

**A New Species of Finless Snake Eel (Anguilliformes:
Ophichthidae) from Ascension Island, with
Comments on *Ichthyapus acutirostris***

John E. McCosker

California Academy of Sciences, Golden Gate Park, San Francisco, California 94118;

Email: jmccosker@calacademy.org

Ichthyapus insularis, new species, is described from the intertidal of Ascension Island. It differs from its widespread Atlantic congener, *I. ophioneus*, in its vertebral number and tail length, and from all other *Ichthyapus* in its vertebral number, body proportions, and preopercular pore condition. The identity of *I. acutirostris* Brisout de Barneville (1847), the generic type, is aligned with specimens from Japan.

In preparing the ophichthid section of the Fishes of the Western North Atlantic, Eugenia Böhlke, Jim Böhlke, and I examined a myriad of finless ophichthids (McCosker et al. 1989) and discovered that one species, *Ichthyapus ophioneus*, was widely distributed from Bermuda to Brazil, and that its only Atlantic congener was an undescribed species from Ascension Island. In preparation for the forthcoming ophichthid chapter of FAO's Fishes of the Eastern Central Atlantic, I now describe that new species. In preparing this description, I believe that I have helped to solve the long-lasting conundrum, "what is the identity of *Ichthyapus acutirostris* Brisout de Barneville (1847)?"

MATERIALS AND METHODS

Type specimens of the new species are deposited in the Department of Ichthyology of the California Academy of Sciences (CAS), San Francisco. Measurements are straight-line (point to point) and made with dial calipers and recorded to the nearest 0.1 mm. Body length comprises head and trunk lengths; head length is measured from the snout tip to the posterodorsal margin of the gill opening; trunk length is taken from the end of the head to mid-anus. Vertebral counts (which include the hypural) are taken from radiographs. Preanal vertebrae are counted until mid-anus. Institutional abbreviations follow the Standard Symbolic Codes for Institutional Research Collections in Herpetology and Ichthyology (Leviton et al. 1985).

Ichthyapus insularis McCosker, sp. nov.

(Figs. 1–2; Tables 1–2)

MATERIAL EXAMINED.— **HOLOTYPE:** USNM 214480, an immature male, 427 mm TL, from Southwest Bay, Ascension Island, in 0–1 m, collected by S. Olson on 12 July 1970. **PARATYPES:** USNM 375444, 8(227–423 mm TL), collected with the holotype. CAS 218803, 387 mm TL, collected with the holotype. ANSP 158903, 2 (166–244 mm TL), from southwest side of English Bay, Ascension Island (07°53'48"S, 14°23'06"W), collected among rocks and sand by W.D. Anderson on 16 July 1980.

DIAGNOSIS.— An elongate, finless species of sphaebranchin (*sensu* McCosker 1977) ophichthine with: tail 57–60% and head 9–11% of total length; 4 preopercular pores and 5 pores in supratemporal canal; teeth conical, uniserial on jaws and vomer; body mostly colorless in preservative; and mean vertebral formula -45-123.5, total vertebrae 121–126.

COUNTS AND MEASUREMENTS OF HOLOTYPE (IN MM).— Total length 427; head 46.8; trunk 130.2; tail 250; body depth at gill openings 11.5; body width at gill openings 11.1; body depth at anus 9.8; body width at anus 9.6; snout 6.5; tip of snout to rictus 15.0; eye diameter 1.2; interorbital distance 2.8; gill opening length 7.3; isthmus width 2.2. Vertebral formula -44-121. 120 lateral-line pores, 8 in branchial region, 46 pores before the anus.

DESCRIPTION OF THE HOLOTYPE.— Body elongate, nearly cylindrical throughout, snout and tail tip sharply pointed, depth at gill openings 37 in TL. Branchial basket notably wider and deeper than body. Head and trunk 2.4 in TL; head 9.1 in TL, 2.8 in trunk. Snout sharply pointed, its underside flattened and bisected by a groove nearly to anterior nostrils. Lower jaw short, included, upper and lower lips meet when mouth is closed. Mouth moderately elongate. Rictus well behind rear margin of eye. Eye minute, 12.1 in upper jaw and 39 in head, its center above middle of upper jaw. Anterior nostril non-tubular, a convoluted opening on underside of snout, about midway between tip of snout and tip of lower jaw when mouth is closed. Posterior nostril with an irregular rim, opening inside of mouth. Branchial openings low, ventral, with a median fold forming a pouch; branchial region expanded, creating a bulbous region in posterior half of head.

