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SCOMBROSPHYRAENA OCEANICA
FROM THE CARIBBEAN SEA
WITH COMMENTS ON ITS POSSIBLE RELATIONSHIPS

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ABSTRACT

The fish **Scombrosphyraena oceanica** is recorded from the Atlantic Ocean for the first time. A redescription is given. This genus is tentatively placed in the Percichthyidae. The family Scombropidae is shown to be an artificial grouping.

INTRODUCTION

Among lower percoid fishes (**sensu** Gosline, 1966) those which dwell in the depths of the sea (**ca** 100–400 fathoms) remain as enigmatic problems when discussing generic and familial relationships. Most authors (**cf.** Parr, 1933; Norman, 1966) have usually placed them in the Serranidae (**sensu lato**), Lutjanidae or Apogonidae. Gosline (1966) removed some of these fish from the Serranidae and placed them in a recreated family, Percichthyidae. As he suggests, many problems remain. In addition to the presence of unique families (**e.g.** Bathyclupeidae, Scombrolabracidae), at least three other percoid families (Sparidae, Sciaenidae and Branchiostegidae) may have contributed to this fauna.

Characters correlated with the type of deep-water habitat (benthic to mesopelagic) tend to confuse generic and familial relationships. For example increased spination, larger eyes, differing body shapes, changes in dentition, black, red, or silvery coloration, and the development of bioluminous organs are all known to be common adaptations of the deeper living percoids. These and other characters are not often found among possible (if any exist) shallow-water relatives. **Howella, Synagrops** and **Acropoma** serve as examples of the difficulties under discussion (**cf.** Schultz, 1940; Katayama, 1959 and 1960; Gosline, 1966; Norman, 1966).

One of these unusual deep-water percoids, **Scombrosphyraena,** was recently captured by the *R/V Oregon II* while trawling in the Caribbean Sea. Fourmanoir (1970) briefly described this genus and species from the tropical Pacific Ocean. His account is sufficient to identify this genus and species, but because the type specimens are from the stomach contents of tunas, many important characters are not mentioned. The capture of a nearly perfect specimen from the Atlantic Ocean indicates that this species is probably pan-tropical in its distribution and affords this redescription.

MATERIAL EXAMINED

Scombrosphyraena oceanica Fourmanoir, 1970 USNM 204646 female, 92.5 mm SL, Caribbean Sea, 81° 52′ W, 13° 26′ N, at 210 fms by a trawl, 21 November 1968, *R/V Oregon II* station 10201. X-rayed. LECTOTYPE and SYNTYPES. (5, 35–56 mm) 16° 30′ S, 166° 58′ E, stomach contents of **Thunnus alalunga,** 23 July 1968, Santo. SYNTYPE (1, 52 mm) 13° 07′ S, 153° 57′ W, stomach contents of **Thunnus alalunga,** 24 July 1969, Calmar IV. (None cleared and stained.)

COMPARATIVE MATERIAL

(All material is cleared and stained unless otherwise indicated.)

Acropoma japonicum Gunther, 1859 ANSP 51328 (1, 80.7 mm) off Bombay, India, 1924.

Brinkmanella elongata Parr, 1933 SIO 61–37 (1, 104.5 mm) 33° 19′ 18″ to 38′ 06″ S, 72° 34′ 24″ to 31′ 00″ E, in 1878 metres by IKMT, 19 December 1960. X-rayed.

Dinolestes lewini (Griffith, 1834) IB 2682 (2, 61.0–178.8 mm) Australia, New South Wales, Camp Cove, 1945.

Epigonus pandionus (Goode and Bean, 1881) UMML 21434 (1, 61.5 mm) 03° 49′ to 48′ N, 07° 38′ to 42′ E, in 269–264 metres by 40 ft otter trawl, 14 May 1965.

Epigonus telescopus (Risso, 1810) UMML 29015 (1, 87.2 mm) 21° 10′ N, 86° 18′ W, in 155–250 fms by 10 ft otter trawl, Pillsbury 582, 23 May 1967.

Florenciella lugubris Mead and De Falla, 1965 MCZ 45894 PARATYPE (1, 57.2 mm) 01° 58′ to 02° 06′ S, 66° 06′ to 02′ E at 500 metres by IKMT, 21 August 1963.

Howella brodiei Ogilby, 1898 UMML 29016 (1, 51.0 mm) 02° 53′ to 55′ N, 04° 43′ to 48′ E, at 800–900 metres by 10 ft IKMT, Pillsbury 303, 25 May 1965.

Neoscombrops sp. USNM (uncat.) (1, 145.3 mm) 12° 07′ N, 82° 44′ W, depth 105 fms by 60 ft shrimp trawl, Oregon 6444, 7 February 1961.

Parasphyraenops atrimanus Bean, 1912 USNM 74085 HOLOTYPE (1, 84.9 mm) Bermuda. X-rayed.

