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Taxonomic Redefinition of the Species of *Acestrorhynchus* of the *microlepis* Group with the Description of *Acestrorhynchus apurensis,* a New Species from Venezuela (Ostariophysi: Characiformes: Characidae)

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ABSTRACT

The species of *Acestrorhynchus* of the *microlepis* group, characterized by the presence of a small, sometimes indistinct, black spot overlying the lateral line, posterior to the opercle, are redefined. *Acestrorhynchus guianensis* Menezes, 1969, is considered a junior synonym of *A. microlepis* (Schomburgk, 1841). New diagnoses and synonymies are provided and *Acestrorhynchus apurensis,* a new species from the Río Apure drainage system (Río Orinoco basin) in Venezuela, is described. A key to the species of the *microlepis* group is provided.

INTRODUCTION

The species of *Acestrorhynchus,* a genus of the characiform fish family Characidae, are widely distributed throughout the rivers of South America. This genus is distinguished from all other characiforms by at least two derived characters: (1) the rhinosphenoid is in contact with the parasphenoid and (2) there is an extension of the cephalic laterosensory canal into the premaxillary bone (Menezes and Géry, 1983).

Seventeen nominal species have been included in this genus, of which 15 are currently

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recognized (Menezes, 1969b, 1992; Menezes and Géry, 1983). The greatest species diversity occurs in the rivers of the Amazon and Orinoco basins and in the series of rivers that drain the Atlantic slopes of the Guianas. Three species occur outside those areas in the Rio São Francisco of Brazil and the Rio Paraná, Río Paraguay, and Río de La Plata drainage systems.

Acestrorhynchus species range from small to medium size, the largest reaching 400 mm in standard length (Mago-Leccia, 1970a). They inhabit mainly lentic habitats such as lagoons and areas near the river shore (Britski et al., 1986), and are predators, primarily of fishes (Menezes, 1969a; Nico and Taphorn, 1985; Amaral, 1990).

Although the phylogenetic relationships among the species of *Acestrorhynchus* require evaluation of characters via outgroup comparison (a task that is beyond the scope of this study), it is possible to tentatively recognize groups of species based on well-defined color patterns. These groupings might constitute monophyletic groups not yet cladistically diagnosed. One of these groups, the *microlepis* group that is the subject of the present study, is defined by the presence of a small, sometimes indistinct, black spot overlying the lateral line, immediately posterior to the opercle.

In the last major revision of *Acestrorhynchus,* Menezes (1969b) redescribed *A. microlepis* (Schomburgk, 1841) and described a new species, *A. guianensis.* More recently, Menezes and Géry (1983) described *A. grandoculis.* These three species with the distinctive black spot immediately posterior to the opercle, characteristic of the *microlepis* group, are distributed in the Amazon and Orinoco basins, and in the Atlantic versant of the Guianas.

Subsequent to the study of Menezes (1969b), there has been a considerable increase in the number of population samples of the genus available for study. Data collected from a larger sample size show that it is not possible to separate *A. guianensis* from *A. microlepis* based on characters previously defined by Menezes (1969b). This additional material revealed a high degree of overlap in scale counts, the primary character previously considered diagnostic across the geographic range of these forms. In addition, examination of these more recently collected specimens revealed the presence of an undescribed species.

The purpose of this study is to investigate and clarify the taxonomic status of *A. guianensis* and *A. microlepis*; to describe the newly discovered species; and to delimit the geographic distribution of the recognized species of the *microlepis* group.

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Materials and Methods

The present study is based on the analysis of meristic and morphometric characters. Counts and measurements were made on the left side of the specimens whenever possible. Measurements were taken with calipers and data recorded to tenths of a millimeter. Measurements of standard length, distance from eye to dorsal-fin origin, distance from dorsal- to caudal-fin origin, caudal peduncle length, and measurements referring to the origin of the fins were all made orthogonal to the main body axis and the remaining measurements were made point-to-point. Greatest body depth, snout length, orbital diameter, post-orbital distance, counts of caudal-fin rays, and maxillary and posterior dentary teeth follow Menezes (1969b). Distance from the dorsal-fin origin to the caudal-fin origin is measured from the anterior termination of the dorsal-fin base to the center posterior termination of the hypural fan (where the principal caudal-fin rays attach to the hypurals). Interorbital width is measured between the borders of the frontal bones at the anterior termination of the supraorbitals. Dorsal- and anal-fin bases were measured between the anterior and posterior termination of the fin base. Teeth on the mesopterygoid were observed only for their presence or absence. Gill rakers were counted on the ceratobranchial portion of the first gill arch. All other measurements and counts follow Fink and Weitzman (1974).

Samples from adjacent localities within single river drainages were initially compared. If no differences were observed they were grouped to form a larger sample. Samples from different rivers within the same river system were then compared and further grouped when no differences were observed. Finally, samples from different river systems were compared. In many instances however, samples from adjacent river systems were represented only by a few specimens. Therefore, in some cases, in order to gain a better understanding of the variation associated with each of the variables, we compared larger samples, even though they did not always originate from adjacent areas. Smaller samples were then successively added to the analysis.

Bivariate scatterplots were used in the analyses of the morphometric data, and frequency distributions were used in the analysis of the meristic data. No significant differences were found for most of the meristic and morphometric variables studied, except for scale counts in *A. microlepis,* discussed below. An analysis of variance (ANOVA) was performed on the frequency distributions of lateral-line scales in this species to test for differences among samples; a frequency distribution table of this variable in different river drainages throughout the distributional range of *A. microlepis* is presented. A Tukey test was further performed to ascertain which means differed significantly from others.

Measurements are presented as proportions of standard length (SL) expressed as percentages, except for subunits of the head, which are presented as percentages of head length (HL). Individual counts and measurements are given only for the holotypes (including data for the holotypes of junior synonyms), with the remaining specimens represented by the sample range of the variable. Means and standard deviations are also presented for all counts and measurements.

Sex of specimens was determined by examination of their gonads under magnification. Data from males, females, and juveniles were analyzed separately but are grouped in the tables. Variables in which differences were found between males and females are discussed under the Sexual Dimorphism section of each species account.

The Material Examined section of each species account is arranged in the following sequence: total number of specimens examined, and in parentheses, the number of specimens from which counts and measurements were taken, and their range of standard lengths (in mm). The lots were grouped according to country and, within each country, the river

system where the specimens were collected, followed by institutional abbreviation, catalog number, number of specimens in the lot, and their range of standard lengths (in parentheses), state, province, department or district (for states within Brazil, only abbreviations are given), and more specific locality data. In the synonymies for each species, localities are presented as originally cited, followed by modern or corrected equivalents, in parentheses, if that differs.

Institutional abbreviations

AMNH	American Museum of Natural History, New York
ANSP	Academy of Natural Sciences of Philadelphia
BMNH	The Natural History Museum, London
FMNH	Field Museum of Natural History, Chicago
INPA	Instituto Nacional de Pesquisas da Amazônia, Manaus
MCNG	Museo de Ciencias Naturales de la UNELLEZ, Guanare
MNRJ	Museu Nacional, Rio de Janeiro
MZUSP	Museu de Zoologia da Universidade de São Paulo
ROM	Royal Ontario Museum, Toronto
TNHC	Texas Memorial Museum, Austin
USNM	National Museum of Natural History, Smithsonian Institution, Washington, D.C.

SPECIES ACCOUNTS

Acestrorhynchus microlepis (Schomburgk, 1841)

Figures 1–3; tables 1–3

Hydrocyon microlepis Schomburgk, 1841: 247 (not plate 25) (original description, type locality: Essequibo River).

Xiphorhamphus microlepis: Müller and Troschel, 1845: 18 (description, Guiana [= Guyana]); 1848: 636 (Pomeroon, Essequibo, Rupununi, Takutu [rivers]). — Günther, 1864: 355 (description; 3 specimens cited: two from British Guiana [= Guyana], presented by Sir R. Schomburgk and one from the Essequibo River). — Steindachner, 1883: 14 (description, Rio Huallaga and Amazonas [Iquitos]). — Eigenmann and Eigenmann, 1891: 58 (reference). — Puyo, 1949: 136, fig. 69 (description, French Guiana: Maroni River, common name: "dent chien").

Xiphorhynchus falcatus: (not Bloch, 1794: 120) Valenciennes, 1849: 337 (in part, Mana [?]).

Xiphorhynchus microlepis: Valenciennes, 1849: 342 (description, Guyana).

Acestrorhynchus microlepis: Eigenmann, 1910: 447 (reference); 1912: 408 (description and diagnosis, Guiana [= Guyana]). — Cockerel, 1914: 111, pl. XXV, fig. 7 (scale morphology). — Di Caporiacco, 1935: 66 (Amazon, Essequibo, Demerara [rivers], common name: "mura"). — Eigenmann and Allen, 1942: 276 (synonymy). — Campos, 1945: 478 (diagnosis). — Fowler, 1945: 173 (reference); 1950: 324 (synonymy). — Boeseman, 1952: 191 (Surinam [= Suriname] River, common name: "dagu fisi," "zadu"). — Fernández-Yépez, 1955: 4 (diagnosis, Venezuela). — Lüling, 1962: 46, fig. 10 (Peru). — Géry, 1964: 31 fig. 24 (diagnosis, Peru). — Lowe McConnell, 1964: 142 (ecology, British Guiana [= Guyana]: Rupununi District). — Menezes, 1969a: 219, table (stomach contents, Brazil: Pará and Amazonas); 1969b: 62, fig. 50 (description, diagnosis, synonymy, geographic distribution). — Mago-Leccia, 1970b: 69 (species list, Venezuela, common name: "care'perro, picúa"). — Ovchynnyk, 1971: 95, fig. 6, table 8 (synonymy, meristic and morphometric data, Ecuador). — Fowler, 1975: 120 (reference). — Cala, 1977: 6 (species list, Colombia: Orinoco Basin). — Géry, 1977: 330, fig. p. 317 (key to species). — Junk et al., 1981: table 11 (Brazil: Central Amazon, Rio Curuá-Una). — Menezes and Géry, 1983: 590 (key to species, new records of distribution, Brazil: Pará and Amazonas). — Santos et al., 1984: 39, figure (description, Brazil: Pará, Rio Tocantins, common name: "ueua, cachorrinho"). — Nico and Taphorn, 1985: 794 (in part; stomach contents, Venezuela: Estado Apure, Río Apure-Orinoco Basin). — Ortega and Vari, 1986: 7 (list of species, based on the literature, Peruvian Amazon). — Lowe McConnell, 1991: table 1 (ecology, Brazil: tributaries of Rio Araguaia and Rio Xingu). — Taphorn, 1992: 104, fig. 67 (description, diagnosis, geographic distribution in Río Apure drainage, Venezuela).

