ON *HYPOPYGUS LEPTURUS*, A LITTLE KNOWN DWARF GYMNOTID FISH FROM SOUTH AMERICA (PISCES, CYPRINIFORMES, GYMNOTOIDEI)

by

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With five text-figures and three plates

ABSTRACT

Hypopygus lepturus Hoedeman, 1962, was hitherto known from the holotype and one paratype only, both imported aquarium specimens. In this paper the type locality of the species is restricted. Additional distributional data from Surinam are given, together with records on the occurrence of *H. lepturus* in Guyana, Venezuela, Colombia, Brazil, and on the very likely occurrence in Peru. Comparative notes on *Steatogenys elegans* (Steindachner, 1880) sensu Boulenger, 1898, are added because of the similar appearance of both species. The synonymy of *Tateichthys duidae* La Monte, 1929, with *Steatogenys elegans* is established.

INTRODUCTION

Hoedeman (1962b: 99) described *Hypopygus lepturus* as a new genus and species, based on two specimens presented to the Leiden Museum by Mr. E. C. Stol in 1952. Boeseman (1952: 192) listed three specimens as *Steatogenys elegans* (Steindachner, 1880), from "Marowini Basin", "New for Surinam"; two of these specimens formed later on the type material of *Hypopygus lepturus*. It is not known what happened to the third specimen, which already was lacking in 1962 (Hoedeman, 1962b: 100). As to the locality of the specimens, Hoedeman already understood that not the Marowini (a southern tributary of the Lawa River) was meant by Boeseman, but the Marowijne River ("Maroni" in French, as given by Hoedeman).

Although one has to be careful with locality data accompanying imported aquarium fish, Stol obviously received material from the lower Marowijne and/or Suriname rivers, because many species he presented to the Leiden Museum (Boeseman, 1952) are known to occur in these rivers.

During recent expeditions to Surinam (the Brokopondo Research Project, 1964-1967, sponsored by the Foundation for Scientific Research in Surinam and the Netherlands Antilles, with the financial aid of the Foundation for the Advancement of Tropical Research) additional material of *H. lepturus* was collected, among which five specimens from the Marowijne river system, Maka Creek. This creek is selected as the type locality by present restriction.

While preparing a review of some genera of gymnotid fishes, the senior author found additional material in several collections, which proves that *H. lepturus* is a widely distributed species, also occurring in the Essequibo river system, the Orinoco drainage, the Rio Amazonas, and in some of its tributaries (fig. 5). Three hundred and eighty-nine specimens were identified as *H. lepturus*.

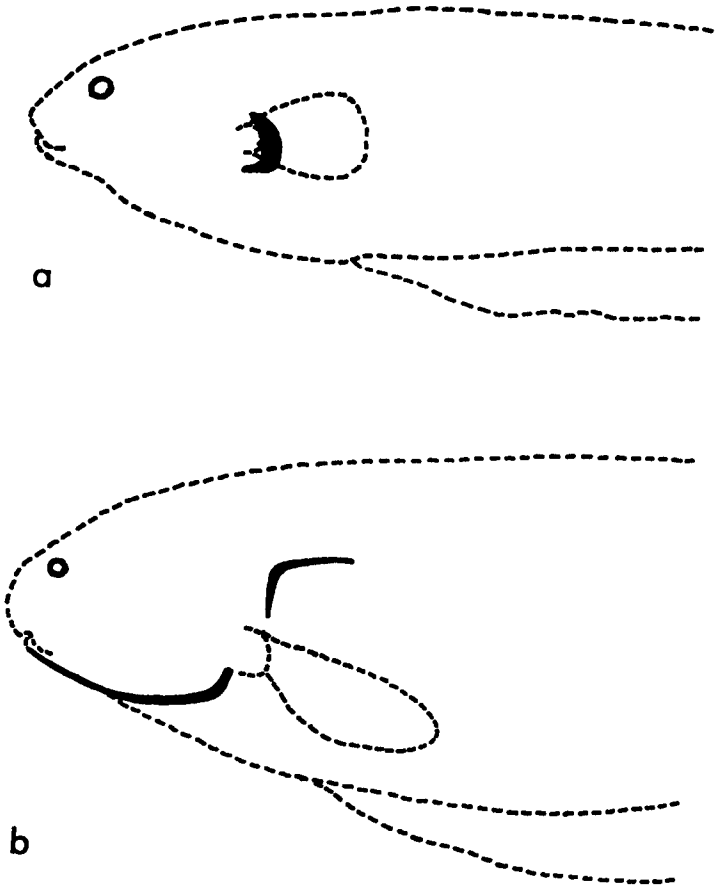


Fig. 1. Diagrams of heads in lateral view showing position of subepidermal organs of a, *Hypopygus lepturus*, and b, *Steatogenys elegans*.

Since *H. lepturus* easily can be confused with *Steatogenys elegans*, it seems useful to compare both species, which often are sympatric. Of *S. elegans* 38 specimens were examined.

We are grateful to the following persons for the loan of material: Dr. M. Boeseman and Dr. G. F. Mees, Rijksmuseum van Natuurlijke Historie, Leiden (RMNH); Dr. W. N. Eschmeyer, California Academy of Sciences, San Francisco (CAS); Dr. J. Géry, Saint-Geniès; Dr. J. P. Gosse, Institut Royal des Sciences Naturelles de Belgique, Brussels (IRScNB); Dr. P. H. Greenwood and Mrs. Dr. R. H. Lowe-McConnell, British Museum (Natural History), London (BMNH); Dr. W. Ladiges, Zoologisches Staatsinstitut und Zoologisches Museum, Hamburg (H); Dr. G. J. Nelson, American Museum of Natural History, New York (AMNH); Dr. S. H. Weitzman and Mr. W. L. Fink, National Museum of Natural History, Washington, D. C. (USNM). The photographic illustrations were made by Mr. A. L. van der Laan, Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam (ZMA). Mr. W. J. Dekkers (ZMA) cleared and stained a specimen of *H. lepturus* for our study.

Hypopygus Hoedeman, 1962

Tateichthys; La Monte, 1929: 1-3 (in part; misidentification).

Steatogenys; Boeseman [non Boulenger, 1898], 1952: 192 (misidentification).

Hypopygus Hoedeman, 1962b: 99-101, 104 (original diagnosis; type species, by original monotypy, *Hypopygus lepturus* Hoedeman, 1962).

Diagnosis.

A monotypic genus, distinguished from *Steatogenys* by the absence of mental and humeral filamentous subepidermal organs, and by the presence of a subepidermal organ just posterior to the pectoral fin insertions.

Hypopygus lepturus Hoedeman, 1962

(figs. 1a, 2-5, pls. 1-3)

Tateichthys duidae; La Monte, 1929: 1-3 (in part; composite description; misidentification [of specimens AMNH 9599, a topotypic paratype bearing the same registration number as the holotype, and AMNH 9600, a paratype from Caño Pescado]).

Steatogenys elegans; Boeseman [non Steindachner, 1880], 1952: 192 (misidentification; listed; Surinam: Marowini Basin).

Hypopygus lepturus Hoedeman, 1962b: 99-101, figs. 4a-b, 5 (original description; type locality: Surinam: Maroni basin, no exact locality; holotype in Rijksmuseum van Natuurlijke Historie, Leiden, RMNH 19466; in key on p. 104).

Type locality, by present restriction: Surinam, district Marowijne, Maka Creek, at left bank of Lawa River, 10 km S of centre of Stoelmans Island, Marowijne river system, 04°16'N, 52°25'W.

