

THE FISHES
OF THE
INDO-AUSTRALIAN
ARCHIPELAGO

VI



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THE FISHES
OF THE
INDO-AUSTRALIAN ARCHIPELAGO

VI

PERCIFORMES (CONTINUED)

Families: SERRANIDAE, THERAPONIDAE,
SILLAGINIDAE, EMMELICHTHYIDAE,
BATHYCLUPEIDAE, CORYPHAENIDAE,
CARANGIDAE, RACHYCENTRIDAE,
POMATOMIDAE, LACTARIIDAE, MENIDAE,
LEIOGNATHIDAE, MULLIDAE

with 81 illustrations

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INTRODUCTION.

This volume contains the continuation of the Division Perciformes of the Suborder Percoidea, belonging to the order Percomorphi as defined in the Addenda on page 409 of the present volume.

It comprises the families: *Serranidae*, *Theraponidae*, *Sillaginidae*, *Emmelichthyidae*, *Bathyclupeidae*, *Coryphaenidae*, *Carangidae*, *Rachycentridae*, *Pomatomidae*, *Lactariidae*, *Maenidae*, *Leiognathidae*, *Mullidae*.

A part of this well founded families are rather small units, some of them represented by a single or a few genera and species only. Other families are less distinctively separated and show a more or less close relationship. This is the case with the *Carangidae* and the kindred: *Chorineminae*, *Trachinotinae* and *Seriolinae*. We have united them as subfamilies with the *Carangidae* to lay stress on their probable genetic connexion and to reduce the number of the numerous families of the Perciformes and to facilitate their taxonomic review.

About the material at our disposal we refer to the repeated statements made in the Introductions to the former volumes.

In preparing this volume we have again to thank Prof. E. D. VAN OORT, the Director, and Dr. F. P. KOUMANS of the Leiden Museum, for giving us every facility to study the fishes of that Museum. It is a pleasing duty of thanking for similar help Mr. C. TATE REGAN, Director of the British Museum (Natural History) and especially Mr. J. R. NORMAN, the Curator of Fishes of that Museum.

It will be of service to those who use the present volume, to remember, that in the Introduction to the second volume we have defined the character and geographical limits of the area from which the fishes are described.

For their benefit we repeat also the technical informations, given in the Introduction to the former volumes of this series.

„In describing the fishes we understand by *Length*, in the discussion of the proportions, the distance between the snout and the base of the caudal fin; in giving the largest size known for a species, we include the caudal fin.

The *Head* is measured from the tip of the snout to the end of the opercle, its proportion to the length is indicated e. g. as follows: head $4-4\frac{1}{2}$ means, that the length of the head is contained 4 to $4\frac{1}{2}$ times in the length.

Height is the maximum height; in special cases it is indicated how it is measured; the figures placed behind „height” indicate how many times it is contained in the length.

The size of the *Eye*, the length of the *Snout*, of the *Jaws* etc. are compared with the length of the head; thus „eye 4” means, that its diameter is $\frac{1}{4}$ of the length of the head.

In counting the *Scales*, under „*L. l.*” is given the number of scales, with or without sensory organs, between the head and the caudal fin or, in most cases, between that fin and the upper corner of the opercle.

L. tr. $\frac{3\frac{1}{2}}{6(7)}$ signifies, that there are $3\frac{1}{2}$ rows of scales between the dorsal fin and the lateral line and 6 to 7 below it, the lateral line itself is in this case not counted. In other cases the lateral line itself is also counted f. i. *L. tr.* $\frac{4\frac{1}{2}}{1}$ (between D. and V.), which signifies, that there are $4\frac{1}{2}$ rows of scales between the dorsal fin and the lateral line, one in the lateral line itself and one between it and the ventral fin.

In the *Fin formulae* the spines and the simple, non-branched rays are generally indicated by a figure, separated by a point from that of the number of the branched rays.

The last soft ray of the dorsal and anal, in case it is cleft to the base and therefore counted as two by some authors (BLEEKER e. g.), is reckoned as one, being supported by a single pterygophore.

