

From the Institut für Seefischerei der Bundesforschungsanstalt für Fischerei, Hamburg, and the Institute of Oceanology, Academy of Sciences USSR, Moscow

Ergebnisse der Forschungsreisen des FFS „Walther Herwig“ nach Südamerika

XXV. *Diplophos rebainsi* n. sp. (Osteichthyes, Stomiatoidei, Gonostomatidae), a New Gonostomatid Fish from Southern Seas

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With 2 figures

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A. Introduction

During the 36th cruise of FRS “Walther Herwig” 12 specimens of an undescribed gonostomatid fish of the genus *Diplophos* Günther, 1873, were captured on a transect between Mar del Plata and Cape Town in March 1971. Eight months later the USSR R/V “Akademik Kurchatov” took another 3 adult and 300 postlarval specimens of the same species on her 11th cruise in the same area. In addition, 3 juvenile specimens caught in the southeastern Pacific by FRS “Professor Derjugin” and kept since 1968 in the collection of the Institute of Oceanology, Moscow, were included in the studies.

Both present authors becoming aware of their dealing with one and the same new species decided to cooperate in reporting their findings.

Catches were made on board “Walther Herwig” with the aid of a 1600-mesh-herring trawl, while “Akademik Kurchatov” and “Professor Derjugin” used IKMT's without closing device and neuston nets for the capture of postlarvae.

B. Material

Holotype (fig. 1A): Zoological Institute of the Academy of Sciences USSR, Leningrad (ZIN), N 40725; “Akademik Kurchatov” Station 851: 43° 00' S, 26° 37' W; depth 900–1030 m; 21. XI. 1971, 1410–1510 hrs; SL 234 mm.

Paratypes: Institute of Oceanology, Moscow (IOAN), unregistered; “Akademik Kurchatov” Station 843: 41° 06' S, 26° 54' W; depth 525 m; 20. XI. 1971, 0445–0545 hrs; 1, SL 229 mm. — IOAN, unreg.; “Akademik Kurchatov” Station 851: data see above; 1, SL 221 mm. — ISH 1018/71; “Walther Herwig” Station 402-II/71: 40° 02' S, 07° 28' W; depth 300–320 m; 18. III. 1971, 2026–2041 hrs; 2, SL 167.3, 173.5 mm. — ISH 1038/71; “Walther Herwig” Station 402-III/71: 40° 01' S, 07° 25' W; depth 800 to 820 m; 18. III. 1971, 2218–2233 hrs; 1, SL 113.4 mm. — ISH 1072/71; “Walther Herwig” Station 406/71: 39° 19' S, 03° 15' W; depth abt. 2000 m; 19. III. 1971, 2000 to 2130 hrs; 1, SL 114.0 mm. — ISH 1102/71; “Walther Herwig” Station 409-I/71: 38° 16' S, 01° 12' E; depth 100–110 m; 20. III. 1971, 1939–1954 hrs; 4, SL 125.0, 128.8, 129.1, 130.2 mm. — ISH 1122/71; “Walther Herwig” Station 409-II/71: 38° 14' S, 01° 15' E; depth 750–760 m; 20. III. 1971, 2100–2115 hrs; 2, SL 122.5, 125.3 mm. — ISH 1163/71; “Walther Herwig” Station 412-II/71: 37° 08' S, 05° 23' E; depth 2100 to 2200 m; 21. III. 1971, 2000–2130 hrs; 2, SL 117.5, 119.1 mm.

