Three New Small Snailfishes of the Genus Careproctus (Teleostei: Cottiformes: Liparidae) from the Aleutian Islands, Alaska

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Three New Small Snailfishes of the Genus *Careproctus* (Teleostei: Cottiformes: Liparidae) from the Aleutian Islands, Alaska

James Wilder Orr[1]

Three new species of small snailfishes, with maximum lengths up to only 60 mm, are described from collections in the Aleutian Islands taken during fisheries resource assessment surveys conducted by the U.S. National Marine Fisheries Service. Previous molecular analyses demonstrated that two of the species are closely related; the third species was found among material thought to consist only of one of these two species. Two of the new species are distinguished from all other species of *Careproctus* on the basis of an anterior dorsal-fin lobe with exserted rays and bodies with widespread small rounded bumps covered with tiny prickles. They are distinguished from each other on the basis of fin ray and vertebral counts, as well as differences in body shape. The third new species is diagnosed from all other species of *Careproctus* by having a small teardrop-shaped body, with loose thin skin and without an anterior dorsal-fin lobe, as well as by high counts of meristic characters, especially pectoral-fin rays. Each species is found widely within the Aleutian Islands from west of Kiska Island in the west to north of Umnak Island in the east at depths of 90 to 447 m.

THE snailfish family Liparidae encompasses over 430 species in about 32 genera worldwide (Chernova et al., 2004; Orr et al., 2019). Its most species-rich genus, *Careproctus*, comprises about 140 species (Chernova et al., 2004; Fricke et al., 2020), some 50 of which are known from the North Pacific, where they are found mainly on the edge of the continental shelf to the deeper waters of the continental slope. Although paraphyletic, as demonstrated in molecular analyses (Orr et al., 2019), the genus is characterized by having a pelvic disk, single nostril, pectoral-fin rays typically fewer than anal-fin rays, pseudobranchs absent, and body color that is not variegated except in a few species (Orr and Maslenikov, 2007).

Fisheries resource assessment surveys conducted by the U.S. National Marine Fisheries Service, Alaska Fisheries Science Center (AFSC), have provided material leading to the descriptions of several new liparids from Alaska (Orr and Busby, 2001, 2006; Orr, 2004, 2012, 2016; Orr and Maslenikov, 2007), as well as extensive material for molecular phylogenetic analyses (Knudsen et al., 2007; Orr et al., 2019). The three new species described herein were collected during these periodic surveys from 1997 to 2018 in the Aleutian Islands from nearly the entire length of the island chain (e.g., von Szalay et al., 2017). All are small pale species, easily missed in the catches of the large benthic otter trawls used in these surveys. Two of the species, originally identified as *Careproctus* sp. A and *Careproctus* sp. J, were included in a recent molecular phylogenetic analysis and were recovered together with *C. canus* in the *C. canus* species group clade (Orr et al., 2019). A third similar species was later discovered among material previously identified as *Careproctus* sp. A. Herein, I provide diagnoses, descriptions, and distributions of the three new species, as well as comparative remarks on *C. canus*, the fourth member of the clade.

MATERIALS AND METHODS

All material examined was obtained from benthic otter trawls (Stauffer, 2004) conducted in the Aleutian Islands, Alaska, USA. Where indicated, some material was collected in a small "benthic bag" attached near the footrope of the otter trawl as described by Orr (2004). All material was fixed in 10% formalin at sea, unless otherwise noted as fixed in 95% ethanol. Specimens with tissues preserved in 95% ethanol are indicated with an asterisk in lists of material examined.

Counts, measurements, and descriptive terminology follow Orr and Busby (2006), based on previous studies of Andriashev and Stein (1998) and Stein et al. (2001), except for pectoral girdle morphology, which follows Orr and Maslenikov (2007). Counts of median-fin rays and vertebrae were taken from radiographs. Counts of gill rakers were taken from the first gill arch on the right side. The right gill membrane and abdomen in most specimens were cut to examine the branchial and visceral cavities; right pectoral girdles were dissected, cleared, and counter stained following Potthoff (1984). Lengths are presented as standard length (SL) and proportions as percent SL, unless otherwise indicated as percent head length (HL), orbit length (OL), or caudal length (CL). Fleshy interorbital width is taken at the greatest width including tissue extending dorsally over the eye; bony interorbital width is the narrowest bony width. Suborbital depth to lower jaw is measured from the ventral rim of the orbit to the mandibular articulation. Measurements and counts are presented in species accounts as the range for all material examined followed by the value for the holotype in parentheses when intraspecific variation is indicated. Comparative counts and measurements for *C. canus* of Kido (1985) are augmented by new data from material examined. Institutional abbreviations are those provided by Sabaj (2020).

Careproctus spiraki, new species

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Pimpled Snailfish

Figures 1A, 2A, 3A, 4; Table 1

Careproctus sp. A: Orr et al., 2019: 33, table 3 (molecular phylogenetics).

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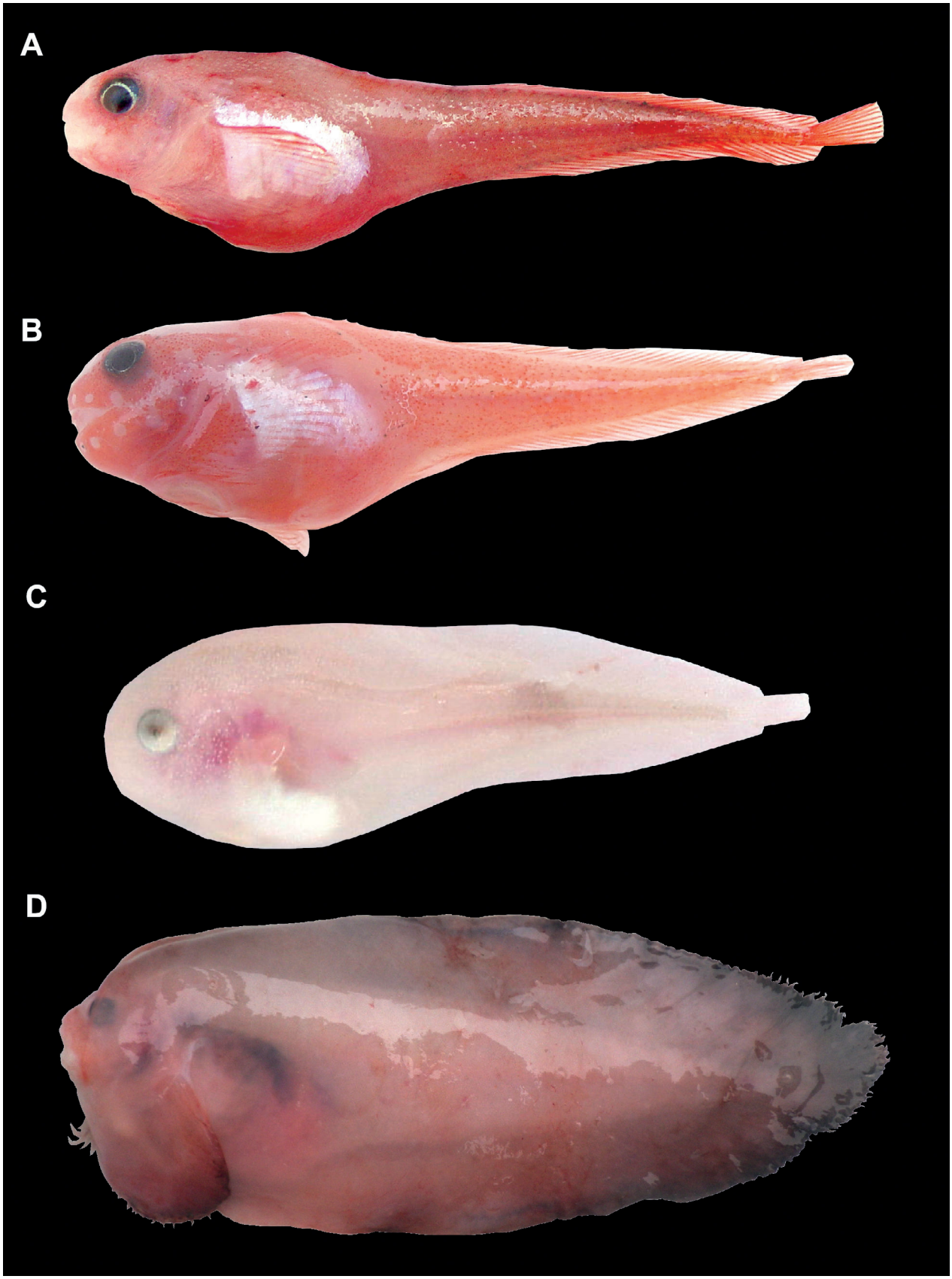

Fig. 1. (A) *Careproctus spiraki*, new species, UW 159753, 52.5 mm, holotype, Aleutian Islands, Seguam Pass, 52.3255°N, 172.7466°W, 457 m depth; (B) *Careproctus maslenikovae*, new species, UW 155708, 36.9 mm, holotype, ripe female, Aleutian Islands, west of the Islands of Four Mountains, 52.6466°N, 170.2027°W, 234 m depth; (C) *Careproctus lacrima*, new species, UW 200024 (out of UW 49434), 50.2 mm, ripe female, holotype, Aleutian Islands, north of Tanaga Island, 52.0038°N, 177.8278°W, 111 m depth; (D) *Careproctus canus*, UW 156561, 198 mm, southeast of Buldir Island, 52.1017°N, 176.004°E, 174 m depth. All photographed before preservation.

