all tropical and subtropical seas, except the eastern Pacific; one species, *Pempheris rhomboidea*, has colonised the Mediterranean Sea via the Suez Canal.

Analyses of the mtDNA sequences of *Pempheris* species in WIO have revealed a number of new species with clearly divergent lineages, but also many species sharing mtDNA haplotypes, usually allopatric but in some cases in sympatry (Randall & Victor 2015). In general, taxa that share mtDNA sequences necessitate a more thorough evaluation to establish their validity. It may be that sweepers exhibit unexpectedly high morphological variation that would bridge some of the putative species differences recently described. Since many of the recently described pempherid species are based on one or a few specimens and show only subtle differences from other members of their complex, the total may fall to only a dozen valid species if intraspecific morphological and colour variation is shown to account for the differences.

Two genera and about 80 species; both genera and about 54 nominal species in WIO.

KEY TO GENERA

- 1a Body dorsoventrally symmetrical: a line from snout tip to mid-caudal-fin base divides body into approximately equal halves; HL greater than body depth; chest broadly rounded ventrally; anal fin ≤ 28 rays *Parapriacanthus*
- 1b Body dorsoventrally asymmetrical: a line from snout tip to mid-caudal-fin base divides body into narrow dorsal part and much broader ventral part; chest with distinct median ventral ridge; anal fin ≥ 35 rays *Pempheris*

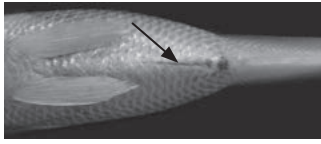
GENUS *Parapriacanthus* Steindachner 1870

Body more or less symmetrical above and below a line from snout to midbase of caudal fin. Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 20–23 rays; pectoral fins 15–18 rays. GR 23–27. Scales small, nearly all ctenoid (with ctenii only on outer margin of scales), adherent, and in only one layer; LL scales 63–74 (except 24–26 in *Pa. rahah*). Twelve species in Indo-Pacific, with 7 in WIO, and several others still to be described.

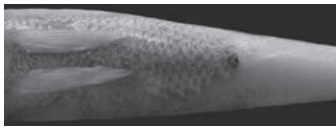
KEY TO SPECIES

1a Black pin-like mark present midventrally, ~½ length of pelvic fins, within white band encircling head of pin, just anterior to anus (not present in juveniles) 2

1b No black pin-like mark midventrally, anterior to anus 4



1a



1b

2a Pectoral-fin length 3.3–3.5 in SL; preanal length 1.5–1.6 in SL; dorsal profile of head and nape nearly straight; iris silvery white in preservative *Pa. argenteus*

2b Pectoral-fin length 3.1–3.3 in SL; preanal length 1.6–1.7 in SL; dorsal profile of head and nape moderately convex; iris golden or dark bluish grey in preservative 3

3a Preanal length ~1.6 in SL; predorsal length 2.5–2.6 in SL; eyes relatively large, orbit diameter 6.3–7 in SL (4 specimens 40–47 mm SL); iris golden in preservative; pectoral fins usually 16 rays *Pa. guentheri*

3b Preanal length ~1.7 in SL; predorsal length 2.3–2.5 in SL; eyes relatively small, orbit diameter 7.8–8 in SL (4 specimens 37–41.5 mm SL); iris dark bluish grey in preservative; pectoral fins usually 17 rays *Pa. kwazulu*

4a Predorsal length 2.3–2.4 in SL; body depth 3.2–3.4 in SL; iris dark bluish grey in preservative, sometimes with faint pale grey ring; dark dots on scales from below lateral line to peduncle *Pa. punctulatus*

4b Predorsal length 2.4–2.5 in SL; body depth 3.1–3.2 in SL; iris golden or black in preservative; dark dots on scales below lateral line, but not as far as peduncle 5

5a Pectoral-fin length 3.5–3.6 in SL; orbit diameter 7.5–7.8 in SL; iris mainly golden (fresh and in preservative) *Pa. rahah*

5b Pectoral-fin length 3.1–3.4 in SL; orbit diameter 6.7–6.9 in SL; iris black in preservative 6

6a Peduncle depth ~8.4 in SL; body width ~2 in body depth; anal fin 21 rays; LL scales 71 (1 specimen) *Pa. darros*

6b Peduncle depth 9.5–10.1 in SL; body width 2.2–2.4 in body depth; anal fin 22 or 23 rays; LL scales 64–68 *Pa. sharm*

Parapriacanthus argenteus (Von Bonde 1923)

Yellowhead sweeper

PLATE 25

Parapempheris argenteus Von Bonde 1923: 11, Pl. 2, Fig. 2 (KwaZulu-Natal, South Africa [Ponta Malongane, Mozambique]).

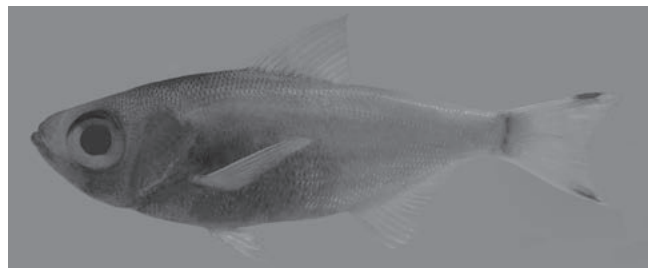
Parapriacanthus guentheri (non Klunzinger 1871): Smith 1949.

Parapriacanthus ransonneti (non Steindachner 1870): SSF No. 216.1*; Heemstra & Heemstra 2004*; King & Fraser 2014*.

Parapriacanthus argenteus: Winterbottom 1976; Randall & Bogorodsky 2016*.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 20–23 rays; pectoral fins 16–18 rays. Head profile nearly straight, except rounded at front of snout. Body depth 3–3.2 in SL, body width 2.1–2.3 in body depth. In SL: peduncle depth 9.3–9.8, HL 2.8–2.9, snout length 11.3–12.2, orbit diameter 7.6–8.2 (eyes relatively small), predorsal length 2.3–2.4, 1st (longest) ray of dorsal fin 4.5–5.4, and pectoral-fin length 3.3–3.5. Teeth in upper jaw sharply conical, in 2 irregular rows: those of outer row forward-projecting, those of inner row strongly recurved; similar smaller teeth in lower jaw, well-spaced, in single row; vomer and palatines with minute, incurved, sharply conical teeth in single irregular row; lips thin, densely covered with papillae; tongue broadly triangular, with small, rounded, flexible terminal flap. GR 24–27. LL scales 64–74.

In life, body translucent dull violet-pink; head, nape and chest yellowish green; iris mainly green. Preserved specimens with purplish brown head, nape and chest, grading to greenish on abdomen, with vertically oriented black flecks on these areas, and posterior half of body beige; caudal fin with dark vertical line at base, and each lobe with short blackish streak near tip; pin-like black line anterior to anus; iris pale grey to white. Attains 7 cm SL.



Parapriacanthus argenteus, 7 cm SL, neotype (S Mozambique).

© HA Randall, Bishop Museum

DISTRIBUTION WIO: southern Oman, and southern Mozambique to South Africa (KwaZulu-Natal: 32° S).

REMARKS The first specimens trawled in 1922 were lost; a neotype was described from specimens collected in 1956. A disjunct Pleistocene relict population survives to the north off the southern Oman coast, the result of an upwelling created by monsoon winds driving surface waters offshore.

Parapriacanthus darros Randall & Bogorodsky 2016

D'Arros sweeper

PLATE 25

Parapriacanthus ransonneti (non Steindachner 1870): Randall & Van Egmond 1994.

Parapriacanthus darros Randall & Bogorodsky 2016: 8, Figs. 6–7 (D'Arros I., Amirante Is., Seychelles).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 21 rays; pectoral fins 16 rays; caudal fin moderately forked. Body depth 3.1 in SL, body width 2 in body depth. In SL: peduncle depth 8.35, HL 2.8, orbit diameter 6.9 (eyes relatively large), predorsal length 2.5, 1st (longest) ray of dorsal fin 5, pectoral-fin length 3.3, and pre-pelvic length 2.7. Teeth at front of upper jaw in 2 close-set rows: those of outer row small and nodular, those of inner row large, broadly spaced, nearly straight, and strongly inward-projecting. GR 26. LL scales 71; scale rows 5½ between lateral line and dorsal-fin base.

In life, pale green on head and abdomen, rest of body translucent pale pink. Preserved specimen pale tan, and nape and abdomen finely speckled; no dark markings on posterior part of body, on fins or fin bases; no pin-like dark line anterior to anus; iris black. Attains at least 5 cm SL.



Parapriacanthus darros, 5 cm SL, male holotype (Seychelles).

© HA Randall, Bishop Museum

DISTRIBUTION Known only from the holotype collected from the Seychelles.

REMARKS Trawled from outer reef in 50–55 m. An aggregation of fish (estimated average size 60 mm TL) was photographed at nearby St Joseph Atoll, and are probably *P. darros*.

Parapriacanthus guentheri (Klunzinger 1871)

Egyptian sweeper

PLATE 25

Pempherichthys guentheri Klunzinger 1871: 470 (Al-Qusayr, Egypt, Red Sea).

Parapriacanthus guentheri: Klunzinger 1884.

Parapriacanthus guentheri: Randall 1983*; Dor 1984; Shpigel & Fishelson 1991; Shpigel 1997*; Field & Field 1998*; Golani & Bogorodsky 2010*; Randall & Bogorodsky 2016*.

Parapriacanthus ransonneti (non Steindachner 1870): Goren & Dor 1994 [as *ransomari*]; Lieske & Myers 2004*.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 21–23 rays; pectoral fins 16 or 17 (usually 16) rays. Body depth 3.1–3.3 in SL, body width 2.2–2.3 in body depth. In SL: peduncle depth 8.9–9.6, HL 2.6–2.7, snout length 10.5–11.7, orbit diameter 6.3–7.4 (eyes relatively large), predorsal length 2.5–2.6, 1st (longest) ray of dorsal fin 4–4.6, pectoral-fin length 3.2–3.3, and preanal length ~1.6. Teeth in upper jaw sharply conical, recurved, and in 2 irregular rows: those of outer row more forward-projecting, those of inner row more strongly recurved; similar smaller teeth in lower jaw, well-spaced, in single row; vomer and palatines with minute, incurved, sharply conical teeth in single irregular row; lips thin, covered with closely adjacent papillae; tongue broadly triangular, with small, rounded, flexible terminal flap. GR 24 or (usually) 25. LL scales 65–73; scale rows 5½ between lateral line and dorsal-fin base.

In life, body yellowish green, with silvery reflections on snout, eyes and operculum, grey-green on chest and abdomen, and rest of body translucent pink, variously overlaid with greenish grey; iris gold. Preserved specimens pale brown, with fine speckling on head, nape and abdomen; caudal fin with dark vertical line at base and dark spots at tips of upper and lower lobes; other fins unmarked; iris gold. Pin-like dark line anterior to anus. Attains 5.5 cm SL.

DISTRIBUTION WIO: Red Sea.

Parapriacanthus kwazulu

Randall & Bogorodsky 2016

Kwazulu sweeper

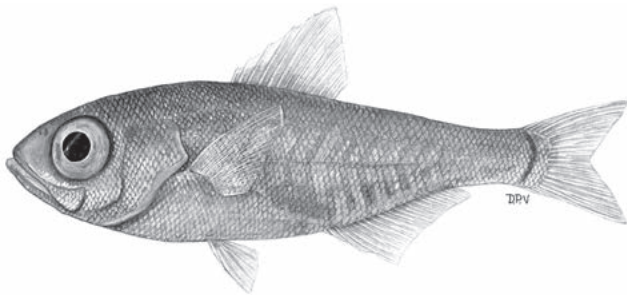
PLATE 25

Parapriacanthus kwazulu Randall & Bogorodsky 2016: 13, Fig. 12 (Park Rynie, KwaZulu-Natal, South Africa).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 20–22 rays; pectoral fins 16 or 17 rays. Body depth 3.1–3.2 in SL, body width 2–2.2 in body depth. In SL: HL 2.7–2.9, snout length 11.5–13, orbit diameter 7.8–8 (eyes relatively small), pectoral-fin length 3.1–3.2, predorsal length 2.3–2.5, 1st (longest) ray of dorsal fin 4–4.7, peduncle depth 9.3–9.8, and preanal length ~1.7. Teeth in upper jaw slender, sharply conical, recurved and well-spaced: those of outer row more forward-projecting, those of inner row more strongly recurved; similar smaller teeth in lower jaw; vomer and palatines with minute, incurved, sharply conical teeth in single irregular row; lips thin, covered with small greenish spots and scattered with larger, low purple papillae; tongue broadly triangular, slightly indented near tip. GR 24–27. LL scales 64–71; scale rows 5½ between lateral line and dorsal-fin base.

In life, head dull greenish yellow with black dots on nape; operculum edge silvery; chest and abdomen silvery grey; rest

of body translucent greenish yellow, except bright pink area above and behind pectoral-fin bases, and series of curving red bands at edge of myomeres, bands progressively smaller nearly to caudal-fin base; blackish pigment overlaying red, white and blue bands at pectoral-fin bases; bright red internal band at anal-fin base; iris yellow. Preserved specimens pale brown, with fine speckling on head, nape and abdomen; caudal fin with dark vertical line at base, and dark spot near tips of upper and lower lobes; other fins unmarked; iris black. No pin-like dark line anterior to anus. Attains at least 7 cm TL.



Parapriacanthus kwazulu, 7 cm TL (South Africa). Source: SSF

DISTRIBUTION Known only from nine subadults collected from South Africa.

REMARKS Type specimens (27.5–42 mm SL) discovered in a cave at ~38 m. Previously all Indo-Pacific populations were identified as *P. ransonneti*, but Randall & Bogorodsky (2016) established that the true *P. ransonneti* from Japan is not present in the Indian Ocean.

Parapriacanthus punctulatus

Randall & Bogorodsky 2016

Dotted sweeper

PLATE 25

Parapriacanthus punctulatus Randall & Bogorodsky 2016: 14, Figs. 2b, 13–16 (Ponta Malongane, Mozambique).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 20–23 rays; pectoral fins 15–17 (usually 16). Body depth 3.2–3.4 in SL, body width 2–2.2 in body depth. In SL: HL 2.8–3, snout length 11.4–13, orbit diameter 6.3–7.4 (eyes relatively large), predorsal length 2.3–2.4, 1st (longest) ray of dorsal fin 4.7–5.4, pectoral-fin length 3.3–3.6, peduncle depth 8.9–10.4, and preanal length 1.5–1.6. Teeth in upper jaw sharply conical, recurved, in 2 irregular rows: those of upper row more forward-projecting, those of inner row more strongly recurved; similar smaller teeth in lower jaw, well-spaced, in single row; vomer and palatines with minute, incurved, sharply conical teeth in single irregular row; lips thin, covered with closely adjacent papillae;

tongue broadly triangular, indented on sides near tip, forming small, half-round, flexible flap. GR 23–26. LL scales 63–72; scale rows 5½ between lateral line and dorsal-fin base.

In life, body translucent pinkish orange, except for yellowish green on snout tip and chin, and in large patch encompassing area below eye and onto opercle, chest and abdomen; series of small dark brown spots basally on posterior half of anal fin present or absent; iris yellow. Preserved specimens tan; head, nape and abdomen finely speckled; numerous dark spots on sides of body below lateral line and extending onto peduncle; caudal fin with dark vertical line at base, and dark spots at tips of upper and lower lobes; other fins unmarked; iris black. No pin-like dark line anterior to anus. Attains at least 7 cm SL.

DISTRIBUTION WIO: Mozambique, South Africa (KwaZulu-Natal), northern Madagascar, Comoros, Seychelles, Réunion and Mascarene Ridge.

REMARKS Named *punctulatus* for the numerous dark brown dots below the lateral line, extending well posterior to the anal-fin origin.

Parapriacanthus rahah Randall & Bogorodsky 2016

Rahah sweeper

PLATE 25

Parapriacanthus rahah Randall & Bogorodsky 2016: 17,

Fig. 17 (cave of drop-off at Rahah Bay, Oman).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 20–22 rays; pectoral fins 15 or (usually) 16 rays. Body depth 3.1–3.2 in SL, body width 2–2.2 in body depth. In SL: HL 2.9–3, snout length 12.2–12.9, orbit diameter 7.5–7.8 (eyes relatively large), predorsal length 2.4–2.5, 1st (longest) ray of dorsal fin 4.4–4.7, pectoral-fin length 3.5–3.6, peduncle depth 9.5–10.2, and preanal length 1.5–1.6. Teeth in upper jaw slender, recurved, in 2 irregular rows, projecting downward and becoming progressively smaller towards end of jaw; lower jaw with 2 medial rows of strongly recurved and inward-projecting teeth, soon reduced to single row for most of jaw; vomer and palatines with small, recurved, sharply conical teeth in single irregular row; upper lip thin, densely covered with dark purple papillae; lower lip with smaller, more widely spaced papillae; tongue broadly triangular, slightly indented on sides anteriorly, forming small rounded tip. LL scales 24–26 (usually 25).

Freshly dead fish tan-orange, except whitish and green on cheek and operculum (possibly because of damage); chest and abdomen mixed blue-green and white; iris gold and green. Preserved specimens pale brown, with fine speckling on head, nape and abdomen; caudal fin with dark vertical line at base, and dark spots at tips of upper and lower lobes; other fins

unmarked; iris gold. No pin-like dark line anterior to anus. Attains at least 5 cm SL.

DISTRIBUTION Presently known only from southern Oman.

