

8. Fishes of the stream drainages

By ERIC R. ALFRED

INTRODUCTION

UP TO NOW the only reported collections of fishes from Tioman are those listed by Tweedie (1936 & 1940) who included four species from fresh-water localities on the Island. These had been collected by the Fisheries vessel *Tongkol* in June 1926 and by the late Norman Smedley, formerly of the National Museum, in May 1927. Subsequent reports, viz., Fowler (1938), Hora and Gupta (1941), and Tweedie (1952 & 1961), have all referred to these same specimens.

During a field-trip to Tioman from 25th May to 7th June, 1958, the writer collected 196 specimens representing 20 species. This report deals largely with this collection and the material previously mentioned by Tweedie (loc. cit.). During the University of Malaya expedition in 1962, a few further specimens were taken from fresh-water and brackish localities and they were identified by Mrs. P. Y. Berry of the Zoology Department of the University. Five species were recorded and these were reported to me by Mr. J. A. Bullock and Lord Medway (in ms.) for inclusion in the present account.

The stream drainages have been described briefly by Bullock and Medway (this *Bulletin*, p. 4). During the 1958 trip, much time was spent collecting beyond the upper tidal limits of the Sungei Tekek, the Sungei Ayer Besar and the Sungei Bahru, mainly with a view to ascertaining the number of primary fresh-water species occurring on the Island. The apparent paucity of brackish water forms is therefore due mainly to inadequate collecting from brackish localities. New records for Tioman are indicated by an asterisk.

ANNOTATED LIST

Puntius lateristriga (Valenciennes)

Figure 6.

Barbus lateristriga Valenciennes, In: Cuvier and Valenciennes, 1842, *Hist. Nat. Poissons*, 16:161 (Java).

Puntius lateristriga Tweedie, 1936, *Bull. Raffles Mus.*, 12:20 (Sedagong River, Tioman Island, west coast Malay Peninsula); Weber and de Beaufort, 1916, *Fishes Indo-Aust. Archipel.*, 3:179; Tweedie, 1961, *Bull. Raffles Mus.*, 26:178 (Tioman Island).

Barbus lateristriga Fowler, 1938, *Fish. Bull.*, 1:252 (Sedagong River, Tioman Island, west coast Malay Peninsula).

Previously known from 7 specimens taken by Smedley from the Sungei Sedagong (= Sungei Ayer Besar) at an elevation of 1,000 ft., a further 63 specimens measuring 60.5–133 mm. total length were collected by the writer from the same locality in 1958. Bullock and Medway also report the species.

The species is common in the torrential stretches of the Ayer Besar and the Bahru, and appears to be the only cyprinid fish occurring on the Island.

Commenting on regional variation in the colour pattern of the species, Tweedie (1961) placed his Tioman specimens under his Johore Form but pointed out that the pattern was indistinct since the specimens had been poorly preserved. He however added that in the single juvenile of the series, the pattern was clear and of the normal Johore type. The specimens now available, show intermediate characteristics between the Johore Form (Tweedie, 1961, pl. 22, fig. 2) and the Muar

River Form (Tweedie, 1961, pl. 22, fig. 4) in the presence of an incomplete anterior horizontal bar which does not reach the posterior vertical bar. Like the form described from Pahang (Tweedie, 1961 pl. 22, fig. 6) some of the specimens from Tioman have a few dark spots between the two vertical bars.

