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ANNOTATED CHECKLISTS OF FISHES

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Family Icosteidae Jordan & Gilbert 1880

ragfishes

By

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A highly compressed body and soft, largely cartilaginous skeleton make ragfishes unusually flexible, although they are not exactly “limp like a rag” as characterized in early literature. They also are not as fragile as sometimes reported, possibly from examination of partially decomposed carcasses washed ashore, but have thick, tough skin. The juveniles and adults differ greatly in appearance and were originally described as different species. The transition to adult form occurs between 40 and 60 cm standard length. Body deep in juvenile, elongate in adult. Eyes small. Mouth terminal and large. Dorsal and anal fins single, long, and high, comprising 50–56 and 33–44 soft rays, respectively. Caudal peduncle long and slender. Caudal fin large and paddlelike, rounded in juvenile and emarginate in adult. Pectoral fins fanlike, pedunculate, 20–22 rays. Pelvic fins and scales present in juvenile, absent in adult. Two nostrils, close together toward front of snout, on each side. Lateral line canal single, with keel of minute spines. Teeth uniserial, small, sharp, closely and evenly set; vomerine and palatine teeth absent. Gill membranes separate, free from the isthmus; except joined and attached to the isthmus for a short distance anteriorly. Branchiostegal rays 6 or 7. Gill rakers 7–17 on first arch. Swim bladder absent.* Vertebrae 66–70. Juvenile light brown blotched yellow and purple, adult dark purplish brown. Total length to 213 cm (7 ft). Juveniles in shallow water or offshore near the surface; adults near bottom and deep, to 1,420 m. Reported to feed on cephalopods and small fishes, but intake of those prey is evidently in minor amounts compared to intake of jellyfishes. Distributed in North Pacific Ocean from California to Japan. One species.

Ragfish morphology and biology have not been adequately described. The following information was provided by K. Gus Thiesfeld (Humboldt State University, California). The cartilaginous skeleton, “watery” muscle tissue, lack of a swim bladder, presence of a prominent fleshy keel along the ventral midline, lack of pelvic fins, and lack of scales indicate adult ragfish are deepwater cruisers. Juveniles seem to have an affinity for sheltering beneath jellyfishes and floating objects. They are frequently caught in jellyfish-infested waters and a live-captured juvenile, evidently the first reported to be held alive, took shelter under floating debris. Ragfish have been collected with partially digested jellyfishes in their guts. Although ragfish reportedly eat squids and other fishes, none of the nearly 40 fresh-caught ragfish dissected by Thiesfeld had squid beaks, fish bones, or crustacean carapace fragments. The morphology of the gill arches and gut is unusual and may be specialized for a diet composed of jellyfishes, salps, and ctenophores. Thiesfeld coined the term “gelativory” for this type of diet.

*Lockington (1880:65 [ref. 2817]), Jordan and Gilbert (1883:619 [ref. 2476]), Jordan and Evermann (1896:972 [ref. 2443]), Regan (1923:610 [ref. 26855]), and McAllister (1968:151 [ref. 26854]) all reported the swim bladder to be present in *Icosteus*. However, Gus Thiesfeld (pers. comm.) found no swim bladder in adult and juvenile specimens (more than 60) he dissected; and Ann C. Matarese and coworkers (pers. comm. to Thiesfeld) found the organ to be lacking in larval and postlarval *Icosteus*. I did not find a swim bladder in the two juveniles and one adult I dissected after learning of Thiesfeld’s observations.

The systematic position of the Icosteidae has not been established with certainty. When Lockington (1880 [ref. 2817]) described *Icosteus* he remarked that its relations are probably with the blennioids. Regan (1923 [ref. 26855]) suggested that ragfishes may be specialized, degenerate perciforms. The taxon has been proposed as a separate order Icosteiformes (e.g., McAllister 1968 [ref. 26854], Gosline 1971 [ref. 26857]) and as a suborder Icosteioidei of Perciformes (e.g., Greenwood et al. 1966 [ref. 26856]). The latter treatment is followed by recent authors (e.g., Nelson 1994 [ref. 26204], Eschmeyer 1998 [ref. 23416]). The sequence of fin formation and a reduced number of pelvic fin rays (present in juveniles) are blennioid-like characters whereas the eggs, larvae, and early juveniles superficially resemble those of stromateoid fishes (Matarese et al. 1984 [ref. 13672]).

