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*CORYPHAENOIDES DELSOLARI*, A NEW SPECIES  
OF MACROURID FISH FROM THE PACIFIC COAST  
OF SOUTH AMERICA

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INTRODUCTION

Chirichigno-Fonseca (1968:418-421, fig. 13) described and illustrated an unusual 454 mm specimen of Macrouridae that was collected in about 300 m off the coast of Callao, Peru. The specimen had fine scale spinules that were tridentate at the tip, a condition previously unknown in macrourids. Although Chirichigno-Fonseca suspected that it represented an undescribed species, the uncertain taxonomic status of the specimen led her to list the species as "*Nematonurus* sp. aff. *altipinnis* Günther." In a later publication (1974) she listed the species as *Coryphaenoides* nov. sp. Subsequently, Iwamoto, who has been involved in a systematic review of all eastern Pacific Macrouridae, discovered many other specimens of the species in several United States museums. This distinctive new species is herein described.

METHODS

Methods for making counts and taking measurements generally follow procedures outlined by Hubbs and Lagler (1958) and modifications for macrourids by Gilbert and Hubbs (1916) and Iwamoto (1970). Head length (HL) is used for comparing most morphometric features, as opposed to the more commonly used standard length and total length (TL) which, in macrourids, are generally unsuitable because of the frequent loss of parts of the attenuated tail tip. A plus sign (+) in front of total length measurements indicates that part of the tail tip is missing.

Dorsal fin ray counts include all rays; the last ray is not split and we do not follow the procedure of counting the last two rays as one. Pectoral fin ray counts include the short, splintlike uppermost ray, which is usually closely appressed to the much longer adjacent ray. Vertebral numbers were counted from radiographs.

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Mr. J. E. Gordon made radiographs of the new species and Mrs. K. P. Smith drew the illustrations.

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#### ***Coryphaenoides delsolari*, new species**

FIGURE 1-3

*Nematonurus* sp. aff. *altipinnis*: Chirichigno-Fonseca; 1968:418-421, fig. 13 [descr.; illus.]; 1969:37, fig. 81 [listed].

*Coryphaenoides* nov. sp. Chirichigno-Fonseca, 1974:315, figs. 622-624 [in key].

*Holotype*: USNM 215278 (87 mm HL, +390 mm TL), off Ecuador, 03°15'S, 80°55'W, 945-960 m, 72-ft otter trawl, 10 Sept. 1966, ANTON BRUN Cruise 18B, Sta. 770.

*Paratypes* (36 specimens, 23-107 mm HL, +92-510 mm TL): Cocos Is., 97 km S: AMNH 7514 (1, 61 HL, +250 TL), 04°50'N, 87°00'W, 940-1646 m, 25 May 1925, ARCTURUS Sta. 74. Galápagos Is.: USNM 135922 (1, 84, +360), 19 km E of Hood Is., 01°35'S, 89°30'W, 1158 m, 7 Nov. 1904, ALBATROSS Sta. 4641. CAS 34288 (1, 23, 115), 27 km