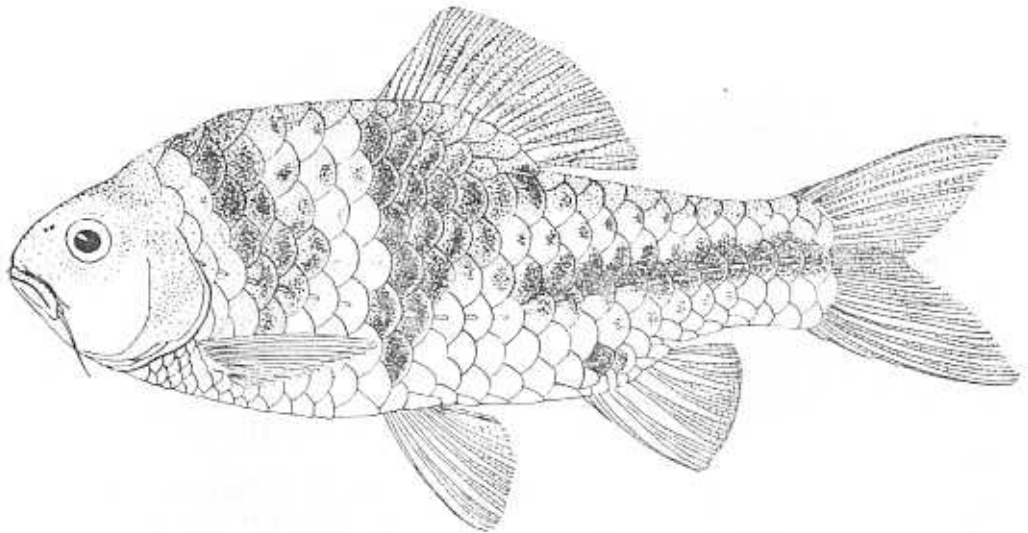


Figure 6. *Puntius lateristriga* (Valenciennes), Sungei Ayer Besar, Pulau Tioman, showing colour pattern.

***Clarias nieuhofi* Valenciennes**

Clarias nieuhofi Valenciennes, In: Cuvier and Valenciennes, 1840, Hist. Nat. Poissons, 15:386 (locality not given).

Clarias nieuhofi Weber and de Beaufort, 1913, Fishes Indo-Aust. Archipel., 2:189; Tweedie, 1936, Bull. Raffles Mus., 12:18 (Sedagong River, Tioman Island, east coast Malay Peninsula); Tweedie, 1952, Bull. Raffles Mus., 24:88 (Tioman Island).

Clarias nieuhofi Fowler, 1938, Fish. Bull., 1:247 (Sedagong River, Tioman Island, east coast Malay Peninsula).

Prophagorus nieuhofi Hora and Gupta, 1941, Bull. Raffles Mus., 17:43 (Sedagong River, Tioman Island).

The previous Tioman record is based on a single specimen collected by Smedley from the Sungei Sedagong (= Sungei Ayer Besar). A further 5 specimens measuring 200–285 mm. total length were obtained in 1958 from the same river at an elevation of about 900 ft. Commenting (in ms.) on the *Clarias* sp. they collected, Bullock and Medway state that they were "sometimes present in quite large numbers and some 12 specimens came simultaneously to refuse in the stream near Camp II (a tributary of the S. Ayer Besar) on one night."

I agree with Hora's observation (in Tweedie, 1952: 86) that the confluence of the median fins with the caudal is not consistent in the species and that *Prophagorus* Smith is not validly distinct from *Clarias* Scopoli. In my 5 specimens, only 1 has these fins confluent.

Fluta alba (Zuiew)

Muraena alba Zuiew, 1793, Nova Acta Acad. Sci. Petrop., 7:299, pl. 7, fig. 2 (not seen).

Monopterus albus Weber and de Beaufort, 1916, Fishes Indo-Aust. Archipel., 3:413, figs. 210-211; Tweedie, 1936, Bull. Raffles Mus., 12:21 (Off Pulau Tioman, east coast of Malay Peninsula).

There is a single specimen from the *Tongkol* collection measuring 280 mm. total length. Tweedie (1936) gives the locality as "Off Pulau Tioman" but the label reads "N.E. of Pulau Tioman". This record requires confirmation.

***Aplocheilus panchax** (Hamilton)

Esox panchax Hamilton, 1822, Fishes of Ganges, pp. 211 & 350, pl. 3, fig. 9 (Bengal).

