

New records of the abyssal grenadiers *Coryphaenoides armatus* and *C. yaquinae* from the western North Pacific

Hiromitsu Endo¹ and Osamu Okamura²

¹ Laboratory of Marine Zoology, Faculty of Fisheries,
Hokkaido University, 3-1-1 Minato-cho,
Hakodate 041, Japan

² Department of Biology, Faculty of Science,
Kochi University, 2-5-1 Akebono-cho,
Kochi 780, Japan

The abyssal grenadier, *Coryphaenoides armatus*, was first described by Hector (1875) from off New Zealand at a depth of 400 fathoms (732 m). It is known as the only cosmopolitan rattail recorded from all oceans except the Arctic (e.g., Grey, 1956; Nybelin, 1957). *C. yaquinae* is very closely related to *C. armatus*, and was confused with the latter in the eastern North Pacific until Iwamoto and Stein (1974) described it as a new species. Wilson and Waples (1983, 1984) discussed in detail the distribution, depth range, morphology, ecology, biochemical genetics and nomenclature of the two species. Both have been recorded from the Pacific Ocean except in the northwestern area. *C. armatus* is distributed vertically at depths of about 2000–4300 m and *C. yaquinae* at about 3400–5800 m (Wilson and Waples, 1983).

Our material agrees well with the descriptions of Iwamoto and Stein (1974). These are the first records of *C. armatus* (new Japanese name: Yoroiodara) and *C. yaquinae* (new Japanese name: Shinkai-yoroiodara) from the western North Pacific around the Japan trench. Moreover, the capture depth of 6380–6450 m for *C. yaquinae* is the deepest record for a macrourid.

Methods for taking meristic and morphometric data follow Hubbs and Lagler (1958) and Okamura (1970) except for the pelvic fin ray counts (i.e., total number of both sides) which follow Wilson and Waples (1984). Institutional abbreviations follow Leviton et al. (1985).

***Coryphaenoides armatus* (Hector, 1875)
(Fig. 1)**

Restricted synonymy

Macrurus armatus Hector, 1875: 81.

Nematonurus armatus: Marshall, 1973: 586, in part.

Coryphaenoides armatus: Iwamoto and Stein, 1974: 27;

McCann and McKnight, 1980: 29; Wilson and Waples, 1983: 1142 (lectotype designation for *C. variabilis*); Wilson and Waples, 1984: 227–237; Iwamoto and Sazonov, 1988: 75; Iwamoto, 1990a: 195; Iwamoto, 1990b: 205.

Material examined. 5 specimens from the western North Pacific: BSKU 35719, 35722, 35723, 488–590 mm total length (TL), 40°06.8'N, 143°58.2'E–40°04.5'N, 143°57.2'E, R.V. Hakuho-Mar, 4200–4220 m, beam trawl, 15 Jul. 1981; BSKU 37297, 37299, 640–750 mm TL, 35°50.2'N, 142°12.5'E, R. V. Bohsei-Mar, 4100 m, fish trap, 4 Nov. 1981.

Comparative materials from the eastern North Pacific (3 specimens): BSKU 44502, 270 mm TL, 44°39.6'N, 125°34.2'W, 2800 m, otter trawl, 10 Jan. 1967; BSKU 44503, 302 mm TL, 44°55.0'N, 125°35.0'W, 2706 m, beam trawl, 16 Jul. 1967; BSKU 44504, 502 mm TL, 44°57.3'N, 126°37.3'W, 2850 m, beam trawl, 19 Feb. 1971.

Diagnosis. Premaxillary teeth usually consist of two distinct rows; outer series enlarged, smaller inner one sometimes lost in large specimens. Mandibular teeth consist of one distinct row. One or two series of scales are present below the suborbital ridge and on the mandibular rami. Color in alcohol is generally dark brown, but blackish on underside of body, branchial and opercular regions, pectoral and pelvic fins, and sensory pores (in large specimens).

Counts and measurements. First dorsal fin rays (1st D) II, 9–10; pectoral rays (P₁) (18) 19–20; total pelvic rays (P₂) 20–24; gill rakers on first arch (GR) (inner) 2+10–12=12–14; gill rakers on first arch (GR) (outer) 0+7–8=7–8; scales below first dorsal origin (1DO) 7.5–8.5; scales below second dorsal origin (2DO) 8–9.5; scales below middle of first dorsal (1DM) 6–8; branchiostegal rays (BR) 6; retia mirabilia and gas gland (RM&GG) 6 (in BSKU 35719); pyloric caeca (PC) 11 (in BSKU 35719); abdominal vertebrae (AV) 14 (except BSKU 37297).