REMARKS Collected at ~14 m. First identified as *P. ransonneti*, type locality Japan, which it closely resembles, but differs from in lacking the pin-like mark before the anus and having a predorsal length of 2.4–2.5 in SL (~2.3 in SL for *P. ransonneti*). Also similar to *P. guentheri* from the Red Sea, but which differs in having the black pin-like mark, as well as larger eyes and a shorter predorsal length.

Parapriacanthus sharm Randall & Bogorodsky 2016

Sharm sweeper

PLATE 26

Parapriacanthus sharm Randall & Bogorodsky 2016: 18, Figs. 18–19 (boat pier at Sharm el-Sheikh, Egypt, Sinai Peninsula, Gulf of Aqaba, Red Sea).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 22 or 23 rays; pectoral fins 16 or (usually) 17 rays. Lower jaw slightly protruding when mouth fully closed. Body depth 3.1–3.2 in SL, body width 2.2–2.4 in body depth. In SL: HL 2.8–2.9, snout length 12–13.2, orbit diameter 6.7–6.9 (eyes relatively large), 1st (longest) ray of dorsal fin 4.7–4.8, pectoral-fin length 3.1–3.4, and preanal length 1.5–1.6. Teeth in upper jaw primarily slender, recurved, in 2 irregular rows: those of outer row in same plane as surface of upper lip anteriorly, then sharply curved inwardly and posteriorly, inner row more sharply recurved; teeth of 2 rows progressively smaller nearly to end of jaw, then reduced to single row. Teeth in lower jaw slightly smaller, strongly recurved, slender, in single row. Vomer with small, incurved, sharply conical teeth in single irregular V-shaped row, and palatines with row of similar teeth. Lips thin, with tiny, well-spaced, dark purple papillae; tongue broadly triangular, slightly indented on sides anteriorly to form small, rounded, thickened tip. GR 25 or 26. LL scales 64–68; scale rows 5½ between lateral line and dorsal-fin origin.

In life, body translucent pale blue, with yellow tinge over front of snout and chin; no dark markings on fins, except dotted blackish vertical line at caudal-fin base; narrow internal red band at anal-fin base; iris blue-green, with dorsal arc of yellow and white on upper half of pupil. Preserved specimens pale brown, with dark vertical line at caudal-fin base, other fins unmarked; iris black. No pin-like dark line anterior to anus. Attains at least 6.2 cm SL (holotype).

DISTRIBUTION WIO: northern Red Sea.

GENUS *Pempheris* Cuvier 1829

Body dorsoventrally asymmetrical (much more body mass below lateral midline), tapering rapidly to very narrow caudal peduncle. Dorsal fin 6 spines, 9 or 10 soft rays; anal fin 3 spines, 35–48 soft rays; pectoral fin rays 17–19 (rarely 16); LL scales 43–75; GR 24–34. Colour highly variable: brownish, reddish, sometimes greenish, often silvery. More than 75 nominal species worldwide (about 35 probably valid); about 50 nominal species in WIO (probably a dozen valid).

Note: We do not follow the elaborate key of Randall & Victor (2015). Additional series of mtDNA-sequenced collections with fresh photographs reveal that colours, markings, and morphometrics are much more variable within species than we presumed in 2015. Length information has not been included for some species due to the doubt about their taxonomic status. Many of the recent species described are likely junior synonyms; those are indicated in Remarks sections. At present, only 11 species in the WIO are reliably distinct (true *P. schwenkii* is added to the list from 2015).

KEY TO SPECIES

- | | | |
|----|--|---|
| 1a | Overall orange, leading edge of dorsal fin orange; bands on flank made up of rows of orange scale centres; LL scales 65–75..... | <i>P. malabarica</i> |
| 1b | Overall not orange; dorsal fin with dark leading edge and/or apical dark spot; LL scales <65 | 2 |
| 2a | No dark bands on flank (in life); prominent black band along anal-fin base, none along margin; dorsal fin with dark leading edge with or without dark apical spot | 25 spp.
[of schwenkioid complex (3 genetic groupings: <i>P. schwenkii/tominagai</i> , <i>P. ibo</i> and <i>P. connelli</i> complex)] |
| 2b | Dark bands on flank made up of rows of dark scale centres (in life) and/or black margin on anal fin; no dark leading margin on dorsal fin (only apical spot) | 3 |
| 3a | Dark bands on flank made up of rows of dark scale centres (in life); iris not bright yellow; anal fin usually without full-length black margin (infrequent exceptions, including dark or red margin in <i>P. mangula</i>); pectoral-fin base with no mark or a dark crescent, usually not a full black oval | 16 spp.
[of banded-flank complex, i.e., <i>P. nesogallica/rhomboides</i> group] |
| 3b | No dark bands on flank (in life); iris bright yellow or brownish; anal fin with full-length obvious black margin; usually a full black oval at pectoral-fin base | 4 |

Continued...

KEY TO SPECIES

- 4a Iris not bright yellow in life; yellow dorsal fin with narrow distal black margin, less than pupil width, extending linearly down to last rays; in life, basal band along anal fin also prominent; LL scales 56–65 *P. bexillon*
- 4b Iris bright yellow in life; dorsal fin not fully yellow, dark apical oval spot, wider than pupil width, not extending down to last rays; in life, basal band along anal fin not prominent; LL scales 53–60 *P. flavicycla*

Pempheris andilana Randall & Victor 2015

Andilana sweeper

PLATE 26

Pempheris andilana Randall & Victor 2015: 17, Fig. 2 (off Andilana Beach, Nosy Be, Madagascar).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 37–41 rays; pectoral fins 17 or (usually) 18 rays. Body depth 2.2–2.3 in SL, body width 2.8–2.9 in body depth. In SL: HL 3.2–3.4, orbit diameter 7.3–8 (eyes moderate), predorsal length 2.4–2.6, and pectoral-fin length 3–3.2. Teeth in upper jaw in 3 irregular rows medially, narrowing laterally to 2 rows, and then to 1 row of minute but still pointed teeth in posterior fifth of jaw; teeth in lower jaw minute, densely spaced, in band of ~4–6 rows where broadest medially, and progressively more retrorse and more inwardly pointing, innermost teeth largest (and larger in males than in females) and nearly horizontal. GR 26–29. Scales cycloid on nape, below dorsal fin, and on sides of chest except ctenoid on ventroanterior fourth of chest; scales ctenoid on dorsal surface of peduncle to one scale row above lateral line, and then cycloid below lateral line except for midventrally; LL scales 52–58.

Colour in life unknown. Preserved specimens pale brown, chest paler; many scales with thin pale yellowish edges, becoming darker above lateral line and much darker on nape; fins yellowish; blackish line centred on upper part of pectoral-fin bases; dorsal fin with black line on leading edge, not becoming broader at tip; dark brown band at anal-fin base almost as broad as outer yellowish part of fin anteriorly but narrower posteriorly; caudal fin with wide blackish margins, broadest at posterior margin. Attains at least 103 mm SL.

DISTRIBUTION Known only from type specimens collected from northeastern Madagascar.

REMARKS One of several recently described schwenkioid species without robust diagnostic characters or mtDNA sequences. It may be a junior synonym of *P. tominagai*, or possibly in the *P. connelli* lineage.

Pempheris argyrea Randall & Victor 2015

Seychelles silver sweeper

PLATE 26

Pempheris oualensis (non Cuvier) Allen & Steene 1987:100, Pl. 7 (Seychelles).

Pempheris argyrea Randall & Victor 2015: 18, Figs. 3–4 (rocky shore at north point of La Digue, Seychelles).

Pempheris schwenkii (non Bleeker 1855): Randall & Bineesh 2014.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36–40 rays; pectoral fins 16–18 (usually 17) rays. Head profile strongly convex. Body depth 2.3–2.5 in SL, body width 2.6–2.7 in body depth. In SL: HL 3.1–3.3, orbit diameter 6.9–7.8, predorsal length 2.6–2.7, pectoral-fin length 3.1–3.3, pre-pelvic length 2.4–2.5, and pelvic-fin length 5.8–6.6. Teeth at front of upper jaw in 3 close-set, irregular rows; teeth in lower jaw minute, densely spaced, in band of 4 or 5 irregular rows. GR 26–30. Scales cycloid on nape, below dorsal fin, and on sides of chest except ctenoid on ventroanterior quarter and peduncle only dorsally and ventrally; LL scales 50–57.

When fresh, body silvery, with dark band along anal-fin base. Preserved specimens pale; dorsal fin with broad brown margin anteriorly, expanding to spot distally; anal fin with broad dark brown band. Attains at least 102 mm SL.

DISTRIBUTION WIO: Seychelles.

REMARKS One of several recently described schwenkioid species without robust diagnostic characters or mtDNA sequences. It may be a junior synonym of *P. tominagai*, or possibly in the *P. connelli* lineage. *Pempheris ternay*, also described from Seychelles, differs by having a red caudal fin (but colour may be an unreliable character); it shares a DNA lineage with *P. tominagai*.

Pempheris bexillon Mooi & Randall 2014

Yellowfin sweeper

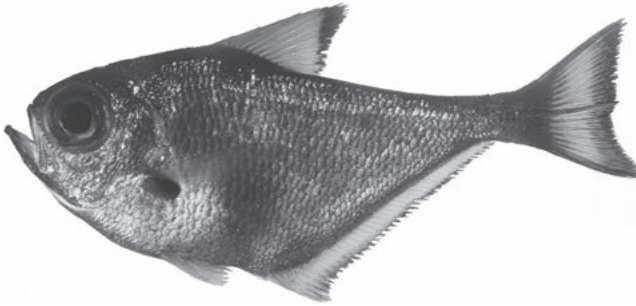
PLATE 26

Pempheris bexillon Mooi & Randall 2014: 391, Figs. 1–2 (Grand Comore I., Comoros); Randall & Victor 2015*; Pinheiro *et al.* 2016.

Dorsal fin 6 spines, usually 9 (rarely 10) rays; anal fin 3 spines, 38–45 rays; pectoral fins 16–19 (usually 18) rays. Head profile smoothly convex. Body depth 2.2–2.4 in SL, body width 3.1–3.3 in body depth. In SL: peduncle depth 9.2–11.2, HL 3.5–3.6, orbit diameter 8.2–8.8, predorsal length 2.6–2.7, pre-pelvic length 2.7–2.8, preanal length 1.9–2, pectoral-fin length 3.3–3.8, and pelvic-fin length 5.4–5.6. Teeth in upper jaw strongly recurved, in 3 irregular rows on anterior three-quarters and visible when mouth closed; teeth in lower jaw minute,

close-set, in broad band medially, increasing from 3 or 4 rows to 7 or 8 rows with growth, and outer 2 or 3 tooth rows of adults exposed when mouth fully closed. GR 31–35. Scales mixed ctenoid and cycloid on nape and below dorsal fin, ctenoid on peduncle and on three-quarters of chest; LL scales 56–65.

In life, head mainly greyish brown, suffused with red ventrally; body pale grey on sides, with scale edges dark grey-brown, and pale greenish yellow along 3 scale rows above lateral line, with scale edges dark green, uppermost scales darkest; pectoral fins with reddish brown rays, and a prominent oval black spot at base and in axil; dorsal fin bright yellow, outer fourth or fifth of anterior rays and membranes black, pigmented area narrow (less than pupil width), linear and progressively narrower posteriorly along margin reaching to last ray; anal fin yellowish, with dark brown band at base and black margin; caudal fin with broad black posterior margin, and narrowly dark upper and lower margins; iris not yellow. Attains at least 155 mm SL.



Pempheris bexillon, 14 cm SL (Rodrigues). PC Heemstra © NRF-SAIAB

DISTRIBUTION WIO: Comoros, Mozambique Channel, Mascarenes and St Brandon Shoals.

REMARKS A SWIO regional species with a deeply divergent, exclusive mtDNA lineage. A large species without bands on flank, a distinctly linear marking on its prominently yellow dorsal fin, and dark bands along the base as well as margin of the anal fin.

Pempheris bineeshi Randall & Victor 2015

Tuticorin sweeper

PLATE 26

Pempheris bineeshi Randall & Victor 2015: 20, Figs. 5–6 (Tuticorin, India).
Pempheris schwenkii (*non* Bleeker 1855): Randall & Bineesh 2014.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38–41 rays; pectoral fins 17 or (usually) 18 rays. Head profile curving slightly at snout tip, then nearly straight to nape. Body depth 2.5–2.7 in SL, body width 2.6–2.7 in body depth. In SL: HL 3.2–3.4, orbit diameter 7.5–7.9, predorsal length 2.8–2.9, and pectoral-fin

length 3.1–3.3. Teeth in upper jaw in 2 rows on medial two-thirds: those of outer row forward-projecting and slightly recurved, those of inner row larger and strongly recurved; teeth in lower jaw minute, densely spaced, in band of 4 or 5 rows where broadest medially. GR 25–27. LL scales 49–54 [other scales almost entirely lost on all type specimens].

When fresh, silvery, caudal fin reddish-orange; dorsal fin with dusky leading margin and apical dark spot; caudal fin with wide dark posterior margin; anal fin with dark band along base of fin; dark crescent at pectoral-fin base. Preserved fish brownish with same markings.



Pempheris bineeshi, 10 cm SL, female holotype (SW India).
KK Bineesh © CMFRI

DISTRIBUTION Indian Ocean: Tuticorin, southern India.

REMARKS A species without clear distinction from *P. schwenkii* and with identical mtDNA sequences to true *P. schwenkii* from Maldives to Indonesia. Likely a junior synonym of *P. schwenkii*.

Pempheris bruggemanni Randall & Victor 2015

Mascarene sweeper

PLATES 26 & 27

Pempheris tominagai (*non* Koeda, Yoshino, Imai & Tachihara 2014):

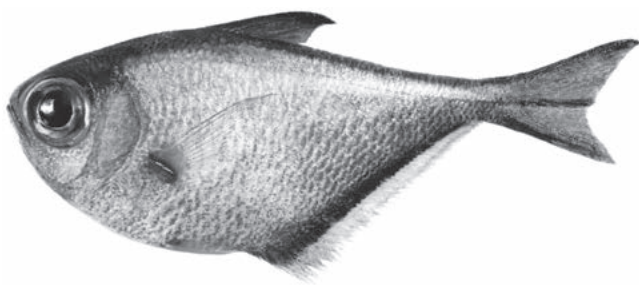
Koeda *et al.* 2014 [in part] (Mauritius).

Pempheris bruggemanni Randall & Victor 2015: 22, Figs. 7–9 (west side of Réunion, Mascarenes).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 40–42 rays; pectoral fins 17 or 18 rays. Body depth 2.3–2.4 in SL, body width 2.9–3 in body depth. In SL: peduncle depth 9.9–10.3, HL 3.1–3.2, orbit diameter 7.2–7.3, preanal length 1.8–1.9, predorsal length 2.5–2.6, and pectoral-fin length 3–3.1. Teeth in upper jaw, in 2 rows medially, narrowing posteriorly to single row; teeth in lower jaw minute, in 3 or 4 irregular rows medially; lips smooth. GR 28 or 29. Scales ctenoid on nape, below dorsal fin, and on ventroanterior two-thirds of sides of chest, but scales cycloid on remainder of chest; scales ctenoid

on peduncle only dorsally and ventrally; LL scales 58–63.

Live photographs underwater show pale grey to brownish fish with some showing a yellow blush on flanks. Fresh photographs show brownish to silvery bodies with variable orange tinge and some with yellow flanks. Preserved fish plain brownish. Dorsal fin with dark leading edge, variably expanded at apex (last few rays not dark); caudal fin with dusky upper and lower margins, only infrequently darker at posterior margin; anal fin with black band along base (sometimes a dusky margin as well); pectoral fin with or without dark crescent at base. Attains at least 120 mm SL.



Pempheris bruggemanni, 11 cm SL, male holotype (Réunion).
© H Bruggemann, ANR-BIOTAS

DISTRIBUTION WIO: Réunion and Mauritius.

REMARKS An endemic schwenkioid species from the Mascarenes with a well-diverged mtDNA lineage, 6.5% from the *P. connelli* lineage in Oman down to South Africa. Distinctive features are higher lateral-line scale counts and yellowish flanks in life, but the yellow is present only on some individuals in schools in underwater photographs and on some fresh DNA-sampled specimens.

Pempheris connelli Randall & Victor 2015

Natal sweeper

PLATE 27

Pempheris connelli Randall & Victor 2015: 24, Figs. 10–11 (Aliwal Shoal, KwaZulu-Natal, South Africa).

Pempheris tominagai (non Koeda, Yoshino, Imai & Tachihara 2014): Koeda *et al.* 2014 [in part].

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 37–43 rays; pectoral fins 17–19 rays. Body depth 2–2.3 in SL, body width 2.8–3 in body depth. In SL: HL 3.2–3.3, orbit diameter 7.1–7.6 (specimens 95–117 mm SL) (eyes moderately large), predorsal length 2.6–2.7, pre-pelvic length 2.4–2.5, and pectoral-fin length 3–3.2. Teeth at front of upper jaw close-set, in 2 rows, about equally recurved; teeth at front of lower jaw much smaller, close-set, nodular to recurved, in 3–5 rows, the

innermost largest and most strongly recurved. GR 29–32.

Scales ctenoid on nape, below dorsal fin, ventroanteriorly and adjacent to operculum; scales cycloid on three-quarters of sides of chest and on sides of peduncle; LL scales 50–58.