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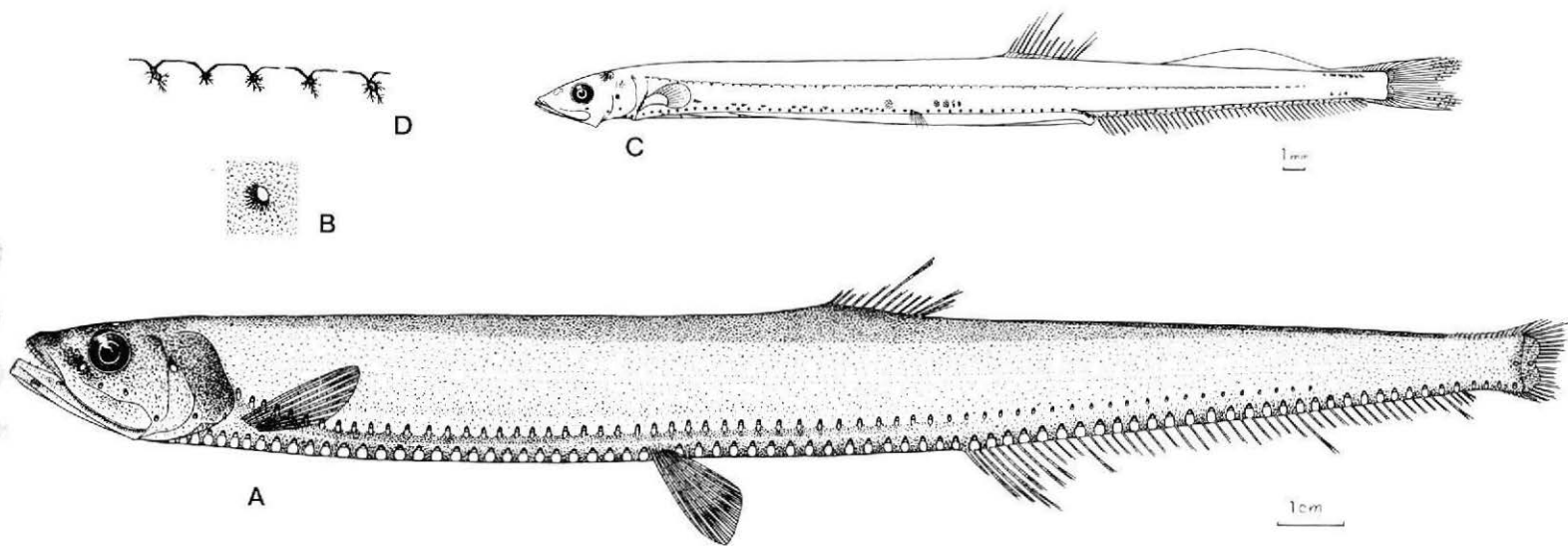


Fig. 1: *Diplophos rebaini* sp. n. A) Holotype, (ZIN) N 40725, external view; B) One of the additional photophores from below the dorsal fin of the paratype, SL 221 mm ($\times 14$); C) External view of postlarva, SL 38 mm; D) Section of mediolateral pigment line (from 6th to 10th segment concentration of melanophores) of the same postlarva.

Additional Material: "Akademik Kurchatov" Station 840: 38° 01' S, 26° 28' W; at surface; 19. XI. 1971, 0350–0410 hrs; 26 postlarvae, SL 20–35 mm; 0425–0445 hrs; 274 postlarvae, SL 22–38 mm. — "Professor Derjugin" Station 47 (sample 9): 45° 00' S, 80° 11' W; at surface; 3./4. V. 1968, 2345–0135 hrs; 1, SL 43.3 mm. — "Professor Derjugin" Station 99 (sample 86): 45° 00' S, 109° 00' W; depth 50 m; 24. V. 1968, 0225–0355 hrs; 1, SL 50.5 mm. — "Professor Derjugin" Station 102 (sample 90): 42° 00' S, 109° 00' W; depth 50 m; 25. V. 1968, 0120–0300 hrs; 1, SL 51.3 mm.

C. Distinctive Characters

Diplophos rebainsi differs from all other Gonostomatidae in having normally 7 (rarely 8) branchiostegal photophores (BR), and from other species of *Diplophos* (*sensu lato*) in the absence of a series of minute photophores on the posterior half of the lower jaw, in the much shorter length of the premaxillary as compared with the much longer toothed part of the maxillary (i.e. similar to *Diplophos greyae* Johnson), and in the narrow interorbital width being less than the horizontal eye diameter. It differs from the *Diplophos taenia*-group in the lower counts of vertebrae, anal fin rays and body photophores, and in the more posterior origins of the dorsal and anal fin; from *Diplophos* (*Manducus*) *maderensis* (Goode & Bean) in higher vertebral, anal fin ray and photophore counts, in a lower body and a shorter head; and from *Diplophos greyae* in the lower counts of branchiostegal rays, anal fin rays and gill rakers, in differences in the main photophore rows, and again in the more posterior origins of dorsal and anal fin. Moreover, *Diplophos rebainsi* has a much more delicate integument than its congeners, the skin being almost entirely rubbed off in all the specimens at hand.

