

THE FISHES
OF THE
INDO-AUSTRALIAN
ARCHIPELAGO

VII



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OF THE
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VII

PERCIFORMES (CONTINUED)

Families: CHAETODONTIDAE, TOXOTIDAE,
MONODACTYLIDAE, PEMIPHERIDAE,
KYPHOSIDAE, LUTJANIDAE,
LOBOTIDAE, SPARIDAE,
NANDIDAE, SCIAENIDAE,
MALACANTHIDAE, CEPOLIDAE

with 106 illustrations

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INTRODUCTION

This seventh volume of the "Indo-Australian Fishes" contains the families *Chaetodontidae*, *Toxotidae*, *Monodactylidae*, *Pemphe-ridae*, *Kyphosidae*, *Lutjanidae*, *Lobotidae*, *Sparidae*, *Nandidae*, *Sciaenidae*, *Malacanthidae*, *Cepolidae* belonging to the Division Perciformes of C. TATE REGAN's arrangement of the Order Percomorphi, which occupied a part of volume V and the whole volume VI. They are now concluded with the above named families in the present volume with an artificial Key to the families, based on the genera occurring in the Indo-Australian Archipelago.

In the Introductions to the preceding volumes the collections of fishes are mentioned of which we could dispose. Several important additions have been made since their publication, which were of help in preparing the present volume:

A collection of marine fishes from the Laboratory for the Investigation of the Sea at Batavia, Java, collected by Dr. J. VERWEY and Dr. J. D. F. HARDENBERG, for which we have also to thank Prof. H. C. DELSMAN, the late head of that institution.

We got also valuable material from Mr. J. KOOIMAN, who was so kind to collect for us at Batu Ulu, as the knowledge of the ichthyology of the South Coast of Java is rather limited.

Besides we are deeply indebted to Prof. H. BOSCHMA, Director of the Leiden Museum and Dr. F. P. KOUMANS, Curator of the collection of fishes, who most liberally assisted us during our visits to their collection or in sending specimens for examination. Our thanks are again due to Mr. C. TATE REGAN, Director of the British Museum (Natural History) and especially to Mr. J. R. NORMAN, Curator of the collection of fishes, for repeatedly affording to one of us the opportunity to study types in that Museum and to give both of us valuable information about them. We also thankfully acknowledge the assistance received from Mr. A. FRASER-BRUNNER, who lately revised the subfamily of Pomacanthinae, and his permission to reproduce some of his figures. We have to tender our sincere thanks to Prof. L. ROULE and Dr. J. PELLEGRIN, who gave to one of us all facilities to study types of Cuvier and Valenciennes in the Paris Museum. Also for valuable informations we got from Dr. G.

DUNCKER, Dr. V. PIETSCHMANN and Dr. S. L. HORA, which have greatly facilitated our task.

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—4½ means, that the length of the head is contained 4 to 4½ 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 ¼ of the length of the head.

In counting the *Scales*, under "L.1." 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 3½ 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 4½ rows of scales between the dorsal fin and the lateral line, one in the lateral line it self 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."

We are much grieved to have lost as secretary Miss C. H. W. MET, who died in 1935. Her accurate and patient work during more than 25 years was a great help in writing this series.

The drawings illustrating this volume are again executed by Mr. J. F. OBBES with his usual skill and care. Finally our best thanks are due to Mr. Th. FOLKERS director of the printing and publishing firm E. J. BRILL LTD. of Leiden, who showed the same help and interest as his predecessor the lamented Mr. C. PELTENBURG in publishing this volume.

Eerbeek
Amsterdam, March 1936

MAX WEBER
L. F. DE BEAUFORT

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Order PERCOMORPHI (continued).

