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New and Rare Species of the Genus *Careproctus* (Liparididae) from the Bering Sea

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Abstract Five species of liparidid fishes, *Careproctus canus* sp. nov., *C. zachirus* sp. nov., *C. simus*, *C. bowersianus* and *C. pycnosoma*, are described or redescribed from the Bering Sea. *C. canus* is distinguished by its trilobed teeth, gill opening wholly located above pectoral fin, 18–24 pyloric caeca, pale peritoneum and stomach, absence of postocular pore, and one suprabranchial pore. *C. zachirus* is characterized by its long upper pectoral fin lobe, 28–31 pectoral and 11 caudal fin rays, one suprabranchial pore, and coloration of each fin. Second records of *C. bowersianus*, *C. simus* and *C. pycnosoma* are reported. *C. pycnosoma* described here is the first record from the Bering Sea.

The genus *Careproctus* is mainly characterized by having a ventral perfect disk and a pair of nostrils, and no barbels on the snout and no color blotches on sides of body. It is one of the largest genera of the family Liparididae, and includes about 50 nominal species from the North Pacific Ocean, Okhotsk and Bering seas. Most species of the genus from the Bering Sea were described by Gilbert (1895) and Gilbert and Burke (1912a). They described 12 species from the Bering Sea, 9 of which they described as new. Burke (1930) extensively reviewed liparidid fishes but his descriptions of deep water liparidids were inadequate because few specimens of each species were known at that time.

In the summer of 1977–1981, during the ground fish survey made by Japan Fisheries Agency in the Bering Sea and the waters around the Aleutian Islands, five rare species of the genus were captured by otter trawl from 244 to 800 m depths. The purpose of this paper is to describe two new species and to redescribe the remaining species.

Methods and materials

Counts, measurements, and terminology follow Stein (1978) except that rays of the lower pectoral fin lobe are counted from the anteriormost ray to the longest ray, and that both pectoral fin rays are counted. The cephalic pore formula lists the number of pores in each series in the following order: nasal, maxillary, mandibular, and suprabranchial series. Their terminology and locations are shown in Fig. 1. Counts of vertical fin rays and vertebrae are based on radiographs.

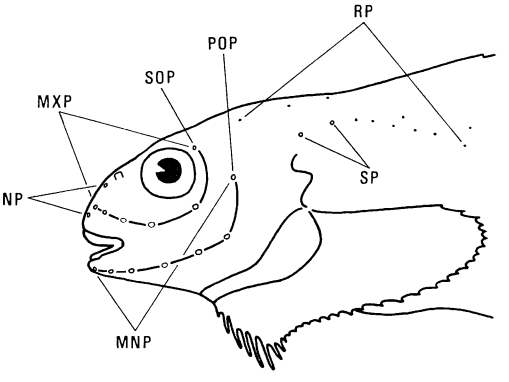

Fig. 1. Diagram showing the arrangement of cephalic and rudimentary pore series on a typical liparidid fish. MNP, mandibular pore; MXP, maxillary pore; NP, nasal pore; POP, postocular pore; RP, rudimentary pore; SOP, supraocular pore; SP, suprabranchial pore.

Abbreviations of depositories of specimens are: FRSKU: Fisheries Research Station, Kyoto University, Maizuru; HUMZ: Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University, Hakodate; USNM: United States National Museum of Natural History, Washington, D.C.

Careproctus canus sp. nov.

(Figs. 2, 3a)

Holotype. HUMZ 88339, female, 154 mm SL,

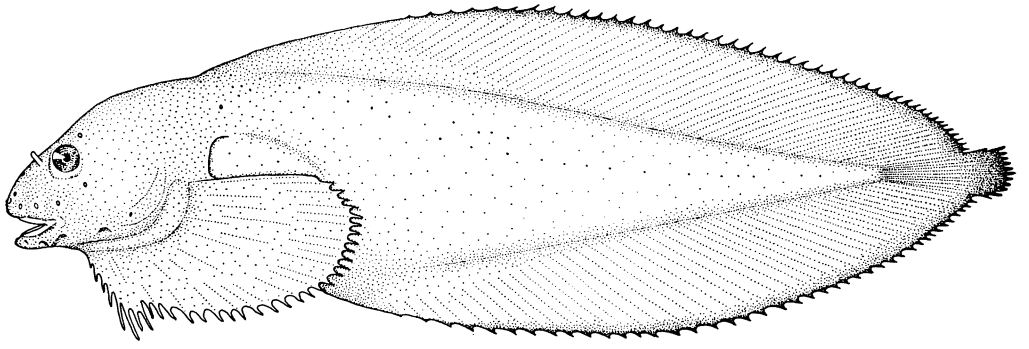

Fig. 2. *Careproctus canus* sp. nov., holotype, HUMZ 88339, 154 mm SL, from near Unalga Island, Aleutian Islands.

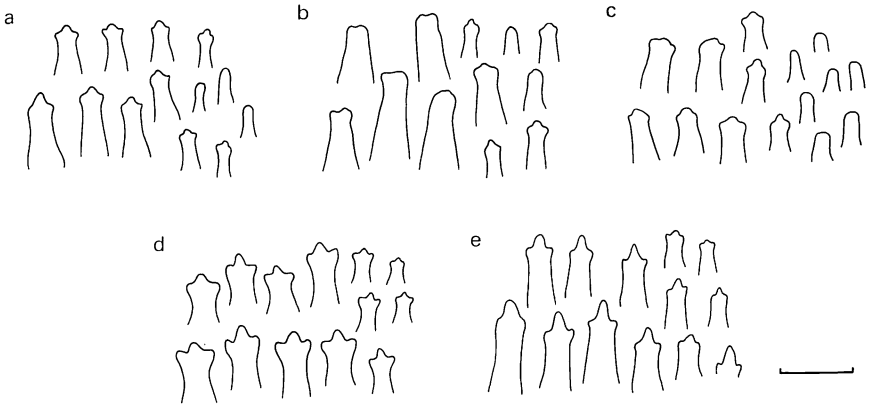

Fig. 3. Diagram showing the shape of premaxillary teeth in five *Careproctus* species. a, *Careproctus canus* sp. nov. (paratype, HUMZ 88659); b, *C. zachirus* sp. nov. (paratype, HUMZ 88658); c, *C. sinus* (HUMZ 88522); d, *C. bowersianus* (HUMZ 88486); e, *C. pycnosoma* (HUMZ 88509). Scale indicates 0.5 mm.

