

Two new species of *Aguarunichthys* from the Amazon basin (Siluroidei: Pimelodidae)

Jansen A. S. Zuanon *, Lúcia H. Rapp Py-Daniel * and Michel Jégu **

Two new species of *Aguarunichthys* are described and compared with *A. torosus*. *Aguarunichthys tocantinsensis*, new species, from the Tocantins River, differs from *A. torosus* by having a larger orbital diameter, overlapping branchiostegal membranes, distance between snout tip and anterior nostrils less than distance between anterior and posterior nostrils, and distance between snout tip and posterior nostrils less than distance between posterior nostrils and posterior edge of orbital rim. *Aguarunichthys inpai*, new species, from the Solimões River, differs from the other two species by having a broader head, smaller eyes and a wider mouth.

Introduction

Aguarunichthys torosus has been described by Stewart (1986) based on a single specimen from the Peruvian Amazon; it is distinguishable from other pimelodid genera by the unusual shape of the air bladder, which has finger-like projections on its posterolateral margin and anterior tubular extensions, and by a subterminal mouth with broad premaxillaries ending in posterolateral extensions.

Recently, collections made in the Solimões River, Marchantaria Island, and on the rocky bottom of the Tocantins River (Fig. 1) resulted in the discovery of specimens of *Aguarunichthys* which turned out to represent two undescribed species.

Material and methods

Measurements and counts follow Stewart (1986). Institutional abbreviations: INPA, Instituto Nacional de Pesquisas da Amazônia, Manaus; LACM, Los Angeles County Museum, Los Angeles; MNHN, Muséum National d'Histoire Naturelle, Paris; MZUSP, Museu de Zoologia da Universidade de São Paulo, São Paulo. Other abbreviations: HL, head length; SL, standard length. The description of colouration is based on both fresh and preserved specimens of *A. tocantinsensis* and on the preserved holotype of *A. inpai*.

* SCT/Instituto Nacional de Pesquisas da Amazônia, Caixa Postal 478, CEP 69011 Manaus, Amazonas, Brazil

** Convênio ORSTOM/CNPq/Instituto Nacional de Pesquisas da Amazônia, Caixa Postal 478, CEP 69011 Manaus, Amazonas, Brazil.

21 OCT 1994
 O.R.S.T.O.M. Fonds Documentaire
 N° : 40659
 Cote : B Ex 1 P5 M

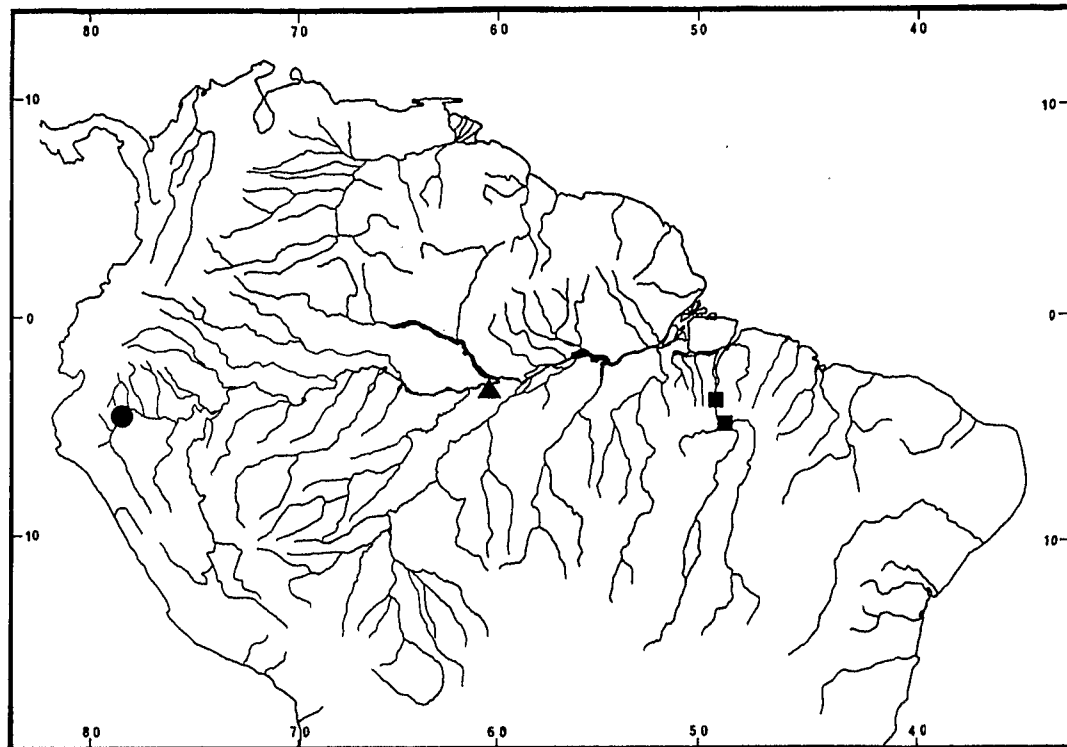


Fig. 1. Type localities of *Aguarunichthys torosus* (circle), *A. inpai* (triangle) and *A. tocantinsensis* (squares).