I. Suborder **Percoidea** (continued).

1. Division PERCIFORMES (continued).

20. Family CHAETODONTIDAE.

More or less compressed, oblong, suborbicular, much elevated or rhombic, covered with moderate-sized, small or minute ctenoid scales, which are finely ciliated, smooth or with longitudinal rugosities, present on head and more or less extended on median fins; the squamation in general may be equal or unequal as to size and arrangement of scales; lateral line usually complete, arched, concurrent with the profile of the back. Eyes lateral. Two more or less approximate nostrils on each side of the generally short head. Mouth small, terminal, protractile or not; teeth slender or elongate, often tricuspid, incised or setiform, in narrow brush-like bands in jaws; palate usually toothless. Branchiostegals five to seven; pseudobranchiae present; four gills with a slit behind the fourth; gill-membranes usually united, free from isthmus or narrowly or broadly

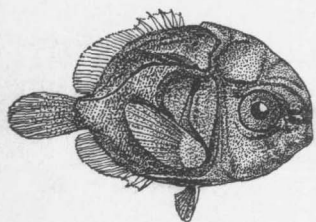


Fig. 1. *Tholichthys*-stage of
Parachaetodon ocellatus
(C. V.) $\times 4$. After Lütken.

attached to it, the branchial aperture being reduced to a narrow slit. Pharyngeal bones not united or coossified. The single dorsal fin long, its spinous part differentiated or not from the soft dorsal. Anal similar to soft dorsal, with three to four, by exception five spines. Caudal truncate, rounded or emarginate, with 14 to 17 branched rays. Pectorals with the lower rays branched. Ventrals thoracal, with a spine and five rays, often with an axillary scaly process. An occipital crest present. Vertebrae usually 10 + 14 (24), in *Scatophagus* 10 + 13 (23), in *Zanclus* reduced to 9 + 13 (22). In their development they pass through a metamorphosis with larval organs, known as *Tholichthys*-stage, described on page 3.

Distribution: Marine tropical, carnivorous fishes, the majority of which is represented in the indo-pacific region according to their habit to frequent coral reefs and costal localities with

similar biological character. Only a few as *Scatophagus*, *Chelmon* and *Anisochaetodon rafflesi* Bennett enter estuaries or extend their habitat outside the Tropics. Many of them are renowned for their bright, gaudy colours and their great activity and quickness of movement.

Key to the Indo-australian subfamilies of
Chaetodontidae.

- I. Anal with 4 spines. Spinous dorsal differentiated from soft dorsal, the first spine procumbent. Mouth small, transverse, not protractile. Gillmembranes forming a fold across the scaly isthmus to which they are narrowly attached. Posttemporal solidly united to skull. Branchiostegals 6—7. Scale minute, adherent 1. *Scatophaginae* p. 3.
- II. Anal with 3 to 4 (5) spines. Spinous dorsal without procumbent spine, sometimes differentiated from, usually totally confluent with soft dorsal. Mouth protractile. Gillmembranes united or not, free from isthmus or narrowly attached to it. Posttemporal solidly united to skull. Branchiostegals 6—7. Scales moderate or small.
 1. Preoperculum serrate or not, but in adult without a strong spine. Anal with 3—4 (5) spines. Ventrals with an axillary scale 2. *Chaetodontinae* p. 13.
 2. Preoperculum strongly armed including a long spine at the angle. Anal with 3 spines. Ventrals without an axillary scale. 3. *Pomacanthinae* p. 119.
- III. Anal with 3 spines. Spinous dorsal confluent with soft dorsal; no procumbent spine. Gillmembranes and isthmus not differentiated from the praeventral integument, which covers a bony thoracic cuirass. Branchiostegals 4—5. Scales minute, nearly microscopic 4. *Zanclinae* p. 168.
- IV. Anal with 3 spines. Gillmembranes broadly united with scaly isthmus. Posttemporal not coossified with skull. Branchiostegals 6.
 1. Spinous dorsal differentiated from soft dorsal; first spine procumbent.
 - a. Mouth not protractile; maxilla not exposed. Pectorals rounded, short. A broad subocular shelf. Scales smooth moderate-sized. 5. *Ephippinae* p. 175.
 - b. Mouth protractile; maxilla distally exposed. Pectorals falcate, elongate. No subocular shelf. Scales ciliated medium-sized. 6. *Drepaninae* p. 178.
 2. Spinous dorsal confluent with soft dorsal; no procumbent spine. Mouth not protractile, maxilla not exposed. Subocular shelf feeble . 7. *Platacinae* p. 182.

