

Discordipinna griessingeri, a New Genus and Species of Gobiid Fish from the Tropical Indo-West Pacific

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Abstract *Discordipinna griessingeri* is described as a new genus and species of gobiid fish from the tropical Pacific, Indian Ocean, and the Red Sea. The genus is unique among gobiids in the forward placement of the dorsal fin over the end of the head and the associated alterations of the anterior vertebrae.

Tropical Indo-Pacific gobiid fishes are one of the largest and poorest known groups of fishes. There are over 100 distinct genera in the region. Approximately 60 genera occur on coral reefs. Many of the species are very small and have been collected only recently using SCUBA and rotenone. Research on the Great Barrier Reef by the senior author indicates that gobiids are the most speciose group of coral reef fishes. About 200 species have been collected from the Great Barrier Reef based on relatively limited sampling. Examination of type material in a number of museums in various parts of the world has indicated that about half of the Indo-Pacific coral reef species of gobiids are still undescribed. With 500 nominal gobioid genera, it is rare that a distinctive new genus is discovered. The present study describes a peculiar reef gobiid genus from several localities in the Indo-west Pacific. At present the species is known only from 15 specimens. The genus differs from other gobiids in the forward placement of the first dorsal fin over the end of the head. Because of its distinctiveness, its relationships to other gobiid genera are uncertain.

Methods

Types are deposited in the Academy of Natural Sciences of Philadelphia (ANSP), the Australian Museum, Sydney (AMS), the Bernice P. Bishop Museum, Honolulu (BPBM), the California Academy of Sciences, San Francisco (CAS), and the National Museum of Natural History, Washington, D. C. (USNM).

Measurements were taken with a dissecting microscope with an ocular micrometer. The methods follow those of Hubbs and Lagler (1958). The interdorsal length is the distance from the base of the last dorsal spine in the first dorsal fin to the second dorsal origin. The last ray in the second dorsal and anal fins, as counted, is branched to the base. The osteology was studied from a cleared and stained paratype. Vertebral counts were made from that specimen and radiographs.

Meristics were taken on all specimens, but measurements were taken on only five specimens, since the others were distorted.

Discordipinna gen. nov.

Type species: *Discordipinna griessingeri* sp. nov.

Diagnosis. First dorsal fin with five spines, originating over posterior end of operculum, widely separated from second dorsal fin; first two spines thickened and second elongate. Tips of pectoral fin elongate. Pelvic fins connected to form a cup-shaped disc; membrane around spine forming a flat lobe. Head depressed. Tongue tip rounded. Gill opening wide; lower opercular membrane attached to isthmus just below and forward from lower base of pectoral fin. First gill arch not connected to operculum by membrane; short anterior rakers. Anterior nostril tubular; posterior nostril with raised rim. No flaps on shoulder girdle. Body completely scaled, posteriorly with ctenoid scales, anteriorly with cycloid scales; top of head with large cycloid scales; cheek and operculum naked. Seventeen segmented caudal rays.

Open head pores present; a pore behind

each posterior nostril; an anterior interorbital between eyes; a posterior interorbital on top of head just behind eye; a postorbital behind each eye; an infraorbital below each postorbital; a lateral canal pore over preoperculum; and a terminal lateral canal pore above posterior end of preoperculum. No preopercular pores.

Head papillae large, but few in number. A line of papillae above upper lip, from anterior nostril to near end of jaw. Three widely spaced papillae in a longitudinal line behind end of jaw. An upper line of three widely spaced papillae extending longitudinally backward from above middle of cheek; with a single papilla directly below posterior end of the row. A longitudinal row of four to six closely spaced papillae above end of middle cheek row. Two papillae along posteroventral margin of eye. A more or less longitudinal row of three papillae near middle of upper operculum. An oblique, almost vertical row on lower anterior part of operculum. No lower longitudinal opercular row. A single mandibular papilla on each side of chin, in line with preopercularmandibular series. Other papillae are shown in Fig. 1.

Outer row of teeth in upper jaw composed of enlarged wide-set teeth extending full length of jaw; anteriorly two inner rows of smaller close-set teeth, tapering posteriorly to one row. Outer row of teeth in lower jaw composed of enlarged close-set teeth anteriorly, row ending at bend of jaw; two inner rows of smaller teeth, tapering posteriorly to one row.