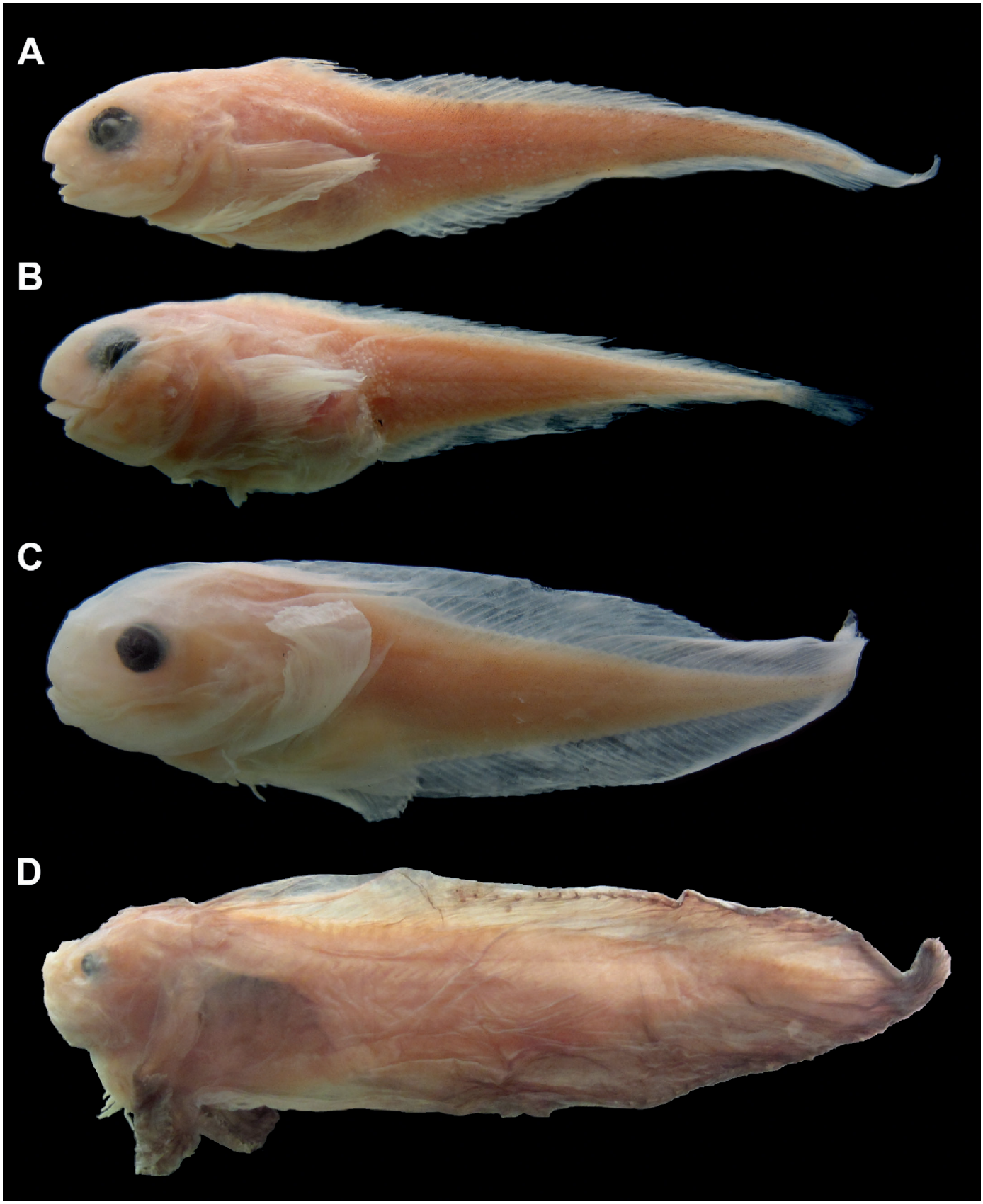

Fig. 2. (A) *Careproctus spiraki*, new species, UW 159753, 52.5 mm, holotype, Aleutian Islands, Seguam Pass, 52.3255°N, 172.7466°W, 457 m depth; (B) *Careproctus maslenikovae*, new species, UW 155708, 36.9 mm, holotype, ripe female, Aleutian Islands, west of the Islands of Four Mountains, 52.6466°N, 170.2027°W, 234 m depth; (C) *Careproctus lacrima*, new species, UW 200024 (out of UW 49434), 50.2 mm, ripe female, holotype, Aleutian Islands, north of Tanaga Island, 52.0038°N, 177.8278°W, 111 m depth; (D) *Careproctus canus*, UW 47852, 170 mm, southeast of Buldir Island, 52.1017°N, 176.004°E, 174 m depth. All photographed after preservation.

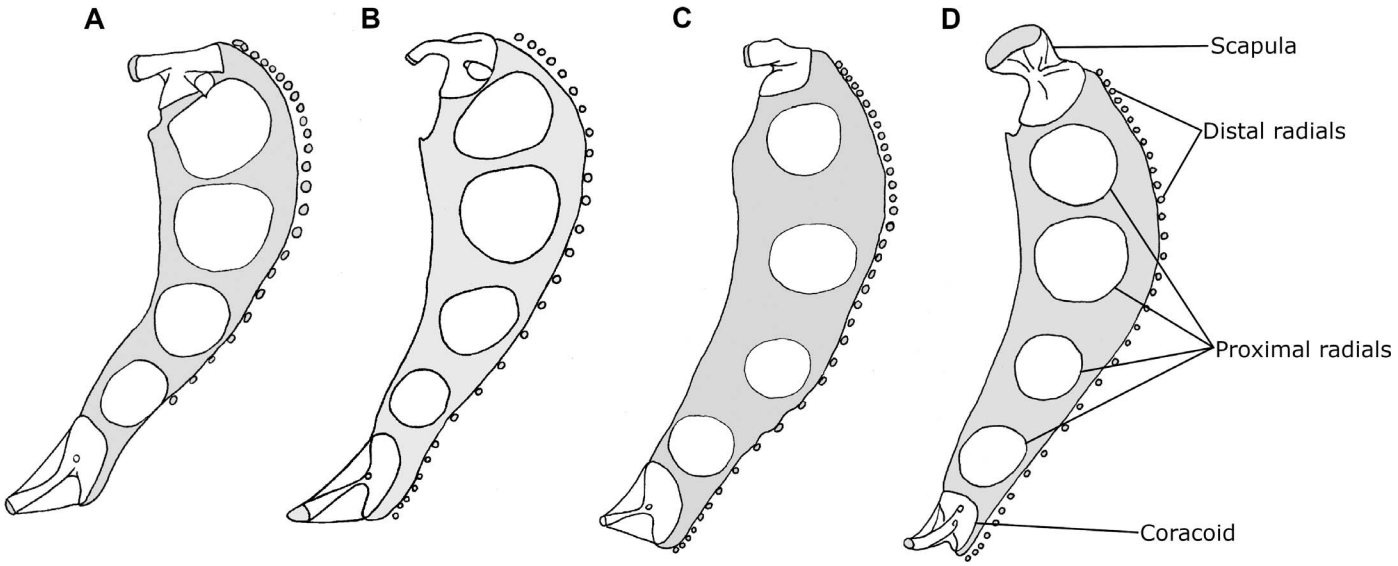

Fig. 3. Right medial views of pectoral girdles. (A) *Careproctus spiraki*, new species, paratype, UW 155713, 42.6 mm; (B) *Careproctus maslenikovae*, new species, paratype, UW 200022, 40.3 mm; (C) *Careproctus lacrima*, new species, paratype, UW 200046, 50.4 mm; (D) *Careproctus canus*, UW 47852, ca. 170 mm with regenerated caudal fin. Shaded areas represent cartilage.

