

Protogrammus, a New Genus of Callionymid Fishes, with a Redescription of *P. sousai* from the Eastern Atlantic

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Abstract A new monotypic genus of callionymid fishes, *Protogrammus*, is described. The type species is *Callionymus sousai* Maul, 1972. The genus is distinguished from the allied genera *Chalinops* and *Diplogrammus* by its free opercular flap of skin that is connected to the body in its upper half, a ventrolateral fold of skin consisting of disconnected segments, unbranched rays in the second dorsal and anal fins, and a very small preopercular spine with the formula $-\frac{1}{1}-1$. The only known species, *Protogrammus sousai*, is redescribed and illustrated.

In the course of a revisionary study of Atlantic callionymid fishes, I had an opportunity to re-examine type material of the species *Callionymus sousai* Maul, 1972 from the Great Meteor Bank. In Maul's (1972, 1976) descriptions of the specimens, the presence of a ventrolateral fold of skin along the sides of the body and of an opercular flap of skin were neither mentioned nor illustrated; few of the important taxonomic characters were described. During the re-examination it became apparent that the species did not fit into any of the known callionymid fish genera, though it was closely related to *Diplogrammus* and *Chalinops*. Since it is neither classifiable as a member of *Callionymus* in my generic system, nor classifiable in Nakabo's (1982) system, a new genus is described for the species in the present paper. As the original description was incomplete, the only known species of the genus is redescribed here.

Methods used follow those of Fricke (1983). The classification follows Fricke (1982, 1983). The specimens examined are deposited in the Museu Municipal do Funchal, Madeira (MMF).

Protogrammus gen. nov.

Type species. *Callionymus sousai* Maul, 1972 by monotypy.

Diagnosis. Callionymid fishes with two dorsal fins, the eyes close together, the lower lip without papillae, a very small preopercular spine of the formula $-\frac{1}{1}-1$, a free opercular flap of skin that is connected to the body in its upper half, a ventrolateral fold of skin along the sides of the body consisting of disconnected segments, and un-

branched rays in second dorsal and anal fins (except for the last which is divided at its base).

Description. Body elongate and depressed. Eyes close together; no supraorbital tentacle. Jaws with many villiform teeth in bands. Lower lip without papillae. Preopercular spine very small, consisting of the main tip, one curved dorsal point, and usually an antrorse point or a sharp keel at its base. Operculum with a free flap of skin that is connected to the body at its dorsal margin (Fig. 1A, C). Sides of body without dermal cirri, but with a ventrolateral fold of skin that consists of disconnected segments (Fig. 2). Lateral line simple along the sides of the body, but with a few short branches.

Two dorsal fins. Second dorsal and anal fin rays unbranched except for the last which is divided at its base.

Etymology. *Protos* (Gr.), original; *gramme* (Gr.), line; does not refer to the lateral line structure, but to the ventrolateral fold of skin and relates the genus to *Diplogrammus*. The name indicates that this genus possesses a primitive ventrolateral fold of skin.

Remarks. This new genus is related to *Diplogrammus* Gill, 1865 (see Fricke, 1983: 491–493) and to *Chalinops* Smith, 1963 (synonymy of the only known species, *C. pauciradiatus*, see Fricke, 1982: 70), but has unique, primitive characters (ventrolateral fold of skin consisting of disconnected segments; free opercular flap of skin connected to the body along its dorsal margin). While *Diplogrammus* possesses a free opercular flap of skin not connected to the body in its dorsal part and a complete ventrolateral fold of skin, *Diplo-*