I. Subfam. SCATOPHAGINAE.

Much compressed, rhomboidal, covered with minute, ctenoid, adherent scales, present also on head and extending on soft dorsal and anal; lateral line complete, arched, concurrent with the dorsal profile. Head small, with an abrupt ascending occipital crest. Eyes lateral, in anterior half of head. Paired approximate nostrils on each side of head. Mouth small, square, terminal, not protractile; maxilla concealed. Opercular apparatus complete, without spines or serrations; preorbital rather high; a subocular shelf present. Six to seven branchiostegals; gillmenbranes united with isthmus, forming a narrow cutaneous fold across it; four gills with a slit behind the last; pseudobranchiae present. Teeth in jaws setiform, tricuspidate, movable; none on vomer and palatines. Two dorsals united at the base, a longer anterior portion preceded by a procumbent short

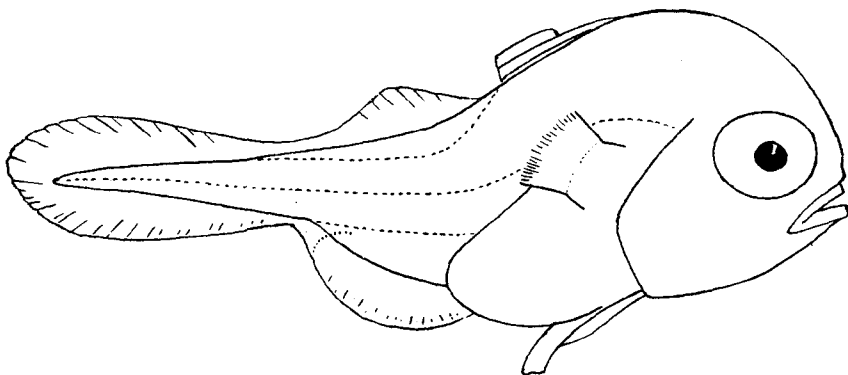


Fig. 2. *Scatophagus argus* (Bloch) Larval stage of 3.2 mm length After Hora.

spine and with eleven to twelve strong heteracanth spines and a shorter posterior portion of sixteen to eighteen rays. Anal with four strong heteracanth spines and fourteen to fifteen rays. Pectorals rather small, rounded, ventrals inserted somewhat behind their base with a spine and five branched rays and a small scaly axillary process. Caudal nearly truncate with sixteen branched rays. The post-temporal is solidly united to the skull. There are 23 (10 + 13) vertebrae and the ribs are sessile, inserted high up on the centra or on the base of the neural arches.

Distribution, that of the single genus known.

Note: These fishes pass in their development through a metamorphosis similar to that of the *Chaetodontidae*. A very young

specimen of 3.2 mm length with the yolk still attached to the body is described by *Hora* (Mem. Asiat. Soc. Bengal VI, 1924, p. 490). (Fig. 2). This stage is followed by a series of larval stages distinguished by the possession of transitory larval organs which change the exterior, compared with that of the definite fish, in a manner that they first were described by *Günther* as a distinct genus *Tho-*