D. Description

In the following description all notes, counts and measurements are given for the holotype. Ranges and mean values for the 14 paratypes are given in parentheses. All measurements are expressed percentages of standard length (SL).

Head small, 13.8 (13.6–15.8; 15.1). Eye circular, moderate in size, orbit 2.7 (2.7–3.8; 3.4), interorbital narrow, 2.5 (2.4–2.7; 2.5). Snout longer than orbit, 4.0 (4.1–4.5; 4.25). Mouth large, oblique; edge of premaxillary straight, toothed edge of maxillary convex, reaching preopercle; premaxillary 3.3 (3.5–4.3; 4.0), much shorter than toothed part of maxillary, which equals 6.3 (6.2–6.9; 6.6). Angle of preopercle obtuse, rounded.

Teeth of upper jaw uniserial, unequal; dentition on left premaxillary represented by 2 small fangs anteriorly, followed by 2 short teeth, 2 longer ones with a short one between them, and a series of 13 short teeth (in the paratypes the fangs number 1–2, followed by a series of irregularly alternating long and short teeth varying in numbers between 8 and 18); maxillary with a single row of 41 closely set teeth gradually increasing in size posteriorly (in the paratypes 25–36, often alternating in size, due partly to replacement teeth); lower jaw with an outer row of 6 (4–10) strongly hooked larger teeth on the anterior half of the jaw, and an inner row of about 10 (11–18) smaller teeth decreasing irregularly in size posteriorly; head of vomer with 1 (1–2) tooth on each side; palatines with a single row of 6 (5–9) teeth, the anteriormost 2 somewhat enlarged; 2 small hooked teeth on the anterior part of the tongue.

Branchiostegal rays 10 (10–11). Pseudobranchiae present.

Gill rakers 3 + 1 + 8 = 12 on first arch in all specimens; spines on inner edge of first arch rudimentary.

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Body very slender, strongly compressed and ribbon-shaped, its dorsal profile in front of dorsal fin almost straight, its maximum depth — just in front of dorsal fin origin — 10.4 (8.4–10.1; 9.3), gradually tapering to caudal peduncle, the depth of which equals 3.4 (2.7–3.7; 3.3). Vent close to anal fin. Dorsal fin originating slightly behind middle of standard length, 54.1 (51.7–53.8; 52.5), its base short, 6.3 (5.9–7.0; 6.6); anal fin long, its base 33.2 (32.4–35.9; 34.3), originating far behind last dorsal fin ray, distance from tip of snout to origin of anal fin 63.1 (61.2–64.4; 62.5); pectoral fins inserted close to ventral profile, short, 8.9 (9.4 in one paratype, the fin rays broken in all of the remaining specimens); pelvic fins inserted on the ventral surface of body, considerably in front of dorsal fin origin, short, 7.8 (8.2 in one paratype, broken in all the others), distance from tip of snout to origin of pelvic fins 42.5 (41.6–43.6; 42.5); adipose fin absent. Scales almost completely lost in all specimens.

D 12 (11–13; 12.5); A 47 (47–52; 49.3); P 9 (in all specimens); Pv 8 (in all specimens); Vertebrae 38 + 39 = 77 (37 + 38 + 37 + 40 = 74 + 77; 75.5) without urostyle (= 1); pyloric caeca 4 + 4 = 8 in a paratype 221 mm, 3 + 4 = 7 in a specimen 114 mm. In addition, the following measurements were taken: Origin of anal fin to base of middle caudal rays 37.4 (36.4–39.9; 38.3); end of anal fin base to base of middle caudal fin rays 4.1 (3.6–4.7; 4.0); end of dorsal fin base to base of middle caudal fin rays 38.4 (40.3–42.2; 41.4); origin of pelvic fins to anal origin 20.8 (17.8 to 20.9; 19.9); origin of pelvic fins to vertical through dorsal fin origin 11.9 (9.3–12.0; 10.9).

Photophores (terminology according to M. GREY, 1964): ORB 1, below front margin of eye. OP 3, superior one near top of preopercle, about level with lower margin of eye; two inferior photophores level with end of maxillary, anterior one near anterior part of subopercle, posterior one on interopercle, hidden under opercle. SO 1, somewhat behind symphysis on inner surface of lower jaw. BR 7 (an additional small photophore present at the caudal end of the right row in the paratype 221 mm). 2 smaller additional photophores below eye, and one on lower jaw, at about half the distance from symphysis to posterior angle of jaw, directed posteriorly.