51°35.1′N, 179°21.6′W, near Unalga Island, Aleutian Islands, depth 300–350 m, 7 July 1980.

Paratypes. 6 specimens: HUMZ 88703, male, 159 mm SL, 52°16.4′N, 175°52.5′E, near Buldir Island, Aleutian Islands, 244–264 m, 13 Aug. 1980; HUMZ 88659, female, 131 mm SL, 51°31.8′N, 179°45.2′E, near Amchitka Island, Aleutian Islands, 351–434 m, 8 Aug. 1980; HUMZ 88783–88786, 1 female and 3 males, 73–110 mm SL, 52°54.1′N, 179°50.4′E, between Medni and Attu Islands, Aleutian Islands, 386–400 m, 20 Aug. 1980. Collection localities are shown in Fig. 4.

Diagnosis. A *Careproctus* with trilobed teeth; gill opening wholly above pectoral fin; pyloric caeca 18–24; peritoneum and stomach pale; postocular pore absent; suprabranchial pore 1.

Description. Data for the holotype are followed by those for the paratypes.

Counts: Dorsal fin rays 53 (51–53), anal fin rays 45 (43–46), pectoral fin rays 36 (33–36), caudal fin rays 11 (11), vertebrae 11+47=58 (11–12+44–47=55–58), pyloric caeca 23(18–24), cephalic pores 2-6-6-1.

Morphometry: Head length 23.8 (22.4–27.7)% SL, body depth 23.2 (19.9–24.3), head width 12.6 (11.7–14.0); snout length 32.6 (29.1–33.3)% HL, eye diameter 14.1 (12.5–13.2), interorbital width 27.4 (26.5–31.8), upper jaw length 37.5 (39.3–42.4), lower jaw length 34.5 (35.0–41.1), upper pectoral fin lobe length 87.8 (74.3–99.1), lower pectoral fin lobe length 46.7 (40.9–60.3), gill opening length 16.6 (13.0–19.9), snout to disk length 53.0 (53.1–62.2), snout to anus length 89.4 (83.2–108.9), mandible to disk

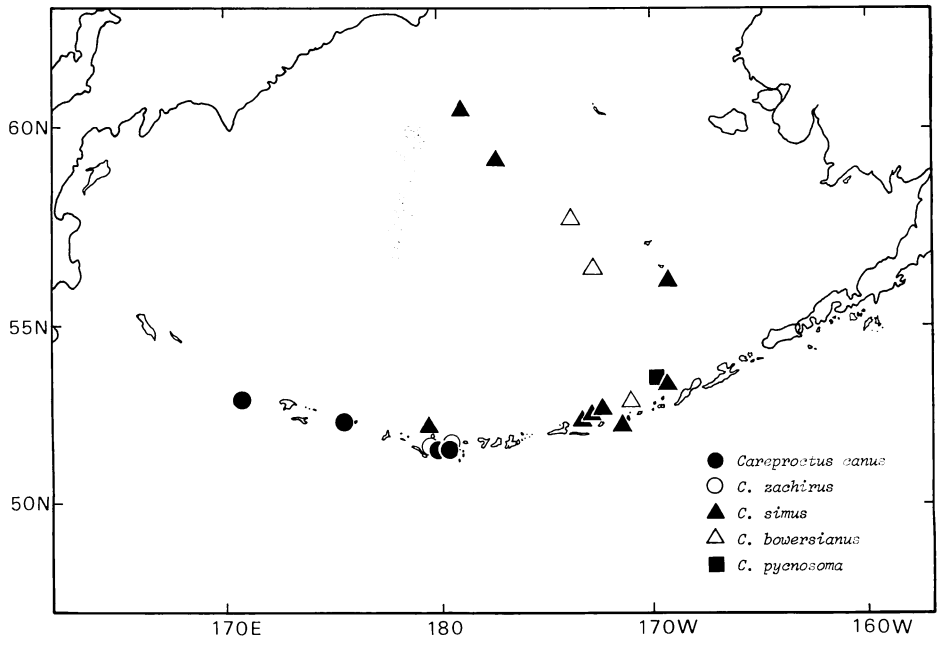

Fig. 4. Map showing collection localities of five *Careproctus* species.

length 44.8 (42.6–58.0), mandible to anus length 82.9 (76.5–105.8), disk to anus length 9.0 (0–7.8), disk length 25.0 (20.5–33.0).

Body deep, compressed. Skin smooth, lacking prickles. Gelatinous tissue thick beneath skin. Rudimentary pores present, forming three rows on each side of body: upper row extending from nape to origin of dorsal fin; middle row only above anterior curve of lateral line; lower row forming lateral line from behind suprabranchial pore to caudal fin.

Head compressed; its upper profile descending steeply from occiput to snout. Snout slightly projecting. Nostril single, in a prominent tube almost one half of eye diameter, on a level with pupil. Eye small. Mouth horizontal; maxillary reaching below posterior margin of pupil. Teeth somewhat long, trilobed with lateral lobes well developed (Fig. 3a), arranged in wide bands composed of 12 (11–14) rows on upper jaw and 13 (13–14) rows on lower jaw. Outer teeth simple or trilobed, smaller than the inner. Maxillary and mandibular pores sunk in pits: supraocular pore not reduced; postocular pore absent. Anteriormost pair of mandibular pores having a common opening. Gill opening wholly above pectoral fin: opercular flap lacking.