Head length (HL) 16.7–18.9 in % of TL. As % of HL; predorsal (PD) 116.3–134.7; preanal (PA) 191.5–201.3; interdorsal (ID) 50.2–85.2; body depth (BD) 81.0–107.1; first dorsal fin (1st D) 66.1–73.3; pectoral fin (P₁) 61.8–69.7; pelvic fin (P₂) 61.1–75.4; snout (S) 22.6–25.8; preoral 11.3–14.3; orbit diameter (OD) 17.7–21.1; interorbital (IO) 24.1–28.2; upper jaw (UJ) 36.0–39.5; barbel (B) 12.8–17.7; gill slit (GS) 15.2–18.8.

***Coryphaenoides yaquinae* Iwamoto and Stein, 1974
(Fig. 1)**

Coryphaenoides variabilis Günther, 1878: 27, in part.

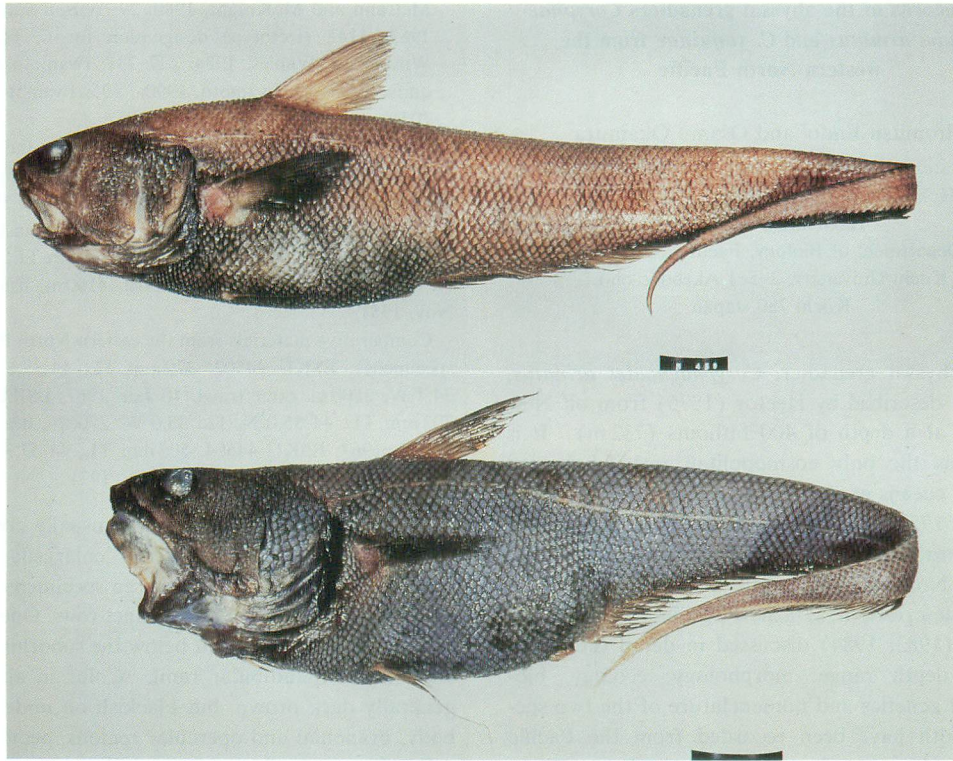


Fig. 1. *Coryphaenoides armatus* from Japan trench, BSKU 37299 (above) and *Coryphaenoides yaquinae* from Japan trench, BSKU 37300 (below).

Macrurus armatus: Günther, 1887: 150, in part.

Nematonurus armatus: Marshall, 1973: 586, in part.

Coryphaenoides yaquinae Iwamoto and Stein, 1974: 34; Wilson and Waples, 1983: 1143.

Material examined. 28 specimens from the western North Pacific: BSKU 19997–20000, 354–485 mm TL, 33° 58.5'N, 142°51.3'E, R.V. Sohyoh-Mar, 5200 m, beam trawl, 4 Jun. 1970; BSKU 35718, 35720, 35721, 349–568 mm TL, 40°06.8'N, 143°58.2'E–40°04.5'N, 143°57.2'E, R.V. Hakuho-Mar, 4200–4220 m, beam trawl, 15 Jul. 1981; BSKU 35724, 357 mm TL, 39°11.3'N, 143°54.4'E–39°13.3'N, 143°56.3'E, R.V. Hakuho-Mar, 5010–5100 m, beam trawl, 25 Jul. 1981; BSKU 35725–35730, 363–471 mm TL, 38°33.3'N, 144°19.4'E–38°35.4'N, 144°20.3'E, R.V. Hakuho-Mar, 6380–6450 m, beam trawl, 31 Jul. 1981; BSKU 35731–35737, 280–547 mm TL, 38°33.9'N, 145°15.7'E–38°35.5'N, 145°15.1'E, R.V. Hakuho-Mar, 5350–5370 m, beam trawl, 1 Aug. 1981; BSKU 37298, 37300, 37301, 480–494 mm TL, 35°50.2'N, 145°12.5'E, R.V. Bohsei-Mar, 4100 m, fish trap, 4 Nov. 1981; NSMT-P 19033, 374 mm TL, 31°10.5'N, 141°42.1'E, 5100 m, 30 Jul. 1976; BSKU 44506–44508, 258–630 mm TL, data unknown.