The family-group name was first used by Jordan and Gilbert (1880:307 [ref. 2469]) in a comparison of *Icosteus* with *Ichthyos*, although first use is sometimes attributed to a later work (Jordan and Gilbert 1883 [ref. 2476]) where the authors included *Icosteus*, *Ichthyos*, and *Bathymaster* in the family. Authors currently recognize *Ichthyos* and *Bathymaster* as belonging to the Centrolophidae (Stromateoidei) and the Bathymasteridae (Zoarcoidei), respectively.

Genus *Icosteus* Lockington 1880

Icosteus Lockington 1880:63 [ref. 2817]. Type species *Icosteus aenigmaticus* Lockington 1880. Type by monotypy.

Schedophilopsis Steindachner 1881:396 [ref. 4232]. Type species *Schedophilopsis spinosus* Steindachner 1881. Type by monotypy.

Acrotus Bean 1888:631 [ref. 227]. Type species *Acrotus willoughbyi* Bean 1888. Type by monotypy.

Icosteus aenigmaticus Lockington 1880

Icosteus aenigmaticus Lockington 1880:63 [ref. 2817] (San Francisco market, California, U.S.A.). Syntypes: CAS (2), lost in 1906.

Schedophilopsis spinosus Steindachner 1881:396 [4 of separate] [ref. 4232] (San Francisco, California, U.S.A.). Holotype (unique): NMW 59817.

Acrotus willoughbyi Bean 1888:631 [ref. 227] (Quinaielt Indian Agency, Damon, Washington, U.S.A.). Holotype (unique): USNM 39340 (lost).

DISTRIBUTION: North Pacific: Bering Sea to southern California, Okhotsk Sea, and Pacific coast of southern Honshu, Japan.

REMARKS: Lockington (1880) based the description of *Icosteus aenigmaticus* on two juvenile specimens (25 cm [10 in] and 29 cm [11.5 in]) “procured in the market of San Francisco” which evidently were lost in the 1906 earthquake and fire. The disposition of a smaller specimen collected in Washington and reported by Lockington (1880) to be in the museum of the University of California at Berkeley is unknown. Another specimen, USNM 27398, is sometimes listed as a possible syntype but was collected at Point Reyes, California, in 1880 by D. S. Jordan and is not a type.

Schedophilopsis spinosus was based on a juvenile measuring 17 cm (6.7 in) caught in deep water near San Francisco (Steindachner 1881:397 [ref. 4232]). Steindachner’s and Lockington’s ragfish types were not illustrated, but that was not unusual for 19th century ichthyology.

The holotype of *Acrotus willoughbyi* measured 161 cm (63.5 in) long. The fish was found on the beach, and afterward preserved in brine. By the time T. H. Bean received it at the U.S. National Museum a half a year or more later, it was so fragile that he stated his intent to give it to the osteologist, Frederick Lucas, for a skeletal preparation. Lucas provided observations on the skeleton (Bean 1888:631–632 [ref. 227]). Sometime later the specimen was discarded or lost; it was not found during inventory in 1980 or again in February 2003. Bean (1888) reported that the museum had received a color sketch of the holotype prepared by the collector, Charles Willoughby; the sketch was not published.

Summary Lists

Genus-Group Names of Family Icosteidae

Acrotus Bean 1888 = *Icosteus* Lockington 1880

Icosteus Lockington 1880 = *Icosteus* Lockington 1880

Schedophilopsis Steindachner 1881 = *Icosteus* Lockington 1880

Incertae Sedis Genus-Group Names

None

Unavailable Genus-Group Names

None

Species-Group Names of Family Icosteidae

aenigmaticus, *Icosteus* Lockington 1880 = *Icosteus aenigmaticus* Lockington 1880

spinus, *Schedophilopsis* Steindachner 1881 = *Icosteus aenigmaticus* Lockington 1880

willoughbyi, *Acrotus* Bean 1888 = *Icosteus aenigmaticus* Lockington 1880

Incertae Sedis Species-Group Names

None

Unavailable Species-Group Names

None

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Acknowledgments

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