Pomatomus saltatrix (Linnaeus, 1758) UMML 29017 (1, ?) Florida, no data, dried skeleton.

Rosenblattia robusta Mead and De Falla, 1965 LACM 10073 PARATYPE (1, 49.0 mm) 54° 40.1′ to 55° 05.8′ S, 58° 57.8′ to 59° 05.3′ W, in 896 metres by IKMT, 4 December 1962. X-rayed.

Scombrolabrax heterolepis Roule, 1922 UMML 7102 (1, 60.0 mm) 25° 11′ N, 89° 50′ W, by 41 ft midwater trawl over 1800 fms, 23 May 1958.

Scombrops boops (Houttuyn **in** Lacépède 1802) USNM 49933 (1, 77.0 mm) Japan, Enoshina, Sagami.

Scombrops oculatus (Poey, 1860) UMML 29018 (1, 390.0 mm) Cay Sal Bank at 136 fms off Elbow Cay, 13 August 1967 (dried skeleton).

Synagrops bella (Goode and Bean, 1895) UMML 16997 (1, 76.9 mm) 04° 58′ to 57′ N, 05° 00′ to 01′ W, in 70–105 fms by 6 ft otter trawl, 31 May 1964.

Synagrops microlepis Norman, 1935 UMML 16599 (1, 70.5 mm) 04° 37′ to 38′ N, 02° 32′ to 35′ W, in 60 fms by 40 ft otter trawl, 28 May 1964.

DESCRIPTION

Scombrosphyraena Fourmanoir, 1970

Figures 1–2

The following characters, based on the only known species, **S. oceanica,** are believed to be of generic rank or higher. Importance of the characters is not implied in the order of presentation.

Vertebrae 10+15. Principal caudal rays 9+8, upper- and lower-most unbranched; five hypurals; a free parahypural; two pairs of uroneurals; three epurals; parapophyses from the eighth to tenth vertebrae; pleural ribs from the third to tenth vertebrae; epipleural ribs from the first to tenth vertebrae. Three predorsals. First dorsal pterygiophore with two spines; second and third dorsal pterygiophores between the third and fourth neural spines. First anal pterygiophore with two spines.

Three major opercular spines; eleven smaller subopercular spines; interopercle smooth except for one small terminal spine caudad; preopercle with a smooth ridge, caudad edge serrated, and ventral edge smooth. Upper edge of the lachrymal deeply serrated, lower edge smooth except a short caudad section serrated; upper and lower edges of the second and third infraorbitals serrated. Caudad portion of cleithrum as a spine. Posttemporal with three spines. Frontals with a single spine near the posterodorsal border of the eye.

Branchiostegal rays seven, three on the ceratohyal articulating ventrally, and four on the outer face of the ceratohyal (two) and epihyal (two).

Maxilla excluded from the gape, caudad not completely sheathed by the preorbital shelf; supramaxillae absent; premaxilla with a postmaxillary process, ascending process nearly to level of posterior nostril; premaxilla not overlapped by the maxilla at the distal end.

Teeth on dentary in a single row, all teeth much reduced in size; teeth lacking on the premaxilla, palatine, ectopterygoid, endopterygoid and vomer.

Ctenoid scales on the opercle, subopercle, interopercle, preopercle, infraorbitals, snout, chin, interorbital, occiput, nape, isthmus, breast and on rest of the body extending onto the caudal fin; no scales on the maxilla, soft dorsal and soft anal fins; no scaly fin sheath at the bases of the dorsal and anal fins; no developed axillary scale at the base of the pelvic spine. Lateral line complete, extending nearly to tip of the caudal fin.

Two nostrils on each side, neither tubular.

Pelvic fin thoracic with one spine and five soft rays.

Pseudobranchia well developed and exposed.

Well developed gillrakers on the first and second arches; a slit behind the fourth arch.

Intestine on right side of the abdomen; pyloric caeca large, few in number.

Swim bladder with a single bundle of retia mirabilia and large gas gland, diaphragm present; no anterior extensions of the swim bladder reaching the base of the skull nor is it posteriorly enclosed by the first haemal pterygiophore.

Scombrosphyraena oceanica Fourmanoir, 1970

Figures 1–2

A species of **Scombrosphyraena** with the following additional characters. (based on the Atlantic specimen):

Dorsal VII-I-I,10; anal III,7; pectoral 14–14. Most of the segmented fin-rays branched. Lateral line scales about 54 (left) and 49 (right), but many scales are missing so counts are only approximate. Other scale counts are not possible because of missing scales. Gillrakers on the first arch: 25 lower, including the one at the angle, and 9 upper (left), 25+9 (right), none rudimentary. Gillrakers on the second arch 24+5 (left) and 22+4 (right), the first two rudimentary.