Two main rows of photophores on body; ventral row complete, from isthmus to base of caudal fin, lateral row terminating at three-quarters the length of anal fin base. Ventral photophores large, decreasing in size only behind end of anal fin base. Lateral photophores much smaller, sharply decreasing in size in front of anal fin origin, and becoming diminutive towards the end of the row. IP 10 (8–9; 8.6); PV 24 (23–25; 24.1); VAV 16 (15–17; 16.1); AC 33 (32–34; 32.6); IC 83 (80–83; 81.5). OV 25 (23–25; 24.2), the anterior 3 to 5 elevated and forming a descending line; VAL 37 (36–39; 37.1); OA 62 (60–63; 61.3). A single non-serial photophore in front of pectoral fin base, level with the two inferior OP. Mediolateral row of smaller photophores probably present; 2 photophores (0–2 in the paratypes) can be seen on the midline of body just in front of the caudal fin on the left side of the holotype (one on the right side), and in the paratype ISH 1072/71 some remains of the skin are retained in the left pectoral area showing a few blackish scale pockets and about 6 small photophores along the lateral line; similar, still underdeveloped photophores are found along the mediolateral line of the largest postlarvae (fig. 1D). Moreover, several minute photophores (photopuncts of JOHNSON, 1970) scattered over the body are present on remains of skin below dorsal fin in the paratype 221 mm SL (fig. 1B).

Colour: Head greyish, back brown, sides of body pale yellowish with dotted dark pigmentation; living specimens with skin intact presumably blackish. Fins colourless,

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except caudal fin with several transverse rows of melanophores and the slightly pigmented dorsal fin rays. Inside of mouth and gill cavity black.

Diplophos rebainsi is named in honour of Captain EDUARD REBAINS, the skipper of R/V "Akademik Kurchatov".

E. Postlarval Stages

Postlarvae were identified by the characteristic numbers of fin rays in dorsal (11–13, most often 12) and anal (47–52, most often 49–50) fins. In all postlarvae 20–38 mm SL a vestigial fin-fold (resembling an adipose fin) is preserved on the dorsal side of the caudal region of the body (fig. 1C). Postlarval pigmentation shows several peculiarities. Most striking is a narrow line of melanophores running along the midline of body from opercle almost to caudal peduncle; at each myomere there are concentrations of pigment cells on this line provided with short branched offshoots directed obliquely downwards along the myoseptae. In advanced postlarvae (35 mm and larger) these pigment concentrations begin to turn into photophores of the mediolateral row; simultaneously body photophores of the ventral row and OP begin to develop.

In spite of the loss of skin in the smaller adults of the type series the melanophores underlying the row of mediolateral photophores can be seen as faint stellate dermal melanophores. All postlarvae also have a longitudinal streak of dark pigment along the upper edge of the caudal peduncle, a bunch of stellate melanophores on nape, and concentrations of pigment near the symphysis of lower jaw, along belly and near vent.

F. South Pacific Specimens

Body proportions (in percent of standard length) of 3 juvenile specimens 43.3–51.3 mm SL: depth of body 6.3–7.4, depth of caudal peduncle 2.5–3.0. Head 15.8–17.8, snout 4.5–5.1, orbit 3.3–3.7, interorbital width 2.3–2.5, upper jaw 10.4–11.8, premaxillary 4.5–5.4, toothed part of maxillary 5.9–6.4. Dorsal base 6.9–7.6, anal base 34.6 to 35.5. Distance from tip of snout to: dorsal origin 51.3–52.0, anal origin 60.1–61.8, pelvic bases 42.0–44.9. Distance between: anal origin and base of middle caudal fin rays 38.9–39.1, end of anal base and base of middle caudal fin rays 4.2–4.5, end of dorsal base and base of middle caudal fin rays, pelvic bases and anal origin 17.4–18.5, pelvic bases and vertical through dorsal origin 8.8–9.9.

Counts: D 12–13, A 51–53, P 9, Pv 8; Brsp 3 – 4 + 1 + 8 = 12 – 13; serial photophores: BR 7–8, IP 8, PV 24–25, VAV 16–18, AC 35–36, IC 85–87, OV 25, VAL 36–40, OA 61–65.

