

FIELD MUSEUM OF NATURAL HISTORY

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VOL. XV

THE MARINE FISHES OF PANAMA

BY

SETH E. MEEK

Late Assistant Curator, Department of Zoölogy

AND

SAMUEL F. HILDEBRAND

Scientific Assistant, U. S. Bureau of Fisheries

PART II

WILFRED H. OSGOOD

Curator, Department of Zoölogy

EDITOR



CHICAGO, U. S. A.

April 15, 1925

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THE MARINE FISHES OF PANAMA.

BY SETH E. MEEK AND SAMUEL F. HILDEBRAND.

PART II.

Class III. Teleostomi—Continued.

Order XIV. Acanthopteri—Continued.

Family XLIV. Carangidæ.

THE CAVALLAS.

Body deep or elongate, usually more or less compressed; head compressed; occipital region usually with a keel; mouth of varying size; premaxillaries usually protractile; maxillary with or without a supplemental bone; preopercle usually entire in adult, armed with 3 or more spines in very young; teeth various, usually small, in one or a few series, or in villiform bands, on jaws, occasionally, wholly wanting in adult; gills 4, a slit behind the last; gill-rakers long or short, few or many; pseudobranchiæ large, sometimes lost with age; branchiostegals commonly 7; scales small, cycloid, sometimes embedded, and occasionally obsolete; lateral line complete, usually with a prominent arch anteriorly, often wholly or in part armed with bony scutes; dorsal fins 2, separate, the spinous dorsal rather weak, usually preceded by a procumbent spine, the spines usually depressible in a groove; second dorsal long, usually more or less elevated anteriorly; anal fin similar to second dorsal in form, sometimes, however, much shorter, always preceded by 2 strong spines, more or less connected with the fin and with each other in young, separate in adult, sometimes, together with procumbent spine and one or two of the anterior spines of dorsal, disappearing with age; caudal fin widely forked; ventrals thoracic, I, 5; pectoral fins usually narrow; pyloric cæca generally numerous; vertebrae about $10+14=24$. Most of the species of this family are widely distributed, and nearly all are valued as food.

KEY TO THE GENERA.

- a. Lateral line wholly or in part armed with bony scutes. (Very weak and occasionally wanting in *Chloroscombrus*)
- b. Dorsal and anal each with a single detached finlet.
Decapterus, p. 333.
- bb. Dorsal and anal without finlets.
- c. Shoulder girdle with a deep furrow near its juncture with the isthmus, and a fleshy projection above it; eye large.
Selar, p. 335.
- cc. Shoulder girdle normal, not as above; eye of moderate size.
- d. Lateral line armed with deep bony scutes for its entire length; last ray of second dorsal and anal enlarged, nearly separate in adult.
Trachurus, p. 336.
- dd. Lateral line with bony scutes on its straight portion only; last ray of second dorsal and anal not notably enlarged.
- e. Maxillary very narrow; head small; teeth in jaws in a single close set series, few or none on vomer, palatines and tongue; dorsal and anal low, never with salient lobes, each with a conspicuous sheath of scales at base.
Hemicaranx, p. 339.
- ee. Maxillary broad; head rather large; teeth, if present, in one or more series, or in bands on jaws, never in a single close set series as above.
- f. Teeth uneven, in one or a few series on jaws, persistent; villiform teeth usually present on vomer, palatines and tongue, these deciduous or wanting in some species.
Caranx, p. 346.
- ff. Teeth, if present, small and even, in a single series, or in villiform bands on jaws.
- g. Minute teeth present on jaws and tongue, none on vomer and palatines, those on jaws lost with age.
Gnathanodon, p. 360.
- gg. Minute teeth on jaws, vomer, tongue, and usually on palatines, present at all ages.
- h. The back much elevated; the dorsal outline more strongly curved than the ventral.
- i. Snout well in advance of the forehead; anterior profile convex; anterior rays of second dorsal and anal filamentous.
- j. Body more or less ovate in young, elongate in adult, not excessively compressed, the outlines not everywhere trenchant; scales of moderate size; dorsal and anal filaments of moderate length.
Citula, p. 361.
- jj. Body strongly ovate in young, somewhat elongate in adult, very strongly compressed, the outlines everywhere trenchant; scales