The *Gillmembranes* may be totally free from each other and from the isthmus; they may be united, but still remain free from the isthmus; or they may be connected with the isthmus and with each other; when in the last case the

posterior border of the united gillmembranes is not quite adnate to the isthmus, there remains a free posterior margin, running as a fold over the isthmus from one gillopening to the other.

We follow the law of priority and use the oldest name which can with certainty be made out by the description, belonging to a certain species. Its author is quoted as the author of the species and his paper is quoted in the first place, when there is no stringent reason to do otherwise.

Mention is further made of all synonyms; besides, we have quoted those papers, which contain a description of the species. If it is a widely spread one, only those papers are quoted, which contain a description of or give some informations — others than those regarding locality only — about Indo-Australian specimens of that species.

According to the international rules of nomenclature we have neglected the generic names, as e. g. those of SWAINSON, which are not accompanied by a description.

We have recorded under: „nomina indigena” those native names, which seemed to us to be trustworthy. We are of opinion that no great value ought to be attached to them, as the unavoidable series of difficulties is still enlarged by the fact, that the authorities for those names have mostly been European or American ichthyologists and no linguists.”

Finally there remains for us the pleasing duty of expressing our sincere thanks to Mr. J. F. OBBES to whom we are indebted for most of the figures, which illustrate this volume and to Mr. C. PELTENBURG, head of the publishing and printing firm E. J. BRILL Ltd. of Leiden, for his help and interest in publishing this volume.

Eerbeek
Amsterdam, December 1931.

MAX WEBER.
L. F. DE BEAUFORT.

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Order PERCOMORPHI (continued) ¹⁾.

I. Suborder Percoidea (continued) ²⁾.

1. Division PERCIFORMES (continued) ²⁾.

7. Family SERRANIDAE.

Body oblong, compressed, of medium or large size; covered by small or large adherent cycloid or mostly ctenoid scales, sometimes embedded in the skin. Lateral line usually complete and single, not extending on caudal; in one subfamily divided into an upper and lower portion. Mouth protractile, large or moderate, not very oblique; maxillary broadened distally, covering a posterior process or expansion of the intermaxillary, usually exposed, rarely slipping below the preorbital. A supplemental maxillary present or absent. In the jaws villiform bands of teeth or series of conical ones, of which the inner one may be depressible; in front often mixed with canines; teeth present also on vomer and palatines. Head usually entirely scaly; scales always on cheeks and opercular apparatus. Operculum with one to three spines; preoperculum with the hind-border serrate or with some spines, its lower border with or without antrorse spines or teeth. Five to eight, usually 6—7 branchiostegals; gillmembranes separate, free from isthmus; pseudobranchiae present; four ($3\frac{1}{2}$) gills; gillrakers short or long, usually stiff. Second orbital with a subocular shelf, supporting the eye. Two pairs of nostrils, the posterior sometimes the larger. A spinous dorsal, continuous or confluent at its base with the soft, many-rayed portion, usually well developed; anal with three spines, in some genera wanting. Caudal with 15—17 principal rays, 13 or 15 of which are branched. Vertical fins with the base of their membrane, at least in the soft-rayed portion, often scaled. Pectorals thoracic, rounded or cuneiform. Ventrals below them, with a spine and five branched rays, without an axillary

1) On p. 268, Vol. V, this order was erroneously called „Perciformes”.

2) See Addenda and Corrigenda at the end of this volume.

scale. Vertebrae 24 (10 + 14), their number sometimes increased.

Carnivorous, chiefly marine fishes of warm and temperate seas, some living in fresh and brackish water.

Key to the indo-australian subfamilies of Serranidae.

I. Lateral line single, continuous to caudal or nearly so.

A. Supplemental maxillary present; scales cycloid or ctenoid, usually small, often embedded in the skin or, in *Centrogenysinae*, rather large. Dorsal VI—XIV, 9—21.

1. Praeoperculum with several strong spines. Scales cycloid, embedded in skin. Teeth in villiform bands, those on vomer in Λ form. Ventrals before pectorals. Gillmembranes separate. Chin in indo-australian genera with a large or rudimentary dermal appendage

1. *Grammistinae* p. 3.