In life coppery to silvery to greenish; dorsal fin with dark leading edge with or without oval apical spot; caudal fin with dark upper and lower margins, posterior margin usually not darkened; anal fin with dark band along base of fin; dark axil of pectoral fin, no dark markings on outer aspect. Attains at least 130 mm SL.

DISTRIBUTION WIO: South Africa (KwaZulu-Natal).

REMARKS The most common South African schwenkioid species, it has the same mtDNA sequence as *P. hollemani* (Madagascar) and *P. rochai* (Oman), likely representing a single WIO species. Apparently wider-bodied than specimens of the two other schwenkioid mtDNA lineages in the WIO, but morphology does overlap. *Pempheris ibo* co-occurs in southern Africa, but has many fewer LL scales. Otherwise, diagnostic characters remain to be documented to separate *P. connelli* from the *P. tominagai* species-complex, which occurs north of South Africa and is more than 10% divergent in mtDNA sequences.

Pempheris convexa Randall & Victor 2014

Convex sweeper

PLATE 27

Pempheris vanicolensis (non Cuvier in Cuvier & Valenciennes 1831): Randall 1995*: 244, Fig. 637.

Pempheris convexa Randall & Victor 2014: 64, Figs. 1–2 (Sawda I., Oman).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 39 or 40 rays; pectoral fins 17–19 rays. Head profile strongly convex. Body depth 2–2.1 in SL, body width 3.1–3.3 in body depth. In SL: peduncle depth 8.9–10.5, HL 3.3–3.5, orbit diameter 8–8.5 (specimens 115–118 mm SL) (eyes relatively small), pectoral-fin length 3.3–3.4, predorsal length 2.5–2.6, and preanal length ~1.8. Teeth in upper jaw small, strongly recurved, close-set, in 2 rows medially; teeth at front of lower jaw minute, in 4 to 6 irregular rows, progressively more recurved inwardly. GR 29–31. Scales ctenoid on nape, sides of chest, and on body below dorsal fin as far as the scale row above lateral line; LL scales 52–56.

The fresh holotype is greenish silvery with only a dark apical spot on the dorsal fin and a dark crescent at the base of the pectoral fin.

DISTRIBUTION WIO: Oman and Maldives.

REMARKS Described from three specimens; their only distinctive feature is the fully convex head profile and a small eye; no mtDNA is available to confirm their taxonomic status.

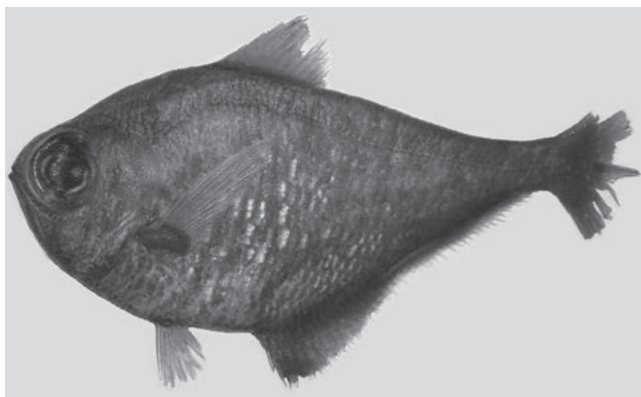
Pempheris cuprea Randall & Victor 2014

Mozambique sweeper

Pempheris cuprea Randall & Victor 2014: 68, Fig. 3 (Mozambique).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 39 or 41 rays; pectoral fins 16–17 rays. Head and snout short, snout length 4–4.5 in HL; dorsal profile a slight sinusoidal curve. Body depth 2.1–2.2 in SL, body width 3–3.1 in body depth. In SL: peduncle depth 9.6–10.3, HL 3.4–3.5, orbit diameter 7.4–7.6 (eyes small), pectoral-fin length ~3.15, predorsal length 2.5–2.6, pre-pelvic length 2.6–2.7, and preanal length 1.9–2. Teeth in upper jaw minute, sharp, incurved, in 2 irregular rows anteriorly; teeth in lower jaw in patch on each side of symphysis, minute, recurved, in up to 6 rows; about half the teeth of tooth patches at front of lower jaw and all of teeth of upper jaw exposed when mouth fully closed. GR 26–28. Scales ctenoid on nape, below dorsal fin and on entire chest; scales cycloid on sides of peduncle; LL scales 54–57 [both sides counted].

Preserved specimens bronzy brown; many scales over pectoral region, abdomen, and above anterior part of anal fin with vertically elongate coppery spot.



Pempheris cuprea, 14 cm SL, female holotype (N Mozambique).

© JE Randall, Bishop Museum

DISTRIBUTION Known only from type specimens collected from Mozambique.

REMARKS A poorly defined species, described from two old museum specimens in poor condition and without DNA sequences. Its taxonomic status is questionable.

Pempheris darvelli Randall & Victor 2014

Jissah sweeper

PLATE 27

Pempheris darvelli Randall & Victor 2014: 71, Figs. 4–7 (Jissah I., Gulf of Oman, Oman).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 41–43 rays; pectoral fins 18 or 19 rays. Head profile a slight sinuous curve; snout short, 4.3–4.6 in HL. Body depth ~2.1 in SL, body width ~3.4 in body depth. Peduncle length 3.8–4 in HL, peduncle depth 9.9–10.2 in SL. In SL: HL 3–3.1, orbit diameter 7.5–7.7, pectoral-fin length 3.1–3.2, predorsal length ~2.6, pre-pelvic length ~2.7, and preanal length ~2. Teeth at front of upper jaw very small, sharp, strongly recurved, in 2 irregular rows, soon narrowing to single row on sides of jaw; teeth on each side of symphysis of lower jaw minute, in 4 or 5 close-set, irregular rows, those of outer row nodular, those of inner rows strongly recurved with very short pointed tips. GR 30–32. Scales ctenoid on anteroventral 90% of chest; LL scales 56–58.

In life, body bronzy brown to coppery, with dark lateral bands made up of darkened scale centres; black on fins limited to apical spot on dorsal fin and tips of first few anal-fin rays and membranes. Preserved specimens dark red-brown, scale edges broadly translucent grey; pectoral fins yellowish grey, with dark red-brown spot on base and axil; pelvic fins dusky yellowish; dorsal fin pale yellowish, distal half of first 6 rays and adjacent membranes black; anal-fin base and adjacent body dark brown, fin more translucent yellow distally; caudal fin dusky yellowish, but darker brown at base and broadly around edges and posterior margin.

DISTRIBUTION Known only from two type specimens collected in the Gulf of Oman.

REMARKS Described from two types without mtDNA sequences. In all aspects, apparently indistinguishable from Red Sea *P. rhomboidea* and likely a junior synonym of *P. nesogallica*.

Pempheris eatoni Randall & Victor 2014

Durban sweeper

PLATE 27

Pempheris eatoni Randall & Victor 2014: 76, Figs. 10–14 (KwaZulu-Natal, South Africa).

Pempheris moluca [error for *molucca*] (*non* Cuvier 1829): Smith 1949*.

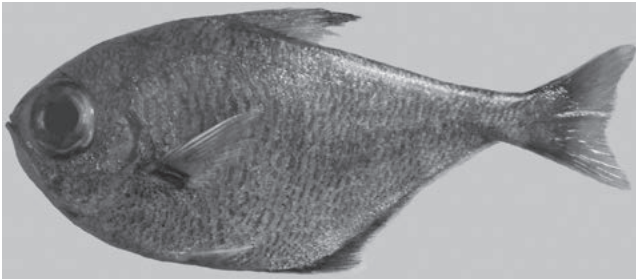
Pempheris adusta (*non* Bleeker 1877): SSF No. 216.2*.

Pempheris onalensis [error for *oualensis*] (*non* Cuvier 1831):

Van der Elst 1988*.

Dorsal fin 6 spines, 9 or 10 (usually 9) rays; anal fin 3 spines, 38–44 rays; pectoral fins 17–19 rays. Head profile slightly convex. Body depth 2.1–2.4 in SL, body width 2.7–3.2 in body depth. In SL: peduncle depth 9.5–10.1, HL 3.3–3.4, orbit diameter 7.2–7.7, pectoral-fin length 3.3–3.6, predorsal length 2.6–2.7, pre-pelvic length 2.5–2.6, and preanal length 2–2.1. Teeth at front of upper jaw very small, sharp, strongly recurved, in 2 irregular rows, and fully exposed when mouth firmly closed; teeth in lower jaw slender and slightly protruding when mouth fully closed, but minute teeth on each side of nodular symphysis in 3 or 4 irregular rows and none exposed when jaw firmly closed. GR 28–33. Scales ctenoid on predorsal area and on entire chest; scales cycloid below dorsal fin; LL scales 53–60.

In life, brownish to silvery with with dark bands along the flank made up of the darkened centres of scales; dorsal fin with dark apical spot. Preserved fish with apical spot and a dark bar at pectoral-fin base. Attains at least 140 mm SL.



Pempheris eatoni, 13 cm SL, female holotype (South Africa).
AD Connell © NRF-SAIAB

DISTRIBUTION WIO: northern Mozambique (Ibo) to South Africa (at least to KwaZulu-Natal).

REMARKS The South African population of the *P. nesogallica/rhomboidea* complex; it shares mtDNA sequences with the other WIO species of that complex and has no distinctive features. Likely a junior synonym of *P. nesogallica*.

Pempheris ellipse Randall & Victor 2015

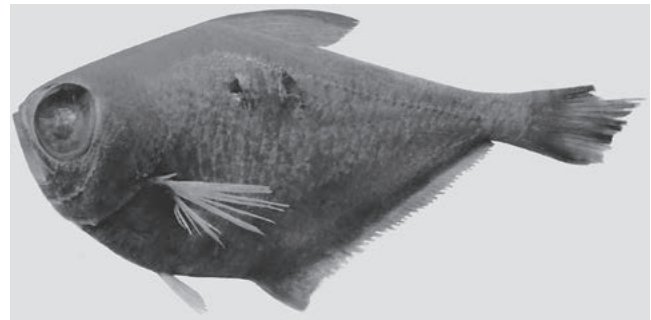
Elliptical sweeper

Pempheris ellipse Randall & Victor 2015: 26, Figs. 12–13
(Rahah Bay, Oman).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36–40 rays; pectoral fins 17–19 (usually 18) rays. Body moderately thick, its depth ~2.1 in SL, width ~3 in depth. In SL: peduncle depth ~11.7, HL ~3.4, orbit diameter ~7.5 (eyes forming vertical ellipse: orbit width 12.2 mm; bony orbit height 13.9 mm), predorsal length ~2.8, pre-pelvic length ~2.5, preanal

length ~2, and pectoral-fin length ~3.3. Teeth in upper jaw close-set, small, recurved, sharply conical, in 2 rows, and progressively smaller laterally; lower jaw with tooth band medially, crossed by 4–6 irregular rows of minute recurved teeth. GR 26–30. Scales ctenoid on nape, below dorsal fin, and on ventroanterior third of sides of chest, scales cycloid on remainder of chest; LL scales 50–57.

Preserved specimens mostly brown, dorsal fin with black leading edge; caudal-fin margins dark; anal-fin base with a broad black band.



Pempheris ellipse, 9 cm SL, female holotype (Oman).
© HA Randall, Bishop Museum

DISTRIBUTION Known from the holotype and juvenile specimens collected from Oman.

REMARKS A schwenkioid fish from Oman, singled out only for the elliptical eye. Eye shape is variable and the holotype of *P. tominagai* shows a similarly elliptical eye. Likely a junior synonym of *P. tominagai*.

Pempheris flavicycla

Randall, Satapoomin & Alpermann 2014

Goldeneye sweeper

PLATE 28

Pempheris oualensis (non Cuvier 1831): Jones & Kumaran 1980*;
Debelius 1999*.

Pempheris vanicolensis (non Cuvier 1831): Talwar & Kacker 1984;
Allen & Steene 1987*: 100, Pls. 5 & 6 (Red Sea & Seychelles);
Winterbottom *et al.* 1989*; Randall & Anderson 1993; Field & Field
1998*; Kuiter 1998*; Lieske & Myers 2004*; Imamura 2009*;
Taquet & Diringer 2012*.

Pempheris adusta (non Bleeker 1877): Koeda *et al.* 2014*.

Pempheris flavicycla flavicycla Randall, Satapoomin & Alpermann *in*
Randall, Bogorodsky, Alpermann, Satapoomin, Moori & Mal 2014: 4,
Figs. 3–6 (Oman; Tanzania); Randall & Bineesh 2014*.

Pempheris flavicycla marisrubri Randall, Bogorodsky & Alpermann *in*
Randall, Bogorodsky, Alpermann, Satapoomin, Moori & Mal 2014: 9,
Figs. 7–9 (Rabigh, Saudi Arabia, Red Sea); Azzurro *et al.* 2015.

Dorsal fin 6 spines, 9 (rarely 10) rays; anal fin 3 spines, 38–44 rays; pectoral fins 16–19 rays (16 rays only [and 39–44 anal-fin rays] in Red Sea subspecies; usually 17 rays in WIO fish and usually 18 rays elsewhere in Indian Ocean). In SL: body depth 2.3–2.6, peduncle depth 10.9–12.2, HL 3.3–3.6, orbit diameter 7.9–8.6, and pectoral-fin length 3.6–3.8. Teeth in upper jaw small, sharp, recurved, in 2 irregular rows anteriorly; patch of small teeth anteriorly in lower jaw exposed when mouth closed. GR 29–33. Scales cycloid on nape, below dorsal fin, on sides of peduncle and on dorsoanterior three-quarters of chest; LL scales 53–61.

In life, from reddish orange to light or dark copper to brown; no bands across flanks; bright yellow iris; dorsal fin with large oval dark apical spot, wider than pupil diameter, typically not extending down to last few rays (exceptions in Kenya); caudal fin typically with broad dark posterior margin; anal fin with a full-length black margin, usually no prominent black band along base of fin (unless preserved); pectoral-fin base usually with large dark oval spot. Attains at least 140 mm SL.

DISTRIBUTION Indian Ocean: two subspecies, *Pempheris flavicycla marisrubri*, native to the Red Sea, and *P. flavicycla flavicycla*, wide-ranging from Oman to East Africa, Seychelles, Chagos and Maldives to India and Thailand. Replaced by *P. adusta* in the Pacific Ocean.

REMARKS A wide-ranging Indian Ocean species with a bright yellow iris. Genetically distant from all other Indian Ocean species, and about 2.5% divergent from its Pacific sister species, *Pempheris adusta* Bleeker 1877 (without the black anal-fin margin). Koeda *et al.* (2014) mistakenly combine the species (see Randall *et al.* 2014). Not a synonym of *Pempheris erythraea* Kossman & Räuber 1877, which is *P. rhomboidea* (37 anal-fin soft rays). *Pempheris flavicycla* is often misidentified as *P. vanicolensis* Cuvier 1831 (an eastern Indian Ocean and Pacific species without any dark pectoral-fin base spot).

Pempheris hadra Randall & Victor 2015

Maldives sweeper

PLATE 28

Pempheris hadra Randall & Victor 2015: 27, Fig. 14 (Maldives).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38 rays; pectoral fins 17 rays. Body stout, width 2.2 in body depth, body depth 2.5 in SL. In SL: peduncle depth 10.9, HL 3.5, orbit diameter 8.4, predorsal length 2.7, pre-pelvic length 2.6, preanal length 1.8, and pectoral-fin length 3.3. Teeth in upper jaw in 2 well-separated rows medially, narrowing to single row; teeth in lower jaw conical medially, in 4 or 5 rows,

those of outer row nearly erect. GR 26. Scales cycloid on nape, below dorsal fin, and on three-fifths of chest; scales ctenoid on ventroanterior two-fifths of chest, along edge of operculum, and on peduncle; LL scales 49.

Freshly dead specimen coppery, with iridescence on head and dorsally on body; scales on sides yellowish green, with brown speckles and dark brown edges; pectoral fins translucent yellowish with reddish rays, and narrow curving dark brown band at base of rays; anal fin pale, and dark brown band along base (3 times broader anteriorly); caudal fin reddish, with broad dark brown band along base and blackish margin. Preserved specimen dark orangish brown, scale edges narrowly pale yellow; fins mostly yellowish; leading edge of dorsal fin blackish, expanding into large black apical spot; no black spot on base or axil of pectoral fins, but curving dark brown line following base of rays; anal fin with dark brown band along base; caudal fin with broad blackish posterior margin, upper and lower edges slightly darker.

DISTRIBUTION Known only from the holotype collected from the Maldives.

REMARKS A species without a clear distinction from *P. schwenkii* and with identical mtDNA sequences to true *P. schwenkii* from India and Indonesia. Likely a junior synonym of *P. schwenkii*.

Pempheris heemstraorum Randall & Victor 2015

Greater sweeper

PLATE 28

Pempheris heemstraorum Randall & Victor 2015: 29, Fig. 15 (Rodrigues, Mascarenes).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 37 rays; pectoral fins 18 rays. Body depth 2.2 in SL, body width 3.4 in body depth. In SL: peduncle depth 11.1, HL 3.1, orbit diameter 8.5 (eyes relatively small), predorsal length 2.7, pre-pelvic length 2.5, preanal length 1.8, longest dorsal-fin ray 3.9, and pectoral-fin length 3 (fins relatively long). Teeth anteriorly in upper jaw recurved, in 2 rows medially, reduced to irregular single row of progressively smaller teeth about one-third back in jaw; teeth in lower jaw minute, conical and recurved, in dense band of 5 or 6 rows medially. GR 31. [Holotype missing outer layer of scales on nape, sides of chest, and peduncle.] LL scales 59; lateral line highly arched anteriorly, rising more than half eye diameter above level of its origin.