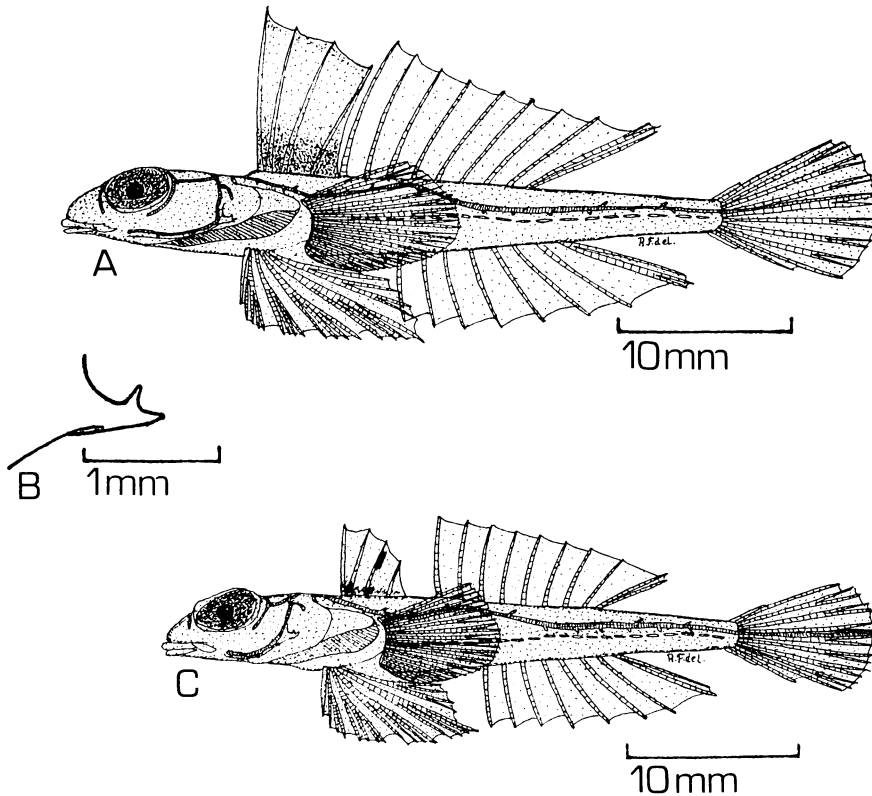


Fig. 1. *Protogrammus sousai* (Maul, 1972). A, MMF 22389, paratype, male, 38.4 mm SL: lateral view. B, left preopercular spine (MMF 22389). C, MMF 22843b, paratype, female, 33.5 mm SL, lateral view.

grammus gruveli Smith, 1963 and *Chalinops* lack a free opercular flap of skin, but possess a complete ventrolateral fold of skin along the sides of the body. The very small and nearly simple preopercular spine of *Protogrammus* gen. nov. is probably related to the environment in which the only known species occurs (deep water, mud bottom, low rate of predation).

Protogrammus sousai (Maul, 1972) comb. nov.
(Meteor dragonet)

Callionymus sousai Maul, 1972: 1–7, figs. 1, 2, 4 (Meteor Seamount, 310–320 m); Maul, 1976: 51–52, figs. 26–28 (after Maul, 1972); Fricke, 1982: 66.

Material examined. MMF 22877, male, holotype, 63.0 mm SL, St. 180a, 30°01.1'N 28°24.0'W, 315–320 m, R/V *Meteor*, 24 July 1967. MMF 22389, 1 male, 38.4 mm SL, St. 160a, 29°50.1'N 28°30.2'W, 310 m, R/V *Meteor*, 18 July 1967. MMF 22843b, 1 female, 33.5 mm SL, St. 159a, 29°50.2'N 28°29.8'W, R/V *Meteor*, 18 July 1967.

Description. D₁ IV; D₂ viii, 1; A vii, 1; P₁ i, 18–19, i (totally: 20–21); P₂ I, 5; C (i), i, 7, ii, (i). Proportions of the specimens examined see Table 1 (expressed as hundredths of SL).