Herein recorded on the basis of the report by Bullock and Medway of specimens taken from a brackish locality. Berry confirmed (in litt.) that she had no doubt of the identification.

***Dermogenys pusillus** van Hasselt

Dermogenys pusillus van Hasselt, 1823, Algem. Konst. Letter-Bode, 1823 (2):131 (Java).

Dermogenys pusillus Mohr, 1936, Mitt. Zool. Mus. Berlin, 21 (1):39-50, figs. 4-7.

The species is common in brackish localities. 16 specimens were taken from the Tekek in 1958. Also recorded by Bullock and Medway.

***Zenachopterus beauforti** Mohr

Zenachopterus beauforti Mohr, 1926, Zool. Jahrb., 52:259, fig. 21 (Muar River and Kuala Selangor).

One specimen, a female of 107 mm. total length (excluding the lower jaw), was collected in 1958 from the brackish zone of the Tekek.

***Mugil seheli** Forskal

Mugil seheli Forskal, 1775, Descriptiones Animalium, p. 73 (Lohaja, Red Sea)

Mugil seheli Weber and de Beaufort, 1922, Fishes Indo-Aust. Archipel., 4:252.

Four specimens of 15-90 mm. total length were taken in 1958 from the brackish zone of the Bahru.

***Pranesus pinguis** Lacepede

Atherina pinguis Lacepede, 1803, Hist. Nat. Poissons, 5: 372, pl. 11 (not seen).

Pranesus pinguis Smith, 1965, Ichth. Bull. Rhodes Univ., 31:616, pls. 99, A-F, 100, A-C.

Six from the brackish zone of the Bahru and seven from the Tekek were taken in 1958. The series measures 100-118 mm. total length. The species was encountered in vast numbers in both localities.

***Apogon amboinensis** Bleeker

Apogon amboinensis Bleeker, 1853, Nat. Tijd. Ned. Indie, 5:329 (Amboina).

Apogon amboinensis Weber and de Beaufort, 1929, Fishes Indo-Aust. Archipel., 5:340.

Seven specimens measuring 58-80 mm. total length were obtained in 1958 from the brackish zone of the Tekek.

***Ambassis interrupta** Bleeker

Ambassis interrupta Bleeker, 1852, Nat. Tijd. Ned. Indie, 3:696 (Ceram and Java).

Ambassis interrupta Weber and de Beaufort, 1929, Fishes Indo-Aust. Archipel., 5:415.

Four from the brackish zone of the Bahru and a further 51 specimens from the Tekek were collected in 1958. They measure 51-95 mm. total length. The species occurred in vast numbers in both localities.

***Therapon jarbua** (Forsk.)

Sciaena jarbua Forskal, 1775, Descriptiones Animalium, p. 50 (Red Sea).

Therapon jarbua Weber and de Beaufort, 1931, Fishes Indo-Aust. Archipel., 6:147.

Four juveniles, the largest measuring 15.5 mm. total length, and a larger specimen of 86 mm. total length were collected in 1958 from the brackish zone of the Tekek.

***Sillago sihama** (Forsk.)

Atherina sihama Forskal, 1775, Descriptiones Animalium, p. 70 (Lohaja, Red Sea).

Sillago sihama Weber and de Beaufort, 1931, Fishes Indo-Aust. Archipel., 6:172, fig. 33.

One of 150 mm. total length was collected from the brackish zone of the Tekek in 1958.

***Selar mate** (Cuvier)

Caranx mate Cuvier, In: Cuvier and Valenciennes, 1833, Hist. Nat. Poissons, 9:54 (Pondichery).

Caranx (Selar) mate Weber and de Beaufort, 1931, Fishes Indo-Aust. Archipel., 6:207.

Eight specimens measuring 93-104 mm. total length were collected in 1958 from the brackish zone of the Sungei Bahru. Large schools were seen.

***Caranx sexfasciatus** Quoy and Gaimard

Caranx sexfasciatus Quoy and Gaimard, 1824, Voy. Uranie, p. 358, pl. 65, fig. 4 (New Guinea).