Freshly dead fish grey-brown, with irregular white markings on scales, and lateral line dark brown; pectoral fins with pale orange-red rays, transparent membranes, and large dark brown spot in axil; leading edge of dorsal fin dark

brown, progressively broader and darker distally to form large elliptical black spot; anal fin with dark band along base; caudal fin with dark upper and lower margins and no posterior dark margin.

DISTRIBUTION Known only from Rodrigues.

REMARKS One of several recently described schwenkioid species without robust diagnostic characters or mtDNA sequences. It has fewer anal-fin rays than *P. bruggemanni*, the other Mascarene schwenkioid species. It could be part of either the *P. tominagai* or *P. connelli* complexes; the taxonomic status is presently unresolved.

Pempheris hollemani Randall & Victor 2015

Madagascar sweeper

PLATE 28

Pempheris hollemani Randall & Victor 2015: 30, Fig. 16 (Libanona Beach, Fort Dauphin, Madagascar).

Pempheris tominagai (non Koeda, Yoshino, Imai & Tachihara 2014): Koeda *et al.* 2014 [in part].

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38–40 rays; pectoral fins 17 or 18 rays. Body depth 2.2–2.3 in SL, body width 2.6–2.7 in body depth. In SL: peduncle depth ~10.5, HL 3.5–3.6, orbit diameter 7.7–7.9 (eyes relatively small), predorsal length ~2.7, pre-pelvic length ~2.5, preanal length ~1.7, and pectoral-fin length ~3.2. Teeth in upper jaw small, slender, in 2 rows anteriorly; teeth anteriorly in lower jaw minute, in dense band. GR 26 or 27. Scales cycloid, except ctenoid on nape, below and posterior to dorsal fin, and below line from mid-edge of opercle to pelvic-fin bases; LL scales 55–58.

Freshly dead fish silvery and slightly reddish brown on dorsal part of head and on body above lateral line, scale edges blackish; scales of body posterior to pectoral fins pale grey and pale brown; lateral line blackish to end of caudal fin; chest and belly pale grey and white; pectoral fins pale pink, with dark brown spot in axil, and dark line only on outer base of rays; pelvic fins pale yellowish orange; dorsal fin with dark leading edge and dark oval apical spot; caudal fin with narrow upper and lower dark margins, wide dark posterior margin; anal-fin base with black band, diffuse in fresh fish and dark in preserved specimen.

DISTRIBUTION Known only from southwestern Madagascar.

REMARKS A species without a clear distinction from other schwenkioid species and with identical mtDNA sequences to *P. connelli* from South Africa and *P. rocha* from Oman. Likely a junior synonym of *P. connelli*.

Pempheris ibo Randall & Victor 2015

Ibo sweeper

PLATE 28

Pempheris ibo Randall & Victor 2015: 31, Figs. 17–18 (Ibo I., Mozambique).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 35–39 rays; pectoral fins 17 or (usually) 18 rays. Body moderately compressed, its depth 2.2–2.5 in SL, width 2.8–3 in depth. In SL: peduncle depth 10.3–12.2, HL 3.2–3.3, orbit diameter 7.3–8, predorsal length 2.7–2.8, pre-pelvic length 2.5–2.6, preanal length 1.8–1.9, and pectoral-fin length 3–3.1. Dentition typical of most species of the genus. GR 27–30. Scales ctenoid on nape, below dorsal fin, and on ventroanterior three-quarters of sides of chest (remaining chest scales cycloid), and on peduncle, except for scale row above and below lateral line; LL scales 43–49; lateral line rising from origin steeply and straight (to a level ~ $\frac{2}{3}$ orbit diameter above origin), then often forming distinct sharp angle with remaining lateral line.

In life, body silvery iridescent pink above lateral line, and with dorsal dark band extending somewhat onto caudal peduncle; body below lateral line varying from golden yellow (and scale edges brown) to silvery blue-green and yellow (and scale edges pale grey); leading edge of dorsal fin dark brown, sometimes expanding to become black distal spot. Preserved specimens orangish brown; anal-fin base with wide dark brown band; caudal fin with dark upper and lower margins (posterior margin not dark). Attains at least 93 mm SL.



Pempheris ibo, 9 cm SL, female holotype (Mozambique).

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DISTRIBUTION WIO: South Africa (KwaZulu-Natal), Mozambique and Madagascar.

REMARKS A small schwenkioid species with a deeply divergent exclusive mtDNA lineage. Other than the low range of LL scale counts, the appearance is much the same as other schwenkioid species. It co-occurs with *P. connelli* in the same schools of fish in South Africa and is difficult to distinguish visually, although generally *P. connelli* tends to be wider-bodied.

Pempheris kruppi Randall, Victor & Aideed 2015

Aden sweeper

PLATES 28 & 29

Pempheris sp.: Zajonz *et al.* 2000 (Socotra Archipelago).*Pempheris kruppi* Randall, Victor & Aideed in Randall & Victor 2015: 33, Figs. 19–20 (Balhaf, Yemen, Gulf of Aden).

Dorsal fin 6 spines, 9 (rarely 10) rays; anal fin 3 spines, 37–41 rays; pectoral fins 18 (rarely 17) rays; caudal fin moderately forked, caudal concavity ~4–5 in HL. Body depth 2.2–2.3 in SL, body width 2.6–2.7 in body depth. In SL: HL 3.1–3.4, orbit diameter 7.2–7.5, interorbital width 10.7–11, predorsal length 2.6–2.7, pre-pelvic length 2.5–2.6, preanal length 1.7–1.8, longest dorsal-fin ray 3.8–4, pectoral-fin length 3.2–3.4, and pelvic-fin length 6–6.7. Teeth in upper jaw minute, slender, conical and recurved, in double row in medial third, continuing as single row to end of jaw; teeth in lower jaw slender, conical and recurved, in narrow band of 4 or 5 rows medially, decreasing to single row; upper lip densely covered in moderately sized papillae; tongue triangular, straight-sided and pointed. GR 29–32. Scales ctenoid on nape and chest, mixed cycloid and ctenoid below dorsal fin, and cycloid on sides of peduncle; LL scales 55–64.

In life, body dark brown, with prominent lateral dark bands made up of rows of dark scale centres; fins yellowish to orange; dorsal fin with distinct oval apical spot; anal fin with dark-tipped membranes on first few rays. Preserved specimens dark brown, scale edges silvery grey; paired fins mostly yellowish; pectoral-fin bases with narrow dark brown band, axils black; dorsal fin yellowish grey, with distal black spot on first 6 rays; basal half of anal fin reddish brown, middle zone brownish, and outer zone translucent; caudal fin grey-brown but progressively paler posteriorly, and with blackish margin present or absent; iris brassy brownish. Attains at least 125 mm SL.

DISTRIBUTION WIO: Gulf of Aden (Yemen) and Socotra.

REMARKS The Yemeni population of the *P. nesogallica/rhomboidea* complex; it shares mtDNA sequences with the other WIO species of that complex and has no distinctive features. Likely a junior synonym of *P. nesogallica*.

Pempheris kuriamuria Randall & Victor 2015

Oman sweeper

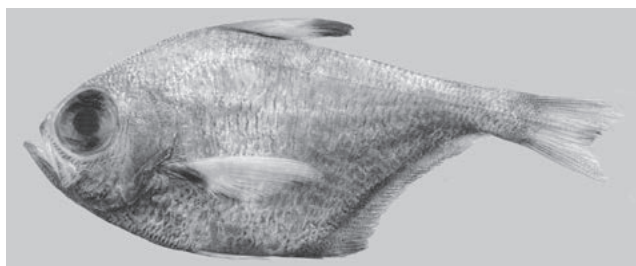
PLATE 29

Pempheris kuriamuria Randall & Victor 2015: 35, Figs. 21–22 (Ras Hamar, Oman).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38–40 rays; pectoral fins 18 or 19 rays. Body depth 2.2 in SL, body width 2.9–3 in body depth. In SL: HL 3.3–3.4, peduncle depth 11.2,

orbit diameter 7.3–7.5, predorsal length 2.5–2.6, preanal length 1.9, and pectoral-fin length 2.9–3. Teeth in upper jaw small, slender, conical and recurved, in 2 close-set rows to below nostrils, continuing as single row to end of jaw; teeth in lower jaw in narrow band, crossed where broadest by 6 or 7 rows of minute, conical, recurved teeth that are progressively more retrorse posteriorly. GR 30. Scales ctenoid on nape and sides of chest, mixed cycloid and ctenoid below dorsal fin, and cycloid on sides of peduncle; LL scales 59–61.

In life, body reddish brown, with dark lateral bands made up of rows of dark scale centres; fins mostly reddish grey; dorsal fin with large black apical spot; anal fin with dark-tipped membranes on first few rays, and narrow dark brown band at base. Preserved specimens pale brown, scale edges broadly silvery; fins yellowish, with dark markings as in life; pectoral fins with semicircular dark brown band at base; anal fin yellowish, first few rays blackish to tips, and narrow brown band at base.

*Pempheris kuriamuria*, 11 cm SL, female holotype (Oman).

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DISTRIBUTION WIO: southern Oman.

REMARKS The southern Oman population of the *P. nesogallica/rhomboidea* complex; it shares mtDNA sequences with the other WIO species of that complex and has no distinctive features. Likely a junior synonym of *P. nesogallica*.

Pempheris leiolepis Randall & Victor 2015

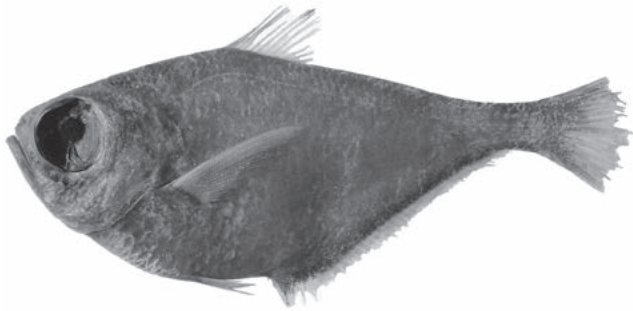
Smoothscale sweeper

Pempheris leiolepis Randall & Victor 2015: 37, Fig. 23 (Chumbe I., Zanzibar, Tanzania).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 37 rays; pectoral fins 18 rays. Head profile nearly straight; tip of lower jaw expanded to small knob that projects slightly forward when mouth firmly closed. Body moderately compressed, its depth 2.4 in SL, width 2.6 in depth. In SL: peduncle depth 11.8, HL 3, eye diameter 7.8, predorsal length 2.5, pre-pelvic length 2.5, preanal length 1.8, and pectoral-fin length 3.2. Teeth in upper jaw small, conical, in 3 or 4 irregular rows, progressively larger and more recurved

inward; teeth in lower jaw smaller and more densely packed, in up to ~6 rows. GR 28. Scales cycloid on nape, below dorsal fin, on sides of peduncle, and on sides of chest; 2 or 3 ctenoid scales below and adjacent to operculum; LL scales 53.

Preserved holotype brownish with only a dark band along anal-fin base and a thin dark crescent at pectoral-fin base.



Pempheris leiolepis, 10 cm SL, male holotype (Tanzania).

© HA Randall, Bishop Museum

DISTRIBUTION Known only from the holotype collected in Tanzania (Zanzibar).

REMARKS One of several recently described schwenkioid species, without DNA sequences, based on a single old specimen in poor condition. Likely a junior synonym of *P. tominagai* or *P. connelli*.

Pempheris malabarica Cuvier 1831

Orange sweeper

PLATE 29

Pempheris malabarica Cuvier in Cuv. & Val. 1831: 308 (Mahé and Malabar coast, India); Bauchot 1963; Randall & Bineesh 2014*; Psomadakis *et al.* 2015.

Pempheris mangula (non Cuvier 1829): Day 1875*.

Pempheris molucca (non Cuvier 1829): Talwar & Kacker 1984*.

Pempheris sp.: Randall 1995.

Pempheris adusta (non Bleeker 1877): Sarang *et al.* 2011.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 42–48 rays; pectoral fins 17–19 rays. Tip of lower jaw often with anteriorly projecting knob. In SL: body depth 2.3–2.5, HL 3.1–3.4, orbit diameter 7.9–9.1 (specimens 107–134 mm SL) (eyes relatively small), predorsal length 2.4–2.5, pre-pelvic length 2.6–2.7, preanal length 1.9–2, and pectoral-fin length 3.5–4.1 (fins relatively short). Teeth in upper jaw of females large for genus, but otherwise typical of dentition of most species, and fully exposed when mouth closed; teeth anteriorly in lower jaw small, in band broadened medially to form semicircular patch, partly exposed when mouth fully closed; outer row of teeth in patch erect in females, enlarged and forward-projecting in

males. GR 25–28. Scales ctenoid on nape, below dorsal fin, and on entire chest and peduncle; scale rows 6 or 7 between lateral line and dorsal-fin origin; LL scales 65–75.

In life, a bright metallic orange fish with prominent dark orange lateral bands on flanks formed from rows of the darker scale centres; dorsal fin orange with dark tinge at apex; caudal fin orange with a thin dark posterior rim; anal fin dark orange sometimes with a dark rim on first few rays; often darker patch on distal maxilla. Attains at least 140 mm SL.

DISTRIBUTION Indo-Pacific. WIO: Oman to Pakistan, India and Sri Lanka; elsewhere to Thailand and Indonesia.

REMARKS A distinctive appearing species with an exclusive mtDNA lineage distant from all other *Pempheris* species. It shares the prominent bands on the flanks with the *P. nesogallica/rhomboidea* complex, but is not related.

Pempheris mangula Cuvier 1829

Indian sweeper

PLATE 29

Pempheris mangula Cuvier 1829: 195 (Visakhapatnam, India)

[available from footnote; after Russell 1803: 114]; Cuvier in Cuv. & Val. 1831; Randall & Bineesh 2014*.

Pempheris molucca (non Cuvier 1829): Day 1876.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38–41 rays; pectoral fins 17–19 rays. Body depth 2.1–2.3 in SL, body width 3.1–3.6 in body depth. In SL: HL 3.3–3.5, peduncle depth 10.8–11.4, orbit diameter 7.3–8.4, pectoral-fin length 3.5–3.7, predorsal length 2.5–2.6, pre-pelvic length 2.7–2.8, and preanal length 1.9–2. Teeth at front of upper jaw in 2 rows, outer row forward-projecting and slightly recurved, inner row strongly recurved; teeth anteriorly in lower jaw small, in paired patches. GR 27–30. Scales cycloid on nape, below dorsal fin, on peduncle, and on dorsoposterior three-quarters of chest; LL scales 54–59.

Fresh specimens from type location overall reddish orange to brownish with bright red-orange fins, to silvery when dead, with lateral bands made up of rows of darkened scale centres; dorsal fin reddish orange with dark oval apical spot; caudal fin bright orange-red with wide dark posterior margin; anal fin dark orange with broad dusky band along base of fin and dark red to dusky band along margin of fin; pectoral fin with dark crescent at base and large dark axil spot; iris dull yellow. Preserved specimens with similar markings, maintaining dark anal-fin margin to varying degrees. Attains at least 150 mm SL.

DISTRIBUTION Indian Ocean: Bay of Bengal, south to Kerala and Sri Lanka and east to Indonesia.

REMARKS A question remains whether *P. mangula* is a separate species from the WIO *P. nesogallica/rhomboidea* entity. It was originally illustrated in 1803 as having a full-length dark anal-fin margin, and the neotypes from that specific collection location, Visakhapatnam in the Bay of Bengal, have a prominent wide dark reddish band along the anal-fin margin (locally commonly sold as “mangula kutti”). Virtually all WIO members of the *P. nesogallica/rhomboidea* complex have no band at the margin, or, at most, on the first few rays or rarely a faint dusky rim. Based on this difference and a 1% divergence in the mtDNA lineage for type-location *P. mangula* (and to Bali, Indonesia), we consider these as two distinct entities. Koeda *et al.* (2014) considered them the same (with *P. mangula* the senior synonym).

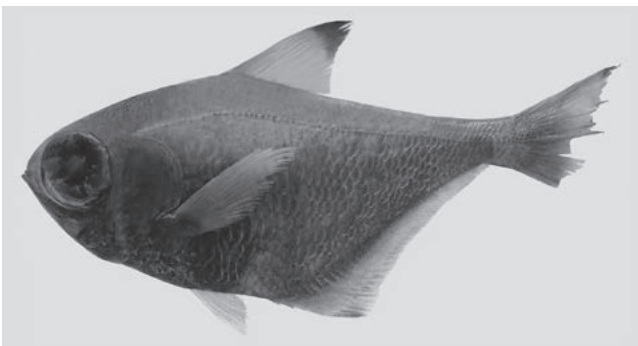
Pempheris megalops Randall & Victor 2015

Bigeye sweeper

Pempheris megalops Randall & Victor 2015: 38, Fig. 24 (north point of La Digue, Seychelles).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 42 rays; pectoral fins 17 rays. Body depth 2.4 in SL, body width 2.9 in body depth. In SL: peduncle depth 11.2, HL 3, orbit diameter 6.2 (eyes huge), interorbital width 11, predorsal length 2.4, pre-pelvic length 2.6, preanal length 2, and pectoral-fin length 3. Upper jaw with narrow symphyseal gap, largest teeth sharply conical and recurved, mainly in 2 irregular rows, those of outer row more jutting, and minute recurved teeth above and interspersed among larger teeth; lower jaw with band of minute, nodular, recurved teeth, in 4 or 5 irregular rows medially where broadest. GR 31. Scales ctenoid on ventroanterior half of sides of chest, and cycloid on remaining half of chest; LL scales 58. [Specimen missing outer layer of scales on nape and sides of peduncle.]

