

## A New Species of the Roughy Genus *Hoplostethus* (Trachichthyidae) off North-western Australia.

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### Abstract

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*Hoplostethus ravurictus* n.sp. is described from a large series collected at continental slope depths in tropical latitudes off North-western Australia. Its description brings the number of documented Australian species of the subgenus *Hoplostethus* (*Hoplostethus*) to four, the three previously recognised species primarily occurring in subtropical and temperate waters of the south. The new species is easily distinguished by the rather pale pigmentation in its buccal and branchial cavities, 13–16 (rarely 10–12 or 17–20) abdominal scutes and fully scaled isthmus. Its characters do not support a particularly close relationship with any of its recognised congeners.

### Keywords

Roughy, *Hoplostethus*, Trachichthyidae, new species, Australia.

### Introduction

In the most recent overview of the trachichthyid genus *Hoplostethus* Cuvier (in Cuvier and Valenciennes, 1829), Kotlyar (1996) recognised four subgenera, three with rather delicate cranial structures and the fourth, *Hoplostethus* (*Hoplostethus*), having a more substantial ossification of the skull, and a shallower bathymetric distribution overall relative to the others. In that study the vast majority of species in the genus are placed in *H. (Hoplostethus)* with 13 species, and *H. (Leiogaster)* with six. The latter increased to seven with the subsequent description of *H. vniro* Kotlyar, 1995. The status of the subgeneric assemblages remains untested.

Kotlyar recorded two species of *H. (Hoplostethus)* in Australian waters, *H. mediterraneus* (Cuvier, 1829) and *H. gigas* (McCulloch, 1914), neither presented as occurring above the southwestern corner of Western Australia on the west coast. Gomon (in Gomon et al., 1994) reported three species that are referable to the subgenus in southern Australian waters, *H. intermedius* (Hector, 1875; regarded by Kotlyar as a subspecies of *H. mediterraneus*), *H. gigas* and *H. latus* McCulloch, 1914, the last distributed northwards at least to Geraldton on the west coast. Kotlyar (1996) had placed *H. mediterraneus* var *latus* in synonymy with *H. mediterraneus*, but a number of characters readily separate the two at the species level (Gomon, in Gomon et al., 1994). The distributions of the two species overlap only between the southwest corner

of Australia and the middle of the Great Australian Bight.

Since the early 1980s, trawlers working the upper slope off North-western Australia have collected specimens of an additional species with characteristics that do not match any in the literature. A description of that species follows.

**Methods and Materials.** Terminology and methodology is that of Kotlyar (1996). The number and size range in standard length (SL) for each lot of specimens examined is presented as a parenthetical expression after the respective registration number. Institutional abbreviations are listed in Leviton et al., (1985). Paratypes measured to determine morphometric variability are marked with an asterisk in the list of paratypes below. Numbers enclosed by square brackets in the species description indicate the number of specimens or structures counted with that value. Scale terminology is that of Roberts (1993).

### *Hoplostethus ravurictus* n. sp.

Figures 1–2; Tables 1–2

*Hoplostethus* sp. Gloerfelt-Tarp and Kailola, 1984: 315, voucher WAM P.26209-015.

*Hoplostethus* sp. Sainsbury et al., 1984: 334, CAAB 37255006, voucher CSIRO CA308.

**Materials examined.** Holotype: NMV A29668-002 (123) Western Australia, Hedland, 18°34.28'–18°34.20'S, 117°27.40'–117°28.17'E, 407–404 m, RV *Southern Surveyor* SS05/2007/049, 14 Jun 2007.



Figure 1. *Hoplostethus ravurictus* n. sp., holotype NMV A29668-002, 123 mm SL, Western Australia, Hedland, 407–404 m.

