

## INDO-PACIFIC DISTRIBUTION OF MICRODESMID FISHES (GOBIOIDEA)\*

C. E. DAWSON

Gulf Coast Research Laboratory, Ocean Springs, Mississippi 39564, USA

### ABSTRACT

The circumtropical gobioid family Microdesmidae is represented in the Indo-Pacific by *Gunnellichthys* Bleeker (six species) and *Paragunnellichthys* Dawson (three species). One or more species are now known to occur from the Hawaiian and Society Islands westward to East Africa and the northern Red Sea. Distribution of each species is discussed and illustrated and comments are provided on the ecology and zoogeography.

### INTRODUCTION

THE family Microdesmidae (=Gunnellichthidae J.L.B. Smith, 1958) includes some thirty-five species of small, anguilliform, tropical and subtropical gobioid fishes. Three of the five genera I now recognize (*Microdesmus* Günther, 1864; *Cerdale* Jordan and Gilbert, 1882 and *Clarkichthys* J.L.B. Smith, 1958) are known only from Atlantic or eastern Pacific waters. The family is represented in the Indo-West-Pacific region by *Gunnellichthys* Bleeker (1858) and *Paragunnellichthys* Dawson (1967). The 20.9 mm (standard length) postlarva from Bikini Atoll which represents the type and only known specimen of *Allomicrodesmus* Schultz (1966), is not a microdesmid.

The systematics and distribution of Indo-Pacific species were most recently treated by J.L.B. Smith (1958) and Schultz (1966) but both efforts were hampered by the lack of adequate study material. In connection with investigations leading to a monograph of the family, I have examined most of the known museum holdings, including important material from the George Vanderbilt Expeditions and International Indian Ocean Expeditions (IIOE), as well as a number of later collections. In recent years I have described five new Indo-Pacific species (Dawson, 1967, 1968, 1969, 1970). Sometime may elapse before completion of my current studies and, although there are still less than three hundred known specimens from the Indo-West-Pacific, this interim report on distribution seems appropriate.

### *Gunnellichthys* BLEEKER

This genus is represented by one or more species throughout much of the tropical Indo-West-Pacific (roughly between 20°N and 20°S latitude) from the Society and Hawaiian Islands westward to the east coast of Africa. These fishes attain a maximum length approaching 125 mm and inhabit coral sands on or near coral reefs. They are usually taken in areas protected from surf, heavy swells, or strong currents, and are known to inhabit depths to at least 30 metres.

*Gunnellichthys pleurotaenia* (Fig. 1 and Pl. A) was originally described from the Celebes and present distribution includes the Fiji Islands; Western Samoa; the Marshall, Mariana, Palau and Philippine Islands; Indonesia and the Great Barrier Reef. This species has been most frequently taken at depths of less than three metres but there is one collection from a depth of 8-20 metres.

\*Presented at the 'Symposium on Indian Ocean and Adjacent Seas—Their Origin, Science and Resources' held by the Marine Biological Association of India at Cochin from January 12 to 18, 1971.

*Gunnellichthys copleyi* (Fig. 1) was originally described from tidepools on the coasts of Mocambique and Kenya. It has since been collected in shallow water habitats at Madagascar and the Aldabra Islands. This species differs only slightly from *G. pleurotaenia* and probably warrants no more than subspecific status. It is of interest to note that these colourful and distinctive fishes have not been represented in collections from the Seychelles and Maldive Islands or the Chagos Archipelago. Other microdesmids, including two with broad distribution, are represented in each of these areas and the apparent absence of the relatively common *G. pleurotaenia* - *G. copleyi* complex seems somewhat surprising.