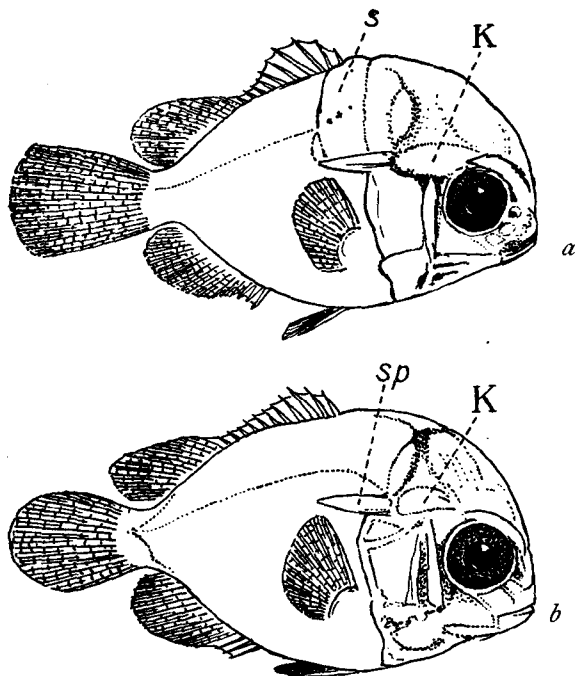


Fig. 3 *a* and *b*. Four succeeding larval (*Tholichthys*—) stages of *Scatophagus argus* (Bloch). K. postorbital knot with suprascapular spine *sp*, *p* preopercular spine, *s* suprascapular and humeral plate, showing their gradual disappearance with growth in specimens of 10 mm length, somewhat more (*b*), of 13 mm (*c*), of 16.5 mm (*d*) $\times 6$, the preceding $\times 7$. After M. Weber.

lichthys. These *Tholichthys*-stages are characterized by a compressed, rounded body, large head with very small mouth and harnessed by the naked, dorsally strongly arched bones of the head and by an extensive suprascapular and humeral bony plate, which cover the back till the dorsal fin and the anterior sides of body. Both are independent cutaneous bones, sometimes erroneously described as produced from the free edges of the bones of the head. Besides there is a postorbital bony knot, or a distinct preopercular bony

plate, carrying a strong suprascapular spine. Of these transitory larval organs the two lastnamed persist the longest, while the suprascapular and humeral plate disappear first in the young growing *Scatophagus*. They are already absorbed in specimens of about 10 mm length (fig. 3a), while rudiments of the suprascapular spine and its knot are still present in specimens of 16 mm length (fig. 3d).