Peritoneum black. Alimentary canal whitish in colour throughout its length, five pyloric caeca. Swim bladder not tough or fibrous, about 28.2 mm in length, rounded at both ends; retia mirabilia bundle 2.8 mm in length. Both gonads large with well developed ova.

Most of the head canal system covered by skin and scales. Pores present only on the lower edge of each lachrymal (two) and on the lower side of the mandible (four). No pores visible elsewhere on the head.

Serrations present on the lachrymal, infraorbitals, preopercle, subopercle and opercle (fig. 2).

Caudal fin slightly forked with ten secondary (procurrent) dorsal rays and nine secondary ventral rays, none spinous.

Proportional measurements expressed as a percentage of standard length (SL): body depth 19.4%; head length 33.1%; horizontal eye length 10.8%; snout length 9.7%; upper jaw length 15.6%; pectoral fin length 18.4%; pelvic fin length 15.2%; first dorsal spine length 1.4%; second 8.6% (broken); third 13.9% (broken but connected); fourth 4.5% (broken); fifth 11.1% (broken but connected); sixth 6.4% (broken); seventh 5.0%; eighth 1.0%; ninth 6.9%; first anal spine length 1.0%; second 3.4%; third 8.9%; pelvic spine length 11.7%; bony interorbital width 6.1%; distance origin of first dorsal fin to snout tip length 36.5%; origin of second dorsal fin to snout tip 60.7%; origin of anal fin to snout tip 63.7%; least depth caudal peduncle 7.0%; caudal peduncle length 25.0%; origin pelvic fin to origin of anal fin 29.3%; origin pelvic fin to anal opening 23.9%.

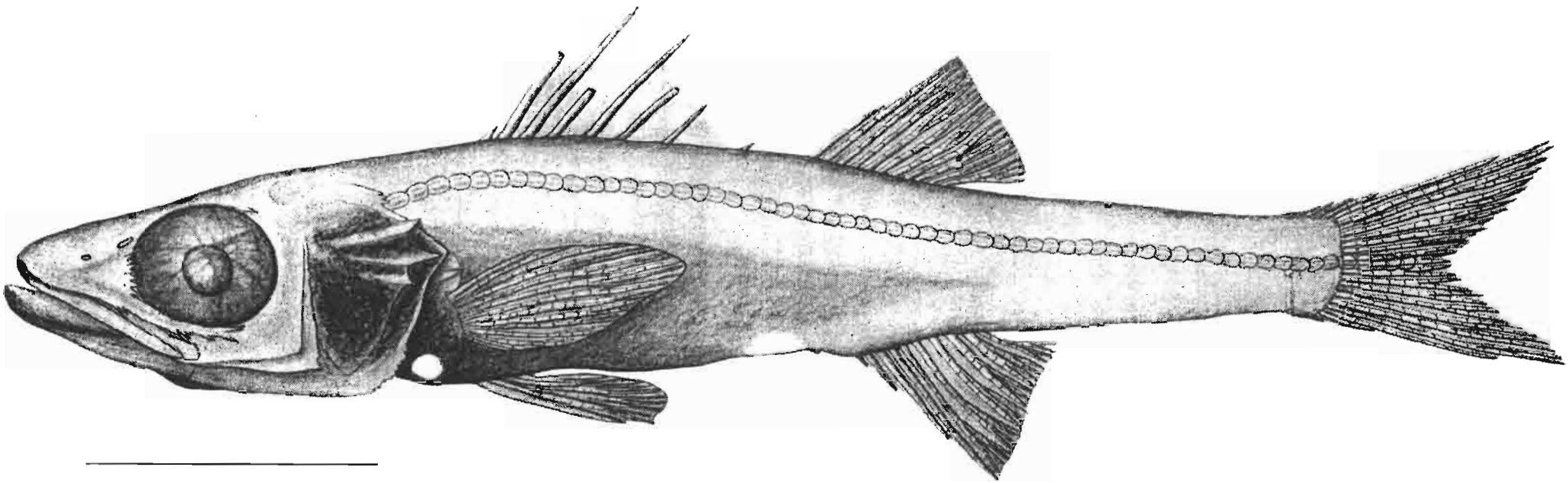

Figure 1

Lateral view of the 92.5 mm SL Atlantic specimen of **Scombrosphyraena oceanica** with all indications of scales removed except for the pored lateral line scales. Scale equals 20.0 mm.

Figure 2

A. Lateral view of the left opercular region of **Scombrosphyraena oceanica** showing the spines and serrations. Scale equals 2.0 mm. p—preopercle, o—opercle, s—subopercle, pt—posttemperal, c—cleithrum, pf—pectoral fin base.

B. Lateral view of the left infraorbitals (1–3) of **Scombrosphyraena oceanica** showing the strong serrations. Scale equals 2.0 mm.