Preserved specimens uniformly pale brown; no dark spot at base or axil of pectoral fins; dorsal fin with black apical spot; first few anal-fin rays blackish; caudal-fin margin broadly blackish.



Pempheris megalops, 12 cm SL, female holotype (Seychelles).

© HA Randall, Bishop Museum

DISTRIBUTION Known only from the holotype collected from the Seychelles.

REMARKS A poorly defined species, without mtDNA sequences, based on a single old holotype distinguished only by the large eye. Its taxonomic status is questionable.

Pempheris micromma Randall & Victor 2015

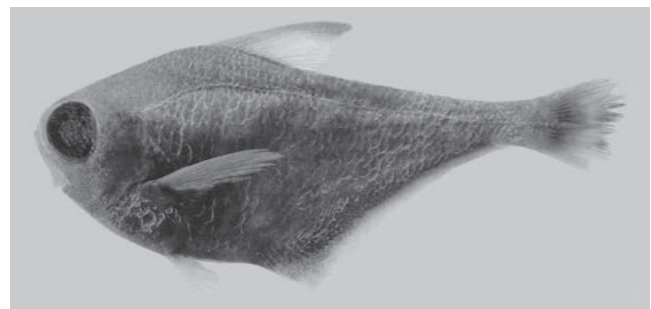
Smalleye sweeper

PLATE 29

Pempheris micromma Randall & Victor 2015: 39, Figs. 25–26 (Rahah Bay, Oman).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 43 rays; pectoral fins 18 rays. Body strongly compressed, its depth 2.4 in SL, width 3.1 in depth. In SL: peduncle depth 11.9, HL 3.6, orbit diameter 9.5 (eyes very small), predorsal length 2.8, pre-pelvic length 2.9, preanal length 2.1, and pectoral-fin length 3.3. Teeth in upper jaw in 2 rows anteriorly, typical of most species of genus; teeth in lower jaw in band, where broadest medially crossed by 4 or 5 rows of minute conical teeth, progressively more recurved inwardly. GR 30. Scales cycloid on nape and below dorsal fin; scales ctenoid on peduncle and on at least ventroanterior two-thirds of chest [specimen missing rest of chest scales]; LL scales 56.

Preserved specimen (holotype) mostly brown, with reflections from scale edges, and greenish grey zone from pectoral-fin bases to abdomen above pelvic fins; paired fins mostly pale yellowish; pectoral-fin bases with narrow dark brown band; dorsal fin with blackish band on leading edge expanding to moderately sized black distal spot; anal fin with broad band at base slightly darker brown than body; caudal-fin margin broadly blackish (no dark pigment on upper and lower edges).



Pempheris micromma, 12 cm SL, female holotype (Oman).

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DISTRIBUTION Known only from the holotype collected from Oman.

REMARKS A poorly defined species, without mtDNA sequences, based on a single old holotype distinguished only by the small eye. Its taxonomic status is questionable.

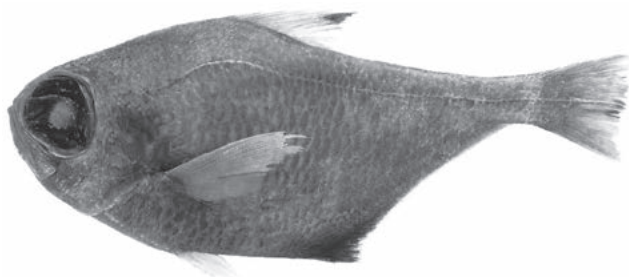
Pempheris muscat Randall & Victor 2015

Muscat sweeper

Pempheris muscat Randall & Victor 2015: 40, Fig. 27 (Cat I., Oman, Gulf of Oman).

Dorsal fin 6 spines, 9 rays (rarely 10 rays); anal fin 3 spines, 37–40 rays; pectoral fins 17–19 rays. Body depth 2.2–2.4 in SL, body width 2.9–3.5 in body depth. In SL: HL 3.1–3.3, orbit diameter 6.8–7.4 (eyes relatively large), predorsal length 2.5–2.6, and pectoral-fin length 3.2. Teeth in upper jaw similar to dentition typical of lower jaw in other species of the genus, with band of 3–5 irregular rows of minute, recurved, sharply conical teeth; lower jaw teeth more widely spaced. GR 30–32. Scales ctenoid on about ventroanterior half of sides of chest, remainder cycloid [specimens missing outer layer of scales on nape and sides of peduncle]; LL scales 54–59.

Preserved specimen (holotype) with grey-brown body scales, each with vertically elongate orange-brown bar; paired fins mostly pale orangish; pectoral fins with faint narrow dark bar across base of rays; dorsal fin with apical black spot (leading edge not dark); anal fin dark only at first few rays; caudal-fin margin blackish.



Pempheris muscat, 13 cm SL, male holotype (Oman).
© HA Randall, Bishop Museum

DISTRIBUTION WIO: Gulf of Oman.

REMARKS A poorly defined species, without mtDNA sequences, based on old specimens. It does not have any distinguishing features from a number of other species: its taxonomic status is questionable.

Pempheris nesogallica Cuvier 1831

African sweeper

PLATE 29

Pempheris nesogallica Cuvier in Cuv. & Val. 1831: 306 (Mauritius, Mascarenes); Heemstra & Heemstra 2004; Koeda *et al.* 2014 [lectotype]; Randall & Victor 2015*.

Pempheris mangula (*non* Cuvier 1829): Smith & Heemstra 1986*.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38–44 rays; pectoral fins 17–19 (usually 18) rays. Body compressed, its depth 2.1–2.3 in SL, width 3–3.4 in depth. In SL: peduncle depth 10.5–11.1, HL 3.2–3.4, orbit diameter 7.4–7.8, predorsal length 2.5–2.6, preanal length 1.8–1.9, and pectoral-fin length 3.3–3.5. Teeth anteriorly in upper jaw strongly recurved, in 3 irregular close-set rows; teeth in lower jaw in band, where broadest medially crossed by 4 or 5 rows of minute conical teeth, progressively more recurved inwardly; tongue triangular and straight-sided, except slightly indented near tip. GR 32–34. Scales ctenoid on nape, below dorsal fin, and on chest; scales cycloid on sides of peduncle; LL scales 57–60.

A photograph of a fresh fish specifically from Mauritius shows a brownish specimen with dark bands along flanks formed by dark scale centres; fins with reddish tint; dorsal fin with black oval apical spot, caudal fin with broad dark distal band; anal fin with diffuse dusky band along base, some black tips on first few rays; pectoral-fin base with dark crescent at base; iris brownish. On Randall's post-mortem photograph from Mauritius, bands on flanks obscured.

DISTRIBUTION WIO: Mauritius and Réunion.

REMARKS Photographs of fish in Mauritius appear identical to other banded-flank fish from many sites in the WIO. Nothing in the description differs from other members of the complex. Note that published descriptions and listings of the species include non-Mascarene specimens (e.g., Koeda *et al.* [2014], who also key out *P. nesogallica* as not having bands on flanks, but bands are lost on preserved specimens). All sampled species thus far of the banded-flank complex in the WIO have the same mtDNA sequence. They are all likely the same species, and then *P. nesogallica* would be the senior synonym (but see remarks under *P. mangula*). We have not synonymised all the various WIO species pending confirmation with mtDNA sequences specifically from Mauritius.

Pempheris orbis Randall & Victor 2015

Sinai sweeper

Pempheris orbis Randall & Victor 2015: 42, Fig. 28 (Dahab, Egypt, Gulf of Aqaba, Red Sea).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38 or 39 rays; pectoral fins 17 or 18 rays. Head profile slightly convex. Body depth 2.3–2.7 in SL, body width 2.6–2.7 in body depth. In SL: peduncle depth 11.1–12, HL 3.2–3.3, orbit diameter 7.4–7.7 (specimens 74–85 mm SL), predorsal length 2.5–2.6, pre-pelvic length 2.4–2.5, and preanal length 1.9–2. Teeth small, conical and recurved, those medially in upper jaw in 3 or 4 irregular rows; teeth in lower jaw in band of 4 or 5 irregular close-set rows, and medially smaller and more nodular, innermost teeth largest and nearly horizontal; lips brown with distinct, well-spaced papillae; tongue triangular and slightly indented near tip. GR 30 or 31. Scales cycloid on nape, below dorsal fin, and on sides of chest; LL scales 58–64.

Preserved specimen (holotype) brown above lateral line, scales below lateral line with silvery grey centres and orange edges; dorsal fin with dark brown leading edge, and black membranes distally between last 3 spines and first 4 rays; anal fin with dark brown band at base; caudal-fin margin dark brown.



Pempheris orbis, 9 cm SL, female holotype (Red Sea).
© HA Randall, Bishop Museum

DISTRIBUTION WIO: northern Red Sea (Gulf of Aqaba).

REMARKS One of several poorly defined schwenkioid species described from the Red Sea, without mtDNA sequences. It differs from *P. tominagai* by a higher range of LL scales. It is uncertain if the distinction will persist with additional sampling.

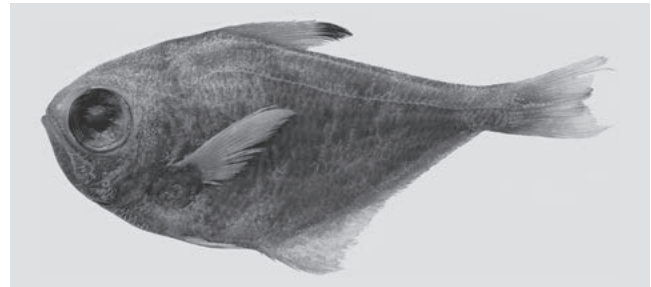
Pempheris pathirana Randall & Victor 2015

Trincomalee sweeper

Pempheris pathirana Randall & Victor 2015: 43, Fig. 29 (Koddiyar Pattu, Trincomalee, Sri Lanka).

Dorsal fin 6 spines, 9 (rarely 10) rays; anal fin 3 spines, 38–43 rays; pectoral fins 17–19 (usually 18) rays. Body depth 2.1–2.3 in SL, body width 2.7–3 in body depth. In SL: peduncle depth 10.2–11.8, HL 3.1–3.3, orbit diameter 7–7.9 (specimens 104–140 mm SL) (eyes moderate), predorsal length 2.6–2.7, pre-pelvic length 2.6–2.7, preanal length ~1.8, pectoral-fin length 3.2–3.3, and pelvic-fin length 5.2–5.5 (fins relatively long). Upper jaw to each side of symphyseal gap with single row of slender recurved teeth within narrow zone of very small nodular teeth, and main row of teeth smaller laterally, in irregular row (in nearly 2 rows in places); small slender teeth at front of lower jaw in 3–5 irregular rows, progressively more recurved inwardly; upper lip with scattered, tiny papillae. GR 29 or 30. Scales ctenoid on nape, entire chest and peduncle; scales cycloid below dorsal fin; LL scales 56–62.

Preserved specimens pale brownish, only dark marking is oval dark apical spot on dorsal fin.



Pempheris pathirana, 13 cm SL, male holotype (Sri Lanka). © S O'Hara

DISTRIBUTION WIO: Trincomalee, Sri Lanka.

REMARKS A poorly defined member of the banded-flank complex, described from old bleached specimens, without mtDNA sequences. Likely a synonym of *P. nesogallica*, or *P. mangula* (based on location), but taxonomic status questionable.

Pempheris peza Randall & Victor 2015

Ponta sweeper

PLATE 29

Pempheris peza Randall & Victor 2015: 44, Fig. 30 (Ponta do Ouro, Mozambique).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36–40 rays; pectoral fins 17 or 18 rays. Body compressed, its depth 2.2–2.4 in SL, width 2.9–3.2 in depth. In SL: peduncle depth 10.4–11.5, HL 3.2–3.4, orbit diameter 7.2–8.1 (specimens 75–113 mm SL), predorsal length 2.6–2.7, preanal length 1.7–1.8, and pectoral-fin length 3–3.3. Teeth in upper jaw sharply conical, recurved, in 3 close-set rows anteriorly, then progressively smaller; lower jaw

teeth in narrow band of 3 or 4 rows anteriorly. GR 28–30. Scales ctenoid on nape, below dorsal fin, and as 2 or 3 ventroanterior scales on chest; scales cycloid on most of chest and on sides of peduncle; LL scales 50–59.

Preserved types brownish, dorsal fin with dark apical spot; caudal fin dark-edged; anal fin with broad black basal band; unmarked pectoral-fin base.

DISTRIBUTION Known only from Mozambique.

REMARKS A poorly defined schwenkioid species from a single collection, without DNA sequences. Since there are no distinguishing features separating it from sympatric *P. connelli*, it is likely a synonym.

Pempheris rhomboidea Kossmann & Räuber 1877

Dusky sweeper PLATE 30

- Pempheris mangula* (non Cuvier 1829): Rüppell 1836: 36 (Red Sea), Klunzinger 1871: 469; 1884; Dor 1984; Koeda *et al.* 2014 (Red Sea only).
Pempheris erythraea Kossmann & Räuber 1877: 398; Golani & Fricke 2018: 105.
Pempheris rhomboidea Kossmann & Räuber 1877: 398, Pl. 3 (Red Sea); Koeda *et al.* 2014; Azzurro *et al.* 2015 (64 Red Sea/Mediterranean specimens).
Pempheris oualensis (non Cuvier): Fishelson *et al.* 1971 (Red Sea).
Pempheris vanicolensis (non Cuvier): Randall 1983; Golani & Diamant 1991.
Pempheris nesogallica (non Cuvier): Koeda *et al.* 2014 (Red Sea only).

Dorsal fin 6 spines, 9 (rarely 10) rays; anal fin 3 spines, 32–39 (from Red Sea counts) rays; pectoral fins 17–19 rays. Body depth 2.1–2.4 in SL, body width 2.6–2.9 in body depth. In SL: peduncle depth 10–11.5, HL 3.2–3.5, orbit diameter 7.3–7.5 (specimens 109–131 mm SL), interorbital width 10.4–11.9, predorsal length 2.5–2.6, pre-pelvic length 2.5–2.6, preanal length 2–2.1, and pectoral-fin length 2.9–3.2. Teeth in upper jaw strongly recurved, in 3 irregular close-set rows, in lower jaw minute, sharp, strongly recurved. GR 29–34. Scales mainly cycloid on nape and below dorsal fin; scales an equal combination of ctenoid and cycloid on chest; LL scales 52–59.

In life, usually brownish, can be reddish or silvery; dark bands along flanks formed by dark scale centres; dorsal fin with black oval apical spot, caudal fin can have broad dark distal band; anal fin can have diffuse dusky band along base, usually no black anal-fin margin, but black often prominent on first few rays (infrequently indistinct duskiness extends full-length); pectoral-fin base with or without dark crescent at base of rays and in axil. Iris brownish. When fresh and in preservative, body brownish or silvery, bands on flanks obscured. Attains at least 140 mm SL.

DISTRIBUTION Red Sea and Lessepsian migrant to Mediterranean Sea.

REMARKS The Red Sea population of the banded-flank species-complex; often misidentified as *P. vanicolensis* (not present in WIO). The synonymous *P. erythraea* types share the low 37–38 anal-fin soft rays and no or indistinct dark anal-fin margin (i.e., not *P. flavicycla*). DNA studies (Azzurro *et al.* 2015) show a single banded-flank lineage in the Red Sea, (i.e., only *P. rhomboidea*) and that it has invaded the Mediterranean. The mtDNA sequence is the same as other banded-flank species in the WIO and 1% away from the Indian banded species, true *Pempheris mangula*, i.e., the type population in Bay of Bengal (not WIO), not the “*P. mangula*” from widespread other locations used by Koeda *et al.* (2014) to tautologically synonymise the two species (see *P. mangula* remarks). If the WIO banded species are synonymised, *P. nesogallica* has priority, but this needs to be confirmed with DNA from the type population in Mauritius.

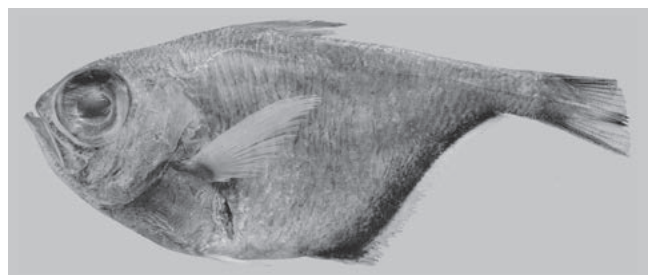
Pempheris rochai Randall & Victor 2015

Hamar sweeper

Pempheris rochai Randall & Victor 2015: 45, Fig. 31 (Ras Hamar, Oman).

Dorsal fin 6 spines, 10 rays; anal fin 3 spines, 39 rays; pectoral fins 17 or 18 rays. Body moderately deep and compressed, its depth 2.3 in SL, width 3.1 in depth. In SL: peduncle depth 10.6, HL 3.2, orbit diameter 6.8, predorsal length 2.7, pre-pelvic length 2.5, preanal length 1.7, and pectoral-fin length 3. Teeth in upper jaw conical, recurved, in single row, progressively smaller posteriorly, ending as small nodules; teeth in lower jaw minute, conical, in narrow band of 3–5 rows medially. GR 28. LL scales 59.

Preserved holotype pale brownish, dorsal fin with dark leading edge expanding at apex; caudal fin dark-edged; anal fin with broad black basal band; narrow dark crescent at pectoral-fin base.



