

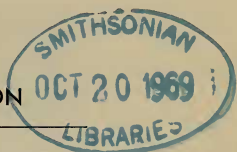
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*PARAGUNNELLICHTHYS FEHLMANNI*, A NEW  
GOBIOID FISH (MICRODESMIDAE) FROM THE  
INDIAN OCEAN

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Among recently received collections of Indo-Pacific wormfishes there is an undescribed species exhibiting the first known occurrence of fully united pelvic fins within the family Microdesmidae. In continuance of my studies of microdesmids, I herewith describe this unusual form from the central Indian Ocean.

Specimens reported here were made available for study by the Smithsonian Oceanographic Sorting Center and have been deposited in the collections of the Smithsonian Institution (USNM) and the Gulf Coast Research Laboratory (GCRL). Head length is measured from the tip of the lower jaw to base of the uppermost pectoral ray; body depth is measured at anal fin origin. Caudal fin length is the distance from the rear of the hypural to the tip of the longest ray. All fin-rays are counted separately; vertebral counts are from radiographs or cleared and stained specimens.

Appreciation is expressed to Dr. Daniel M. Cohen for comments on the manuscript. Semidiagrammatic delineations are by Mr. Harry L. Moore, Jr. This study was supported in part by National Science Foundation Grant GB-6823.

***Paragunnellichthys fehlmanni* new species**

*Holotype*: USNM 203830; 33.6 mm SL; Diego Garcia Atoll, Chagas Archipelago, 7°15'43"S, 72°22'36"E; chemical ichthyocide collection in depths up to 8 ft over reef NW of lagoon; 18 June 1967; H. A. Fehlmann coll.

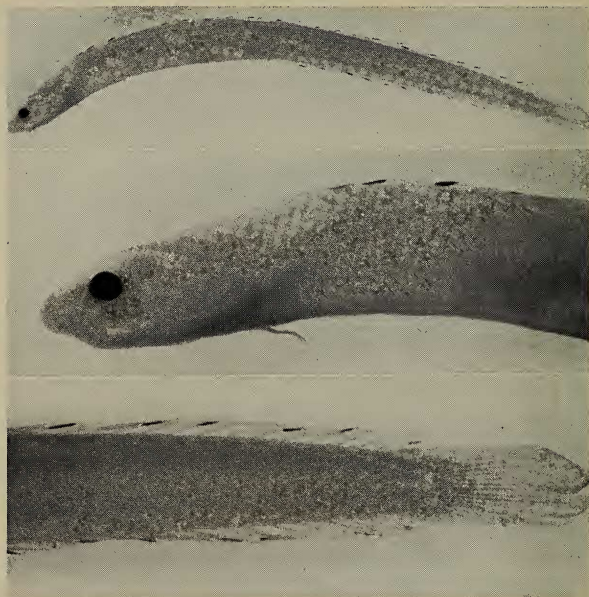


FIG. 1. *Paragunnellichthys fehlmanni*. USNM 203830; holotype; 33.6 mm SL.

*Paratypes*: USNM 203832; (2) 31.5–33.8 mm SL. USNM 203831; 24.9 mm SL; cleared and stained. GCRL 3452; 31.2 mm SL; cleared and stained. Collection data of paratypes as for holotype.

*Diagnosis*: A species of *Paragunnellichthys* with short pelvic fins united by a membrane; interradial membranes of dorsal and anal fins with a somewhat irregular series of vertically elongate black blotches; the first two dorsal spines more closely spaced than successors; anal fin origin beneath interspace between 22nd to 24th dorsal fin elements; proximal pterygiophore of 1st dorsal spine inserted between 3rd and 4th abdominal vertebrae.

*Description*: Dorsal spines 19–21, dorsal segmented rays 31–33, total dorsal elements 51–53; anal rays 29–31; pectoral rays 10; pelvic fin I, 2; segmented caudal rays 15; vertebrae 25 + 27–29 = 52–54. See Table 1 for proportional measurements and counts.

TABLE 1. Measurements (mm) and counts of *Paragunnellichthys fehlmanni*.