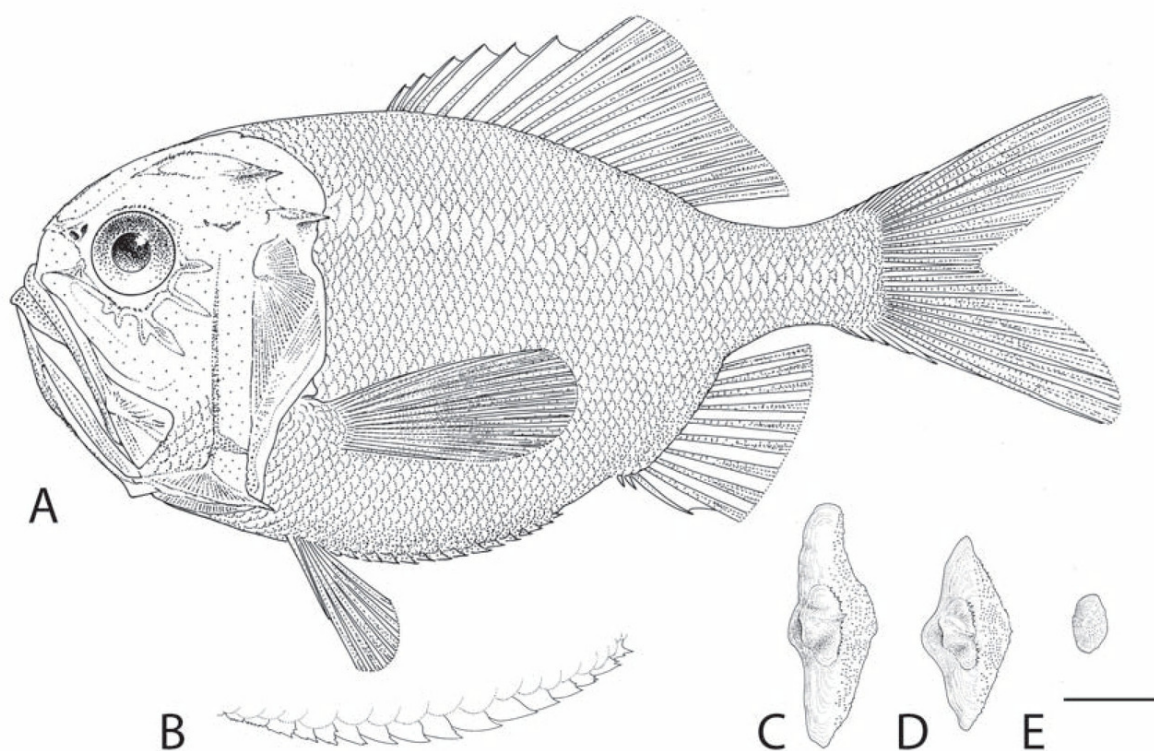


Figure 2. *Hoplostethus ravurictus* n. sp.: (A) holotype, NMV A29668-002, 123 mm SL; (B) abdominal scutes; (C) anterior lateral line scale; (D) posterior lateral line scale; and, (E) scale from just below dorsal fin base. Scales from NTM S12734-005, paratype, 141 mm SL. Bar associated with scales equals 5 mm.



Table 1. Frequency of meristic values in type specimens. Values for holotype are marked with an asterisk.

	Dorsal Fin							Anal Fin Rays		
	Spines			Rays		Total				
No. of elements	V	VI	VII	13	14	19	20	8	9	10
No. of specimens	2	77*	1	76*	4	77*	3	1	77*	2

	Caudal Fin Rays											
	Dorsal						Ventral					
	Unsegmented		Segmented				Segmented				Unsegmented	
			Unbran.	Branched		Branched		Unbranched				
No. of elements	6	7	2	8	9	8	9	1	2	5	6	7
No. of specimens	56	23*	79*	3	76*	79*	1	1	78*	5	70*	4

	Pectoral Fin Rays				Vertebrae			
No. of elements	13	14	15	16	11+14	12+14	11+15	11+16
No. of specimens	1	5	121*	3	2	1	70*	1