Pempheris rochai, 12 cm SL, female holotype (Oman).

© HA Randall, Bishop Museum

DISTRIBUTION Known only from the holotype collected from Oman.

REMARKS A species without a clear distinction from other schwenkioid species and with identical mtDNA sequences to *P. connelli* from South Africa and *P. hollemani* from Madagascar. Likely a junior synonym of *P. connelli*.

Pempheris rubricauda Randall & Victor 2015

Redtail sweeper

PLATE 30

Pempheris rubricauda Randall & Victor 2015: 46, Fig. 32 (Nosy Vorona, Nosy Be, Madagascar).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36–41 rays; pectoral fins 17 or (usually) 18 rays. Body depth 2.2–2.5 in SL, body width 2.8–2.9 in body depth. In SL: peduncle depth 10–11.1, HL 3.1–3.3, orbit diameter 7.6–8.2 (specimens 69–77 mm SL) (eyes relatively small), predorsal length 2.6–2.7, pre-pelvic length 2.4–2.5, preanal length 1.8–1.9, and pectoral-fin length 3.4–3.6. Teeth in upper jaw in 2 rows medially, then narrowing to single row; teeth in lower jaw minute, densely spaced, in band of 3 or 4 rows medially. GR 28 or 29. Type specimens missing most of outer layer of scales, but enough remain on holotype to determine cycloid scales on nape, in 1st row below dorsal fin, and on three-quarters of sides of chest, but ctenoid ventroanteriorly on chest; scales cycloid on sides of peduncle, but ctenoid dorsally and ventrally; LL scales 55–57.

In life, brownish to silvery, dorsal fin with dark leading edge and apical spot; caudal fin reddish with a dark margin; anal fin with a broad black basal band; pectoral fins reddish tinged, narrow dark crescent around base.

DISTRIBUTION Known from northwestern Madagascar.

REMARKS One of several recently described schwenkioid species. It has almost the same mtDNA sequence as the more northern *P. tominagai*, from which it differs only by a red tail and a higher range of LL scales: colour is highly variable in the group and additional sampling may merge the scale counts. In that case, it would likely be a junior synonym of *P. tominagai*.

Pempheris russellii Day 1888

Pakistan sweeper

PLATE 30

Pempheris russellii Day 1888: 788 (Karachi, Pakistan); Psomadakis *et al.* 2015.

Pempheris mangula (*non* Cuvier): Koeda *et al.* 2104: 309.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 39–42 rays; pectoral fins 17–19 (usually 18) rays. Body depth 2.1–2.2 in SL, body width 3.3–3.5 in body depth. In SL: HL 3.1–3.3, orbit diameter 7.6–8.2 (specimens 111–131 mm SL) (eyes relatively small), predorsal length 2.5–2.6, pre-pelvic length 2.55–2.6, preanal length 1.9–2, and pectoral-fin length 3.4–3.6. Teeth in upper jaw in 2 rows medially, narrowing to single row; teeth in lower jaw minute, densely spaced, in band of 3 or 4 rows medially. GR 30 or 31. Most specimens missing most of outer layer of scales, but enough remain on holotype to determine cycloid scales on nape, in 1st row below dorsal fin, and on three-quarters of sides of chest, with ctenoid scales ventroanteriorly on chest; scales cycloid on sides of peduncle, ctenoid dorsally and ventrally. LL scales 54–58.

In life, brownish to greyish with dark bands along flanks formed by dark scale centres; dorsal fin with black oval apical spot, caudal fin can have broad dark distal band; anal fin can have diffuse to dusky band along base, but with no dark margin; pectoral-fin base with dark crescent at base of rays and in axil. Iris brownish. When fresh and in preservative, body brownish or silvery, bands on flanks obscured. Attains at least 140 mm SL.

DISTRIBUTION WIO: Pakistan (Sindh coast) to Iran (Makran coast).

REMARKS The northern Arabian Sea coast (Iran and Pakistan) representative of the banded-flank species-complex, described in 1888. The local mtDNA sequence is the same as the widespread banded species-complex, i.e., *P. rhomboidea* (Red Sea) and several recently described species from Oman down the African coast. Underwater photos off Karachi show the typical bland appearance and there are no significant features separating *P. russellii*. If all WIO banded species represent one species, *P. nesogallica* from the Mascarenes has priority (although needs confirmation with a DNA sequence). The mtDNA lineage is about 1% divergent from the close relative, *P. mangula*, which ranges from India to Bali, Indonesia, and is distinguished by a reddish to dusky band along the anal-fin margin.

Pempheris sarayu Randall & Bineesh 2014

Kerala sweeper

PLATE 30

Pempheris sarayu Randall & Bineesh 2014: 33, Fig. 12 (Kovalam, Kerala, India); Randall & Victor 2015.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 39 rays; pectoral fins 18 or 19 rays. Head profile straight above eyes, convex on nape. Body depth 2.05 in SL. In SL: HL 3.3, orbit diameter 7.6, predorsal length 2.65, pre-pelvic length 2.55, preanal length 2,

and pectoral-fin length 3.65. Teeth anteriorly in upper jaw minute, conical, in 2 rows; teeth anteriorly in lower jaw smaller, nodular, in narrow band of 2–4 irregular rows. GR 31. Scales partly ctenoid posteriorly on nape, mainly ctenoid on peduncle, and ctenoid on chest; LL scales 55.

Fresh holotype coppery with dark bands along flanks formed by dark scale centres; dorsal fin with black apical spot, caudal fin with a dusky distal margin; anal fin unmarked; pectoral-fin base with dark crescent at base of rays. Iris brownish.

DISTRIBUTION Known only from Kovalam, India.

REMARKS Described from a single holotype from the Arabian Sea coast of southern India without DNA sequences. It is distinguished from other members of the banded-flank complex only by barely shorter pectoral fins and up to 19 pectoral-fin rays. It is likely a junior synonym of *P. nesogallica*.

Pempheris sergey Randall & Victor 2015

Jeddah sweeper

PLATE 30

Pempheris sergey Randall & Victor 2015: 47, Fig. 33 (Sharm Obhur, Saudi Arabia, Red Sea).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38–42 rays; pectoral fins 17 or 18 rays. Body depth 2.5–2.6 in SL, body width 2.7–2.8 in body depth. In SL: peduncle depth 11.1–11.6, HL 3.3–3.4, orbit diameter 7.4–7.7, predorsal length 2.7–2.8, pre-pelvic length 2.5–2.6, preanal length 1.7–1.8, and pectoral-fin length 3.1–3.4. Teeth in upper jaw conical, recurved, in double row, those of upper row more projecting, those of lower row more strongly recurved; teeth in lower jaw minute and slender, in band of 4 or 5 irregular close-set rows where broadest medially. GR 26 or 27. Scales cycloid on nape, below dorsal fin, on sides of peduncle, and as a few ventroanteriorly on chest; scales otherwise cycloid on sides of chest; LL scales 51–55.

Fresh specimens greenish yellow, with orangish tail and yellow iris; in preservative pale brown. Dorsal fin with dark leading edge and large oval apical spot; caudal fin with black margins, broadest posteriorly; anal fin with black band along base of fin; pectoral fin with dark crescent at base.

DISTRIBUTION Known only from the type collection in the Red Sea.

REMARKS One of several recently described schwenkioid species from the Red Sea, based on a single collection of greenish yellow specimens with the same mtDNA sequence as *P. tominagai* and no other distinction; it is very likely a junior synonym of *P. tominagai*.

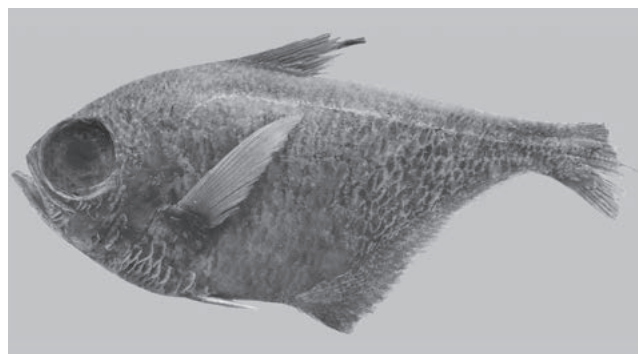
Pempheris shimoni Randall & Victor 2015

Shimoni sweeper

Pempheris shimoni Randall & Victor 2015: 49, Fig. 34 (Shimoni, Kenya).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 37–41 rays; pectoral fins 17–19 (usually 18) rays. Body depth 2.2 in SL, body width 3 in body depth. In SL: peduncle depth 9.9–10.3, HL ~3.3, eye diameter ~7.3, predorsal length ~2.5, preanal length ~1.9, and pectoral-fin length ~3.2. Lower jaw projecting when mouth fully closed, and with slight inward-projecting knob at tip. Upper jaw dentition typical of genus, with 2 irregular rows of sharply recurved teeth on each side of symphyseal gap, reduced to single row of gradually smaller teeth about half way back in jaw; teeth in lower jaw minute, seemingly only nodular (but microscopic inspection reveals them to be sharply pointed), progressively larger and more recurved inwardly, in close-set band of 4 or 5 irregular rows. Tongue deeply concave on each side, resulting in narrow, rectangular, anterior part, ending in rounded flexible flap. GR 28–31. Scales ctenoid on nape, below dorsal fin, and on ventroanterior two-thirds of chest; LL scales 53–58.

Preserved specimens uniformly orangish brown, fins slightly paler; reddish brown band across pectoral-fin bases (probably dark brown in life); dorsal fin with broad black tip; caudal fin without dark upper and lower edges [posterior margin damaged].



Pempheris shimoni, 13 cm SL, female holotype (Kenya).

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DISTRIBUTION WIO: Kenya (off Shimoni and Mombasa).

REMARKS A species described from a collection with only a single adult specimen, in poor condition and without mtDNA sequences. It has no distinctive characters and very likely represents a junior synonym of *P. nesogallica*.

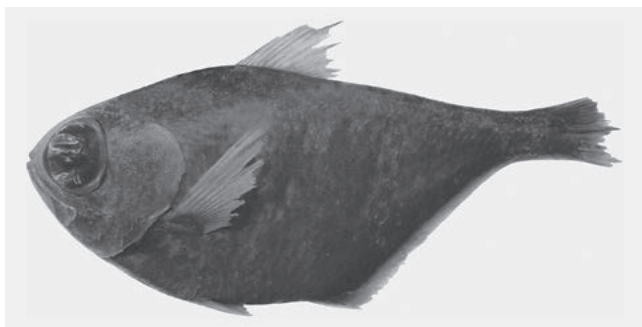
Pempheris shirleen Randall & Victor 2015

Hurghada sweeper

Pempheris shirleen Randall & Victor 2015: 50, Fig. 35 (Hurghada, Egypt, Red Sea).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 37 or 38 rays; pectoral fins 17 or 18 rays. Body depth 2.3–2.4 in SL, body width 2.8–2.9 in body depth. In SL: peduncle depth 11.7–12.1, HL 3.2–3.25, orbit diameter 7.4–7.5 (specimens 103 and 105 mm SL), pectoral-fin length 3.4, predorsal length 2.7–2.8, pre-pelvic length 2.4–2.5, and preanal length 1.7–1.8. Teeth medially in upper jaw small, progressively more recurved inwardly, in 3 irregular rows; teeth in lower jaw smaller, more slender, in band of 3 or 4 close-set irregular rows where broadest. GR 27 or 28. Scales cycloid on nape, below dorsal fin, and on sides of peduncle; scales cycloid on sides of chest except for a few ctenoid scales ventroanteriorly; LL scales 50–54.

Preserved specimens dark purplish brown, scale edges slightly darker brown; anal-fin base with narrow dark brown band, and adjacent body darker than rest of body.



Pempheris shirleen, 11 cm SL, female holotype (Red Sea).
© HA Randall, Bishop Museum

DISTRIBUTION Known only from two type specimens collected from the Red Sea.

REMARKS One of several recently described schwenkioid species in the Red Sea, in this case from old specimens in poor condition without mtDNA sequences. It has no distinctive characters and is likely a junior synonym of *P. tominagai*.

Pempheris smithorum Randall & Victor 2015

Zanzibar sweeper

Pempheris smithorum Randall & Victor 2015: 51, Fig. 36 (Chumbe I., Zanzibar, Tanzania).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 40 or 41 rays; pectoral fins 17 or 18 rays [fins damaged in type specimens]. Lower jaw tip expanded to distinct knob, extending both anteriorly and posteriorly, and jaw strongly protruding when jaws fully closed. Body depth 2.3–2.4 in SL, body width 2.6–2.8 in body depth. In SL: peduncle depth ~10.2, HL ~3.4, orbit diameter ~7.2, predorsal length ~2.8, pre-pelvic length ~2.7, and preanal length ~1.9. Upper jaw appears to have 2 irregular rows of large recurved teeth on each side of symphyseal gap [many teeth missing], those in one row protruding forward, the others strongly recurved; lips with small, close-set, round papillae. GR 30 or 31. Scales ctenoid on nape, below dorsal fin, and on chest; scales cycloid on sides of peduncle; LL scales 56–59.

Preserved specimens uniformly dark brown, with large dark brown spot at pectoral-fin bases (probably black in life). Attains at least 130 mm SL.



Pempheris smithorum, 13 cm SL, male holotype (Tanzania).
© HA Randall, Bishop Museum

DISTRIBUTION WIO: Tanzania (Chumbe I. and Mafia Is.).

REMARKS A species described from two old specimens in poor condition without mtDNA sequences. It has no distinctive characters and is likely a junior synonym of *P. nesogallica*.

Pempheris tau Randall & Victor 2015

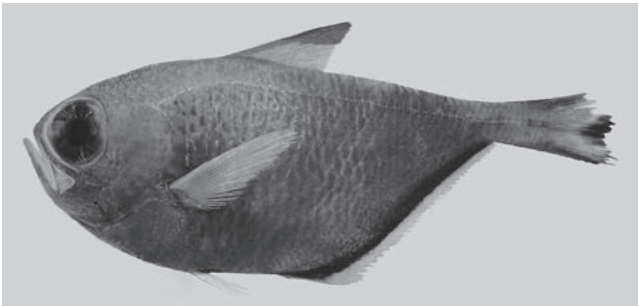
Tau sweeper

Pempheris tau Randall & Victor 2015: 52, Fig. 37 (Nuweiba, Egypt, Gulf of Aqaba, Red Sea).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 38 or 39 rays; pectoral fins 17 or 18 rays. Body depth 2.3–2.6 in SL, body width 2.5–2.7 in body depth. In SL: peduncle depth 11.8–11.9, HL 3.3–3.4, orbit diameter 7.9–8.7 (specimens 95–116.5 mm SL) (eyes very small), predorsal length ~2.7, pre-pelvic length ~2.5, preanal length ~1.9, and pectoral-fin length 3.1–3.3. Teeth in upper jaw conical and recurved, medially in 3 irregular rows, soon reduced to 2 rows, and finally

to single row of minute teeth near end of jaw; teeth in lower jaw similar but much smaller, more slender, in 3 or 4 irregular rows medially, then progressively fewer and smaller towards end of jaw. GR 30–33. Scales cycloid on nape, below dorsal fin, and on sides of peduncle; scales cycloid on sides of chest except for a few ctenoid scales ventroanteriorly; LL scales 50–55.

Preserved specimens brownish, dorsal fin with dark leading edge expanding at apex; caudal fin dark-edged, posterior margin with wide black band; anal fin with broad black basal band; narrow dark crescent at pectoral-fin base.



Pempheris tau, 10 cm SL, male holotype (Red Sea).
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DISTRIBUTION WIO: northern Red Sea (Sinai Peninsula).

REMARKS One of several recently described schwenkioid species in the Red Sea, in this case from two old specimens without mtDNA sequences. It has no distinctive characters and is likely a junior synonym of *P. tominagai*.

Pempheris ternay Randall & Victor 2015

Seychelles sweeper

PLATE 31

Pempheris ternay Randall & Victor 2015: 53, Fig. 38 (Cape Matoopa, Ternay Marine National Park, Mahé, Seychelles).

Pempheris tominagai (non Koeda, Yoshino, Imai & Tachihara 2014): Koeda *et al.* 2014 [in part].

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36 rays; pectoral fins 17 rays. Body depth 2.5 in SL, body width 2.9 in body depth; HL 3.3 in SL; orbit diameter 7.5 in SL (eyes relatively small and precisely circular). Teeth in upper jaw small, pointed and recurved, in 2 rows medially, those of upper row projecting forward, those of lower row curving downward, and progressively smaller and narrowing to single row about half way back in jaw; teeth in lower jaw minute, densely spaced, in band of 3 or 4 rows medially, progressively more retrorse inwardly. GR 28. [Specimen missing all outer-layer scales and nearly all of inner layer, except those of lateral line.] LL scales 51.

Fresh holotype brownish red with bright orange caudal fin; dorsal-fin with dark apical spot; caudal fin with broad black posterior margin; anal fin with black band along base of fin; pectoral fins reddish with dark crescent at base. Iris brownish.

DISTRIBUTION Known only from the holotype collected from the Seychelles.

REMARKS One of several recently described schwenkioid species without robust diagnostic characters. Its distinctive feature, the orange caudal fin, can occur in other species. It has almost the same mtDNA sequence as *P. tominagai* and is likely a junior synonym.