Holotype.—UW 159753, 52.5 mm, Aleutian Islands, Seguam Pass, 52.3255°N, 172.7466°W, 457 m depth, F/V *Sea Storm*, cruise 2004-01, haul 60, J. W. Orr, 19 June 2004.

Paratypes.—19 specimens, 38.7–54.6 mm. SIO 20-11 (ex UW 200019), 44.7 mm, 51.8043°N, 174.5775°W, 323 m depth, F/V *Ocean Explorer*, cruise 2018-01, haul 84, N. E. Roberson, 30 June 2018; SIO 20-12 (ex UW 200099), 45.3 mm, 52.2440°N, 171.6998°W, 394 m depth, F/V *Sea Storm*, cruise 2002-01, haul 211, R. C. Harrison, 6 August 2002; UW 155710*, 41.9 mm, 53.0411°N, 169.0997°W, 193 m depth, F/V *Gladiator*, cruise 2006-01, haul 19, J. W. Orr, 12 June 2006; UW 155713*, 3, 38.7–47.9 mm, 52.3675°N, 171.2463°W, 328 m depth, F/V *Gladiator*, cruise 2006-01, haul 39, benthic bag, J. W. Orr, 16 June 2006; UW 155809, 41.2 mm, 52.3675°N, 171.3377°W, 325 m depth, F/V *Dominator*, cruise 2000-01, haul 83, benthic bag, K. P. Maslenikov, 11 June 2000; UW 200012 (ex UW 159753), 43.8 mm, same locality as holotype; UW 200013, 2, 40.5–45.3 mm, 51.8048°N, 174.5653°W, 320 m depth, F/V *Dominator*, cruise 2000-01, haul 92, K. P. Maslenikov, 13 June 2000; UW 200014, 45 mm, 51.541°N, 176.6219°W, 373 m depth, F/V *Dominator*, cruise 2000-01, haul 109, benthic bag, K. P. Maslenikov, 17 June 2000; UW 200015, 50.8 mm, 51.7817°N, 177.4851°E, 261 m

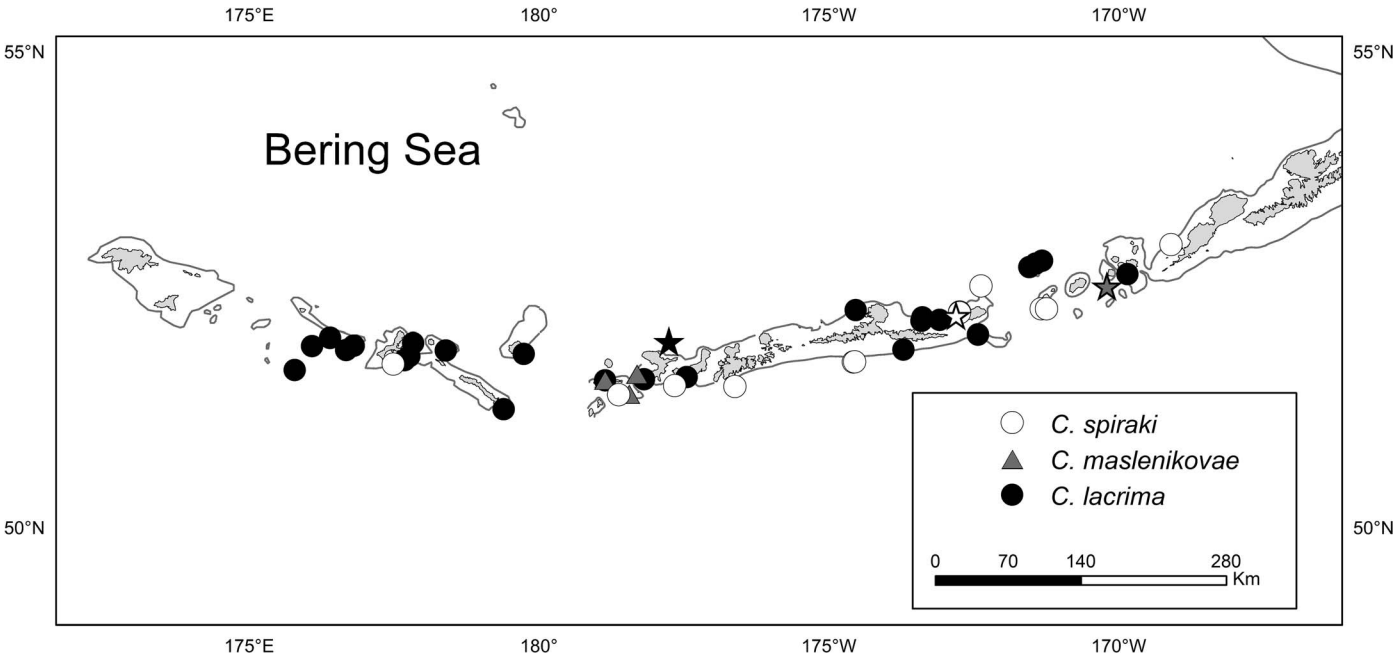

Fig. 4. Distribution of three new species of *Careproctus* from the Aleutian Islands based on all known material: *Careproctus spiraki*, new species (white circle), *Careproctus maslenikovae*, new species (gray triangle), and *Careproctus lacrima*, new species (black circle). Each symbol may represent more than one capture. Holotype localities are represented by stars. Bottom contour illustrated is 200 m.

Table 1. Proportional morphometric and meristic characters of *Careproctus spiraki*, new species, *Careproctus maslenikovae*, new species, and *Careproctus lacrima*, new species. Morphometric data are given in percent standard length and presented as the range, followed by the mean ± standard deviation (SD).