Key to the species of *Aguarunichthys*

1. - Head and body robust, stout (head width 84.9 % HL, 24.0 % SL); mouth width 55.5 % HL; eye small (orbital diameter 6.3 % HL, 1.8 % SL); cream coloured with faint small dark spots on head and body (Solimões River).
..... *A. inpai*
- Head and body elongate (head width 66-70 % HL, 18-21 % SL); mouth width 37-45 % HL; head and body olive-brown with large darker spots.
..... 2
2. - Interdorsal distance (distance between dorsal and adipose fin) 10.0-12.6 % SL; eye large (orbital diameter 11.6-14.6 % HL; 3.2-4.0 % SL) (Tocantins River).
..... *A. tocantinsensis*
- Body more elongate (interdorsal distance 9.5 % SL); eye small (orbital diameter 8.2 % HL; 2.1 % SL) (Cenepa River).
..... *A. torosus*

Aguarunichthys tocantinsensis, new species
(Fig. 2a)

Holotype. INPA 5400, 301 mm SL; Brazil: Pará State: Tocantins River drainage, rapids above Marabá; M. Jégu, 21 November 1990.

Paratypes. BRAZIL: PARA STATE: INPA 5399, 3, 211-317 mm SL; Tocantins River drainage, below the Tukurui dam, rotenone; M. Jégu, September 1984. - INPA 5401, 3, 240-295 mm SL; Tocantins River drainage, rocky ponds below the Tukurui dam, just after closing the dam; G. M. dos Santos, November 1984. - MZUSP uncat., 1, 282 mm SL, MNHN uncat., 1, 211 mm SL; Tocantins River drainage, below the Tukurui dam, rotenone; M. Jégu, September 1984.

Diagnosis. *Aguarunichthys tocantinsensis* is distinguished from the other species of the genus by presenting a larger orbital diameter (3.2-4.0 % SL, vs. 2.1 % SL in *A. torosus* and 1.8 % SL in *A. inpai*), a smaller interdorsal distance (10.0-12.6 % SL, vs. 9.5 % in *A. torosus* and

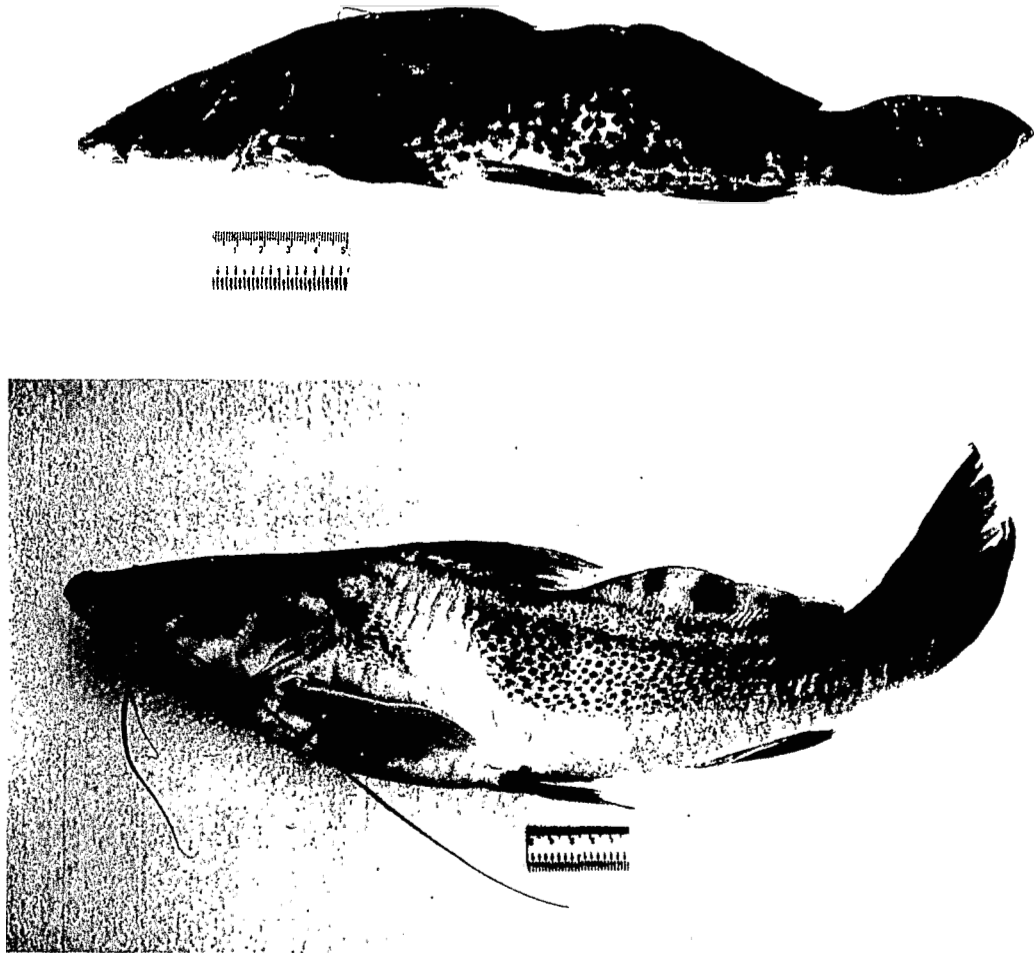


Fig. 2. a, *Aguarunichthys tocantinsensis*, paratype, INPA 5399, 317 mm SL; b, *A. inpai*, holotype, INPA 5398, 420 mm SL (rightside, reversed).