	Outer Gill Rakers on 1st Gill Arch										
	Upper Limb			Angle	Lower Limb			Total			
No. of elements	5	6	7	1	11	12	13	18	19	20	21
No. of specimens	1	64*	3	78*	3	42*	23	4	41*	20	3

	Abdominal Scutes										
No. of elements	10	11	12	13	14	15	16	17	18	19	20
No. of specimens	1	1	1	16	19	19*	10	2	4	0	1

Paratype: (78, 25.4–141 mm SL). AMS I.23425-004 (5, 84.4–103) Western Australia, northwest shelf, 18°46'S, 117°00'E, 400 m, RV *Soela*, 1 Sep 1982; CAS 227136 (3, 78.7–116), same collection data as NTM S12734-005 below; CSIRO CA308 (95.0) Western Australia, SW of Rowley Shoals, 18°19'–18°18'S, 118°17'–118°08'E, 297–308 m, FRV *Courageous*, 20 May 1978; CSIRO CA3588 (64.8) Western Australia, SW of Imperieuse Reef, Rowley Shoals, 18°03.5'–17°56.7'S, 118°13.0'–118°21.2'E, 418–420 m, FRV *Soela*, SO0183/69, 5 Feb 1983; CSIRO CA3597 (122) Western Australia, SW of Imperieuse Reef, Rowley Shoals, 18°03.5'–17°56.7'S, 118°13.0'–118°21.2'E, 418–420 m, FRV *Soela*, SO0183/69, 5 Feb 1983; CSIRO CA3598 (112) Western Australia, SW of Imperieuse Reef, Rowley Shoals, 18°03.5'–17°56.7'S, 118°13.0'–118°21.2'E, 418–420 m, 'FRV *Soela*', SO0183/69, 5 February 1983; CSIRO CA3809 (91.8) Western Australia, SW of Imperieuse Reef, Rowley Shoals, 18°11.0'–18°07.0'S, 118°04.0'–118°09.0'E, 400–404 m, FRV *Soela*, SO0183/68, 5 Feb 1983; CSIRO H2106-1 (78.0) Western Australia, NE of Mermaid Reef, Rowley Shoals, 16°54'S, 120°25'E, 393 m, *Striker*, SO0588/70, 27 Sep 1988; CSIRO H2898-10 (3, 74.2–99.2) Western Australia, SW of Rowley Shoals, 18°03.8'–18°07.1'S, 118°16.3'–118°12.3'E, 357–361 m,

FRV *Southern Surveyor*, SS0491/112, 26 Sep 1991; CSIRO H2899-03 (114) Western Australia, SW of Rowley Shoals, 18°04.6'–17°59.3'S, 118°13.6'–118°19.5'E, 379–3941 m, FRV *Southern Surveyor*, SS0491/113, 27 Sep 1991; CSIRO H4031-04 (68.9) Western Australia, N of Cape Lambert, 18°58.2'–18°57.6'S, 117°12.1'–117°14.6'E, 253–248 m, FRV *Southern Surveyor*, SS0895/59, 30 August 1995; CSIRO H4031-05 (5, 50.5–58.5) Western Australia, N of Cape Lambert, 18°58.2'–18°57.6'S, 117°12.1'–117°14.6'E, 253–248 m, FRV *Southern Surveyor*, SS0895/59, 30 Aug 1995; CSIRO H4664-02 (47.9) Western Australia, Rowley Shoals area, 17°38.9'–17°37.0'S, 119°00.3'–119°00.8'E, 310 m, FRV *Southern Surveyor*, SS0797/123, 31 Aug 1997; NMNZ P.44687 (125), NMNZ P.44689 (108), same collection data as NTM S12734-005 below; NMV A29662-005\* (76.3) Western Australia, Dampier, 19°43.78'–19°43.57'S, 115°21.22'–115°20.60'E, 389–423 m, RV *Southern Surveyor*, SS05/2007/034, 12 Jun 2007; NMV A29668-022\* (92.9), same collection data as holotype; NMV A29670-009\* (86.3) Western Australia, Leveque, 14°36.52'–14°35.77'S, 121°19.77'–121° 21.20'E, 712–709 m, RV *Southern Surveyor*, SS05/2007/103, 26 Jun 2007; NMV A29703-014 (82.7) Western Australia, Leveque,

Table 2. Standard lengths and selected morphometric values expressed as percent SL for the holotype and 17 paratypes of *Hoplostethus ravurictus* n. sp.