SSE of Isla San Cristóbal, 01°06'S, 89°22'W, 700–800 m, 12 Aug. 1968, TE VEGA Cruise 19, Sta. 102. Ecuador: IMARPE 66-2222 (1, 72, +310), MCZ 51524 (1, 72, +345), and CAS 34289 (8, 40–107, 182–510), capture data same as holotype. Peru: USNM 150187 (1, 81, 375), Point Aguja, 05°47'S, 81°24'W, 980 m, beam trawl, 12 Nov. 1904, ALBATROSS Sta. 4653. LACM 33876 (2, 93–101, +350–+400), near Lobos de Afuera Is., 07°07'S, 80°46'W, 1200 m, beam trawl, 20 Jan. 1974, Cruise 7401, Sta. SNPI-13. IMARPE 74-2218 (3, 69–91, 294–388), 07°07'S, 80°46'W, 1200 m, modified Agassiz trawl, 20 Jan. 1974, E. del Solar. CAS 34290 (4, 38–58, +140–+225), IMARPE 66-2221 (1, 49, +180), 07°49'S, 80°38'W, 605–735 m, otter trawl, 5 Sept. 1966, ANTON BRUUN Cruise 18B, Sta. 754. IMARPE 71-982 (1, 85, 396), 10°00.5'S, 79°11'W, 800 m, modified Agassiz trawl, May 1971, Juan Vélez. IMARPE 71-932 (2, 58–66, 245–286), 10°51.8'S, 78°30.7'W, 800 m, modified Agassiz trawl, 15 May 1971, Juan Vélez. IMARPE 58-981 (1, 93, 454), off Callao, 300 m, 1958, Martínez. CAS 28765 (1, 27, +107), 13°S, 76°W, 700–704 m, 25 Jan. 1972. IMARPE 72-977 (1, 89, 385), 13°57.2'S, 76°42'W, 600 m, 7 Aug. 1972, M. Méndez. CAS 28766 (1, 26, +92), 17°43'S, 71°42.5'W, 650 m, 27 Jan. 1972. CAS 28767 (1, 92, +267) and IMARPE 72-2220 (1, 81, 375), 18°10'S, 71°29'W, 610 m, 21 Aug. 1972, M. Méndez. Chile: CAS 34291 (2, 36–38, 165–165), 32°17'S, 71°39.5'W, 580 m, 72-ft otter trawl, 11 Aug. 1966, ANTON BRUUN Cruise 18A, Sta. 702. CAS 34292 (1, 39, 187), 32°08.5'S, 71°43'W, 960 m, 72-ft otter trawl, 12 Aug. 1966, ANTON BRUUN Cruise 18A, Sta. 703.

*Diagnosis:* A species of *Coryphaenoides* (subgenus *Coryphaenoides*) with head and body scales densely covered with fine, relatively erect spinules, most with multipronged, usually tridentate, tips (Fig. 2) in adult specimens larger than 50 mm in head length. Almost all of head and body uniformly scaled, including essentially all of snout, suborbital region and rami of lower jaws, but not including the exposed surface of the interopercle and the branchiostegal membrane. Pelvic rays 9–10 (rarely 11). Medial gill rakers on first (outermost) arch 1–2 + 9–12 (11–14 total); on second arch 1–2 + 9–11 (10–13 total). Mouth moderate in size; upper jaw 2.4–2.9 into head. Orbits large, 2.9–3.4 into head, 0.9–1.1 into interorbital space. Barbel short and very thin, usually 4 or more into orbit diameter, more than 10 into head. Teeth small, in moderately broad band in upper jaw with outer series slightly enlarged; in narrow band on lower jaw (band broader at symphysis).

*Counts and measurements:* Fin ray and gill raker counts are tabulated in Table 1. Total length of specimens examined +92–510 mm; head length 23–107 mm. The following measurements are in percent of head length: postrostral length of head 70–79; snout length 26–32 (38 in smallest juvenile); preoral length 13–24; width between supranarial ridges 20–25; orbit diameter 23–34; interorbital width 23–32; postorbital length of head 38–50; distance orbit to angle of preopercle 42–50; suborbital width 12–17; upper jaw length 35–41; preanal length 128–164; distance outer pelvic ray to anal origin 28–53; distance isthmus to anal

TABLE 1. Frequency distributions of selected meristic characters of *Coryphaenoides delsolari*.

	9	10	11	12	13	14	$\bar{x}$
First dorsal fin rays	—	5	19	4	1	—	11.03
Pelvic fin rays*	30	27	1	—	—	—	9.50
Medial gill rakers on:							
first arch	—	—	5	17	5	1	12.07
second arch	—	2	15	11	—	—	11.32
	19	20	21	22	23	24	$\bar{x}$
Pectoral fin rays*	1	6	10	13	20	5	22.09

\* Fin ray counts (doubled) taken from fins of both sides.

origin 60–91; greatest body depth 58–87; depth over anal origin 44–70; interspace between first and second dorsal fins 13–45; height first dorsal fin 50–66; length pectoral fin 53–67; length pelvic fin 38–57; length barbel 3–10 (usually 4–6); length first (outer) gill slit 11–17.