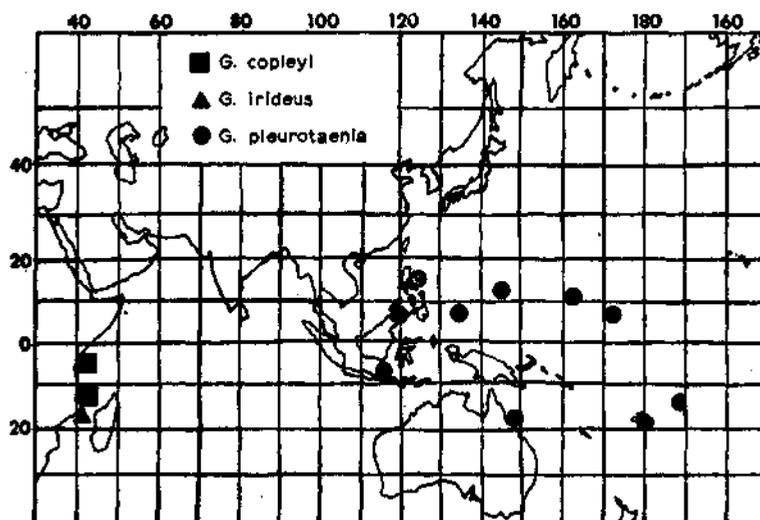


Fig. 1. Confirmed Indo-West-Pacific distribution of *Gunnellichthys copleyi*, *G. irideus*, and *G. pleurotaenia* as of November, 1970.

*Gunnellichthys irideus* (Fig. 1) is known only from the original 18 specimens taken in a tidepool collection in Mocambique.

*Gunnellichthys curiosus* (Fig. 2 and Pl. I B) was described from a single specimen taken in the Seychelles by the IIOE in 1964. Recent collections have extended the known range to the Great Barrier Reef and the Hawaiian Islands. This is the only microdesmid known from Hawaii and the collection of several specimens by Dr. J.E. Randall and colleagues since 1968 indicates that the species is well established in those waters. *G. curiosus* is evidently most common in somewhat deeper waters than its congeners and all collections have been made at depths between 9 and 30 metres.

*Gunnellichthys monostigma* (Fig. 2 and Pl. I C) was described from tidepool collections in Mocambique but subsequent collections have shown this species to be widely distributed in central Indo-Pacific regions. In addition to the type locality, the species is now known from the Society, Samoa, Marshall and Caroline Islands and the Great Barrier Reef. Recorded depths range to a maximum of 20 metres.

*Gunnellichthys viridescens* (Fig. 2) was described from 15 specimens taken in IIOE collections from the Seychelles and Maldive Islands. Study of older museum material and recent collections has extended the known range to include the Marshall

and Caroline Islands and the Great Barrier Reef. Although collections have been made at depths of 20 metres, the majority of specimens have apparently been taken at depths of less than five metres.

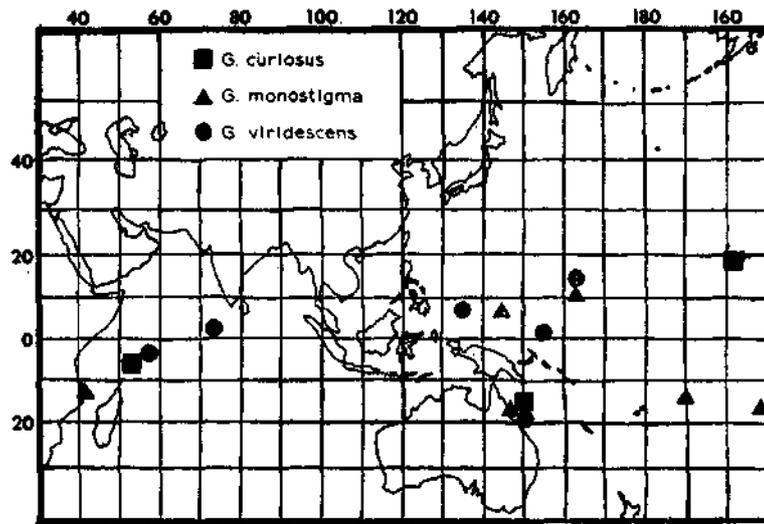


Fig. 2. Confirmed Indo-West-Pacific distribution of *Gunnellichthys curiosus*, *G. monostigma*, and *G. viridescens* as of November, 1970.

*Gunnellichthys* sp.: In addition to the species treated above, I have two undescribed forms under study; one from Madagascar, the other from the Gulf of Thailand. The latter specimen represents the only known record of a microdesmid from the coastal waters of the Asiatic mainland.

#### Paragunnellichthys Dawson

This recently described genus (Fig. 3) is presently known from a very few specimens from widely separated central and western Indo-Pacific localities. These fishes mature at lengths of about 40 mm and apparently occupy habitats similar to those of *Gunnellichthys*. The maximum depth of collection is now recorded at about 8 metres.