<i>Hoplostethus ravurictus</i> n.sp.		
	holotype	paratypes
		(n=17)
Standard length (mm)	92.9	75.0-141.0
Body depth	52.5	49.2-55.0
Head length	40.3	38.2-42.2
Head height	46.2	43.5-47.6
Forehead height	5.4	3.3-6.4
Eye diameter	11.0	10.1-14.0
Postorbital length	19.2	15.2-20.9
Interorbital width	12.0	11.2-13.3
Maxillary length	28.3	26.9-30.2
Lower jaw length	29.9	27.6-30.7
Snout length	8.1	5.6-10.4
Caudal peduncle depth	12.6	11.2-13.3
Caudal peduncle length	20.6	19.4-23.6
Predorsal length	49.4	47.3-52.1
Preanal length	69.1	67.4-76.8
Prepectoral length	39.4	35.6-42.3
Prepelvic length	44.4	41.7-46.9
Pectoral Pelvic length	9.7	8.8-13.1
Pelvic Anal length	32.8	28.0-38.5
Dorsal base length	38.1	35.7-41.6
Anal base length	19.7	15.4-19.8
Pectoral fin length	31.3	28.0-32.2
Pelvic fin length	24.8	20.8-25.4
1st dorsal spine length	3.1	0.4-4.0
2nd dorsal spine length	6.7	4.3-8.4
Last dorsal spine length	14.6	12.5-18.9
1st anal spine length	1.3	0.8-1.6
Last anal spine length	10.4	7.2-12.5

14°53.48'–14°53.27'S, 121°33.92'–121°36.10'E, 285–302 m, RV *Southern Surveyor*, SS05/2007/108, 27 Jun 2007; NMV A29703-015\* (75.0), as for NMV A29703-014; NMV A29703-016 (2, 72.5–78.3), as for NMV A29703-014; NTM S12288-026 (5, 69.5–83.0), Northern Territory, Arafura Sea, E of Evans Shoal, 09°46'S, 130°14'E, 270–300 m, 15 Sep 1987, NT Fisheries; NTM S12456-001\* (85.0), Northern Territory, Arafura Sea, N of Bathurst I, 09°46'S, 130°00'E, 275 m, 7 Jul 1988, M. Sachse; NTM S12604-002 (4, 79.2–89.0), Western Australia, NW shelf, off Rowley Shoals, 17°39'S, 118°41'E, 405 m, 5 Nov 1985, W. Houston; NTM S12605-001 (99.5), Western Australia, NW shelf, off Rowley Shoals, 17°52'S, 118°27'E, 420 m, 6 Nov 1985, W. Houston; NTM S12606-012 (6, 73.2–94.9), Western Australia, NW shelf, off Rowley Shoals, 18°00'S, 118°16'E, 430 m, 6 Nov 1985, W. Houston; NTM S12610-009\* (2, 75.2–130), Western Australia, NW shelf, off Rowley Shoals, 17°52'S, 118°28'E, 415 m, 7 Nov 1985, W. Houston; NTM S12641-004 (59.0), Western Australia, NW shelf,