#### DESCRIPTION

*General features:* The head of *Coryphaenoides delsolari* (Fig. 1) is large, deep, and relatively broad in juveniles but somewhat more laterally compressed in adults. Snout strongly pointed in juveniles but becomes blunt in adults; its dorsal median ridge with a high arch giving characteristic profile to snout in both young and adult. This median snout ridge enters into interorbital space leaving a shallow trough on either side. Interorbital space is broad; its width shorter than orbit diameter in young but greater than orbit diameter in large adults. Suborbital region relatively flat, but broad, bony, shelflike upper portion distinctly set off from soft, nonbony lower portion. Posterior (vertical) and ventral (horizontal) margins of preoperculum form a broadly acute angle; ridges on bone form a prominent lobe at their angle. Interopercle exposed posteriorly as a triangular tab. Mouth large; opening little restricted laterally and extends posteriorly almost under anterior edge of pupil. Maxillary extends posteriad to below posterior half of orbit. Barbel very thin and short; its length goes 2 to 3 times into suborbital width, only slightly greater than length of posterior nostril. Opercular opening relatively wide, with gill membranes broadly attached to isthmus and free posterior fold over isthmus virtually lacking. Five to 7 padlike lateral gill rakers of first arch visible through short outer gill slit. Rakers on medial side of arch more tubercular in shape, with 1–2 on the upper limb and 9–12 on the lower limb (total rakers 11–14). Raker count on

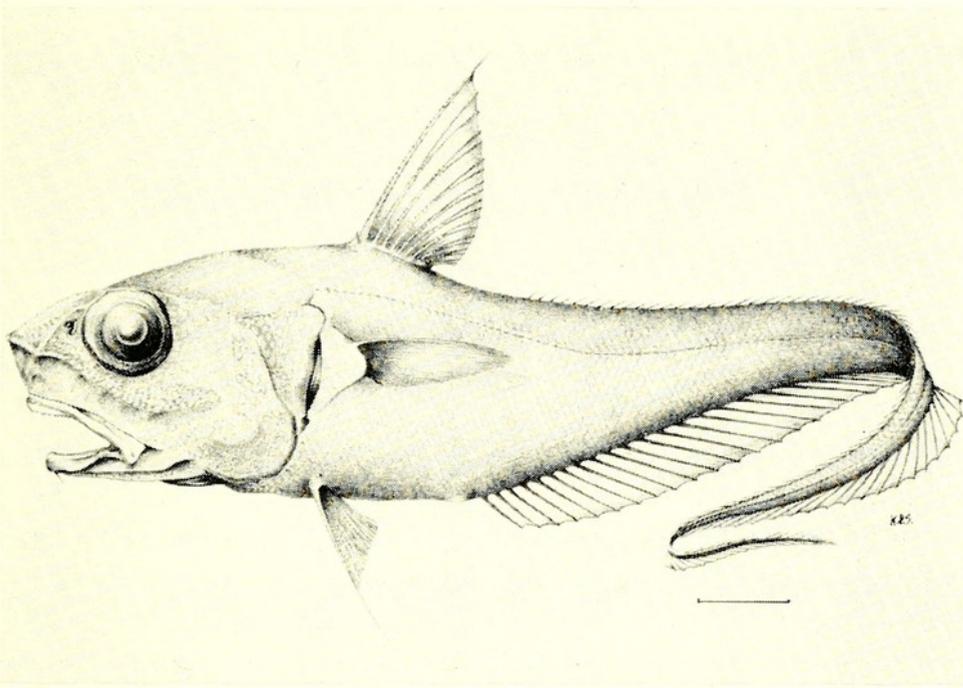


FIG. 1. Holotype of *Coryphaenoides delsolari* Chirichigno and Iwamoto, USNM 215278, 87 mm in head length, from off Ecuador in 945–960 m. Scale represents 25 mm. Drawn by Katherine P. Smith.

medial side of second arch 1–2 + 9–11 (10–13 total). Twelve precaudal vertebrae counted (by radiographs) in 2 specimens.

*Fins:* First dorsal fin rather low; its greatest height much less than postrostral length of head. First spinous dorsal ray spikelike; second elongated, with small, closely set teeth along leading edge. Midbase of pectoral fin about on midlateral line; length of fin more than half head length. Pelvic fin rather small, with outer ray prolonged into filamentous tip extending slightly beyond anal fin origin.

*Teeth:* Upper jaw teeth small, arranged in a broad band, with a slightly enlarged outer series. Lower jaw teeth very small, in a narrow band.

