Arquivos de Zoologia

ARQ. ZOOL., S. PAULO, 28(4): 1-37 30.XII.1976

SYSTEMATICS AND GEOGRAPHICAL DISTRIBUTION OF THE GENUS *PAROTOCINCLUS* EIGENMANN & EIGENMANN, 1889 (OSTARIOPHYSI, LORICARIIDAE)

JULIO C. GARAVELLO

ABSTRACT

Notes are given on the systematics, geographical distribution and ecology of the genus Parotocinclus. *The species are redescribed and five new species* (cristatus, amazonensis, jimi, cearensis *and* minutus) *are described. Two well defined groups of species are recognized and an Amazonian origin for the genus is postulated to explain the distribution along a long but narrow belt in eastern South America.*

INTRODUCTION

Some years ago Heraldo Antonio Britski and I, at the Museu de Zoologia da Universidade de São Paulo, started a revision of the subfamily Hypoptopomatinae based on extensive material of Loricariidae obtained from Brazilian and foreign museums. The first stage of this study was a detailed morphological analysis to redefine the genera of Hypoptopomatinae and delimit them. From the beginning, the sharply defined and geographically delimited genus *Parotocinclus* presented the opportunity for a M. Sc. thesis in Zoology at the Instituto de Biociências da Universidade de São Paulo; hence, the publication of the revision of this genus precedes the publication of the revision of the Hypoptopomatinae as a whole.

In this paper, I treat only the systematics of *Parotocinclus*. The old species are redescribed, five new species are described, and notes are given on the ecology and geographical distribution of the genus.

Parotocinclus was initially described by Eigenmann & Eigenmann (1889) as a monotypic subgenus of *Hisonotus*, for the species *Otocinclus maculicauda* Steindachner, 1877. According to these authors, *Hisonotus* lacked perforations on the postemporal bone, a character used to separate it from *Otocinclus*.

Departamento de Zoologia da Universidade Estadual de Campinas.

In Eigenmann & Eigenmann's revision of the Loricariidae (1890) *Parotocinclus* was elevated to generic status because of the presence of an adipose fin. *Hypoptopoma, Otocinclus, Hisonotus* and *Parotocinclus* composed the subfamily Hypoptopomatinae, characterized only by external morphology.

Regan (1904) studied the osteological characters of the subfamilies of Loricariidae. The Hypoptopomatinae were distinguished by the exposed scapular bridge (cleithra and coracoids). In that study he gave little importance to the morphological characters used by Eigenmann & Eigenmann (1890) to redefine *Hisonotus* and *Parotocinclus;* he showed that perforations existed on the postemporal bone in these genera, and considered both as synonyms of *Otocinclus.*

Eigenmann (1910), agreeing in part with Regan, considered *Hisonotus* as a synonym of *Otocinclus,* but maintained the generic position of *Parotocinclus.*

Gosline (1947), concerned mainly with the division of the subfamilies of the Loricariidae, left *Parotocinclus* as a valid genus in the Hypoptopomatinae, thus maintaining the treatment of Eigenmann.

The species originally described in *Parotocinclus* and their present names, as well as the species described in other genera and presently considered as pertaining to *Parotocinclus,* are the following:

1. *Otocinclus maculicauda* Steindachner, 1877; present name: *Parotocinclus maculicauda* (Steindachner, 1877); type-locality: Santa Cruz, Estrada de Ferro Central do Brasil, Rio de Janeiro; range: southeastern coastal rivers of Brazil, from Santa Catarina to Espírito Santo.

2. *Microlepidogaster bahiensis* Ribeiro, 1918; present name: *Parotocinclus bahiensis* (Ribeiro, 1918); type-locality: Vila Nova, now Senhor do Bonfim, Bahia; range: Senhor do Bonfim.

3. *Microlepidogaster doceanus* Ribeiro, 1918; present name: *Parotocinclus doceanus* (Ribeiro, 1918); type-locality: Rio Doce, Espírito Santo; range: Rio Doce basin.

4. *Parotocinclus cesarpintoi* Ribeiro, 1939; present name *Parotocinclus cesarpintoi* Ribeiro, 1939; type-locality: Rio Paraíba do Norte, Quebrângulo, Alagoas; range: Rio Paraíba do Norte basin.

5. *Parotocinclus steindachneri* Caporiacco, 1947; present name: *Parotocinclus maculicauda* (Steindachner, 1877); type-locality: Rio Novo, Santa Catarina; range: southeastern coastal rivers of Brazil, from Santa Catarina to Espírito Santo.

6. *Plecostomus spilosoma* Fowler, 1949; present name: *Parotocinclus spilosoma* (Fowler, 1949); type-locality: Campina Grande, Paraíba; range: Campina Grande.

7. *Plecostomus spilurus* Fowler, 1949; present name: *Parotocinclus spilurus* (Fowler, 1949); type-locality: Rio Salgado, Icó, Ceará; range: Rio Salgado basin.

8. *Parotocinclus britskii* Boeseman, 1974; present name: *Parotocinclus britskii* Boeseman, 1974; type-locality: Left tributary of the Coppename River, Surinam; range: Coppename and Nickerie River basins.

Five new species are described in this paper: *Parotocinclus cristatus, amazonensis, jimi, cearensis* and *minutus*.

Material

611 specimens were studied, from the Museu de Zoologia da Universidade de São Paulo (MZUSP), Museu Nacional, Rio de Janeiro (MNRJ), Academy of Natural Sciences of Philadelphia (ANSP) and Rijksmuseum van Natuurlijke Historie of Leiden (RMNH). The material studied is listed in the appendix.

Methods

Measurements were made with vernier calipers to the nearest millimeter. Scales and teeth were counted using a stereomicroscope. Drawings were made by direct observation of specimens under the stereomicroscope.

Measurements

A. Standard lenght: from tip of snout to base of caudal fin.
B. Body depth: measured at the origin of dorsal fin.
C. Head length: from tip of snout to hind margin of bony opercle.
D. Head depth: measured on a vertical line from the highest point of the supraoccipital bone.
E. Body width: measured at the widest region of the scapular bridge.
F. Trunk length: standard length minus head length.
G. Predorsal distance: from tip of snout to anterior base of first dorsal fin ray.
H. Orbital diameter: taken horizontally.
I. Interorbital distance: smallest distance between orbits.
J. Snout length: from tip of snout to anterior border of orbit.
K. Caudal peduncle depth: smallest depth vertically.

Counts

A. Number of perforated plates in the lateral line.
B. Number of plates anterior to the dorsal fin.
C. Number of plates posterior to the dorsal fin.
D. Ratio of the number of premaxillary teeth to dentary teeth.

The following sets of dimensions were compared for analyses:

Predorsal distance x standard length
Head length x trunk length
Caudal peduncle depth x body depth
Interorbital distance x head length
Snout length x head length
Body width x head length
Head depth x standard length
Body depth x standard length
Orbital diameter x head length
Orbital diameter x interorbital distance
Body width x standard length

Of these eleven sets, only the last four proved useful for separating species or species groups and are shown as figures 3-4.

Parotocinclus Eigenmann & Eigenmann, 1889

Hisonotus (*Parotocinclus*) Eigenmann & Eigenmann, 1889: 41. Type species: *Otocinclus maculicauda* Steindachner, 1877.

Parotocinclus; Eigenmann & Eigenmann, 1890: 329.

Otocinclus; Regan, 1904: 268 (part).

Description

Small; trunk nearly five centimeters in standard length; head slightly depressed; orbit small and slightly superior. Body covered by small plates; denticles on the plates irregularly distributed. Rostral margin of head composed of rigid and regular bony plates, bearing reverted denticles of various sizes. Preopercle emerging at the surface of the head as an elongated bony plate (fig. 1); opening of the air-bladder capsule just below the postemporal plate and covered by skin (fig. 1); postemporal perforations variable in size, never on the entire surface of the bony plate.

Perforated plates of the lateral line numbering 21-25; predorsal region with two pairs of bony plates just behind the supraoccipital bone, followed by a large plate anterior to the dorsal fin (fig. 1); postdorsal plates 15-16 in number; one unpaired platelet before the adipose fin. Abdomen totally covered by large plates or platelets, with or without regular distribution; sometimes with naked areas among the plates.

Scapular bridge exposed and with strong denticles; two foramina in the median region, just on the cleithro-coracoid suture, always covered by skin; these foramina may be reduced, with a small skin covering, and the bridge may appear partially covered by skin on the midline. In young specimens skin covers all of the scapular bridge.

Dorsal fin rays: i+7; spine locking mechanism of the dorsal fin present. Adipose fin present; anal fin rays: i+5; caudal: i+14+i; pectoral: i+6 and ventral: i+5. Premaxillary teeth: 13-32 and dentary teeth: 11-29; small pharingeal teeth.

Males with a genital papilla.

The colour pattern is normal for the Hypoptopomatinae: on each side a dark brown band, as large as the orbital diameter, running from the snout to the caudal peduncle; dorsum between these lateral bands light gray; abdomen yellowish; caudal peduncle spotted black below. Four transverse dark bars, as large as, or narrower than, the lateral band on the dorsum: one bar before and one behind the dorsal fin, while one lies ahead and one behind the adipose fin; or only three bars: one crossing under the dorsal fin and others before and behind the adipose fin.

Ontogeny

Immature specimens of all *Parotocinclus* species tend to have crests or depressions on the head, that partially or completely disappear in the adult. For the median scapular bridge foramina, I found some variation with age in the area covered by skin. Young specimens generally have naked abdomens, but, depending on the developmental stage, some species may have platelets on the lateral region of the abdomen. Because of the constancy of meristic characters in adults in this genus and the use of slight differences in number for identification of different species, the identification of the rather variable young specimens is a serious problem. In view of this, only the examination of a good series of specimens is likely to give the correct identification for young.