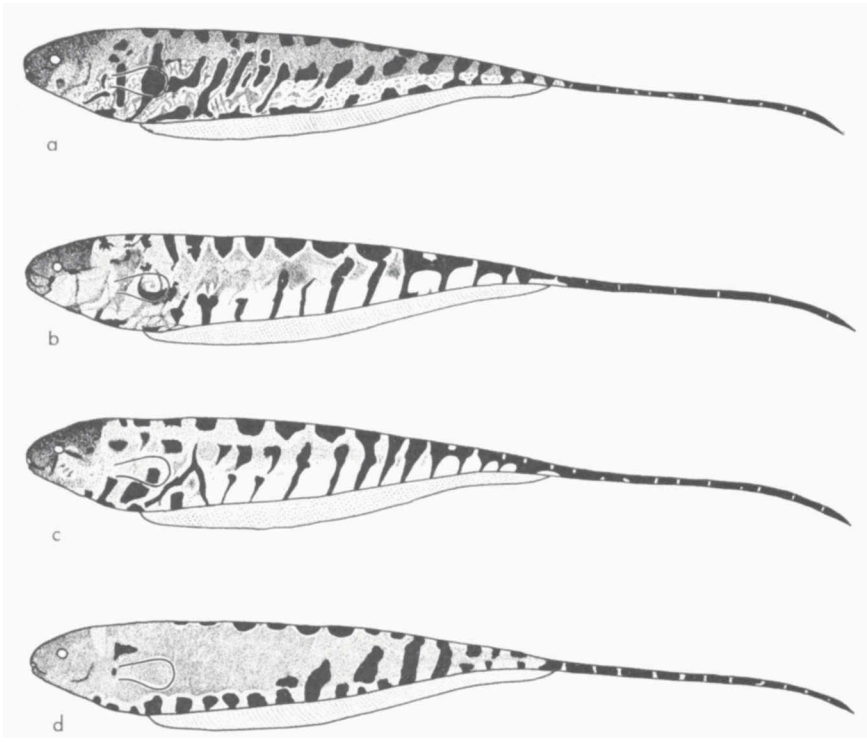


Fig. 2. Diagrams showing variability in colour pattern in four specimens of *Hypopygus lepturus*. a, Surinam, Kwati Watra Creek, 99 mm tl (ZMA 106.081); b and c, Surinam, Carolina Creek, both 71 mm tl (ZMA 106.062); d, Guyana, tributary of Rupununi River at Karanambo, 74 mm tl (BMNH 1971.10.19.3).

Specimens examined.

SURINAM. — RMNH 19466, holotype, 74 mm tl, Marowijne river system, no exact locality, don. E. C. Stol, summer 1951; — RMNH 24408, one paratype, 75 mm tl, same data as holotype; — ZMA 106.082, five topotypes, max. 87 mm tl, Marowijne river system, Maka Creek at left bank of Lawa River, 10 km S of centre of Stoelmans Island, depth 30-120 cm, width 4 m, running water, bottom sand, fish poison, coll. H. Nijssen, 21.iv.1967; — IRScNB 17517, one specimen, 48 mm tl, district Marowijne, creek at left bank of Marowijne River at Hede Island, coll. J. P. Gosse, 24.xi.1966; — IRScNB 17533, one specimen, 68 mm tl, district Marowijne, Marowijne river system, tributary of upper Oelemari River, coll. J. P. Gosse, 14.xi.1966; — ZMA 106.078, four specimens, max. 71 mm tl, Suriname river system, creek at right bank of Gran Rio, 2.5 km NE of the Awadam (= Awaradam) Fall, coll. H. Nijssen, 28-i-1967; — ZMA 106.079, one specimen, 67 mm tl, Suriname river system, creek at right bank of Gran Rio, 0.6 km SW of Ligorio Village, coll. H. Nijssen, 27.i.1967; — RMNH 26593, four specimens, Suriname river system, creek near Awaradam Fall, coll. M. Boeseman, 15.viii.1964; — RMNH 26594, one specimen, Suriname river system, tributary of Pikien Rio upstream of Asidonhopo Village, coll. M. Boeseman, 13.viii.1964; — ZMA 106.031, two specimens, max. 99 mm tl, Suriname river system, Kwati Watra Creek at left bank of Suriname River, 0.5 km S. of Botopasi Village, coll. H. Nijssen, 19.iii.1967; — RMNH 26595,

two specimens, Suriname river system, creeks between Kabel and Lombé Villages, tributaries of Suriname River, coll. M. Boeseman, 17/18.ii.1964; — ZMA 106.062, thirty-five specimens, max. 88 mm tl, Suriname river system, Carolina (= Malasie) Creek, 10 km SE of airfield Zanderij at road Zanderij-Kraka, coll. H. Nijssen, 14.xii.1966 (one specimen cleared and stained; five specimens deposited in USNM); — RMNH 26596, twenty-three specimens, max. 100 mm tl, Suriname river system, Saramacca Creek, coll. G. F. Mees, 7.iv.1965 (five specimens deposited in ZMA 111.197); — RMNH 26597, three specimens, Suriname river system, Saramacca Creek, coll. G. F. Mees, 20.iv.1965; — RMNH 25598, one specimen, Suriname river system, Saramacca Creek, coll. G. F. Mees, 27.iv.1965; — RMNH 25599, one specimen, Corantijn river system, Kabalebo River at Avanavero Falls, coll. G. F. Mees, 20.ix.1965; — ZMA 106.083, six specimens, max. 82 mm tl, Nickerie river system, creek at right bank of Nickerie River, 12 km WSW of Stondansie Fall, coll. H. Nijssen, 5.iv.1967.

GUYANA. — BMNH 1971.10.19.3, one specimen, 74 mm tl, tributary of Rupununi River at Karanambo, Essequibo river system, coll. R. H. Lowe-McConnell, 27.xi.1958; — BMNH 1971.10.19.4, one specimen, 34 mm tl, same locality as BMNH 1971.10.19.3, coll. R. H. Lowe-McConnell, 1957; — CAS (SU 54615), three specimens, max. 83 mm tl, no other data; — ZMA 112.010, four specimens, max. 95 mm tl, northern Rupununi Savanna, Rock Pond, 15 miles E of Lethem, coll. C. Hopkins, 22.vi.1970.

VENEZUELA. — IRScNB 15245, forty-nine specimens, max. 72 mm tl, Est. Amazonas, between San Fernando de Atabapo and Casiquiare Canal, Rio Orinoco system, coll. de Wavrin, 1935: — CAS (SU 58667, SU 58787), two specimens, max. 57 mm tl, Caño de Quiribana, Rio Orinoco near Caicara, coll. C. Ternetz, 11.v.1925; — AMNH 9599 (in part), one specimen (paratype of *Tateichthys duidae*), 65 mm tl, Est. Amazonas, Burned Mountain Creek, 5 miles northeast of Caño Pescado, alt. 115 m, Rio Orinoco system, coll. G. H. H. Tate, 25.xi.1928; — AMNH 9600 (in part), one specimen (paratype of *Tateichthys duidae*), 48 mm tl, Est. Amazonas, Caño Pescado, 5 miles north of Esmeralda, alt. 110 m, upper Orinoco drainage, coll. G. H. H. Tate, 9.iii.1929.

COLOMBIA. — CAS (SU 50634), eight specimens, max. 70 mm tl, Province Caqueta, small forest tributaries of Rio Orteguaza, on road from Tres Esquinas to Solano (00°45'N, 75°15'W), Rio Caqueta system, coll. T. D. White, J. N. Reynolds & L. Wulff, 12.ii.1958; — CAS (SU 53800), one specimen, 83 mm tl, Province Meta, Cordillera Macarena, small brook 3 miles below El Refugio on Rio Guyabero, alt. 280 m (02°16'N, 73°46'W), Rio Guaviare system, coll. T. D. White & G. S. Myers, 24.ii.1960.

PERU. — H 4576, two specimens, max. 64 mm tl, Est. Loreto, Rio Amazonas between Iquitos and Leticia, coll. H. Pietsch, x.1936/v.1937 (imported for Aquarium Hamburg).