Pectoral fin very shallowly notched. Uppermost pectoral fin ray almost on a level with lower margin of orbit. Upper pectoral fin lobe reaching origin of anal fin. Lower pectoral fin lobe short with 5 (5–6) rays, reaching slightly behind anus. Symphysis of lower pectoral fin lobe below posterior margin of eye. Dorsal fin origin slightly anterior to a vertical through gill opening. Anal fin origin below 10th (8th–10th) dorsal fin ray. Anterior rays of dorsal and anal fins buried in gelatinous subcutaneous layer; tips of remaining rays free. Dorsal and anal fin rays relatively long. Caudal fin round, broad, continuous with dorsal and anal fins for about two-thirds of its length without notches at union; its rays having free tips.

Disk round, flat with broad margin. Anus immediately behind disk, located anteriorly to gill opening (anus with a short and conical genital papilla in males; HUMZ 88703, 88783, and 88786).

Stomach and pyloric caeca located on left side of body cavity. Stomach moderately large. Pyloric caeca long, slender, and pointed.

Body color when fresh gray, transparent; posterior margin of dorsal, anal, and caudal fins dark. In alcohol body color the same as fresh

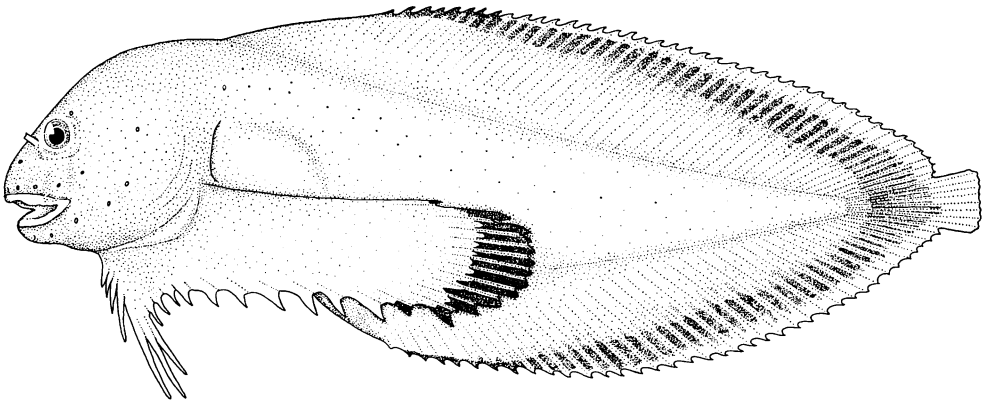

Fig. 5. *Careproctus zachirus* sp. no., holotype, HUMZ 88338, 252 mm SL, from near Unalga Island, Aleutian Islands.

specimens; oral and gill cavities, peritoneum, stomach, and pyloric caeca pale.

Distribution. Off the western Aleutian Islands at depths of 244 to 434 m.

Remarks. This species is very similar to *C. segaliensis* Gilbert et Burke, known from the southern Okhotsk Sea, and *C. sinensis* Gilbert et Burke, known from the Japan Sea, in having a deep and compressed body, trilobed teeth, gill opening wholly located above pectoral fin, and one suprabranchial pore. A radiograph of the holotype of *C. segaliensis* (USNM 73336) shows that it has 61 dorsal, 53 anal, and 6 caudal fin rays and 66 vertebrae. Therefore, *C. canus* is clearly separable from *C. segaliensis* in having much fewer dorsal and anal fin rays and vertebrae, and more pectoral (25 in *C. segaliensis*) (Gilbert and Burke, 1912b) and caudal fin rays (10). Burke (1930) reported that *C. sinensis* had 5 maxillary and 6 mandibular pores. However, my re-examination of the holotype of *C. sinensis* (USNM 73339) reveals that it has 6 maxillary and 7 mandibular pores. Because the number of cephalic pores is species specific, *C. canus* is distinct from *C. sinensis* in having a different number of mandibular pores. Furthermore, *C. canus* differs from *C. sinensis* in having fewer anal (47 in *C. sinensis*) and more caudal fin rays.

Most *Careproctus* species found in shallower waters than about 500 m have pink or red body color (Rass, 1964). Although this species is captured between 244 and 434 m, it lacks pink or red coloration when fresh. Instead, it is uniformly gray with dark posterior margin of dorsal, anal, and caudal fins.

Etymology. From the Latin canus (gray) in reference to the gray body color.

Careproctus zachirus sp. nov.
(Figs. 3b, 5)

Holotype. HUMZ 88338, male, 252 mm SL, 51°35.1′N, 179°21.6′W, near Unalga Island, Aleutian Islands, depth 300–350 m, 7 July 1980.

Paratypes. 3 specimens: HUMZ 88337, male, 236 mm SL, collected with the holotype; HUMZ 88657, 88658, 2 males, 238–249 mm SL, 51°31.8′N, 179°45.2′E, near Amchitka Island, Aleutian Islands, 351–434 m, 8 Aug. 1980. Collection localities are shown in Fig. 4.

Diagnosis. A *Careproctus* with long upper pectoral fin lobe, its length 2.0–2.5 in standard length; pectoral fin rays 28–31, caudal fin rays 11; suprabranchial pore 1; posterior part of upper pectoral fin lobe black; dorsal and anal fins with a black submarginal band.

Description. Data for the holotype are followed by those for the paratypes.

Counts: Dorsal fin rays 53 (51–52), anal fin rays 45 (43–45), pectoral fin rays 30 (28–31), caudal fin rays 11 (11), vertebrae 13+45=58 (12+44–46=56–58), pyloric caeca 26 (26–31), cephalic pores 2-6-7-1.