Key to adult specimens of *Parotocinclus*

1. Tuft of denticles on the supraoccipital bone; caudal peduncle nearly rectangular in cross section ..... *cristatus*
   Supraoccipital without crests, depressions or tufts of denticles; peduncle rounded or ellipsoid in cross section 2

2. Abdomen covered by regular rows of plates or platelets, without naked areas 3
   Abdomen naked or with extensive naked areas; if present, plates form only one row on each side and another medially broken or absent anteriorly and widening to the preanal region ... 8

3. Premaxillary teeth: 13-18, dentary teeth: 11-15 4
   Premaxillary teeth: 27-31, dentary teeth: 26-29 5

4. Scapular bridge almost totally exposed; abdomen covered by regular rows of large and elongated plates ..... *amazonensis*
   Scapular bridge exposed only in a small region on each side; abdomen covered by a row of elongated plates on each side with numerous platelets scattered among them ..... *spilurus*

5. Abdomen with one row of 4 or 5 elongated plates on each side, with numerous platelets among them 6
Abdomen with 3-5 longitudinal rows of large plates 7

6. Plates of the lateral line 23-24; orbit large, contained twice in the interorbital; tip of the pectoral fins reaching only 1/3 of the lenght of the ventrals ..... *jimi*
Plates of the lateral line 25-26; orbit contained about 3.5 times in the interorbital; tip of the pectoral fins passing the middle of the ventrals ..... *doceanus*

7. Plates of the lateral line 24-26; four transverse dark bars on the dorsum; two besides dorsal fin and two besides adipose fin .. .. *maculicauda*
Plates of the lateral line 22-23; three transverse dark bars on the dorsum: one under the dorsal and two besides adipose fin .... *britskii*

8. Scapular bridge exposed only in the lateral regions, with large foramina on the symphysis; caudal peduncle rounded in cross section ..... *cearensis*
Scapular bridge almost totally exposed, with small foramina on the symphysis; peduncle rounded, or with the ventral side flat in cross section 9

9. Plates of the lateral line 21-22; large perforations in the postemporal plate; regions of insertion of unpaired fins depressed ... . *minutus*
Plates of the lateral line 23-24; minute perforations in the postemporal plate; insertion of the unpaired fins nearly rounded 10

10. Large nostrils: internasal distance contained 6-8 times in the interorbital; peduncle ventrally flat in cross section ..... *spilosoma*
Normal nostrils: internasal only contained 4-5 times in the interorbital; peduncle rounded in cross section ..... *cesarpintoi*

Obs.: This key does not include *Parotocinclus bahiensis* (Ribeiro) as the type is lost and the original description is brief and incomplete.

Parotocinclus cristatus sp. n.

(Figs. 9-10)

Type material: Holotype MNRJ 10132, Fazenda Almada, Ilhéus, *Bahia,* Brazil; (Pereira); 16-23.II.1945. Paratypes MNRJ 10122-10131 (10 specimens), same data of holotype.

Diagnosis

Plates of the lateral line 22-23. Occiput with a tuft of denticles. Abdomen entirely covered by large plates between the coracoids and

ventral fin: 3-5 elongated plates on each side and two irregular series centrally. Peduncle nearly rectangular in cross section. Premaxillary teeth 26-30 and dentary teeth 24-28.

Description

Head short and wide; rostral margin of snout rounded. Predorsal body profile nearly straight from tip of snout to the dorsal fin, slightly raised in the region of the nostrils and of the supraoccipital bone. A dense tuft of denticles on the occiput. A shallow and small depression near the upper margin of each postemporal plate and another on each frontal bone; these are more conspicuous in young specimens. Orbits nearly lateral. Denticles of the head plates uniformly distributed and smaller than the denticles under the rostral margin of snout. Postemporal plate with numerous small perforations over about 2/3 of its area; the lower perforations much larger and more conspicuous than the higher. Opening of the air-bladder capsule small, half the orbital diameter in height and two thirds distance from the orbital rim in width. In the regions of the insertions of dorsal and anal fins the trunk is depressed, giving to sections of the peduncle a rectangular appearance. Scapular bridge nearly entirely covered by denticles and exposed; only a small anterior area, near the symphysis, covered by skin. Tips of the pectoral fins reaching the median portions of ventrals; these in males reaching the anal fin. Abdomen covered by large plates: one row of 3-5 plates between the coracoids and the ventral fin on each side and one or two irregular rows centrally; one plate in front of the anal opening. Young specimens with naked areas among these plates, but with the same distribution. Anal fin truncate; caudal fin strongly notched.

Colour of specimens preserved in alcohol

Body clear brown; superior region of head dark, with a clear and large stripe running from tip of snout to the nostrils. A lateral light brown band, as large as the orbital diameter, runs from tip of snout to the caudal fin, passing the lower margin of the eye. Four transverse dark brown bars on dorsum: two besides the dorsal fin and two besides adipose fin. At the intersections of transverse bars with the longitudinal bands the colour is much brighter, producing the appearance of lateral spots. Fin rays with small brown spots; caudal fin with an irregular dark spot at its base; much of the superior lobe is pale, while the inferior lobe is pale medially.

Range: Ilhéus, Bahia.

Parotocinclus amazonensis sp. n.

(Figs. 21-22)

Type material: Holotype MZUSP 10145, Ilha Sorubim, Rio Solimões, *Amazonas*, Brazil; (Expedição Permanente da Amazônia); X.1968.

Diagnosis

Plates of the lateral line 22. Abdomen entirely covered by large plates, irregularly distributed. Head without crests, depressions or tufts of denticles. Premaxillary teeth 15 and dentary teeth 14.

Description

Dorsal profile a slightly convex line from tip of snout to the beginning of dorsal fin; supraoccipital bone slightly elevated. Occiput vithout crests or tufts of denticles. Postemporal plate without depressions. Orbits nearly lateral, prominent. Anterior region of snout slightly depressed; upper part of snout with denticles as large as those of the lower surface of the rostral margin; denticles of the remainder parts of head small, forming a dense covering for the plates. Almost half of the postemporal plate with perforations; many large perforations below, small ones above. Opening of air-bladder capsule large, equal to the orbital diameter in width and half the orbital diameter in height. Trunk depressed at insertions of dorsal and anal fins; peduncle rounded in cross section.

Scapular bridge almost completely exposed; the foramina located in the median symphysis of coracoids and covered by skin. Tips of pectoral fins reaching beyond the middle of ventrals; these in the specimen not reaching the anal fin. Abdomen totally covered by large and irregular plates, without regular distribution.

Colour of the specimen preserved in alcohol

Superior region of head and supraoccipital bone dark. A lateral black band, sligtly wider than the orbital diameter, runs from tip of snout to the peduncle, passing under the eyes and along the middle of the body. Trunk light gray above, yellowish below. Three transverse dark brown bars, each as wide as the lateral band, on the dorsum; the first crossing just in front of the dorsal fin; the second before the adipose fin, and the last on the caudal peduncle. Fin rays dark brown with regular black stains; interradial membranes transparent. A large dark brown spot at the base of caudal fin extending along the inferior undivided ray to the tip of fin.

Range: Ilha Sorubim, Rio Solimões, Amazonas.

Paratocinclus spilurus (Fowler, 1941)

(Figs. 17-18)

Plecostomus spilurus Fowler, 1941: 148; figs. 47-49 (type-locality: Rio Salgado, Icó, *Ceará*, Brazil); Gosline, 1945: 82 (ref.); Fowler, 1954: 195 (ref.).

Material examined: Ceará, ANSP 69404-69408 (5 specimens, paratypes of *Plecostomus spilurus* Fowler, same data of holotype).

Diagnosis

Plates of the lateral line 23-24. Abdomen covered by a row of elongated plates on each side, with rounded ones irregularly distributed on the middle. Head without crests, depressions, or tufts of denticles. Premaxillary teeth 13-18 and dentary teeth 11-15.

Description

Head narrow and somewhat depressed; rostral margin of snout ellipsoid; orbits nearly lateral. Dorsal profile slightly convex from tip of snout to beginning of orbits and nearly straight from orbits to dorsal fin. Some inconspicuous rows of denticles run on the region among the nostrils, the frontals and supraoccipital bone. Postemporal perforations on almost 3/4 of the plate area; large and oblique below, small and normal above. Opening of air-bladder capsule equal to orbital diameter in width and one half its distance in height. Head without crests, depressions, or tufts of denticles. Trunk depressed at insertion of dorsal and anal fins; peduncle rounded in cross section.

Scapular bridge exposed only laterally; median region covered by skin. Abdomen almost covered by small rounded platelets: one lateral row of elongated plates on each side and numerous between the coracoids and preanal region. Tips of pectoral fins reaching the median portion of ventrals; these reaching the beginning of anal fin. Anal fin truncate. Caudal fin slightly notched, with inferior lobe larger than upper lobe.

Colour of specimens preserved in alcohol

Trunk light gray above; head and distal region of caudal peduncle dark. A lateral dark band running along the middle of the body; three transverse dark bars on the dorsum: two crossing besides dorsal fin and one before adipose fin. Abdomen yellowish and spotted black below. Fin rays with small alternated dark brown stains; two oblique dark bars on the anterior part of caudal fin and one on the tip of lobes.

Range: Rio Salgado, Icó, Ceará.

Parotocinclus jimi sp. n.

(Figs. 25-26)

Type material: Holotype MZUSP 12133, Rio do Peixe, small tributary of Rio de Contas, Fazenda Pedra Branca, Itagibá, *Bahia*, Brazil; (Jim & Toledo); 20-23.V.1973. Paratypes MZUSP 12134-12153 (20 specimens) Rio de Contas, Itagibá, *Bahia* (Abe); 19.VII.1974 and MZUSP 12154 (194 specimens) same data of holotype.

Diagnosis

Plates of the lateral line 23-24. Abdomen entirely covered by large plates and platelets: one row of 6 or 7 elongated plates on each side and numerous juxtaposed platelets in the middle. Head without crests or depressions. Premaxillary teeth 20-28 and dentary teeth 18-25.

