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A new species of *Paraulopus* (Aulopiformes: Paraulopidae) from seamounts of the Tasman Sea

Martin F. Gomon

Sciences Department, Museum Victoria, GPO Box 666, Melbourne, Victoria 3001, Australia (mgomon@museum.vic.gov.au)

Abstract Gomon, M.F. 2010. A new species of *Paraulopus* (Aulopiformes: Paraulopidae) from seamounts of the Tasman Sea. *Memoirs of Museum Victoria* 67: 15–18.

A new species of the *Paraulopus nigripinnis* species complex of the family Paraulopidae is described from four specimens taken on seamounts and rises in the western, central and eastern parts of the Tasman Sea between 30° and 35°S. It is distinguishable from other members of the complex in having 8–9 anal fin rays; 19 pectoral fin rays; 48 vertebrae; 19–24 predorsal scales; 5.5 scales above the lateral line; a large pelvic fin (length 22.8–28.4% SL), distal margin of pelvic fin deeply concave, separating the fin into inner and outer lobes, with the inner lobe much shorter than the outer (the ratio of the lengths of the outer to the inner is 1.7–2.1); two prominent, broad brown bands on the side of the body posterior to the dorsal fin; a broad black marginal stripe covering the distal third of the dorsal fin, with a distinct broad white submarginal stripe; a white marginal band and a black submarginal band on the distal third of the upper lobe of the caudal fin; a black marginal band on the ventral lobe of the caudal fin; and the buccal cavity almost entirely black.

Keywords Paraulopidae, *Paraulopus*, sp. nov., Tasman Sea

Introduction

Scrutiny of museum specimens referrable to the recently described genus *Paraulopus* (Sato and Nakabo, 2002a) has revealed a surprising diversity in Australian and New Zealand waters (Sato and Nakabo, 2002b; Gomon and Sato, 2004; Sato *et al*., 2010). Members of this Indo-West Pacific genus are separable into two complexes: the Northern Hemisphere and tropical *Paraulopus oblongus* complex, and a *Paraulopus nigripinnis* complex — so far known only from cool tropical and temperate Australasian localities. Species of the latter were distinguished by Sato *et al*. (2010). Species in the Tasman Sea separating Australia and New Zealand usually occur, at least in part, at deep-shelf or upper-slope depths of one of the two countries. Several specimens of a previously undescribed species in the *P. nigripinnis* complex, first collected near Lord Howe Island, are known from seamounts and rises in the Tasman Sea, but apparently do not occur in Australian continental waters, and so far have not been taken within New Zealand's Exclusive Economic Zone. A description of that species is presented here.

Materials and methods

Terminology and methodology mostly follow Sato *et al*. (2010). The pelvic fin in species with a deeply concave distal margin are separated into distinct inner and outer lobes; the lengths of the lobes are measured from the base of the first pelvic fin ray to the tip of the longest ray of each lobe. Institutional codes are those of Leviton *et al*. (1985).

Paraulopus balteatus sp. nov. Banded cucumberfish

Figure 1; table 1

Material examined. Holotype: AMS I.44606-001 (320), Tasman Sea, Australia, New South Wales, Browns Mount off Botany Bay 34°02'S, 151°39'E (estimated), 430 m, 17 June 2008, drop line, FV *Blue Eye*, collected by Jurgen Konrad and retained by Pascal Geraghty, Department of Primary Industries, NSW Fisheries.

Paratypes: NMNZ P. 10455 (246), Three Kings Ridge, 30°45.00'S, 173°57.00'E, 537–677 m, 6 July 1962, RV Tui, beam trawl; NMNZ P. 35686 (278), Lord Howe Rise, 34°09.20'S, 162°51.80'E, 365–793 m, 16 September 1998, FV Arrow; NMV A22071 (305), Lord Howe Rise, 33°38'S–33°38'S, 162°21'E–162°28'E, 300–750 m, 22 March 2001, demersal trawl, Ken Smith, MAFRI.

Diagnosis. Anal fin rays 8–9; pectoral fin rays 19; vertebrae 48; predorsal scales 19–24; scales above lateral line 5.5; pelvic fin large, length 22.8–28.4% SL, larger in males than females, inner lobe much shorter than outer lobe, ratio of lengths of outer lobe to inner 1.7–2.1; sides with two prominent broad brown bands posterior to dorsal fin; broad black marginal stripe covering distal third of dorsal fin with distinct broad white submarginal stripe; distal third of upper lobe of caudal fin with white marginal band and black submarginal band and ventral lobe with black marginal band; buccal cavity pigmented black forward to jaws; males with black anal fin margin anteriorly and distally, anal fin of females lacking dark margins.

Figure 1. *Paraulopus balteatus* sp. nov., holotype, AMS I.44606-001, 320 mm SL, male, Tasman Sea, Australia, New South Wales, Browns Mount off Botany Bay 34°02'S, 151°39'E (est.), 430 m, photo by S. Humphreys (AMS).