	USNM 203830 Holotype	USNM 203832 Paratype	USNM 203832 Paratype	USNM 203831 Paratype	GCRL 3452 Paratype
Standard length	33.6	33.8	31.5	24.9	31.2
Caudal fin length	3.6	3.5	3.4	2.6	3.0
Least caudal peduncle depth	1.4	1.2	1.2	1.0	1.2
Body depth at anal fin origin	2.1	2.0	2.0	1.7	1.9
Predorsal length to tip of lower jaw	5.1	5.0	4.9	4.2	4.9
Preanal length	18.2	17.8	16.8	13.4	17.5
Pectoral fin length	2.2	2.1	2.1	1.9	2.2
Pelvic fin length	1.1	0.9	1.0	0.8	0.9
Distance from pelvic insertion to anal fin origin	13.7	13.4	12.8	9.5	13.3
Head length	4.2	4.1	3.7	3.4	4.1
Eye diameter	0.6	0.6	0.6	0.5	0.6
Snout length	0.6	0.6	0.5	0.5	0.6
Distance from anterior margin of eye to tip of lower jaw	0.9	0.9	0.9	0.8	1.0
Postorbital length	2.6	2.6	2.2	2.1	2.5
Interorbital width	0.3	0.3	0.3	0.2	0.3
Tip of lower jaw to angle of gape	0.9	0.7	0.8	0.7	0.7
Number of dorsal spines	20	20	21	19	20
Number of segmented dorsal rays	31	32	32	33	32
Total dorsal elements	51	52	53	52	52
Number of anal rays	29	30	31	30	29
Anal fin origin beneath interspace between dorsal elements	23/24	22/23	23/24	22/23	23/24

Body moderately elongate, slender, depth at anal fin origin averages 6.3 percent of SL, tapering to about 60 percent of body depth at caudal peduncle; compressed, breadth at anal fin origin 2.7 percent of SL in holotype, greatest breadth (5.1 percent of SL) at opercle; caudal fin

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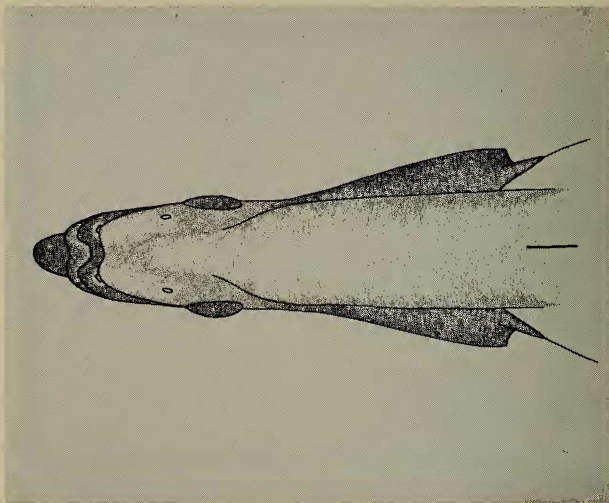


FIG. 2. *Paragunnellichthys fehlmanni*. Semi-diagrammatic delineation of dorsal aspect of head.

broadly rounded, averages 10.4 percent of SL; head length 11.7–13.7 percent of SL, its depth subequal to that of body; interorbital narrow, convex, its width equal to about  $1/2$  of eye diameter; eye lateral, high on head, its diameter, averaging 14.9 percent of head length, is slightly greater than snout length; lower jaw prominent, extends about  $2/3$  of eye diameter beyond snout tip, fleshy, its lateral depth subequal to eye diameter, narrowing in front to a prominent subvertical fleshy symphyseal ridge which is matched by a slight emargination of the snout tip (Fig. 2); gape short, reaches a vertical from front margin of posterior naris, inclined to about  $45^\circ$ ; upper lip broad near angle of gape, narrow and concealed in front by overhanging snout; lower lip broad posteriorly but narrows to a faint ridge across the symphysis, somewhat pouch-like and includes the anterior  $2/3$  of the upper lip and the median snout tip when mouth is closed; anterior naris opens anterolaterally through a short tubule at the end of a prominent fleshy dorsolateral longitudinal snout ridge; posterior naris dorsolateral over preorbital, with only a slightly elevated margin, its diameter about  $7$  in eye; lower jaw with two anterior rows of 12–14 large caniniform teeth and with a single row of minute pointed teeth on the posterior half of each dentary; upper jaw with two rows of about 18–20 enlarged caniniform teeth, those of the inner row somewhat recurved.