Description

Head without crests, tufts of denticles, or depressions. Dorsal profile slightly convex from beginning of dorsal fin to region between eyes, very steep from here to tip of snout. Orbits almost superior, upper margin prominent. Postemporal plate slightly depressed in the margin of orbits. Rostral margin of snout with large denticles on the lower surface; denticles of the upper part of snout and head small and regularly distributed. Postemporal plate with large and irregular perforations on nearly 2/3 of the area; the channel perforating obliquely, gives to this plate a vermiform appearance on base. Opening of the air-bladder capsule large, equal to orbital diameter in width and half orbital diameter in height. Trunk slightly depressed on the base of the unpaired fins; caudal peduncle nearly rounded or ellipsoid in cross section.

Scapular bridge nearly entirely exposed, only a reduced anterior median region covered by skin; foramina in adults very small. Abdomen in adults totally covered by plates and platelets: one row of 6 or 7 elongated plates on each side and numerous platelets in the middle; large plates on the preanal region. Young specimens with abdomen covered only by the lateral series and a median series anterior to anal opening; numerous naked areas between these series; specimens too young do not have platelets on the abdomen. Tip of pectoral fins only reaching the beginning of ventrals; ventral fins long in males, reaching the anal fin.

Colour of specimens recently preserved in formalin

Body light gray above. A lateral black band, larger than the orbital diameter, runs from tip of snout to the peduncle, passing under the eyes and along the middle of the body. Limits of the snout plates, head plates and sometimes trunk plates with clear vermiform lines; trunk region above lateral band light gray; inferior region yellowish with small black spots. Four transverse brown bars, larger than the lateral ones, on the trunk: two besides dorsal fin and two besides adipose fin. Fin rays with regular black stains; interradial membranes transparent. A large and irregular dark spot on inferior lobe of caudal fin, continuing the lateral black band; caudal fin rays spotted black in the distal region; light areas between the black basal spot and the tip of caudal fin.

This colour pattern may also be masked by the light gray coloration of the body or by brown vermiform lines.

Parotocinclus doceanus (Ribeiro, 1918)

(Figs. 7-8)

Microlepidogaster doceanus Ribeiro, 1918: 634 (717); (type-locality: Rio Doce, *Espírito Santo,* Brazil); Gosline, 1945: 101 (ref.); Fowler, 1954: 166 (ref.).

Material examined: Espírito Santo: MZUSP 1016 (holotype of *Microlepidogaster doceanus* Ribeiro) and MZUSP 2698, 8059-8060 (3 specimens, paratypes, same data of holotype).

Diagnosis

Plates of the lateral line 24-25. Abdomen entirely covered by small plates, irregularly distributed. Head without crests or depressions. Premaxillary teeth 27-31 and dentary teeth 26-29.

Description

Head thin, without crests, depression or tufts of denticles. Orbits nearly lateral, somewhat prominent in the upper region. Predorsal profile slightly convex, salient in the region between nostrils and in the supraoccipital bone. Perforations of postemporal plate on about 3/4 of the area, large on base and small above. Opening of the air-bladder capsule small; one half distance from the orbit in width and 1/3 of orbital diameter in height. Anterior region of trunk and highest portion of head slightly depressed. Caudal peduncle ellipsoid in cross section.

Scapular bridge almost totally exposed; small foramina on the median region of bridge, covered by skin. Abdomen covered by small plates, irregularly distributed. Tip of pectoral fins reaching more than the middle of ventrals; ventral fins not reaching the anal. Anal fin truncate.

Obs.: The specimen described here was not in good condition and entirely discoloured. Ribeiro (1918) presents a brief diagnosis of the original colour pattern of this species: "Escamas quasi perfeitamente glabras. Cor de sépia uniforme com uma barra negra oblíqua ocupando quasi o lobo inferior e base superior da caudal".

Range: Rio Doce, Espírito Santo.

Parotocinclus maculicauda (Steindachner 1877)

(Figs. 5-6)

Otocinclus maculicauda Steindachner, 1877: 222 (part), pl. 12, figs. a-b (type-locality: Santa Cruz, Estrada de Ferro Central do Brasil, *Rio de Janeiro,* Brazil); Regan, 1904: 268 (Santa Cruz, Sudeste do Brasil).

Hisonotus maculicauda; Eigenmann & Eigenmann, 1889: 41 (Santa Cruz): Eigenmann & Eigenmann, 1890: 392 (same data).

Parotocinclus maculicauda; Eigenmann & Eigenmann, 1891: 40 (ref.); Ribeiro, 1908: 2 (Rio Ribeira de Iguape); Eigenmann, 1910: 413 (ref.); Ribeiro, 1911: 87, pl. 29, fig. 2 (Santa Cruz e Ribeira); *Parotocinclos maculicauda* (imsspell.); Ribeiro, 1918: 717 (ref.).

Parotocinclos maculicauda (misspell); Ribeiro, 1918: 717 (ref.).

Parotocinclus steindachneri Caporiacco, 1947: 201 (type-locality: Rio Novo, *Santa Catarina*, Brazil).

Material examined: *Santa Catarina*: Joinville, MNRJ 10079-10080 (2 specimens); Ibirama, MZUSP 8031-8038 (8 specimens). *São Paulo*: Juquiá: Fazenda Poço Grande, MZUSP 8039 (1 specimen); Ribeirão Poço Grande, MZUSP 8040-8058 (19 specimens). *Rio de Janeiro*: Estrada Itaguaí-Raiz da Serra: Córrego da Lagoa Nova, km 7, MZUSP 8678 (4 specimens); Ribeirão da Ponte do Teixeira, km 5, MZUSP 8679 (24 specimens); Estrada do Marapicu, córregos afluentes do Prata-Mendanha, MZUSP 8680, 10124-10144 (51 specimens); Rio Itaguaí, MNRJ 10098 (1 specimen); Tinguá, MNRJ 10092-10097 (6 specimens); Rio Camboatá, Queimados, MNRJ 4691, 10082-10091 (11 specimens). *Espírito Santo*: São João de Petrópolis, MNRJ 6211, 10099-10118 (29 specimens); Rio Perdido, Santa Tereza, MNRJ 5118, 10120-10121 (3 specimens).

Diagnosis

Plates of the lateral line 23-25. Abdomen covered by three regular rows of large plates, without naked areas; young with naked areas between the series. Head normal, without crests, depressions or tufts of denticles. Premaxillary teeth 25-32 and dentary teeth 24-28.

Description

Predorsal body profile slightly convex from tip of snout to the beginning of dorsal fin; region between the nostrils slightly depressed. Head without crests or tufts of denticles; orbits almost superior; median region of supraoccipital bone and margin of orbits slightly prominent. Upper region of snout with denticles as large as those of lower surface of rostral margin; remaining denticles of head plates small and regularly distributed. Numerous postemporal perforations, small and irregular, obliquely placed on about one half of postemporal plate area. Opening of air-bladder capsule small; one half distance from the orbit in height and 1/3 of orbital diameter in width. Caudal peduncle rounded in cross section.

Scapular bridge almost entirely exposed, only a small anterior area covered by skin. Abdomen in adults covered bq three regular rows; very young specimens do not have platelets on the abdomen. Tips of pectoral

fins reaching more than the middle of ventrals; in the males reaching anal fin. Anal fin truncate. Caudal fin strongly notched.

Colour of specimens recently preserved in formalin

One lateral light brown band, larger than the orbit, runs from tip of snout to caudal peduncle, passing the middle of the body; this band may have light vermiform lines in the limits of the upper snout plates. Body light brown above lateral band; yellowish below and small black spots on the anterior region; the dark lateral band is brighter and more delimitated below. Four transverse black bars, as large as the lateral band on the dorsum: two besides dorsal fin and two besides adipose fin. Fin rays light brown, regularly stained with black; interradial membranes transparent. A large and irregular black blotch on almost the inferior lobe of caudal fin, continuing the lateral black band; some caudal rays and membranes brown distally, forming a large blotch on the upper caudal lobe; inferior lobe also with a distal irregular spot, separated from the basal blotch by a hyaline area.

This colour pattern may however appear almost completely masked.

Range: Southeastern coastal rivers of Brazil, from Santa Catarina to Espírito Santo.

Parotocinclus britskii Boeseman, 1974

(Figs. 23-24)

Parotocinclus britskii Boeseman, 1974: 267 (type-locality: "Left tributary of Coppename River, Surinam").

Material examined: Surinam: "Rigth tributary of Nickerie River, 12 km of Stondansi Falls"; RMNH 26924 (2 specimens), (paratypes of *Parotocinclus britskii* Boeseman).

Diagnosis

Plates of the lateral line 22-23. Abdomen covered by 4 or 5 rows of large plates: one row of elongated plates on each side and others of rounded plates in the middle. Head without crests or depressions. Premaxillary teeth 25-28 and dentary teeth 25-26 (paratypes examined).

Description

Small: 2 to 2,7 centimeters of standard length. Predorsal profile slightly convex from tip of snout to dorsal fin; rostral margin of snout almost spathulate; rounded in dorsal view and depressed between nostrils. Head without crests, depressions or tufts of denticles; denticles of upper part of snout as large as those of lower surface of rostral margin; remaining denticles of head plates small and uniformly distributed. Orbits almost

superior. A slight depression on the frontals gives to the upper part of orbits a prominent aspect. Almost half of the postemporal plate with perforations; large and oblique below, small and almost straigth above, Opening of air-bladder capsule large, equal to orbital diameter in width and half of orbital diameter in height.

Scapular bridge almost totally exposed, only a small median area covered by skin. Trunk slightly depressed in the insertions of unpaired fins; peduncle ellipsoid in cross section. Abdomen covered by rows of 4 or 5 large plates: a row of elongated plates on each side and rows of rounded ones in the middel. Tip of pectoral fins reaching more than the middle of ventrals; these fins reaching the beginning of anal. Anal fin truncate. Caudal fin notched.