Head pores (Fig. 1) conspicuous. Single median interorbital and temporal pores. Supraorbital pores 1 + 4, infraorbital pores 5 + 2, supratemporal pores 5, lower jaw pores 4, preopercular pores 4. (The head pores of the 11 paratypes are nearly identical to those of the holotype, save 2 with 5 rather than 4 right lower jaw pores and 1 with 6 rather than 5 supratemporal pores.) 120 lateral-line pores, 8 before gill opening, 46 before anus.

Teeth (Fig. 2) uniserial, small, conical and sharp. Intermaxillary with a chevron of 11 teeth, followed by a short gap and a linear row of 13 vomerine teeth. Jaw teeth nearly subequal, small and close-set, 24–28 teeth in upper jaw and 22–26 teeth in lower jaw.

Body mostly colorless in isopropanol. Faint brown pigment smudges surround the second and third supraorbital pores and overlaying the nape and cheeks; a faint brown posteriorly-directed "V" arises behind posterior mid-orbit and extends to the interorbital pore.

SIZE.— The largest specimen examined is 427 mm, an immature male. None of the specimens appears (examined radiographically, but not by dissection) to be a mature female.

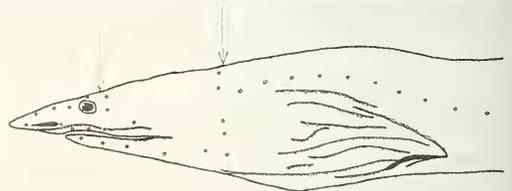


FIGURE 1. Lateral view of the holotype of *Ichthyapus insularis* (USNM 214480, 427 mm TL). Arrows indicate locations of the median interorbital and the temporal pores.

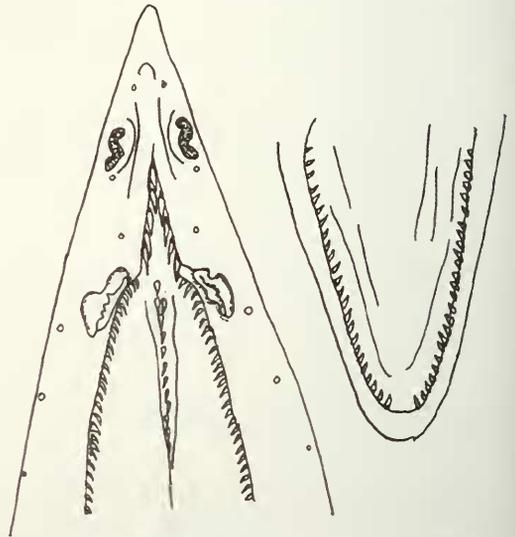


FIGURE 2. Dentition of the holotype of *Ichthyapus insularis* (USNM 214480, 427 mm TL) (upper jaw, left; lower jaw, right). The lips have been slightly retracted to expose the teeth and posterior nostrils.

ETYMOLOGY.— From the Latin *insularis*, of an island, in reference to its apparently endemic location.

DISTRIBUTION.— Known only from Ascension Island.

REMARKS.— Inasmuch as species of *Ichthyapus* lack fins and, particularly in preservative, display little or no differences in coloration, the most useful characters to differentiate species seems to be the preopercular pore (POP) condition, vertebral number, and body/tail proportions. Those characters show limited variation as demonstrated by an examination of 77 specimens of *I. ophioneus* that had a range of total vertebrae from 125–139, and the POP condition of 75 specimens was 4 and only two had 3 pores (McCosker et al. 1989). On that basis,

Ichthyapus insularis appears to be most similar to *I. ophioneus* (Evermann and Marsh), a widespread western Atlantic species from Bermuda, Bahamas, Florida, the Greater Antilles, and St. Helena Island. The two, however, differ in their vertebral number (121–126 vs. 125–139) and the comparative length of head and trunk to total length (.40–.43 vs. .36–.40). Specimens of the new species were compared to and separable from *I. ophioneus* from St. Helena Island. And, although not visible on all specimens, the faint dorsal head coloration of *I. insularis* is lacking in all specimens examined of *I. ophioneus*. The new species can be differentiated from its Pacific and Indian Ocean congeners on the basis of characters listed in Table 2.

The only recent treatment of Ascension Island shorefishes is that of Lubbock (1980). In it he mentions but did not examine an Ascension Island specimen of “*Sphagebranchus ophioneus* found washed up on the beach by the Shackleton-Rowett expedition.” I have not examined that specimen either, but I believe that it will prove to be *I. insularis*.