2. Praeoperculum with a double serrated edge. Scales ctenoid, free. Teeth in villiform bands; those on vomer in two separate patches. Ventrals below pectorals. Gillmembranes united. No mental appendage.

2. *Diploprioninae* p. 7.

3. Praeoperculum entire or moderately serrate, its lower limb with or without a distinct antrorse spine. Scales small or minute and ctenoid or cycloid, or rather large and strongly ciliated. Ventrals below or behind base of pectorals. Gillmembranes separate. No mental appendage.

a. Teeth pluriserial, the inner series enlarged, depressible, hinged at base; scales minute, ctenoid or cycloid. Dorsal VI—XI (XII), 11—21; pectorals 15—20 divided rays and a scaly process above axil. Caudal with 15 branched rays

3. *Epinephelinae* p. 10.

b. Teeth minute in villiform bands; no enlarged, depressible teeth; scales rather large, strongly serrate. Dorsal XIII—XIV, 9—11; pectorals 13—14 divided rays, without axillary process. Caudal with 12 divided rays

4. *Centrogenysinae* p. 86.

B. No supplemental maxillary. Scales large or moderate. Praeoperculum serrate (by exception entire). Teeth, with one exception in villiform bands, usually intermixed with not depressible caniniforms.

1. Maxillary naked. Lateral line complete, not close to dorsal. Dorsal X, 11—15; caudal with 15 branched rays 5. *Serraninae* p. 88.
 2. Maxillary with imbricate scales. Lateral line, close to dorsal, continuous or reduced. Dorsal IX—XII, 9—20. Caudal with 13 branched rays 6. *Anthiinae* p. 94.
- II. Lateral line divided in an upper and lower portion.
 Praeoperculum entire or with a flat superior spine only, operculum unarmed 7. *Pseudochromidinae* p. 116.

1. Subfam. GRAMMISTINAE.

Body oblong, compressed, covered with very small, cycloid scales, more or less embedded in the skin; lateral line complete, the sensory tubes straight. Head entirely covered with minute scales, or only its sides scaled. Mouth large, protractile, oblique; maxillary exposed with a supplemental bone, lower jaw prominent, the chin with or without a prominent or rudimentary fringed dermal appendage. Praeoperculum and operculum posteriorly with several strong spines. Gillmembranes separate; 7 branchiostegals; gillrakers short; pseudobranchiae present. Villiform teeth in bands on jaws, vomer and palatines; tongue smooth. Spinous and soft dorsal fins connected at base; the former with six to eight spines, the latter with a spine and 11—15 rays or the dorsal fins are separate with II—III (IV) spines and 23—26 rays. Three anal spines, if developed. Caudal rounded. Pectorals rounded with 16 or 17 rays. Ventrals close together, slightly in advance of origin of pectorals with a strong but short spine and 5 rays; without a scaly axillary process. Vertebrae 11 + 13 or 10 + 14; intermaxillaries reaching frontals, which embrace a fossa in front.

Distribution: Marine fishes of tropical Western Indopacific and tropical America.

Key to the indo-australian genera of Grammistinae.

1. Spinous dorsal with 6 or 7 spines; no separate anal spines developed; chin with a rudimentary dermal appendage; head scaled on sides only 1. *Grammistes* p. 4.
2. Spinous dorsal with 7 or 8 spines; strong anal spines separate; chin with a large dermal appendage; head entirely scaled 2. *Pogonoperca* p. 6.

I. *Grammistes* Bloch, Schneider.

Bloch, Schneider, *Systema Ichthyologiae* 1801, p. 182, emend.

Cuvier, *Règne Anim.* 1817, p. 281.

Grammistes Bleeker, *Atl. ichthyol.* VII. 1873—1876, p. 69 (p. p.).