NW of Lynher Bank, 14°50'S, 121°35'E, 275–280 m, 15 Jul 1989, J. Baille; NTM S12694-004 (2, 68.0–87.5), Western Australia, NW shelf, off Rowley Shoals, 17°28'S, 118°53'E, 400 m, 4 Nov 1985, W. Houston; NTM S12727-009 (113), Western Australia, SW of Rowley Shoals, 17°52'S, 118°28'E, 410 m, 9 Feb 1990, D. Evans; NTM S12728-005 (3, 75.0–86.1), Western Australia, SW of Rowley Shoals, 18°01'S, 118°23'E, 420 m, 6 Feb 1990, D. Evans; NTM S12734-005\* (4, 75.3–141), Western Australia, Exmouth Plateau, 19°49'S, 113°34'E, 1020 m, 23 Feb 1990, D. Richardson; NTM S13138-004 (2, 73.0–78.5), Northern Territory, Arafura Sea, E of Evans Shoal, 09°48'S, 130°07'E, 265 m, 14 Dec 1990, D. Evans; QM I.38272\* (3, 80.5–114), same collection data as NTM S12734-005 above; USNM 393569\* (3, 78.5–121), same collection data as NTM S12734-005 above; WAM P.25401.017 (25.4), Western Australia, Rowley Shoals, Browse I, 13°47'S, 123°18'E, 242 m, 23 Dec 1969; WAM P.26209.015 (4, 43.2–70.1) Western Australia, 18°18'S, 118°08'E, 297–330 m, FV



*Courageous*, J.B. Hutchins, 20 May 1978; WAM P.30576.018 (105), Western Australia, SW of Rowley Shoals, 17°59'S, 118°18'E, 420–416 m, RV *Soela*, 27 Jan 1984, CSIRO.

*Other material*. QM I.33908 (2, 67.3–68.9), Western Australia, NNE of Dampier, 18.58°S, 117.12°E, 248–253 m; WAM P.21599.001 (2, 93.9–105), Western Australia, Rowley Shoals, 13°45'S, 123°31'E, 250 m, 23 Dec 1969.

*Diagnosis*. Pectoral fin rays 15, rarely 13, 14 or 16; abdominal scutes 13–16, rarely 10–12 and 17–20, some scutes in large individuals with multiple apical points; isthmus covered with small spinoid scales; body rectangular, depth distinctly shorter than length, 1.9–2.0 in SL; nape almost straight, forehead turning abruptly downward above upper lip; body silvery in life, buccal cavity and opercular recess pale to slightly dusky.

*Description*. (See Table 1 for frequencies of values for selected meristic characters.) Dorsal fin rays VI, 13 (V–VII, 13 or 14 = 19 or 20); anal fin rays III 9 (III, 8–10); caudal fin rays 7 + 2 + 9 + 8 + 2 + 6 (6 or 7 + 2 + 8 or 9 + 8 or 9 + 1 or 2 + 5–7); pectoral fin rays 15 (13–16); pelvic fin rays I, 6; gill rakers 6 + 1 + 12 (5–7 + 1 + 11–13 = 18–21); lateral line scales 27 (26–28); transverse scales 12/1/22 (9–12/1/20–24); predorsal scales 20 (17–22); scutes 15 (10–20); vertebrae 11 + 15 (11–12 + 14–16 = 25–27); pyloric caeca about 15 (based on NTM SI2734-005); pseudobranch 19 (16–21); branchiostegal rays 8.

(See Table 2 for comparative ranges of selected morphometric characters.) Body ovoid, distinctly longer than deep, depth 1.86–2.03 in SL. Head large, its height slightly greater than its length, 107–116% HL; upper profile in front of dorsal fin gently curved to back of head, with mostly straight forehead, and an abrupt downturn above upper lip; forehead deep, anterodorsal profile separated from above orbital rim by distance 8.4–15.7% HL; space between eyes bulging and wide, interorbital width 27.6–32.8% HL; eye of moderate size, 25.9–33.1% HL; crests of head bones strong, fine spinules on apices at skin surface; depressions between crests moderately deep; mouth reaching to below hind margin of eye (to slightly beyond in juveniles); fine denticulate teeth covering oral margins of premaxilla and dentary, extending onto lateral surfaces, palatine with narrow band of similar teeth, vomer without teeth (with or without one to several small teeth). Preopercular spine long, not quite reaching ventral-fin base. Humeral spine smaller than preopercular spine. Longest gill raker about 2/3 eye diameter; gill filaments at angle of first gill arch very short, about 1/10 eye diameter and about 1/3 length of longest filaments of pseudobranch. Body covered with adherent scales, with densely spinoid scales above lateral line and low on side, intermediate scales cycloid, at least anteriorly (all but those above pectoral-fin base spinoid in small specimens, large specimens as with holotype); isthmus covered with fine spinoid scales; center of each lateral line scale without a distinct spine; deep serrated abdominal keel formed from enlarged scales (scutes) covered laterally all but along distal edge by normal body scales, anterior-most scute and those posteriorly with more than one apical tip, appearing as additional closely juxtaposed scutes (all scutes simple in juveniles); predorsal scales on dorsal midline slightly raised (more so in small individuals), their spinules not greatly enlarged. Dorsal fin spines progressively