Osteology: Branchiostegals 5. No post-

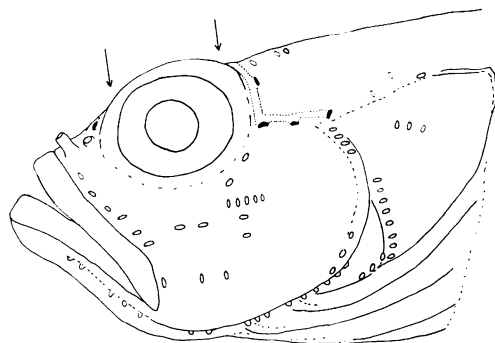


Fig. 1. Head of *Discordipinna griessingeri*, showing sensory papillae and pores. BPBM 5884, cleared and stained paratype. Arrows indicate median head pores.

cleithrum. No mesopterygoid. Metapterygoid with a slender anteroventral process extending over quadrate. Sphenotic short, flange supporting hyomandibular fused with flange forming posterior part of orbit. Preoperculum without a process extending to posterior flange of hyomandibular. No hyomandibular process from flange to preoperculum. Frontal short, not prolonged, frontal ridge large, forming posterior and dorsal part of orbit. Supraoccipital diamond-shaped with prominent lateral wedge-shaped wings. Sphenotic with a short dorsal flange not meeting lateral wings of supraoccipital. Scapula absent. Glossohyal spatulate.

Vertebrae $10+16=26$ (in 2). First vertebra shortened, second normal length with neural arch extending forward, third with neural arch extending far forward, fourth and following neural arches normal. Four pterygiophores between third and fourth neural

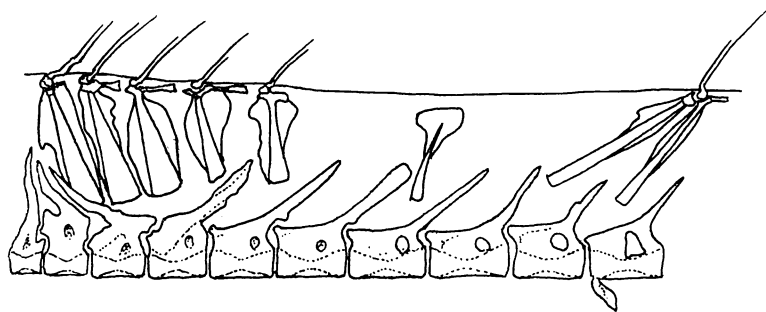


Fig. 2. First 10 vertebrae and dorsal pterygiophores in *Discordipinna griessingeri*.

arches; one between fourth and fifth neural arches; none between fifth and sixth; and one without a dorsal spine between sixth and seventh neural arches (Fig. 2). Anterior zygapophyses weakly developed on vertebrae four to eleven. Dorsal ribs associated with vertebrae one to eleven, last two reduced and free. Ventral ribs on vertebrae three to nine. Caudal skeleton with one enlarged epural; an upper splint-like free hypural; two enlarged hypural plates, uppermost fused with urostyle, lowermost articulating ventrally with urostyle; one lower splint-like small free hypural. One segmented caudal ray articulating with epural, one with upper hypural, seven with upper hypural plate, six with lower hypural plate, one with lower hypural (also articulating with lower hypural fan), and one articulating with hemal arch of penultimate vertebra.

Derivation of name. From the Latin, *discors*, different and the Latin, *pinna*, fin; alluding to the peculiar placement of the first dorsal fin and the elongated rays of the first dorsal and pectoral fins.

Discordipinna griessingeri sp. nov.
(Figs. 1~4)

Measurements of holotype and 4 paratypes

Table 1. Measurements of five types of *Discordipinna griessingeri*. Measurements in mm.