Comparative materials from the eastern North Pacific (4

specimens): OS uncatalogued, 212–357 mm TL, 45°01.3'N, 153°51.5'W, 5180 m, 3 m beam trawl, 19 Aug. 1976.

Diagnosis. Premaxillary teeth usually consist of two or more irregular rows, outer series much enlarged. Mandibular teeth consist of two irregular rows near symphysis, and of one distinct row posteriorly. Scale rows below suborbital ridge and on mandibular rami (present in *C. armatus*) are usually absent in this species. Color in alcohol is blackish, grayish brown to grayish blue generally.

Counts and Measurements. 1st D. II, 8–9(10); P₁. 19–21; P₂. (19)20(22); GR. (inner) 1–2+9–11=11–13; GR. (outer) 0+7–9=7–9; scales 1DO 7.5–9; 2DO. 7.5–9.5; 1DM. (5)6–8; BR. 6; RM&GG. 6 (in BSKU 35725, 35733); PC. 10–11 (in BSKU 35725, 35733); AV 13–14.

HL. 17.8–21.5 in % of TL. As % of HL: PD. 101.7–122.3; PA. 153.0–201.3; ID. 36.8–61.0; BD. 74.2–104.3; 1st D. 60.8–78.4; P 1. 56.3–76.3; P 2. 51.1–94.0; S. 24.8–31.4; PO. 9.5–17.8; OD. 16.3–22.8; IO. 18.3–28.4; UJ. 36.0–52.7; B. 9.8–22.8; GS. 10.0–23.2.

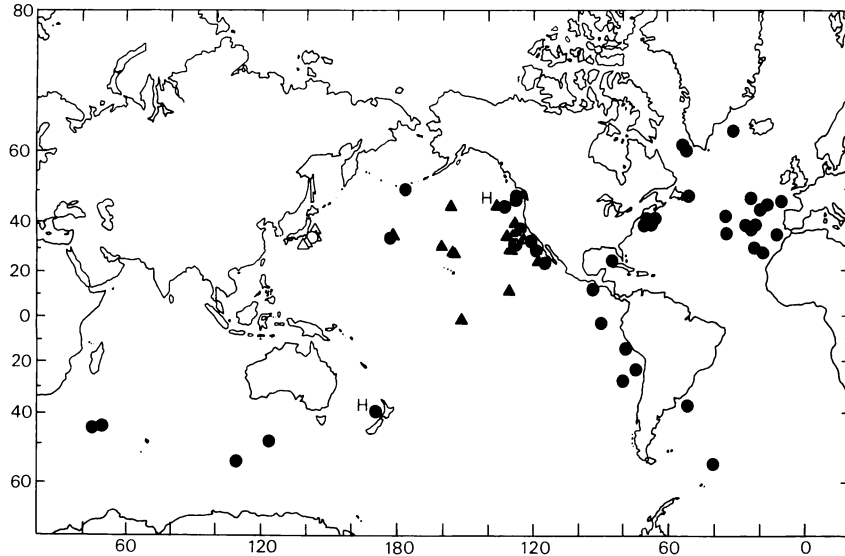


Fig. 2. Distribution of *Coryphaenoides armatus* and *C. yaquinae*. For *C. armatus*, filled circles are literature records from Hector (1875), Nybelin (1957), Wilson and Waples (1983, 1984); open circles are our specimens. For *C. yaquinae*, filled triangles are literature records from Iwamoto and Stein (1974) and Wilson and Waples (1983); open triangles are our specimens. Type localities for the two species are shown by H.

Discussion

Iwamoto and Stein (1974) noted differences between *C. armatus* and *C. yaquinae* in dentition, squamation and coloration. Regarding squamation, differences were found in the morphology of body scales and the developmental degree of naked areas on the anterolateral regions of the snout. However, Wilson and Waples (1983) pointed out the existence of wide variation in squamation features, and additionally showed electrophoretic differences between the two species. For meristic and morphological characters (except dentition), we also found overlap of character ranges and much variation in the North Pacific specimens. The premaxillary and mandibular dentition patterns are here regarded as the only reliable morphological characters for distinguishing between the species. We newly examined the character of scales below the suborbital ridge and on the mandibular rami: one or two series of scales are present in both regions in *C. armatus*, but generally absent in *C. yaquinae*. Although this character showed a few exceptions in the western North Pacific specimens of *C. yaquinae*, we used it and dentition pattern to distinguish the two species.