- very small; dorsal and anal filaments long, extremely long in young. *Alectis*, p. 363.
- ii. Snout scarcely in advance of forehead; anterior profile nearly vertical; soft dorsal and anal low, never falcate, the anterior rays not produced into filaments. *Vomer*, p. 365.
- hh. The back little elevated; the ventral outline much more strongly curved than the dorsal; lateral line with few very weak bony scutes or none. *Chloroscombrus*, p. 369.
- aa. Lateral line entirely unarmed.
- k. Second dorsal and anal about equal in length, both longer than the abdomen.
- l. Body deep, ovate; premaxillaries protractile; second dorsal and anal fins anteriorly elevated, falcate.
- m. Body very closely compressed, the outlines everywhere trenchant; preorbital extremely deep; maxillary broad, with a well developed supplemental bone. *Selene*, p. 371.
- mm. Body less closely compressed, the abdomen never trenchant; preorbital very narrow; maxillary narrow, without a distinct supplemental bone. *Trachinotus*, p. 377.
- ll. Body oblong; premaxillaries not protractile, except in very young; maxillary narrow, without a supplemental bone; second dorsal and anal fins low, never falcate. *Oligoplites*, p. 387.
- kk. Anal fin much shorter than second dorsal, its base shorter than abdomen.
- n. Dorsal and anal each with a single detached finlet, composed of 2 rays. *Elagatis*, p. 393.
- nn. Dorsal and anal without finlets.
- o. First dorsal with 6 to 8 slender spines, connected by membrane at all ages; lateral line with a long, low arch, forming a slight keel on caudal peduncle in adult. *Seriola*, p. 394.
- oo. First dorsal with 3 or 4 low, stiff spines, separate in adult, or connected by membrane in very young; lateral line scarcely arched, forming a prominent dermal keel on caudal peduncle. *Naucrastes*, p. 399.

100. Genus *Decapterus* Bleeker.

Decapterus Bleeker, Nat. Tijds. Ned.—Ind., I, 1851, 358 (type *Caranx kurra* Cuvier & Valenciennes).

Eustomatodus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 261 (type *Decapterus kurroides* Bleeker).

Body elongate, fusiform; head rather short; snout pointed; mouth small; jaws subequal; maxillary broad, with a supplemental bone; premaxillaries protractile; teeth minute; scales moderate; straight portion of lateral line armed with bony scutes, at least posteriorly; first dorsal with slender, persistent spines; second dorsal and anal each with a single detached finlet; spines preceding anal well developed, persistent; pectorals rather short.

250. *Decapterus punctatus* (Agassiz).

Scomber hippos Mitchell, Trans. Lit. & Phil. Soc. N. Y., I, 1815, Pl. V, fig. 5 (not of Linnæus).

Caranx punctatus Agassiz, in Spix, Pisc. Brasil., 1831, 108, Pl. LVIa, fig. 2 (Brazil).

Caranx suareus Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 1833, 33 (Mediterranean).

Decapterus punctatus Poey, Syn. Pisc. Cub., 1868, 368; Jordan & Evermann, Bull. U. S. Nat. Mus., XLVII, 1896, 907.

Head 3.7 to 4.3; depth 4.3 to 5.3; D. VII or VIII-29 to 31-I; A. II-I, 25 to 27-I; lateral scutes 35 to 42.

Body elongate, little compressed, fusiform; the ventral outline anteriorly a little more convex than the dorsal; head rather short and low; snout pointed, 2.75 to 3.5 in head; eye 2.75 to 3.8; mouth small, oblique; jaws subequal; maxillary broad, reaching anterior margin of eye, 2.1 to 3.0 in head; teeth minute, those on upper jaw in a single series, those on lower jaw in a narrow band near symphysis, in a single series laterally; vomer, palatines, and tongue with bands of villiform teeth; gill-rakers short and close set, about 35 on lower limb of first arch; scales moderate; breast and most of head scaly; lateral line scarcely arched, the curved portion quite as long as straight part, the latter fully armed with deep, short scutes; first dorsal with very slender spines, the longest about as long as eye and snout; second dorsal and anal similar, little elevated anteriorly, each with a single detached finlet; caudal forked, the lobes short, subequal; ventrals rather small, about as long as postorbital part of head; pectorals shorter than head, never falcate, 4.4 to 5.7 in length of body.

Color bluish black above, silvery below; a distinct opercular spot present; dorsals and caudal dusky; other fins pale; axil of pectoral black.

We have a single specimen 147 mm. in length. The above description is based on this one and numerous specimens from the West Indies and the eastern coast of the United States. There

appears to be considerable variation among individual specimens of this species with respect to the shape of the body. In some specimens the body is almost perfectly fusiform, in others it is more or less compressed and usually notably deeper. That the tongue is devoid of teeth, as is stated in current descriptions, is not true of any of the specimens examined by us, for in each one the tongue has a narrow longitudinal band of minute teeth on its median line.