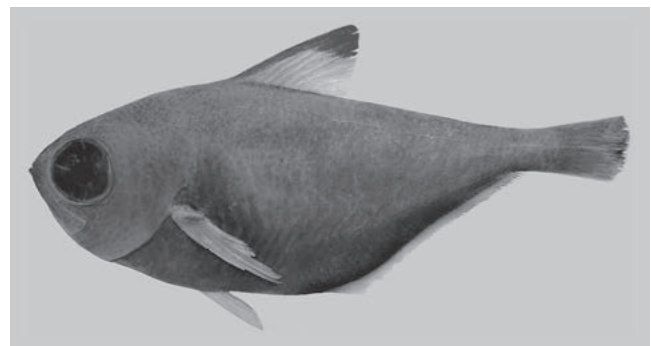
Pempheris tilman Randall & Victor 2015

Aqaba sweeper

Pempheris tilman Randall & Victor 2015: 54, Fig. 39 (off Aqaba, Jordan, Gulf of Aqaba, Red Sea).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36–41 rays; pectoral fins 17 rays. Body depth 2.4–2.6 in SL, body width 2.5–2.7 in body depth. In SL: peduncle depth 10.7–11, HL 2.9–3.2, orbit diameter 7.6–7.9 (specimens 75–96.5 mm SL) (eyes relatively small), predorsal length 2.7–2.8, pre-pelvic length 2.7–2.8, and preanal length 1.8–1.9. Teeth conical and recurved, those at front of upper jaw in 2 irregular rows, reduced opposite nostrils to single irregular row of progressively smaller teeth; teeth in lower jaw minute, in 3 or 4 irregular rows medially, progressively fewer and smaller towards end of jaw. GR 29 or 30. Scales cycloid on nape, below dorsal fin, and on chest, except for a few ctenoid scales ventrally on chest near opercle; LL scales 49–52.

Preserved specimens brownish, dorsal fin with dark leading edge expanding at apex; caudal fin dark-edged, posterior margin with black band; anal fin with broad black basal band; narrow dark crescent at pectoral-fin base.



Pempheris tilman, 10 cm SL, male holotype (Red Sea).
© HA Randall, Bishop Museum

DISTRIBUTION Known only from two type specimens collected from northern Red Sea (Gulf of Aqaba).

REMARKS One of several recently described schwenkioid species in the Red Sea, in this case from two old specimens without mtDNA sequences. It has no distinctive characters and is likely a junior synonym of *P. tominagai*.

Pempheris tiran Randall & Victor 2015

Tiran sweeper

PLATE 31

Pempheris tiran Randall & Victor 2015: 55, Fig. 40 (Strait of Tiran, Saudi Arabia, Red Sea).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 42–44 rays; pectoral fins 17 or (usually) 18 rays. Body depth 2.4–2.5 in SL, body width ~2.7 in body depth. In SL: peduncle depth 10.7–11.8, HL 3.4–3.5, orbit diameter 7.8–8.3 (3 specimens: 121–125 mm SL), predorsal length 2.7–2.8, pre-pelvic length 2.7–2.8, preanal length 1.8–1.9, and pectoral-fin length 3.3–3.4. Teeth large for genus; teeth in medial third of upper jaw of male in 3 irregular rows, upper-row teeth conical and forward-projecting, those of inner rows strongly recurved and inwardly projecting, remaining teeth in jaw in 2 rows, progressively smaller, except for a few minute teeth in single row near end of jaw; teeth of female about half size of those of male, those of medial third of upper jaw in single irregular row, remaining teeth in 2 irregular rows, except for tiny teeth in single irregular row for last fourth of jaw; band of teeth in lower jaw of both sexes strongly outwardly curved medial to narrow symphysis, in 4 rows (progressively larger and more recurved inwardly in female; largest teeth of male in 2 outer rows, erect or slightly recurved), and outer medial teeth of lower jaw visible in both sexes when mouth fully closed; upper lip relatively smooth, with close-set low papillae; lower lip with smaller and more widely separated papillae; tongue with sides slightly incurved, tip rounded and flexible. GR 31 or 32. Scales cycloid on nape, below dorsal fin, and on sides of peduncle; LL scales 62–64.

The two preserved type specimens dark brown; dorsal fin with dusky leading edge and black apical spot, much wider than pupil diameter and not extending down to last several rays; caudal fin with broad dark posterior margin, thin dark upper and lower margins; anal fin with dark band along base and black band along margin of fin extending full-length; pectoral fin with large oval spot at base. Iris pale on inner portion.

DISTRIBUTION Known only from two type specimens from one location in the Red Sea.

REMARKS *Pempheris tiran* has identical mtDNA sequences and no significant differences in characters from *P. flavicycla*. It is certainly a junior synonym.

Pempheris tominagai Koeda, Yoshino & Tachihara 2014

African silver sweeper

PLATE 31

Pempheris vanicolensis (non Cuvier 1831) Randall 1995: 244,

Fig. 638 (Oman).

Pempheris tominagai Koeda, Yoshino & Tachihara in Koeda, Yoshino, Imai & Tachihara 2014: 317, Fig. 7 (Sharm el-Sheikh, Egypt, Red Sea); Randall *et al.* 2014; Azzurro *et al.* 2015.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36–39 (Red Sea only) rays; pectoral fins 16–18 (usually 17) rays. In SL: body depth 2.3–2.5, HL 3.1–3.3, orbit diameter 6.8–7.3, and predorsal length 2.6–2.7. Teeth in upper jaw in 3 rows medially, all down-curved. GR 26–30. Scales cycloid on nape, in 1st row below dorsal fin, on sides of peduncle, and on sides of chest, except for 2 or 3 ctenoid scales anteroventrally on chest; LL scales 45–51 (Red Sea only).

Colour in life variable, from bronzy brownish (most underwater photographs) to silvery to greenish; upper body darkened; dorsal fin with dark leading edge often expanding to oval dark apical spot; caudal fin with dark upper and lower margins, with or without a wide dark posterior band; a prominent dark band along anal-fin base; pectoral fin reddish with thin dark crescent at base; iris yellow to brownish. Attains 101 mm SL.

DISTRIBUTION WIO: Red Sea, Oman and apparently widespread in NWIO.

REMARKS The first schwenkioid species described from the Red Sea, in 2014. Fish from the rest of the NWIO, i.e., Chagos Archipelago, Yemen (*P. xanthomma*), Seychelles (*P. ternay*) and northern Madagascar (*P. rubricauda*) share the mtDNA lineage. Farther east, from Maldives to India to Indonesia, it is replaced by the lineage of true *P. schwenkii*, 2.5% different. Only distantly related schwenkioid lineages occur in the SWIO (southern Madagascar, Mascarenes, and southern Africa). A number of recently described schwenkioid species from the Red Sea and NWIO are likely junior synonyms of *P. tominagai*. Koeda *et al.* (2014) include *P. connelli* and other unrelated species from southern Africa and Mauritius in their type series, thus the actual features of *P. tominagai* remain undocumented. They also presumed *P. schwenkii* is not in the Indian Ocean, but mtDNA indicates it occurs from Maldives eastward. If the two species eventually cannot be phenotypically distinguished, *P. schwenkii* would be the senior synonym.

Pempheris trinco Randall & Victor 2015

Sri Lanka sweeper

PLATE 31

Pempheris trinco Randall & Victor 2015: 57, Fig. 42 (Trincomalee, Sri Lanka).
Pempheris schwenkii (non Bleeker 1855): Randall & Bineesh 2014.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 37–41 rays; pectoral fins 17 or (usually) 18 rays. Body depth 2.3–2.5 in SL, body width ~2.6 in body depth. In SL: HL 3.2–3.3, orbit diameter 7.1–7.8, predorsal length 2.6–2.7, and pectoral-fin length 3–3.4. Teeth in upper jaw in 2 rows medially, outer row slightly recurved, inner row larger and more strongly recurved, narrowing to single row posteriorly; teeth in lower jaw similar but smaller, in 3 irregular rows and more strongly recurved inward. GR 26–28. Scales cycloid on nape, in 1st row below dorsal fin, on sides of peduncle, and on sides of chest except for a few ctenoid scales ventroanteriorly; LL scales 49–58.

In life, body silvery, with scale centres silvery grey and scale edges broadly coppery; dark band across pectoral-fin bases; dorsal fin with dark apical spot; anal-fin base with relatively narrow dark band; caudal-fin margin broadly blackish.

DISTRIBUTION Indian Ocean: Sri Lanka.

REMARKS A poorly defined schwenkioid species native to Sri Lanka, without mtDNA sequences and with no distinctive characters. Likely a synonym of *P. schwenkii*, found to the west in Maldives and eastward to Indonesia.

Pempheris viridis Randall & Victor 2015

Arabian sweeper

PLATE 31

Pempheris viridis Randall & Victor 2015: 58, Fig. 43 (off Al Lith, Saudi Arabia, Red Sea).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 37 rays; pectoral fins 17 rays. Head profile nearly straight. Body depth 2.7 in SL, body width 2.7 in body depth. In SL: peduncle depth 11.3, HL 3.2, eye diameter 7.3, predorsal length 2.6, pre-pelvic length 2.5, preanal length 1.8, and pectoral-fin length 3.4. Teeth medially in upper jaw small, slender, conical and recurved, in 3 or 4 irregular rows, reduced laterally to 2 well-separated rows of larger, strongly recurved teeth; lower jaw with band of minute teeth at symphysis, gradually reduced posteriorly to single row. GR 25. Scales cycloid on nape, below dorsal fin, on sides of peduncle, and on most of sides of chest [specimen has 6 ctenoid scales in 2 rows on right side of chest, and 12 ctenoid scales in 4 rows on left side at angle of opercle]. LL scales 53; lateral line highly arched anteriorly, its vertical height above level of its origin equal to two-thirds orbit diameter.

In life, body bright metallic green, scale edges yellowish brown; relatively narrow dark band at anal-fin base; caudal fin

orange, with wide dark band at posterior margin, and narrower bands along upper and lower edges; iris yellow.

DISTRIBUTION Known only from the holotype collected from the Red Sea.

REMARKS One of several recently described schwenkioid species from the Red Sea, based on a single metallic green specimen with the same mtDNA sequence as *P. tominagai* and no other distinction; it is very likely a junior synonym of *P. tominagai*.

Pempheris wilsoni Randall & Victor 2015

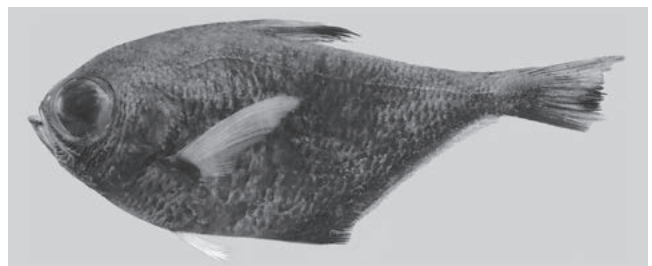
Fahal sweeper

PLATE 32

Pempheris wilsoni Randall & Victor 2015: 60, Figs. 45–48 (Fahal I., Oman, Gulf of Oman).

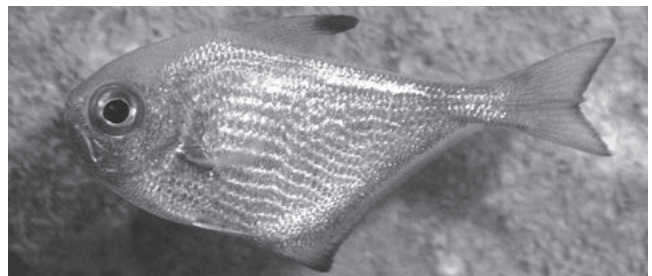
Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 45 rays; pectoral fins 17 rays. Body depth 2.4 in SL, body width 2.7 in body depth. In SL: peduncle depth 10.3, HL 3.5, orbit diameter 7.3, predorsal length 2.7, pre-pelvic length 2.7, preanal length 1.9, and pectoral-fin length 3.2. Dentition as described for *P. smithorum*, but teeth of lower jaw smaller; sides of tongue concave, tip rounded. GR 29. [Specimen missing most of outer layer of scales.] LL scales 59.

In life, coppery brown with dark bands along flanks made up of rows of darkened scale centres; dorsal fin with dark oval apical spot, caudal fin with thin dark posterior rim; anal fin with dark margin on first several rays only; pectoral fin with or without narrow dark crescent at base.



Pempheris wilsoni, 12 cm SL, male holotype (Oman).

© HA Randall, Bishop Museum



Pempheris wilsoni (Oman). © KDP Wilson

DISTRIBUTION Known only from the Gulf of Oman.

REMARKS The northern Oman population of the *P. nesogallica/rhomboides* complex; it shares mtDNA sequences with the other WIO species of that complex and has no distinctive features. Likely a junior synonym of *P. nesogallica*.

Pempheris xanthomma Randall & Victor 2015

Yemen sweeper

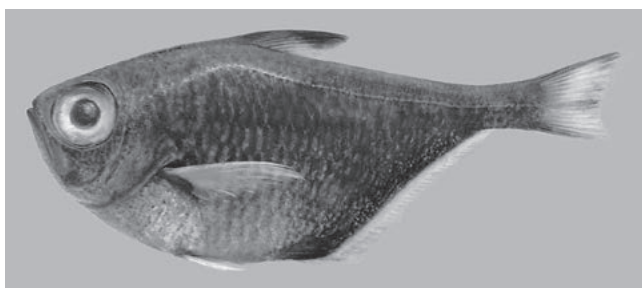
PLATE 32

Pempheris xanthomma Randall & Victor 2015: 62, Figs. 49–50
(Ras Majdah, Yemen, Gulf of Aden).

Pempheris tominagai (non Koeda, Yoshino, Imai & Tachihara 2014):
Randall *et al.* 2014.

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36–41 rays; pectoral fins usually 17 (16–18) rays. Body depth 2.2–2.5 in SL, body width 2.5–3.5 in body depth. In SL: peduncle depth 9.7–11.2, HL 3.1–3.4, orbit diameter 7.5–7.8 (eyes relatively small), predorsal length 2.7–2.8, pre-pelvic length 2.5–2.6, preanal length 1.7–1.8, and pectoral-fin length 3.2–3.4. Dentition typical of most species of genus. GR 26–29. Scales cycloid on nape, below dorsal fin, on sides of peduncle, and on chest except for a few to up to one-fourth of the scales ctenoid ventroanteriorly; LL scales 49–57.

Preserved specimens brownish yellow; dorsal fin with dusky leading edge and oval dark apical spot; caudal fin with dark upper and lower margins, dusky on posterior margin; anal-fin base with wide dark band; pectoral fin with narrow dark crescent at base; iris yellow.



Pempheris xanthomma, 9 cm SL, female holotype (Gulf of Aden).
© HA Randall, Bishop Museum

DISTRIBUTION Known only from type series collected from the Gulf of Aden.

REMARKS A schwenkioid species based on a single collection from Yemen, sharing a mtDNA lineage with *P. tominagai* and with no distinctive characters. It is very likely a junior synonym of *P. tominagai*.

Pempheris zajonzi Randall & Victor 2015

Socotra sweeper

PLATE 32

Pempheris zajonzi Randall & Victor 2015: 64, Fig. 51 (off Ras Qatanin,
Socotra I., Yemen).

Dorsal fin 6 spines, 9 rays; anal fin 3 spines, 36–38 rays; pectoral fins 17 rays. Head profile from above eyes to dorsal-fin origin nearly straight; lower jaw not protruding when mouth firmly shut. Body depth ~2.4 in SL, body width ~2.7 in body depth. In SL: HL ~3.2, orbit diameter ~8 (eyes relatively small), predorsal length ~2.6, pre-pelvic length ~2.5, preanal length ~1.8, and pectoral-fin length ~3.3. Teeth at front of upper jaw in 3 irregular rows, well-developed, recurved for two-thirds length of tooth-bearing part of jaw, upper teeth more protruding, and lower teeth strongly recurved; teeth at front of lower jaw minute, in 3 or 4 irregular close-set rows, progressively more recurved and larger inwardly. GR 28–30. Scales cycloid on nape, below dorsal fin, on sides of peduncle, and on chest except about one-fourth of scales ctenoid ventroanteriorly; LL scales 49–54.

Preserved specimens uniformly brown; pectoral-fin bases only slightly darker than adjacent body; leading edge of dorsal fin black, slightly expanding distally; anal fin with broad black band; caudal fin yellow, with narrowly black upper and lower edges, and broadly black posterior margin; iris dark bluish grey. Attains at least 90 mm SL.

DISTRIBUTION Known from a single collection at Socotra.

REMARKS A poorly defined schwenkioid species from Socotra, without mtDNA sequences and with no distinctive characters. Its relatively narrow body indicates it is likely a junior synonym of *P. tominagai* (the alternative species *P. conelli/rochai* has a wider body).

FAMILY TOXOTIDAE

Archerfishes

Gerald R Allen

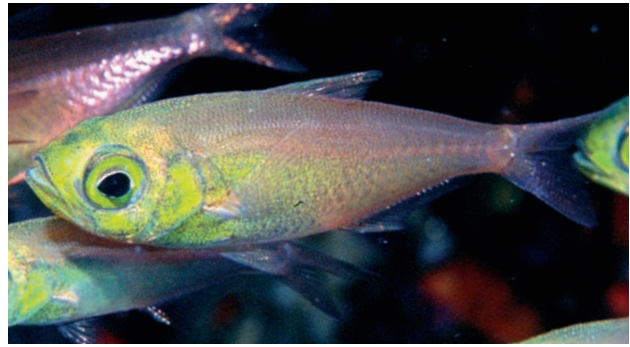
Body moderately compressed, ovate or rhomboidal, covered with relatively large ctenoid scales, extending onto head and median fins; cheek and opercle scaly. Dorsal fin single, with 4–6 stout spines, 15–18 rays; anal fin 3 stout spines, 15–18 rays; caudal fin generally truncate. Eyes large, set near dorsal profile and above rear portion of mouth. Mouth moderately large, protrusile, with lower jaw protruding; villiform teeth on jaws, vomer and palatines; roof of mouth with deep longitudinal groove that forms a tube when the tongue is pressed against it. Gill rakers 2–8 on lower limb of 1st arch. Lateral line continuous, from upper edge of gill cover to caudal-fin base.