7.1 % in *A. inpai*), and a smaller internares distance (4.3-4.9 % SL, vs. 5.1 % SL in *A. torosus* and 5.5 % SL in *A. inpai*).

Description. Morphometric and meristic data are presented in Tables 1 and 2. Ventral profile of body almost straight; dorsal profile strongly ascending from tip of snout to dorsal fin origin, horizontal till anterior third of adipose fin, and then, gradually descending till end of caudal peduncle. Head longer than wide, weakly depressed. Cephalic lateral line system well developed, although more conspicuously seen on snout and on infraorbital region. Some projec-

tions of cephalic lateral line system run along supraoccipital process, almost parallel to it. Eye large, in a latero-superior position. Anterior nostril closer to snout than to posterior nostril and at the same level of insertion of maxillary barbel. Posterior nostril, anteriorly surrounded by dermal flap, closer to tip of snout than to posterior edge of orbital rim. Supraoccipital process long and narrow, in contact with predorsal plate. Only one detectable fontanelle, long, extending from just behind posterior nostrils to about posterior edge of orbit. Mouth distinctly subterminal, with mouth opening slightly arched. Maxillary barbel reaching posteriorly to

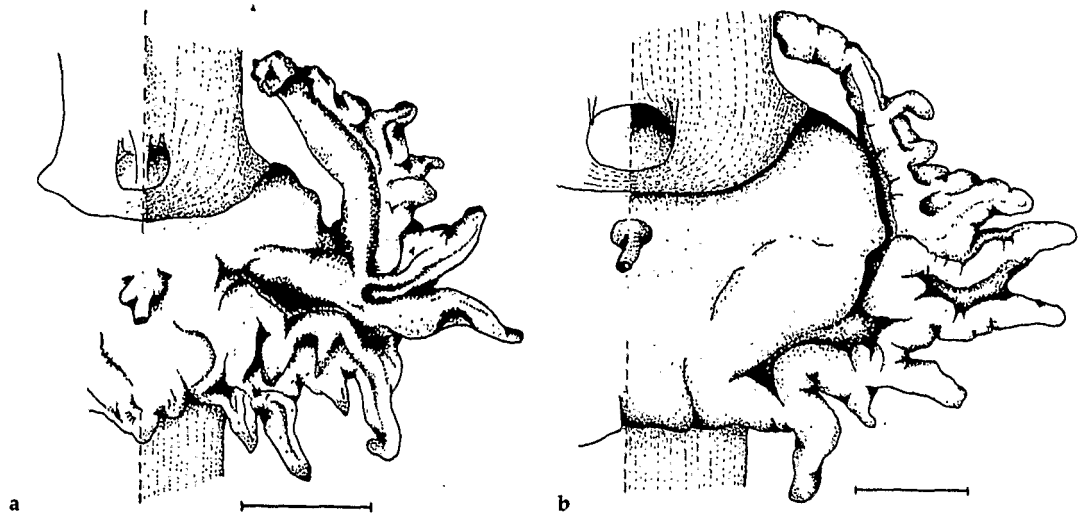


Fig. 3. Ventral view of left half of air-bladder of: a, *Aguarunichthys tocantinsensis*, INPA 5399, 280 mm SL; b, *A. inpai*, holotype, INPA 5398, 420 mm SL. Scale bars: 5mm.

approximately second third of adipose fin. In smallest specimens (below 245 mm SL), maxillary barbel can reach beyond adipose fin. Outer mental barbel reaching middle of pectoral spine; inner mental barbel generally extending to pectoral origin. Branchiostegal membranes overlapping at midline. Gill rakers, on first left branchial arch: ventral limb with 1-3 rudimentary rakers and 10-11 normal rakers; dorsal limb with 4-5 rakers; total 15-18.

Air-bladder as in *A. torosus* (Fig. 3a)

Predorsal plate triangular, extending posteriorly on both sides of dorsal spine. First ray of dorsal fin present, weakly developed, but without locking mechanism. Posterior margin of dorsal fin straight to slightly concave. Dorsal spine flexible, not pungent, without serrations, and about as long as first branched ray. When depressed, tip of dorsal rays reaches beginning of adipose keel. Posterior margin of pectoral concave, its tip not pointed. Pectoral spine flattened dorso-ventrally, flexible, with about 65 weak serrae on posterior margin, larger and more densely concentrated on proximal half. Pectoral spine as long as first branched ray. Pectoral fin, when depressed, not reaching pelvic origin. Posterior margin of pelvic fin straight, with simple ray slightly longer than first branched ray. Posterior margin of anal conspicuously concave, with branched rays much long-

er than simple ones. Adipose base long and not connected to dorsal. Adipose fin higher at anterior third. Forked caudal fin, with dorsal lobe slightly longer and more pointed than ventral lobe. Caudal fin with 17 procurrent rays dorsally and ventrally. Total vertebrae countings 43-44 plus one for the PUI centra.