BRAZIL. — USNM, forty-two specimens, max. 72 mm tl, Est. Mato Grosso, tributary of Rio Batovi, Rio Xingú system, coll. H. Schultz, x.1964 (five specimens deposited in ZMA 111.202); — USNM, six specimens, max. 64 mm tl, same locality as preceding sample, coll. H. Schultz, viii/ix.1964; — IRScNB 17518, ninety-three specimens, max. 71 mm tl, Est. Mato Grosso, upper Rio Xingú, lagoon along Tuatuari Creek, upstream of Posto Leonardo, coll. J. P. Gosse, 12.x.1964; — IRScNB 17519, five specimens, max. 63 mm tl, Est. Mato Grosso, upper Rio Xingú, affluent of Lake Upavi, Posto Leonardo, Villas-Boas, coll. J. P. Gosse, 19.x.1964; — IRScNB 17520, five specimens, max. 61 mm tl, Est. Mato Grosso, creek at right bank of upper Rio Xingú, 500 m upstream of Posto Diauarum, coll. J. P. Gosse, 23.x.1964; — IRScNB 17521, four specimens, max. 66 mm tl, Est. Mato Grosso, affluent of Lake Yamarikumão at Suià Village, Rio Suià Missu, upper Rio Xingú system, coll. J. P. Gosse, 3.xi.1964; — ZMA 111.201, seven specimens, max. 59 mm tl, Est. Amazonas, Castanha Creek, tributary at right bank of Rio Negro, two hours upstream from Manaos by boat, coll. E. Fittkau & J. Géry, 23.x.1965; — IRScNB 17526, two specimens, max. 81 mm tl, Est. Amazonas, tributary

of Rio Jacitara, Lago Grande de Manacapuru, coll. J. P. Gosse, 12.xi.1962; — IRScNB 17527, six specimens, max. 60 mm tl, Est. Amazonas, Ananas Creek, affluent of Lago Téfé, coll. J. P. Gosse, 19.xi.1962; — IRScNB 17528, four specimens, max. 78 mm tl, Est. Amazonas, creek at left bank of Rio Negro, Archipelago das Anavilhanas, coll. J. P. Gosse, 18.xi.1967; — IRScNB 17529, two specimens, max. 68 mm tl, same locality as IRScNB 17528, coll. J. P. Gosse, 19.xi.1967; — H 4575, one specimen, 58 mm tl, Est. Amazonas, Rio Manacapuru, coll. W. Ehrhardt, 27.i.1925; — IRScNB 17530, sixteen specimens, max. 96 mm tl, Est. Amazonas, Japu Creek at left bank of Rio Tiquié, coll. J. P. Gosse, 7.xii.1967; — IRScNB 17531, seven specimens, max. 48 mm tl, Est. Amazonas, creek at right bank of Rio Uaupés at Trovao, about 20 km upstream of mouth of Rio Uaupés, coll. J. P. Gosse, 9.xii.1967 (two specimens deposited in ZMA 111.245); — IRScNB 17532, one specimen, 58 mm tl, Est. Amazonas, tributary of Rio Preto da Eva, coll. G. Marlier, 28.i.1964; — BMNH 1926.10.27.230-239, ten specimens, max. 91 mm tl, Est. Para, Rio Amazonas at Monte Alegre, coll. C. Ternetz, no date; — CAS (SU 54497), one specimen, 82 mm tl, Est. Para, Uruara Creek, tributary of Rio Tapajós near Santarem, coll. C. Ternetz, 2.vii.1924; — IRScNB 17522, four specimens, max. 68 mm tl, Est. Para, creek at left bank of Rio Cururu, upper Rio Tapajós system, coll. J. P. Gosse, 20.xi.1964; — IRScNB 17523, one specimen, 70 mm tl, Est. Para, tributary of Rio Cururu, downstream of mission post Cururu, upper Rio Tapajós system, coll. J. P. Gosse, 21.xi.1964; — IRScNB 17524, one specimen, 64 mm tl, Est. Para, creek at left bank of Rio Trombetas at Porteira Falls, coll. J. P. Gosse, 30.xi.1964; — IRScNB 17525, six specimens, max. 58 mm tl, Est. Rio Branco, Uazinho Creek, 10 km S. of Boa Vista at road Boa Vista-Caracarai, Rio Negro system, coll. J. P. Gosse, 29.xi.1962.

Description.

Morphometric data, based on five topotypes and, in parentheses, on five specimens from Saramacca Creek, Surinam (ZMA 111.197): total length 79-87 (90-100) mm; standard length, from tip of snout to base of last anal fin ray 55-59 (57-61.5) mm; head length, from tip of snout to end of operculum, including membraneous flap 7.0-7.6 (6.8-7.5) in standard length; pre-anal fin length, from tip of snout to base of first anal fin ray 4.2-4.5 (4.4-4.9) in standard length; body height, at base of first anal fin ray 5.9-6.5 (5.8-6.3) in standard length; body width, at pectoral fin base 11.5-12.8 (11.6-13.0) in standard length.

All measurements were taken directly, the total length and standard length to the nearest 0.5 mm, the head length, pre-anal fin length, body height, and body width to the nearest 0.1 mm.

Meristic data. — Number of anal fin rays of the five topotypes (ZMA 106.082) 120, 130, 133, 133, 135; of five specimens from Saramacca Creek, Surinam (ZMA 111.197) 122, 123, 124, 125, 126; of a specimen from Kwati Watra Creek, Surinam (ZMA 106.081) 136; of six specimens from Monte Alegre, Brazil (BMNH 1926.10.27.230-239) 117, 121, 125, 133, 133, 158.

Number of pelvic fin rays of two topotypes 12 in both specimens; of four specimens from the Saramacca Creek 10, 11, 12, 12; of four specimens from

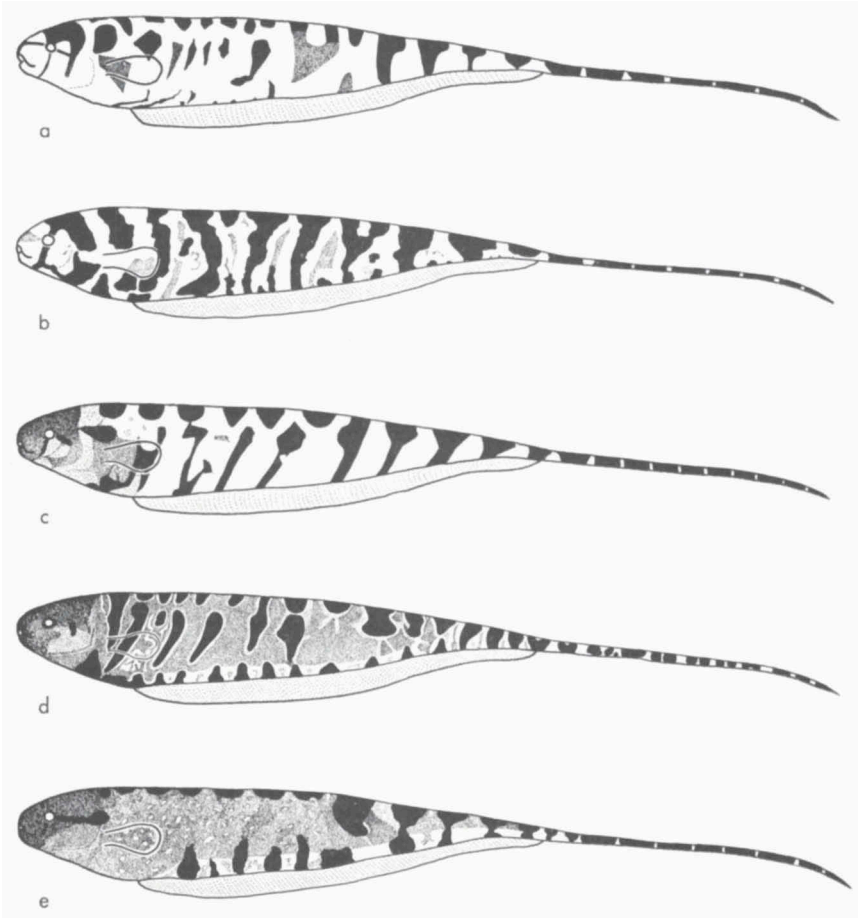


Fig. 3. Diagrams showing variability in colour pattern in five specimens of *Hypopygus lepturus*. a, Venezuela, Burned Mountain Creek, 65 mm tl (AMNH 9599 in part, topotypic paratype of *Tateichthys duidae*); b, Colombia, tributaries of Rio Orteguaza, 57 mm tl (CAS (SU 50634)); c, Brazil, Castanha Creek, 55 mm tl (ZMA 111.201); d and e, Brazil, tributary of Rio Batovi, 78 and 65 mm tl, respectively (ZMA 111.202).

Monte Alegre 11, 12, 12, 13.

Number of vertebrae of the single cleared and stained specimen (ZMA 106.062, Carolina Creek, Surinam): 76.

Colour in alcohol. — Ground-colour tan. Head dorsally evenly pigmented with brown, laterally with an irregular brown pattern. In general, many brown saddle-like blotches on the dorsum of the fish, extending laterally. A pattern of prominent oblique brown bars on the sides, very variable in specimens within a single population, often even different at either side of one specimen.