*Paragunnellichthys seychellensis* (Pl. II A) was described from four specimens in IIOE collections in the Seychelles. Two additional fish have subsequently extended the known range to Palau and the Caroline Islands.

*Paragunnellichthys fehlmanni* is known only from the type series of five specimens taken at depths of less than three metres in the Chagos Archipelago.

*Paragunnellichthys springeri* (Pl. II B) is represented only by the holotype collected in the northern Red Sea during 1969. This specimen is the only microdesmid recorded from the Red Sea and represents the northernmost Indo-Pacific record of the family.

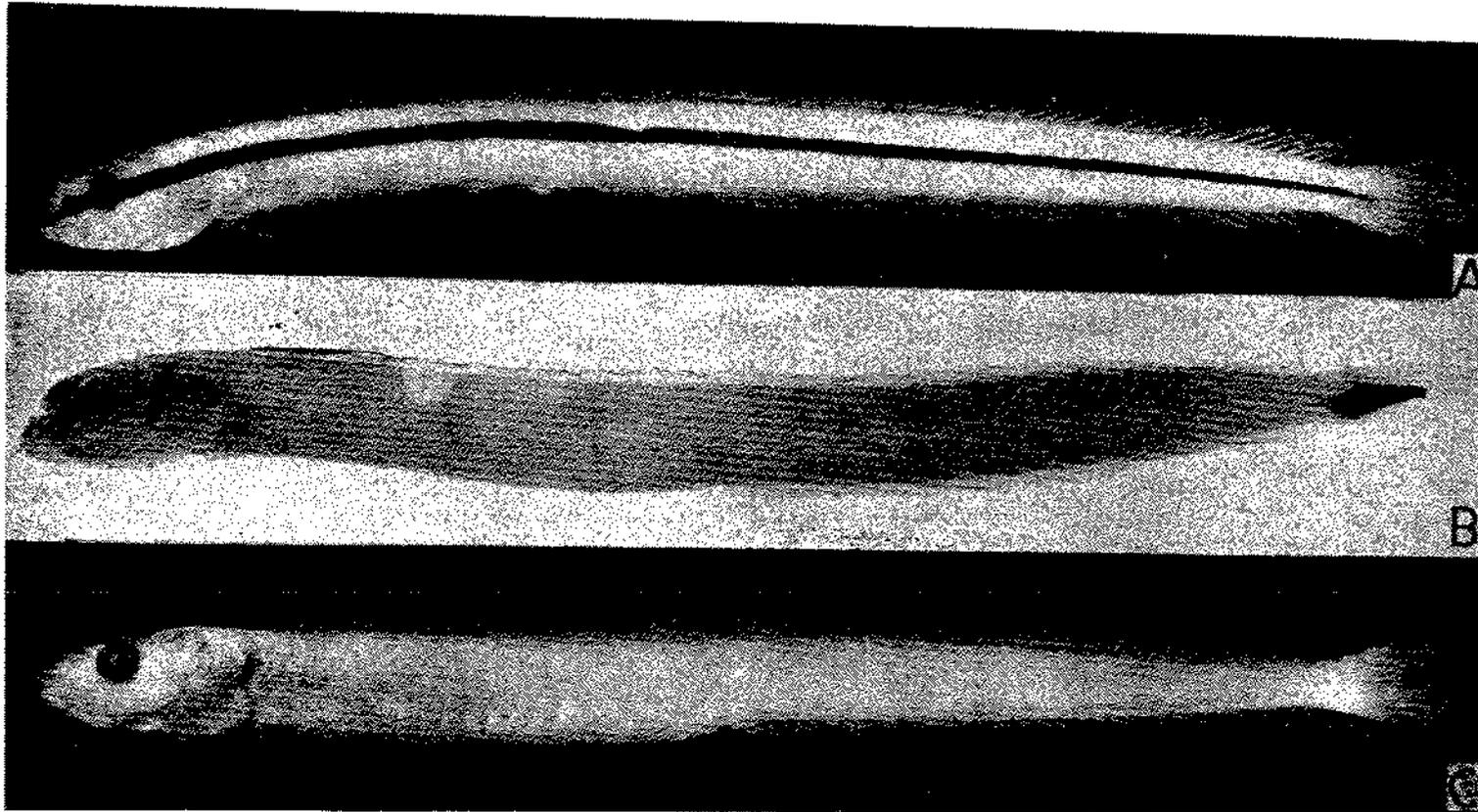


Plate I. A. *Gunnellichthys pleurotaenia* (74 mm S.L.); B. *Gunnellichthys curiosus* (79 mm S. L.) and C. *Gunnellichthys monostigma* (85 mm S.L.).