Description. Dorsal fin rays 11; anal fin rays 9; caudal fin rays 1+8+1+9+8+1+8+1; pectoral fin rays 19; pelvic fin rays 9; vertebrae 19+29; lateral line scales 48–49; scales above lateral line 5.5; scales below lateral line 3.5; predorsal scales 19–24; gill rakers 8–9+18–20 = 27–28. (See table 1 for morphometric values).

Cigar-shaped body, tapering evenly to narrow caudal peduncle; anus about midway between pelvic-fin base and anal-fin origin. Head bluntly pointed, rather cylindrical, not depressed; dorsal outline of head and nape nearly straight in lateral profile; snout short. Nostrils ovoid, positioned midway between eye and tip of snout, subdivided by transverse flap of skin. Superocular ridge on either side above central half of eye. Eye large, positioned dorsolaterally, on dorsal profile of head. Posterior edge of preopercle smooth, curved at angle. Mouth terminal; dorsoposterior corner of maxilla below centre of eye. Teeth on jaws fine, in broad strip extending anteriorly onto lateral surfaces of premaxilla and dentary, tapering to narrow strip posteriorly. Vomerine teeth fine, in narrow transverse band, continuous with posteriorly tapering band of teeth on exposed edge of palatine; hyoid teeth fine, in ovoid patch on each side, axis angled anteromesially at anterolateral corner of tongue; teeth on lateral periphery slightly enlarged. Gill rakers on upper arm of first arch short; those on lower limb moderately long and slender, with one or two rudimentary rakers at both dorsal and ventral ends of arch.

Scales large, cycloid. Predorsal scales extending forward to vertical through posterior extent of eye. Cheek scales large, covering cheek and preopercle, in about three poorly defined rows. Lateral line positioned midlaterally on side, anterior end slightly elevated.

Dorsal fin moderately tall with short base, second ray longest but only slightly longer than first, subsequent rays decreasing in length; first two rays unbranched, subsequent rays branched; vertical through origin of fin closer to origin of pelvic fin than origin of pectoral fin; adipose fin small but obvious, positioned just in advance of vertical through posterior end of anal fin base. Anal fin short based, of moderate height, first ray shortest, length of subsequent rays subequal, first two unbranched, others branched; anal fin origin closer to base of tail than to origin of pelvic fin. Caudal fin distinctly forked, upper lobe slightly longer than lower. Posterior tip of pectoral fin reaching beyond origin of pelvic fin but not to vertical through centre of longest ray; fourth ray longest; first ray simple, others branched. Posterior tip of depressed pelvic fin reaching about halfway between pelvic fin origin and anal fin origin; posterior margin distinctly concave; inner ray distinctly shorter than fin length; first ray unbranched, others branched; tip of outer lobe of pelvic fin expanded into a fleshy, pad-like structure.

A large species, largest specimen examined 320 mm SL.

Pigmentation in alcohol. Body dusky dorsally, underside pale, with two broad brown bands encircling body except ventrally, first posterior to dorsal fin, second posterior to anal fin, and several broad brown blotches dorsally on side, one below posterior half of dorsal fin, second between bands (third just prior to caudal fin in paratypes). Snout, dorsal part of cheek and operculum very dark. Buccal lining of mouth black; tongue black with white tip and lateral margins. Dorsal fin dark brown basally with broad black marginal stripe occupying distal half (to third) of fin anteriorly, and broad white submarginal stripe. Adipose fin dusky. Anal fin white with narrow black margin anteriorly and distally in males; entirely white in females. Caudal fin dark basally with broad pale vertical intermediate

Table 1. Selected proportional measurements and counts for types of *Paraulopus balteatus* sp. nov.

	Holotype	Paratypes (n = 3)	
		Range	Mean ± SD
Standard length (mm)	320	246–305	
% SL			
Body depth	21.6	17.8–19.7	18.7±1.0
Body width	18.3	15.8–21.5	17.9±3.2
Head length	30.0	30.6–32.6	31.5±1.0
Caudal peduncle depth	8.1	5.8–7.6	6.9±0.9
Caudal peduncle length	19.6	20.2–21.8	20.8±0.8
Predorsal length	37.8	39.2–40.0	39.7±0.4
Preanal length	75.0	71.6–74.4	73.3±1.5
Prepectoral length	30.4	31.3–32.9	31.9±0.9
Prepelvic length	42.5	40.7–43.6	41.8±1.6
Preanus length	55.0	56.1–59.3	58.0±1.7
Pelvic fin origin to anus	15.2	16.4–19.1	17.6±1.4
Anus to anal fin origin	18.5	15.6–16.2	16.0±0.3
Dorsal fin base	15.1	12.8–15.0	14.1±1.1
Dorsal fin height	24.9	21.7–28.3	25.7±3.6
Dorsal fin last ray		8.0–17.0	12.5±6.4
Anal fin base	7.6	6.7–8.3	7.4±0.8
Anal fin height	7.5	5.9–9.7	8.4±2.2
Pectoral fin length	22.0	20.8–21.6	21.2±0.4
Pelvic fin length	26.5	22.8–28.4	26.2±3.0
Pelvic fin inner lobe length	15.1	12.6–14.9	13.8±1.2
Interpelvic width	15.0	13.3–16.1	14.2±1.6
% HL			
Head depth	57.8	49.7–53.1	51.8±1.8
Orbit diameter	34.9	36.1–38.8	37.7±1.4
Postorbital length	43.2	38.0–40.5	39.3±1.3
Head width	55.9	55.8–57.0	56.5±0.6
Interorbital width	10.9	9.5–11.0	10.2±0.8
Upper jaw length	44.5	43.1–43.8	43.5±0.4
Snout length	26.0	23.2–26.6	24.7±1.8
Adipose fin length	5.7	6.2–7.4	6.6±0.7
% pelvic fin length			
Pelvic fin inner lobe length	57.0	48.7–55.4	52.7±3.6