Morphometry: Head length 25.8 (25.7–27.7)% SL, body depth 27.1 (24.4–31.0), head width 14.7 (13.9–15.3); snout length 34.9 (30.8–32.2)% HL, eye diameter 11.4 (11.6–13.9), inter-

orbital width 36.2 (32.2), upper jaw length 46.2 (43.0–48.5), lower jaw length 42.0 (39.8–45.6), upper pectoral fin lobe length 158.0 (152.5–187.3), lower pectoral fin lobe length 78.8 (70.3–90.0), gill opening length 28.9 (24.7–34.9), snout to disk length 54.8 (50.8–56.8), snout to anus length 87.2 (79.6–87.4), mandible to disk length 44.9 (43.6–51.6), mandible to anus length 76.2 (75.6–82.3), disk to anus length 0 (0–4.9), disk length 30.3 (26.6–28.5).

Body deep, compressed. Skin smooth, lacking prickles. Gelatinous tissue thick beneath skin. Rudimentary pores present, forming three rows on each side of body: upper row extending from nape to origin of dorsal fin; middle row only above anterior curve of lateral line; lower row forming lateral line from behind suprabranchial pore to caudal fin.

Head compressed; its upper profile descending steeply from occiput to snout. Snout slightly projecting anteriorly to lower jaw. Nostril single, in a prominent tube, almost on a level with lower margin of pupil; its length about two-thirds of eye. Eye small. Mouth horizontal; maxillary reaching below posterior margin of orbit. Teeth somewhat long, simple or with faint lobes (Fig. 3b), arranged in wide bands consisting of about 19 (18–22) rows on upper jaw and about 22 (22) rows on the lower. Outer teeth simple or trilobed with weakly developed lateral lobes. Anteriormost pair of mandibular pores separated from each other. Gill opening wholly above pectoral fin. Opercular flap lacking.

Pectoral fin distinctly notched. Uppermost pectoral fin ray on a horizontal between lower margin of orbit and posterior corner of maxillary. Upper pectoral fin lobe extremely long with 14 (13–15) rays, extending posteriorly to a vertical through base of 21th (19th–23rd) anal fin ray. Notch bridged by 10 (9–10) widely spaced rays. Lower pectoral fin lobe with 6 (6) rays not reaching anal fin origin. Dorsal fin origin above gill opening. Anal fin origin below 8th (8th) dorsal fin ray. Anterior rays of dorsal and anal fins buried in gelatinous layer; tips of remaining rays free. Dorsal and anal fin rays relatively long. Caudal fin truncate, broad, continuous with dorsal and anal fins for about two-thirds of its length. End of dorsal fin forming notch on caudal fin.

Disk round, slightly cupped, located between verticals through posterior margin of orbit and gill opening; its margin broad. Anus located immediately behind disk, slightly anterior to a vertical through gill opening; a small conical genital papilla present in males.

Stomach and pyloric caeca located on left side of body cavity. Stomach moderately large. Pyloric caeca long, pointed.

Body color when fresh pinkish; eye black; posterior part of upper pectoral fin lobe stained with black in both outer and inner sides; free tips of anterior dorsal and anal fins tinged with tips of remaining rays and posterior caudal fin with pink; black bands of dorsal and anal fins jointed each other in middle of caudal fin. In alcohol pinkish color faded; oral and gill cavities, peritoneum, stomach, and pyloric caeca pale.

Distribution. The Amchitka Pass at depths of 300 to 434 m.

Remarks. Body color of this species is peculiar in having black posterior part of upper pectoral fin lobe and black dorsal and anal bands with pink margins. No other *Careproctus* species has the above coloration.

This species resembles *C. canus* in having a deep and compressed body, gill opening wholly located above pectoral fin, one suprabranchial pore and similar fin ray count of each vertical fin, but is easily distinguishable from *C. canus* by the longer upper pectoral fin lobe, fewer pectoral fin rays (28–31 against 33–36), more mandibular pores (7 against 6) and body coloration. This species also closely resembles *C. sinensis* in most characters. There is the gap of body length between both species because *C. sinensis* is actually known only from the small holotype (59 mm SL). However, the holotype of *C. sinensis* is a mature female with prominent ovipositor (Gilbert and Burke, 1912b: fig. 13). *C. sinensis* is probably the species of small size. Therefore, this species is easily distinguishable from *C. sinensis* by its longer upper and lower pectoral fin lobe (40.9–49.3% of SL against 22% of SL, and 19.5–23.9% of SL against 11% of SL), more caudal fin rays (11 against 10), fewer anal and pectoral fin rays (43–45 against 47, and 28–31 against 33), and body coloration.

Etymology. From the Greek za (superlative) and cheir (hand) in reference to the long pectoral fin.

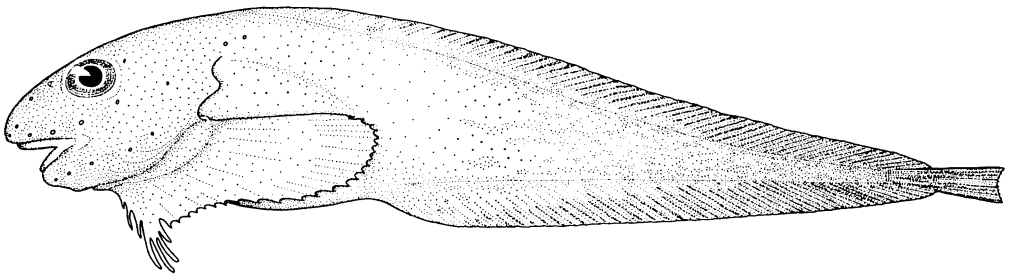

Fig. 6. *Careproctus simus* Gilbert, HUMZ 88447, 123 mm SL, from north of Seguam Island, Aleutian Islands.

Careproctus simus Gilbert
(Figs. 3c, 6)

Careproctus simus Gilbert, 1895: 444 (original description; type locality: north of Unalaska Island, Bering Sea, 54°01′40″N, 166°48′50″W, *Albatross* station 3331, in 641 m); Burke, 1930; 112, fig. 28.