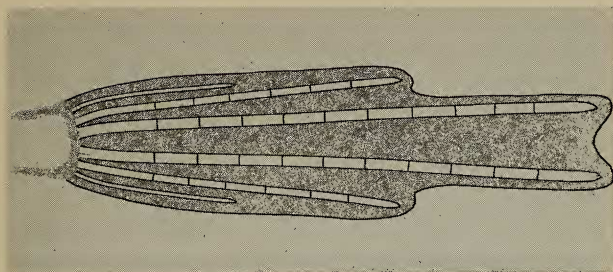


FIG. 3. *Paragunnellichthys fehlmanni*. Semi-diagrammatic delineation of united pelvic fins.

Gill opening large, subtubiform, directed posteriad, originates on pectoral peduncle just anterior of insertion of uppermost pectoral ray, curves downward and slightly forward to unite with the ventral margin of the peduncle near its insertion; ventral terminus of gill opening concealed by folds of the overhanging branchiostegal membrane. Dorsal and anal rays terminate on the short caudal peduncle, free from the caudal fin, depressed tips of terminal rays extend slightly past rear of hypural; dorsal fin originates well posteriad of gill opening, near a vertical through anterior third of pectoral fin; interspace between the 1st two dorsal spines one-third to one-half shorter than those which follow; the 1st dorsal spine about two-thirds the length of the 2nd, the 1st segmented ray is about 20 percent longer than the last spine; the last two dorsal and anal rays separate, not closely approximated; the 1st anal element is segmented and all segmented dorsal and anal rays are apparently simple; caudal fin formula, from stained paratype,  $5 + 2 + 11 + 2 + 5$ ; pectoral fin elongate and narrowly rounded, fin-rays simple, the 5th or 6th the longest, the rather short peduncle is not completely concealed by the opercle and branchiostegal membrane. Pelvic fins (Fig. 3) inserted about one-half their length in advance of dorsal fin origin and well posteriad of pectoral fin insertion, united by a distinct membrane, each with a slender outer spine and two simple rays, the innermost the longer. Anal fin origin beneath interspace between dorsal elements 22 and 23 or 23 and 24.

Head with embedded, separated, cycloid scales on posterior nape, opercle and upper branchiostegal membrane, apparently absent from cheeks, snout and ventral head; body scales similar, somewhat larger, nonimbricate but occasionally touching, cover predorsum, lateral body and abdomen except for a small naked area about anal and genital openings; fins naked but with some scales on pectoral peduncle and continuing forward within the gill opening; scales inconspicuous and difficult to see, maximum scale diameter about four in eye diameter.

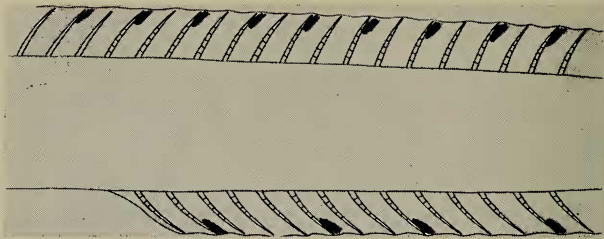


FIG. 4. *Paragunnellichthys fehlmanni*. Semi-diagrammatic delineation of median body section showing dorsal and anal fin blotches.

Dermal sensory papillae inconspicuous, apparently with a transverse row crossing nape, a short longitudinal row along upper margin of opercle, a supraorbital row which continues forward to snout tip, one or two rows on infraorbital and lower preorbital and with two parallel rows along side of lower jaw; sensory papillae apparently absent from abdomen and lateral body.