General colour pattern in 70% ethanol is seen in figure 1. Of interest here is the peculiar rounded pigmentless area on the breast just ahead of the pelvic fins and a less well defined area on either side of the anus. These areas are suggestive of possible bioluminous windows in an otherwise black background.

RELATIONSHIPS

This brief discussion of the probable affinities of this genus serves to amplify the comments made in the introduction about higher classification of deep-water percoids. Many characters are important in the consideration of generic relatives and family placement in the Percoidea, **i.e.** type of swim bladder, number and disposition of dorsal and anal spines, number of vertebrae, caudal skeleton, degree of sheathing of the maxilla, lateral line characteristics, dentition, areas of scalation, relative development of the axillary scale at the base of the pelvic spine, and nerve patterns. Emphasis of any particular combination of characters may lead to different conclusions about relationships and higher classification.

The serrated and spiny bones of the head, dorsal spine relationships, vertebral count, peculiar pigmentless areas on the breast and near the anus, lateral line extending far onto the caudal fin, minute teeth present only on the dentary, axillary scale not developed at the base of the pelvic fin, maxilla not completely sheathed by lachrymal, almost complete scalation of the head, a swim bladder with a diaphragm organization and a simple gas producing organ delineate **Scombrosphyraena** from all other known genera in the suborder Percoidea. Relationships have been briefly investigated through literature and specimens available for immediate examination. Members of the Serranidae, Percichthyidae, Apogonidae, Lutjanidae, Pomatomidae, Centracanthidae and Emmelichthyidae (**sensu** Schultz, 1944) are considered. Examination of the Scombropidae reveals an artificial grouping. **Scombrops** is related to **Pomatomus** but none of the other genera placed in this family at various times belongs here. **Scombrops** is placed in the Pomatomidae in agreement with Norman (1966). **Scombrosphyraena** may be related to **Howella, Bathysphyraenops, Malakichthys, Acropoma** and **Neoscombrops.**

The two closely related genera, **Howella** and **Bathysphyraenops** (recently synonomized by Uyeno and Kubota, 1970), have never been satisfactorily placed in existing families. They are not apogonids (**sensu** Fraser, in press) as some authors have suggested. Gosline (1966) did not place **Howella** either in the Serranidae or Percichthyidae [contrary to Uyeno and Kubota, 1970, he (Gosline) only volunteered "apogonid-like"]. No other genera in the families considered show any promise of possible relationships.

There are a number of differences among the genera which may lead to the conclusion that even these genera are unrelated. However, these genera can be grouped together (given the mozaic pattern of characters) on the basis of having a simple swim bladder with a diaphragm system, three anal spines, no well developed axillary scale at base of the pelvic spine, no scales on soft dorsal and anal fins, head region well scaled, low vertebral counts (24–25),

and maxilla not completely sheathed by the lachrymal caudad. These characters are sufficient to delineate these genera from the Apogonidae, Lutjanidae, Emmelichthyidae, Centracanthidae and Pomatomidae. Only the Serranidae and Percichthyidae remain and if Gosline's (1966: 95–96) diagnosis is correct (especially the number of uroneurals, hermaphroditism) for the Serranidae then **Scombrosphyraena** and its relatives may be related to the Percichthyidae.

Neoscrombops, Malakichthys and **Acropoma** all have 10+15 vertebrae, a supramaxilla, and two opercular spines. **Scombrosphyraena** and **Howella** have no supramaxilla and a minimum of three opercular spines but differ in number of vertebrae (10+15 and 10+14 respectively). The form of the dorsal fin differs among the genera: united in **Malakichthys** (X,10) and **Neoscombrops** (IX or X,9–10), divided in **Acropoma** (VIII-I,10), **Scombrosphyraena** (VII-I-I,10), and **Howella** (VIII–I,9). The swim bladder begins to enter an expanded interhaemal in **Malakichthys** (not entering in **M. wakiyai** and **M. griseus** but entering in **M. elegans**: Katayama, 1960) and enters an expanded interhaemal in **Acropoma.** None of the other genera exhibits such modifications of the swim bladder. One can envisage a **Malakichthys-Neoscombrops** ancestor from which groups like **Acropoma, Scombrosphyraena** and **Howella** may have appeared. **Scombrosphyraena** and **Howella** are pelagic derivatives of such an ancestor in this hypothesis, with **Howella** and **Scombrosphyraena** sharing a number of characters (elongate body, increased spination of the opercle series and head region in general, similar swim bladder organization with a single bundle of retia mirabilia and diaphragm) which may be interpreted as the result of either convergence or ancestry.

This group may be placed in the Percichthyidae subject to further study concerning its integrity and any interpretation regarding tribal or subfamilial classification. In this we agree with Uyeno and Kubota (1970) on **Howella** but without access to their evidence.

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