Colour of specimens preserved in alcohol

One dark brown band, larger than the orbital diameter, runs from tip of snout to caudal peduncle. Head dark, with light vermiform lines on the limits of the upper snout plates. Body yellowish, contrasting with three transverse brown bars on the dorsum: the first under the beginning of dorsal fin, the second under the adipose fin and the third on the peduncle, just before the caudal fin. The dark coloured bars are brighter than the light pattern of the body. Unbranched rays of fins regularly brown stained; interradial membranes transparent. Caudal fin dark brown below, with slight indications of the fine transverse bars on the middle and on the tip.

Range: Rivers Coppename and Nickerie, Surinam.

Parotocinclus cearensis sp. n.

(Figs. 19-20)

Plecostomus spilosoma Fowler, 1941: 152 (part); (paratypes from Rio Choró, *Ceará,* Brazil); Gosline, 1945: 82 (ref.); Fowler, 1954: 195 (ref.).

Type material: Holotype MNRJ 10176, Cachoeira do Gusmão, Ipu, *Ceará*, Brazil; (Cruz); 24.VIII.1952; Paratypes MNRJ 8689 and 10155-10175 (124 specimens), same data of holotype. Paratypes ANSP 69414-69416 (3 specimens), Rio Choró, *Ceará;* 1936.

Diagnosis

Plates of the lateral line 23-24. Abdomen nearly naked: only a sigle row of small plates on each side and a group of platelets irregularly distributed on preanal region. Scapular bridge only exposed in a small area on each side. Premaxillary teeth 20-23 and dentary teeth 19-23.

Description

Head broad and depressed. Predorsal profile slightly convex from tip of snout to beginning of dorsal fin. Small rows of denticles on the surface of supraoccipital and frontal bones. Denticles of the lower surface of rostral margin of snout as small as those of the upper body plates. Orbits nearly superior. Postemporal plate with minute perforations below. Opening of air-bladder capsule large, equal to orbital diameter in width and 3/4 of orbital diameter in height. Cross section of caudal peduncle ellipsoid. Trunk depressed at insertions of unpaired fins.

Scapular bridge almost covered by skin, only exposed in a small area on each side. Abdomen nearly naked, only a single row of small plates on each side, one group of platelets in the middle and another preanal group, both irregularly distributed; young specimens have only two or three platelets on each side and others in the middle of abdomen. Tip of pectoral fins reaching the beginning of ventrals; these in males reaching the anal fin. Anal fin truncate. Caudal fin slightly notched, the inferior lobe larger than upper lobe.

Colour of specimens preserved in alcohol

Body light brown on dorsum and yellowish on the abdomen; only dorsal region of head dark; a light and irregular whitish line runs from rostral margin of snout to the nostrils on each side of head. One lateral brown band runs from tip of snout to caudal fin, passing the orbit, and along the middle of the body. Four transverse brown bars on the dorsum: two besides dorsal fin and two besides adipose fin. Fin rays with black spots and interradial membranes transparent. Three dark bars crossing the caudal fin, the two later larger than the first.

Range: Rio Choró, Ceará.

Parotocinclus minutus sp. n.

(Figs. 13-14)

Type material: Holotype MNRJ 10135, Rio Vasa-Barris, Canudos, Bahia, Brazil; (Travassos); V.1955. Paratypes MNRJ 10133-10134 (2 specimens), same data of holotype.

Diagnosis

Plates of the lateral line 21-22. Abdomen with one row of elongated plates on each side and another of platelets on the middle, running to preanal region; a group of platelets on the preanal region. Premaxillary teeth 21-22 and dentary teeth 17-19.

Description

Small, 2 to 3 centimeters of standard lenght. Head short and wide. Predorsal profile slightly convex from tip of snout to the dorsal fin,

prominent only in the supraoccipital bone. Region between the nostrils narrow; three rows of small denticles run from the snout to upper part of head through the internasal bony plates. One shallow and small depression on the frontals at the interorbital region. Orbit large and nearly superior, contained twice in the head depth. Postemporal perforations on about 3/4 of the plate area, large and oblique perforations below. Opening of air-bladder capsule large, equal to orbital diameter in width and half the orbital diameter in height. Caudal peduncle ellipsoid in cross section; regions of insertions of dorsal and anal fins depressed.

Scapular bridge almost totally exposed, only a small anterior area of the foramina covered by skin. Abdomen with small plates and naked areas: one lateral row of 3-6 elongated plates on each side and another of small plates in the middle, running to the preanal area; a group of small preanal plates. Tip of pectoral fins reaching the beginning of ventrals; these in males reaching the anal fin. Anal fin truncate.

Colour of specimens preserved in alcohol

Body ligth brown; head dark, except in the rostral margin of snout; light vermiform whitish lines in the limits of snout plates; a large one running between the nostrils. One lateral brown band runs from tip of snout to the caudal fin passing the eye and along the middle of the body. Four transverse dark bars on the dorsum: two besides the dorsal fin, the third under the adipose fin and the fourth on the caudal peduncle, just before the caudal fin. Fin rays and membranes spotted black; interradial membranes transparent. Caudal fin with three vertical brown bars: the first on base, the second on the middle and the third near the tip of fin.

Range: Rio Vasa-Barris, Bahia.

Parotocinclus spilosoma (Fowler, 1941)

(Figs. 11-12)

Plecostomus spilosoma Fowler, 1941: 152 (part), figs. 53-55 (type-locality: Campina Grande, *Paraíba*, Brazil); Gosline, 1945: 82 (ref.); Fowler, 1954: 195 (ref.).

Material examined: Paraíba: ANSP 69411-69413 (3 specimens), (paratypes of *Plecostomus spilosoma* Fowler, same data of holotype).

Diagnosis

Plates of the lateral line 21-23. Abdomen with small plates and naked areas: one row of small elongated plates on each side and another of rounded plates in the middle, widening towards preanal region. Distance between nostrils contained 6-8 times in the interorbital distance. Caudal peduncle flat below.

Description

Head normal, without crests of tufts of denticles. Predorsal body profile slightly convex from dorsal fin to supraoccipital bone, almost straight from this region to rostral margin of snout. Snout short and wide; orbits large and nearly superior; large nostrils and internasal region narrow, contained 6 to 8 times in the interorbital distance. Denticles of the lower surface of rostral margin larger than those of the upper part of snout and of body plates. Minute postemporal perforations on about 1/2 of the postemporal plate. Opening of air-bladder capsule large, equal to orbital diameter in width and half orbital diameter in height. Trunk depressed in the insertion of unpaired fins. Caudal peduncle convex above and flat below in cross section.

Scapular bridge almost totally exposed; large foramina on the median symphysis, covered by skin. Abdomen with small plates and naked areas: one row of small elongated plates on each side and another of rounded plates in the middle, widening towards preanal region. Young specimens with naked abdomen. Tip of pectoral fins reaching only the beginning of the ventrals. Anal fin truncate.

Obs.: In spite of the poor condition of the type material, it is possible to visualize the typical colour pattern of the Hypoptopomatinae.

Range: Campina Grande, Paraíba.

Parotocinclus cesarpintoi Ribeiro, 1939

(Figs. 15-16)

Paraotocinclus cesarpintoi Ribeiro, 1939: 365 (misspell.), (type-locality: Quebrângulo, *Alagoas,* Brazil).

Parotocinclus cesarpintoi; Gosline, 1945: 99 (ref.); Fowler, 1954: 133 (ref.).

Material examined: Alagoas: MNRJ 10136-10154 (19 specimens) and MNRJ 1154 (62 specimens), Rio Paraíba, Quebrângulo (Cesar Pinto); 1940; MNRJ 1153 (4 specimens) Rio Paraíba, Quebrângulo (Cesar Pinto); 1939.

Diagnosis

Plates of the lateral line 23. Abdomen with small plates and naked areas: one or two rows of elongated plates on each side and another of rounded plates in the middle, widening towards preanal region. Premaxillary teeth 20-24 and dentary teeth 19-23.

Description

Head short and wide. Predorsal profile slightly convex from dorsal fin to upper part of interorbital; nearly straight from there to tip of snout. A shallow depression on internasal region. Lower surface of rostral margin of head with denticles as small as those of upper region; these denticles larger than those of the body plates. Supraoccipital with some regular rows of denticles. Postemporal with minute perforations on about 3/4 of the plate area. Opening of air-bladder capsule reduced, equal to orbital diameter in width and one half orbital diameter in height. Trunk rounded in the insertions of unpaired fins. Cross section of caudal peduncle rounded.

Scapular bridge partially exposed; only an elongated part of coracoids and foramina covered by skin. Abdomen with one or two rows of elongated plates on each side and another of rounded plates in the middle, widening towards the preanal region; this row sometimes runs to the lateral rows; naked areas between these plates. Tips of pectoral fins reaching only beginning of ventrals; ventral fins in males reaching the anal fin. Anal fin truncate. Caudal fin strongly notched.

Colour of specimens preserved in alcohol

Body light brown. Head dark with fine light vermiform whitish lines on the limits of snout plates; one brown bar narrower than orbits runs from rostral margin of snout to the eyes. One lateral and irreglar dark brown band runs from the posterior region of the head to the peduncle. Four transverse bars larger than the lateral band on the dorsum: two besides the dorsal fin and two besides the adipose fin. Dorsal, ventral and pectoral fins with two vertical dark bars. Caudal fin with a vertical bar below and two others on the median region and distally.

Range: Rio Paraíba, Alagoas.

Parotocinclus bahiensis (Ribeiro, 1918)

Microlepidogaster bahiensis Ribeiro, 1918: 635 (717); (type-locality: Vila Nova, now Senhor do Bonfim, Bahia, Brazil); Gosline, 1945: 101 (ref.); Fowler, 1954: 166 (ref.).