In the holotype there are about fifteen blotches on the dorsum and about ten oblique bars on the sides alternating with faint brown patches on the lateral axis (pl. 1). About the same pattern is present in the paratype. The five specimens from the Marowijne River (ZMA 106.082) show 12 to 15 blotches on the dorsum and 6 to 11 oblique bars on the sides (two specimens shown in pl. 2).

The material as a whole shows variability in colour pattern to such an extent, that it seems useless to describe all minor details. An impression of the variation observed is given in figures 2 and 3.

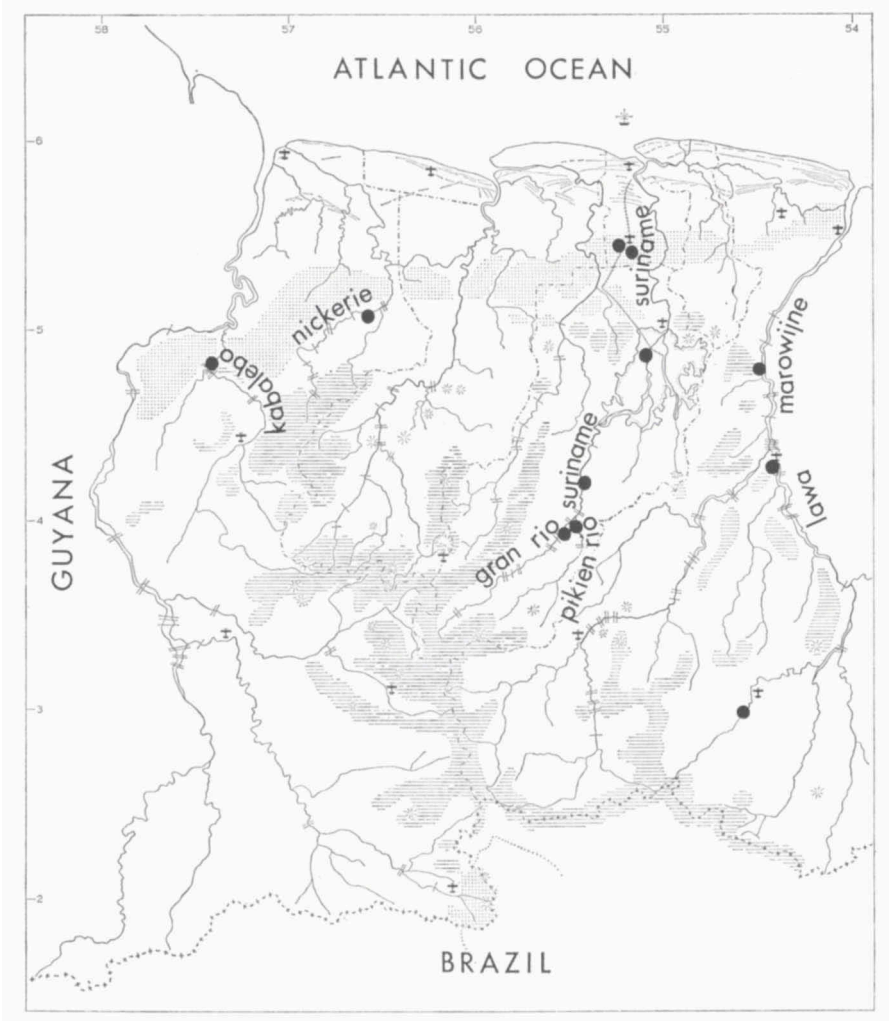


Fig. 4. Map of Surinam showing localities where *Hypopygus lepturus* was collected.

Subepidermal organ. — The characteristic, though not previously discovered, subepidermal organ (fig. 1a) can be observed in preserved specimens by removing the usually thick epidermal layer. Sometimes this subepidermal organ is difficult to locate, particularly in less perfectly preserved specimens. Due to the loose structure of the nearby cutis and muscles the subepidermal organ can easily be damaged.

Steatogenys Boulenger, 1898

Rhamphichthys (Brachyrhamphichthys); Steindachner [non *Rhamphichthys* Müller & Troschel, 1848, and non *Brachyrhamphichthys* Günther, 1870], 1880: 89 (original description of *Rhamphichthys (Brachyrhamphichthys) elegans*).

Steatogenys Boulenger, 1898: 428 (new generic name for *Rhamphichthys (Brachyrhamphichthys) elegans* Steindachner, 1880).

Steatogenes; Eigenmann & Ward, 1905: 171 (misspelling for *Steatogenys*).

Tateichthys La Monte, 1929: 1 (original diagnosis; type species, by original monotypy, *Tateichthys duidae* La Monte, 1929).

Diagnosis.

A monotypic genus, characterized by the possession of paired mental and humeral filamentous subepidermal organs.

Steatogenys elegans (Steindachner, 1880)

(figs. 1 b, 5, pls. 1, 3)

Rhamphichthys (Brachyrhamphichthys) elegans Steindachner, 1880: 89, pl. 9 figs. 1, 1a (original description; type locality: "...den Ausständen des Amazonen-Stromes zunächst der Mündung des Rio negro..."; two syntypes in Naturhistorisches Museum, Wien).

Rhamphichthys (Brachyrhamphichthys) mirabilis Steindachner, 1880: 104, pl. 9 figs. 1, 1a (name erroneously included in the legend of figures of *Rhamphichthys (Brachyrhamphichthys) elegans*).

Steatogenys elegans; Boulenger, 1898: 428 (evaluation of *R. (B.) elegans* at distinct generic level; locality record from Rio Jurua).

Steatogenes elegans; Eigenmann & Ward, 1905: 171, pl. 9 fig. 11 (misspelling for *Steatogenys*; listed; Barra do Rio Negro; figure taken from Steindachner, 1880).

Tateichthys duidae La Monte, 1929: 1-3, fig. 1 (in part; original description; type locality: Venezuela, Burned Mountain Creek, Mt. Duida, upper Orinoco drainage, about five miles northeast of Caño Pescado, 350 feet elevation; holotype in American Museum of Natural History, New York, AMNH 9599 [in part]).

Specimens examined.

GUYANA. — CAS (IUM 12614), two specimens, Demerara River at Kumaka, coll. C. H. Eigenmann, 1908.

PERU. — USNM 86795, one specimen, Iquitos, coll. W. R. Allen, no date; — CAS (IUM 15717), three specimens, Iquitos, coll. W. R. Allen, 1920.

BRAZIL. — IRScNB 17514, three specimens, max. 137 mm tl, Est. Amazonas, Japu Creek at left bank of Rio Tiquié, coll. J. P. Gosse, 7.xii.1967; — BMNH 1897.12.1.210-213, four specimens, Est. Amazonas, Rio Jurua, coll. J. Bach, vii.1897; — IRScNB 270,

three specimens, max. 189 mm tl, Est. Para, Rio Trombetas near Obidós, coll. "Mercator" (9th cruise), 14.i.1936; — IRScNB 17515, one specimen, 149 mm tl, Est. Para, Rio Cururu, tributary of upper Rio Tapajós, coll. J. P. Gosse, 19.xi.1964; — IRScNB 17516, one specimen, 111 mm (caudal filament broken) tl, Est. Para, creek at left bank of Rio Cururu, tributary of upper Rio Tapajós, coll. J. P. Gosse, 20.xi.1964; — CAS (SU 54422/23), two specimens, Est. Para, Lago Grande into Amazon, stretch between Santarem and Obidos, coll. C. Ternetz, x/xi.1924; — CAS (IUM 13410), two specimens, Est. Para, Santarem, coll. J. D. Haseman, 15.xii.1909; — CAS, three specimens, Est. Para, Belem, coll. C. Ternetz, v.1924; — CAS, eight specimens, Est. Para, Belem (market), coll. E. C. Starks, summer 1911 (one specimen cleared and stained); — BMNH 1929.7.29.21-23, three specimens, Est. Para, Rio Cumarapy, coll. Flemming, date unknown; — BMNH 1926.10.27.240, one specimen, Est. Para, Monte Alegre, coll. C. Ternetz, date unknown.

Description.

Morphometric data of three specimens from Rio Cumarapy (BMNH 1929.7.29.21-23) and, in parentheses, of one specimen from Monte Alegre (BMNH 1926.10.27.240): total length 191-206 (121) mm; standard length, from tip of snout to base of last anal fin ray 117-127 (75.5) mm; head length, from tip of snout to end of operculum, including membraneous flap 7.7-8.2 (7.0) in standard length; pre-anal fin length, from tip of snout to base of first anal fin ray 5.0-5.6 (4.8) in standard length; body height, at base of first anal fin ray 6.0-7.0 (5.3) in standard length; body width, at pectoral fin base 14.8-15.9 (10.5) in standard length.