| Character | Holotype | Paratypes | | | |
|-----------------------------------|----------------|---------------|--------------|--------------|---------------------|
| | USNM 214889 | BPBM 11266 | BPBM 5884 | BPBM 5884 | AMS I. 17450-001 |
| Sex | ♀ | ♂ | ♀ | ♂ | ♂ |
| Standard length | 19.5 | 16.2 | 20.7 | 19.4 | 10.9 |
| Head length | 5.6 | 4.2 | 6.2 | 5.5 | 3.3 |
| Head width | 3.8 | 3.4 | 4.0 | 3.3 | 2.3 |
| Head depth at preopercular margin | 3.0 | 2.6 | 3.3 | 2.9 | 1.5 |
| Body depth at anal origin | 3.4 | 3.1 | 3.6 | 3.4 | 1.7 |
| Caudal peduncle depth | 2.4 | 2.4 | 2.7 | 2.5 | 1.2 |
| Snout length | 1.1 | 1.3 | 1.4 | 1.3 | 0.8 |
| Eye length | 1.7 | 1.3 | 1.6 | 1.4 | 1.0 |
| Upper jaw length | 2.2 | 1.6 | 2.3 | 2.0 | 1.2 |
| Base of first dorsal fin | 1.8 | 1.7 | 1.8 | 1.8 | 0.9 |
| Base of second dorsal fin | 3.8 | 3.4 | 4.5 | 3.2 | 2.1 |
| Interdorsal length | 4.0 | 2.4 | 4.0 | 3.4 | 1.5 |
| Base of anal fin | 3.6 | 3.0 | — | 3.4 | 2.0 |
| Second dorsal spine length | 18.4 | 7.0 | 12.5 | 13.5 | 5.7 |
| Pectoral fin length | 8.3 | — | 9.0 | 8.6 | 3.7 |
| Pelvic fin length | 6.3 | 5.1 | 6.1 | 6.0 | 3.2 |
| Caudal fin length | 8.3 | — | 6.5 | — | — |

are given in Table 1.

Meristics: Numbers in parentheses indicate number of specimens with each count; an asterisk indicates count of holotype. First dorsal V (15)*. Second dorsal I, 7 (1); I, 8 (14)*. Anal I, 8 (15)*. Pectoral: Red Sea and western Indian Ocean 18 (1), 19 (3)*, 20 (1); Cocos Keeling and Pacific 17 (2), 18 (5), 19 (2). Longitudinal scale count 22 (2)*, 23 (1), 24 (2), 25 (1). Segmented caudal rays 17 (15)*. Branched caudal rays 15 (5)*, 16 (2).

First dorsal fin widely separated from second dorsal; base of first dorsal 2 in interdorsal distance. Head depressed, distinctly broader than deep. Mouth oblique, forming an angle of 45° with body axis. Maxilla reaches to a point under anterior part of pupil. Snout short, equal to or shorter than eye diameter. Interorbital narrow, less than half pupil diameter. Body slightly compressed; dorsal profile curved upward under first dorsal fin, sloping gradually downward posteriorly from second dorsal origin. Ventral profile straight. First dorsal fin high in both sexes, spines longer in female; first spine moderately elongated, distal fifth of spine free from membrane; second spine longest, reaching to or beyond end of second dorsal fin; third spine moderately elongated, varying

from equal to to one half length of first spine; fourth spine considerably shorter than preceding; fifth spine shortest; fourth and fifth spines shorter than body depth. Pectorals elongate, distal sixth or quarter of rays free of delicate interconnecting membrane; lower three or four rays simple, other rays branched; ninth to fourteenth rays very elongated, reaching to below second dorsal fin, between middle of to slightly beyond end of fin. Pelvic fins long, reaching anus. Caudal fin pointed, 1.0 to 1.5 times head length.

Colouration of fresh male from the Marquesas Islands (BPBM 11266): Background colour of head and body light green. A lateral dark brown stripe on lower third of body extending on to caudal fin. Three fine longitudinal gold lines above ventral stripe. Top and sides of head with numerous dark brown spots, about equal in size to pupil, forming three longitudinal rows. Basal half of first dorsal fin reddish orange, distal half yellowish orange, tip with a small white spot. Second dorsal fin reddish orange, cut basally by a light green stripe; distal tip blue; three large black oval spots arranged in a row along middle of fin; spots slightly larger than eye. Anal fin white basally, with

a broad median dark orange band, followed by a broad black stripe; distal margin of fin blue. Upper half of caudal fin reddish orange, surrounding three black spots as large as eye; a black stripe near upper margin of fin and bordered by light blue; middle of fin with a narrow light green stripe; lower half of fin dark brown. Pelvic fins yellowish green. Pectoral fin with alternating oblique black and reddish orange bars.