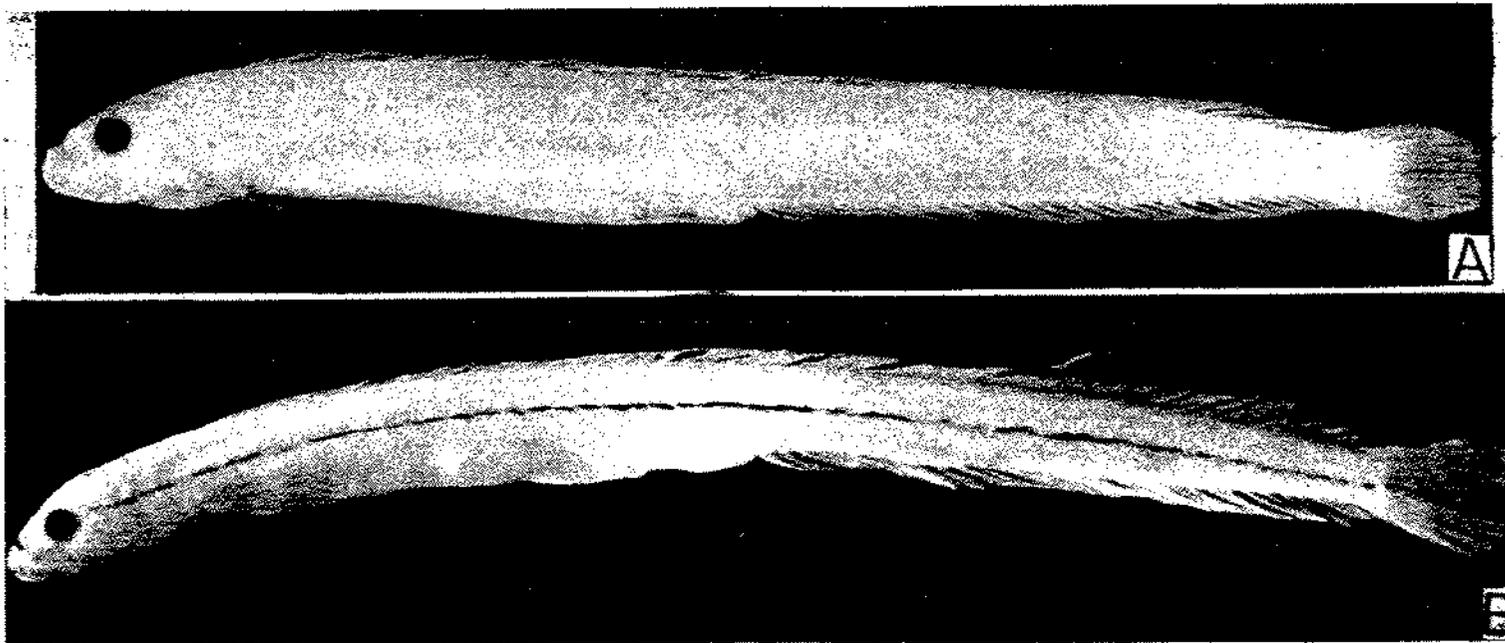


Plate II. A. *Paragunnellichthys seychellensis* (34 mm S.L.); and B. *Paragunnellichthys springeri* (22 mm S.L.).

## DISCUSSION

It is readily apparent from the foregoing that little is known concerning the distribution of Indo-Pacific microdesmids. A number of forms are recorded from a few specimens taken in single collections over a wide geographical range; three species are known only from the type localities. Large sub-regions such as the Persian Gulf, Arabian Sea, Bay of Bengal, western Sumatra and northwestern Australia are completely devoid of records, although each contains numerous and extensive areas of what may be termed "likely habitats".