Family **PEMPHERIDAE**, Sweepers



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Parapriacanthus argenteus, yellowhead sweeper, 7 cm SL, neotype (S Mozambique).



© DR King

Parapriacanthus argenteus, yellowhead sweeper (South Africa).



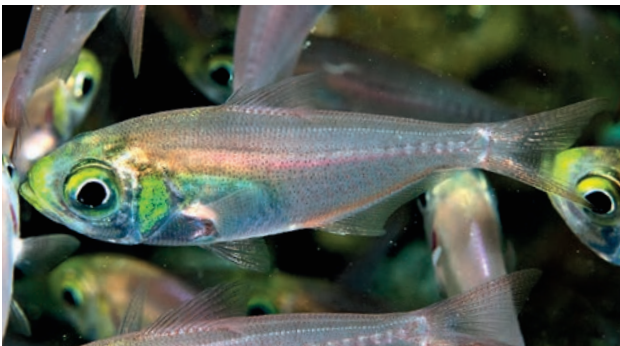
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Parapriacanthus darros, D'Arros sweeper aggregation (Seychelles).



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Parapriacanthus guentheri, Egyptian sweeper, 4 cm SL (Red Sea).



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Parapriacanthus guentheri, Egyptian sweeper (Red Sea).



AD Connell © NRF-SAIAB

Parapriacanthus kwazulu, Kwazulu sweeper, 4 cm SL, male holotype (South Africa).



© R Winterbottom, ROM

Parapriacanthus punctulatus, dotted sweeper, 5 cm SL (Comoros).



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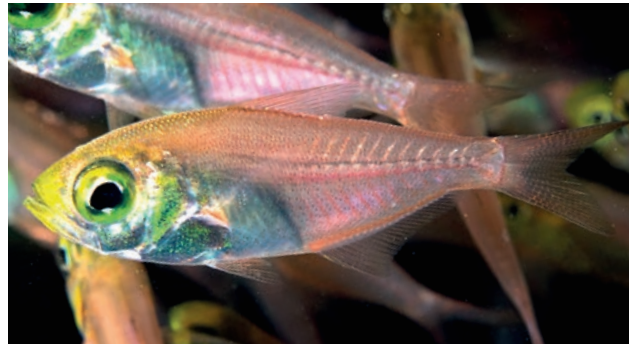
Parapriacanthus rahah, Rahah sweeper, 5 cm SL, female holotype (Oman).

Family **PEMPHERIDAE**, Sweepers



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Parapriacanthus sharm, Sharm sweeper (Red Sea).



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Parapriacanthus sp. (Red Sea). #



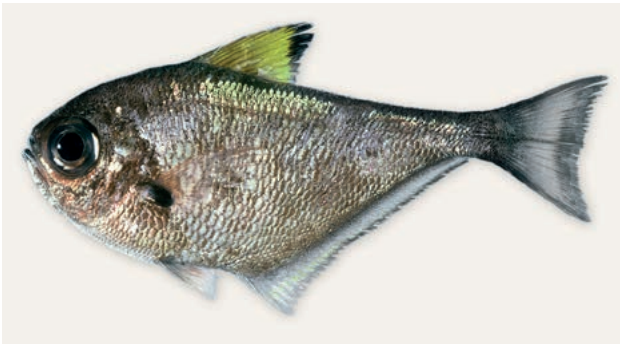
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Pempheris andilana, Andilana sweeper, 10 cm SL (Madagascar).



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Pempheris argyrea, Seychelles silver sweeper, 10 cm SL, holotype (Seychelles).



PC Heemstra © NRF-SAIAB

Pempheris bexillon, yellowfin sweeper, 13 cm SL (Comoros).



PC Heemstra © NRF-SAIAB

Pempheris bexillon, yellowfin sweeper, 15 cm SL (Mauritius).



KK Bineesh © CMFRI

Pempheris bineeshi, Tuticorin sweeper, 10 cm SL, paratype (SW India).



© H Bruggemann, ANR-BIOTAS

Pempheris bruggemanni, Mascarene sweeper, 10 cm SL, female paratype (Réunion).

= no species account

Family **PEMPHERIDAE**, Sweepers



© A Diringer

Pempheris bruggemanni, Mascarene sweeper (Réunion).



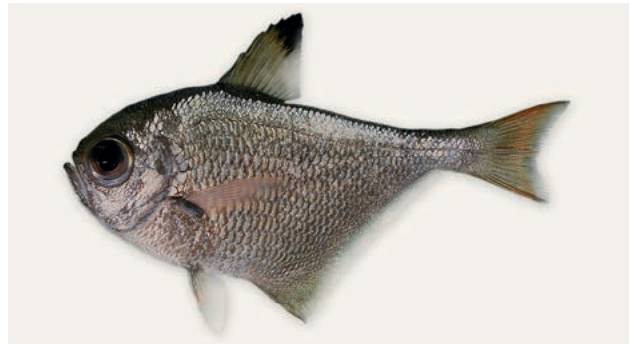
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Pempheris connelli, Natal sweeper, 12 cm SL, female (South Africa).



© DR King

Pempheris connelli, Natal sweeper (South Africa).



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Pempheris convexa, convex sweeper, 12 cm SL, male holotype (Oman).



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Pempheris darvelli, Jissah sweeper (Gulf of Oman).



© DR King

Pempheris eatoni, Durban sweeper (South Africa).



© A Diringer

Pempheris eatoni, Durban sweeper (South Africa).



© DR King

Pempheris eatoni, Durban sweeper, subadult (Mozambique).

Family **PEMPHERIDAE**, Sweepers



PC Heemstra © NRF-SAIAB

Pempheris flavicycla flavicycla, goldeneye sweeper, 13 cm SL (Seychelles).



© A Sutton

Pempheris flavicycla flavicycla, goldeneye sweeper (Tanzania).



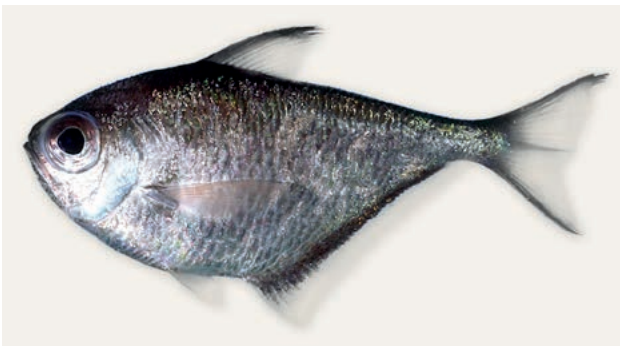
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Pempheris flavicycla marisrubri, Red Sea goldeneye sweeper (Red Sea).



O Gon © NRF-SAIAB

Pempheris hadra, Maldives sweeper, 12 cm SL, female holotype (Maldives).



PC Heemstra © NRF-SAIAB

Pempheris heemstraorum, greater sweeper, 13 cm SL (Rodrigues).



E Heemstra © NRF-SAIAB/AV2010

Pempheris hollemani, Madagascar sweeper, 12 cm SL, holotype (Madagascar).



© DA Polack

Pempheris ibo, Ibo sweeper aggregation (Mozambique).



© HA Randall, Bishop Museum

Pempheris kruppi, Aden sweeper, 12 cm SL, female holotype (Gulf of Aden).

Family **PEMPHERIDAE**, Sweepers



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Pempheris kruppi, Aden sweeper aggregation (Gulf of Aden).



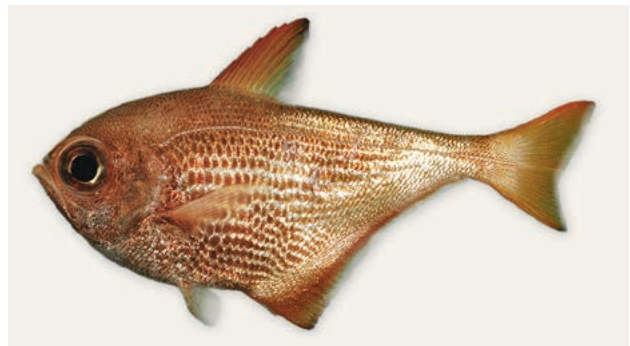
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Pempheris kuriamuria, Oman sweeper (Oman).



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Pempheris kuriamuria, Oman sweeper (Oman).



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Pempheris malabarica, orange sweeper, 13 cm SL (Oman).



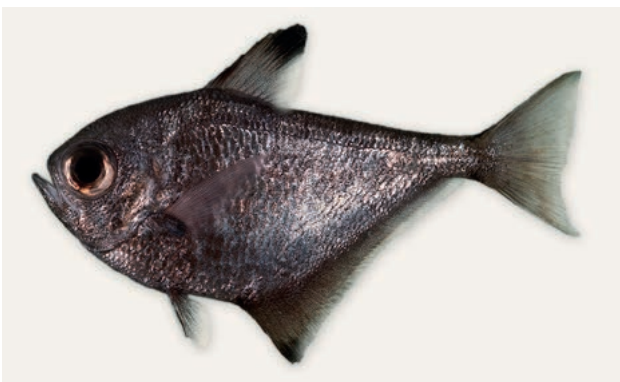
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Pempheris mangula, Indian sweeper, 12 cm SL, paraneotype (SE India).



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Pempheris micromma, smalleye sweeper, 12 cm SL, female holotype (Oman).



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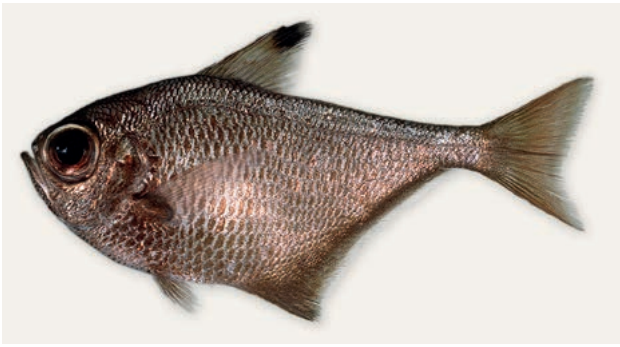
Pempheris nesogallica, African sweeper, 12 cm SL (Mauritius).



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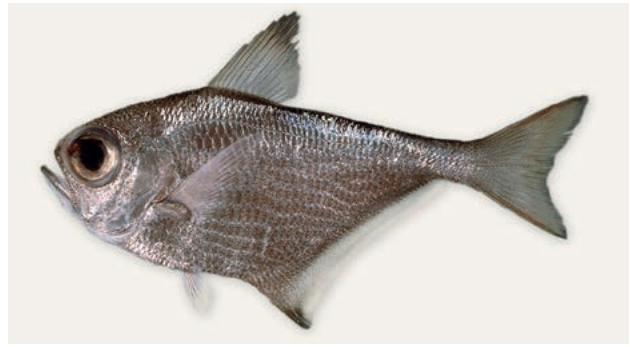
Pempheris peza, Ponta sweeper, 11 cm SL, male holotype (Mozambique).

Family **PEMPHERIDAE**, Sweepers



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Pempheris rhomboidea, dusky sweeper, 12 cm SL (Red Sea).



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Pempheris rhomboidea, dusky sweeper, 9 cm SL, subadult (Gulf of Suez).



© R. Pillon

Pempheris rhomboidea, dusky sweeper, Lessepsian migrant (Greece).



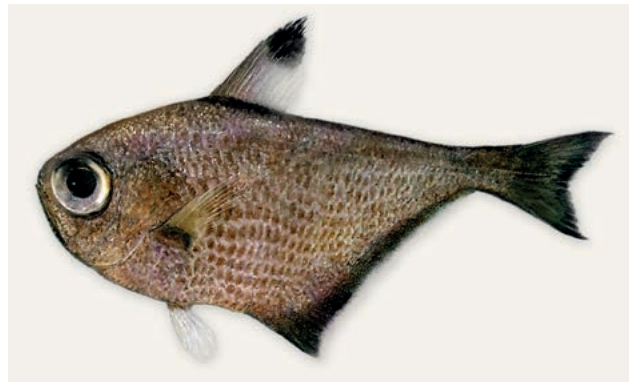
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Pempheris rhomboidea, dusky sweeper, Lessepsian migrant (Cyprus).



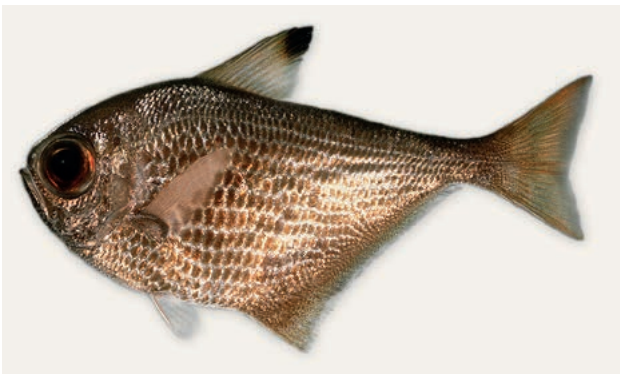
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Pempheris rubricauda, redbtail sweeper, 7 cm SL (Madagascar).



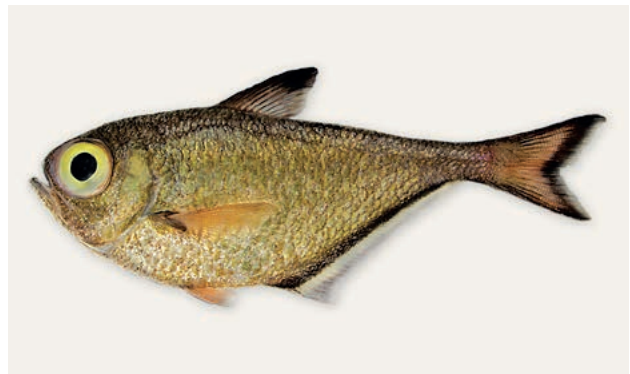
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Pempheris russellii, Pakistan sweeper, 14 cm SL (Pakistan).



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Pempheris sarayu, Kerala sweeper, 13 cm SL (Kovalam, India).



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Pempheris sergey, Jeddah sweeper, 10 cm SL (Red Sea).

Family **PEMPHERIDAE**, Sweepers



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Pempheris ternay, Seychelles sweeper, 9 cm SL, male (Seychelles).



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Pempheris tiran, Tiran sweeper, 12 cm SL, male (Red Sea).



© K Koeda

Pempheris tominagai, African silver sweeper, 10 cm SL, holotype (Red Sea).



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Pempheris tominagai, African silver sweeper (Red Sea).



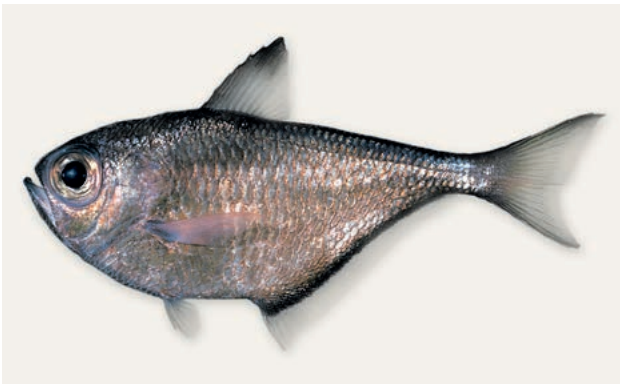
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Pempheris tominagai, African silver sweeper (Red Sea).



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Pempheris tominagai, African silver sweeper (Red Sea).



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Pempheris trinco, Sri Lanka sweeper, 10 cm SL, male (Sri Lanka).



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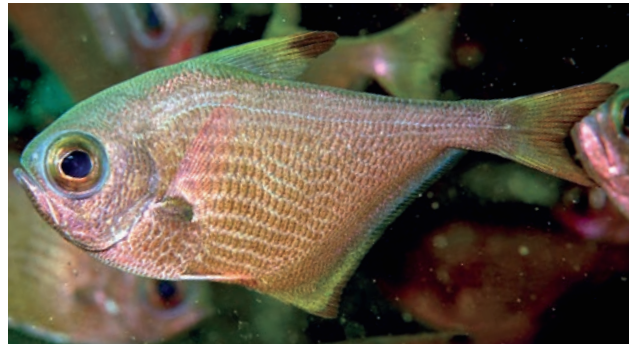
Pempheris viridis, Arabian sweeper, 8 cm SL (Red Sea).

Family **PEMPHERIDAE**, Sweepers



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Pempheris wilsoni, Fahal sweeper aggregation (Oman).



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Pempheris wilsoni, Fahal sweeper (Oman).



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Pempheris xanthomma, Yemen sweeper (Yemen).



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Pempheris zajonzi, Socotra sweeper, 9 cm SL, male holotype (Yemen).

Family **TOXOTIDAE**, Archerfishes



© GR Allen

Toxotes chatareus, sevenspot archerfish, 20 cm TL (NW Australia).



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Toxotes jaculatrix, banded archerfish, 8 cm TL, juvenile (NW Australia).



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Toxotes jaculatrix, banded archerfish, 25 cm TL, adult (Indonesia).