Original description (Ribeiro, 1918): "D. i+7; A. i+5; L. lat. 24; cabeça 2 e 2/3; altura 1/5; olhos 1/6, 2 e 1/2 no interorbital, este 1/3 na cabeça. Origem da dorsal sobre a das ventrais. Adiposa presente. Acúleo peitoral chegando ao meio das ventrais que atingem a anal. 6 placas entre a dorsal e a adiposa; dorsal reclinada chegando a uma placa anterior àquela nadadeira e ocupando 10 placas; caudal lunada. Abdome totalmente nú. Placas cefálicas e do corpo aciculadas porém não carenadas; 3 filas de espinhos no occiput, a maior mediana;

pardo com 4 nódoas claras no dorso. Caudal transfaciada de modo irregular. 2 exemplares n.º 1071, registrados como procedentes de Vila Nova, Estado da Bahia, coletor Garbe, 1908".

Obs.: In this description Ribeiro showed doubt about the generic position of the species; he put an interrogation after the generic name. The type material of *Microlepidogaster* (?) *bahiensis* Ribeiro disappeared (Britiski, 1969) and this description, little informative does not permit comparison with other species of *Parotocinclus;* by this reason *P. bahiensis* was not included in the key. However, according to the original description this species has an adipose fin and the type-locality is situated within the range of *Parotocinclus.* These facts permit the conclusion that this description refers to a *Parotocinclus* species.

ECOLOGY

Southeastern Brazilian species of *Parotocinclus* inhabit small streams of running water, no deeper than 1.5 m, with dense submerged marginal vegetation. The ichthyofauna of these creeks is principally composed of small fresh-water fishes, except for *Hoplias malabaricus* and *Geophagus brasiliensis,* which tend to attain large size.

I have collected *Parotocinclus maculicauda* near the margins of littoral streams of the states of Rio de Janeiro and São Paulo, on the abundant submerged vegetation of *Brachiaria purpurascens.* It lives on submerged leaves of this grass or on the trunks or pebbles in the dark bottom. With *P. maculicauda* I found various other species of Hypoptopomatinae: *Microlepidogaster lophophanes, Otocinclus notatus* and *Otothyris* sp. in Rio de Janeiro and *Otocinclus leucofrenatus* and *Otocinclus affinis* in São Paulo. These species are as small as *P. maculicauda,* and do not exceed 6 centimeters in standard length.

Superficial examination of stomach contents of specimens of *maculicauda* showed a considerable amount of unicellular algae (Diatomaceae), in addition to filamentous algae, plant fragments, sand grains and unidentified material.

P. cesarpintoi, according to Ribeiro (1939), lives on the pebbles of northeastern streams and is called "chupa-pedras" (stone-sucker). The stomach contents of *cesarpintoi* and *cearensis* were principally filamentous algae (Oedogoniaceae and Desmidiaceae); the amount of mud and sand grains in their stomachs was generally greater than in *maculicauda.*

P. cesarpintoi and *cearensis,* according to Ribeiro and the examition of stomach contents, probably lives on the stream bottom or near it.

P. amazonensis, collected in a shallow arm of the Solimões River and *jimi,* collected in a small rushing tributary of the Contas River, were both on the submerged vegetation.

DISCUSSION

Morphology and Behaviour

Parotocinclus has been previously considered (Britski & Garavello, in preparation) the most primitive genus of the Hypoptopomatinae. It is possible to assemble the species in two groups, according to the size of the denticles on the body plates and on the lower surface of the rostral margin of head. The denticles may be large, strong and joined to the plates, as in *maculicauda, doceanus, jimi, amazonensis, minutus* and*britskii,* or small and feeble, as in *spilosoma, cearensis* and *cesarpintoi* (table 1).

The features of the *maculicauda* species group, present in almost all of the Hypoptopomatinae, are related to the behaviour of these small catfishes in attaching themselves to the submerged marginal vegetation. I have observed this fact in *maculicauda* and *jimi,* and assume that the association between denticle morphology and behaviour is constant.

The species of the *spilosoma* group, as stated by Ribeiro (1939) for *cesarpintoi,* have a prevailingly benthonic habitat, as the majority of the Loricariidae. The benthic habit appears in a given region with specific ecological features, and has all the appearance of being derivate; accordingly, the *maculicauda* species group would show the more primitive state of the character.

P. spilurus shares characters with the two groups: with *spilosoma* weak denticles and a large number of ventral platelets, with *maculicauda* a rather slender trunk and almost lateral orbits. This combination of characters precludes dividing *Parotocinclus* in two genera. Very probably *spilurus* is derived from a northeastern (*spilosoma* group) species through adaptation to a different environment. It is expected that further similar cases will be encountered, as it is clear that the ecological commitments (and their morphological consequences) are not irrevocable in this group, that retains a good measure of evolutionary plasticity.

Distribution

The species of *Parotocinclus* are found in coastal streams from Santa Catarina to Ceará. They are not recorded from the São Francisco, Jequitinhonha, Mucuri and other large rivers which flow into the Atlantic Ocean, nor from the Paraná-Paraguay basin. Little can be said about their distribution in the Amazonian and Surinam basins; the fact that there are only two records (*amazonensis* and *britskii*) for the area indicates that the forms are rare there, and only very intensive collecting will afford reliable distributional data.

In view of the large number of collections made in recent years, principally in the Guianas, the scanty records of *Parotocinclus* may well mean that modern forms of Hypoptopomatinae (e.g. of the genera

Hypoptopoma and *Otocinclus*, both with more species and wider distribution in these basis) may be eliminating *Parotocinclus* there.

The disjunct distribution of the Amazonian species does not seem to indicate a recent entry; on the contrary their rareness suggests a reduction of the range of *Parotocinclus* in the area. In accepting an Amazonian origin for this genus and a consequent dispersion to the southeast through the northeastern region, I certainly contradict what is known about the dispersion of other South American fresh-water fish groups, which probably arrived in the southeast through the Paraguay and Paraná drainages.

The absence of *Parotocinclus* in the Paraná-Paraguay basin and its dispersion along the coast in streams from Ceará to Santa Catarina does not suggest that the dispersion was through the interior. Groups that followed the Paraná-Paraguay route still occur in these basins. *Oligosarcus,* for exemple, occurs in the Paraná-Paraguay basin, in Uruguay and in southeastern Brasil, to Bahia, going no further north than the Rio Jequitinhonha (Menezes, 1969).

The passage of *Parotocinclus* from Amazonia to the area of the caatingas, in the northeastern states, may have proceeded through the coastal rivers. It is unknown whether the genus occurs in the coastal rivers north of Ceará, since there are no collections from the area. The same may be said of the Tocantins-São Francisco connection where the group would have found congenial habitats during wetter climatic episodes. Vanzolini (1974) speaks of a broad continuity which probably existed between the Atlantic and Amazonian forests in relatively recent times.

The São Francisco basin shows higher faunistic similarities with the southeastern than with the northeastern river basins (Fowler, 1954). The remarkable impoverishment of the northeastern fauna may be due to modern climatic conditions; it is known (Ab'Saber, 1957) that the present temporary drainage was preceeded by a system of permanent rivers. The rapid change of regimes imposed strong demands on local *Parotocinclus*: at this time probably occurred the most important evolutionary transformations that gave origin to the species of the *spilosoma* group.

It is impossible to say at present whether the species of *Parotocinclus* in the northeast of Brasil originated from one single invasion, followed by radiation, or are the result of adaptations of several migratory waves. This study does not permit to fully understand the phylogenetic relationships between these two groups of *Parotocinclus;* perhaps karyotipic or electrophoretic data may better reveal the relationships.

ACKNOWLEDGEMENTS

The present study was supported by the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), grant "Biológicas 68/231 and 69/122". Dr. Heraldo A. Britski has provided continuing orientation and encouragement in the study of the Loricariidae. I am indebted to Dr. Paulo E. Vanzolini, Dr. Naercio A. Menezes and José L. de Figueiredo, of the Museu de Zoologia da Universidade de São Paulo for help with the discussions, and other suggestions and comments on the manuscript.

For the loans of specimens I am grateful to Dr. Haroldo P. Travassos, for the excellent collection of Hypoptopomatinae of the Museu Nacional, Rio de Janeiro; Dr. James Böhlke of the Academy of Natural Sciences of Philadelphia, for the type material of *Plecostomus spilosoma* Fowler and *Plecostomus spirulus* Fowler; to Dr. Marinus Boeseman of the Rijksmuseum van Natuurlijke Historie of Leiden for paratypes of *Parotocinclus britskii* Boeseman.

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APPENDIX

List of localities, study material and numbers. The number of specimens and the range of standard length in mm are in parentheses. The 27 tables were deposited at the library of Museu de Zoologia da Universidade de São Paulo.

Parotocinclus cristatus

MNRJ 10122-10132 (11, 25-35)— Brasil, *Bahia*, Ilhéus, Fazenda Almada.

Parotocinclus amazonensis

MZUSP 10145 (1, 15)— Brasil, *Amazonas*, Rio Solimões, Ilha Sorubim.

Parotocinclus spilurus

ANSP 69404-69408 (5, 27-29)— Brasil, *Ceará*, Icó, Rio Salgado.

Parotocinclus jimi

MZUSP 12133-12152 (21, 32-37)— Brasil, *Bahia*, Itagibá, Rio de Contas.
MZUSP 12154 (194)— same data

Parotocinclus doceanus

MZUSP 1016, 2698, 8059-8060 (4, 25-31)— Brasil, *Espírito Santo*, Rio Doce.