longer posteriorly, greatest increases in length from first to third spine; posterior spines progressively thicker with prominent lengthwise striations (rather simple in juveniles, becoming broader and striations developing with growth); soft rays distinctly longer than last spine, first few nearly twice length of last spine, outer margin of soft dorsal fin nearly straight. Pectoral fin reaching base of anterior segmented anal fin rays. Pelvic fin to just beyond middle scutes (almost reaching anus in small specimens). Pyloric caeca unbranched.

Moderately small species, largest specimen examined 141 mm SL.

Pigmentation in alcohol. Uniformly pale; buccal and branchial chambers mostly pale, dusker towards back of mouth (almost uniformly pale in small specimens), underside of tongue uniformly pale.

Colour in life. Silver with metallic sheen, narrow strip dorsally on side adjacent dorsal fin base olivaceous; fins hyaline, pectoral and caudal fins with faint reddish to brownish hue; buccal and branchial chambers creamy to yellowish grey (fig. 1).

*Etymology*. The specific name *ravurictus*, from the Latin *ravus* meaning 'greyish yellow' and *rictus* 'open mouth', in reference to the pale buccal cavity of this species, which contrasts with the black lining of the mouth found in most other species of the subgenus *H. (Hoplostethus)*.

*Distribution*. Apparently confined to tropical latitudes of western Australia between about 10° and 20°S. Occurs at slope depths between about 250 and 1000 m, most specimens in collections coming from around 400 m.

*Comments*. Species of the subgenus *H. (Hoplostethus)* are relatively conservative morphologically, the characters employed by Kotlyar (1996) to distinguish between species mostly involving subtle differences in body form, numbers of pectoral fin rays, predorsal scales, abdominal scutes, gill rakers and pyloric caeca, scale form and details of colouration. *Hoplostethus ravurictus* is unique among currently recognised species in having a yellowish grey rather than black lining of the buccal cavity and branchial region. Unlike other Australian species, it also has the isthmus fully covered with spinoid scales. Although Kotlyar failed to comment on the latter character in diagnosing species, the isthmus appears to be naked in most, the sole exception seen during the course of this study being a species that occurs off southern Japan and northern Taiwan, treated in the literature as *H. crassispinus* Kotlyar 1986 (Yamakawa, in Okamura et al., 1982; Yamakawa, in Okamura, 1985; Mok, in Shen, 1993; Hyashi, in Nakabo, 2002). *Hoplostethus ravurictus* differs from the Australian *H. gigas*, *H. intermedius* and *H. latus* also in having more numerous abdominal scutes (10–20, rarely 10–12 or 17–20, versus 8–12, rarely 11 or 12). The affinities of *H. ravurictus* with described species are not clear as it fails to share diagnostic characters with any of them. Only *H. abramovi* (southwestern Indian Ocean), *H. crassispinus* (central North Pacific) and *H. rifti* (southwestern Indian Ocean) regularly have comparable numbers of abdominal scutes. All three of these have greater numbers of pectoral fin rays than *H. ravurictus* (16, versus 15,



rarely 13, 14 or 16) and black membranes between dorsal fin spines, while the first two have a deeper body and more curved predorsal profile.

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