Acestrorhynchus cachorro Fowler, 1939: 274, fig. 61 (original description, type locality: Ucayali River basin, Boca Chica, Peru). — Eigenmann and Allen, 1942: 276 (reference). Campos 1945: 479 (reference). — Fowler, 1945: 172 (reference); 1950: 322, fig. 383 (reference). — Géry, 1972: 29 (description). — Böhlke, 1984: 44 (species mentioned in catalog of type specimens).

Acestrorhynchus guianensis Menezes, 1969b: 70, fig. 54 (original description, type locality: Botanic Garden [British] Guyana [= Guyana] [trenches in Georgetown with water from the Demerara River]). — Menezes and Géry, 1983: 590, tables 5 and 7 (key to species, meristic and morphometric

TABLE 1

Meristics for (A) holotype of *Acestrorhynchus guianensis* FMNH 74359; (B) holotype of *A. cachorro* ANSP 68679; (C) all specimens of *A. microlepis* from which counts were taken (with the exception of the holotypes of *A. guianensis* and *A. cachorro,* and MZUSP 37919, see text for discussion); (D) all specimens of *A. grandoculis* from which counts were taken; (E) holotype, MZUSP 48373; (F) paratypes, MZUSP 37269, UNELLEZ 11323, TNHC 14872; and (G) all specimens of *A. apurensis* from which counts were taken (with the exception of holotype).

(Values for each count are, respectively, the range, mean, and standard deviation.)

	A	B	C	D	E	F	G
Lateral-line scales	98	112	96–123	77–87	114	103–115	102–115
			109.1	81.8		107.6	108.0
			5.36	2.62		.56	3.81
Scales above lateral line	19	20	16–25	14–19	—	—	23–24
			20.4	16.7			23.5
			1.63	.87			.58
Scales below lateral line	13	—	11–18	9–13	—	14	14–18
			14.8	10.5			16.0
			1.34	.97			1.58
Scales around caudal peduncle	28	—	25–35	22–27	31	30–34	30–35
			29.6	23.5		31.8	31.9
			1.99	1.19		1.32	1.32
Branched anal-fin rays	25	27	22–31	24–29	26	24–28	24–28
			27.1	25.7		25.8	25.8
			1.41	1.00		1.03	1.09
Branched pectoral-fin rays	14	16	10–18	11–16	13	10–13	10–14
			14.8	13.6		11.5	11.9
			1.18	1.15		1.07	1.24
Teeth on dentary	11	11	6–15	10–20	7	4–11	4–11
			11.0	14.6		7.4	7.7
			1.58	1.96		1.71	1.82
Maxillary teeth	23	24	14–33	26–48	14	10–21	10–21
			22.2	36.6		14.2	14.9
			3.16	4.2		3.16	3.01
Gill rakers on ceratobranchial	—	16	14–20	13–18	—	14–17	14–18
			16.4	14.9		14.5	15.8
			1.25	.97		1.23	1.54

data). — Géry, 1977: 327 (key to species); Géry et al., 1991: 42 (French Guyana [= French Guiana]: Oyapock and Approuage rivers). NEW SYNONYMY.

DIAGNOSIS: *Acestrorhynchus microlepis* differs from *A. grandoculis* in having more scales along the lateral line (96–123 vs. 77–87, respectively). The species have somewhat overlapping numbers of scales above and below the lateral line and around the caudal peduncle, and overlapping number of teeth on the posterior part of the dentary and on the maxilla, but they demonstrate significantly different mean values for these meritic values (table 1). The two species also differ in orbital diameter (22.9–34.1 vs. 31.3–41.5, respectively) and snout length (32.0–42.4 vs. 27.6–37.6, respectively). In *A. microlepis* the distance from the eye to the dorsal-fin origin is greater than the distance from the latter to the caudal-fin origin while in *A. grandoculis* the opposite occurs.

Acestrorhynchus microlepis differs from *A. apurensis* in the relative length of the snout (32.0–42.4 vs. 41.5–46.5, respectively), head (24.9–31.4 vs. 31.4–34.0, respectively), and orbital diameter (22.9–34.1 vs. 20.9–24.0, respectively). When specimens of *A. microlepis* only within the known size range of *A. apurensis* are compared, there is no overlap in orbital diameter (24.1–32.3 vs. 20.9–24.0, respectively, in specimens of *A. microlepis* less than 80 mm in standard length and *A. apurensis*).

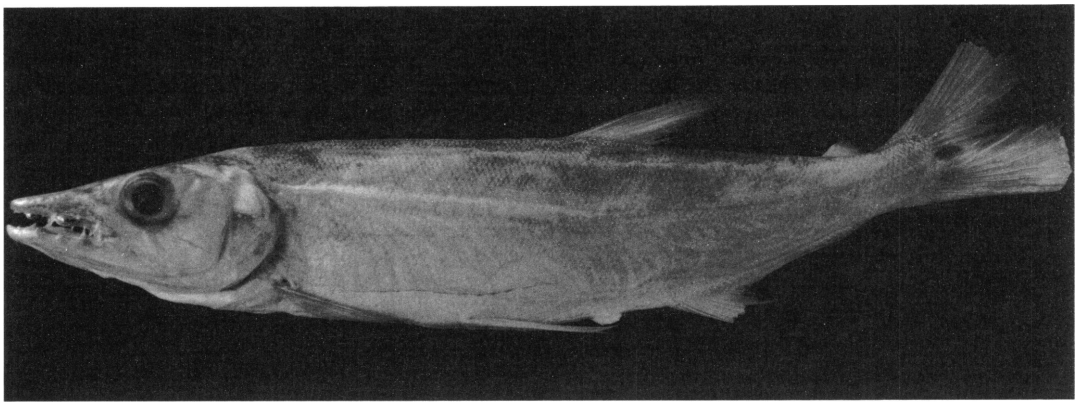

Fig. 1. *Acestrorhynchus microlepis,* MZUSP 34971, 157 mm SL, Brazil, Amazonas, Rio Negro, Anavilhanas.

DESCRIPTION: Body moderately large, elongate, and compressed laterally, females reach a larger maximum size than males (260 mm vs. 168 mm SL, respectively). Dorsal profile of head straight from tip of snout to tip of supraoccipital spine, sometimes a little depressed in region of snout. Dorsal profile of body slightly convex from tip of supraoccipital spine to caudal peduncle. Ventral profile of body slightly curved from tip of lower jaw to caudal peduncle. Snout pointed, its length 32.0–42.4 of HL. In females, snout length always longer than orbital diameter (22.9–31.7 of HL). In males snout length varies from shorter to longer than orbital diameter (24.8–34.1 of HL). Lower jaw slightly shorter than upper jaw, two anteriormost canine teeth on upper jaw visible laterally when mouth fully closed. Premaxilla with 1 canine tooth anteriorly, followed by 5–12 small conical teeth, another canine tooth longer than first, and 1 (rarely 2) small conical tooth slightly longer than anterior ones. Dorsolateral part of each premaxilla with two foramina which receive first two teeth of dentary. Anterior portion of maxilla with 1 canine tooth followed by 3 (rarely 2 or 4) conical teeth slightly longer than those of premaxilla, another canine tooth slightly longer than anterior one, and another small conical tooth. Posterior portion of maxilla situated beneath first infraorbital, with 14–33 small conical teeth. Dentary with 1 conical tooth anteriorly, followed by 4 canines separate from each other and slightly different in size; first and third about same size and larger than second and fourth. First and second canine teeth with 2 (sometimes 3) small intervening conical teeth along same line formed by canine teeth; slightly internal to these 1–7 small conical teeth (sometimes covered by skin) form rudimentary inner row.

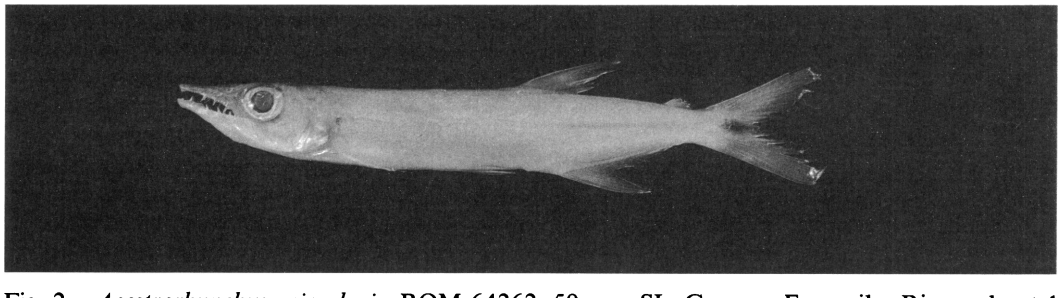

Fig. 2. *Acestrorhynchus microlepis,* ROM 64262, 59 mm SL, Guyana, Essequibo River, about 1.6 km downstream from Tambikabo inlet.