Coloration. Live specimen: head, body and fins brownish green with black spots. Barbels black.

Preserved specimens: dorsal surface light brown, with darker brown, rounded spots. Flanks spotted, the largest spots being on the middle portion of the sides; their size decreases anteriorly and posteriorly. All spots are smaller than eye diameter. Ventral surface cream coloured, without spots, but with melanophores dispersed around mouth and on infraorbital region. Small blotches around anal fin base, more numerous on ventral surface of caudal peduncle. Maxillary barbel brown dorsally and beige ventrally; mental barbels cream coloured with few melanophores on the base, more conspicuous on outer ones. Whole surface of fins brown with small dark spots. Posterior portion of caudal fin lighter and less conspicuously spotted. Both pectoral and pelvic fins more conspicuously spotted dorsally than ventrally.

Etymology. Named *tocantinsensis* after the river where the type series has been collected.

Discussion. Direct comparison between similar size specimens of *A. torosus* (346 mm SL) and *A. tocantinsensis* (317 mm SL) shows a clear differentiation. *Aguarunichthys tocantinsensis* has a larger eye (orbital diameter 11.6 % HL, vs. 8.2 % in *A. torosus*), a smaller interorbital distance (25.4 % HL, vs. 29.1 %), a stouter body (head length 27.3 % SL, vs. 25.2 %), a greater predorsal distance (37.5 % SL, vs. 34.7 %), more gill rakers (15-18, vs. 13-14), and more densely spotted body (Figs. 4-5).

Aguarunichthys tocantinsensis was collected in areas with strong currents and rocky bottom.

Most of the specimens were collected about 15 days after closing the Tucuruí dam, in the Tocantins River, when the riverbed was almost exposed. Intensive studies and collections were done 5 years before the closing of the dam but *A. tocantinsensis* was not found at that time. Even local fishermen were not familiar with this species. The discovery of fish species in the Rio Tocantins which had not been caught before the closing of the dam, as *Parancistrus aurantiacus* (Rapp Py-Daniel, 1988), *Sartor tucuruense* (Santos & Jégu, 1987), *Teleocichla cinderella* (Kullander, 1988), *Crenicichla* spp. (Ploeg, 1986) gives us new insights in the fish fauna of the rapids, a biotope strongly endangered by the construction of hydroelectric dams.

Table 1. Morphometric ratios of *Aguarunichthys torosus* (n=1), *A. tocantinsensis* (n=9) and *A. inpai* (n=1). Data in square brackets are for holotype.

character	<i>A. torosus</i>	<i>A. tocantinsensis</i>	<i>A. inpai</i>
standard length (mm)	346	211-317 [301]	420
percentage of standard length			
head length	25.2	26.5-28.2 [27.6]	28.3
body depth	17.6	17.3-22.5 [22.5]	23.3
predorsal length	34.7	35.7-37.7 [37.7]	36.0
prepelvic length	47.4	42.4-50.7 [49.5]	49.0
preanal length	70.2	68.3-72.1 [68.8]	70.0
interdorsal distance	9.5	10.0-12.6 [11.3]	7.1
dorsal spine length	20.3	19.6-22.5 [20.7]	22.6
pectoral spine length	21.4	20.2-23.6 [21.4]	22.6
1st ventral ray length	16.6	16.0-18.2 [17.2]	17.1
1st anal ray length	16.8	14.8-16.8 [16.8]	16.2
anal base length	11.7	10.4-12.7 [11.8]	12.6
adipose base length	35.8	32.4-35.7 [35.7]	33.3
caudal length (upper lobe)	23.7	19.9-29.8 [19.9]	26.9
caudal peduncle length	18.8	18.2-20.6 [19.4]	20.6
caudal peduncle depth	8.2	8.0- 9.6 [9.6]	9.5
head width	18.4	18.1-21.6 [21.1]	24.0
head depth	14.1	13.2-16.1 [15.5]	16.7
snout length	13.6	14.0-15.3 [15.3]	15.5
orbital diameter	2.1	3.2- 4.0 [3.5]	1.8
interorbital distance	7.3	6.2- 7.5 [7.5]	7.9
internares distance	5.1	4.3- 4.9 [4.8]	5.5
bucal width	9.8	10.1-12.1 [10.6]	15.7
percentage of head length			
head width	72.3	66.7-77.6 [76.5]	84.9
head depth	55.8	48.6-58.2 [56.0]	58.8
orbital diameter	8.2	11.6-14.6 [12.8]	6.3
interorbital distance	29.1	22.9-27.2 [27.2]	27.7
snout length	53.8	52.1-55.4 [55.4]	54.6
bucal width	38.9	37.3-45.3 [38.6]	55.5
premaxilar width	32.3	32.7-35.8 [33.0]	37.8