Body elongate and depressed. Head depressed, 3.7–4.6 in SL. Body depth 6.9–8.0 in SL. Body width 6.4–8.9 in SL. Eye diameter 2.2–2.8 in head. Preorbital length 2.9–4.2 in head. Interorbital distance 19.3–20.3 in head. Occipital region smooth. Branchial opening dorsal in position. Preopercular spine with a straight main tip, a smooth ventral margin, the base with a bony keel or an antrorse spine, and one curved point on its dorsal margin (formula: $-\frac{1}{1}-1$; see Fig. 1B). Lower half of operculum with a free flap of skin, but upper half connected with the body (Fig. 1A, C). Urogenital papilla elongate in the male, 14.0–18.2 in head; not visible in the female. Lateral line reaching from preorbital region to end of fourth branched caudal fin ray (counted from above), with a number of short

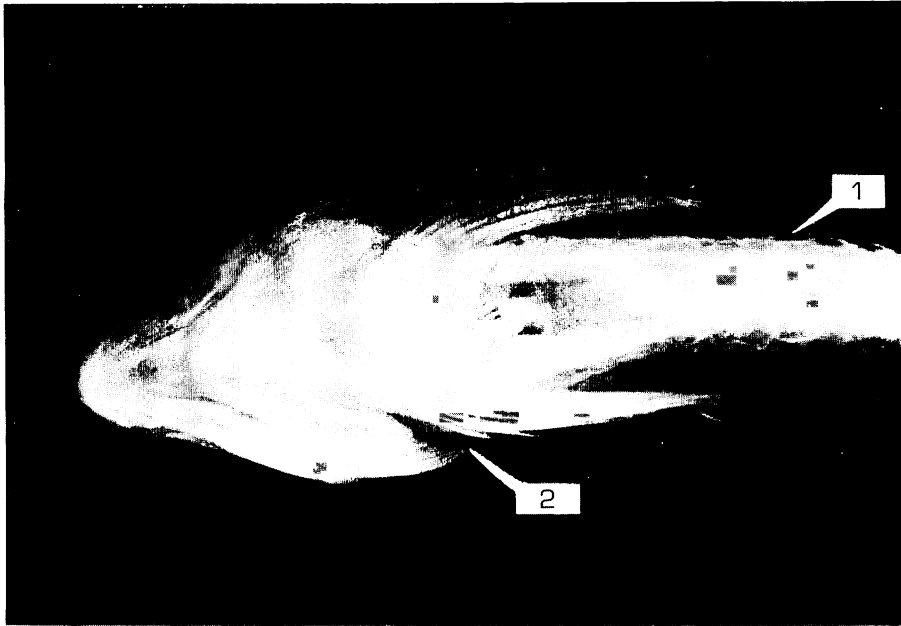


Fig. 2. *Protogrammus sousai* (Maul, 1972), MMF 22389, paratype, male, 38.4 mm SL: ventral view of head. 1, ventrolateral fold of skin; 2, opercular flap of skin.

dorsal and ventral branches along the sides of the body, and with a long preopercular branch. The lines of the opposite sides are interconnected by a commissure across the occipital region. Sides of body below the lateral line with a lateral fold of skin consisting of short disconnected segments (Fig. 2). Caudal peduncle length 4.2–4.8 in SL. Caudal peduncle depth 21.4–26.6 in SL.

First dorsal fin without filaments, the first spine

Table 1. Proportions of type specimens of *Protogrammus sousai* (Maul, 1972), expressed as hundredths of SL.

	Holo- type male	Paratypes	
		male	female
Predorsal (1) length	28.51	29.86	31.43
Predorsal (2) length	42.64	41.79	47.54
Preanal fin length	50.06	50.98	55.77
Prepelvic fin length	27.30	26.87	27.74
Head length	21.79	25.62	26.60
Caudal fin length	29.82	23.25	23.44
Eye diameter	9.94	9.36	10.35
First D ₁ spine length	33.05	25.28	12.23
Last D ₂ ray length	34.13	21.85	13.30
Last A ray length	19.24	20.70	18.73
Pelvic fin length	27.02	30.64	29.35