Known from Cape Cod to Brazil. Our specimen is from Porto Bello.

101. Genus *Selar* Bleeker.

Selar Bleeker, Nat. Tijds. Neder.—Ind., I, 1851, 359 (type *Caranx boops* Cuvier & Valenciennes).

Trachurops Gill, Proc. Ac. Nat. Sci. Phila., 1862, 238 (type *Scomber plumieri* Bloch=*Scomber crumenophthalmus* Bloch).

Body elongate, little compressed; the back not elevated; eye very large; shoulder girdle with a deep furrow at its juncture with the isthmus, and a fleshy projection above the furrow; other characters essentially as in *Caranx*.

251. *Selar crumenophthalmus* (Bloch).

Scomber crumenophthalmus Bloch, Naturg. Ausl. Fische, VII, 1793, 77, Pl. CCCXLIII (Acara [in Guinea]).

Scomber plumieri Bloch, Naturg. Ausl. Fische, VII, 1793, 79, Pl. CCCXLIV (Antilles).

Scomber balantiophthalmus Bloch & Schneider, Syst. Ichth., 1801, 29 (Guinea).

Caranx crumenophthalmus Lacépède, Hist. Nat. Poiss., IV, 1803, 703.

Caranx plumieri Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 1833, 65.

Trachurops brachychirus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 261 (Cape San Lucas).

Trachurops plumieri Poey, Enumeratio, 1875, 78.

Trachurops crumenophthalmus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1883, 196; Gilbert & Starks, Memoir. Cal. Ac. Sci., IV, 1904, 75 (Panama Bay).

Head 3.03 to 3.35; depth 3.1 to 3.85; D. VIII-I, 23 to 26; A. II-I, 20 to 23.

Body elongate, little compressed; the back not elevated; ventral outline more strongly convex than the dorsal; head long and low; snout rather pointed, 3.3 to 3.9 in head; eye very large, with a well

developed adipose membrane in adult, 2.75 to 3.17 in head; mouth large, oblique; lower jaw projecting; maxillary reaching anterior margin of pupil, 2.1 to 2.45 in head; teeth small, present on both jaws, vomer, palatines and tongue, those in upper jaw anteriorly in two series, or a narrow villiform band in a single series laterally, those in lower jaw in a single series; vomerine teeth in rather broad patches; palatine teeth in a very narrow band or single series; tongue with a long, narrow villiform band; gill-rakers scarcely half as long as eye, 23 to 27 on lower limb of first arch; scales small, cycloid; breast fully scaled; head mostly covered with small scales; lateral line without an arch, armed with scutes which increase in size posteriorly; first dorsal with rather high, slender spines; second dorsal and anal similar, moderately elevated anteriorly, each with a low sheath of scales at base; caudal moderately forked, the lobes subequal, shorter than head; ventrals rather long, reaching to or slightly past vent; pectorals rather long and falcate, 3.2 to 4.5 in length of body.

Color bluish above, silvery below; snout and tip of lower jaw dusky; fins mostly dusky; dorsal and caudal edged with black.

Of this species 6 specimens, ranging from 93 to 255 mm. in length, were secured. Three of these are from the Atlantic coast and the other 3 from the Pacific.

Known from most tropical seas. Our specimens are from Porto Bello and Panama City market. The specimens from the two coasts seem to agree perfectly.

102. Genus *Trachurus* Rafinesque.

Trachurus Rafinesque, Caratteri, etc., 1810, 41 (type *Scomber trachurus* Linnæus=*Trachurus saurus* Rafinesque).

Body elongate, somewhat compressed; the back not elevated; head rather low; snout blunt; mouth moderate; premaxillaries protractile; maxillary of moderate width, supplemental bone present; teeth minute, mostly in a single series on jaws; vomer, palatines and tongue with bands of villiform teeth; gill-rakers long and slender, close set; lateral line prominently arched anteriorly, armed with bony scutes for its entire length, those on straight portion the strongest, spinous; an accessory dorsal branch to lateral line; first dorsal with rather slender spines connected by membrane; second dorsal and anal similar; no finlets, but the last ray of second dorsal and anal enlarged and nearly separate in adult.