These specimens listed by PARIN et al. (in print) as *Diplophos* sp. fit rather well with the type description. However, the meristic characters in the caudal region of body (i.e. anal fin rays, photophores AC and partly VA) in the Pacific specimens show an increase in numbers when compared with the type series (probably due to lower water temperatures). In accordance the total numbers of body photophores in the Pacific examples is higher than in the Atlantic ones (IC 85–87 vs. 80–83, OA 61–65 vs. 60–63).

There are two variants of meristics found in Pacific specimens only: most interesting is the presence of 8 normally developed BR-photophores on both sides of the largest specimen; moreover, the gill rakers on the upper limb of the first arch in the specimen 50.5 mm number one more than in all other specimens investigated.

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G. Habits and Distribution

Diplophos rebaini is an oceanic, obviously mesopelagic species. Postlarvae and juveniles, at least in the night, dwell near the surface, adults were taken by hauls with open nets ranging from about 100 to 2000 m. In the South Atlantic all stations of the two research vessels, on which this gonostomatid fish was taken, are situated in a rather narrow belt stretching between 37° S and 43° S from 05° 23' E to 26° 54' W, i.e. in the area of the Subtropical Convergence. In the eastern South Pacific Ocean the species was found in subantarctic (notal) waters between 42° S and 45° S and from 80° 11' W to 109° W. Thus, *D. rebaini* most probably represents a further member of the specific circumglobal ichthyofauna of this area (SVERDRUP et al., 1942, ANDRIASHEV, 1962, GIBBS, 1968, JOHNSON, 1972). This view is supported by its evident absence in subtropical and antarctic waters, two regions from which the ichthyofauna has been thoroughly investigated.

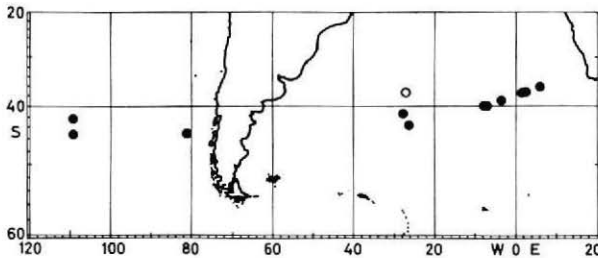


Fig. 2: *Diplophos rebaini* sp. n., geographical distribution (solid dots: adult specimens; open circle: postlarvae).

H. Summary

A new species of the gonostomatid genus *Diplophos* Günther, 1873, *D. rebaini* n. sp. is described from 15 specimens collected in 1971 by FRS "Walther Herwig" and R/V "Akademik Kurchatov" in the South Atlantic Ocean. In addition 300 postlarvae of this species were caught by the last-mentioned vessel in the same area using a neuston net, and 3 juveniles in 1968 by FRS "Professor Derjugin" in the eastern South Pacific Ocean. The new species is the only gonostomatid so far known having normally 7 branchiostegal photophores. It differs from other species of *Diplophos* mainly in the absence of a series of minute photophores on the lower jaw, in the relationship between the respective lengths of premaxillary and the toothed part of the maxillary, and in its meristics. *D. rebaini* represents a member of the specific faunal community of the Subtropical Convergence and Subantarctic area.

I. Zusammenfassung

Eine neue Gonostomatidenart der Gattung *Diplophos* Günther, 1873, *D. rebaini* spec. nov., wird an Hand von 15 von FFS „Walther Herwig“ und FS „Akademik Kurchatov“ 1971 im Südatlantik gesammelten Exemplaren beschrieben. Das letztgenannte Forschungsschiff fing zusätzlich 300 Postlarven dieser Art im Neuston des gleichen Gebietes. Außerdem lagen 3 jugendliche Exemplare zur Untersuchung vor, welche von FFS „Professor Derjugin“ im südöstlichen Teil des Stillen Ozeans erbeutet wurden. Hauptmerkmale der neuen Art sind der Besitz von gewöhnlich 7 Branchiostegalphotophoren, das Fehlen der Reihe winziger Photophoren am Unterkiefer, die von den übrigen Arten der Gattung abweichenden Längenbeziehungen zwischen Praemaxillare und bezahntem Teil des Maxillare sowie meristische Besonderheiten.

D. rebaini ist ein weiteres Mitglied der besonderen Faunengemeinschaft der Subtropischen Konvergenzzone und Subantarktik.

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J. Acknowledgements

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