Caranx sexfasciatus Weber and de Beaufort, 1931, Fishes Indo-Aust. Archipel., 6:243.

A single specimen of 120 mm. total length was taken from the brackish zone of the Bahru in 1958.

***Pomacentrus melanopterus** Bleeker

Pomacentrus melanopterus Bleeker, 1852, Nat. Tijd. Ned. Indie, 3:562 (Amboina).

Pomacentrus littoralis (nec Cuvier) Tweedie, 1940, Bull. Raffles Mus., 16:79 (Tioman Island, fresh-water stream).

Pomacentrus melanopterus de Beaufort, 1940, Fishes Indo-Aust. Archipel. 8:380.

Known from 2 specimens, 100 and 111 mm. total length, collected by Smedley from a "fresh-water stream" in Juara Bay. Tweedie (1940) listed them as *P. littoralis*.

***Salarias edentulus** (Bloch, Schneider)

Blennius edentulus Bloch, Schneider, 1801, Systema Ichthyologiae, p. 172 (not seen).

Salarias edentulus Chapman, In: de Beaufort and Chapman, 1951, Fishes Indo-Aust. Archipel., 9:328.

Two specimens, a male of 75 mm. and a female of 72 mm. total length, were collected at the mouth of the Sungei Tekek in 1958. This widely distributed species is now recorded for the first time from Malaya.

Acentrogobius ornatus (Ruppell)

Gobius ornatus Ruppell, 1828, Atl. Reise N. Afr. Fische, p. 135 (not seen).

Acentrogobius ornatus Tweedie, 1936, Bull. Raffles Mus., 12:28 (Ayer Batang, Tioman Island, east coast Malay Peninsula); Koumans, 1953, Fishes Indo-Aust. Archipel., 10:71.

Tweedie's record (1936) is based on 4 specimens of 22–53 mm. total length collected from Kampong Ayer Batang by Smedley, and identified as the present species by Dr. F. P. Koumans.

***Acentrogobius balteata** (Herre)

Vaimosa balteata Herre, 1935, Field Mus. Nat. Hist. Zool., 18 (12):419 (not seen).

Acentrogobius balteata Koumans, 1953, Fishes Indo-Aust. Archipel., 10:73.

Four specimens of this distinctively marked fish were collected in 1958 from the brackish zone of the Tekek. They measure 31.2–34.5 mm. total length and 24.6–27.0 mm. standard length. The species is new to Malaya.

***Glossogobius biocellatus** (Valenciennes)

Gobius biocellatus Valenciennes, In: Cuvier and Valenciennes, 1837, Hist. Nat. Poissons, 12:73 (Pondichery).

Glossogobius biocellatus Koumans, 1953, Fishes Indo-Aust. Archipel., 10:163.

One specimen collected in 1958 and measuring 67 mm. total length from the brackish zone of the Tekek. The process of the iris in the pupil is distinct.

***Glossogobius celebius** (Valenciennes)

Gobius celebius Valenciennes, In: Cuvier and Valenciennes, 1837, Hist. Nat. Poissons, 12:74 (Celebes).

Glossogobius celebius Inger, 1957, Fieldiana: Zoology, 36 (3):396 (key).

Two specimens of 62 and 77 mm. total length were collected from fresh-water in the Tekek in 1958. The locality was well above the brackish water limits and was near the commencement of the torrential zone.

***Glossogobius giurus** (Hamilton)

Gobius giurus Hamilton, 1822, Fishes of Ganges, p. 51, pl. 33, fig. 15 (Gangetic provinces).

Glossogobius giurus Inger, 1957, Fieldiana: Zoology, 36 (3):396 (key).

A fine specimen of 220 mm. total length was collected in 1958 from the brackish zone of the Tekek.

Periophthalmus argentilineatus Cuvier

Periophthalmus argentilineatus Cuvier, In: Cuvier and Valenciennes, 1837, Hist. Nat. Poissons, 12:191 (Waigeu).