KEY TO THE SPECIES.*

- a. Body rather deep, compressed, its depth 3.45 to 4.25 in its length; curved portion of lateral line usually notably shorter than the straight part; bony scutes very deep, the deepest in straight part of lateral line about three-fourths the depth of eye; pectorals reaching to beginning of straight part of lateral line.
trachurus, p. 337.
- aa. Body very elongate, little compressed, its depth 4.5 to 5.3 in its length; curved portion of lateral line as long as the straight part; bony scutes narrow, the deepest in straight part of lateral line slightly more than half the depth of eye; pectorals failing to reach beginning of straight part of lateral line.
picturatus, p. 338.

252. *Trachurus trachurus* (Linnæus).

Scomber trachurus Linnæus, Syst. Nat., Ed. X, 1758, 298 (Mediterranean Sea); Bloch, Ichtyol., II, 1785, 97, Pl. LVI.

?*Caranxomorus plumierianus* Lacépède, Hist. Nat. Poiss., III, 1802, 84, Pl. II, fig. 1 (from a figure by Plumier; Martinique?).

Caranx semispinosus Nilsson, Prodr. Ichthyol. Scand., 1832, 84 (Scandinavia).

Caranx trachurus Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 1833, 11 (part).

Trachurus europæus Gronow, Cat. Fish, 1854, 125 (Seas of Europe).

Trachurus trachurus Gunther, Cat. Fish. Brit. Mus., II, 1860, 419 (part); Lutken, (Dan. Vid. Selsk. Skr., 5 ser., XII) Spolia Atlantica, 1880, 125; Jordan & Evermann, Bull. U. S. Nat. Mus., XLVII, 1896, 910, Pl. CXL, fig. 384.

Trachurus declivis Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 358 (not *Caranx declivis* Jenyns).

Head 3.25 to 3.75; depth 3.45 to 4.25; D. VII or VIII-I, 30 to 35; A. II-I, 24 to 27.

Body of moderate depth, compressed; the back little elevated; dorsal and ventral outlines about evenly convex; head rather long, compressed; snout blunt, 1.2 to 4 in head; eye 3.25 to 4.38; mouth moderate, oblique; lower jaw projecting; maxillary reaching slightly past anterior margin of eye, rarely to anterior margin of pupil, 2.4 to 2.88 in head; teeth weak, in a single series on jaws; vomer, palatines and tongue with bands of villiform teeth; gill-rakers long and slender,

*For a revision of this genus see Nichols (Bull. Amer. Mus. Nat. Hist., XLII, 1920, 477 to 481), whose classification, with the limited material available, we are unable to verify.

about two-thirds the length of eye, very close set and difficult to enumerate, 35 to 44 on lower limb of first arch; scales small, covering most of head; lateral line with a prominent arch, armed with deep bony scutes for its entire length, those on straight portion the strongest, each with a spine, forming a keel, the deepest about three-fourths the depth of eye, 35 to 45 in number, the curved portion usually notably shorter than the straight part; first dorsal with rather long, slender spines, connected by membrane; second dorsal and anal similar, scarcely elevated anteriorly, the last ray of each fin enlarged and nearly separate in adult; caudal broadly forked, the lobes of about equal length; ventrals rather small; pectorals long, the upper rays considerably produced, reaching to or nearly to beginning of straight part of lateral line, 3.16 to 4.4 in length of body.

Color bluish green above, pale or silvery below; opercle with a black spot on its edge above its posterior angle.

This species was not taken by us. It is here described from 10 specimens, ranging in length from 75 to 300 mm.

Known from nearly all warm and temperate seas. Specimens examined by us are from the Mediterranean Sea, Norway, Rhode Island, Florida, Chile and Japan.

253. *Trachurus picturatus* (Bowdich).

Seriola picturata Bowdich, Excursions in Madeira, 1825, 123, fig. 27 (Madeira).

Caranx trachurus Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 1833, 11 (Mediterranean; Valparaiso; part).

Caranx cuvieri Lowe, Trans. Zoöl. Soc. London, II, 1837, 183 (Madeira).

Caranx symmetricus Ayres, Proc. Cal. Ac. Sci., I, 1855, 62 (San Francisco).

Trachurus symmetricus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 260.

Trachurus fallax Capello, Journ. Sci. Math. Phys. Nat. Lisboa, 1867, 310-318 (Lisbon).

Caranx (Trachurus) cuvieri Steindachner, (Sitzb. k. Ak. Wiss. Wien, LXXI) Ichth. Beitr., II, 1875, 16.

Trachurus cuvieri Lütken, (Dan. Vid. Selsk. Skr., 5 ser., XII) Spolia Atlantica, 1880, 126.

Caranx picturatus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 269.