Apparently without predorsal interneurals; pterygiophores poorly ossified and difficult to see in both radiographs and stained material; distal pterygiophores begin immediately behind the first segmented dorsal ray and after the second anal ray; first dorsal spine inserted over interspace between the 3rd and 4th abdominal vertebrae. Abdominal neural spines strong, slender and pointed, generally of subequal length and located posteriad on centra; prezygopophyses low, slightly elevated and bluntly pointed in lateral aspect; ribs apparently articulate with centra of the first two vertebrae, with parapophyses on remaining abdominal vertebrae; abdominal epipleurals begin with the third vertebra; skull short, somewhat elevated, frontals poorly ossified and fail to reach mesethmoid in either radiographs or stained material; posttemporals curve well forward, not elevated above the anteriormost vertebrae; branchiostegal rays 5, the innermost remote from its fellows; mandible short and well ossified, with a prominent, pointed, terminal ventral process.

Ground color, in alcohol, primrose yellow; without conspicuous markings on head or body but with a few irregularly scattered light brown micromelanophores on predorsum, along either side of the spinous dorsal and on the midlateral body; interradiial membranes of dorsal and anal fins with prominent but somewhat irregular series of vertically elongate dark brown to black blotches (Figs. 1 and 4); dorsal markings are more closely spaced than those of the anal fin and counts from three fish ranged from 23 to 27 on the dorsal membranes and 10 to 13 on the anal; remaining interradiial membranes, caudal and paired fins immaculate; eye black, the pupil somewhat iridescent.

TABLE 2. Comparison of selected characters distinguishing *Paragunnellichthys fehlmanni* and *P. seychellensis*.

Character	<i>P. fehlmanni</i>	<i>P. seychellensis</i>
Number of dorsal spines	19-21	16-18
Total dorsal elements	51-53	47-48
Pelvic fins	united, inserted posteriorly of pectorals	separate, inserted in advance of pectorals
Number of abdominal vertebrae	25	21
Total vertebrae	52-54	48-49
1st dorsal spine inserted between	3rd and 4th vertebrae	1st and 2nd vertebrae
Postorbital length	averages 61.5 percent of HL	averages 53.4 percent of HL
Tip of lower jaw to angle of gape	averages 19.6 percent of HL	averages 25.4 percent of HL

*Etymology*: I take pleasure in naming this species after the collector, Dr. H. A. Fehlmann.

*Relationships*: The presence of conspicuous blotches on the dorsal and anal fins permits ready separation of *Paragunnellichthys fehlmanni* from its only known congener *P. seychellensis* Dawson. These species are further differentiated in a number of meristic and morphological features and some of the more useful characters are compared in Table 2.

The completely united pelvic fins of *P. fehlmanni* are unique among microdesmids. I have seen a narrow fragile basal membrane uniting these fins in one or two of some 13 specimens of *Gunnellichthys irideus* J. L. B. Smith, but separate pelvic fins has formerly been considered to be a family characteristic. In the absence of other major anatomical variations, I do not consider that the united fin condition justifies erection of a new genus.

In addition to the united pelvics, *Paragunnellichthys fehlmanni* differs from the generic description (Dawson, 1967) in having a more posterior insertion of both dorsal and pelvic fins. It does agree, however, in such critical features as the nature of the gill opening and the number of pelvic and principal caudal fin-rays. Despite certain discrepancies, it is evident that *fehlmanni* should be included in *Paragunnellichthys* in preference to the other microdesmid genera which consistently have either three or four segmented pelvic rays.

*Remarks:* *Paragunnellichthys* is now known only from the Seychelles and the Chagas Archipelago. Although this genus may have restricted distribution, it should be expected in other Indo-Pacific reef and lagoon habitats. This conclusion is supported by the recent collection of *Gunnellichthys curiosus* Dawson, previously known only from the Seychelles, in Hawaiian waters by Dr. J. E. Randall.

LITERATURE CITED

- 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: 73-82.