Body oblong, compressed, covered with very small cycloid, obtusely keeled scales, embedded in the epidermis. Head scaly on the sides, otherwise naked; chin with a rudimentary dermal appendage; posterior border of praeoperculum with two to four spines, operculum with three strong spines. Spinous dorsal with six to seven rather strong spines, covered with thick skin, broadly connected with the soft dorsal with one spine and 13—15 rays. Anal short, with 10—11 rays, no distinct spines developed. Caudal rounded. Pectorals rounded; ventrals with a short spine. For other characters see those of the family.

Distribution: that of the single species known.

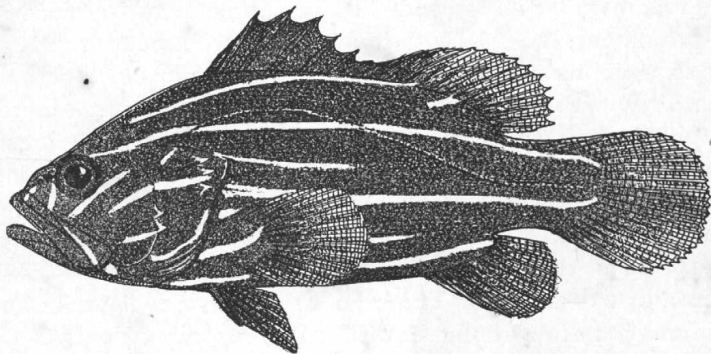


Fig. 1. *Grammistes sexlineatus* (Thunb.) half n. s.

I. *Grammistes sexlineatus* (Thunb.) [Fig. 1. pag. 4].

Perca sexlineata Thunberg, *Vetensk. Ac. Handl.* Stockholm XHI, 1792, p. 142.

Grammistes orientalis Bloch, Schneider, *Syst. Ichth.* 1801, p. 188.

Bodianus sexlineatus Lacépède, *Hist. Nat. Poissons* IV. 1802, p. 285, 302.

Sciaena vittata Lacépède, l. c. p. 310, 316.

Perca triacantha Lacépède, l. c. p. 398, 424.

Perca pentacantha Lacépède, *ibidem*.

Centropomus sexlineatus Lacépède, o. c. V. 1803, p. 689.

Grammistes orientalis Cuvier & Valenciennes, *Hist. Nat. Poissons* II. 1828, p. 203.

Grammistes orientalis Bleeker, *Nat. Tijdschr. Ned. Indië* IV. 1853, p. 105.

Grammistes orientalis Günther, *Cat. Brit. Mus.* I. 1859, p. 171.

Grammistes orientalis Klunzinger, *Abhandl. zool. bot. Ges. Wien* XX. 1870, p. 707.

Grammistes orientalis Günther, *Fische der Südsee* I. 1873—1875, p. 10.

- Grammistes orientalis* Bleeker, Verh. Akad. Amsterdam XIV. (1873) 1874, Révis. Epineph. p. 129 — Atl. ichth. VII. 1873—1876, p. 70.
Grammistes orientalis Day, Fishes of India 4°, 1878—1888, p. 28.
Grammistes orientalis Macleay, Descript. Cat. Austral. Fish. I. 1881, p. 26.
Grammistes sexlineatus Klunzinger, Fische des Rothen Meeres I. 1884, p. 10.
Grammistes sexlineatus Boulenger, Cat. Brit. Mus. 2nd ed. I. 1895, p. 346.
Grammistes sexlineatus Jordan & Seale, Bull. Bureau Fish. XXV. (1905) 1906, p. 260.
Grammistes sexlineatus Gilchrist & Thompson, Ann. South Afric. Museum VI. (prt. 2) 1908, p. 145.
Grammistes sexlineatus Pellegrin, Bull. Soc. Zool. France XXXIX. N^o. 5, 1914, p. 224.
Grammistes sexlineatus Barnard, Ann. South Afric. Museum XXI. 1925—1927, p. 492.
Grammistes sexlineatus Fowler, Fish. Oceania, Mem. Bishop Mus. X, 1928, p. 187.