	C. spiraki			*C. maslenikovae*			*C. lacrima*		
	n	Range	Mean±SD	*n*	Range	Mean±SD	*n*	Range	Mean±SD
Standard length (mm)	18	38.7–52.5		4	29.4–40.3		19	31.4–58.5	
%SL									
Head length	18	23.4–26.7	25.1±0.9	4	25.9–28.5	27.7±1.2	19	27.7–33.5	30.8±1.7
Head width	18	11.1–14.9	13.0±1.2	4	15.1–20.1	17.9±2.0	19	9.6–16.2	12.4±2.0
Greatest body depth	18	19.0–30.2	24.4±2.7	4	24.1–30.9	27.7±3.2	19	24.5–31.2	27.7±2.1
Body depth at anal-fin origin	18	14.2–19.7	17.1±1.3	4	18.4–19.5	18.7±0.5	19	16.2–23.5	19.6±2.3
Body depth from anal-fin origin to dorsal-fin origin	18	21.2–28.2	25.7±2.1	4	27.6–31.3	29.5±1.7	19	23.8–30.0	26.1±1.5
Body depth at pelvic fin	18	17.3–24.6	20.7±2.1	4	24.1–30.9	25.9±3.4	19	23.0–28.1	25.9±1.4
Body depth at dorsal-fin origin	18	19.0–30.2	24.4±2.8	4	26.2–30.9	28.9±2.0	19	23.6–31.2	27.6±2.2
Snout length	18	5.5–8.4	7.0±0.7	4	7.4–9.5	8.6±0.9	19	7.6–10.0	8.7±0.6
Orbit length	18	5.6–8.8	7.2±0.8	4	6.2–8.4	7.4±0.9	19	6.0–8.2	7.0±0.7
Post orbit length	18	8.8–13.8	10.8±1.3	4	10.3–13.4	11.7±1.5	19	12.5–17.1	15.1±1.3
Interorbital width (bony)	18	3.9–5.8	4.7±0.6	4	6.7–8.5	7.7±0.9	19	3.6–6.9	5.2±0.9
Interorbital width (fleshy)	18	6.7–11.3	9.4±1.4	4	12.4–16.0	14.5±1.5	19	6.5–11.5	9.0±1.4
Suborbital depth to upper jaw	18	2.2–4.2	3.4±0.6	4	4.1–5.1	4.6±0.5	19	3.6–6.4	4.8±0.9
Suborbital depth to lower jaw	18	5.5–8.5	7.0±0.8	4	7.5–9.5	8.3±0.9	19	6.7–11.3	9.0±1.2
Mouth width	18	8.1–13.7	10.7±1.4	4	12.7–14.3	13.5±0.8	19	8.0–16.4	10.7±2.2
Maxilla length	18	8.7–10.9	9.6±0.7	4	10.9–12.7	11.8±0.8	19	10.9–13.6	12.2±0.8
Mandible length	18	9.1–11.1	10.2±0.7	4	11.1–14.4	12.3±1.4	19	12.2–14.9	13.6±0.7
Gill slit length	18	3.9–6.9	5.4±1.0	4	3.8–6.5	5.5±1.2	19	5.3–8.7	7.1±1.2
Pectoral-fin length	18	14.6–19.6	17.2±1.5	4	18.6–19.7	19.3±0.5	19	15.5–23.1	20.6±2.2
Lower lobe of pectoral-fin length	18	11.2–15.9	13.9±1.3	4	13.6–16.0	14.8±1.0	19	11.8–19.0	14.8±2.2
Notch ray of pectoral-fin length	17	7.1–12.4	9.6±1.1	4	8.4–11.2	9.7±1.4	19	4.5–10.5	8.1±1.5
Predorsal length	18	25.7–30.5	27.9±1.3	4	26.6–30.8	28.8±1.8	19	30.5–38.7	34.7±2.2
Pre-anal-fin length	18	34.4–43.2	40.4±2.3	4	43.9–47.7	46.6±1.8	19	40.8–50.6	45.5±2.5
Snout to pelvic-disc length	18	10.9–17.1	15.1±1.6	4	16.1–20.3	18.5±2.0	19	15.6–22.8	19.5±2.0
Snout to anus length	18	24.9–33.1	28.7±2.0	4	34.4–37.2	35.6±1.2	19	24.8–31.6	29.0±1.9
Pelvic disc length	18	8.6–12.4	9.9±0.9	4	11.1–12.6	11.7±0.7	19	8.0–11.5	9.3±1.0
Pelvic disc width (flattened)	18	7.8–10.3	8.8±0.7	4	9.9–12.4	11.2±1.0	19	6.3–11.0	8.9±1.2
Pelvic disc to anus length	18	1.6–5.6	3.9±1.2	4	5.8–6.9	6.4±0.6	19	0.2–1.9	0.9±0.4
Anus to anal-fin length	18	10.4–16.1	13.7±1.6	4	8.8–15.9	12.5±3.0	19	14.5–29.8	20.4±4.1
Post anal-fin origin length	18	56.8–65.6	59.6±2.3	4	52.3–56.1	53.4±1.8	19	49.4–59.2	54.5±2.5
Caudal-fin length	18	11.5–14.4	12.8±0.8	4	11.7–14.6	12.8±1.3	18	10.3–16.1	13.5±1.5
Dorsal-fin attachment to caudal-fin length	18	2.3–4.0	3.0±0.5	4	2.0–3.3	2.7±0.6	18	4.6–8.5	6.1±1.1
Anal-fin attachment to caudal-fin length	18	2.7–5.3	3.5±0.6	4	2.0–4.0	2.9±0.9	18	5.1–9.0	6.9±1.3
Caudal-fin base depth	18	2.1–3.0	2.5±0.3	4	2.4–3.0	2.7±0.3	19	1.5–2.9	2.2±0.3
Nasal tube length	18	0.8–1.8	1.3±0.3	4	1.7–2.2	2.0±0.2	18	0.6–2.4	1.4±0.5
Meristics									
Dorsal-fin rays	18	38–43	40.4±1.3	4	38–40	38.8±1.0	19	47–52	50.2±1.3
Anal-fin rays	18	32–37	33.9±1.3	4	32–33	32.5±0.6	19	43–45	43.7±0.7
Pectoral-fin rays	18	28–32	29.4±1.2	4	26–29	27.5±1.3	19	32–38	34.7±1.6
Pectoral-fin lower lobe rays	18	6–10	8.0±0.8	4	6–8	7.0±0.8	19	6–8	6.6±0.8
Principal caudal-fin rays	17	10–12	10.8±0.5	3	10–11	10.7±0.6	13	11–13	11.2±0.6
Precaudal vertebrae	18	9–10	9.2±0.4	4	9–9	9.0±0	19	10–11	10.1±0.2
Caudal vertebrae	18	33–37	34.8±1.2	4	33–34	33.5±0.6	19	43–47	45.1±0.8
Total vertebrae	18	42–46	44.0±1.3	4	42–43	42.5±0.6	19	53–57	55.1±0.8
Pterygiophores anterior to haemal spine I	17	1–2	1.5±0.5	4	1–2	1.5±0.6	18	1–2	1.1±0.3
Gill rakers	14	4–8	5.6±1.2	3	6–9	7.7±1.5	11	4–6	4.8±0.8

depth, F/V *Vesteraalen*, cruise 2000-01, haul 139, benthic bag, 24 June 2000; UW 200016, 44.3 mm, 52.331°N, 172.747°W, 447 m depth, F/V *Sea Storm*, cruise 2002-01, haul 156, J. W. Orr, 23 July 2002; UW 200017, 48.2 mm, 51.4516°N, 178.6279°W, 453 m depth, F/V *Sea Storm*, cruise 2016-01, haul 103, W. A. Palsson, 2 July 2016; UW 200018, 39.7 mm, 52.3334°N, 172.7459°W, 439 m depth, F/V *Ocean Explorer*, cruise 2018-01, haul 52, 22 June 2018; UW 200020, 47.8

mm, 51.8066°N, 174.5565°W, 323 m depth, F/V *Ocean Explorer*, cruise 201801, haul 85, N. E. Roberson, 30 June 2018; UW 200021, 40 mm, 51.5508°N, 177.6611°W, 328 m depth, F/V *Ocean Explorer*, cruise 2018-01, haul 99, N. E. Roberson, 3 July 2018.

Diagnosis.—*Careproctus spiraki* is distinguished from all other described North Pacific species of *Careproctus* by having a slender body covered with small bumps and anterior dorsal-fin rays forming a lobe with deeply exserted rays. *Careproctus maslenikovae*, new species, shares these characters, but *C. spiraki* differs in its more slender, longer body reflected in the following morphometric characters: body depth at pelvic disc less (17.3–24.6 % vs. 24.1–31.0 % in *C. maslenikovae*, new species); head width less (11.1–14.9 % vs. 15.1–20.1 %); anus placed more anteriorly, snout to anus length less (24.9–33.1 % vs. 34.4–37.2 %), anus closer to the posterior edge of the pelvic disc (1.6–5.6 % vs. 5.8–7.0 %); pre-anal-fin length shorter (34.4–43.2 % vs. 43.9–47.7 %); and length posterior to anal-fin origin longer (56.8–65.6 vs. 52.3–56.1 %). The following meristic characters are also different between the two species: vertebrae 42–46 in *C. spiraki* (vs. 42–43 in *C. maslenikovae*, new species), dorsal-fin rays 38–43 (vs. 38–40), and pectoral-fin rays 28–32 (vs. 26–29). *Careproctus spiraki* is also similar to *C. lacrima*, new species, but is further and readily distinguished from it in its more slender body with its tight skin (vs. more robust body with loose thin skin in *C. lacrima*, new species), two suprabranchial pores (vs. one pore), two separate chin pores (vs. one chin pore), and lower meristic counts (dorsal-fin rays 38–43 vs. 47–52 in *C. lacrima*, new species; anal-fin rays 32–37 vs. 43–45; pectoral-fin rays 28–32 vs. 32–38; and total vertebrae 42–46 vs. 53–57).

Description.—Body slender, tapering posteriorly, rounded anteriorly, moderately compressed posteriorly; greatest depth at dorsal-fin origin 72.3–115.3 (109.6) % HL. Body posterior to anal-fin origin long, about 56.8–65.6 (57.0) % SL. Head moderately large 23.4–26.7 (25.1) % SL, dorsal profile narrowly rounded from nape to snout. Snout rounded, slightly projecting beyond upper jaw, length about equal to orbit length, 22.0–33.3 (33.3) % HL, jaws terminal. Mouth small, maxilla 35.6–43.0 (37.1) % HL, extending anterior to mid-orbit, oral cleft extending anterior to orbit. Premaxillary tooth plates matching mandibular tooth plates. Premaxillary and mandibular teeth trilobed in 7–14 oblique rows, increasing from three to five teeth in anteromedial rows to nine teeth in posterolateral rows. Diastema absent at symphysis of upper and lower jaws. Orbit large, 21.2–35.0 (31.8) % HL, dorsal margin below dorsal contour of head, suborbital depth to oral cleft 29.0–76.0 (38.1) % OL; pupil large, round. Interorbital space broad, fleshy distance 26.8–46.1 (37.1) % HL, bony distance 16.1–23.5 (17.4) % HL, slightly convex. Nostril single, with base of well-developed tube at level with middle to upper part of orbit; nostril tube length 3.4–7.2 (3.8) % HL, 11.9–23.5 (11.9) % OL.