Periophthalmus argentilineatus Tweedie, 1936, Bull. Raffles Mus., 12:28 (Ayer Batang, Tioman Island, east coast Malay Peninsula); Koumans, 1953, Fishes Indo-Aust. Archipel., 10:214.

Periophthalmus barbarus (p.p., nec Linn.) Fowler, 1938, Fish. Bull., 1:267 (Ayer Batang, Tioman Island, east coast Malay Peninsula).

Tweedie's record (1936) is based on 7 specimens of about 55–65 mm. total length collected by Smedley from Kampong Ayer Batang and identified by Dr. F. P. Koumans as the present species. A single specimen of 58.2 mm. total length was taken from the mangrove at Kampong Tekek in 1958. Bullock and Medway report a *Periophthalmus* sp. as frequent in the mangrove near their Camp I.

***Eleotris insulindica** (Bleeker)

Culius insulindica Bleeker, 1875, Arch. Neerl. Sc. Ex. et Nat., 10:107 (not seen).

Eleotris insulindica Koumans, 1953, Fishes Indo-Aust. Archipel., 10:300.

Two specimens of 99 and 108 mm. total length were obtained in 1958 from the brackish zone of the Bahru.

***Ophiocara porocephala** (Valenciennes)

Eleotris porocephala Valenciennes, In: Cuvier and Valenciennes, 1837, Hist. Nat. Poissons, 12:237 (Seychelles).

Ophiocara porocephala Koumans, 1953, Fishes Indo-Aust. Archipel., 10:343.

Four specimens of 68-170 mm. total length were collected in 1958 from the brackish zone of the Tekek. The species is collected by the local populace for food.

DISCUSSION

Crude observations made by the writer in 1958 indicate that a close parallel exists between the physical features of the Tioman streams and those of the Palau Islands in the West Pacific which are described by Fehlmann (1961). Following the zonation he proposed, it is possible to break down the major stream drainages of Tioman into four zones as follows:

The *Mangrove Zone* extending from the mouth of the streams to the level attained by the highest high tides (Plate 3). The majority of the fishes recorded were collected in this zone and they include the Hemiramphidae, Apogonidae, Sillaginidae, Ambassidae, Theraponidae, Atherinidae, Pomacentridae, Gobiidae, Eleotridae, Blennidae, Mugilidae, Carangidae and Cyprinodontidae.

The *Lower Graded Zone* extending from the level attained by the highest high tides to the lower reaches of the bedrock in the stream bottom. The fishes occurring here include Hemiramphidae, Gobiidae, Ambassidae and Clariidae.

The *Cascade Zone* extending from the lower reaches of the bedrock in the stream bottom to the upper reaches of bedrock in the stream bottom (Plate 3). This zone covers by far the greater part of the Tioman streams. Only the Clariidae and Cyprinidae occur here.

The *Source Zone* extending from the upper reaches of bedrock in the stream bottom to the source of the stream. The fish fauna appears to be restricted to the Clariidae.

The similarities in the faunal composition of the Mangrove Zone in both Tioman and Palau are not unexpected. The forms occurring here are mainly the so-called diadromous fresh-water fishes which, as Myers (1949) points out, "are distributed by sea and their presence in the fresh-water fauna is often an indicator more of the composition of the marine than of the fresh-water fauna."

In the Palaus, the absence of primary or secondary fresh-water fishes coupled with the occurrence of complementary forms is in keeping with their position as oceanic islands. In Tioman however, the presence of the two primary fresh-water fishes, viz., *Puntius lateristriga* and *Clarias nieuhofi*, immediately suggests that the island must have been connected to the mainland in the past. The occurrence of the secondary fresh-water fishes, *Aplocheilichthys panchax* and *Dermogenys pusillus*, could be cited as further evidence for this. Most significant however, are the similarities in the colour pattern of *P. lateristriga* from Tioman with those of specimens from the adjacent mainland of Johore and Pahang.