Colouration of a fresh female from the Great Barrier Reef (CAS 39675): Background colour of head and body white to tan. A lateral dark brown or reddish-brown stripe extending to near end of caudal peduncle, continued on caudal fin as a bright red or reddish orange band. Three fine longitudinal red lines on side above ventral stripe. First dorsal as in Marquesas specimen, except tip of fin not distinctly marked. Second dorsal fin marked as in Marquesas specimen, except black spots smaller than eye. Anal white basally, distal half reddish orange. Caudal reddish orange, cut by a clear bar near base of fin; three to five small spots dorsally, anteriormost largest, but smaller than eye; middle of fin with pale white stripe, bordered by narrow yellow stripes; margin

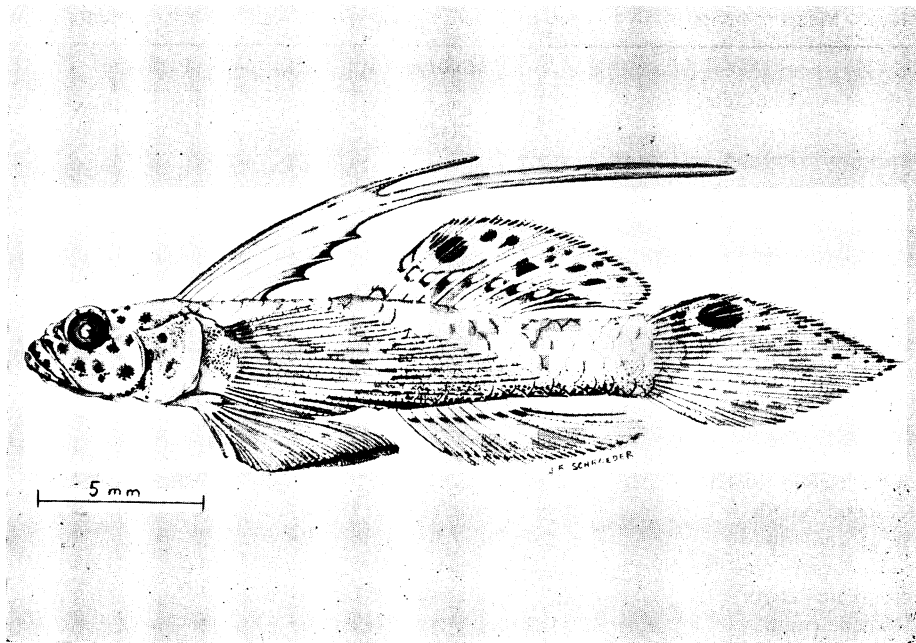


Fig. 3. Holotype of *Discordipinna griessingeri*. Drawing by J. R. Schroeder.

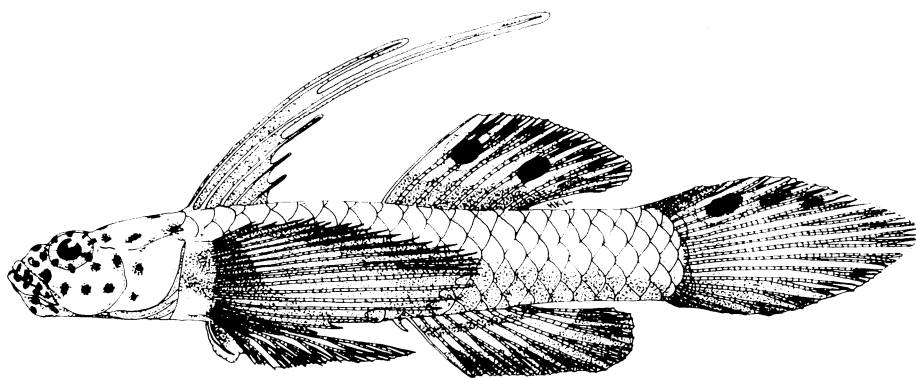


Fig. 4. Male paratype of *Discordipinna griessingeri*, AMS I. 18124-001. Drawing by H. K. Larson.

of fin light blue, with a narrow black curved line proximal to margin. Pelvic fins white. Pectoral with a reddish stripe from upper base to tip of fin, bordered below by black, then yellow, then a clear area, then a white stripe, followed ventrally by an oblique red stripe, followed by white.