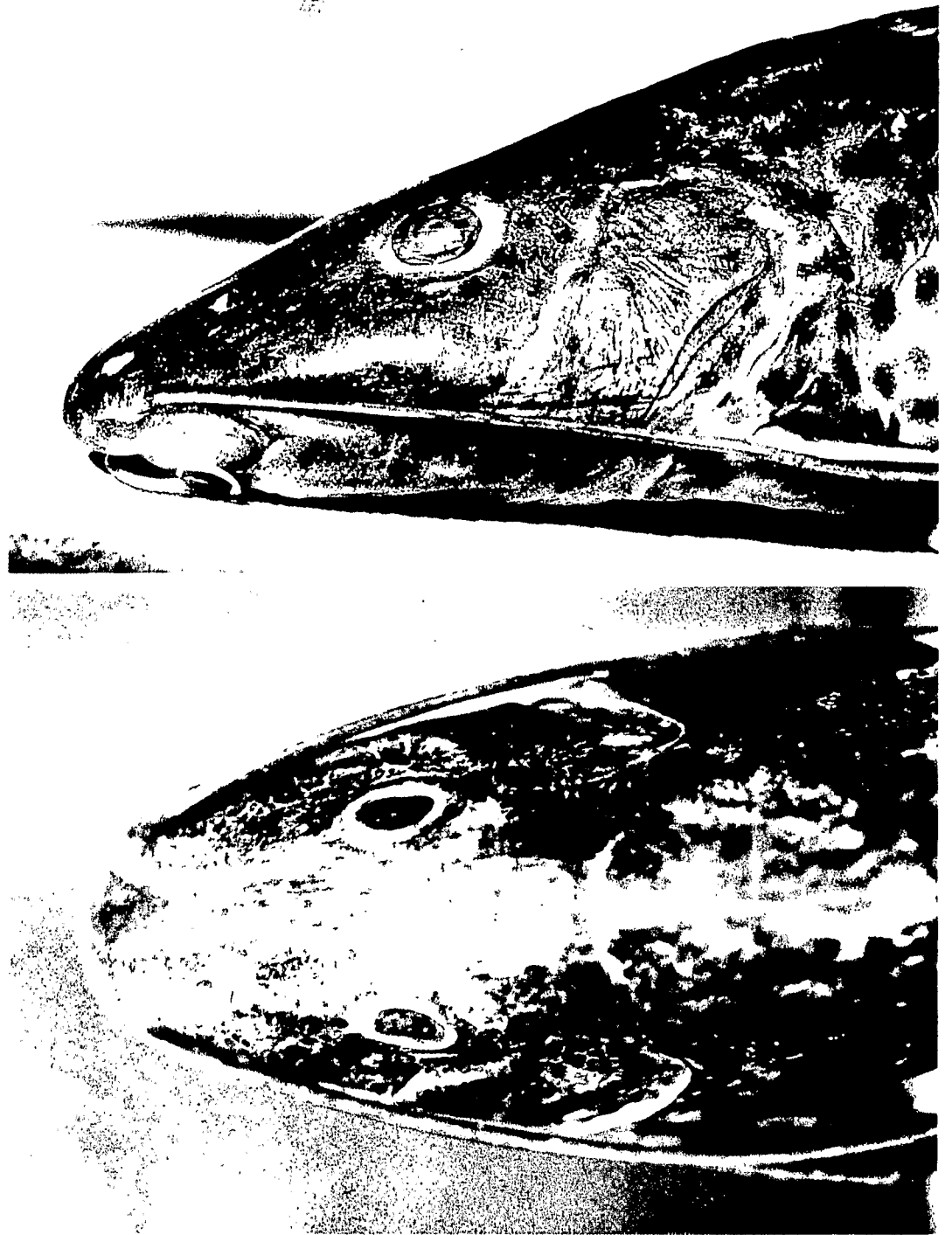


Fig. 4. Head of *Aguarunichthys tocantinsensis*, INPA 5401-1, 295 mm SL)

