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SCOPELOGADUS (?) *CAPISTRANENSIS*, A NEW FOSSIL MELAMPHAID (PISCES: TELEOSTEI) FROM CAPISTRANO BEACH, CALIFORNIA

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Melamphaidae, a family of bathypelagic fishes that hitherto has been known only from living material, comprises 5 genera and about 33 species. Regan (1911), followed by Ebeling (1962), referred it to the Stephanoberyciformes, an order of peculiar spiny-rayed deep-sea fishes allied with the Beryciformes, but having a hypertrophied open cephalic sensory canal system lined with delicate bony ridges, usually a single triangular supramaxillary bone, often a regressed lateral line, no orbitosphenoid bone, and possibly various other adaptations to life in the deep sea. Ebeling (1962) presented a key to the 5 melamphaid genera: *Melamphaes* Günther 1864, *Sio* Moss 1962, *Scopelogadus* Vaillant 1888, *Poromitra* Goode and Bean 1883, and *Scopeloberyx* Zugmayer, 1911. Ebeling and Weed (in press) revised *Scopelogadus*, which contains three living species, including two subspecies.

Scopelogadus, like other Melamphaidae, is mostly circum-tropical at depths between 100 meters and the bottom. *S. beanii*, however, is antitropical and inhabits both the temperate

North Atlantic and the region of the Subtropical Convergence, which is an area of sinking of water masses at about 40°S lat. (Ebeling and Weed, in press).

Very few fossils of bathypelagic fishes have been reported. Only the Gonostomatidae, Paralepididae, and Myctophidae are listed in Berg (1940) as other than Recent ("Miocene to Recent"). To my knowledge, the only fossil melamphoids were collected by Dr. Andreas B. Rehnitz on May 2, 1956, from Miocene shales along the sea cliff south of Capistrano Beach in Orange County, California. Because counts and measurements of these two small specimens generally agree with those of *Scopelogadus*, they are provisionally placed in this genus (Table 1).

The Capistrano Miocene locality consists mainly of finely laminated diatomaceous shale and mudstone. From the included Foraminifera fauna, Dr. M. N. Bramlette of the University of California, Scripps Institution of Oceanography inferred that the shale-mudstone deposits probably accumulated on the sea floor below 100 fathoms during the Upper Miocene Age (Miller, 1951). Dr. Carl L. Hubbs (pers. comm.), also of Scripps, added that although the lower parts contain algae (20 species thus far discovered), a few fish (herring), and many fish scales, the upper parts are bathypelagic deposits, in which have been found, besides the melamphoids, fossils of the bathypelagic fish *Cyclothone* and of the pelagic crustacean *Pleuromcodes*. Miller (1951) described a new fossil species of petrel, *Oceanodroma hubbsi*, which was also found near the bathypelagic site. More recently, a grunion-like shallow water fish (Atherinidae) was uncovered. As suggested by Dr. Hubbs, it would appear from this stratification of faunas that the deposits originated in a shallow basin, which gradually deepened as a result of either a rise in sea level or a depression of the bottom.

Scopelogadus (?) *capistranensis*, new species

Fig. 1

The following description is mainly of the holotype. Information from an impression of a second, smaller specimen compliments data on numbers of pectoral and pelvic rays and

TABLE 1. COMPARISON OF *Scopelogadus* (?) *capistranensis* WITH THE 5 GENERA OF MELAMPHAIDAE.

Proportions are in per cent standard length.

	<i>S. capistranensis</i>	<i>Scopelogadus</i>	<i>Melamphaes</i>	<i>Sio</i>	<i>Scopeloberyx</i>	<i>Poromitra</i>
Greatest depth of body	33	23-33	25-34	25-30	23-32	26-34
Predorsal length	52	43-54	39-47	45-52	46-56	44-57
Origin of dorsal to caudal base .	50	54-60	57-64	53-56	50-58	50-61
End of dorsal to caudal base.	32	32-40	29-37	26-33	27-38
Head length	45?	33-46	33-44	34-42	30-45	33-46
Tip of snout to back edge of preopercle	28?	19-28	21-28	22-26	25-34	23-35
Greatest depth of head	30	24-30	23-34	26-27	22-32	24-31
Snout to base of pectoral	47	34-43	34-42	34-40	28-47	35-45
The dorsal ray (no. from last) under which anal originates . (±, directly under last ray; —, slightly behind)	4-5	3-6	(—) —5	(±), (—)	(±) —2 or 3	3-9
Snout to anal origin	64	55-66	62-75	65-68	61-75	56-74
Length of caudal peduncle	30	28-40	18-30	25-32	23-29	22-37
Depth of caudal peduncle	11	9-14	9-13	10-13	8-12	8-14
Length of upper jaw	17?	13-19	16-20	13-15	15-23	15-22
Total dorsal rays	12 or 13	12-13	17-21	12	13-15	13-17
Total anal rays	9 or 10	9	9-10	9	8-10	9-12
Precaudal vertebrae	10	10	11-12	10	10	9-10
Caudal vertebrae	14	13-17	14-18	16-17	14-17?	15-20
Serrations on angle of preopercle	Numerous small	Numerous small	Absent or few and large	Numerous, minute	Absent	Numerous or small or large
Total number of disagreements with genus	2	7	10	4	2
Number of meristic disagreements	0	3	1	1	1