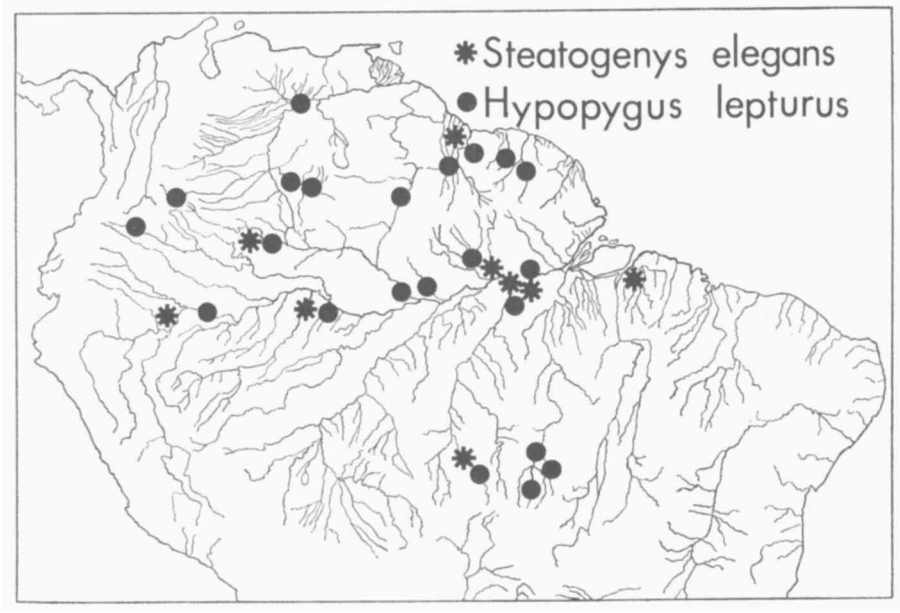


Fig. 5. Map of northern South America showing localities where *Steatogenys elegans* and *Hypopygus lepturus* were collected, based on examined material.

Meristic data. — Number of anal fin rays 168, 169, 171 in the three specimens from Rio Cumarapy, and 154 in the specimen from Monte Alegre. Number of pectoral fin rays 11, 11, 12, and 13, respectively.

Colour in alcohol. — The colour pattern of *Steatogenys elegans* is variable, even on both sides of the same specimen. The three specimens from Rio Cumarapy have either broad oblique bars on the body connected with large saddle-like blotches on the dorsum, or large irregular shaped blotches ventral to the saddle-like blotches, separated by a nearly unpigmented area. The anal fin shows 9 to 14 blotches, usually bending anteriorly along the edge of the fin. The specimen from Monte Alegre shows less distinct bars on the body, which may be due to way and time of preservation. The saddle-like blotches on the dorsum are smaller and more numerous than in the Cumarapy specimens. The anal fin shows 11 blotches, most of which ventrally bifurcate (pl. 1).

Subepidermal organs. — The peculiar filamentous subepidermal mental and humeral organs distinguish *Steatogenys* from all other Gymnotoidei, if not from all other fishes. The biological function is not yet exactly known. Lowrey (1913: 685-694, figs. 1-4) studied the submental organs. She writes (p. 685): "The subdermal filament consists of a series of saucer-shaped discs, placed parallel to each other, surrounded by a cylindrical sheath of connective tissue, and with a large nerve running between these discs and the sheath. From the minute structure of the discs, and from the relation of the nerve to them, it seems that these discs are electroplaxes, and that each subdermal filament is an electric organ." She concludes her paper by stating (p. 694) that: "1. The submental filaments of Steatogenys elegans are not adipose tissue. 2. These filaments possess all the characters of electric organs." and "3. The minute anatomy of the filaments agrees with that of the electroplaxes from known electric tissue."

Ellis (1913: 166) remarks: "The lateral filaments, called skinny flaps by Steindachner, are much like the mental filaments. Each lies in a groove, which begins just above and behind the origin of the pectorals and curves upward and backward from its base, a thinner portion extends downward behind the pectorals to the origin of the ventral filament. The histological structure of these filaments shows many points of similarity with that of the electric tissue of the electric eel. For the present, at least, these structures are considered as electric, or pseudo-electric, organs."

Myers (1936: 116) states: "It has apparently not before been noticed in print that these extraordinary mental "filaments" of *Steatogenys* occur

not only in the paired canals on the chin, but also run back in a closed tube behind the pectoral base and up to the scapular region, where they again reach the surface; both ends of each "filament" are free. The use of these organs remains a mystery." Myers obviously did not consult the original description, reading (Steindachner, 1880: 89): "Der vorderste Theil dieses Seitencanales verliert sich in einer furchenartigen Vertiefung, aus welcher sich bei einem Exemplare unserer Sammlung ein häutiger Lappen hervorheben lässt." Moreover, Myers did not refer to the figures by Konopicky (plate 9 in Steindachner, 1880) of *"Rhamphichthys (Brachyrhamphichthys) mirabilis"* (= *Steatogenys elegans*), showing the humeral (fig. 1) as well as the mental (fig. 1a) subepidermal filamentous organs.

Hoedeman (1962b: 105) remarks: "In *Steatogenys elegans* I found that the well-known mental filaments extend backward under the pectorals, turn upward and continue backward as loose "humeral filaments" just over the lateral line. The structures no doubt are functional, and they may proove to act as "electrodes" of some electric organ. The segmental arrangements of the tissue may point in that direction."

Fortunately, the interest in bioelectrogenesis is rapidly growing (Chagas & Paes de Carvalho, 1961; Bennett, 1970).

HYPOPYGUS LEPTURUS VERSUS STEATOGENYS ELEGANS

Hypopygus lepturus and *Steatogenys elegans* are quite similar fishes in general body shape and colour pattern. However, *Steatogenys elegans* can be distinguished at a glance from *Hypopygus lepturus* by the presence in the former species of a number of large marbled brownish blotches on the anal fin, not necessarily corresponding to the oblique bars on the body.

Hypopygus lepturus attains a maximum total length of 100 mm (in 389 specimens) and seems to be the smallest representative of the suborder Gymnotoidei. The smallest specimen of *Steatogenys elegans* examined by us measures 121 mm total length, whereas the largest specimen is 206 mm. In 17 specimens of *Hypopygus lepturus* the range of number of anal fin rays is 117-158. Hoedeman (1962b: 101) recorded "about 100 (104)" for holotype and paratype. However, the condition of these specimens does not allow an exact count. In four specimens of *Steatogenys elegans* the range of number of anal fin rays is 154-171. Steindachner gives 165-176 in his original description, which was based on the two syntypes. In 10 specimens of *Hypopygus lepturus* the range of number of pectoral fin rays is 10-13, in four specimens of *Steatogenys elegans* 11-12 (Steindachner gave 14-15). In *Hypopygus lepturus* the shape of the pectoral fin is rounded, and shorter

than in *Steatogenys elegans*. *Hypopygus lepturus* has a larger head in standard length (6.8-7.6 in *H. lepturus* against 7.7-8.2 in *S. elegans*), a larger pre-anal fin length in standard length (4.2-4.9 in *H. lepturus* against 5.0-5.6 in *S. elegans*), and a greater body width in standard length (11.5-13.0 in *H. lepturus* against 14.8-15.9 in *S. elegans*).

Steatogenys elegans seems to be a rare species, less common than *Hypopygus lepturus*, judging from the number of specimens (38 against 389) in various museum collections.

Myers (1936: 116) remarks: "..., *Tateichthys duidae* La Monte..., of which I have examined a paratype through the courtesy of Miss La Monte, possesses the mental filaments and is a synonym of *Steatogenys elegans* (Stdr.)." Myers did not examine the holotype of La Monte's species. Two paratypes of *T. duidae* appeared to be identical with *Hypopygus lepturus*. Because the holotype of *T. duidae* could not be borrowed from the American Museum of Natural History, Dr. G. J. Nelson kindly examined this specimen at our request. He provided us with the following information (in litt., 12.xi.1971): "It has paired, mental subepidermal organs. The grooves in which they lie have been cut into so that the organs are exposed.... the anal fin does have dark brown blotches on it as figured by La Monte." The characters mentioned by Nelson confirm the identity of *Tateichthys duidae* with *Steatogenys elegans*. The fact that at least two paratypes of *Tateichthys duidae* do not possess mental and humeral subepidermal filamentous organs (and therefore agree with the original diagnosis of *Tateichthys*: "... no filaments in the mental region.") has no impact on the nomenclatural status of *Tateichthys duidae*. La Monte did not recognize two species (belonging to two distinct genera) in her material, which illustrates the similarity in appearance of *Steatogenys elegans* and *Hypopygus lepturus*. Several specimens of the latter species were found labeled as *Steatogenys elegans* in museum collections.

