New Records of Three Fish Species from Hawaii

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The first significant report on the meso- and bathypelagic fishes of Hawaii was based on material collected by the 'Albatross' in December, 1891. Eight beam trawl hauls were made in Kaiwi Channel at depths of 295-375 fm. Of the 26 species collected, all but 5 were described by Gilbert and Cramer (1897) as new species. In 1902, the 'Albatross' was sent to carry out a survey of the deep water fauna of the Hawaiian Islands, supervised by David S. Jordan and Barton W.Evermann. The area surveyed included the major islands and the leeward islands up to Laysan Island. The 344 hauls, mostly at depths not more than 400 fm, yielded 111 species from depths of 100 fm or more and of which 70 were described as new species (Gilbert, 1905). Since Gilbert's reports (1905) on the fishes collected by the 'Albatross', practically no work had been done on deep-sea fishes in Hawaii for over 45 years. In the late 1940's the National Marine Fisheries Service in Honolulu became interested in tuna fishing in the central Pacific Ocean. Ships such as H. M. 'Smith' and others, while being employed mainly in tuna surveys, collected a fair amount of pelagic and deep-sea fishes by trawling as well as long lines. In 1967, after the arrival of the 'Townsend Cromwell' in the islands, the National Marine Fisheries Service (NMFS) in Honolulu launched a five-year survey of the deep water around the Hawaiian Islands which was led by Dr. Paul Struhsaker. The first four cruises yielded 182 species of which 29 were new to Hawaii (Struhsaker, 1973). Two years later, Dr. T. A. Clarke of the University of Hawaii started collecting meso- and bathypelagic fishes, concentrating mainly on myctophid and stomiatoid fishes. A more or less regular sampling is still being carried out by NMFS as well as the University of Hawaii.

Although the benthic fish fauna of Hawaii below 100 fm is one of the best known in the world (Randall, 1976), the accidental catching of the unique megamouth shark, *Megachasma pelagios* Taylor, Compagno et Struhsaker, 1983 and the new species and records resulting from recent deep dives of the submersible 'Makalii' (Gon, 1985; Suzumoto, personal communic.) indicate that there is more to be discovered in the deeper water around the islands.

Counts and measurements follow Hubbs and Lagler (1958) and photophore terminology follows Grey (1964). The depth of the suborbital bone in *Paratrachichthys* is the greatest distance between the ventral margin of the orbit and the ventral edge of the bone. The specimens examined for this study are deposited in the Bernice P. Bishop Museum, Honolulu (BPBM).

Family Trachichthyidae

*Paratrachichthys prosthemius* Jordan et Fowler, 1902
(Fig. 1)

*Paratrachichthys prosthemius* Jordan and Fowler, 1902: 9, fig. 1 (Suruga Bay).

Three adult females of *P. prosthemius*, a new record to Hawaii, were found in a collection recently donated to the Bishop Museum by Dr. Paul J. Struhsaker. These were mixed with 52 specimens of *P. heptalepis* recently described from Hawaii (Gon, 1983). The specimens (BPBM 29261, 60.0 and 61.4 mm SL; BPBM 29262, 60.8 mm SL) were trawled by the NMFS vessel 'Townsend Cromwell' off Haleiwa, Oahu, in the depth range of 90-110 m.

Dorsal rays V, 13; anal rays III, 8; pectoral rays 12/12; transverse rows of scales 59–62; pored...
lateral-line scales 29–30; ventral scutes 9–10; gill-rakers 7–(15–16); 5 or 6 spiny procurrent rays on each side of the caudal fin. Depth of body 2.7–2.8, length of head 2.8–2.9 in SL, caudal peduncle depth 6.8–7.2 and its length 5.5–5.6 in SL; snout 5.1–5.8, eye 2.8–3.0, interorbital 3.7–3.9 in head length; depth of the suborbital bone 2.4 in orbit diameter.