Parotocinclus maculicauda

MNRJ 10079-10080 (2, 43-43)— Brasil, *Santa Catarina*, Joinville.
MZUSP 8031-8038 (8, 33-42)— Brasil, *Santa Catarina*, Ibirama.
MZUSP 8039-8058 (20, 20-51)— Brasil, *São Paulo*, Juquiá, Fazenda Poço Grande.
MZUSP 8678 (4)— Brasil, *Rio de Janeiro*, Estrada Itaguaí-Raiz da Serra km 7, Córrego da Lagoa Nova.
MZUSP 8679 (24)— Brasil, *Rio de Janeiro*, Estrada Itaguaí-Raiz da Serra úm 5, Ribeirão da Ponte do Teixeira.
MZUSP 8680 (30)— Brasil, *Rio de Janeiro*, Estrada do Marapicu, Córregos afluentes do Prata-Mendanha.
MZUSP 10124-10144 (21, 15-39)— same data.
MNRJ 10098 (1, 41)— Brasil, *Rio de Janeiro*, Itaguaí.
MNRJ 10092-10097 (6, 36-45)— Brasil, *Rio de Janeiro*, Tinguá.
MNRJ 4961, 10082-10091 (11, 26-38)— Brasil, *Rio de Janeiro*, Queimados, Rio Camboatá.
MNRJ 6211, 10099-10118 (29, 36-47)— Brasil, *Espírito Santo*, São João de Petrópolis.
MNRJ 5118, 10120 10121 (3, 37-43)— Brasil, *Espírito Santo*, Santa Tereza, Rio Perdido.

Parotocinclus britskii

RMNH 26924 (2, 21-23)— Surinam, Nickerie River, 12 km of Stondansi Falls.

Parotocinclus cearensis

MNRJ 10155-10176 (20, 23-35)— Brasil, *Ceará*, Ipu, Cachoeira do Gusmão.
MNRJ 8689 (105)— same data.
ANSP 69414-69416 (3, 34-41)— Brasil, *Ceará*, Rio Choró.

Parotocinclus minutus

MNRJ 10133-10135 (3, 19-24)— Brasil, *Bahia*, Canudos, Rio Vasa-Barris.

Parotocinclus spilosoma

ANSP 69411-69413 (3, 28-36)— Brasil, *Paraíba*, Campina Grande.

Parotocinclus cesarpintoi

MNRJ 10136-10154 (19, 26-45)— Brasil, *Alagoas*, Quebrângulo, Rio Paraíba.
MNRJ 1153, 1154 (62)— same data.

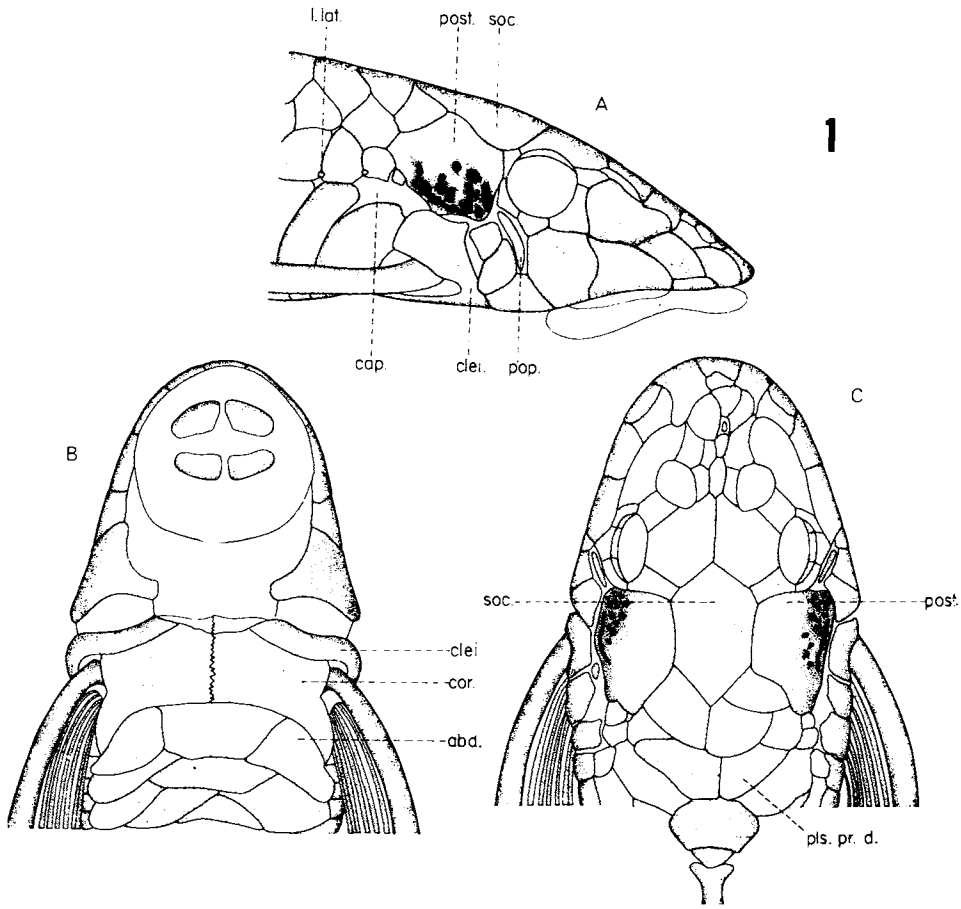


Fig. 1. Head plates of *Parotocinclus maculicauda* (Steindachner) MZUSP 8037, 40 mm of standard length. Lateral view: *cap.* opening of air-bladder capsule; *clei.* cleithrum; *l.lat.* lateral line; *pop.* preopercle; *post.* postemporal plate; *soc.* supra-occipital. Ventral view: *abd.* abdominal plates. Dorsal view: *pls. pr. d.* predorsal plates.

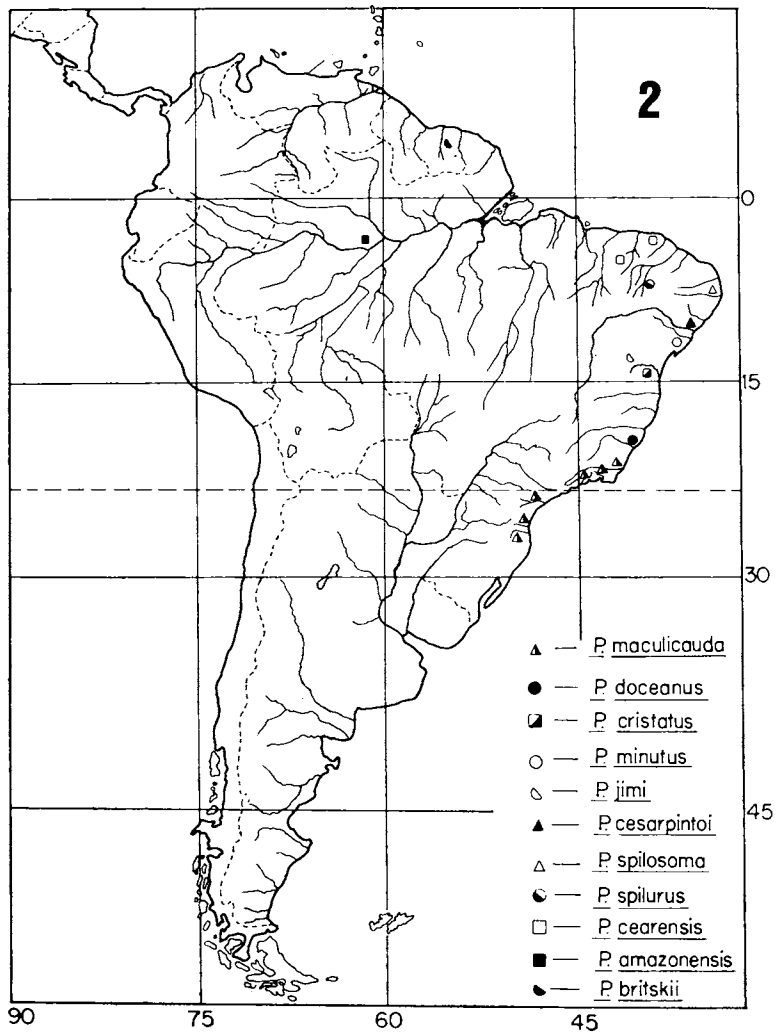


Fig. 2. Geographic distribution of *Parotocinclus* Eigenmann & Eigenmann.