Pores of cephalic lateralis of moderate size: nasal pores two, maxillary pores six, preoperculomandibular pores seven, suprabranchial pores two (pore pattern 2-6-7-2); chin pores paired in separate pits. Interorbital pore absent. Free neuromasts (Andriashev and Stein, 1998) not observed.

Gill rakers 4–8 (5), short, rounded with tiny spines. Gill opening small, 15.5–29.4 (15.9) % HL, upper margin at level of dorsal part of orbit, extending to just above pectoral fin. Opercular flap angular. Branchiostegal rays six.

Dorsal-fin rays 38–43 (40; Table 1), anterior 5–6 rays exserted, deeply emarginate, forming slight lobe, anterior uniserial and unsegmented, more posterior rays biserial and segmented; all rays simple. Predorsal inserted between neural spines two and three, anteriormost dorsal-fin pterygiophore inserted between neural spines three and four, together bearing a single ray.

Anal-fin rays 32–37 (33; Table 1), all rays biserial, segmented, and simple. One or two anal-fin pterygiophores each bearing a single ray anterior to first haemal spine. Anal-fin origin below vertebrae 10–11 or 11–12 (caudal vertebrae 1–2).

Pectoral fin moderately notched, with 28–32 (29) rays (Table 1). Upper lobe of 20–24 (23) rays extending to anal-fin origin or beyond to anal-fin ray four, dorsalmost rays lengthening to rays 5–7, more ventral rays gradually shortening to shortest ray of notch. Lower lobe short, with 6–9 (8) rays, extending to about anus; dorsal rays slightly and gradually lengthening to thicker and slightly fleshy rays 5–6, ventral rays more slender and gradually shortening to ventralmost ray near pectoral symphysis. Tips of rays 5–30 % free of membrane, lower 5–6 rays more strongly exserted. Rays in notch slightly more widely spaced than rays of lobes. Uppermost pectoral-fin ray level with ventral rim of orbit. Lowermost pectoral-fin ray below posterior part of orbit.

Proximal pectoral radials four (1+1+1+1), robust; radial one slightly notched at scapular fenestra, radials two through four round, unnotched, radial four not widely spaced from radial three (Fig. 3A). Scapular fenestra small, other fenestrae absent. Scapula with strong helve; coracoid narrowly triangular with broad lamina. Distal radials present at base of pectoral-fin rays two to 23, more ventral distal radials reduced, absent from base of ventralmost 6 rays, which articulate with non-staining fibrocartilage.

Pelvic disk large, 35.7–47.3 (37.1) % HL, flat, round, slightly longer than wide, anterior lobe moderately developed. Anus much closer to pelvic disk than to anal-fin origin.

Principal caudal-fin rays 10–12 (11; Table 1), dorsal procurrent rays 1, ventral procurrent rays 0–1 (1). Membrane of posterior dorsal-fin rays attached to caudal fin for 18.9–29.1 (22.6) % CL; posterior anal-fin rays, 22.6–47.0 (29.0) % CL.

Skin thin, small rounded bumps covered with tiny prickles widespread over body. Pyloric caeca 16–18, thick, length about 37% HL.

Vertebrae 42–46 (43), 9 or 10 (10) precaudal, 33–37 (33) caudal (Table 1). Pleural ribs 2–3, present on vertebrae 9 and 10 when 2, present on vertebrae 7–9 or 8–10 when 3, anteriormost shorter and more slender, those more posterior longer and thicker. Hypural plate composed of dorsal and ventral plates divided by a small to large split up to 75% length of plate. Single epural present.

The largest specimen examined was a ripe 52.5 mm female with yolked eggs (UW 159753). The smallest female with yolked eggs was 39.7 mm (UW 111834). The largest male examined was 41.9 mm (UW 155710); no males examined had enlarged, swollen testes.

Coloration.—In life, body overall red to pink, darkening slightly posteriorly with darker speckling (Fig. 1A). Anterior

pores of head surrounded by unpigmented areas, lips unpigmented. Bright white blotch behind pectoral fin over abdomen. All fins with red rays, membranes unpigmented. Peritoneum and orobranchial cavity pale; stomach, intestines, pyloric caeca, and urogenital papilla pale. When preserved, body pale with faint dark pigment posteriorly at base of dorsal and anal fins and on sides of body (Fig. 2A).

Distribution.—*Careproctus spiraki* has been collected only in the Aleutian Islands, from Kiska Island in the west (177.5°E) to north of Umnak Island in the east (169.1°W) at depths of 193–447 m (Fig. 4).

Life history.—One partially digested specimen (discarded) was found in the stomach of a *Malacocottus zonurus* taken in the central Aleutian Islands.

Etymology.—The species epithet *spiraki*, to be treated as a noun in apposition, is derived from the Greek σπυριά, meaning small rice-like bumps, and refers to the small bumps covering the body.

Careproctus maslenikovae, new species

urn:lsid:zoobank.org:act:6D0043CE-B8C6-4F26-9FCE-AB993CFD0D63
Blushing Snailfish
Figures 1B, 2B, 3B, 4; Table 1

Holotype.—UW 155708*, 36.9 mm, ripe female, Aleutian Islands, west of the Islands of Four Mountains, 52.6466°N, 170.2027°W, 234 m depth, F/V *Gladiator*, cruise 2006-01, haul 35, benthic bag, J. W. Orr, 15 June 2006.

Paratypes.—3 specimens, 29.4–40.3 mm. SIO 20-13 (ex UW 200023), 37.0 mm, ripe female, 51.6084°N, 178.8598°W, 322 m depth, F/V *Sea Storm*, cruise 2002-01, haul 76, benthic bag, K. P. Maslenikov, 28 June 2002; UW 154503*, 29.4 mm, male, 51.6716°N, 178.3111°W, 261 m depth, F/V *Gladiator*, cruise 2006-01, haul 91, W. C. Flerx, 2 July 2006; UW 200022, 40.3 mm, ripe female, 51.4564°N, 178.4459°W, 280 m depth, F/V *Sea Storm*, cruise 2002-01, haul 72, K. P. Maslenikov, 26 June 2002.

Diagnosis.—*Careproctus maslenikovae* is distinguished from all other described North Pacific species of *Careproctus* by having a robust body covered with small bumps and anterior dorsal-fin rays forming a lobe with deeply exserted rays. *Careproctus spiraki* shares these characters but *C. maslenikovae* differs in its more robust, shorter body reflected in having a greater body depth at pelvic disc (24.1–30.9 % vs. 17.3–24.6 % in *C. spiraki*), greater head width (15.1–20.1 % vs. 11.1–14.9 %); more anteriorly placed anus, with snout to anus length 34.4–37.2 % (vs. 24.9–33.1 %); anus placed farther from the posterior edge of the pelvic disc (5.8–7.0 % vs. 1.6–5.6 %); longer pre-anal-fin length (43.9–47.7 % vs. 34.4–43.2 %); and shorter length posterior to anal-fin origin (52.3–56.1 vs. 56.8–65.6 %). The following meristic characters are also less in *C. maslenikovae* than in *C. spiraki*: vertebrae 42–43 (vs. 42–46 in *C. spiraki*), dorsal-fin rays 38–40 (vs. 38–43), and pectoral-fin rays 26–29 (vs. 28–32). *Careproctus maslenikovae* is also similar to *C. lacrima*, new species, but is further and readily distinguished from it in its more slender body with its tight skin (vs. more robust body with loose skin in *C. lacrima*), two suprabranchial pores (vs. one pore), two separate chin pores (vs. one chin pore), and far lower meristic counts (dorsal-fin rays 38–40 vs. 47–52 in *C. lacrima*, new species; anal-fin rays 32–33 vs. 43–45; pectoral-fin rays 26–29 vs. 32–38; and total vertebrae 42–43 vs. 53–57).