Dentary with series of 6–15 small conical teeth posteriorly. Ectopterygoid with row of small closely set conical teeth highly variable in number, smaller than those in upper and lower jaws. Mesopterygoid with small, elongate to oval-shaped patch of very small conical teeth. Ceratobranchial of first gill arch with 14–20 gill rakers. Gill rakers spiny, with surface almost entirely covered with small spines and prominent spine on dorsal edge of each gill raker; prominent spine less evident on gill rakers situated on anterior part of gill arch. Scales small, 96–123 in lateral line, 16–25 longitudinal scale rows between lateral line and dorsal-fin origin, 11–18 between lateral line and anal-fin origin, 25–35 around caudal peduncle. Origin of dorsal fin situated posterior to midlength of body, between vertical through pelvic- and anal-fin origins. Dorsal fin with ii, 9 rays, its distal edge concave. Distance from eye to dorsal-fin origin always greater than distance from latter to caudal-fin origin. Anal fin falcate; tips of first branched rays extending beyond midlength of anal-fin base when fin depressed. Anal-fin origin slightly posterior to vertical through posterior end of dorsal-fin base. Anal fin with v (sometimes vi), 22–31 rays, without hooks or spines on rays in males. Pelvic fin pointed in profile distally. Relative pelvic-fin length variable, tips of longer rays usually reaching anterior margin of anus, and extending beyond anus (but not reaching anal-fin origin) in some larger specimens (SL > 200 mm). Pelvic-fin rays i, 7. Distance from snout to pelvic-fin origin 47.0–53.6 of SL. Pectoral fin pointed in profile distally, tip of longest pectoral-fin ray not reaching pelvic-fin origin. Pectoral-fin rays i, 10–18. Caudal fin forked, ventral caudal-fin lobe usually slightly longer than dorsal. Caudal-fin rays i, 17, i. Adipose fin well developed, situated on vertical through posteriormost rays of anal fin.

COLOR IN ALCOHOL: Ground coloration light brown to yellowish. Darker on top of head, snout, dorsal surface of body, particularly along dorsal midline. Ventral half of opercle and subopercle silvery or punctuated with brown pigment. Dorsolateral surface of body darker than ventrolateral surface. Abdominal region of body pale. A narrow silvery white band (in those specimens lacking guanine layer, band of dark pigmentation) along midlateral surface of body. Very small, sometimes indistinct, dark blotch immediately posterior to opercle, on lateral line. Black spot on base of caudal-fin usually nearly round but sometimes horizontally oblong. All fins with scattered brown pigmentation, especially dorsal, pectoral, and caudal fins. In many specimens dark pigment faded, particularly in the pelvic and anal fins. Tip of dorsal fin usually dark. In many specimens tips of caudal-fin rays dark, forming narrow marginal stripe.

SEXUAL DIMORPHISM: The number of females present in the samples examined is much larger than that of males. Some samples consisted only of females. Of the 553 specimens in which the gonads were examined 325 are females, 137 males, and 64 juveniles. It was not possible to determine the sex with certainty in 27 specimens.

One sample from Rio Amapá, in northern Brazil (MZUSP 34969, SL 90–134 mm), however, has 13 males and 10 females. In this sample all the males have a larger orbital diameter (31.2–34.1) and a shorter snout (32.0–34.2) when compared to the females (28.8–31.4 and 35.4–37.7, respectively) (figs. 3, 4). The males are also, on the average, smaller than the females (SL 90.0–119.0 and 105.0–134.0 mm, respectively). None of the males have anal fin hooks as occurs in some characiforms.

Sexual dimorphism was also observed in samples from other localities (e.g., from Rio Negro, Rio Tapajós, and Rio Capim in the Amazon Basin). However, in these samples the differences were not found in all males and females examined. In some samples (e.g., from Rio Tocantins, Rio Xingu, Rio Madeira) no differences were found between males and females.

When specimens from the entire range of species distribution are grouped, there is a large overlap between males and females in orbital diameter (25–34.1 and 23.5–31.7, respectively) and snout length (31.4–39.8 and 32.9–41.2, respectively).

DISTRIBUTION: *Acestrorhynchus microlepis* is widely distributed throughout the rivers of the Amazon and Orinoco basins and in the series of rivers that drain the Atlantic slopes of the Guianas (fig. 5).

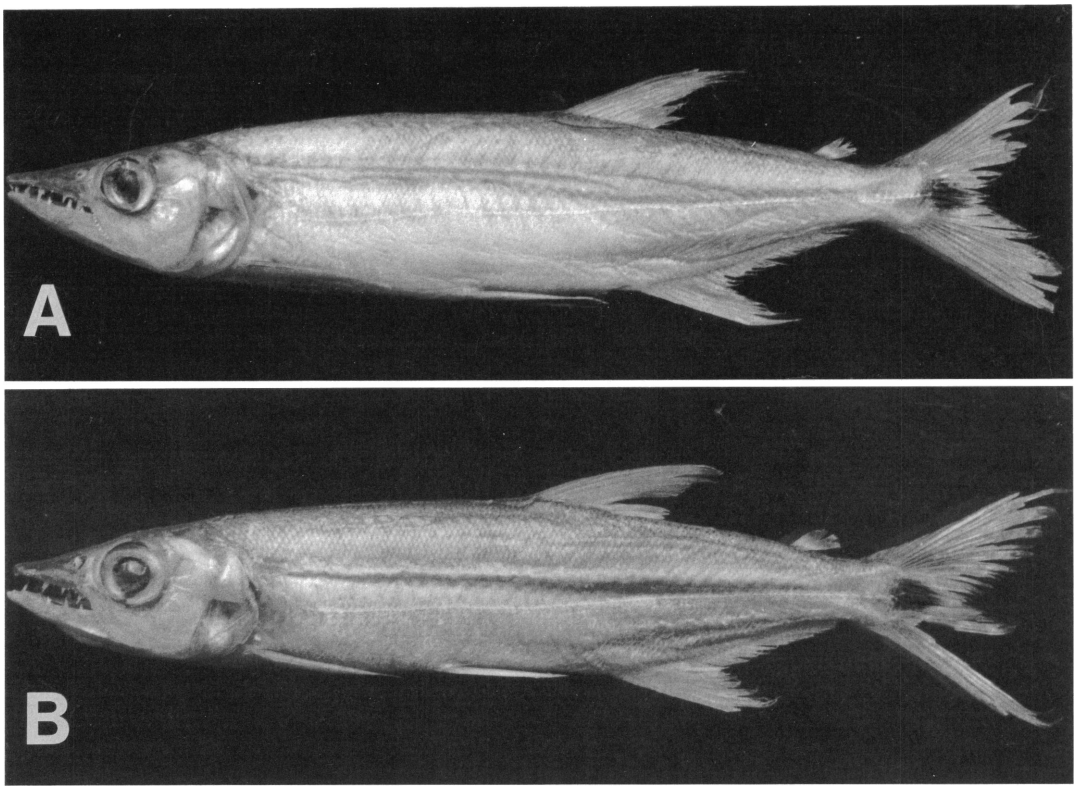

Fig. 3. *Acestrorhynchus microlepis,* MZUSP 34969, Brazil, Amapá, Amapá (city), flooded savanna; **A,** female, 121 mm SL; **B,** male, 105 mm SL.

GEOGRAPHIC VARIATION: Specimens from the Rio Negro system have the black spot on the base of the caudal fin more horizontally elongate than does material from the remainder of the species range.

A large range of variation in the meristic data for this species was observed (table 1). However, no pattern of meristic variation (with the exception of scale counts, discussed below) was found to conform to any simple geographic pattern, the lowest and highest values in most instances being from adjacent areas and in some cases the same locality.

Table 2 shows the frequency distribution of lateral-line scales of various populations of *A. microlepis.* Although the range of variation is wide, specimens from the rivers of Amapá state in northern Brazil, and the Rio Capim, Pará state, tend to have fewer lateral-line scales relative to specimens from the Rio Tefé, in the upper Amazon Basin. However, this pattern is obscured when specimens from the other tributaries of the Amazon are included in the analyses. Lateral-line scale counts for these specimens are intermediate between the groups with high and low counts. The ANOVA performed on the frequency distributions of lateral-line scales showed significant differences among the means of the different populations of *A. microlepis* [$F.0005(13)(524) = 20.903$; $P < 0.001$]. The Tukey test indicated that the population from the Rio Amapá drainage is significantly different from the populations from the other drainages in the number of lateral-line scales.