Dorsal ridges on head serrated posteriorly, curving outward behind the eyes. Anteriorly these ridges end on the snout with short, blunt spines. Posttemporal spine long and strong. Opercular spine extending beyond the opercular membrane, but preopercular spine shorter, not reaching beyond the membrane. Anus between pelvic bases. Striated areas on isthmus, under pectoral base along ventral side of body to about caudal base. Teeth in both jaws small, conical, arranged in a wide patch near symphysis, tapering posteriorly to a narrow band; vomer with 4–6 minute teeth and a narrow band on palatines. Posterior projection of cleithrum with a prominent, diagonal, dorsally pointing ridge and few smaller ridges under it. Its edge smooth.

A juvenile specimen (BPBM 28125, 19 mm SL) was collected by the use of rotenone, on Penguin Bank, E of Molokai, at a depth of 650 ft, by Dr. Edith H. Chave during a deep dive in the submersible ‘Makalii’. The juvenile (Fig. 1) resembles the adult fish in its general morphology but differs in proportions. Distinguishing features such as the spine and form of the posttemporal bone, the opercular and preopercular spines, the head ridges, and the extension of the striated area on the caudal peduncle are already distinct. Sciliation of the juvenile is markedly different from the adult. Each scale has 2–3 long spines on its midline, erected in an angle of about 70 degrees to the body surface. In alcohol, the colour of the juvenile is brown on most of the body and head. The head is slightly darker. Ventrals from isthmus to caudal base and under and above anterior half of pectoral fin black. Pelvic fins pale, with scattered melanophores. Other fins pale. Bases of ventral scutes dark but ridges pale.

Paratrachichthys prosthemius, previously known only from Japan (Jordan and Starks, 1904; Jordan et al., 1913; Kamohara, 1950; Abe 1963; Matsubara, 1971; Masuda et al., 1975), differs from P. heptalepis in having a more pointed posttemporal bone with a longer and sharper spine, longer opercular spine and shorter preopercular spine (Gon, 1983). The suborbital bone is smaller, at most 0.5 of orbit compared to about 0.7 of orbit in P. heptalepis. The occipital pit of P. prosthemius has no mesially curved ridges and the posterior projection of the cleithrum is somewhat thicker and more pointed. The striated area along the side of the body of P. prosthemius reaches further on the caudal peduncle, almost to caudal fin base (Gon, 1983). Kuwabara (1955) and Haneda (1957) described the luminous organ of P. prosthemius.

Krefft (1976) found juveniles of P. argyrophanus as far as 1,000 miles off shore in the south Atlantic. It is very likely that P. prosthemius also has a long pelagic stage and that its pelagic juveniles were carried by the Kuroshio current from Japan to the northwestern end of the Hawaiian Ridge and from there migrated to the major islands.

Key to the Trachichthyidae of the Hawaiian Islands

1a. Anus between pelvic fin bases; large scutes between anus and origin of anal fin; anal rays 8 (Paratrachichthys) ............... 2
1b. Anus in front of anal origin; scutes between anus and anal fin origin absent, but present anterior to anus; anal fin rays 10 ....... Hoplostethus mediterraneus

2a. Posttemporal spine weak, in the form of a low ridge of the posttemporal bone; striated area along the ventral side of the body reaching just past anal fin base. P. heptalepis
2b. Posttemporal spine long and pointed; striated area along ventral side of the body reaching almost to caudal fin base ....... P. prosthemius

Family Photichthyidae

Ichthyococcus intermedius Mukhacheva, 1980


A specimen of I. intermedius (BPBM 17863, 53 mm SL) was collected by Dr. T. A. Clarke of the Hawaii Institute of Marine Biology on June 10, 1971 (21°23’N, 158°21’W, 540–590 m, 10-ft IK trawl). Dorsal fin rays 13; anal fin rays 14; 6; pectoral fin 13; pelvic fin 7; caudal fin 17–18; 101