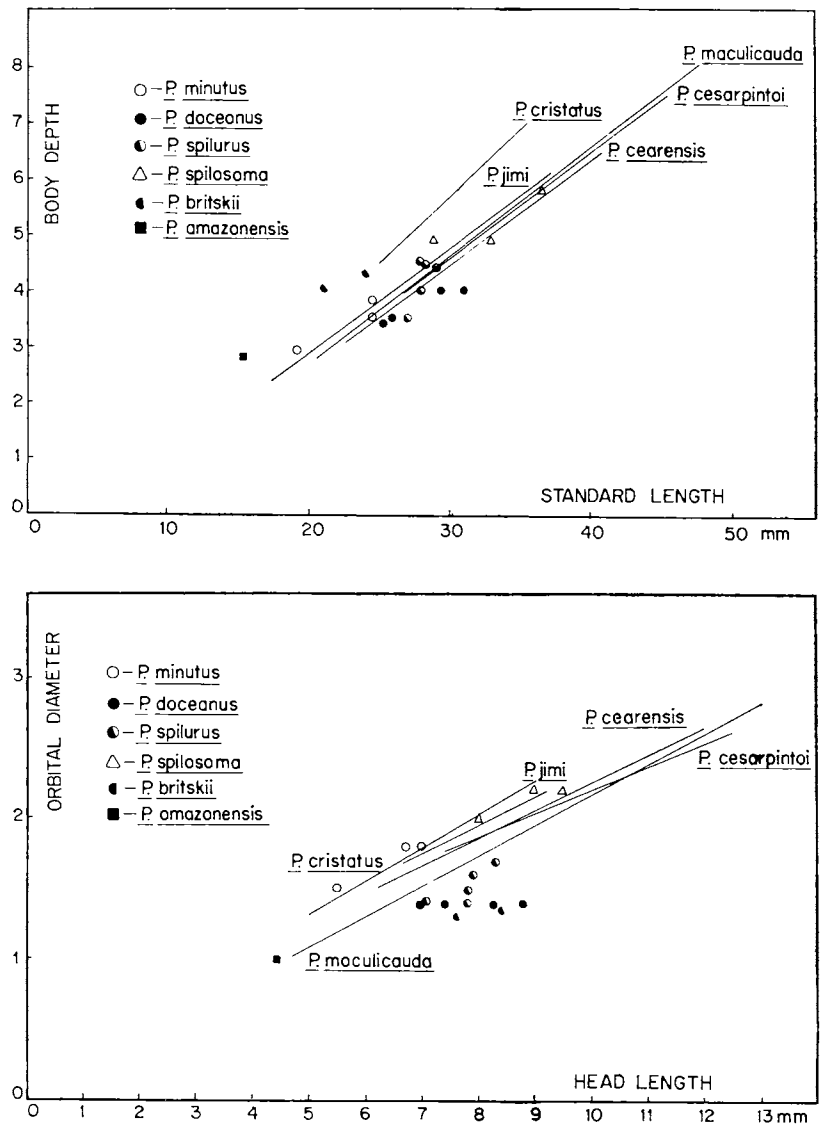


Fig. 3. *Parotocinclus* Eigenmann & Eigenmann. Linear regressions of body depth on standard length and orbital diameter on head length.

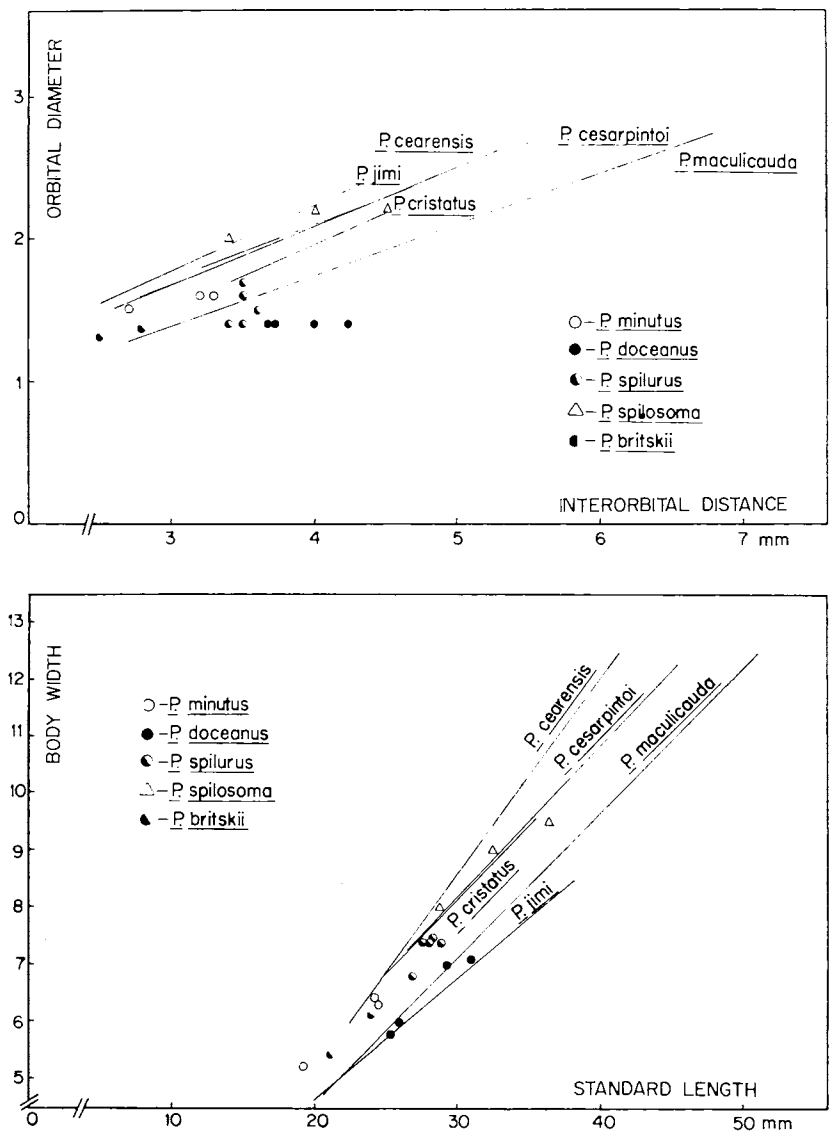
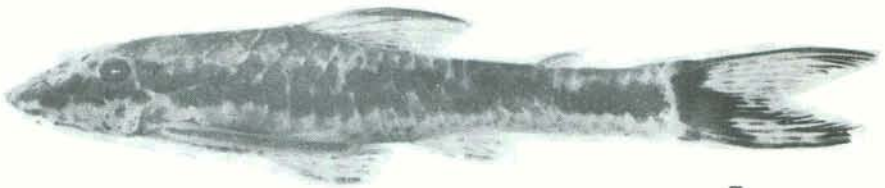


Fig. 4. *Parotocinclus* Eigenmann & Eigenmann. Linear regressions of orbital diameter on interorbital distance and body width on standard length.



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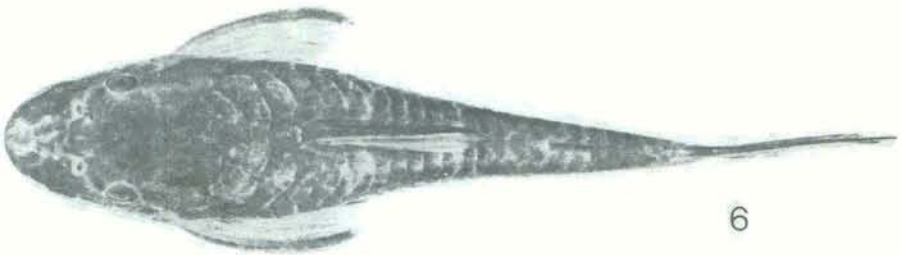

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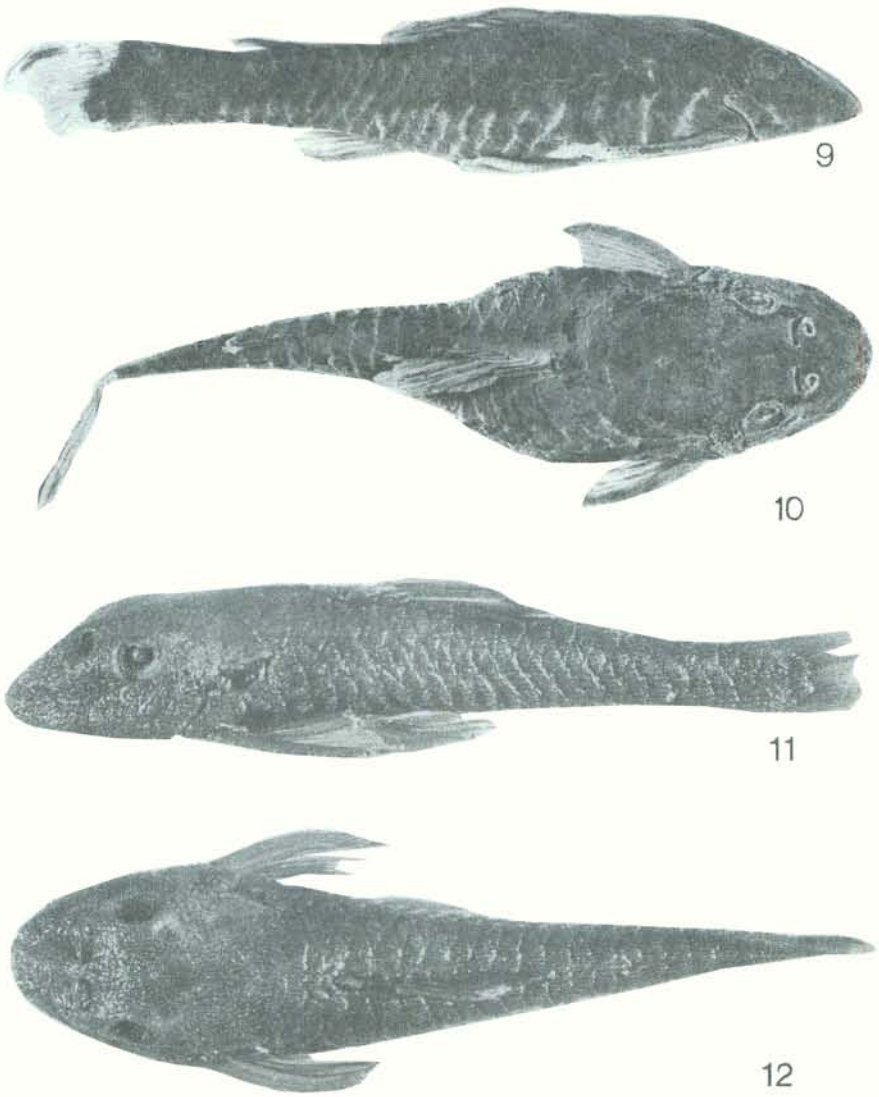
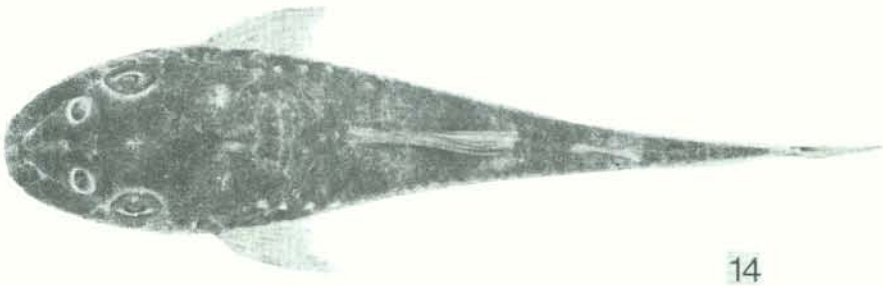
Parotocinclus. Figs 5-6: *maculicauda* (Steindachner), MZUSP 8058, 51 mm. Figs. 7-8: *doceanus* (Ribeiro), MZUSP 2698, 25 mm.