Meristic values	**Holotype**	**Range**
Dorsal-fin rays	11	11
Anal-fin rays	9	8–9
Pectoral-fin rays	19	19
Pelvic-fin rays	9	9
Gill rakers	8 + 19 = 27	8–9 + 18–20 = 27–28
Pored lateral-line scales	47	48–49
Scales above lateral line	5.5	5.5
Scales below lateral line	3.5	3.5
Predorsal scales	24	19–21
Vertebrae	19 + 29	19 + 29

HL = head length; SD = standard deviation; SL = standard length

band and narrow white marginal band with black submarginal band on upper lobe and narrow black marginal band on dorsal two-thirds of lower lobe. Pectoral fin dusky. Pelvic fin rather dark with white margin on distal edge and distally along anterior edge; fine black distal edge (in males only).

Fresh colour. Body bluish-grey above with pearlescent white underside and iridescent blue sheen; bands and blotches brownish. Black markings on fins intensely so; other dark areas (described above) greyish. Pectoral and outer parts of pelvic fins shaded yellow.

Etymology. The name *balteatus*, from the Latin for 'belted or banded', in reference to the distinctive broad brown bands on the sides of the body in this species.

Distribution. Known only from the Tasman Sea at 30–35°S, from Browns Mount southeast of Botany Bay, New South Wales, to the Three Kings Ridge just north of the northern boundary of New Zealand's EEZ, in depths no shallower than 300 m and no greater than 800 m.

Comments. This species was initially confused with *Paraulopus okamurai* (Sato and Nakabo, 2002b), a closely related congener that occurs in the same area. It attains a similarly large size and has equally distinctive black-and-white-patterned dorsal and caudal fins. The pattern of the fins in *P. okamurai* is the basis for its New Zealand vernacular name, 'magpie cucumberfish'. The two are separable by details of the fin patterns, as well as the presence in the new species of prominent broad brown bands on the side of the body of adults (versus, at most, much smaller brown blotches midlaterally and a smaller brownish saddle behind the adipose fin), 8–9 anal fin rays (versus 9–11 rays, rarely 9), 19 pectoral fin rays (versus 16–17), and an entirely black interior of the mouth, except for the tongue, which has white at the tip and along the lateral edges (versus entirely pale). The same characteristics also separate *P. balteatus* from most other species in the complex. Its pectoral fin count overlaps only with *P. novaeseelandiae* (Sato and Nakabo, 2002b), which rarely has 19 rays; only *P. melanostomus* (Sato *et al*., 2010) has the buccal cavity completely lined with black, although the throat of some of the others is darkly pigmented. Many of the species, especially at a small size, have brownish spots or small blotches along the side, often horizontally aligned midlaterally, and like *P. novaeseelandiae* have a brownish saddle under or behind the adipose fin. None of those blotches, however, are expanded to broad bands that nearly encircle the side as in *P. balteatus*. The new species also has among the largest pelvic fins of the genus, the length of which is only matched by *P. longianalis* (Sato *et al*., 2010), and to some extent *P. novaeseelandiae,* but the inner lobe of the pelvic fin in *P. balteatus* is much shorter relative to the outer lobe than in the others (length of outer lobe relative to inner lobe 1.7–2.1 versus 1.3–1.7).

As in most other members of the *P. nigripinnis* complex, sexual dimorphism is quite apparent in this species, involving the size and colouration of the pelvic fins and pigmentation of the dorsal and anal fins. Males have a larger pelvic fin (length 26.5–28.4% SL, versus 22.8% SL in females), and the pigmentation of these fins is much darker in males with a fine black margin distally. Males also have a fine black margin anteriorly and distally on the anal fin that is missing in females, while the dorsal fin has a fine, stark white distal margin that does not appear to feature in females.

Despite the recent increase of collecting in central latitudes of the Tasman Sea, this species is known only from four large specimens, one of which was taken on hook and line. Its absence from trawl collections may infer a preference by the species for a hard-bottom habitat, which is usually avoided by trawl fishers. The fact that *P. nigripinnis, P. novaeseelandiae* and *P. okamurai* have also been taken with hook and line (Roberts, 1997, 2004; Stewart, 2006; Struthers, National Museum of New Zealand, pers. comm., March 2010) suggests that species of this genus are carnivorous. Individuals probably rest on their substantial pelvic fins waiting for potential prey to come to them — a behaviour common to a number of other members of the order.

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