Trachurus picturatus Jordan & Gilbert, Proc. U. S. Nat. Mus., 1883, 191; Jordan & Evermann, Bull. U. S. Nat. Mus., XLVII, 1896, 909.

Head 3.5 to 3.8; depth 4.5 to 5.3; D. VIII-I, 29 to 35; A. II-I, 25 to 29.

Body very elongate, little compressed; the back scarcely elevated; dorsal and ventral outlines about evenly convex; head low, little compressed; snout blunt, 3.05 to 3.4 in head; eye 3.34 to 3.9; mouth rather small, oblique; lower jaw projecting; maxillary reaching to or slightly past anterior margin of eye, 2.5 to 2.65 in head; teeth weak, in a single series in jaws; vomer, palatines and tongue with bands of villiform teeth; gill-rakers long and slender, about two-thirds the length of eye, very close set and difficult to enumerate, 35 to 40 on the lower limb of first arch; scales small, covering most of head; lateral line with a prominent arch, armed with rather narrow bony scutes for its whole length, those on straight portion the strongest, each with a spine, forming a keel, the deepest scutes slightly more than half the depth of eye, 40 to 50 in number, the curved portion as long as the straight part; first dorsal with rather slender spines, connected by membrane; second dorsal and anal similar, not much elevated anteriorly, the last ray of each fin enlarged, nearly separate in adult; caudal broadly forked, the lobes of about equal length; ventrals rather small; pectorals long, the upper rays more or less produced, but failing to reach beginning of straight part of lateral line, 3.8 to 4.3 in length of body.

Color bluish green above, pale or silvery below; opercle with a black spot on its edge above posterior angle.

This species was not taken by us. It is here described from 16 specimens, ranging in length from 130 to 280 mm.

A pelagic species, widely distributed in nearly all open seas. Abundant on coast of California, also recorded from the Galapagos Islands and Chile. Not as yet recorded from either coast of Panama, nor, in fact, from the entire Atlantic coasts of North and South America. Specimens examined are from California, "Punta Delgade", and "Europe".

103. Genus *Hemicaranx* Bleeker.

Hemicaranx Bleeker, Versl. Ak. Amsterdam, XIV, 1862, 135 (type *Caranx marginatus* Schlegel).

Carangops Gill, Proc. Ac. Nat. Sci. Phila., 1862, 238 (type *Caranx heteropygus* Poey).

Head small; maxillary very narrow; teeth in the jaws in a single, close set, series, few or none on vomer, palatines, and tongue; dorsal

and anal rather low anteriorly, never with salient lobes, each with a wide sheath of scales at base. Other characters essentially as in *Caranx*.

KEY TO THE SPECIES.

- a. Dorsal and anal anteriorly more or less elevated, the outer margins of fins not evenly convex; pectoral fin falcate, reaching much beyond beginning of straight portion of lateral line; dorsal spines long and flexible; body without evident cross-bars.
- b. Dorsal and ventral outlines about evenly curved; caudal deeply forked, the upper lobe produced in adult, its longest rays nearly equal to depth of body; color pale bluish or brownish above; base of pectoral without a large black blotch.
amblyrhynchus, p. 341.
- bb. Dorsal outline anteriorly more strongly curved than the ventral; caudal moderately forked, the upper lobe not much produced and not equal to depth of body; color bluish black above; base of pectoral with a large jet black blotch.
- c. Snout rather blunt, its anterior profile gently elevated; maxillary short, reaching to or slightly past anterior margin of eye, 3.1 to 3.45 in head; pectorals long, 2.45 to 2.9 in length of body; fins mostly yellowish green.
atrimanus, p. 342.
- cc. Snout very blunt, its anterior profile strongly elevated; maxillary longer, reaching anterior margin of pupil, 2.7 to 3.06 in head; pectorals shorter, 3.28 to 3.84 in body; fins mostly blackish.
zelotes, p. 343.
- aa. Dorsal and anal anteriorly not elevated, the outer margins of fins evenly convex; pectorals not falcate, reaching beginning of lateral line; dorsal spines short and stiff; body with evident cross-bars, at least in young.
- d. Anterior profile strongly convex over snout, ascending in an almost straight oblique line from posterior nostril to first dorsal; lateral scutes moderately developed; dorsal and anal high, the longest rays equal to eye and postorbital part of head, the last rays of fins usually reaching base of outer caudal rays; caudal little forked, the lobes subequal, broad and round.
leucurus, p. 344.
- dd. Anterior profile nearly evenly convex; lateral scutes very strongly developed; dorsal and anal low, the longest rays equal to postorbital part of head, the last rays not nearly reaching