Description.—Body stout, tapering posteriorly, slightly compressed, depth at dorsal-fin origin 92.7–111.5 (109.6) % HL. Body posterior to anal-fin origin short, about 52.3–56.1 (52.3) % SL. Head moderately large, 26.0–28.5 (28.2) % SL, dorsal profile rounded from nape to snout. Snout rounded, slightly projecting beyond upper jaw, slightly longer than orbit, 26.1–36.5 (32.7) % HL. Mouth small, maxilla 38.3–46.9 (45.2) % HL, extending to mid-orbit, oral cleft extending anterior to orbit. Lower jaw slightly inferior, premaxillary tooth plates matching mandibular tooth plates. Premaxillary and mandibular teeth trilobed in 8 or 9 oblique rows, increasing from four to six teeth in anteromedial rows to nine teeth in posterolateral rows. Diastema absent at symphysis of upper and lower jaws. Orbit large, 24.0–29.8 (29.8) % HL, dorsal margin below dorsal contour of head, suborbital depth to oral cleft 54.6–78.3 (61.3) % OL; pupil round. Interorbital space broad, fleshy width 47.9–56.7 (56.7) % HL, bony width 23.5–30.1 (29.8) % HL, slightly convex. Nostril single, with base of well-developed tube at level with upper part of orbit; nostril tube length 6.1–7.7 (7.7) % HL, 22.6–30.4 (27.3) % OL.

Pores of cephalic lateralis of moderate size: nasal pores two, maxillary pores six, preoperculomandibular pores seven, suprabranchial pores two (pore pattern 2-6-7-2); chin pores paired in separate pits. Interorbital pore absent. Free neuromasts not observed.

Gill rakers 6–9 (8), short, rounded with tiny spines. Gill opening small, 14.6–22.9 (19.2) % HL, upper margin at level of mid-orbit or dorsal part of orbit, extending to just above pectoral fin. Opercular flap narrowly rounded. Branchiostegal rays six.

Dorsal-fin rays 38–40 (39; Table 1), anterior 5–6 rays exserted, deeply emarginate, forming slight lobe, anterior uniserial and unsegmented, more posterior rays biserial and segmented; all rays simple. Predorsal inserted between neural spines two and three, anteriormost dorsal-fin pterygiophore inserted between neural spines three and four, together bearing a single ray.

Anal-fin rays 32–33 (32; Table 1), all rays biserial, segmented, and simple. One or two anal-fin pterygiophores each bearing a single ray anterior to first haemal spine. Anal-fin origin below vertebrae 11–12 (caudal vertebrae 1–2).

Pectoral fin moderately notched, with 26–29 (29) rays (Table 1). Upper lobe of 20–22 (22) rays extending to anal-fin origin or beyond to anal-fin ray two, dorsalmost rays lengthening to rays 5–6, more ventral rays gradually shortening to shortest ray of notch. Lower lobe short, with 7–8 (7) rays, extending to anus; dorsal rays gradually lengthening to thick and fleshy rays 3–4, ventral rays gradually shortening to ventralmost ray near pectoral symphysis. Tips of rays 5–40 % free of membrane, lower rays more strongly exserted. Rays in notch slightly more widely spaced than rays of lobes. Uppermost pectoral-fin ray level with ventral rim of orbit. Lowermost pectoral-fin ray below posterior rim of orbit.

Proximal pectoral radials four (1+1+1+1), robust, unnotched, radial four not widely spaced from radial three, radial 2 larger than all others (Fig. 3B). Scapular fenestra

small, other fenestrae absent. Scapula with slender strong helve; coracoid narrowly triangular with broad lamina. Distal radials present at base of all except the first pectoral-fin ray, more ventral distal radials reduced.

Pelvic disk large, 40.4–44.6 (42.7) % HL, flat, round, about equal in length to width, anterior lobe moderately developed, flat with margins often slightly upturned. Anus closer to pelvic disk than to anal-fin origin.

Principal caudal-fin rays 10–11 (11; Table 1), dorsal procurrent rays 1, ventral procurrent rays 1. Membrane of posterior dorsal-fin rays attached to caudal fin 14.0–27.9 (20.0) % CL; posterior anal-fin rays, 14.0–30.8 (20.0) % CL.

Skin thin, small rounded bumps covered with tiny prickles widespread over body. Pyloric caeca 16–18, thick, length about 43% HL.

Vertebrae 42–43 (43), 9 precaudal, 33–34 (34) caudal (Table 1). Pleural ribs absent or one reduced pair on penultimate precaudal vertebra. Hypural plate composed of dorsal and ventral plates divided by deep split about 50–75 % length of plate. Single epural present.

Of four specimens examined, three, including the holotype, were females 36.9–40.3 mm with ripe eggs. The smallest specimen was a 29.4 mm immature male (UW 154503).

Coloration.—In life, body overall light red-orange (Fig. 1B). Top of head from nape to snout pale, unpigmented. Red slash extending from nares posteriorly over eyes and joining pigmented red-orange cheeks. Anterior pores of head surrounded by unpigmented areas, lips unpigmented. Bright white flash behind pectoral fin over side of abdomen; pale, unpigmented area posterior to white flash above anal-fin origin extending to dorsal-fin base posterior to anterior lobe. All fins with red rays, membranes unpigmented. Eye black. Peritoneum and orobranchial cavity pale; stomach, intestines, pyloric caeca, and urogenital papilla pale. When preserved, body uniformly pale with scattered fine dark speckling (Fig. 2B).

Distribution.—*Careproctus maslenikovae* has been collected only in the Aleutian Islands at depths of 234–322 m (Fig. 4). The holotype was collected just west of the Islands of Four Mountains (170.2°W), while all paratypes were collected about 600 km to the west in the vicinity of Tanaga Island (178.3°W to 178.9°W).

Etymology.—Named for the diligent collector of many snailfish types and other specimens, Katherine P. Maslenikov, Collections Manager of the Burke Museum's Fish Collection at the University of Washington, and for her contributions to and cheerful support of ichthyology in the Pacific Northwest.

Careproctus lacrima, new species

urn:lsid:zoobank.org:act:22CE355B-89E3-40D8-8872-92B6E1C87A70
Teardrop Snailfish
Figures 1C, 2C, 3C, 4; Table 1

Careproctus sp. J: Orr et al., 2019: 33, table 3 (molecular phylogenetics).

Holotype.—UW 200024 (out of UW 49434), 50.2 mm, ripe female, Aleutian Islands, north of Tanaga Island, 52.0038°N, 177.8278°W, 111 m depth, F/V *Sea Storm*, cruise 200201, haul 118, J. W. Orr, 11 July 2002.