Seven specimens from one sample (MZUSP 37919) collected at the Rio Mucuim, a tributary of the Rio Purus in the Amazon Basin, show slightly higher values of scale counts (120–131, 26–30, 16–20, and 36–39, respectively in, above, and below the lateral line and around the caudal peduncle, vs. 96–123, 16–25, 11–18, 25–35 in samples from

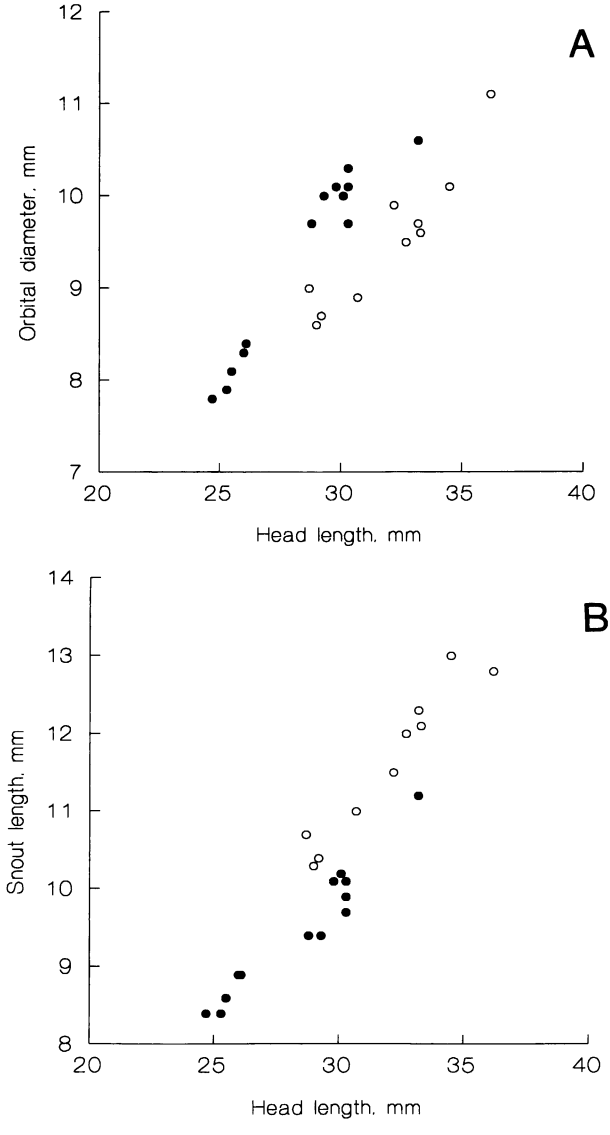

Fig. 4. Plots of: **A,** orbital diameter; **B,** snout length, both against head length, and in millimeters, for males (filled circles) and females (open circles) of *Acestrorhynchus microlepis* (MZUSP 34969) from Rio Amapá, Amapá State, Brazil.

the remainder of the species range). The nonoverlap in the number of scales above the lateral line and around the caudal peduncle between these two groups, may suggest that the sample from the Rio Mucuim represents an undescribed species. We have decided not to recognize those specimens as a different species, based on: (1) small sample size; (2) the slight overlaps in the number of lateral-line scales and scales below the lateral line; (3) the large degree of variation in scale counts in other larger population samples, and (4) all other meristic and morphometric data are included within the range of variation of *A. microlepis*. This was the only sample examined from well within the Rio Purus system. The closest locality from which another sample was examined lies at the

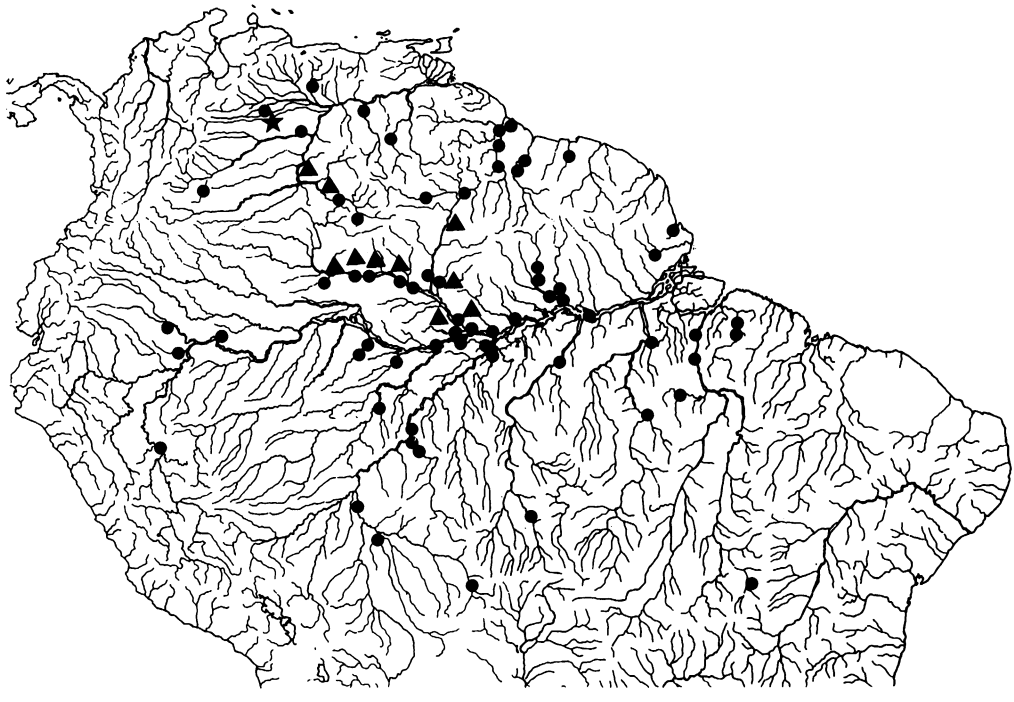

Fig. 5. Map of central and northern portions of South America showing geographic distribution of *Acestrorhynchus microlepis* (filled circles), *A. grandoculis* (triangles), and *A. apurensis,* new species (star). Some symbols represent more than one lot of specimens or localities.

mouth of Rio Purus (MZUSP 6289). The meristic and morphometric data taken from this sample (9 specimens) are included within the range of variation in *A. microlepis.* Until more specimens from the region become available for study, we choose to tentatively assign the specimens from Rio Mucuim to *A. microlepis.*

As is the case with the meristic data, variation in the morphometric data does not seem to conform to any simple geographic pattern. Some of the variation can be associated with sex differences (detailed above under Sexual Dimorphism) or allometry. For example: the relative length of the upper jaw (56.0–69.9 and 68.5–74.1 of head length, in specimens respectively smaller and larger than 200 mm in standard length). Similar relations in body depth and orbital diameter are noted.

The wide range of variation associated with many of the morphometric characters may also result from the large number of measured specimens (table 3). Thus, many specimens with extreme values for the variables being measured were incorporated in the analyses. In those instances the range of each variable would give little information on the definition of the species. Here, the mean and the standard deviation presented for each of the variables measured give a better characterization of the species in question.

Despite the problems, mentioned above, no traits are apparent that would allow the unambiguous subdivision of *A. microlepis* into more than one recognizable species.

REMARKS: *Acestrorhynchus guianensis* Menezes, 1969, is here considered a junior synonym of *A. microlepis* (Schomburgk, 1841). According to Menezes (1969b), *A. guianensis* "is extremely close to *A. microlepis* from which it differs in number of scales. It has fewer scales in, above and below the lateral line." These counts are, respectively, according to Menezes, 93–106, 17–19, 13–15 versus 108–122, 20–22, and 15–18 in *A. microlepis.* No other meristic or morphometric differences between the two species were observed by Menezes (1969b).

TABLE 2

Frequency distribution of lateral-line scales of various populations of *Acestrorhynchus microlepis*.
(In some cases, names of rivers refer to the main river and its tributaries. Guyana, Suriname, and Amapá, are political units rather than drainage basins.)

	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123
Orinoco	–	–	–	–	–	1	–	1	3	2	1	–	–	2	4	3	1	2	–	1	1	2	1	3	1	–	2	–
Guyana	–	–	1	–	–	–	1	1	1	1	1	–	8	4	4	5	3	3	1	2	–	–	–	–	–	–	–	–
Suriname	–	–	–	–	–	–	–	1	1	1	2	1	2	4	–	3	4	1	2	1	1	–	–	–	–	–	–	–
Amapá	1	–	2	3	2	7	5	7	7	6	7	5	1	3	1	–	–	1	–	–	–	1	–	–	–	–	–	–
Capim	1	1	–	1	7	2	3	4	4	1	2	1	3	4	3	6	–	5	2	5	–	–	–	–	–	–	–	–
Tocantins	–	–	–	–	–	–	–	–	–	–	–	1	4	–	–	3	3	2	1	–	–	–	–	–	2	–	2	1
Xingu	–	–	–	–	–	–	–	–	–	2	–	1	–	1	3	–	–	1	3	1	2	–	2	–	–	–	–	–
Tapajós	–	–	1	–	–	–	2	1	2	6	6	4	5	3	3	6	1	–	–	–	1	1	–	1	–	–	–	–
Trombetas	–	–	–	1	1	1	–	4	4	–	5	2	1	1	2	3	4	–	1	1	1	1	1	–	–	–	–	–
Negro	–	1	–	2	1	–	7	2	6	7	6	8	10	6	5	5	7	3	3	3	3	–	–	–	–	–	–	–
Madeira	–	1	–	–	–	1	–	4	2	2	1	8	6	6	6	8	8	5	2	7	3	3	3	1	1	–	–	–
Purus	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	–	2	1	–	2	1	–	1	–	–	–
Tefé	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	2	5	1	5	4	3	5	2	2	1
Ucayali	–	–	–	–	–	–	–	–	2	1	1	3	3	3	2	–	5	1	–	–	–	–	–	–	–	–	–	–
Total	2	3	4	7	12	12	18	25	32	29	32	35	43	37	33	44	35	24	19	27	12	15	12	8	10	2	4	2

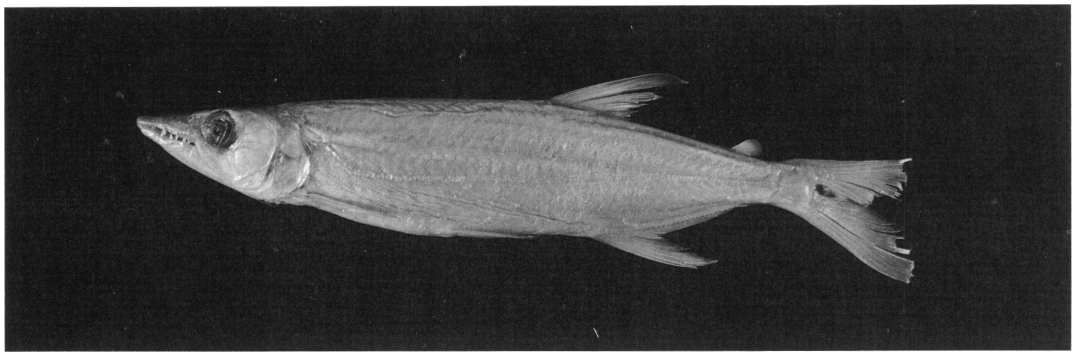

Fig. 6. *Acestrorhynchus microlepis,* MZUSP 37919, 144 mm SL, female, Brazil, Amazonas, Rio Mucuim, Município de Canutama.