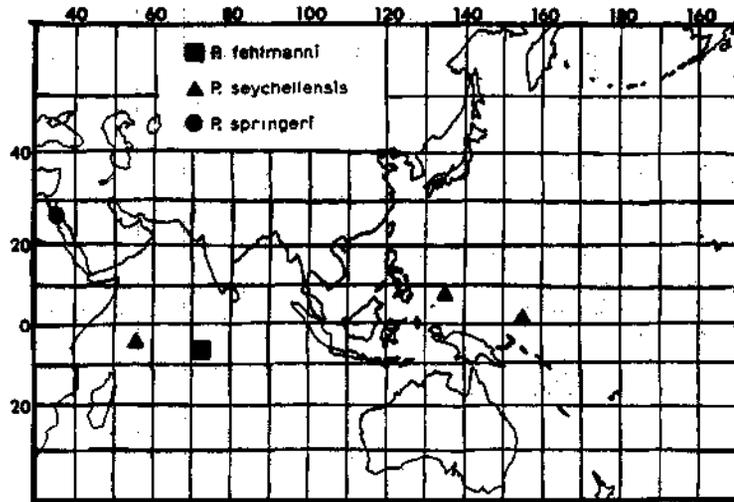


Fig. 3. Confirmed Indo-West-Pacific distribution of *Paragunnellichthys* species as of November 1970.

The lack of more complete distribution records is partly due to the difficulty of capturing these secretive fishes. The most productive method is through the use of ichthyocides, but even under ideal conditions great diligence is needed for the successful retrieval of such diminutive forms. Other capture methods, such as the use of nets, traps or spear, require either a high level of proficiency or considerable good fortune. Difficulties in identification and a somewhat scattered literature have also contributed to the problem and I strongly suspect that a number of useful records rest among the host of unidentified Indo-Pacific collections of a number of institutions.

Available data on species reasonably well represented in collections (*G. pleurotaenia* + *G. copleyi*, *G. monostigma*, *G. viridescens*) suggest widespread distribution throughout low latitude reef habitats of the Indo-West-Pacific. Peripheral distribution shown for certain blennies of the genus *Entomacrodus* (Springer, 1967) does not seem to apply to these species.

Of the nine described Indo-West-Pacific species, eight have been recognized since 1950 and five of these since 1967. As noted above, there are two undescribed forms on hand and there appears little doubt that further collecting will reveal the presence of additional taxa. Rather than engage in theory or speculation concerning the zoogeography of Indo-Pacific microdesmids, I withhold further discussion until additional material is available. Present distributional data on these fishes more nearly reflect the distribution of collectors than the distribution of a particular species or population.

## REFERENCES

- BLEEKER, P. 1858. Tiende bijdrage tot de kennis der fischfauna van Celebes. *Act. Soc. Sci. Indo-Neerl.*, 3: 1-16.
- DAWSON, C.E. 1967. *Paragunnellichthys seychellensis*, a new genus and species of gobioid fish (Microdesmidae) from the Western Indian Ocean. *Proc. Biol. Soc. Wash.*, 80 :73-81.
- 1968. Two new wormfishes (Gobioida : Microdesmidae) from the Indian Ocean. *Ibid.*, 81 :53-68.
- 1969. *Paragunnellichthys fehlmanni*, a new gobioid fish (Microdesmidae) from the Indian Ocean. *Ibid.*, 82 :373-380.
- 1970. A new wormfish (Gobioida : Microdesmidae) from the northern Red Sea. *Ibid.*, 83 (25): 267-272.
- GÜNTHER, A. 1864. On some new species of Central-American Fishes. *Proc. Zool. Soc. London*, 1864 : 23-27.
- JORDAN, D.S. and C.H. Gilbert 1882. Descriptions of nineteen new species of fishes from the Bay of Panama. *Bull. U.S. Fish. Comm.*, 1 : 306-335.
- SCHULTZ, L.P. 1966. Fishes of the Marshall and Marianas Islands: Families Kraemeriidae through Antennariidae. *Bull. U.S. Nat. Mus.*, 202 (3) :1-176.
- SMITH, J.L.B. 1958. The gunnellichthid fishes with description of two new species from East Africa and of *Gunnellichthys (Clarkichthys) bilineatus (Clark)* 1936. *Ichthyol. Bull. Rhodes Univ.*, 9: 123-129.
- SPRINGER, V.G. 1967. Revision of the circumtropical shorefish genus *Entomacrodus* (Blenniidae: Salariae). *Proc. U.S. Nat. Mus.*, 122 (3582): 1-150.