D. VI—VII, I. 13—15; A. 10; P. 2.15; V. I. 5; L. I. 63—72;

$$\begin{array}{r} 9-11 \\ \text{L. tr. } \frac{1}{40-43} \end{array}$$

Height 2.4—2.6, 3—3.1 in length with caudal. Head 2.4—2.9, 3.1—3.3 in length with caudal. Eye 4.2—5, equal to snout or slightly less than snout. Interorbital space somewhat convex, five seventh of eye in small specimens, almost equal to eye in larger ones. Mouth very oblique; lower jaw somewhat projecting, with a rudimentary dermal appendage on the chin. Small teeth in four to five rows in jaws, in a triangular patch on vomer and in two rows on palatines. Tongue smooth. Three or four separate spines along hindborder of praeoperculum. Operculum with three spines. Origin of dorsal slightly behind base of pectorals. Dorsal spines covered with thick skin; second and third spine somewhat longer than the others, slightly shorter than longest soft rays and about equal to one and a half diameter of eye. Origin of anal about below middle of soft portion of dorsal. Dorsal and anal rounded. Caudal rounded. Pectorals rounded, equal to or somewhat longer than postorbital part of head. Ventrals somewhat shorter, their spine thick, covered by skin and half as long as the longest soft ventral ray. Caudal peduncle about as long as broad, its least height equal to eye and snout. Colour of preserved specimens dark reddish brown with white longitudinal bands, three on very young specimens, increasing in number up to nine in old specimens and partly broken on sides of head in transverse stripes. Fins brown at base, whitish along the margin. Length 200 mm,

Habitat: Sumatra (Benkulen, Kauer, Trussan, Priaman);

Batu islands; Banka; Java (Patjitan; Karangbollong, Prigi); Celebes (Menado, Tanawanko); Sangir islands; Sulu islands!; Halmahera; Ternate; Batjan; Flores; Rotti!; Buru; Ceram; Ambon!; Goram; Aru islands; Misol; Waigeu!; Mysore; New Guinea (Doreh, Kelana Harbour, South New Guinea). — Coast of Natal, Mossambique, Bourbon, Mauritius, Madagascar, Zanzibar, Red Sea, Ceylon, Madras, Aldabra, Andamans, Philippines, Formosa, North Australia, eastwards to Marquesas and Paumotu islands. — In sea.

2. *Pogonoperca* Günther.

(Günther, Cat. Brit. Mus. i. 1859, p. 169).

Grammistes Bleeker, Atl. ichth. vii. 1873-1876, p. 69 (p. p.)

Body compressed, oblong, covered with very small cycloid scales, embedded in the skin. Head entirely covered with minute

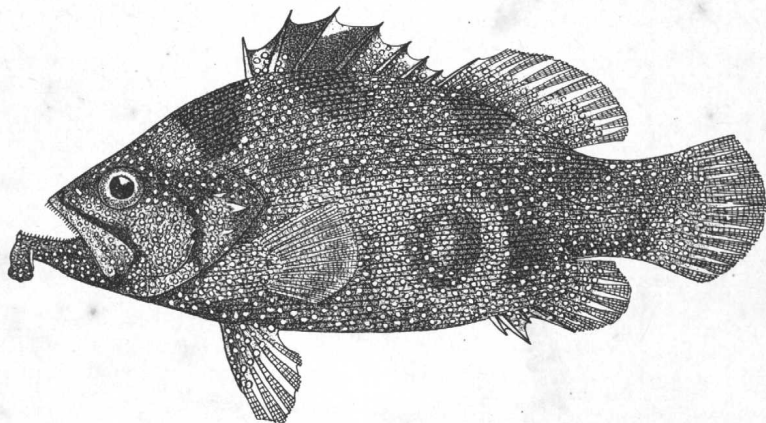


Fig. 2. *Pogonoperca punctata* (C.V.) After Bleeker.

scales; chin with a conspicuous dermal lobe; posterior border of rounded praeoperculum with three to five spines, operculum with three distant spines. Spinous dorsal with seven strong spines, connected at its base with the soft dorsal with one spine and eleven to twelve branched rays. Anal with three distinct separate spines and eight rays. Caudal rounded. Pectorals rounded; ventrals with a rather long spine. For other characters see those of the family.

Distribution: Marine fishes of the tropical Indic and Pacific.