The analyses carried out in the present study, including a larger number of specimens, indicate that it is not possible to distinguish the two species based on the characters used by Menezes (1969b). As detailed in the previous section, the wide variation in the meristic and morphometric data over the entire distributional range of the specimens examined does not conform to any simple geographic pattern. In particular, the pattern of variation in the number of lateral-line scales (presented in table 2) shows that the upper limit of 106 scales for *A. guianensis* and the lower limit of 108 scales for *A. microlepis,* cited by Menezes (1969b), cannot be used to distinguish these two species. The holotype of *A. guianensis* Menezes, 1969b (fig. 7) was reexamined and the meristic and the morphometric data relative to this specimen are given in tables 1 and 3.

The question of the type of *A. microlepis* (Schomburgk, 1841) is more complicated. No type was designated at the time the species was described. There are two specimens at the Natural History Museum, London (BMNH—registration uncertain) presented by Sir R. H. Schomburgk, that were thought to be the specimens he used in taking his notes. However, according to D. Siebert (personal commun.), at the present there is no way to say with certainty whether these specimens are from Schomburgk's first or second trip to the Guyana. If they are from the second trip, such specimens should be excluded from being types.

Acestrorhynchus cachorro Fowler, 1939 (fig. 8) is maintained as a junior synonym of *A. microlepis* following Menezes, 1969b. The holotype of *A. cachorro* was reexamined and the meristic and morphometric data for this specimen are presented in tables 1 and 3. Géry (1972) also examined this specimen and suggested that it could be a valid species based on differences of body depth. In fact, this

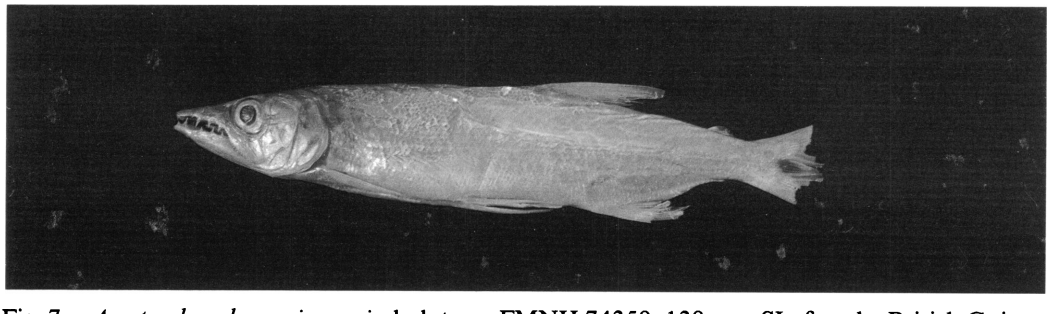

Fig. 7. *Acestrorhynchus guianensis,* holotype, FMNH 74359, 130 mm SL, female, British Guiana (= Guyana), Georgetown, Botanic Garden.

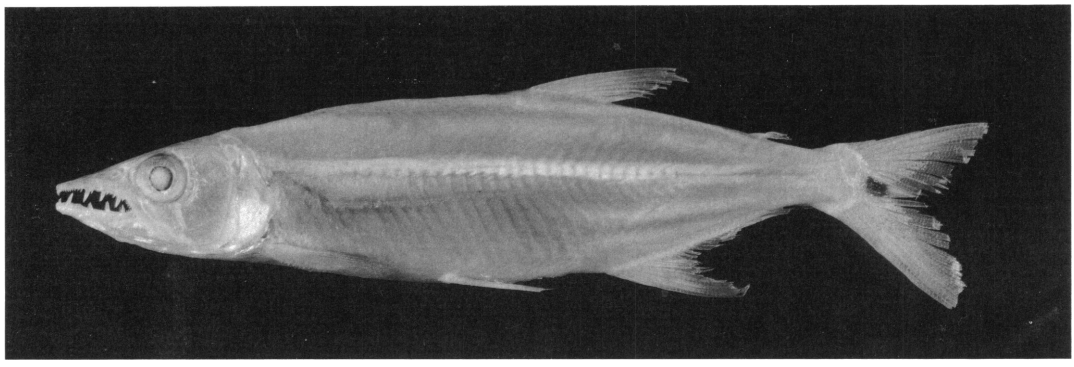

Fig. 8. *Acestrorhynchus cachorro,* holotype, ANSP 68679, 141 mm SL, Peru, Río Ucayali basin, Boca Chica.

specimen has a relatively deeper body than the remaining examined specimens of *A. microlepis* (25.1 vs. 11.6–23.0, respectively). The caudal peduncle is also slightly deeper in *A. cachorro* than in the remaining specimens of *A. microlepis* examined (6.9 vs. 4.5–6.7, respectively). However, all other meristic and morphometric data fall within the range of variation found in *A. microlepis.* Specimens from the Río Ucayali (region where the specimen of *A. cachorro* was collected) were also examined and values for the body depth for these specimens coincide with those of *A. microlepis.* Body depth is a variable that can show great variation depending on factors such as fullness of the stomach, stage of the reproductive cycle, and preservation artifacts after collecting. Because body depth was the only difference found between *A. cachorro* and *A. microlepis* and, moreover, *A. cachorro* is known only from the holotype, we have chosen to retain it as a junior synonym of *A. microlepis.*

MATERIAL EXAMINED: 686 specimens (543, 36.0–260.0). **GUYANA.** Essequibo River system: AMNH 43346 (3, 71.0–100.0) Bartica & Wismar; AMNH 72105 (1, 75.0) abandoned stone quarry behind Gideon's store, north bank Mazaruni river; AMNH 73009 (1, 110.0) sandbar north bank Cuyuni river, just upstream of Caowry creek; AMNH 7128 (2, 79.0) Rochester; AMNH 13412 (1, 100.0) Wismar; AMNH 72032 (3, 28.7–36.0) Cebo creek, north bank Mazaruni river, few hundred yards east of St. Edwards Church, Kartabo; BMNH 1.21.28 (1, 143.0) Essequibo; BMNH—registration uncertain (2, 84.0–111.0) British Guyana; FMNH 53495 (2, 73.0–87.4 paratytpes of *A. guianensis*) Maduni creek; FMNH 53502 (1, 164.0 paratype of *A. guianensis*) Issororo Rubber plantation; FMNH 53501 (2, 165.0–224.0 paratypes of *A. guianensis*) Lama Stop-off; ROM 64253 (3, 64.0–76.0) Essequibo river, between pot falls island and a small island on the east side; ROM 64254 (1, 76.9) Essequibo river inlet, about 7 km southeast of Tambikabo inlet; ROM 64255 (2, 93.0–113.0) Essequibo river, Kurupukari. Channel at south end of cowhead island (local name); ROM 64256 (1, 64.0) Creek at Kurupukari falls, near Ameridian village; ROM 94257 (1, 70.3) pool about 500 m inland from Essequibo river, opposite north tip of cowhead island; ROM 64258 (6, 66.0–121.0) Essequibo river, Turtle pan sandbank, just south of Turtle Pond rock; ROM 64259 (1, 82.0) Essequibo river, inlet and beach downstream from Kurupukari; ROM 64260 (3, 65.0–91.0) Essequibo river, approximately 1.6 km from mouth of Tambikabo inlet; ROM 64261 (1, 75.7) Cowhead creek, off northern bank of Essequibo river, at north end of indian house island; ROM 64262 (5, 59.0–79.0) Essequibo river, about 1.6 km downstream from Tambikabo inlet; ROM 64263 (5, 60.0–98.0) Essequibo river, channel at south end of Cowhead island; USNM 66111 (1, 82.0) Essequibo river, Crab Falls; Demerara river system: AMNH 7143 (1, 97.0) Malali; FMNH 74359 (1, 130.0 holotype of *A. guianensis*) Botanic Garden; FMNH 53504 (2, 98.7–

TABLE 3

Morphometrics for (A) holotype of *Acestrorhynchus guianensis* FMNH 74359; (B) holotype of *A. cachorro* ANSP 68679; (C) all specimens of *A. microlepis* from which measurements were taken (with the exception of the holotypes of *A. guianensis* and *A. cachorro*, and MZUSP 37919, see text for discussion); (D) all specimens of *A. grandoculis* from which measurements were taken; (E) holotype, MZUSP 48373; (F) paratypes, MZUSP 37269, UNELLEZ 11323, TNHC 14872; and (H) all specimens of *A. apurensis* from which measurements were taken (with the exception of holotype).

(Values for each measurement are respectively the range, mean, and standard deviation.)

