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OPAEOPHACUS ACROGENEIUS, A NEW GENUS AND SPECIES OF ZOARCIDAE (PISCES: OSTEICHTHYES) FROM THE BERING SEA

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Abstract.—*Opaeophacus* (with *O. acrogeneius,* a previously undescribed zoarcid from the Bering Sea) is a new genus close to *Nalbantichthys* Schultz, *Andriashevia* Fedorov and Neyelov, and *Puzanovia* Fedorov. It differs from all known fishes in having a slot-like, vertically-oriented cavity in the lens of the eye. *Opaeophacus* has firm skin, normal penultimate and ultimate vertebrae, lacks scales, lacks palatine and vomerine teeth, has lateral neuromast organs, pectoral fins, gill opening entirely above the pectoral fin, and six branchiostegal rays. Those characters in combination differentiate the genus.

Four specimens of a new fish from near Seguam Island in the Bering Sea, and another collected north of Umnak Island were presented to Oregon State University. Comparison of the new form with the known genera of Zoarcidae showed that it is clearly distinct and we therefore propose a new monotypic genus for it.

Methods

Specimens were fixed at sea in 10% formalin-seawater solution and later transferred to 50% isopropanol. Counts and measurements follow Hubbs and Lagler (1958). All specimens were radiographed, and one (USNM 260321) was cleared and counterstained with alizarin and alcian blue by the method of Dingerkus and Uhler (1977). The ranges of counts and ratios are given first, followed by the values for the holotype in parentheses. Specimens are on deposit at the National Museum of Natural History, Washington, D.C. (USNM), the California Academy of Sciences, San Francisco (CAS), and the Department of Fisheries and Wildlife, Oregon State University, Corvallis (OS).

Opaeophacus, new genus

Type-species.—*Opaeophacus acrogeneius*, n. sp.

Diagnosis.—Optic lens with vertical, slot-like cavity, filled with soft hyaline gelatinous material; no pelvic fins or lateral jaw lobes; ultimate and penultimate vertebrae normal; scales, palatine teeth and vomerine teeth absent; body lateral line present, of free lateralis organs; pectoral fin present, with 4–5 rays; 6 branchiostegal rays; no opening behind last gill arch; gill openings entirely dorsal to base of pectoral fin; small pseudobranchiae present; only unbranched soft rays in all fins, with those in caudal, pectoral and posterior one-third of dorsal and anal fins segmented; no pyloric caeca.

Comparisons.—This genus is part of the "natural group" suggested by Fedorov and Neyelov (1978) to contain *Nalbantichthys* Schultz, 1967, *Puzanovia* Fedorov, 1975, and *Andriashevia* Fedorov and Neyelov, 1978. It shares the general shape,

massive lower jaw, blunt head, reduced pectoral fin, reduced gill opening, and reduced lateral line of those genera. It differs from all three in the absence of scales; from *Nalbantichthys* in having lateral sensory neuromasts, six branchiostegals, and firm skin; from *Puzanovia* in having the gill opening entirely dorsal to the base of the pectoral fin; and in the absence of vomerine teeth, scales, and an opening behind the fourth gill; and from *Andriashevia* in having pectoral fins, in the absence of palatine teeth and an opening behind the fourth gill, and in having segmented soft rays.

It also differs from all related genera in having a slot-like, vertical pit extending halfway to the center of the lens of the eye.

Etymology.—The generic name is taken from the Greek 'opaeos,' "with a hole" and 'phakos,' "lens."

Opaeophacus acrogeneius, new species
Fig. 1

Holotype.—USNM 260320, 145 mm SL, female collected off Seguam Island, Bering Sea at 52°42'N, 172°15'W, depth of capture 500–800 m, by G. Hewitt, aboard M/V *Mito Maru 82,* a long-liner, 12 Apr 1979. It was associated with an unidentified orange colonial coelenterate.

Paratypes.—USNM 260321, 137 mm SL, male and 147 mm SL, male, cleared and stained; CAS 52802, 151 mm SL male; same collection data as holotype. OS 10000, 154 mm SL, female, Bering Sea, North of Umnak Island, 53°33'N, 169°18'W, at 600–700 m by R. McClure, M/V *Shintoko Maru 37,* 27 Sep 1982. It was associated with unidentified black coral and basket starfish snagged by a hook of a long-line.

Diagnosis.—Same as for genus.

Counts.—Vertebrae 144–149 (148), 25–26 (26) precaudal; dorsal fin rays 141–148 (146); anal fin rays 121–124 (123); caudal fin rays 8–9 (9); pectoral fin rays 4–5 (4); branchiostegals 6 (6); gill rakers 11 + 0 + 3 on first arch. Ratios as % of SL. Head 11.2–12.0 (11.2); depth of head 7.4–8.3 (7.4); snout 3.0–3.5 (3.2); eye 1.5–1.7 (1.5); width of lower jaw 5.8–6.8 (5.9). Distance from pectoral fin base to gill opening 1.4–2.0 (1.4); snout to anus 24.4–25.4 (24.5).