*Squamation:* Almost all parts of head and body uniformly scaled. All of snout and suborbital region scaled except narrow strip along ventral margins. Rami of lower jaw scaled. Gular membrane of large (445 mm TL) specimen (CAS 34289) with median patch of small, deciduous, spinulated scales; membrane naked in all other specimens. Branchiostegal membrane, exposed portion of interopercle, and shoulder girdle beneath gill covers naked. Scales on trunk and tail densely covered with slender, relatively erect spinules arranged in irregularly divergent rows. In large specimens (greater than about 80 mm HL), most scales have narrow, lanceolate spinules with tridentate or multipronged (as many as 5) tips (Fig. 2). In smaller specimens (50–80 mm HL) tridentate

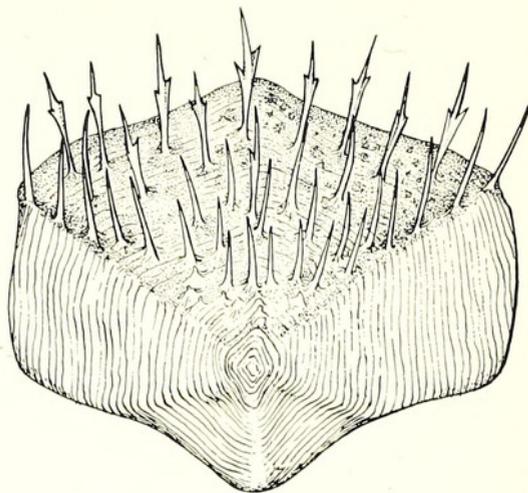


FIG. 2. Scale of *Coryphaenoides delsolari* from flank below the interspace between the first and second dorsal fins. Drawn by Katherine P. Smith.

spinules sparse but developed to various degrees. In even smaller specimens (less than 50 mm HL), spinules few, conical, and with slender, sharp, recurved tips. Well-developed terminal scute, and 2 less developed lateral scutes on snout. Scales dorsally on suborbital region deeply embedded and somewhat more coarsely spinulated than those ventrally. Scale rows (including the small ones at the base of the first spinous ray) below origin of first dorsal fin 8–12,  $4\frac{1}{2}$ –8 rows below middle of fin, and 6–9 rows below origin of second dorsal fin. Lateral line scales 36–44 counted posteriad from shoulder girdle over distance equal to pre-dorsal length.

*Alimentary canal:* The configuration of the alimentary canal (Fig. 3) agrees with that of *Coryphaenoides nasutus*, as figured by Okamura (1970:Fig. 63C), except that relatively few of the 11–14 short pyloric caeca are directed antieriad (supposedly characteristic of the subgenus *Coryphaenoides*)—most are directed posteriad.

*Gas bladder:* The large gas bladder is filled with spongy lipoidal matter that is characteristic of many macrourids. A well-developed oval area is situated dorsally. There are 4 long, slender retia (in a multiply coiled or looped arrangement), each connected to a small, peltate gas gland.

*Color in alcohol:* The overall ground color of medium to large individuals is dark brown, while the fins, gill membranes, and lips are brownish black. Linings of the oral, buccal, branchial, and abdominal cavities are blackish. Young individuals are generally paler in color than adults.

*Etymology:* The species is named in honor of Dr. Enrique del Solar in recognition of his numerous contributions to Peruvian ichthyology.