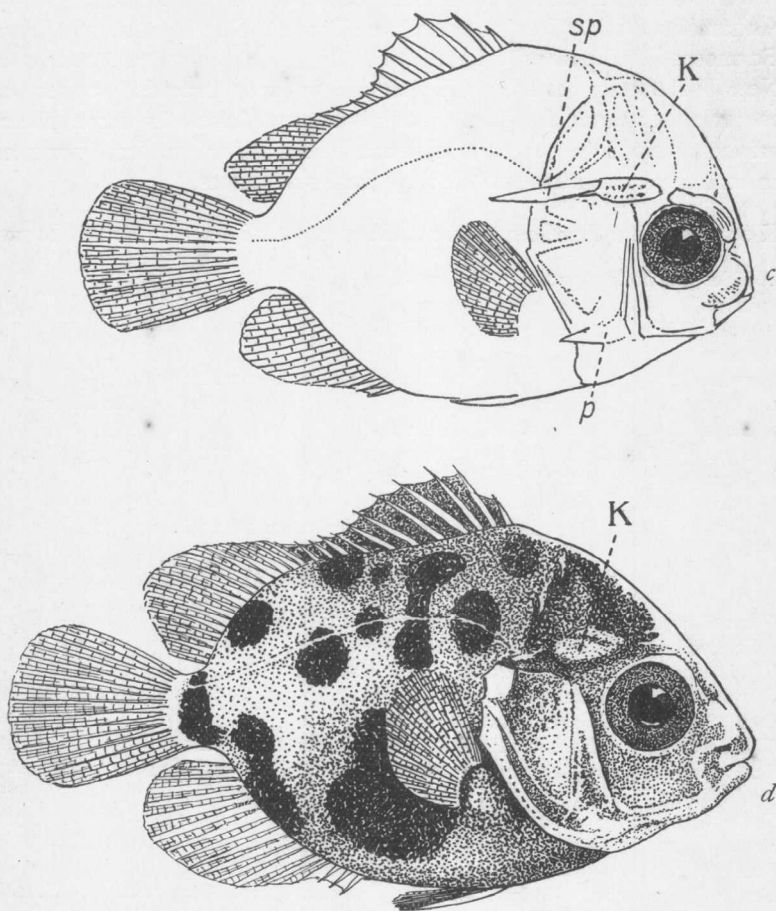


Fig. 3 c and d. Four succeeding larval (*Tholichthys* —) stages of *Scatophagus argus* (Bloch). K postorbital knot with suprascapular spine sp, p preopercular spine, a suprascapular and humeral plate, showing their gradual disappearance with growth in specimens of 10 mm length, somewhat more (b), of 13 mm (c), of 16.5 mm (d) $\times 6$, the preceding $\times 7$. After M. Weber.

1. *Scatophagus* Cuvier & Valenciennes.

(Cuvier & Valenciennes, Hist. Nat. Poissons VII, 1830, p. 136).

Cacodoxus Cantor, Journ. Asiat. Soc. Bengal XVIII (1849) 1850, p. 1145.

Ephippus Bleeker, Verh. Akad. Amsterdam XVIII (1876) 1877, p. 26 (nec Cuvier & Valenciennes).

For characters of the single genus known see those of the sub-family.

Distribution. From East coast of Africa, British India, Andamans, Malay Peninsula, Siam, Tonkin, South coast of China, Formosa, Philippines, throughout the Archipelago, Australia to New Caledonia and Tahiti. Living in sea, brackish water of estuaries, entering freshwater of rivers and lakes. In some places valued as food in others not eaten, being a foul feeder, living of animal food but attracted also by foul substances.

Key to the Indo-australian species of *Scatophagus*.

1. Sides of body spotted, only in very juvenile state sometimes anteriorly with a few transverse stripes. Hind-margins of soft dorsal and anal sub-vertical 1. *Sc. argus* p. 6.
2. Body with six brown cross-bands 2. *Sc. argus* var. *tetracanthus* p. 9.
3. Sides of body with 16 to 18 narrow black bands from back surpassing lateral line, spotted below. Hind-margins of soft dorsal and anal oblique in antero-posterior direction. 3. *Sc. multifasciatus* p. 10.

1. *Scatophagus argus* (Bl.) (Fig. 3 and 5).

Chaetodon argus Bloch, Ausl. Fische III, 1788, p. 86, tab. 204, fig. I, — Bloch, Schneider, Syst. ichth. 1801, p. 232.

Chaetodon argus Linné, Gmelin, Syst. nat. edit. XIII, 1788, p. 1248.

Chaetoden argus Shaw, Gen. Zool. IV, 1803, p. 332.

Ephippus argus Cuvier, Règne anim. 1817, II, p. 335.

Chaetodon atro-maculatus Bennett, Fish. Ceylon 1828. Pl. 18.

Scatophagus argus Cuvier & Valenciennes, Hist. nat. Poissons VII, 1831, p. 136.

Scatophagus Bougainvillii Cuvier & Valenciennes, l. c. p. 142.

Scatophagus ornatus Cuvier & Valenciennes, l. c. p. 143.

Scatophagus purpurascens Cuvier & Valenciennes, l. c. p. 144.

Scatophagus argus Bleeker, Nat. & Geneesk. Arch. Ned. Ind. (3) II, 1845, p. 520 (name only).

Scatophagus macronotus Bleeker, ibidem (monstrositas).

Scatophagus argus Bleeker, Verh. Batav. Gen. XXIII, (1849) 1850, Chaetodont. p. 24.

Cacodoxus argus Cantor. Journ. Asiat. Soc. Bengal XVIII, (1849) 1850, p. 1145.