Classification of the genus Hypopygus

Hoedeman (1962b: 100) placed *Hypopygus* in the family Rhamphichthyidae, and stated: "The present new genus and species is apparently related to both *Parupygus* and *Hypopomus* (hence the name)." In his key to the Guiana genera and species, the Rhamphichthyidae are represented by *Sternopygus* (p. 103), *Eigenmannia* (p. 103), *Parupygus* (p. 104), *Hypopygus* (p. 104), *Hypopomus* (p. 104), *Steatogenys* (p. 105), *Rhamphichthys* (p. 105), and *Gymnorhamphichthys* (p. 106). Weitzman (in Greenwood et al., 1966: 383) already observed: "No extensive research on their [the Gymnotoidei] morphology and classification has been undertaken since that

of Regan (1911a) and that of Ellis (1913). Anatomical investigations of gymnotoid interrelationships are needed. Géry and Vu-Tân-Tuê (1964) presented a key to the genera and families based largely on the work of Regan, Ellis, and Eigenmann and Allen (1942). Regan's analysis is still the most complete, and it forms the basis of the discussion presented here" and (p. 384): "... a complete study may alter the family arrangement accepted here." Greenwood et al. (1966: 396) accepted the families Gymnotidae, Electrophoridae, Apteronotidae, and Rhamphichthyidae in the suborder Gymnotoidei (= superfamily Gymnotoidea of the suborder Characoidei, according to Rosen & Greenwood, 1970: 23). The Sternopygidae were included in the Apteronotidae.

The nominal genera of Gymnotoidei, or the equivalent Gymnotoidea, belonging to the "Rhamphichthyidae/Sternopygidae group" are the following:

1) *Rhamphichthys* Müller & Troschel, 1848. Type-species *Gymnotus rostratus* Linnaeus, 1766.
2) *Sternopygus* Müller & Troschel, 1848. Type-species *Gymnonotus macrurus* Bloch & Schneider, 1801.
3) *Hypopomus* Gill, 1864. Type-species ***Rhamphichthys mulleri*** Kaup, 1856.
4) *Brachyrhamphichthys* Günther, 1870. Type-species ***Rhamphichthys artedi*** Kaup, 1856.
5) *Cryptops* Eigenmann, 1894 (preoccupied). Type-species ***Sternopygus humboldtii*** Steindachner, 1878.
6) *Eigenmannia* Jordan & Evermann, 1896 (replacement for *Cryptops* Eigenmann, 1894). Type-species *Sternopygus* ***humboldtii*** Steindachner, 1878.
7) *Steatogenys* Boulenger, 1898. Type-species ***Rhamphichthys (Brachyrhamphichthys) elegans*** Steindachner, 1880.
8) *Gymnorhamphichthys* Ellis, 1912. Type-species ***Gymnorhamphichthys hypostomus*** Ellis, 1912.
9) *Urumara* de Miranda Ribeiro, 1920. Type-species ***Urumara rondoni*** de Miranda Ribeiro, 1920.
10) *Tateichthys* La Monte, 1929. Type-species ***Tateichthys duidae*** La Monte, 1929.
11) *Rhabdolichops* Eigenmann & Allen, 1942. Type-species ***Rhabdolichops longicaudatus*** Eigenmann & Allen, 1942.
12) *Parupygus* Hoedeman, 1962. Type-species ***Parupygus savannensis*** Hoedeman, 1962.
13) *Hypopygus* Hoedeman, 1962. Type-species ***Hypopygus lepturus*** Hoedeman, 1962.
14) *Archolaemus* Korringa, 1970. Type-species ***Archolaemus blax*** Korringa, 1970.

From these, *Brachyrhamphichthys* and *Tateichthys* have been considered synonymous with *Hypopomus* and *Steatogenys*, respectively, by previous authors. We strongly question the validity of *Rhabdolichops*, for *R. longi-*

caudatus (holotype examined in California Academy of Sciences), hardly can be distinguished from *Eigenmannia*. In our opinion, *Rhamphichthys*, *Gymnorhamphichthys*, and *Urumara* (cf. Curra & de Miranda Ribeiro, 1961) can be distinguished from the other generic taxa by possession of a long snout. *Sternopygus* and *Archolaemus* are the only genera with a free orbital rim. *Steatogenys* is characterized by the possession of highly peculiar paired filamentous subepidermal organs. *Eigenmannia* and *Rhabdolichops* have teeth in both jaws just as *Sternopygus*. *Hypopygus* has no teeth, like *Hypopomus* and *Parupygus*, but is distinct from all genera in this heterogeneous group by the possession of a paired postpectoral subepidermal organ.

Ecological notes

Nothing was known about the ecological position of *Hypopygus lepturus*, because the only specimens hitherto known were non-living imported aquarium fishes. Although no special study has been made of ecological conditions under which *H. lepturus* lives, some field data are available now, including those collected during a 15 months stay of the senior author in Surinam, sampling fish in several river systems.

Of the 90 specimens recently collected in Surinam with the aid of rotenone, 62 were caught in tributaries of the Para River (Suriname river system) in the Zanderij Formation, a savanna belt extending from 150 km inland in the western part of Surinam to 40 km inland in the eastern part. These savanna creeks (Carolina Creek and Saramacca Creek) hold running, tea coloured acid waters with a pH as low as 4.6, have a bottom of sand covered with decaying leaves, and are not deeper than about 100 centimetres. The remaining 28 Surinam specimens were collected in slightly acid forest creeks (pH ranging from about 5.3 to 6.7) in the middle and upper courses of the Suriname river system (14 specimens), and in the middle course of the Marowijne river system (7), Nickerie river system (6), and Corantijn river system (1), the latter two samples from localities just south of the savanna belt (see fig. 4). In these creeks the bottom was sandy, the water was streaming, and the depth was to about 100 centimetres.

Of the remaining samples ecological data are known only for a sample of 42 specimens collected by the late H. Schultz from a tributary of the Rio Batovi, Rio Xingú system, Mato Grosso. The specimens were caught in a savanna creek in gallery forest, almost dried up, and with a bottom of sandy mud, the water current was very slow, temperature 22° C, depth 5 centimetres.

LITERATURE

BENNETT, M. V. L., 1970. Comparative physiology: electric organs. — Annual Review of Physiology, 32: 471-528, figs. 1-6, table 1 [with extensive bibliography].

BLOCH, M. E. (in J. G. SCHNEIDER, editor), 1801. Systema Ichthyologiae: i-lx, 1-584, pls. 1-110. — Berolini.

BOESEMAN, M., 1952. A preliminary list of Surinam fishes not included in Eigenmann's enumeration of 1912. — Zool. Meded. Leiden, 31 (17): 179-200.

BOULENGER, G. A., 1898. On a collection of fishes from the Rio Jurua, Brazil. — Trans. zool. Soc. London, 14, 7 (2): 421-428, pls. 39-42.

CHAGAS, C. & A. PAES DE CARVALHO (editors), 1961. Bioelectrogenesis. A comparative survey of its mechanisms with particular emphasis on electric fishes. Proceedings of the Symposium on Comparative Bioelectrogenesis, Rio de Janeiro, 1959: i-xiv, 1-413, illustrated. — Amsterdam, London, New York, Princeton.

CURRA, R. A. & P. DE MIRANDA RIBEIRO, 1961. Notas sistématicas sobre Urumarã Rondoni Miranda Ribeiro, 1920 (Pisces Gymnotoidei-Rhamphichthyidae). — Bol. Inst. Oceanogr. Univ. Oriente, Cumaná, Venezuela, 1 (2): 474-482, figs. 1-2.

EIGENMANN, C. H., 1894. Notes on some South American fishes. — Ann. New York Acad. Sci., 7: 625-637.