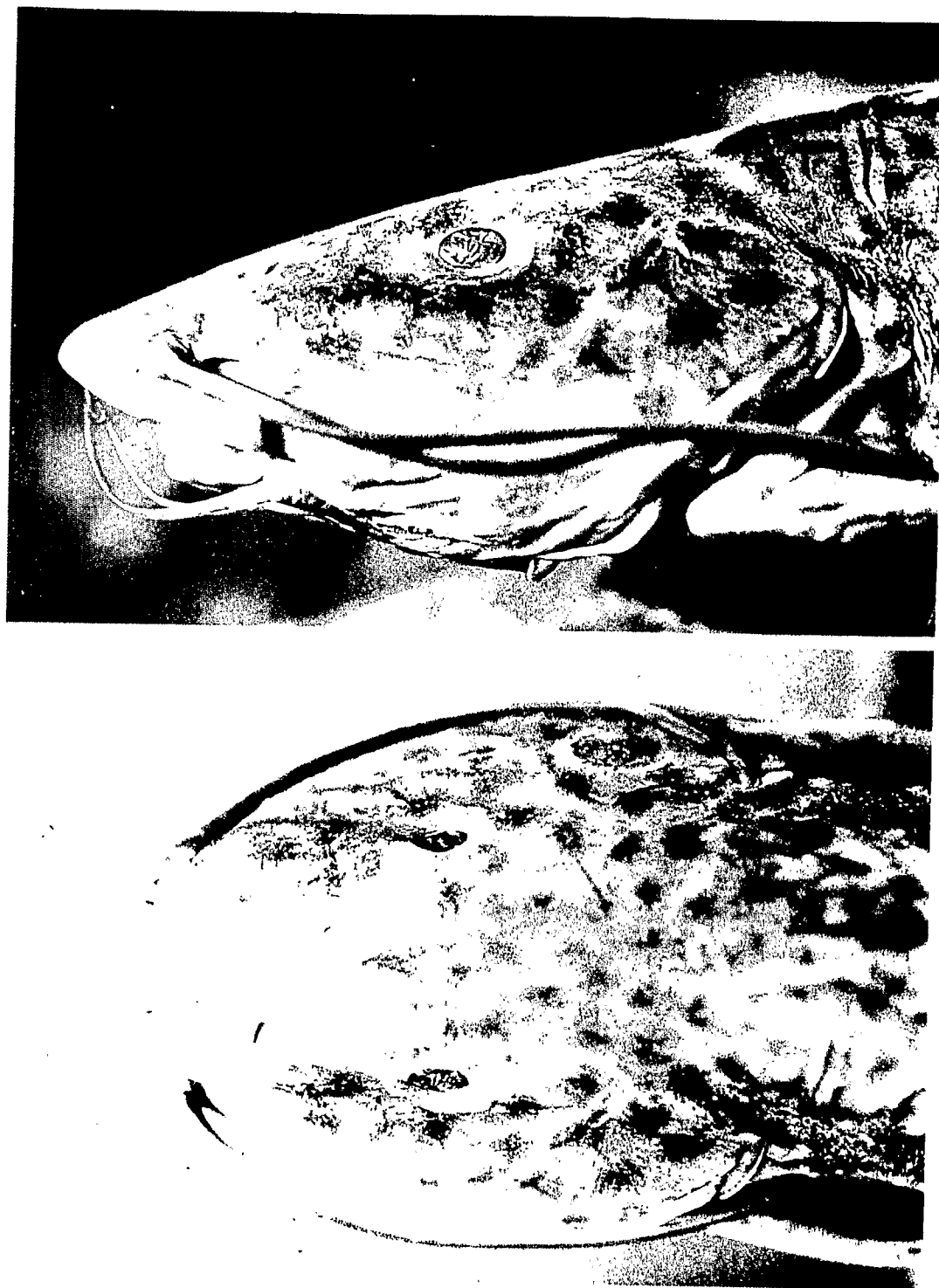


Fig. 5. Head of *Aguarunichthys torosus*, holotype, LACM 39651, 346 mm SL.

Aguarunichthys inpai, new species
(Fig. 2b)

Holotype. INPA 5398, 420 mm SL; Brazil: Amazonas State: Solimões River drainage, north of the Marchantaria Island, at about 15 km above confluence with Rio Negro drainage, bottom trotline; J. Zuanon, 27 September 1988.

Diagnosis. *Aguarunichthys inpai* is distinguished from the other two species by having a smaller eye (orbital diameter 6.3 % HL, vs. 11.6-14.6 % HL in *A. tocantinsensis* and 8.2 % HL in *A. torosus*), a broader and more depressed head (head width 84.9 % HL, vs. 66.7-77.6 % HL in *A. tocantinsensis* and 72.3 % HL in *A. torosus*; head depth 58.8 % HL, vs. 48.6-58.2 % HL in *A. tocantinsensis* and 55.8 % HL in *A. torosus*), a wider mouth (mouth width 55.5 % HL, vs. 32.7-35.8 % HL in *A. tocantinsensis* and 32.3 % HL in *A. torosus*), and a fainter spotted color pattern.

Description. Morphometric and meristic data are presented in Tables 1 and 2.

Specimen robust, stout, with dorsal profile slightly ascending from tip of snout to origin of dorsal fin and then descending towards caudal peduncle. Head broad and depressed. Cephalic lateral line system well developed, with strong radiation on infraorbital region. Some projections of the cephalic lateral line system run parallel to supraoccipital process. Eye small, in supero-lateral position. Interorbital region almost plain. Snout broad. Anterior nostril tubular, directed forward and situated at the same level as maxillary barbel. Distance from anterior nostril to tip of snout approximately as long as distance between anterior and posterior nostril. Posterior nostril with anterior semicircular flap of skin. Distance from posterior nostril to tip of snout longer than distance between posterior

nostril and posterior edge of orbital rim. Fontanelle narrow and elongate anteriorly, beginning close to level of posterior nostril and extending to level of posterior margin of orbital rim. Supraoccipital process long and narrow, in contact with predorsal plate. Mouth distinctly subterminal, with upper lip well developed. Premaxillary tooth plate broad and slightly arched, with lateral projections backwards, and partially exposed when mouth is closed. Dentary tooth plate narrower than premaxilla, enlarged on midline and pointed on the tips, which are directed postero-laterally. Maxillary barbel extending to about 75 % of adipose-fin base length. Outer mental barbel extending to half of pectoral spine length. Inner mental barbel extending to insertion of pectoral fin. Branchiostegal membranes slightly overlapping at midline. Gill rakers hard, with following disposition on first left gill arch: ventral limb with 1 rudimentary raker and 10 developed rakers, and dorsal limb with 4 rakers; total 15.