Materials. 28 specimens: HUMZ 82006, female, 141 mm SL, 60°21.1′N, 178°58.0′W, depth 597 m, 26 July 1979; HUMZ 82560, male, 92 mm SL, 59°19.7′N, 178°06.7′W, 610 m, 28 June 1979; HUMZ 82897, female, 140 mm SL, 56°00.9′N, 169°14.3′W, 610 m, 18 June 1979; HUMZ 88387, male, 103 mm SL, 52°17.7′N, 173°11.5′W, north of Amlia Island, Aleutian Islands, 410–422 m, 15 July 1980; HUMZ 88443, 88447–88449, 88451, 88452, 88455, 88458, 88464, 9 females, 113–145 mm SL, 52°38.8′N, 172° 28.3′W, north of Seguam Island, Aleutian Islands, 520–590 m, 16 July 1980; HUMZ 88495, 88497, 88501–88503, 88505, 88507, 88510, 7 females and 1 male, 87–126 mm SL, 53°15.3′N, 169°03.4′W, northwest of Umnak Island, Aleutian Islands, 596–610 m, 19 July 1980; HUMZ 88522, 88523, 88526, 88527, 4 females, 111–145 mm SL, 52°17.8′N, 171°19.1′W, south of Amukta Island, Aleutian Islands, 580–586 m, 28 July 1980; FRSKU S4823, female, 121 mm SL, 52°22.3′N, 172°48.8′W, Seguam Pass, 704–725 m, 4 Nov. 1980; FRSKU S4824, 4825, 2 females, 135–144 mm SL, 52°10.1′N, 179°18.6′E, north of Semisopochnoi Island, Aleutian Islands, 430–440 m, 7 Oct. 1980. Collection localities are shown in Fig. 4.

Diagnosis. A *Careproctus* with trilobed teeth; snout distinctly projecting; dorsal fin rays 54–58; anal fin rays 47–51; pectoral fin rays 31–37; peritoneum faintly pigmented; suprabranchial pores 2.

Description. Counts: Dorsal fin rays 54–58, anal fin rays 47–51, pectoral fin rays 31–37, caudal fin rays 10, vertebrae 10–11+48–52= 59–63, pyloric caeca 20–28, cephalic pores 2-6-7-2.

Morphometry: Head length 23.7–27.3% SL, body depth 17.2–26.9, head width 12.0–16.9; snout length 29.2–39.4% HL, eye diameter 20.2–26.0, interorbital width 27.3–32.9, upper jaw length 34.3–48.5, lower jaw length 32.2–43.6, upper pectoral fin lobe length 63.4–77.9, lower pectoral fin lobe length 34.8–50.3, gill opening length 26.7–37.7, snout to disk length 44.7–54.7, snout to anus length 61.1–78.6, mandible to disk length 29.5–39.0, mandible to anus length 44.8–62.1, disk to anus length 0–7.7, disk length 13.8–21.4.

Body stout, deepest at dorsal fin origin, then tapering slowly to caudal fin. Skin smooth, lacking prickles. Gelatinous tissue thin beneath skin. Rudimentary pores absent.

Head heavy; its profile descending slowly to snout, then retracting to mouth. Snout heavy, projecting beyond upper lip for diameter of pupil. Nostril single, in a short tube, just in front of eye on a level with lower margin of pupil. Eye large. Mouth inferior; maxillary reaching below middle of eye. Teeth short, stout, trilobed with lateral lobes weakly developed (Fig. 3c), arranged in moderately wide bands consisting of 11–15 rows on both jaws. Outer teeth simple, smaller than the inner. Anteriormost pair of mandibular pores separated from each other, not in the same pit. Gill opening wholly above pectoral fin or extending down in front of 1–4 pectoral fin rays. Opercular flap triangular, supported by two spines; both spines almost extending horizontally.

Pectoral fin shallowly notched; level of its uppermost pectoral ray between lower margin of orbit and posterior corner of maxillary. Upper

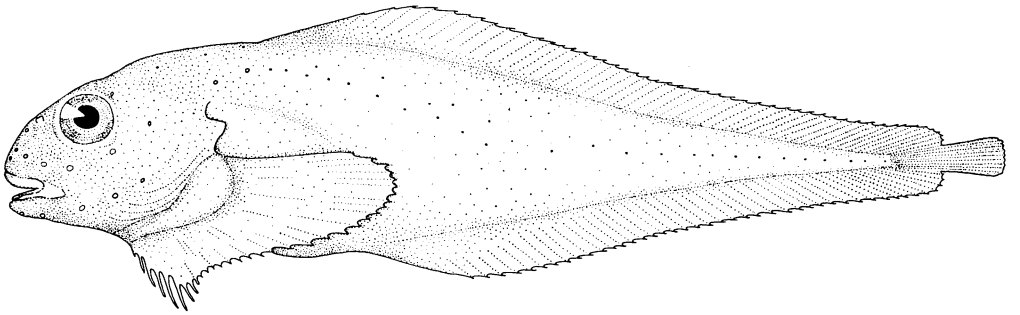

Fig. 7. *Careproctus bowersianus* Gilbert et Burke, HUMZ 88483, 126 mm SL, north of Chagulak Island, Aleutian Islands.

pectoral fin lobe reaching anal fin origin. Lower pectoral fin lobe composed of 5–6 thickened rays, reaching behind anus, almost below opercular flap. Symphysis of lower pectoral fin lobe below middle of eye. Dorsal fin origin above gill opening. Anal fin origin below 9th–12th dorsal fin ray. Anterior dorsal and anal rays buried in gelatinous tissue. Caudal fin emarginate, narrow, continuous with vertical fins for about two-fifths of its length without notches at union.

Disk smaller than eye, triangular or round, and flat; its margin broad. Anus immediately behind disk with a long genital papilla in males.

Stomach and pyloric caeca located on left side of body cavity. Stomach small. Pyloric caeca long, pointed.

Body color when fresh red; posterior dorsal and anal fins and caudal fin black. In alcohol reddish color faded; eye black; oral and gill cavities, stomach, and pyloric caeca pale; peritoneum faintly pigmented.