Lubbock listed 71 shorefish species at Ascension and found 11 to be endemic. Recognizing that *I. insularis* is indeed endemic, the degree of endemism of his ichthyofaunal list is thereby elevated to 12 species or 17%. More recent collecting at Ascension and the reidentification of many museum specimens (for example, two additional ophichthids, *Callechelys bilinearis* and *Phaenomonas longissima*, are now known from Ascension) will undoubtedly modify Lubbock’s analysis.

COMPARATIVE MATERIAL EXAMINED.— 1062 specimens of *Ichthyapus ophioneus*, 50–479 mm TL, from 86 lots from Bermuda, Bahamas, Florida, West Indies, Cuba, Puerto Rico, Lesser Antilles, Panama, Belize, Venezuela, Brazil and St. Helena, including the holotypes of *Sphagebranchus ophioneus* (USNM 49526) and *Sphagebranchus conklini* (FMNH 57731). Those specimens are listed in McCosker et al. (1989:325).

On the Identity of *Ichthyapus acutirostris*

The provenance of the type specimen of *Ichthyapus*, *I. acutirostris* Brisout de Barneville (1847), is unknown in that the type specimen (MNHN 2119, two were described, but only one

TABLE 1. Counts and proportions (in thousandths) of the holotype and 11 paratypes of *Ichthyapus insularis*. TL= total length. HL= head length.

	Mean	Range
TL (mm)	—	166–427
HL/TL	99	90–110
Head and trunk/TL	415	401–426
Tail/TL	585	401–426
Depth at gill opening/TL	25	20–29
Upper jaw/HL	307	267–338
Snout/HL	154	139–167
Eye/HL	25	19–29
Interorbital/HL	65	54–74
Gill Opening/HL	138	113–166
Isthmus/HL	43	32–61
Preanal vertebrae	45	44–46
Total vertebrae	123.5	121–126

TABLE 2. Characteristics of the species of *Ichthyapus*. Abbreviations are: 1, this study; 2, McCosker and Castle 1986; 3, Blache and Bauchot 1972; 4, Hatooka et al. 1995; 5, Randall and McCosker 1975; 6, McCosker et al. 1989; 7, McCosker 2002; POP = preopercular pore condition; body is the proportion of head and trunk (in hundredths); * = holotype.

	POP	Vertebrae	Body/TL	Source
<i>I. acuticeps</i>	4	101–108	47–50	1,2
<i>I. acutirostris</i> *	3	133	40	1,3
<i>I. Japan</i>	3	129–133	42–44	4
<i>I. Easter Island</i>	3	130–134	42–45	5
<i>I. insularis</i>	4	121–126	41–43	1
<i>I. ophioneus</i>	4	125–129	35–40	6
<i>I. selachops</i>	4	137–144	38–40	1
<i>I. "vulturis complex"</i> (except Hawaii)	4	120–130	39–41	1
<i>I. vulturis</i> (Hawaiian archipelago)	3 or 4	120–124	39–43	1,7

remains) lacks locality information other than "Haute-Mer, Océan équatorial." The specimen was collected by "M. Rang" (Monsieur Paul-Charles-Alexandre-Léonard Rang, 1793–1843), a French malacologist who collected primarily in the tropical Atlantic but also visited India, Madagascar (Bauchot et al. 1990:121), and Japan (P. Béarez, in litt., 7 Jan. 2004). There is no indication the he traveled to the South Pacific.

Since its description, *Ichthyapus acutirostris* has been ascribed to specimens from St. Helena Island (Cadenat and Marchal 1963) and from Baja California, Mexico (Blache and Bauchot 1972). The type of *I. acutirostris* has 133 vertebrae and three preopercular pores (POP). It thereby does not agree with any Atlantic species. Blache and Bauchot compared the type specimen to a specimen of *Ichthyapus* from Baja California (MNHN 1893-58) and suggested that the two were conspecific. I have examined both specimens and find the latter to be *Ichthyapus selachops* (Jordan and Gilbert 1882), a widespread eastern Pacific species known from Baja California to Ecuador, which has 137–144 vertebrae ($n = 17$) and four POP. (Table 2 lists the POP and vertebral condition of all known *Ichthyapus*.)