Coloration in alcohol: Background color of head and body light brown. A dark brown lateral stripe on lower third of body. Top and sides of head with numerous dark brown spots. Dorsal fin light brown basally, dark brown on distal half, or entirely light brown. Second dorsal fin opaque with 3 large brown oval spots with black centers, arranged in a longitudinal row. Second and third spots reduced in Red Sea and western Indian Ocean material. Upper part of caudal fin with 3 large black oval spots (Marquesas), or 2 large spots, followed by 2 or 3 smaller spots (Pacific and Indian Ocean); lower third of caudal dark brown or translucent; middle of fin opaque. Anal opaque, sometimes with dark brown margin. Pelvic opaque. Pectoral dark brown, with oblique light brown bars.

Variation: Specimens from the Red Sea (the type locality) and the western Indian Ocean differ from eastern Indian Ocean and Pacific Ocean material in having the second and third dorsal spots and the second and third caudal spots reduced (see Figs. 3 and 4), and possibly in averaging higher pectoral ray counts. The caudal and dorsal spots are darkest in material from the Marquesas. The differences in fin coloration of fresh material

may be due to sexual dimorphism or geographical variation. In gobiids, males often have darker fins. Unfortunately much of the material is faded, and insufficient material of both sexes is available from the three geographical areas.

Derivation of name. Named after Mr. S. Griessinger, the collector of one paratype.

Material examined. Holotype: USNM 214889, a 19.5 mm SL female from El Himeira, Israel, Gulf of Aqaba, 9~12 m.

Paratypes: AMS I. 18740-013, male, 1(14 mm SL), Yonge Reef, Great Barrier Reef, Australia, 9~12 m. AMS I. 18354-095, 1(11), Bird Island, Bay of Islands, Suva Harbour, Fiji, 6 m. AMS I. 17450-001, male, 1(11), Tenoko, Gambiers, 24 m. AMS I. 18124-001, male, 1(17), Cocos-Keeling Island, coral, rock and sand, 21~24 m. ANSP 128412, female, 1(19), taken with AMS I. 18124-001. ANSP 128413, male, 1(19), Cocos-Keeling Island, 7.5 m. BPBM 5884, male and female, 2(19~21), largest cleared and stained, Teavaraa Pass, Papara, Tahiti, 27 m. BPBM 11266, male, 1(16), Fatu Hiva, Marquesas Islands, 24 m. CAS 39675, female, 1(19), One Tree Island, Great Barrier Reef, Australia, 5 m. USNM 214887, female, 1(16), Ras Muhammed, Israel, Strait of Jubal, Red Sea, 0~9 m. USNM 214888, female, 1(18), El Himeira, Israel, Gulf of Aqaba, 21~27 m. USNM 216940, male, 1(16), St. Brandon's Shoals, 16°27' S, 59°39' E. 8~9 m. USNM 216941, female, 1(16), St. Brandon's Shoals, 16°45' S, 59°34' E. 15 m.

Habits and Relationship

Discordipinna griessingeri has been collected around coral reefs in depths from 5 to 27 m. It is found in areas with live coral, rubble and sand, and presumably lives in crevices in coral or on sand below coral. Its cryptic habits and general head physiognomy, particularly the depressed head, suggest a similarity to the genus *Callogobius*, but relationships of *Discordipinna* are unknown. *Discordipinna* differs from *Callogobius* in lacking fleshy ridges on the head. The placement of the dorsal fin over the end of the head and the alteration of the anterior neural spines are features unique among gobioid fishes.

The species is known from the central and western tropical Pacific, the Indian Ocean and Red Sea.

Acknowledgements

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for providing the excellent drawing of the holotype by J. R. Schroeder, and for loan of much of the type material. J. Randall also provided material and a kodachrome of a fresh specimen. H. K. Larson drew the paratype and other figures.

Literature Cited

Hubbs, C. L. and K. F. Lagler. 1958. Fishes of the great Lakes region. Bull. Cranbrook Inst. Sci., (26): xi+213 pp., 251 figs., 44 pls.

(DFH: The Australian Museum, 6-8 College St., Sydney, New South Wales, Australia; PF: O.R.S.T.O.M., Noumea, New Caledonia)

熱帯インド・西太平洋で採集されたハゼ科の新属新種 *Discordipinna griessingeri*

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熱帯太平洋，インド洋，紅海から得られたハゼ科の *Discordipinna griessingeri* を新属新種として記載した。本属は背鰭が体の前方，頭部後端上にあり，それに関連して前部の脊椎骨が変形している点で，ハゼ科の中で特異な存在である。