——, 1912. The freshwater fishes of British Guiana, including a study of the ecological grouping of species and the relation of the fauna of the plateau to that of the lowlands. — Mem. Carnegie Mus., 5: i-xvii, 1-578, figs. 1-39, pls. 1-103.

EIGENMANN, C. H. & W. R. ALLEN, 1942. Fishes of western South America: 1-494, figs. 1-48, pls. 1-22, 1 map. — Univ. Kentucky.

EIGENMANN, C. H. & D. P. WARD, 1905. The Gymnotidae. — Proc. Washington Acad. Sci., 7: 159-188, pls. 7-11.

ELLIS, M. M., in EIGENMANN, C. H., 1912. Family X. Gymnotidae: 422-442.

——, 1913. The gymnotid eels of tropical America. — Mem. Carnegie Mus., 6 (3): 109-195, figs. 1-33, pls. 15-23.

GÉRY, J. R. & VU-TÂN-TUÊ, 1964. Gymnorhamphichthys hypostomus petiti ssp. nov. un curieux poisson gymnotoïde arénicole. — Vie et Milieu, vol. Jubilaire dédié à Georges Petit, suppl. 17: 485-498, figs. 1-3, pl. 1, table 1.

GILL, [T.], 1864. "... several points in ichthyology and conchology." — Proc. Acad. nat. Sci. Philadelphia: 151-152.

GREENWOOD, P. H., D. E. ROSEN, S. H. WEITZMAN & G. S. MYERS, 1966. Phyletic studies of teleostean fishes, with a provisional classification of living forms. — Bull. American Mus. nat. Hist., 131 (4): 339-455, figs. 1-9, pls. 21-23, charts 1-32.

GÜNTHER, A., 1870. Catalogue of the Physostomi, containing the families Gymnotidae, Symbranchidae, Muraenidae, Pegasidae, and of the Lophobranchii, Plectognathi, Dipnoi, Ganoidei, Chondropterygii, Cyclostomata, Leptocardii, in the British Museum. In: Catalogue of the fishes in the British Museum, 8: i-xxv, 1-549, illustrated.

HOEDEMAN, J. J., 1962a. Notes on the ichthyology of Surinam and other Guianas 9. New records of gymnotid fishes. — Bull. aquatic Biol., 3 (26): 53-60, figs. 1-7, table 1.

——, 1962b. Notes on the ichthyology of Surinam and other Guianas 11. New gymnotoid fishes from Surinam and French Guiana, with additional records and a key to the groups and species from Guiana. — Bull. aquatic Biol., 3 (30): 97-107, figs. 1-5.

JORDAN, D. S. & B. W. EVERMANN, 1896. The fishes of North and Middle America: a descriptive catalogue of the species of fish-like vertebrates found in the waters of North America, north of the isthmus of Panama. Part I. — Bull. U.S. nat. Mus., (47): i-lx, 1-1240.

KAUP, [J. J.], 1856. Catalogue of apodal fish, in the collection of the British Museum: i-viii, 1-163, figs. 1-11, pls. 1-19. — London.

KORRINGA, M., 1970. A new gymnotoid fish from the Rio Tocantins, Brazil. — Proc. California Acad. Sci., 38 (13): 265-271, figs. 1-2, tables 1-3.

LA MONTE, F., 1929. Two new fishes from Mt. Duida, Venezuela. — American Mus. Novitates, (373): 1-4, figs. 1-3.

LINNAEUS, C., 1766. Systema naturae per regna tria naturae, etc. (ed. 12), 1: 1-532. — Holmiae.

LOWREY, A., 1913. A study of the submental filaments considered as probable electric organs in the gymnotid eel, Steatogenys elegans (Steindachner). — Journ. Morphol., 24 (4): 685-694, figs. 1-4.

MIRANDA RIBEIRO, A. DE, 1920. Peixes (excl. Characinidae). Comissão de linhas Tel Estr. de Mato-Grosso ao Amazonas, Zool., Hist. Nat. Ann. 5, publ. 58: 1-15 [not seen; quoted from R. A. Curra & P. de Miranda Ribeiro, 1961].

MÜLLER, J. & F. H. TROSCHEL, in Schomburgk, R., 1848. Fische: 618-644.

MYERS, G. S., 1936. A new genus of gymnotid eels from the Peruvian Amazon. — Proc. biol. Soc. Washington, 49: 115-116.

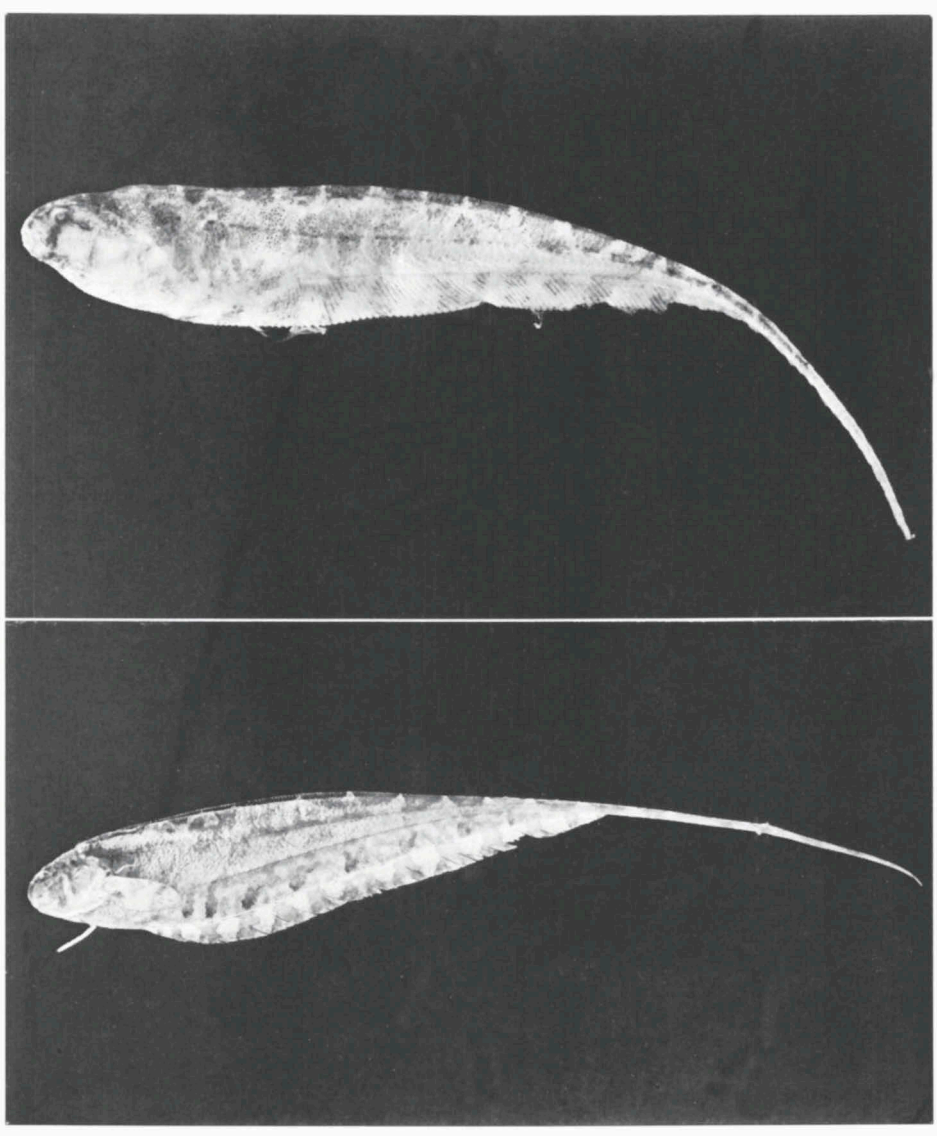
REGAN, C. T., 1911. The classification of the teleostean fishes of the order Ostariophysi. — 1. Cyprinoidea. — Ann. Mag. Nat. Hist., (8) 8: 13-32, figs. 1-2, pl. 2.

ROSEN, D. E. & P. H. GREENWOOD, 1970. Origin of the weberian apparatus and the relationships of the ostariophysan and gonorynchiform fishes. — American Mus. Novitates, (2428): 1-25, figs. 1-16.