Distribution. The Bering Sea at depths of 410 to 725 m.

Remarks. Gilbert (1896) did not report the number of dorsal and anal fin rays of the holotype in original description of this species. Burke (1930) described that the holotype of *C. simus* had more than 47 dorsal and 41 anal fin rays, and that caudal fin was lost. A radiograph of the holotype (USNM 51688) shows that it has at least 53 dorsal and 46 anal fin rays, though their exact counts are unknown because of its damaged posterior dorsal and anal fins. These counts of the new specimens almost agree with those of the holotype.

This species resembles *C. mollis* (Gilbert and Burke, 1912a; Burke, 1930) in most characters, but differs from the latter in having projecting snout (not projecting in *C. mollis*), anteriormost pair of mandibular pores not located in the same pit (located in the same pit), larger number of pyloric caeca (13), larger eye and gill opening, and smaller disk (17.9, 19.0, and 26.7% of head length). This species resembles *C. curilanus* in having distinctly projecting snout, but is easily distinguishable from the latter by its more dorsal and anal fin rays, vertebrae and pyloric caeca (49, 44, 54, and 7 in *C. curilanus*), and color of peritoneum (black).

Until now this species has been known only from the damaged holotype from north of Unalaska Island, the Bering Sea. The new specimens provide the second record of this species and extend the known range to the north, to the south, and to the west.

Careproctus bowersianus Gilbert et Burke
(Figs. 3d, 7)

Careproctus bowersianus Gilbert and Burke, 1912a: 76, fig. 20 (original description; type locality: Bowers Bank, Bering Sea, 54°30′30″N, 179°14′E, *Albatross* station 4772, in 630–681 m); Burke, 1930: 115, fig. 33.

Materials. 6 specimens: HUMZ 81890, female, 130 mm SL, 57°50.9′N, 173°57.7′W, depth 720–750 m, 21 June 1979; HUMZ 88483–88486, 4 females, 126–137 mm SL, 52°46.1′N, 171°04.1′W, north of Chagulak Island, Aleutian Islands, 710–750 m, 17 July 1980; HUMZ 93505, female, 156 mm SL, 56°33.0′N, 172°51.5′W, 705–800 m, 18 Aug. 1981. Collection localities are shown in Fig. 4.

Diagnosis. A *Careproctus* with trilobed teeth;

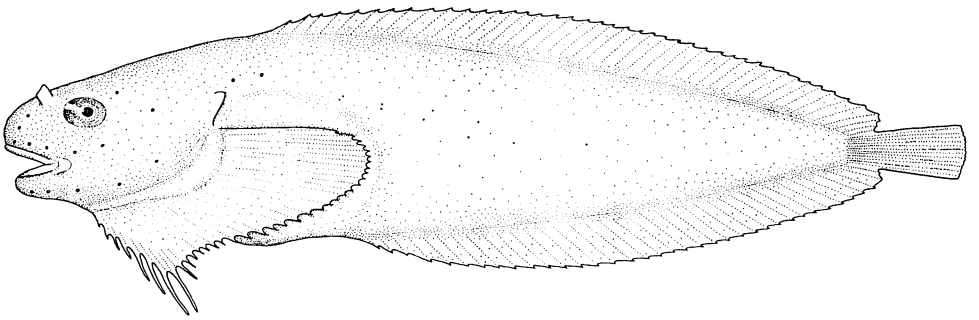

Fig. 8. *Careproctus pycnosoma* Gilbert et Burke, HUMZ 88509, 79 mm SL, northwest of Umnak Island, Aleutian Islands.

snout not projecting; tips of anterior dorsal rays buried in gelatinous tissue; dorsal fin rays 51–54; anal fin rays 46–48; pectoral fin rays 34–38; pyloric caeca 11–14; peritoneum pale; stomach black.

Description. Counts: Dorsal fin rays 51–54, anal fin rays 46–48, pectoral fin rays 34–38, caudal fin rays 10–11, vertebrae 9–10+47–50= 57–59, pyloric caeca 11–14, cephalic pores 2-6-7-2.

Morphometry: Head length 25.9–28.9% SL, body depth 22.8–25.5, head width 13.2–15.2; snout length 31.8–34.0% HL, eye diameter 23.8–25.7, interorbital width 34.4–39.2, upper jaw length 33.4–37.7, lower jaw length 32.3–34.4, upper pectoral fin lobe length 61.0–67.7, lower pectoral fin lobe length 32.3–40.4, gill opening length 20.7–25.2, snout to disk length 51.9–59.9, snout to anus length 84.3–93.8, mandible to disk length 48.6–59.3, mandible to anus length 79.6–87.5, disk to anus length 3.1–11.7, disk length 18.1–28.7.

Body stout, deepest at dorsal fin origin, then tapering slowly to caudal fin. Gelatinous tissue thin beneath skin. Skin smooth, lacking prickles. Rudimentary pores forming three rows on each side of body: upper row extending from nape to origin of dorsal fin; middle row only above anterior curve of lateral line; lower row forming lateral line from behind suprabranchial pores to caudal fin.

Head large; its upper profile descending steeply to snout. Snout blunt, not projecting. Nostril single, in a short tube, on a level with mid-pupil. Eye large. Mouth horizontal, small; maxillary extending slightly posteriorly to below anterior margin of eye. Teeth short, stout, strongly trilobed (Fig. 3d), forming wide bands composed of 11–15 rows on both jaws. Outer teeth strongly trilobed, smaller than the inner. Anteriormost pair of mandibular pores separated from each other, not in the same pit. Gill opening short, wholly above pectoral fin or extending down in front of 1–3 pectoral fin rays. Opercular flap triangular, supported by two spines recurved dorsally.