Parotocinclus. Figs. 9-10: *cristatus*, sp. n., MNRJ 10132, 35 mm. Figs. 11-12: *spilosoma* (Fowler), ANSP 69413, 36 mm.

13



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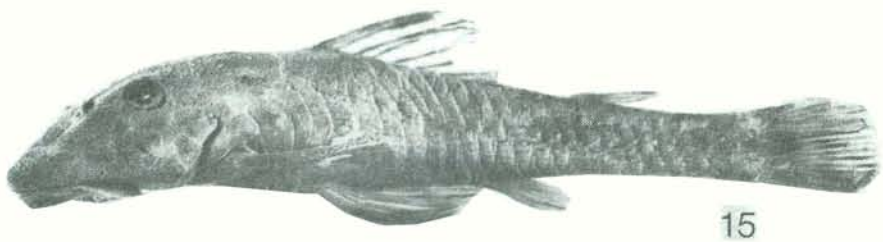

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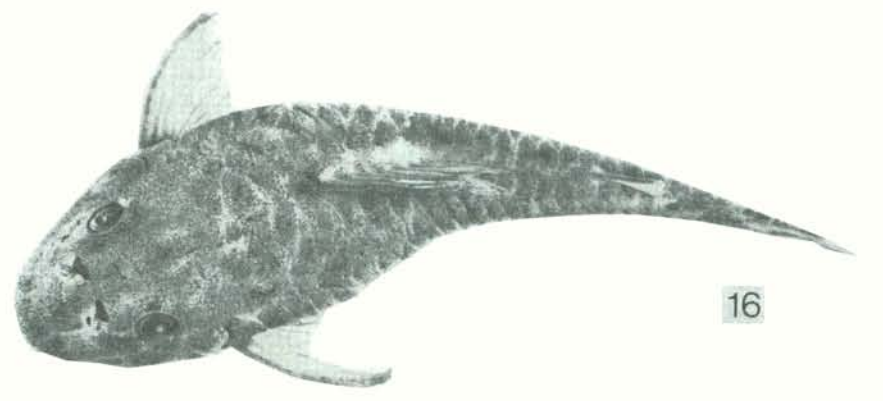
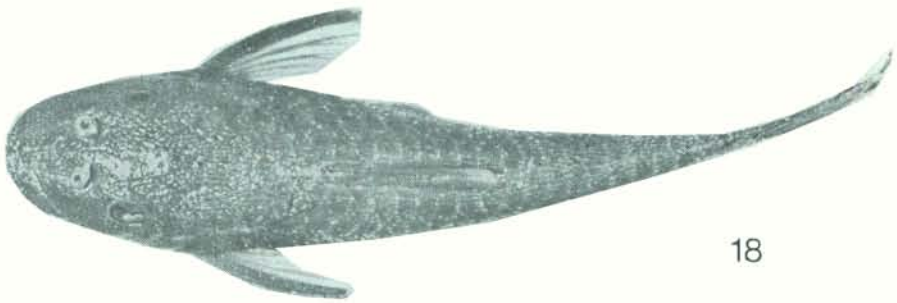


16

Parotocinclus. Figs. 13-14: *minutus*, sp. n., MNRJ 10314, 24 mm.
Figs. 15-16: *cesarpintoi* Ribeiro, MNRJ 10151, 42 mm.

17



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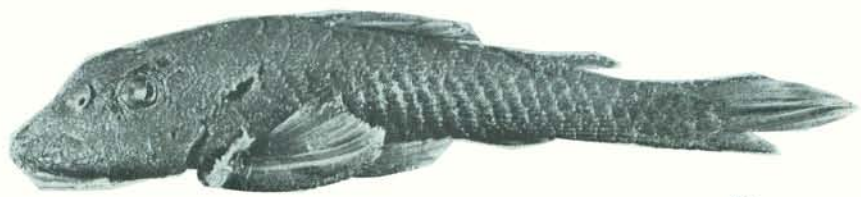

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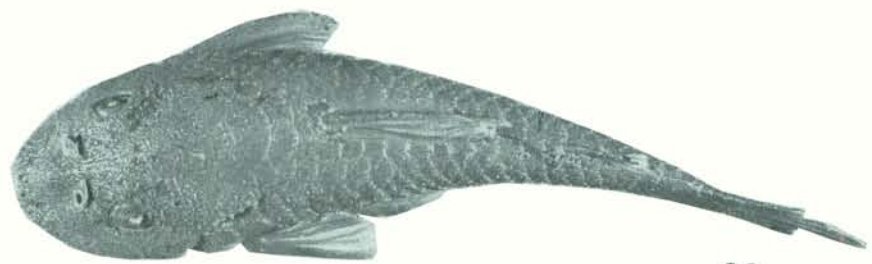

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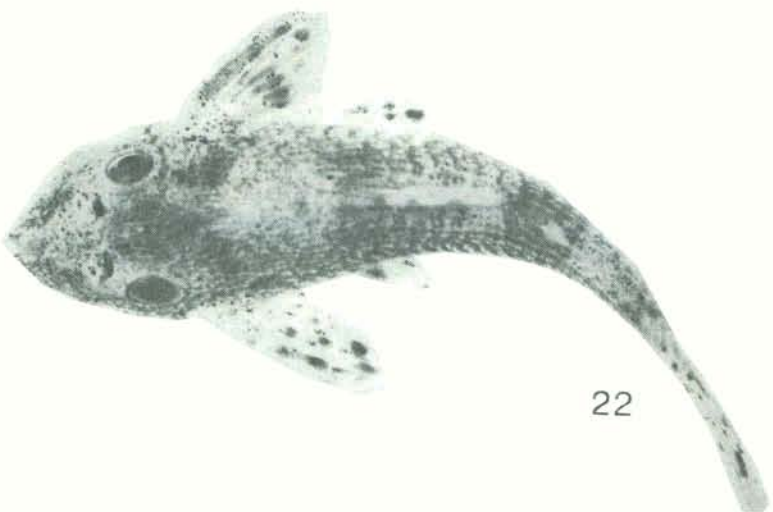
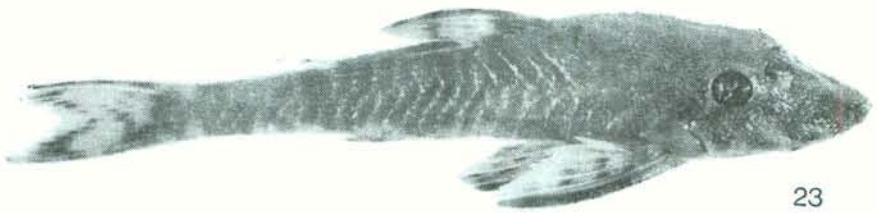
Parotocinclus. Figs. 17-18: *spilurus* (Fowler), ANSP 69407, 29 mm. Figs. 19-20: *cearensis*, sp. n., MNRJ 10176, 35 mm.

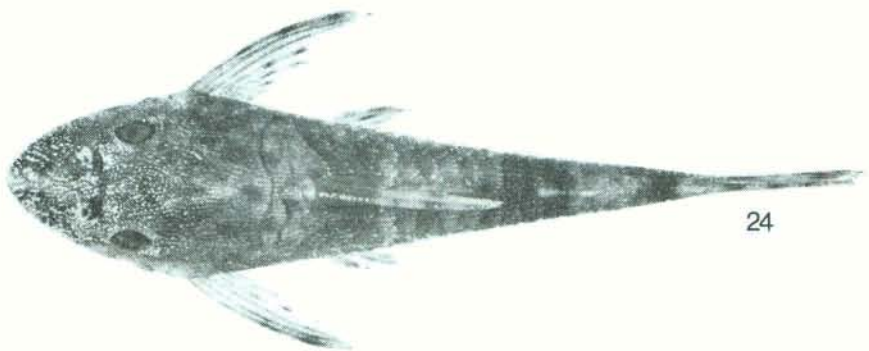
21

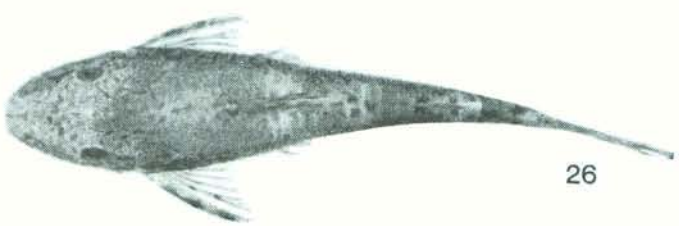


22

Figs. 21-22: *Parotocinclus amazonensis*, sp. n., MZUSP 10145, 15 mm.







Parotocinclus. Figs. 23-24: *britskii* Boeseman, RMNH 26924, 23 mm. Figs. 25-26: *jimi,* sp. n., MZUSP 12133, 33 mm.

TABLE 1

Features	Groups	
	maculicauda	spilosome
Denticles of rostral margin	strong and large	small and feeble
Postemporal perforations	large, occupying ca. 3/4 of the area	small, occupying ca. 1/2 of the area
Abdomen	covered by plates and (or) platelets	with large naked areas
Head and trunk	slightly compressed	slightly depressed
Position of orbit	nearly lateral	nearly superior
Lateral dark band	conspicuous	unconspicuous
Environment	streams to 1,5m deep	shallow streams and creeks
Substrate	generally submerged vegetation	generally rocks on the bottom