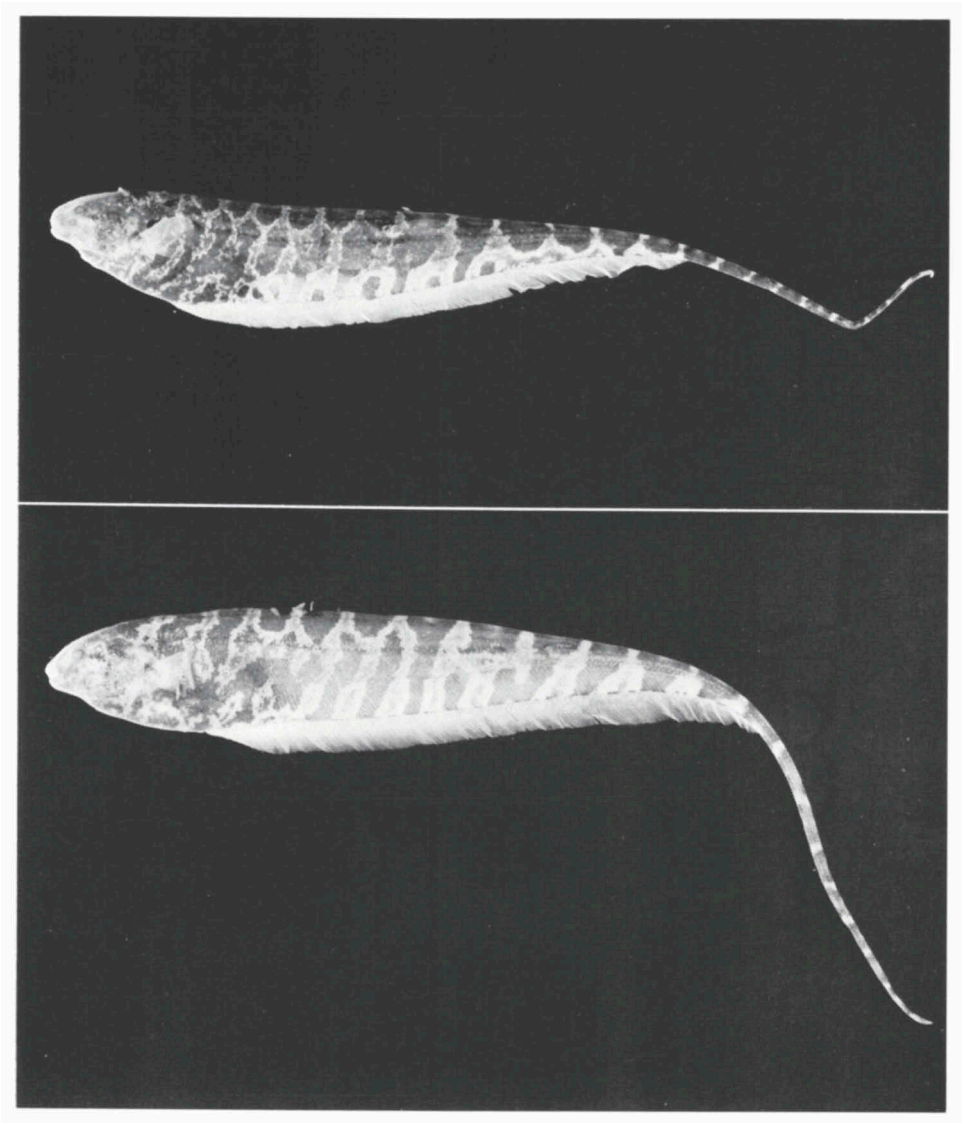
SCHOMBURGK, R., 1848. Reisen in British-Guiana in den Jahren 1840-1844, etc., 3: i-viii, 533-1260. — Leipzig.

STEINDACHNER, F., 1878. Zur Fisch-Fauna des Magdalenen-Stromes. — Denkschr. mathem.-naturwiss. Cl. kais. Akad. Wiss., Wien, 39 (1): 1-62, pls. 1-15.

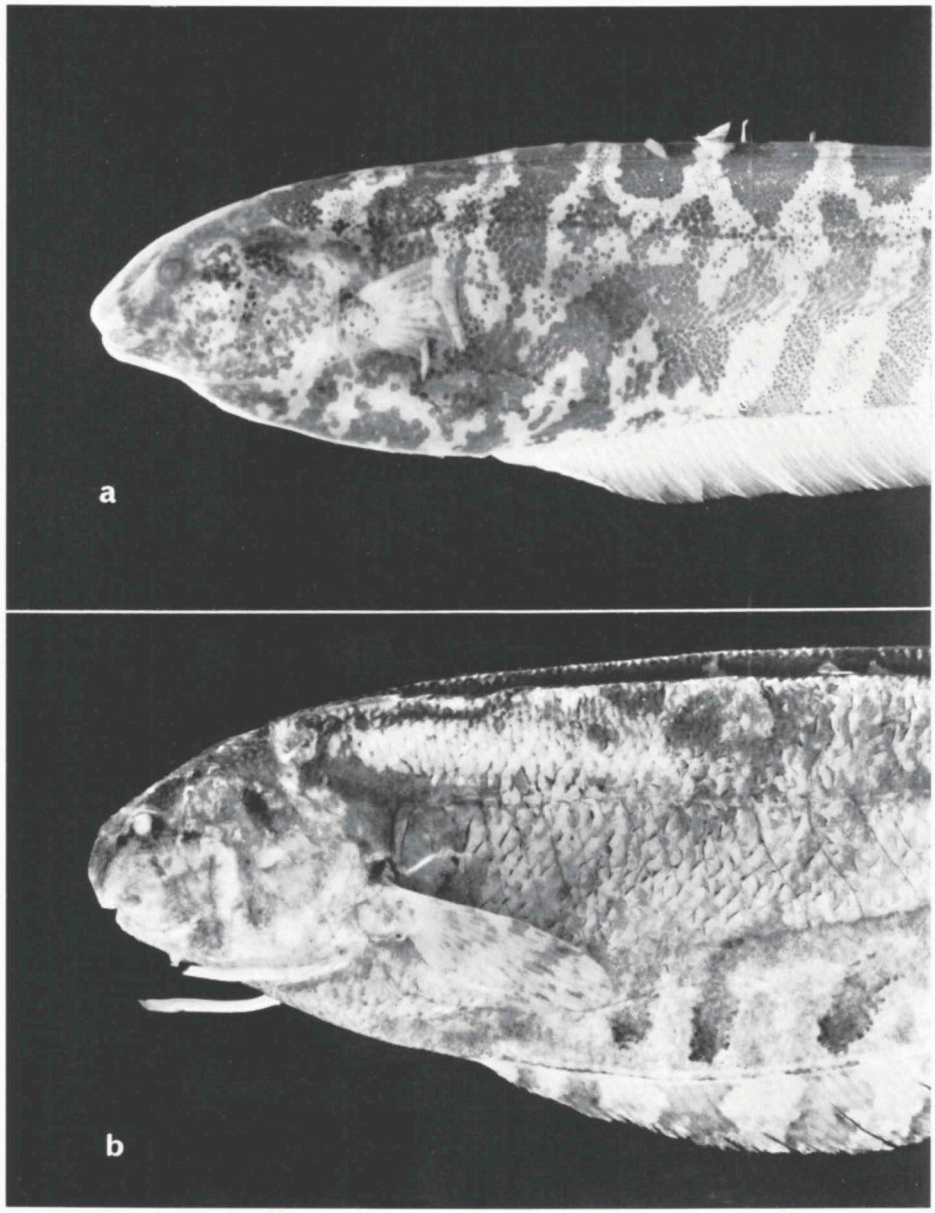
——, 1880. Zur Fisch-Fauna des Cauca und der Flüsse bei Guayaquil. — Denkschr. mathem.-naturwiss. Cl. kais. Akad. Wiss., Wien, 41: 55-104, pls. 1-9.



Upper fig. *Hypopygus lepturus*, holotype from Marowijne river system, 74 mm tl
Lower, fig. *Steatogenys elegans*, from Rio Amazonas at Monte Alegre,
121 mm tl (BMNH 1926.10.27.240).



Hypopygus lepturus, topotypes from Maka Creek, 87 mm tl (above) and 85 mm tl (below) (ZMA 106.082).



Heads in lateral view of a, *Hypopygus lepturus* (detail of pl. 2, lower fig.), and b, *Steatogenys elegans* (detail of pl. 1, lower figure).