longer than first ray of second dorsal fin in the male, shorter in the female. First spine in the male 3.0–4.0 in SL, in the female 8.2 in SL. Predorsal (1) length 3.18–3.51 in SL. Second dorsal fin in the male slightly concave distally, in the female slightly convex. Rays unbranched except for the last which is divided at its base. First ray in the male 5.1–5.4 in SL, in the female 6.9 in SL. Last ray in the male 3.0–4.6 in SL, in the female 7.5 in SL. Predorsal (2) length 2.10–2.39 in SL. Anal fin beginning on a vertical through about third ray of second dorsal fin. Rays unbranched except for the last which is divided at its base. First ray 9.4–10.6 in SL. Last ray 4.8–5.3 in SL. Preanal fin length 1.79–2.00 in SL. Pectoral fin reaching back to base of first to third anal fin membrane. Pectoral fin length 4.5–6.3 in SL. Prepectoral fin length 2.5–3.0 in SL. Pelvic fin with a slightly elongate fourth ray. Pelvic fin length 3.2–3.7 in SL. Prepelvic fin length 3.5–3.8 in SL. Caudal fin distally convex, 3.4–4.3 in SL.

Color in alcohol. Head and body yellow, without any markings. Eye dark gray. First dorsal fin in the male translucent, base and distal margin dusky; in the female with a few dark spots. Other fins hyaline.

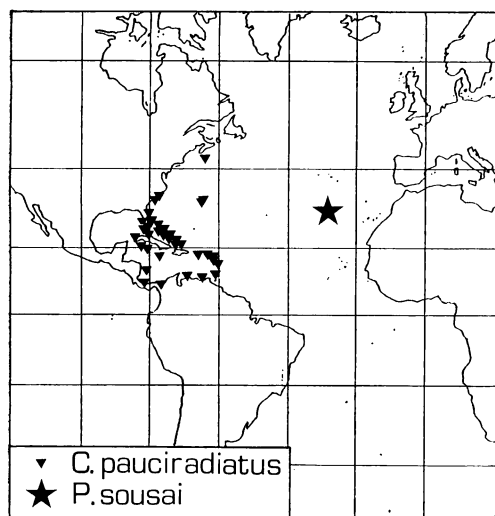


Fig. 3. Geographical distribution of *Protogrammus sousai* and *Chalinops pauciradiatus*.

Sexual dimorphism. Males have a higher first dorsal fin than females, a different coloration of that fin, a higher and different shape of the second dorsal fin, and a longer urogenital papilla.

Distribution. *Protogrammus sousai* is known only from the Great Meteor Seamount in the eastern Central Atlantic (Fig. 3). It has been collected at depths of 310–320 m. The distribution is compared with that of *Chalinops pauciradiatus* (which is the closest related species in the Atlantic Ocean) in Fig. 3.

Remarks. This species differs from any other callionymid fishes in its generic characters. The only other species of the group of genera with a ventrolateral fold of skin along the sides of the body occurring in the Atlantic Ocean is *Chalinops pauciradiatus* from the West Atlantic (distribution see Fig. 3). Species of *Diplogrammus* are exclusively Indo-West Pacific in their distribution ranges (Fricke, 1983).

Protogrammus sousai seems to be a primitive member of the complex of callionymid fishes with a free opercular flap of skin (including also *Eleutherochir* Bleeker, 1879 and *Draculo* Snyder, 1911), as it lacks papillae on the lower lip (like *Diplogrammus* and *Chalinops*), and possesses an asymmetrical caudal fin formula i, 7, ii (plus small upper and lower unsegmented soft rays), like *Diplogrammus*, *Chalinops* and *Eleutherochir*. The semi-connected opercular flap of skin seems to

be a primitive character, near the original shape of a free opercular flap of skin as an extension of the gill membrane. The ventrolateral fold of skin seems to be primitive as well, as it is not complete. The small preopercular spine is probably an adaptation to a low rate of predation, and therefore a specialized character.

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ネズボ科魚類の1新属 *Protogrammus* と東部大西洋産の模式種 *P. sousai* の再記載

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Maul が 1972 年に新種として発表した *Callionymus*

sousai を模式種にして、新属 *Protogrammus* を記述した。本属は鰓蓋後部に皮弁があり、その背方半分が体部と連結すること、体部の腹側に1皮褶が不連続に縦走することなどで、近似の *Chalinops* 属やコブヌメリ属と区別される。また、東部大西洋の Great Meteor Bank から得られた模式種の前記載が不完全であるので詳しく再記載した。