Paratypes.—30 specimens, 31.4–60 mm. SIO 20-14 (ex UW 200029), 58.5 mm, 52.8714°N, 171.3223°W, 207 m depth, F/V *Vesteraalen*, cruise 200001, haul 75, W. C. Flerx, 11 June 2000; SIO 20-15 (ex UW 200048), 53.3 mm, 51.2943°N, 179.3892°E, 141 m depth, F/V *Ocean Explorer*, cruise 201801, haul 124, N. E. Roberson, 12 July 2018; UW 49434*, 45–47.5 mm, 52.0038°N, 177.8278°E, 111 m depth, F/V *Sea Storm*, cruise 200201, haul 118, in 95% ethanol, J. W. Orr, 11 July 2002, collected with holotype; UW 159754, 45.2 mm, 52.2378°N, 173.4039°W, 109 m depth, F/V *Sea Storm*, cruise 200401, haul 57, J. W. Orr, 18 June 2004; UW 200025, 60 mm, 52.8043°N, 171.5425°W, 210 m depth, F/V *Dominator*, cruise 200001, haul 81, benthic bag, K. P. Maslenikov, 11 June 2000; UW 200026, 52.2 mm, 52.3518°N, 174.5383°W, 116 m depth, F/V *Dominator*, cruise 200001, haul 101, benthic bag, K. P. Maslenikov, 15 June 2000; UW 200027, 47.6 mm, 51.9730°N, 176.0841°E, 85 m depth, F/V *Dominator*, cruise 200001, haul 227, K. P. Maslenikov, 20 July 2000; UW 200028, 40.0 mm, 51.8653°N, 177.7627°E, 112 m depth, F/V *Vesteraalen*, cruise 199701, haul 188, 28 July 1997; UW 200030, 42 mm, 51.6057°N, 178.8612°W, 250 m depth, F/V *Vesteraalen*, cruise 200001, haul 128, W. C. Flerx, 21 June 2000; UW 200031, 2, 44.8–46.2 mm, 51.8222°N, 177.679°E, 133 m depth, F/V *Vesteraalen*, cruise 200001, haul 149, W. C. Flerx, 27 June 2000; UW 200032, 50 mm, 52.0591°N, 176.3951°E, 162 m depth, F/V *Vesteraalen*, cruise 200001, haul 176, 6 July 2000; UW 200033, 43.5 mm, 51.9253°N, 178.3918°E, 90 m depth, F/V *Vesteraalen*, cruise 200201, haul 155, benthic bag, R. N. Clark, 6 July 2002; UW 200034, 31.4 mm, 51.8899°N, 179.7352°E, 93 m depth, F/V *Sea Storm*, cruise 200201, haul 129, J. W. Orr, 14 July 2002; UW 200035, 46.8 mm, 52.0940°N, 172.4287°W, 163 m depth, F/V *Sea Storm*, cruise 200201, haul 164, benthic bag, R. C. Harrison, 28 July 2002; UW 200036, 50.0 mm, 52.2485°N, 173.091°W, 139 m depth, F/V *Sea Storm*, cruise 201001, haul 80, N. E. Roberson, 3 July 2010; UW 200037, 47.7 mm, 51.7163°N, 175.7843°E, 93 m depth, F/V *Sea Storm*, cruise 201001, haul 133, N. E. Roberson, 16 July 2010; UW 200038, 2, 50.0–54.0 mm, 51.6416°N, 177.4531°W, 133 m depth, F/V *Sea Storm*, cruise 201001, haul 163, benthic bag, K. P. Maslenikov, 25 July 2010; UW 200039, 47.0 mm, 51.931°N, 176.6729°E, 147 m depth, F/V *Sea Storm*, cruise 201401, haul 158, G. R. Hoff, 18 July 2014; UW 200040, 51.0 mm, 52.2753°N, 173.3868°W, 121 m depth, F/V *Sea Storm*, cruise 201801, haul 56, N. E. Roberson, 23 June 2018; UW 200041, 45.0 mm, 52.7315°N, 169.8518°W, 195 m depth, F/V *Sea Storm*, cruise 201901, haul 1, P. Von Szalay, 24 May 2019; UW 200042, 50.6 mm, 52.8416°N, 171.4327°W, 204 m depth, F/V *Gladiator*, cruise 200401, haul 36, benthic bag, K. P. Maslenikov, 15 June 2004; UW 200043, 49.0 mm, 51.9767°N, 176.8038°E, 134 m depth, F/V *Gladiator*, cruise 200401, haul 141, M. Martin, 11 July 2004; UW 200044, 2, 49–51.2 mm, 51.9774°N, 176.8028°E, 128 m depth, F/V *Gladiator*, cruise 200401, haul 142, N. Laman, 11 July 2004; UW 200045, 43.0 mm, 51.2946°N, 179.3899°E, 140 m depth, F/V *Gladiator*, cruise 200401, haul 169, R. N. Clark, 19 July 2004; UW 200046, 50.4 mm, 51.935°N, 173.7147°W, 104 m depth, F/V *Ocean Explorer*, cruise 201001, haul 54, W. C. Flerx, 23 June 2010; UW 200047, 50.0 mm, 51.6177°N, 178.1900°W, 131 m depth, F/V *Ocean Explorer*, cruise 201001, haul 148, 20 July 2010.

Diagnosis.—*Careproctus lacrima* is distinguished from all other described North Pacific species of *Careproctus* by having a small teardrop-shaped body, with loose thin skin, and anterior dorsal-fin rays buried in tissue. Among species of the *C. canus* species group (Orr et al., 2019), *Careproctus lacrima* is most similar to small *C. canus*, differing in having seven preoperculomandibular pores (vs. six in *C. canus*), lower counts of dorsal-fin rays (47–52 vs. 51–55) and vertebrae (53–57 vs. 55–60), and a smaller maximum size (60 mm vs. 198 mm). *Careproctus lacrima* is also similar to *C. spiraki* and *C. maslenikovae* but is further and readily distinguished from them in lacking small, rounded bumps on its body and in having a single chin pore (vs. two chin pores), higher counts of pectoral-fin rays (32–38 vs. 28–32 in *C. spiraki* and 26–29 in *C. maslenikovae*), vertebrae (53–57 vs. 42–46 and 42–43), dorsal-fin rays (47–52 vs. 38–43 and 38–40), and anal-fin rays (43–45 vs. 32–37 and 32–33).

Description.—Body teardrop-shaped, deep and rounded anteriorly, tapering posteriorly, moderately compressed, depth at dorsal-fin origin 75.8–103.6 (88.5) % HL. Body posterior to anal-fin origin short to moderately long, about 49.4–59.2 (56.2) % SL. Head large, 27.7–33.6 (29.5) % SL, broadly rounded from nape to snout to pectoral-fin insertion. Snout rounded, slightly projecting beyond upper jaw, longer than orbit, 24.7–32.1 (29.5) % HL. Mouth small, maxilla 35.6–43.2 (38.5) % HL, extending to mid-orbit, oral cleft extending anterior to orbit, jaws terminal. Premaxillary tooth plates matching mandibular tooth plates. Premaxillary and mandibular teeth broadly trilobed in a broad band of 9–12 oblique rows of 6–9 teeth per row. Diastema absent at symphysis of upper and lower jaws. Orbit small, diameter 19.7–26.6 (25.0) % HL, dorsal margin well below dorsal contour of head, suborbital depth to oral cleft 50.0–100.0 (59.5) % OL; pupil tiny, reduced to a pinpoint. Interorbital space moderately broad, fleshy width 21.4–36.0 (35.1) % HL, bony width 12.0–23.0 (23.0) % HL, convex. Nostril single, in well-developed tube at level with upper part of orbit; nostril tube length 1.9–8.1 (8.1) % HL, 8.8–32.4 (32.4) % OL.

Pores of cephalic lateralis large: nasal pores two, maxillary pores six, preoperculomandibular pores seven, suprabranchial pores one (pore pattern 2-6-7-1); chin pore single. Interorbital pore absent. Free neuromasts not evident.

Gill opening small, 16.3–30.3 (21.0) % HL, upper margin at level of mid-orbit or dorsal part of orbit, extending to just above pectoral fin. Opercular flap rounded. Branchiostegal rays six.

Dorsal-fin rays 47–52 (51; Table 1), anterior 4–5 rays buried in tissue, uniserial and unsegmented, more posterior rays biserial and segmented; all rays simple. Anterior 15 rays not exserted; more posterior rays slightly exserted. Anteriormost dorsal-fin pterygiophore inserted between neural spines three and four or four and five (three and four), bearing a single ray.

Anal-fin rays 43–45 (44; Table 1), anterior ray unsegmented, more posterior rays biserial and segmented; all rays simple. Anterior 5–6 rays not exserted; more posterior rays slightly exserted. One or two anal-fin pterygiophores each bearing a single ray anterior to first haemal spine. Anal-fin origin below vertebrae 12–13 (caudal vertebrae 2–3).

Pectoral fin moderately notched, with 32–38 (35) rays (Table 1). Upper lobe of 25–32 (29) rays extending to anal-fin origin or beyond to anal-fin ray three, dorsalmost rays lengthening to rays 6–7, more ventral rays gradually shortening to shortest ray of notch. Lower lobe short, with 6–8 (6) rays, extending just past anus; dorsal rays gradually lengthening to thick and fleshy rays 2–3, ventral rays more slender and gradually shortening to ventralmost ray near pectoral symphysis. Tips of rays 5–50 % free of membrane, lower rays more strongly exserted. Rays in notch slightly more widely spaced than rays of lobes. Uppermost pectoral-fin ray level with lower part of orbit. Lowermost pectoral-fin ray below posterior rim of orbit.

Proximal pectoral radials four (1+1+1+1), robust; all radials round, unnotched, radial four not widely spaced from radial three (Fig. 3C). All fenestrae absent. Scapula small, with strong helve and rounded base, lacking distinct posterior arm; coracoid broadly triangular with broad lamina. Distal radials present at base of all but first pectoral-fin ray, more ventral distal radials smaller.

Pelvic disk moderate in size, 24.7–37.9 (30.4) % HL, round, slightly longer than wide, anterior lobe moderately developed, flat with margins often turned slightly down or up. Anus much closer to pelvic disk than to anal-fin origin.

Principal caudal-fin rays 11–13 (11; Table 1), dorsal procurrent rays 2, ventral procurrent rays 1–2 (1). Membrane of posterior dorsal-fin rays attached to caudal fin 35.6–56.8 (51.4) % CL; posterior anal-fin rays, 37.0–75.0 (62.5) % CL.

Skin thin, fragile, prickles tiny, in patches, apparently easily lost; bumps absent. Pyloric caeca seven, thick, length about 35% HL.

Vertebrae 53–57 (55), 10–11 (10) precaudal, 43–47 (45) caudal (Table 1). Pleural ribs 2–3, present on vertebrae 9–10 or 8–10, anteriormost short and slender, those more posterior long and slender. Hypural plate composed of dorsal and ventral plates divided by split about 50% length of plate. Single epural present.