Description.—Body elongate, tapering from blunt head to pointed tail, greatest depth about 8% SL. Skin thick and firm in newly preserved specimens. Head about 12% SL, broader ventrally. Massively fleshed lower jaw slightly longer than upper jaw; rictus of mouth extends to below posterior margin of eye; maxillae completely covered by skin; no separate lips. Eye small, about 14% HL, covered by membrane continuous with skin of head; lens with elongate vertical pit filled with soft gelatinous material extending into lens about 25% of its diameter (Fig. 1). One pair of tubular nostrils, directed forward. Cephalic lateralis pores small; one interorbital pore; 3 pores in occipital commissure; postorbital pores 3, one over gill opening; suborbital pores 5; supraorbital pores 2; preoperculomandibular pores 6; no lateral lobes, ridges or cirri on head. Teeth on dentaries and premaxillae sharp and recurved at tip, those at jaw symphyses larger; dentary teeth nearly hidden by tissue of jaws; palatine and vomerine teeth absent. Both upper and lower oral valves large; glossohyal covered by thick "tongue." No slit behind last gill arch; pseudobranchiae present; gill opening small, entirely dorsal to pectoral

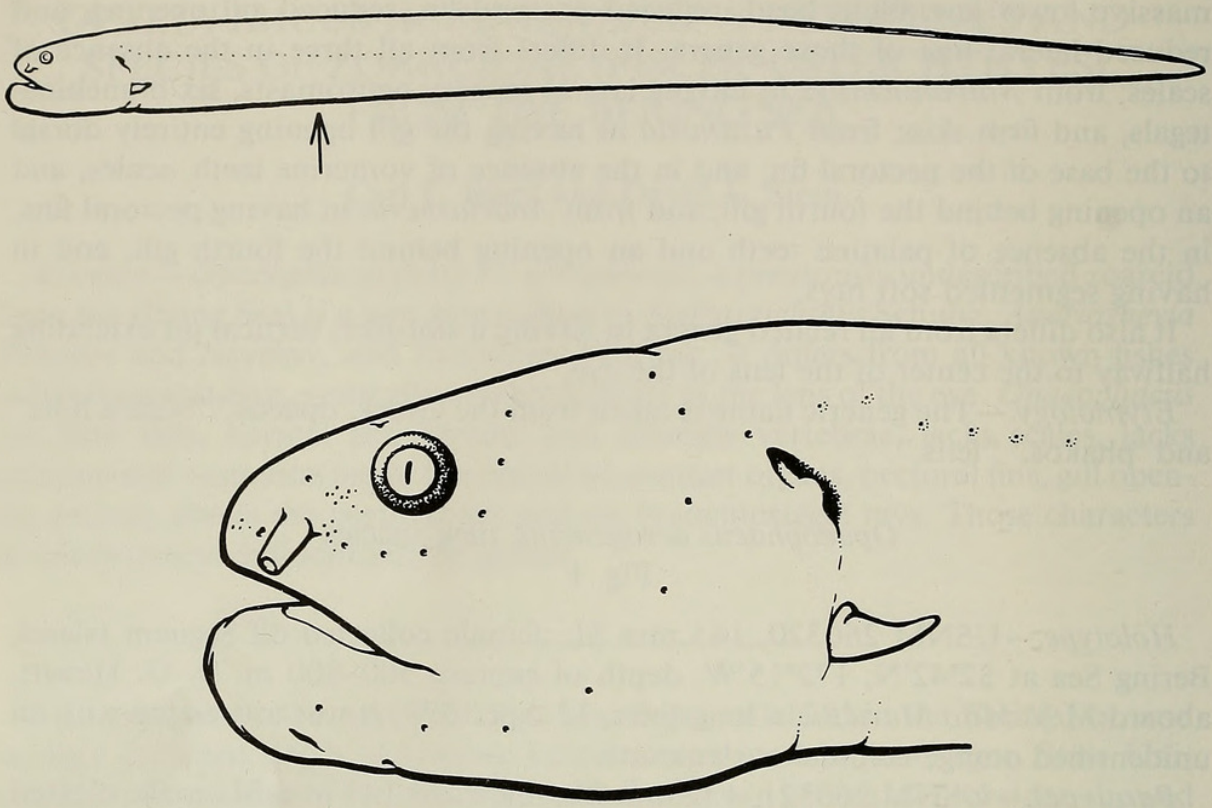

Fig. 1. Above. *Opaeophacus acrogeneius,* holotype, USNM 260320, 145 mm SL, showing disposition of lateral neuromasts. Arrow indicates position of anus. Below. Head of holotype showing slit in eye lens and the disposition of cephalic sensory pores. Drawings by Bonnie Hall.

fin. Lateral line midlateral with about 65 tiny crater-like pits extending posteriorly for about 65 to 70% of SL. Scales and pelvic fins absent. Pectoral fins small and slender; dorsal and anal fins completely hidden in skin. Only soft rays present, unbranched; those in caudal, pectoral, and posterior third of dorsal and anal fins segmented. Pyloric caeca absent. Vertebrae inequiamphicoelous; penultimate vertebra normal.

Color in life and soon after fixation bright tangerine orange, very closely resembling the color of the colonial coelenterate from which the specimens from Seguam Island were collected. Color faded in alcohol to light tan within a few months.

Etymology.—From the Greek 'akrogeneios', meaning "with prominent chin."

Remarks.—The strange eye lens of *Opaeophacus* with its slot-like vertical cavity constitutes a puzzling adaptation. If the soft gelatinous material that fills the cavity has a refractive index different from that of the lens, light striking the cavity would not be focused on the fundus of the retina but would be scattered to the anterior and posterior of the retina. Unless some unknown specialization provides otherwise, that would seem to have the effect of destroying visual acuity, but would spread any available light over a greater number of visual cells. A possible advantage could be the detection of silhouettes of organisms moving against a dimly lighted background.

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