Pectoral fin shallowly notched; its uppermost fin ray on a level with lower margin of orbit. Upper pectoral fin lobe reaching anal fin origin. Lower pectoral fin lobe short with 5–7 weak rays, almost reaching anus. Pectoral symphysis below posterior margin of orbit. Dorsal fin origin posterior to a vertical through tip of opercular flap. Anal fin origin below 5th–8th dorsal fin ray. Anterior dorsal and anal rays buried in gelatinous tissue. Caudal fin round, relatively stiff, continuous with vertical fins for two-fifths of its length. Ends of dorsal and anal fins forming small notches on caudal fin.

Disk flat and round; its margin broad. Anus immediately behind disk.

Stomach and pyloric caeca located on left side of body cavity. Stomach small. Pyloric caeca long, pointed.

Body color when fresh uniformly red; eye silvery; pupil black. In alcohol body pale; posterior dorsal and anal fins and caudal fin somewhat dusky; eye black; pupil pale; oral and gill cavities and peritoneum pale; stomach black.

Distribution. The Bering and the Okhotsk seas at depths of 630 to 800 m.

Remarks. This species is similar to *C. mollis* (Gilbert and Burke, 1912a; Burke, 1930) in most characters, but differs from *C. mollis* in having black stomach (pale stomach in *C. mollis*), anteriormost pair of mandibular pores not located in the same pit (located in the same pit), larger eye and smaller upper jaw (17.9 and 42.1 % of head length).

This species has been known from two specimens captured on Bowers Bank, the Bering Sea. The present specimens provide the second record of this species and extend the known range to the north, to the south, and to the east.

Careproctus pycnosoma Gilbert et Burke
(Japanese name: Konnyaku-uo)
(Figs. 3e, 8, 9)

Careproctus pycnosoma Gilbert and Burke, 1912b: 372; fig. 14; pl. 46, fig. 3 (original description; type locality: off Cape Rollin, Simushir Island, Kuril Islands, 46°42′N, 151°45′E, *Albatross* station 4803, in 419 m); Burke, 1930: 108, fig. 24.

Material. HUMZ 88509, female, 79 mm SL, northwest of Umnak Island, Aleutian Islands, 53°15.3′N, 169°03.4′W, depth 596–610 m, 19 July 1980. Collection locality is shown in Fig. 4.

Diagnosis. A *Careproctus* with trilobed teeth; snout not projecting; tips of anterior dorsal rays projecting above fin membrane; dorsal fin rays 42–45; anal fin rays 36–39; peritoneum and stomach pale.

Description. Morphometry and counts are shown in Table 1.

Body short, robust, deepest at anus, then tapering slowly to caudal fin, but posterior part of body deeper and thicker than that of other species. Gelatinous tissue thin. Prickles absent. Rudimentary pores on nape and sides of body,

Table 1. Comparison of the present specimen with the holotype in *Careproctus pycnosoma*.

	Present specimen	Holotype
	HUMZ 88509	USNM 73340
Standard length (mm)	79	39
Percent of SL:		
Head length	28.4	26.9
Head width	17.0	15.4
Body depth	25.4	18.7
Snout length	10.3	9.5
Eye diameter	5.9	7.4
Interorbital width	10.3	10.0
Mouth width	13.4	12.8
Maxillary length	12.3	11.5
Gill opening length	4.9	5.6
Upper pectoral fin lobe length	21.3	17.7
Lower pectoral fin lobe length	15.4	10.5
Predorsal length	32.8	30.3
Preanal length	44.8	40.3
Snout to disk length	16.8	14.6
Snout to anus length	31.9	28.5
Mandible to disk length	12.5	13.1
Mandible to anus length	28.9	27.2
Disk to anus length	6.8	7.2
Disk length	9.9	7.9
Counts:		
Dorsal fin rays	42	45
Anal fin rays	36	39
Pectoral fin rays	38	39
Caudal fin rays	12	11
Vertebrae	10+36=46	10+39=49
Pyloric caeca	17	17

forming two rows: upper row only above anterior curve of lower row; lower row extending more posteriorly.

Head blunt; its width nearly equal to depth; its profile descending slowly to snout. Snout broad and blunt, not projecting. Nostril single, in a well developed tube, on a level with upper half of eye; its posterior margin raised into a flap and its opening about equal to diameter of pupil. Eye moderately large. Mouth horizontal, broad; maxillary reaching slightly behind a vertical through anterior margin of eye. Teeth stout, strongly trilobed with central lobe larger than lateral lobes (Fig. 3e), forming wide bands arranged in 10 rows on both jaws. Outer teeth trilobed, smaller than the inner. Cephalic pores prominent: supraocular, postocular, and second suprabranchial pore not so much reduced; supraocular (Fig. 9), sixth mandibular, and both suprabranchial pores with flap. Anteriormost pair of mandibular series separated, not in the same pit. Gill opening wholly above pectoral fin. Opercular flap triangular, supported by two spines; both spines recurved dorsally.

Pectoral fin shallowly notched. Uppermost pectoral fin ray on a level with lower margin of orbit. Upper pectoral fin lobe reaching anal fin origin. Lower pectoral fin lobe short, not reaching anus, consisting of 8 (left) and 7 (right) rays. Symphysis of both lower lobes located almost below posterior end of orbit. Dorsal fin origin posterior to a vertical through tip of opercular spine. Anal fin origin below 7th dorsal fin ray. Anterior dorsal and anal fin rays stiff, not buried in gelatinous tissue; their tips projecting above fin membrane. Caudal fin round, stout, and broad; its connection to dorsal fin one-fourth of its length. Ends of dorsal and anal fins forming notches on caudal fin.

Disk relatively large, round and flat, located between verticals through posterior end of orbit and gill opening. Anus separated from posterior end of disk by about two-thirds of disk length, nearer to disk than to anal fin origin.

Stomach and pyloric caeca on left side of body cavity. Stomach small. Pyloric caeca fat, short, and bluntly pointed.

Body color when fresh uniformly red. In alcohol body pale; musculature sparsely pigmented; oral and gill cavities, peritoneum, stomach, and pyloric caeca pale.