The recorded locality for *Glossogobius celebius* is interesting and should be investigated further. Its position is probably complementary owing to the scarcity of primary and secondary species.

ACKNOWLEDGEMENTS

I wish to record my thanks to Enche Ismail bin Hj. Ariffin, District Officer, Mersing, and to Enche Alwi bin Long, Penghulu, Pulau Tioman, for their kind assistance during the field-trip in 1958.

REFERENCES

- DE BEAUFORT, L. F., 1940. The Fishes of the Indo-Australian Archipelago, **8**: xv+508 pp., 56 figs. Leiden: E. J. Brill.
- , and W. M. CHAPMAN, 1951. The Fishes of the Indo-Australian Archipelago, **9**: xi+484 pp., 89 figs. Leiden: E. J. Brill.
- FEHLMANN, H. A., 1961. Notes on Fish Ecology in Stream Drainages in the Palau Islands. *Proc. IX Pac. Sci. Congr. 1957*, **10**: 11-13.
- FOWLER, H. W., 1938. A List of the Fishes known from Malaya. *Fisheries Bulletin*, **1**: 268+lvi pp.
- HORA, S. L., and J. C. GUPTA, 1941. Notes on Malayan fishes in the collection of the Raffles Museum, Singapore, Part 1. *Bull. Raffles Mus.*, **17**: 12-43, figs. 1-9, pls. 2-4.
- INGER, R. F., 1957. Report on a Collection of Marine Fishes from North Borneo. *Fieldiana: Zoology*, **36** (8): 341-405, figs. 5 & 6.
- KOUMANS, F. P., 1953. The Fishes of the Indo-Australian Archipelago, **10**: xiii+423 pp., 95 figs. Leiden: E. J. Brill.
- MOHR, E., 1926. Die Gattung *Zenachopterus* Gill. *Zool. Jahrb.*, **52**: 231-266, 21 figs.
- , 1936. Hemiramphiden Studien IV.-VI. *Mitt. Zool. Mus. Berlin*, **21** (1): 34-64, figs. 1-14.
- MYERS, G. S., 1949. Salt tolerance of fresh-water fish groups in relation to zoogeographical problems. *Bijdr. tot de Dierk.*, **28**: 315-322.
- SMITH, J. L. B., 1965. Fishes of the family Atherinidae. *Ichth. Bull. Rhodes Univ.*, **31**: 601-632, figs. 1-8, plates 98-102.
- TWEEDIE, M. W. F., 1936. A List of Fishes in the Collection of the Raffles Museum. *Bull. Raffles Mus.*, **12**: 16-28.
- , 1940. Additions to the collection of fishes in the Raffles Museum. *Bull. Raffles Mus.*, **16**: 68-82.
- , 1952. Notes on Malayan fresh-water fishes. 3-5. *Bull. Raffles Mus.*, **24**: 63-95.
- , 1961. Notes on Malayan Fresh-water fishes. 9. *Bull. Raffles Mus.*, **26**: 178-182, figs. 1 & 2, pls. 22 & 23.
- WEBER, M., and L. F. DE BEAUFORT, 1913. The Fishes of the Indo-Australian Archipelago, **2**: xx+404 pp., 151 figs. Leiden: E. J. Brill.
- , and ———, 1916. The Fishes of the Indo-Australian Archipelago, **3**: xv+455 pp., 214 figs. Leiden: E. J. Brill.
- , and ———, 1922. The Fishes of the Indo-Australian Archipelago, **4**: xiii+410 pp., 103 figs. Leiden: E. J. Brill.
- , and ———, 1929. The Fishes of the Indo-Australian Archipelago, **5**: xiv+458 pp., 98 figs. Leiden: E. J. Brill.
- , and ———, 1931. The Fishes of the Indo-Australian Archipelago, **6**: xii+448 pp., 81 figs. Leiden: E. J. Brill.