Air-bladder as in *A. torosus* (Fig. 3b).

Predorsal plate triangular, extending posteriorly on both sides of dorsal spine. First dorsal-fin ray present, but without locking mechanism. Posterior margin of dorsal fin slightly concave. Dorsal spine with distal third flexible, little longer than first branched ray. Dorsal spine without serrae. Posterior margin of pectoral fin concave. Pectoral spine flattened dorso-ventrally, with distal half flexible and as long as first branched ray. Anterior margin of pectoral spine smooth; posterior margin with about 100 weak and not pointed serrations (left side). Simple pelvic ray hard on base and one-third smaller than first branched ray. Simple anal ray smaller than first branched ray (last two anal rays united at the base and counted as one). Adipose base long and not connected to dorsal. Adipose fin higher at anterior third. Forked caudal fin, with dorsal

Table 2. Meristic data of *Aguarunichthys torosus* (n=1), *A. tocantinsensis* (n=9) and *A. inpai* (n=1). Data in square brackets are for holotype.

character	<i>A. torosus</i>	<i>A. tocantinsensis</i>	<i>A. inpai</i>
dorsal rays	I+6	I+6 [I+6]	I+6
pectoral rays	I+13	I+13 [I+13]	I+13
ventral rays	i+5	i+5 [i+5]	i+5
anal rays	v+9	v+7-9 [v+8]	v+9
caudal rays	i+8/7+i	i+8/7+i [i+8/7+i]	i+8/7+i
gill rakers (1st left arch)	14	15-18 [16]	15

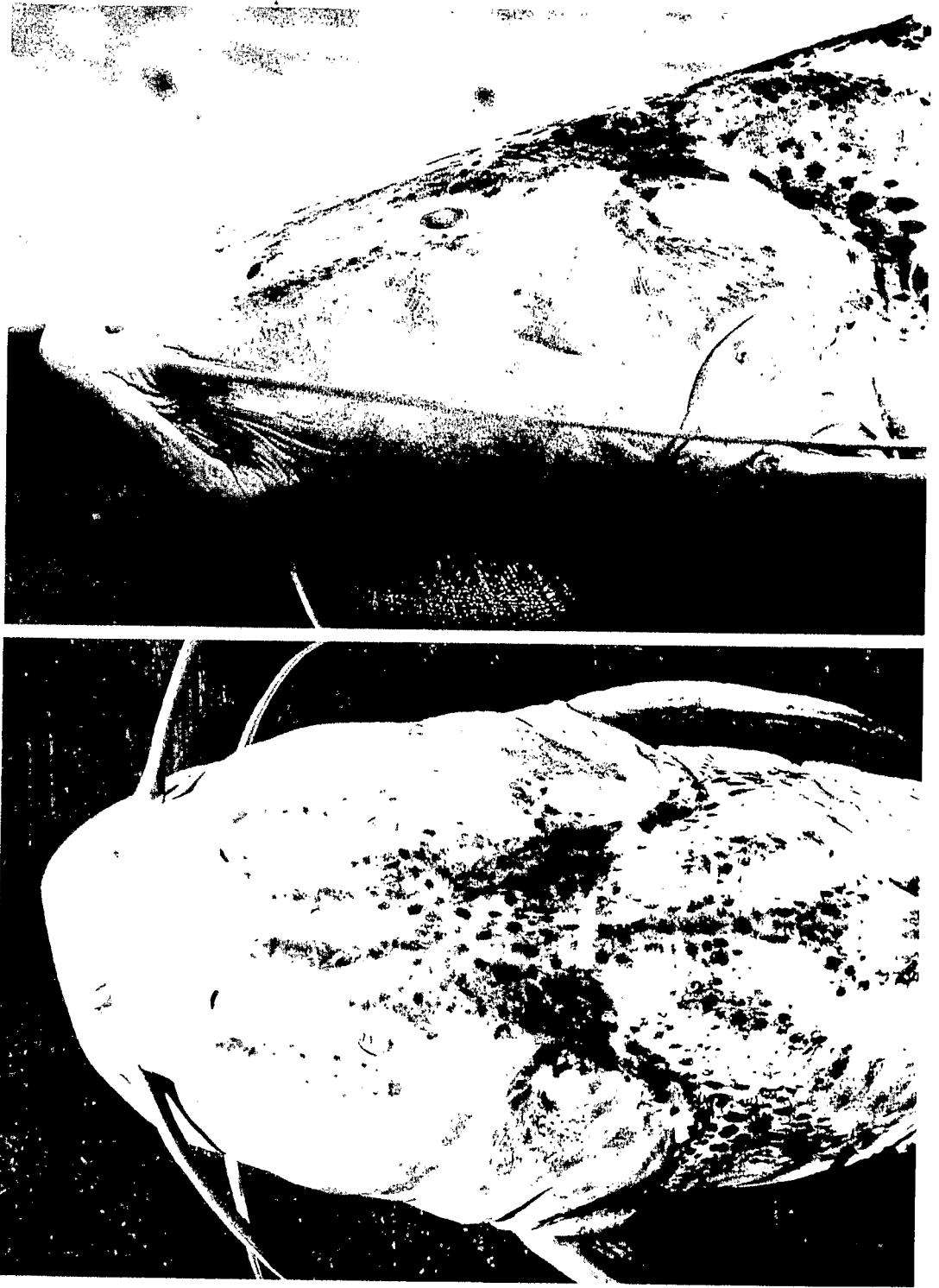


Fig. 6. Head of *Aguarunchthys impai*, holotype, INPA 5398, 420 mm SL.

lobe slightly longer and more pointed than ventral lobe. Caudal fin with 17 procurent rays dorsally and ventrally.