The only species with three POP are *I. acutirostris*, some specimens of Hawaiian *I. vulturis* (the relationship of Hawaiian *I. vulturis* to those across the Indo-Pacific requires further analysis), and specimens of *Ichthyapus* from Easter Island (identified as *I. vulturis* by Randall and McCosker 1975) and Japan (identified as *I. vulturis* by Hatooka et al. 1995). Vertebral numbers of all Hawaiian *I. vulturis* are lower than those of *I. acutirostris*, and on that basis I presume that their identity would reside with specimens now known either from Easter Island or Japan. In that the collector never visited the south Pacific (few if any collections had been made at or near Easter Island before the 20th century) but had traveled to Japan (aboard the *Levant* and after 1836), I suggest that the remaining holotype of *I. acutirostris* is of the same species as the two specimens identified by Hatooka et al. (1995) from Japan. A comparison of the proportions, pore patterns, and dentition as seen in the illustration of the Japanese specimen (Hatooka et al. 1995, fig. 2) with the illustrations of the holotype of *I. acutirostris* (Blache and Bauchot 1972, figs. 14–15) demonstrates that

they are identical. *Ichthyapus vulturis* is known from Japan. I have examined a specimen from Ogasawara Islands (BPBM 35175, 99 mm TL) that has 120 vertebrae and four POP. The identity of the Easter Island specimens remains undetermined. And finally, although species of *Ichthyapus* live in shallow water and are easily captured with rotenone and occasionally captured by dredge sampling, it is possible that additional unknown taxa remain that could be identified with *I. acutirostris*.

ACKNOWLEDGMENTS

I particularly thank the late Eugenia Böhlke (ANSP) for her contributions to our work with the FWNA ophichthid eels. Thanks are also due: Marie Louise Bauchot and Phillipe Béarez of MNHN for their assistance with *I. acutirostris*; the curatorial staffs of AMNH, ANSP, BMNH, BPBM, CAS, FMNH, MCZ, SIO, UMML, and USNM for their assistance with specimens; William Eschmeyer (CAS) for advice concerning nomenclature; Mysi Hoang (CAS) for assistance with the figures; and David Smith (USNM) and Tomio Iwamoto (CAS) for reviewing portions of this manuscript.

LITERATURE CITED

- BAUCHOT, M. L., J. DAGET, AND R. BAUCHOT. 1990. L'ichtyologie en France au début du XIXème siècle. L'histoire naturelle des poissons du Cuvier et Valenciennes. *Bulletin du Muséum national d'Histoire naturelle*, 4e sér., 12(1):3–142.
- BLACHE, J., AND M. L. BAUCHOT. 1972. Contribution à la connaissance des Poissons Anguilliformes de la côte occidentale d'Afrique. *Bulletin de l'IFAN*, sér. A, 34(3):692–773.
- BRISOUT DE BARNEVILLE. 1847. Note sur un nouveau genre d'Anguilliformes. *Revue Zoologique* 1847:219–220.
- CADENAT, J., AND E. MARCHAL. 1963. Résultats des campagnes océanographiques de la Reine-Pokou aux îles Sainte-Hélène et Ascension. Poissons. *Bulletin de l'IFAN*, sér. A, 25(4):1235–1315.
- HATOOKA, K., T. YOSHINO, AND A. ONO. 1995. A rare ophichthid eel, *Ichthyapus vulturis*, from Izu Peninsula, Japan (Pisces: Ophichthidae). *Bulletin of the Osaka Museum of Natural History* 1995(49):19–22.
- LEVITON, A.E., R.H. GIBBS, JR., E. HEAL, AND C.E. DAWSON. 1985. Standards in herpetology and ichthyology: part I. Standard symbolic codes for institutional resources collections in herpetology and ichthyology. *Copeia* 1985:802–832.
- LUBBOCK, R. 1980. The shore fishes of Ascension Island. *Journal of Fish Biology* 17:283–303.
- MCCOSKER, J.E. 1977. The osteology, classification, and relationships of the eel family Ophichthidae. *Proceedings of the California Academy of Sciences* ser. 4, 41(1):1–123.
- MCCOSKER, J.E. 2002. Notes on Hawaiian snake eels (Pisces: Ophichthidae), with comments on *Ophichthus bonaparti*. *Pacific Science* 56(1):23–34.
- MCCOSKER, J.E., E.B. BÖHLKE AND J.E. BÖHLKE. 1989. Family Ophichthidae. Pages 254–412 in *Fishes of the Western North Atlantic, Part Nine, Vol. One: Orders Anguilliformes and Saccopharyngiformes*. Sears Foundation for Marine Research, Yale University, New Haven, Connecticut.
- MCCOSKER, J.E., AND P.H.J. CASTLE. 1986. Family Ophichthidae. Pages 176–186 in M. Smith and P. Heemstra, eds., *The Sea Fishes of Southern Africa*. Macmillan Publ., Johannesburg, South Africa.
- RANDALL, J.E., AND J.E. MCCOSKER. 1975. The eels of Easter Island with a description of a new moray. *Los Angeles County Museum of Natural History Contributions in Science* No. 264. 32 pp.