	A	B	C	D	E	F	G
Standard length	130.0	141	36.0–260.0	37.0–108.0	57.0	43.4–53.8	43.4–71.0
Predorsal distance	60.8	60.3	58.3–64.6	55.3–59.7	63.1	62.5–64.9	61.8–65.1
			60.7	57.6		64.2	64.0
			0.96	1.02		.64	.82
Prepelvic distance	48.1	48.2	47.0–53.6	47.8–52.4	54.3	52.9–56.5	52.9–56.5
			49.9	49.9		55.1	54.9
			1.21	.95		.98	1.04
Preanal distance	69.2	69.5	66.4–73.0	66.7–71.6	70.2	70.2–73.5	70.2–73.5
			69.4	68.7		72.1	71.9
			1.16	.99		.92	.98
Prepectoral distance	26.5	25.5	23.2–33.3	26.1–31.0	31.6	30.8–34.9	30.8–34.9
			26.9	27.9		32.9	2.8
			1.52	1.05		1.01	1.04
Body depth	20.2	25.1	11.6–23.0	14.3–24.3	15.3	12.9–15.8	12.9–16.6
			18.1	20.4		14.6	14.7
			1.92	1.85		.74	0
Caudal-peduncle depth	6.4	6.9	4.5–6.7	4.9–7.2	5.3	5.1–6.1	5.1–6.1
			5.7	6.3		5.6	5.6
			0.38	.46		.29	.29
Head length	28.4	27.1	24.9–31.4	27.5–31.6	32.3	31.6–34.0	31.4–34.0
			27.8	28.9		32.7	32.5
			1.23	.80		.54	.65
Pectoral-fin length	16.5	17.0	9.6–18.1	9.5–18.5	10.9	9.9–11.2	9.9–13.1
			14.8	16.1		10.4	11.1
			1.2	1.67		.41	1.03
Pelvic-fin length	16.8	15.1	9.3–18.5	10.0–16.5	10.1	8.6–10.2	8.6–11.8
			13.2	13.9		9.5	9.9
			1.45	1.42		.53	.84
Dorsal-fin length	22.2	—	17.0–23.7	20.8–27.0	17.2	15.4–20.8	15.4–21.0
			20.4	24.4		18.6	18.9
			1.23	1.40		1.23	1.31
Anal-fin length	—	—	14.7–21.4	18.2–24.6	16.5	15.1–17.7	15.1–18.7
			17.9	21.7		16.8	16.9
			1.16	1.44		.70	.83
Dorsal base	9.8	9.9	8.1–10.9	9.5–12.6	9.6	8.1–10.0	8.1–10.0
			9.5	11.0		8.9	9.0
			.45	.62		.48	.47
Anal base	21.8	22.9	18.7–24.9	21.1–25.0	19.8	17.9–20.8	17.9–21.3
			21.9	22.9		19.6	19.9
			1.04	.83		.75	.81
Caudal-peduncle length	10.0	9.4	7.8–11.9	8.7–12.3	10.0	8.0–10.4	8.0–10.4
			10.1	10.2		9.1	9.4
			.67	.85		.64	.72
Dorsal-caudal distance	38.2	39.3	33.7–42.0	35.9–43.9	34.9	32.5–35.7	32.5–37.2
			38.3	41.4		34.2	34.6
			1.26	1.47		.80	1.08
Eye-dorsal distance	43.8	43.4	40.1–47.4	36.0–41.1	43.9	39.6–43.3	39.6–43.3
			43.1	38.8		41.9	41.9

TABLE 3—(*Continued*)

	A	B	C	D	E	F	G
			1.16	1.03		.92	.92
Snout length	37.9	33.4	32.0–42.4	27.6–37.6	42.9	41.5–46.5	41.5–46.5
			37.3	31.8		44.9	44.5
			1.93	1.94		1.19	1.18
Orbital diameter	27.6	29.3	22.9–34.1	31.3–41.5	23.4	20.9–23.7	20.9–24.0
			28.3	35.8		22.4	22.7
			1.96	1.95		.82	.84
Interorbital distance	12.2	14.7	8.2–16.2	9.9–15.6	10.9	7.9–11.4	7.9–11.4
			12.1	12.6		9.7	9.8
			1.39	1.27		9.4	.91
Postorbital distance	36.3	38.7	31.5–41.0	31.6–38.8	36.4	32.2–36.4	32.2–36.8
			36.5	34.4		34.2	34.5
			1.61	1.52		1.07	1.23
Upper maxillary length	65.3	62.3	56.0–74.1	54.4–64.8	60.9	60.5–68.6	60.5–68.6
			63.6	60.9		64.6	64.6
			2.89	1.90		1.91	1.93

103.5 paratypes of *A. guianensis*) Botanic Garden. — **SURINAME.** Corantijn River system: AMNH 54816 (2, 41.5–96.0) Nickerie, small tributary of Kabelebo River, ca. 150 m upstream mouth Dalbana Creek; AMNH 54928 (1, 107.0) Nickerie, Corantijn River, Camp Hydro, ca. km 370, ca. 30 km N of Tiger Falls; AMNH 54885 (47, 109.0–168.0) Nickerie, Toeboeroe Creek, Corantijn River, km 220, 300–900 m from mouth; USNM 225501 (1, 139.0) Nickerie, Corantijn River; USNM 225613 (1, 143.0) Nickerie, Matapi Creek; USNM 225488 (1, 45.0) Nickerie, stream entering Corantijn River at approximately km 385 slightly north of Tiger Falls; USNM 225500 (1, 74.0) Nickerie, creek about 2 km north of Matapi; USNM 225612 (5, 36.0–87.0) Nickerie, Corantijn River at km 180, side channel of main river along Surinamese shore. Suriname River system: MZUSP 19710 (3, 171.0–225.0) Brokopondo, Van Blommenstein Lake (artificial lake in Suriname River system), 2 km east of Afobak village. — **VENEZUELA.** AMNH 77835 (7, 90.0–152.0) Guarico, Río Guariquito, at government Reserve, east-southeast of Calabozo, several points along river; MZUSP 27893 (6, 107.0–149.0); ANSP 16592 (1, 67.0) Apure, Caño Poterito, 24 km S of Río Cinaruco on San Fernando de Apure-Puerto Paez highway; MZUSP 37271 (5, 73.0–109.0) Apure at Universidad Nacional Experimental de los Llanos Occidentales Ezequiel Zamora (UNELLEZ) Módulo; MZUSP 37272 (5, 67.0–97.0) Apure, next to UNELLEZ Módulo; ANSP 166783 (1, 114.0) Bolivar, San Pedro de Tauca: L. Madera; ANSP 159397 (6, 137.0–167.0) Bolivar, Caño (possibly Caño Curimo) feeding Río Caura near confluence of Río Caura-Rio Orinoco; ANSP 159399 (1, 111.0) Bolivar, Río Caura at Puerto Las Majadas; AMNH (1, 167.0) Bolivar, Río Paragua, opposite mouth of Río Carapo at sand beach; USNM 270226 (2, 97.0–108) Bolivar, small caño connecting with Río Orinoco immediately south of El Burro; AMNH 93023 (161.0–199) Amazonas, Río Mavaca at base camp; USNM 309214 (1, 185.0) Amazonas, Río Mavaca; ANSP 161451 (2, 117.0–153.0) Amazonas, Caño Caripo (1st Casiquiare caño ca. 5 min from confluence of Casiquiare and Orinoco—left side). — **COLOMBIA.** ANSP (1, 67.0) Meta, Lomalinda, southeast of Villavicencio, near Río Ariari.— **BRAZIL.** MZUSP 34969 (23, 95.0–134.0) and MZUSP 44050 (3, 148.0–165.0) AP, Rio Amapá, Amapá (city), Flooded Savanna; MZUSP 44048 (5, 202.0–247.0) and MZUSP 44049 (24, 182.0–257.0) AP, Rio Amapá, Cachoeira Grande; MZUSP 44051 (4, 209–260) AP, Rio Cupixi, at bridge along road to Serra do Navio. **Rio Capim system:** MZUSP 20591 (19, 49.0–155.0) PA, Lago Bernardino, near Badajós, Rio Capim; MZUSP 20584 (1, 59.0) PA, Igarapé Candiru-Mirim, Rio Capim, perto de Badajós; MZUSP