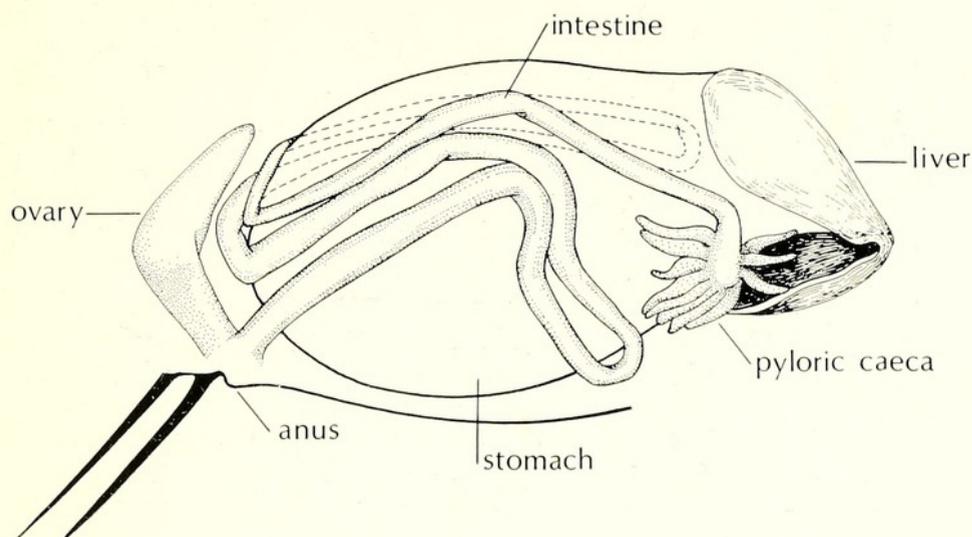


FIG. 3. Diagrammatic illustration of alimentary canal of *Coryphaenoides delsolari* showing coiling pattern of intestine and positions of certain organs. Drawn by Katherine P. Smith.

#### COMPARISONS AND RELATIONSHIPS

*Coryphaenoides delsolari* appears to be most closely related to *Coryphaenoides altipinnis* Günther, 1877, a species found off Japan known only from the holotype (the two small 6-inch specimens of the type series mentioned by Günther (1887:139) represent a species of *Nezumia*). We have not examined the holotype of *C. altipinnis* but from Günther's excellent illustration we note several distinct differences between that species and *C. delsolari*. *C. altipinnis* appears to have: (1) a larger barbel that enters about 1.2 times into the suborbital width compared with about 3 in *delsolari*; (2) a narrower suborbital region (about 2.5 into orbit compared with about 1.8 in *delsolari*); (3) a larger posterior nostril (length about 1.2 into suborbital compared with about 3 in *delsolari*); and (4) the scale spinules lack multipronged tips, appearing coarser, situated in distinct radiating, ridgelike rows, especially on the opercle, in contrast to the finer spinules not in distinct ridgelike rows in *delsolari*. *C. altipinnis* also appears to have a narrower suborbital shelf and a lower pectoral fin, the upper edge of which lies below the midlateral line, in contrast to well above the midlateral line in *delsolari*.

*C. delsolari* also resembles the Philippine species *C. orthogrammus* (Smith and Radcliffe, 1912) in many features, but *orthogrammus* has a more pointed snout, which is naked ventrally, and it lacks the peculiar tridentate scale spinules of *delsolari*.

Of the eastern Pacific species of macrourids, *C. delsolari* is likely to be confused only with *C. bucephalus* (Garman, 1899) with which it shares a generally similar physiognomy, dentition, and fin ray counts,

The new species can be readily distinguished from *bucephalus* by its higher gill raker count (11–14 total on medial side of first arch, compared with 9–10 in *bucephalus*), its much shorter barbel (more than 10 in head compared with less than 10 in head in *bucephalus*), its longer outer gill slit (11–17 percent of head length compared with 8–9 percent in *bucephalus*), and its distinctive scale spinules.

*C. delsolari* is readily distinguished from other members of the genus found off Peru and nearby waters by its distinctive scale spinules and the following: from *C. carminifer* (Garman, 1899) and *C. acrolepis* (Bean, 1884) by its higher pelvic fin ray count and shorter barbel; from *C. ariommus* Gilbert and Thompson, 1916, by its wider outer gill slit, more numerous gill rakers, and longer upper jaw; from *C. armatus* (Hector, 1875) by its dentition, larger orbit, shorter barbel, and more broadly scaled snout; from *C. capito* (Garman, 1899) (*Macrurus leucophaeus* Garman, 1899 and *M. boops* Garman, 1899 are probably synonyms) by its less restricted mouth (opening extends to anterior edge of orbit in *capito*, to pupil in *delsolari*), broader interorbital space (14–21 percent HL in *capito*), and longer, more lobate preopercle (distance orbit to angle of preopercle 31–35 percent HL in *capito*); from *C. fernandezianus* (Günther, 1887) by its more widely scaled snout and its dentition; from *C. liraticeps* (Garman, 1899) (*Macrurus anguliceps* Garman, 1899 and *M. latinatus* Garman, 1899 are probably synonyms) by its wider outer gill slit, more numerous gill rakers, longer upper jaw, and more numerous pelvic fin rays.

#### DISTRIBUTION

The species is known from collections made on the Cocos Ridge, 97 km south of Cocos Is., off the Galapagos, off Ecuador, and southward through Peru to central Chile at latitude 32° south, in depths of 580–1200 m.

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