Coloration. Preserved specimens: body cream coloured, with several round brown spots, scattered on dorsal surface of head, predorsal region, base of dorsal fin and lateral surfaces of body. Largest spots equal to orbit diameter. Broad transversal unpigmented stripe at dorsal origin level. Base of flanks and ventral surface unpigmented. Dorsal fin yellowish white with small dark spots on the spine and on distal extremity of branched rays. Pectoral fin brownish grey dorsally, with small dark spots, and ventrally, yellowish white with hyaline stripe on posterior margin. Pelvic beige, with distal extremity of the rays darker, forming greyish stripe. Anal white, with first branched ray slightly greyish distally. Adipose whitish, showing narrow stripe on outer margin. Anteriorly, dorsal surface of adipose fin covered by diffuse inconspicuous small dark spots. Caudal unpigmented, whitish.

Etymology. *inpai*, latinization of the acronym INPA (Instituto Nacional de Pesquisas da Amazônia).

Discussion. Despite existing connections between the Solimões-Amazonas River and the Tocantins River, the differences found between *A. inpai* and *A. tocantinsensis* are evident enough to consider them as two different taxa. Besides, *A. tocantinsensis* was collected above rapids in the Rio Tocantins, a biotope characterized by a group of rheophilic species' (*Mylesinus paucisquamatus*, Jégu & Santos, 1988; *Harttia* spp., Rapp Py-Daniel et al., in prep.) and greatly differing from the habitat of *A. inpai*. *Aguarunichthys inpai* was collected at a depth of about 30 meters (dry season) in the Solimões River ("várzea" area); there, the riverbed consists of sediments.

Marchantaria Island, the type locality of *A. inpai*, is an area very close to Manaus that is overfished by local fishermen. Despite this fact, fishermen were not used to catch *A. inpai* (the same as with *A. tocantinsensis* and *A. torosus*). It may be the deep-bottom dwelling habits of these fishes that explain the rarity of their capture. It can be speculated that the amazing shape of the air-bladder of the *Aguarunichthys* species may

have provided them with a greater capability to survive in deep water.

Comparison material. *Aguarunichthys torosus*. LACM 39651-1, 346 mm SL, holotype; Peru: Departamento Amazonas: Rio Cenepa, 1.6 km west of Huampami and near to the peruvian military camp Chavez Valdivia, about 210 m asl, approx. 4°28'S 78°10'W; R. McDiarmid, 26 VII 1977.

Acknowledgments

Field work in Tocantins River drainage was funded by INPA/ELETRONORTE Convention and by INPA/ORSTOM Convention. Field work in the Solimões River, Marchantaria Island, was funded by INPA/Max-Planck Convention. We would like to thank J. Seigel, LACM, for the loan of the holotype of *A. torosus* and Labbish Chao for hand-carrying it. We are most grateful to Vernon Thatcher, INPA, for his endless patience in revising our English manuscript.

Literature cited

- Jégu, M. & G. M. dos Santos. 1988. Une nouvelle espèce du genre *Mylesinus* (Pisces, Serrasalminidae), *M. paucisquamatus* décrite du bassin du Rio Tocantins (Amazonie, Brésil). *Cybium*, 12: 331-341.
- Kullander, S. O. 1988. *Teleocichla*, a new genus of South American rheophilic cichlid fishes with six new species (Teleostei: Cichlidae). *Copeia*, 1988: 196-230.
- Ploeg, A. 1986. The cichlid genus *Crenicichla* from the Tocantins River, State of Pará, Brazil, with descriptions of four new species (Pisces, Perciformes, Cichlidae). *Beaufortia*, 36: 57-80.
- Rapp Py-Daniel, L. H. 1989. Redescription of *Parancistrus aurantiacus* (Castelnau, 1855) and a preliminary description of two new genera: *Baryancistrus* n.g. and *Oligancistrus* n.g. (Siluroidei; Loricariidae). *Cybium*, 13: 235-246.
- Santos, G. M. & M. Jégu. 1987. Novas ocorrências de *Gnathodolus bidens*, *Synaptolaemus cingulatus* e descrição de duas espécies novas de *Sartor* (Characiformes, Anostomidae). *Amazoniana*, 10: 181-196.
- Stewart, D. J. 1986. Revision of *Pimelodina* and description of a new genus and species from the Peruvian Amazon (Pisces: Pimelodidae). *Copeia*, 1986: 653-672.

Received 9 June 1992
Revised 27 August 1993
Accepted 12 October 1993