43099 (1, 105.0) and MZUSP 20559 (9, 98.0–136.0) PA, Lago Timbiras, Rio Capim; MZUSP 20578 (14, 96.0–142.0) PA, Lago Jurunundéua, Rio Capim; MZUSP 20551 (10, 115.0–159.0) PA, Praia de Caranadéua, Rio Capim; MZUSP 20566 (1, 124.0) PA, Lago Maria Preta, Rio Capim. **Rio Tocantins system:** MZUSP 20645 (2, 100.0–176.0) PA, Igarapé Muru, Rio Tocantins, downstream from Tucuruí; MZUSP 20652 (6, 113.0–169.0) PA, Lake at the margin of Iagarapé Muru, Rio Tocantins, downstream from Tucuruí; MZUSP 20630 (1, 132.0) PA, Rio Tocantins, Baião; MZUSP 20347 (2, 114.0–135.0) PA, Laguinho, near Tucuruí, Rio Tocantins; MZUSP 34972 (1, 123.0) PA, Rio Itacaiunas, Caldeirão; MZUSP 40457 (3, 99.0–142) and MZUSP 40913 (3, 149.0–165.0) GO, Poço da Gandaia (marginal lake, Rio Paranã), Fazenda Olho d'Agua, Flores de Goiás. **Rio Xingu system:** MZUSP 34976 (3, 100.0–123.0) and MZUSP 34959 (12, 88.0–187.0) PA, Rio Xingu, Belo Monte; MZUSP 35975 (1, 105.0) PA, Rio Fresco, Aldeia Gorotire, Município São Felix do Xingu; USNM 310051 (2, 153.0–172.0) MT, small tributary of Rio Batovi, upper Rio Xingu. **Rio Tapajós system:** MZUSP 34985 (18, 100.0–174.0) PA, Rio Tapajós, Itaituba; MZUSP 43680 (27, 95.0–138.0) PA, Rio Tapajós, Ilha da Barreirinha, near São Luís; MZUSP 8525 (1, 132.0) PA, Rio Tapajós, Santarém; MZUSP 34724 (15, 49.0–81.0) MT, Rio Arinos, Município de Porto dos Gaúchos; USNM 194308 (1, 144.0), USNM 194362 (1, 78.0), USNM 194319 (2, 106.0–125.0) and USNM 194340 (1, 112.0) MT, upper Rio Juruena. **Rio Trombetas system:** MZUSP 34965 (6, 110–137.0) PA, Rio Trombetas, 20 km above mouth; MZUSP 34978 (10, 88.0–133.0) PA, Rio Trombetas, Cuminá; MZUSP 43100 (2, 113.0) PA, Lago Jacupá, Oriximiná; MZUSP 15967 (1, 95.0) PA, island at mouth of Lago do Erepecu, Reserva Biológica de Trombetas, Rio Trombetas; MZUSP 15671 (1, 123.0) PA, Povoado da Tapagem, Reserva Biológica de Trombetas, Rio Trombetas; MZUSP 4607 (1, 94.0) PA, Lago Jacaré, Rio Trombetas; INPA 3420 (1, 147.0) PA, Rio Trombetas (Rio Mapuera) Cachoeira São Francisco; INPA 3373 (2, 108.0–111.0) PA, Rio Trombetas, Lago Tapagem; INPA 3405 (1, 172.0) PA, Rio Trombetas, Lago Tapagem; INPA 3407 (1, 135.0) PA, Rio Trombetas, Igarapé Caxipacoré; INPA 5445 (2, 135.0–162.0) PA, Rio Trombetas; INPA 3406 (3, 111.0–165.0) PA, Rio Trombetas, downstream Cachoeira Vira-Mundo; INPA 3255 (2, 115.0–173.0) PA, Rio Trombetas, upstream Cachoeira Vira-Mundo; INPA uncataloged (field number 416) (1, 140.0) PA, Rio Trombetas, upstream Cachoeira Porteira. **Rio Madeira system:** MZUSP 6974 (1, 101.0) AM, Rio Madeira, 25 km from Nova Olinda; MZUSP 7601 (10, 105.0–145.0) AM, Rio Canumã; MZUSP 34722 (16, 73.0–96.0) AM, Rio Madeira, igarapé 15 km from Humaitá; MZUSP 35528 (1, 112.0) AM, Igarapé Joari, Humaitá; MZUSP 35582 (5, 126.0–138.0) AM, Igarapé Banheiro, Humaitá; MZUSP 34970 (1, 95.0) AM, Rio Madeira, Calama (Poço da Angélica); MZUSP 34981 (1, 113.0) RO, Rio Machado, Santo Antônio; MZUSP 34977 (1, 86.0) RO, Rio Machado; MZUSP 34980 (1, 84.0) RO, Rio Machado, Jamarizinho; MZUSP 42449 (2, 78.0–115.0) MT, Rio Guaporé, Vila Bela da Santíssima Trindade; MZUSP 44046 (14, 100.0–178.0) MT, Rio Alegre, tributary of Rio Guaporé, ca. 30 km upstream from Vila Bela da Santíssima Trindade; INPA 7326 (8, 98.0–180.0) RO, Rio Pacaás Novos, Guajará-Mirim. **Rio Negro system:** MZUSP 6678 (5, 104.0–145.0) AM, Rio Negro, vicinity of Manaus; MZUSP 6779 (1, 169.0) AM, Igarapé Tarumãzinho and Tributary #1 north of Manaus; MZUSP 34971 (6, 119.0–156.0) AM, Rio Negro, Anavilhanas; MZUSP 34984 (2, 118.0–123.0) AM, Rio Negro, Anavilhanas, flooded forest; MZUSP 29267 (1, 88.0) AM, Rio Negro, Anavilhanas, woody shore; MZUSP 34962 (3, 122.0–166.0) AM, Rio Negro, Anavilhanas, Lago do Prato, beach; MZUSP 20188 (3, 59.0–78.0) AM, Lago Central, left margin of Rio Negro, between Rio Camaraú and Apaú; MZUSP 34983 (2, 129.0–131.0) AM, Rio Negro, Urumari (2 hours upstream from Barcelos); MZUSP 34963 (5, 124.0–163.0) AM, Rio Arirará, near the mouth, beach; MZUSP 34973 (104.0–177.0) AM, Rio Negro, Mandiquié; MZUSP 34982 (2, 119.0–136.0) AM, Rio Negro, Urubaxi (mouth of Rio Urubaxi); MZUSP 31048 (1, 95.0) AM, Rio Negro, Ilha de Buiu-Açu; MZUSP 34964 (1, 170.0) AM, Rio

Marié, Lago do Curuá-Muru; MZUSP 34957 (27, 116.0–150.0) AM, Rio Negro, Cumuru, beach; MZUSP 20200 (1, 135.0) AM, Rio Jauaperi, from mouth to 100 km upstream; MZUSP 20193 (12, 42.0–56.0) AM, Lagoa de Sapos, 70 to 80 km upstream mouth of Rio Jauaperi; MZUSP 34958 (4, 141.0–162.0) RR, Rio Branco, Marará, beach; MZUSP 34960 (5, 101.0–190.0) RR, Rio Branco, Marará, floodplain lake; MZUSP 20247 (4, 101.0–129.0) RR, Lagoa do Sr. Durval Magalhães, 47 km from Boa Vista, highway Tepequém–Roraima; MZUSP 37569 (2, 125.0) RR, Rio Uraricoera, Estação Ecológica de Maracá, SEMA. **Rio Purus system:** MZUSP 6289 (9, 108.0–176.0) AM, Lago Castro, mouth of Rio Purus; MZUSP 37919 (7, 132.0–144.0 see remarks above) AM, Rio Mucuim, município de Canutama. **Rio Tefé system:** MZUSP 34961 (10, 87.0–135.0) AM, Rio Tefé, Jurupari; MZUSP 34974 (13, 84.0–138.0) AM, Rio Tefé, Mastro; MZUSP 34968 (1, 149.0) AM, Rio Tefé, Mucura; MZUSP 34967 (2, 128.0–185.0) AM, Rio Tefé, Ressaca do Paula; MZUSP 34979 (1, 87.0) AM, Rio Tefé, Supiã-pucu; MZUSP 34966 (4, 103.0–146.0) AM, Rio Tefé, Vista escura. **Localities along Rio Solimões/Rio Amazonas:** MZUSP 6543 (2, 95.0–113.0) AM, Lago Manacapuru; MZUSP 19763 (1, 159.0) AM, Lago Janauacá, right margin of Rio Solimões; MZUSP 7524 (1, 125.0) AM, Paraná de Urucará, município de Urucará; MZUSP 20166 (2, 108.0–109.0) AM, Rio Solimões, Coari; MZUSP 7929 (1, 134.0) PA, Igarapé do Rio Jamari, upstream of Terra Santa; USNM 229061 (1, 99.0) AM, Lago Janauari, Lago Canta Galos, near Manaus; USNM 305154 (1, 102.0) AM, Lago Janauari, near Canta Galos, AM; USNM 179526 (1, 172.0) and USNM 179530 (10, 69.0–89.0) AM, Rio Urubu, 25 miles from Itacoatiara. — **PERU. Río Ucayali system:** ANSP 68679 (1, 141.0 holotype of *A. cachorro*) Loreto, Río Ucayali, Boca Chica; MNRJ 3993 (6 out of 7, 76.0–145.0) Loreto, Yahnas Yacu, near Pevas; MZUSP 14733 (1, 155.0) Ucayali, Provincia Coronel Portillo, Río Ucayali, Masisea; MZUSP 14735 (1, 150.0), MZUSP 14734 (6, 67.0–159.0), and MZUSP 14732 (3, 94.0–116) Ucayali, Provincia Coronel Portillo; Cashibococha, Pucallpa; MZUSP 20531 (1, 113.0) Ucayali, Laguna Yarinacocha, Río Ucayali, near Pucallpa; USNM 280458 (2, 80.0–93.0) Loreto, Caño entering Río Nanay, northeast of Iquitos. — **BOLIVIA.** AMNH 39726 (8, 53.0–104.0) Beni, Río Itenez, 2 km southeast of Costa Marques (Brazil); AMNH 40106 (9, 77.0–146.0) Beni, playa pond of Río Itenez, 9 km SE from Costa Marques (Brazil). — **ECUADOR.** MZUSP 38666 (1, 127.0) Napo, Laguna Jatuncocha, Río Napo drainage system.

Acestrorhynchus grandoculis
Menezes and Géry, 1983
Figure 9; tables 1, 3

Acestrorhynchus grandoculis Menezes and Géry, 1983: 582 (original description, type locality: mouth of Rio Urubaxi, in Rio Negro, Amazonas, Brazil).

DIAGNOSIS: *Acestrorhynchus grandoculis* differs from both *A. microlepis* and *A. apurensis* in having larger scales which are consequently present in fewer numbers. It has 77–87 scales in the lateral line versus 96–123 in *A. microlepis* and 102–115 in *A. apurensis*. It has a relatively large eye (31.3–41.5 vs. 22.9–34.1 and 20.9–24.0, respectively, in *A. microlepis* and *A. apurensis*). The distance from the eye to the dorsal-fin origin is always less than the distance from the latter to the origin of the caudal fin, while in both *A. microlepis* and *A. apurensis* the opposite is true.

SEXUAL DIMORPHISM: In this species females are comparatively larger than males (66–108 vs. 67–86 mm, respectively) with 56% of the females measuring more than 88 mm in standard length.

DISTRIBUTION AND GEOGRAPHIC VARIATION: Rio Negro and its tributaries, and upper Río Orinoco Basin. The latter represents a new locality record (fig. 5), extending the previously known distribution of the species. The meristic and morphometric data from these specimens are included within the limits of variation known for the specimens of the Rio Negro system.

REMARKS: A full description of *A. grandoculis* is given in Menezes and Géry (1983). The data presented herein are intended only as a means of comparison with the other species of the *microlepis* group.

MATERIAL EXAMINED: 121 (59, 37.0–108.0).