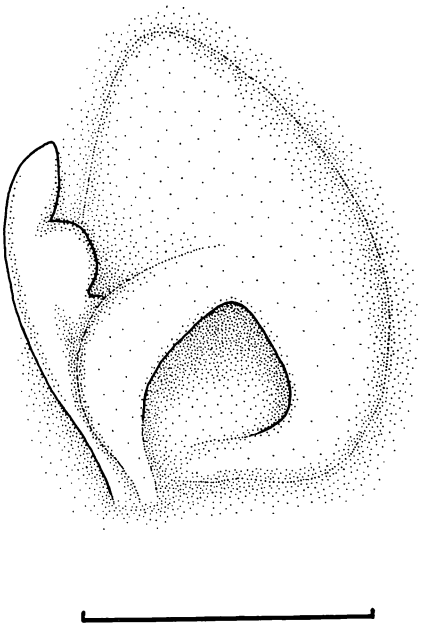

Fig. 9. Lateral view of the flap of supraocular pore in *Careproctus pycnosoma* (HUMZ 88509). Scale indicates 0.5 mm.

Distribution. Off Simushir Island of the Kuril Islands (Gilbert and Burke, 1912b) and off Umnak Island, the Bering Sea, at depths of 419 to 610 m.

Remarks. The present specimen agrees well with the holotype in counts and morphometry in spite of being much larger than the holotype (39 mm SL). The prominent differences between it and the holotype are in body depth and lower pectoral fin lobe length (Table 1). The difference in body depth may reflect development of ovary in the new specimen, which is a mature female having ripe eggs, because the holotype is immature. The difference in lower pectoral fin lobe length is probably due to allometric growth as in *Careproctus acanthodes* Gilbert et Burke and *C. reinhardti* (Krøyer) (Schmidt, 1950; Andriashev, 1954).

Burke (1930) noted a shallow notch in anterior dorsal fin of the holotype, and he predicted that this character is an important character for separating this species from many other species of the genus. However, he recognized this character varied within a species in *C. ectenes* Gilbert. Since the present material lacks the

notch in dorsal fin, this character is not a valid diagnostic character for this species.

The new material has a small flap in front of supraocular (Fig. 9), sixth mandibular pore, and both suprabranchial pores, which have never been reported in other liparidid fishes. These flaps are small and difficult to discern; their taxonomic value is currently unknown. The holotype of this species seems to lack them. These flaps may develop with growth or may be a sexual dimorphic character. They may be of considerable taxonomic importance if adequate materials of this species and related species become available.

C. pycnosoma resembles *C. curilanus* Gilbert et Burke and *C. ectenes* Gilbert in having anterior dorsal fin rays projecting above fin membrane. However, this species differs from the latter two species in the following characters: 1) snout not projecting (projecting in the latter two species); 2) peritoneum pale (black); 3) dorsal fin rays 42–45, anal fin rays 36–39, pectoral fin rays 37–38, and vertebrae 46–49 (48 or more, 43 or more, 34 or fewer, and 54); 4) pyloric caeca 17 (0–7).

This species was previously known only from the holotype (USNM 73340) from off Simushir Island, the Kuril Islands. The new specimen described here represents the second record and first occurrence from the Bering Sea of this species.

Comparative materials

Careproctus segaliensis Gilbert et Burke: radiograph of holotype, USNM 73336, 48°36′10″N, 145°17′30″E, off Cape Patience, Sakhalin Island, Okhotsk Sea, *Albatross* station 5026, depth 218 m, 28 Sep. 1906.

Careproctus sinensis Gilbert et Burke: holotype, USNM 73339, female, 59 mm SL, 38°35′N, 138°41′E, off Sado Island, Japan Sea, *Albatross* station 4813, depth 366 m, 18 July 1906.

Careproctus simus Gilbert: radiograph of holotype, USNM 51688, 54°01′40″N, 166°48′50″W, north of Unalaska Island, Bering Sea, *Albatross* station 3331, depth 641 m, 21 Aug. 1890.

Careproctus mollis Gilbert et Burke: holotype, USNM 74383, female, 74 mm SL, 52°55′40″N, 173°26′E, off East Cape, Attu Island, Bering Sea, *Albatross* station 4784, depth 247 m, 11 July 1906.

Careproctus curilanus Gilbert et Burke: holotype, USNM 73341, male, 64 mm SL, 46°42′N, 151°45″E, off Cape Rollin, Simushir Island, Kuril Islands, *Albatross* station 4803, depth 419 m, 24 June 1906.

Careproctus pycnosoma Gilbert et Burke: holotype, USNM 73340, immature, 39 mm SL, same locality as *C. curilanus*.

Careproctus ectenes Gilbert: holotype, USNM 48618, female, 64 mm SL, 54°01′40″N, 166°48′50″W, north of Unalaska Island, Bering Sea, *Albatross* station 3331, depth 641 m, 21 Aug. 1890.

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ベーリング海から得られたコンニャクウオ属（クサウオ科）の2新種と3稀種

木戸　芳

ベーリング海から得られたコンニャクウオ属 *Careproctus*（クサウオ科）の5種を記載した．新種の *C. canus* は歯が三葉に分かれていること，鰓孔が胸鰭より上方に位置すること，幽門垂数が 18～24 本であること，腹膜と胃が淡色であること，postocular pore がなく，suprabranchial pore が 1 個であることにより他種と区別される．また，新種の *C. zachirus* は胸鰭の上葉が長く，体長の 40% 以上あること，胸鰭条数が 28～31 本であること，尾鰭条数が 11 本であること，suprabranchial pore が 1 個であること，胸鰭後端と垂直鰭の縁辺付近が黒いことにより他種と区別される．*C. simus*, *C. bowersianus* およびコンニャクウオ *C. pycnosoma* を第二番目の記録として再記載した．コンニャクウオはベーリング海からの初記録である．

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