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the position of the pelvic fin relative to that of the pectoral. Additional characters are given in Table 1.

Body with greatest depth, at pelvic insertion, about 0.33 standard length. Caudal peduncle with length 2.5 times its least depth. Distance from tip of snout to base of first anal ray almost 0.7 standard length. Head large, 0.45 standard length; its depth about 0.7 its length; 3 or more weak spines faintly visible at posteroventral angle of preopercle. Branchiostegal rays at least 6.

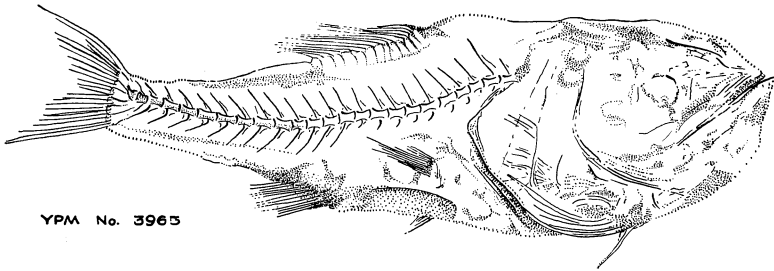


Fig. 1. *Scopelogadus* (?) *capistranensis*, holotype YPM No. 3965, 38.7 mm standard length.

Dorsal fin with about 13 rays (total); origin at middle of body: distance from tip of snout to base of first ray equals distance from this ray to base of caudal fin, which also equals distance from tip of snout to base of pectoral fin. Anal fin with 9 or 10 rays (total); originates under fourth from last dorsal ray. Pectoral fin with more than 12 or 13 rays, possibly 15. Pelvic fin with about 8 rays; inserts directly under pectoral. Caudal fin with 19 principal rays.

Vertebrae on holotype 10 precaudal plus 14 caudal (the first caudal vertebra overlies the first distinct haemal spine, the urostyle is counted as one element); in smaller specimen about 24 to 26. The arch of the first haemal spine apparently lacks the anteroventrally projecting spurs characteristic of some species in *Melamphaes* and *Scopeloberyx*.

MATERIAL

The types are two impressions of whole specimens, catalogued Yale University, Peabody Museum Paleontological Col-

lections No. 3965. The larger, standard length 38.7 mm, is selected as holotype. The vertebral column and most of the fin rays are easily discernible on the holotype (Fig. 1). The impression of the smaller specimen is much fainter and therefore difficult to interpret. On the holotype are impressions of various head bones, including the line of fusion of the hyomandibular with the front of the preopercle, sections of the opercular series, parts of the jaws, branchiostegal rays, fin supports, and the caudal skeleton.

DERIVATION OF NAME

The species name *capistranensis* refers to the locality of discovery of the fossils.

IDENTIFICATION WITH *Scopelogadus*

The fact that *Scopelogadus* (?) *capistranensis* has 19 principal caudal rays and thoracic pelvic fins places it with the berycoid-like fishes. Its general shape, positioning of fins, numbers of fin rays, etc. further refer it to the Melamphaidae. A definite identification of the fossils with *Scopelogadus* was impossible, although the specimens are provisionally referred to this genus by virtue of comparisons with each melamphaid genus. In Table 1 are listed the only characters measureable on the fossils, along with ranges of values for all five melamphaid genera. At the bottom of each "genus column" are: first, the total number of characters whose ranges exclude values for *S. capistranensis* and second, this number of disagreements for meristic characters only. Both *Scopelogadus* and *Poromitra* had only two disagreements. Even though the next lowest proportion of disagreements, 4/18, of *Scopeloberyx* is not significantly different from 2/18 $X^2=0.20$ with one d.f., $0.75 > p > 0.45$), the fossils agree with *Scopelogadus* in both meristic counts and general overall shape, which associate them most strongly with this genus.

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