Wilson and Waples (1984) subdivided *C. armatus* into two subspecies, *C. a. variabilis* (Günther, 1878) from the central and eastern North Pacific and *C. a. armatus* (Hector, 1875) from all other areas, based on the interorbital width, interdorsal space, number of first dorsal fin rays and total number of pelvic fin rays (Iwamoto and Sazonov (1988) and Iwamoto (1990a) confused the pelvic count with the pectoral ones). As to the morphometric and meristic differences between the two subspecies of *C. armatus*, our five specimens from the western North Pacific showed the following numerical values, respectively; IO (24.1, 26.5, 27.3, 28.0, 28.2 in % of HL), ID (50.2, 52.2, 71.3, 73.8, 85.2 in % of HL), 1st D (II, 9, 9, 10, 10, 10) and P₂ (10/10, 11/11, 12/12, 12/12, 12/12). Comparing with Wilson and Waples (1984), at least, the two proportions of our materials are close to *C. a. armatus*, whereas the total number of pelvic fin rays are close to *C. a. variabilis*. Though the differences between *C. a. armatus* (southeastern Pacific specimens) and *C. a. variabilis* in coloration were noted by Iwamoto and Sazonov (1988), our specimens have blackish pectoral and pelvic fins (as in *C. a. variabilis*) and brown first dorsal and anal fins (as in *C. a. armatus*) (Fig. 1).

In the Pacific Ocean, *C. armatus* has been record-

ed from off New Zealand (type locality), off the coasts of North and South America, and from the central part of the North Pacific basin atop a submarine plateau. According to the present record from off Japan, *C. armatus* may occur in all areas of the Pacific Ocean within its depth range (Fig. 2). On the other hand, the distribution of *C. yaquinae* may be restricted to the North Pacific Ocean except for "Challenger" station 271 (0°33'S) in the equatorial mid-Pacific (Iwamoto and Stein, 1974; Wilson and Waples, 1983) (Fig. 2).

In the western North Pacific, *C. armatus* was caught between the depths of about 4100 m and 4200–4220 m, and *C. yaquinae* between 4100 m and 6450 m. Although the two species partly overlap in their vertical distributions, they seem to segregate by depth: *C. armatus* is an inhabitant of shallower waters than *C. yaquinae*. Iwamoto and Sazonov (1988) mentioned that the grenadiers collected by fish trap at the depth of 6160 m from off Japan in Horibe (1982) were probably *C. yaquinae*. Our data support their presumption. If waters shallower than 4100 m are more thoroughly explored, the upper limits and range of overlap of their vertical distributions should be revealed.

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ソコダラ科のヨロイダラ(新称)とシンカイヨロイダラ
(新称)の西部北太平洋からの初記録

遠藤広光・岡村 収

日本海溝付近の深海底、水深 4100-6450 m においてビームトロールおよびフィッシュトラップにより採集されたソコダラ科のホカケダラ属は、Iwamoto and Stein (1974) による両顎の歯列の形態学的差異などにに基づき、*Coryphaenoides armatus* と *C. yaquinae* の 2 種に同定された。さらに両種は頭部下面と下顎下面の鱗の有無により、かなり明瞭に分けられることが新たに判明した。両種が西部北太平洋から報告されるのはこれが初めて

である。*C. armatus* は北極海を除くすべての大洋に分布し、通常水深約 2000-4000 m に生息する。一方 *C. yaquinae* は主に北太平洋に分布し、その生息水深は *C. armatus* よりやや深く通常約 3400-5800 m であり、両種の間には水深によるある程度のすみわけが見られる。本報告により、西部北太平洋においても両種のすみわけが推測された。なお、*C. yaquinae* の採捕水深 6450 m は、これまで報告されたソコダラ科魚類の中では最深記録である。加えて、*C. armatus* は Wilson and Waples (1984) により 2 亜種に分けられたが、本海域のものは両亜種の間接的形質をもつことが明らかとなった。

C. armatus に対して新和名ヨロイダラを、*C. yaquinae* に対しては新和名シンカイヨロイダラを提唱する。

(遠藤: 041 函館市港町 3-1-1 北海道大学水産学部水産動物学講座; 岡村: 780 高知市曙町 2-5-1 高知大学理学部生物学科)