The largest specimen examined was a 60.0 mm ripe female (UW 200025). The smallest female with yolked eggs was 43.5 mm (UW 200033). The largest male examined was 47.5 mm (UW 49434); no males examined had enlarged, swollen testes.

Coloration.—In life, body pale, mostly translucent, small white spots over head to nape, faint darker pigment scattered internally over posterior part of body (Fig. 1C). Flash of white covering belly from pectoral fin base to near anal-fin origin. Pectoral fins unpigmented, translucent; pelvic disc white; median fins translucent, rays with faint pigment. Iris brassy. Peritoneum and orobranchial cavity pale; stomach, intestines, pyloric caeca, and urogenital papilla pale. When preserved, body uniformly pale with scattered fine dark speckling (Fig. 2C).

Distribution.—*Careproctus lacrima* has been collected only in the Aleutian Islands, from off Kiska Island (176.8°E) to north of Amukta Island (171.3°W) at depths of 90–207 m (Fig. 4).

Etymology.—The specific epithet refers to the translucent and tear-drop shaped body. It is derived from the Latin *lacrima* for tear or teardrop to be treated as a noun in apposition.

DISCUSSION

The three new species are more similar to one another than to all other species of *Careproctus* in the North Pacific. Two of the new species were recovered in a moderately well-

supported clade in the recent molecular phylogenetic analysis of Orr et al. (2019: fig. 10) designated as the *C. canus* species group. *Careproctus spiraki* (as "*Careproctus* sp. A") was placed as the sister species of *C. lacrima* (as "*Careproctus* sp. J") and *C. canus*. Although not included in the molecular analysis, *C. maslenikovae* is similar in size and coloration to *C. spiraki*, and the two species are clearly closely related. *Careproctus spiraki* and *C. maslenikovae* are distinguished from each other by several significant differences in body shape, particularly body depth and posterior body length, and meristic characters, and both are easily distinguished from *C. lacrima* by their possession of small bumps on the body, an anterior dorsal-fin lobe, two chin pores, and lower meristic counts of vertebrae and median fins.

Careproctus canus in contrast is a much larger species distinctive in its loose skin, grayish body, and posterior dorsal and anal fins that are confluent with the caudal fin (Fig. 1D). It differs clearly in meristic counts, having 55–60 total vertebrae, 51–55 dorsal-fin rays, 43–47 anal-fin rays, and 32–36 pectoral-fin rays. Counts are higher and slightly overlapping in *C. lacrima* in all but pectoral-fin rays but higher than and not overlapping in all counts with both *C. spiraki* and *C. maslenikovae*. Body shape differs as well, with *C. canus* having a smaller orbit (4.0–4.6 % vs. 5.5–7.4 % among the three new species), narrower fleshy interorbital width (5.5–6.6 % vs. 6.5–15.9 %), smaller mouth (maxilla length 6.9–8.5 % vs. 8.7–13.6 %, mandible length 7.7–11.1 % vs. 9.1–14.9 %), shorter lower pectoral-fin lobe (8.6–11.6 % vs. 11.2–19.0 %), shorter pre-dorsal-fin length (23.1–23.4 % vs. 25.7–38.8 %), shorter pre-anal-fin length (22.0–22.3 % vs. 24.8–37.2 %), and smaller pelvic disk (disk length 7.1–7.9 % vs. 8.0–12.6 %, disk width 5.5–6.9 % vs. 9.9–12.4 %).

Among other small liparids with a distinct disc are *C. abbreviatus*, which reaches a maximum size of 100 mm, and *Lopholiparis flerxi* obtaining 38 mm (Maslenikov et al., 2013). *Careproctus abbreviatus*, known certainly from only three specimens (Burke, 1930; Chernova et al., 2004; Maslenikov et al., 2013), can be easily distinguished from all by its low count of pectoral-fin rays (21–24); small, deeply cupped pelvic disc; and absence of an anterior dorsal-fin lobe. *Lopholiparis flerxi*, another rare species known from only five specimens (Orr, 2004; Maslenikov et al., 2013; UW 159752), is readily identified by its heavily ossified superficial head bones, distinct rounded anterior dorsal-fin lobe, and low vertebral and dorsal- and anal-fin ray counts (Orr, 2004). In life, *C. lacrima* has small white spots covering the head and nape, similar to *Lopholiparis* (Maslenikov et al., 2013: fig. 2E), but lacks the anterior dorsal-fin lobe and superficial ossified bones of the head, and it has much higher meristic counts. Other similarly small liparids in the region are among the pelagic or semi-pelagic species of *Paraliparis* and the monotypic *Liparisscus* and *Nectoliparis*. These small species all reach maximum lengths of 70–100 mm (Kido, 1988, 1993; Mecklenburg et al., 2002), similar to the new species, but are easily distinguished from them by the absence of a pelvic disc.

Other North Pacific species with a distinct anterior dorsal-fin lobe include *C.* (*Temnocora*) *candidus* and related undescribed species (Orr, unpubl. data; J. Gardner, pers. comm., January 2020). All are larger species, variegated in body color, with an elliptical pupil and typically higher meristic counts than either *C. spiraki* or *C. maslenikovae*, the two new species with an anterior dorsal-fin lobe.

The geographic ranges of all three new species overlap across the Aleutian Islands, although none of the species were collected together in the same haul. *Careproctus lacrima* was collected in shallower depths, while *C. maslenikovae* and *C. spiraki* were collected deeper. Among the three, *Careproctus spiraki* was collected at the deepest depths of about 450 m, near the deepest trawling depths attempted in surveys of the Aleutian Islands since the 1980s.

I have tentatively identified one specimen (UW 158306) as *C.* sp. cf. *spiraki* from the eastern Aleutian Islands that has a pectoral-fin ray count of 41, nine rays more than any other specimen of *C. spiraki*. It is similar in having an anterior dorsal-fin lobe with exserted rays and similar vertebral and median fin counts, as well as being similar in general body morphology, but it was fixed in 95% ethanol at sea and is distorted. It likely is an undescribed species, but I postpone its description until additional material in good condition is available.

MATERIAL EXAMINED

Careproctus abbreviatus: SU 3082, 53 mm, holotype, photo and x-ray only, 54.3167°N, 159.6667°W, 1143 m depth, *Albatross* station 3338, 28 August 1890; UW 117359, 52 mm, 51.5636°N, 178.3331°E, 465 m depth, F/V *Dominator*, cruise 2000-01, haul 156, 30 June 2000; UW 151411, 3, 35–50 mm, 52.6504°N, 172.2440°W, 397 m depth, F/V *Dominator*, cruise 1997-01, haul 74, R. C. Harrison, 26 June 2000.

Careproctus candidus: *Temnocora candida*, USNM 74384, 60.7 mm, holotype, off Attu I., Aleutian Islands, 52.9278°N, 173.43°E, 247 m depth, *Albatross* station 4784, 11 June 1906. Other material listed by Orr and Maslenikov (2007).

Careproctus canus: UW 47852, 6, 160–182 mm, 52.9784°N, 170.9474°E, 122 m depth, F/V *Vesteraalen*, cruise 2002-01, haul 92, W. C. Flerx, 19 June 2002; UW 156561, 198 mm, 52.1017°N, 176.004°E, F/V *Sea Storm*, cruise 2016-01, haul 166, P. Von Szalay.

Careproctus sp. cf. *spiraki*: UW 158306, 54.6 mm, 52.6076°N, 172.3766°W, 284 m depth, F/V *Alaska Provider*, cruise 2016-01, haul 40, R. Wilborn, 17 June 2016.

Lopholiparis flerxi: UW 47868, 32.5 mm, holotype, 51.4593°N, 178.4612°W, 278 m depth, F/V *Vesteraalen*, cruise 2000-01, haul 120, W. C. Flerx, 20 June 2000; UW 113820, 38 mm, 51.9774°N, 176.8102°E, 135 m depth, F/V *Gladiator*, cruise 2004-01, haul 143, G. C. Jensen, 11 July 2004; UW 113885, 32 mm, 52.1187°N, 176.2799°E, 121 m depth, F/V *Gladiator*, cruise 2004-01, haul 148, G. C. Jensen, 12 July 2004; UW 119829, 32.5 mm, 51.3533°N, 178.9297°W, 166 m depth, F/V *Sea Storm*, cruise 2010-01, haul 172, K. P. Maslenikov, 27 July 2010.

DATA ACCESSIBILITY

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