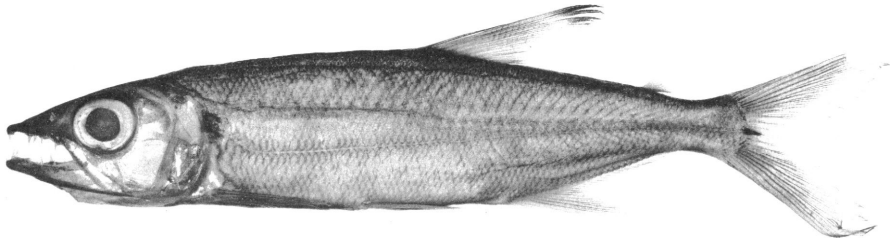

Fig. 9. *Acestrorhynchus grandoculis,* holotype, MZUSP 25863, 101 mm SL, female, Brazil, Amazonas, Rio Negro, mouth of Rio Urubaxi.

— **BRAZIL.** Rio Negro system: MZUSP 6778 (1, 108.0) AM, Igarapé Tarumãzinho e tributary number 1 north of Manaus; MZUSP 29280 (33, 48.0–86.0) AM, Rio Negro, Anavilhanas; MZUSP 29283 (2, 70.0–88.0) AM, Rio Negro, Barcelos, Praia de Urumari; MZUSP 29284 (2, 85.0–96.0) AM, Rio Negro, below Rio Daraá; MZUSP 29281 (66, 4, 90.0–93.0) AM, Rio Negro, Ilha de Tamaquaré; MZUSP 31049 (1, 93.0) AM, Rio Negro, Paraná do Jacaré; MZUSP 25863 (1, 101.0 holotype of *A. grandoculis*) AM, Rio Negro, mouth of Rio Urubaxi; MZUSP 29282 (1, 106.0) RR, Rio Branco, Cachoeira Bem-Querer (at igarapé, 2 km above falls); MZUSP 20192 (5, 37.0–44.0) AM, Lagoa de Sapos, 70–80 km above mouth of Rio Jauaperi; MZUSP 27320 (1, 79.0) RR, Rio Jufari, Baia Grande, São Bento, Município de Caracaraí. — **VENEZUELA.** Río Orinoco system: ANSP 161453 (1, 88.0) Amazonas, Río Orinoco, at sand island ca. 1 to 2 km upstream from Guachipana; ANSP 159409 (7, 75.0–103.0) Amazonas, Río Sipapo, along playas of sand and rock ca. 1 to 4 km above Pendare.

Acestrorhynchus apurensis, new species
Figure 10; tables 1, 3

Acestrorhynchus sp. ("pico largo"): Taphorn, 1992: 102 (diagnosis, geographic distribution in Río Apure system).

DIAGNOSIS: *Acestrorhynchus apurensis* is readily distinguished from *A. grandoculis* by scale counts (102–115 lateral-line scales vs. 77–87 in *A. grandoculis*). This species is only known from juveniles (43.4–71.0 mm in SL) and is very similar to *A. microlepis,* with the species showing a large overlap in most meristic and morphometric values (tables 1, 3). However, it can be distinguished from the latter by the relatively longer snout (41.5–46.5 vs. 32.0–42.4 in *A. microlepis*), a smaller orbital diameter (20.9–24.0 vs. 22.9–34.1 in *A. microlepis*) (fig. 11), and a longer head

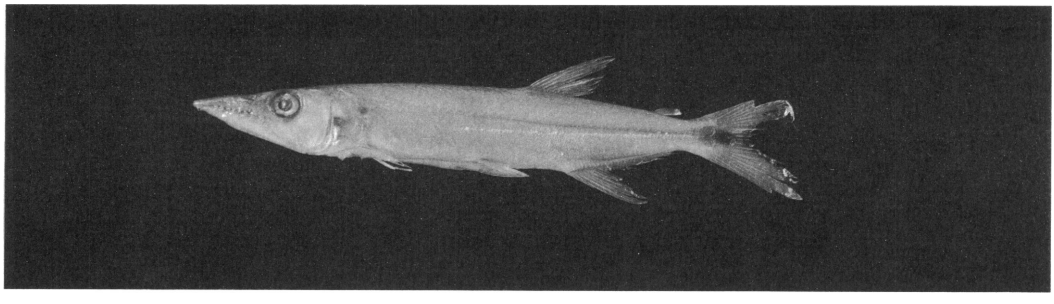

Fig. 10. *Acestrorhynchus apurensis,* new species, holotype, MZUSP 48373, 57 mm SL, juvenile, Venezuela, Apure, Módulo de la UNELLEZ (7°25′50″, 69°35′30″).

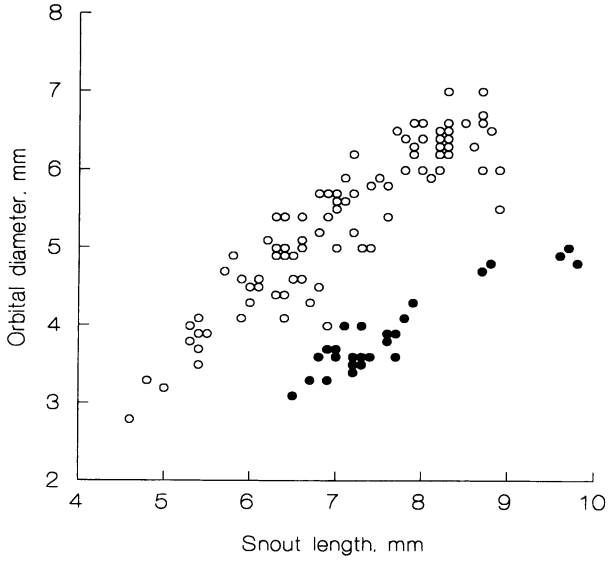

Fig. 11. Plot of orbital diameter against snout length, both in millimeters, for *Acestrorhynchus apurensis*, new species (filled circles), and *A. microlepis* (open circles) specimens of less than 80 mm SL.

(31.4–34.0 vs. 24.9–31.4 in *A. microlepis*). If specimens of *A. microlepis* within the same size range of *A. apurensis* are the only ones compared, then there is no overlap in orbital diameter (20.9–24.0 vs. 24.1–32.3, respectively, in *A. apurensis* and in specimens of *A. microlepis* less than 80 mm in standard length). In *Acestrorhynchus microlepis* a relative small orbital diameter is associated with larger specimens (SL > 150 mm).

DESCRIPTION: Body elongate and compressed laterally. Dorsal profile of head straight from tip of snout to tip of supraoccipital spine. Dorsal profile of body slightly convex from tip of supraoccipital spine to caudal peduncle base. Ventral profile of body slightly curved from tip of lower jaw to caudal peduncle base. Snout relatively long, pointed, its length 41.5–46.5 of HL. Eye very small, orbital diameter 20.9–24.0. Upper jaw slightly longer than lower jaw (comparatively longer than that of *A. microlepis*), the two anteriormost canine teeth on upper jaw visible laterally when mouth fully closed. Premaxilla with 1 canine tooth anteriorly, followed by 4–10 small conical teeth, another canine longer than first and 1 (rarely 2) small conical tooth slightly longer than anterior ones. Two premaxillary foramina receive first two teeth of dentary. In some specimens either first or (usually) second dentary tooth perforates thin skin covering premaxillary foramen dorsally such that tips of anterior dentary teeth are visible from dorsal view of head. Anterior portion of maxilla with 1 canine tooth followed by 3 (sometimes 2) conical teeth slightly longer than those of premaxilla, another canine slightly longer than anterior one, and another small conical tooth. Posterior portion of maxilla situated beneath first infraorbital, with 10–21 small conical teeth. Dentary with 1 conical tooth anteriorly, followed by 4 canine teeth separate from each other, first slightly larger than remaining ones and situated slightly more internally. Third tooth slightly larger than second and fourth. Between first and second canine teeth there are 2 (sometimes 3) small conical teeth situated in same line formed by second and fourth canines, plus 1 to 5 small conical teeth (sometimes covered by skin) slightly internal to remaining dentary teeth, forming rudimentary inner row. Dentary with series of 4–11 small conical teeth posteriorly. Ectopterygoid with one row of small closely set conical teeth, highly variable in number, smaller than those in upper and lower jaws. Mesopterygoid teeth present in larger

specimens, but difficult to see in small ones. Ceratobranchial of first gill arch with 14–18 gill rakers. Gill rakers spiny, with surface almost entirely covered with small spines and prominent spine on dorsal edge of each gill raker; spine less evident on gill rakers situated along anterior part of gill arch. Scales small, 102–115 in lateral line, 23–24 longitudinal scale rows between lateral line and dorsal-fin origin, 14–18 between lateral line and anal-fin origin, 30–35 around caudal peduncle. Dorsal-fin origin situated posterior to midlength of body, between vertical through pelvic- and anal-fin origins. Dorsal fin with ii, 9 rays, distal border concave. Distance from eye to dorsal-fin origin always greater than distance from latter to caudal-fin origin. Anal fin falcate, tips of first branched rays extending beyond midlength of anal-fin base when fin depressed. Anal-fin origin slightly posterior to vertical through posterior end of dorsal-fin base. Anal fin with v (sometimes iv or vi), 24–28 rays. Pelvic fin pointed in profile distally, tips of longer rays usually (but not always) reaching anterior margin of anus. Pelvic-fin rays i, 7. Pectoral fin short, pointed in profile distally. Pectoral-fin rays i, 10–14. Caudal fin forked, ventral caudal-fin lobe usually slightly longer than dorsal one. Caudal-fin rays i, 17, i. Adipose fin well developed, situated on vertical through posteriormost rays of anal fin.

COLOR IN ALCOHOL: Ground coloration light-brown to yellowish. Dorsal portion of head darker, particularly in parietal region. Abdominal region pale. Region dorsal of lateral line and posterior to anal fin with scattered chromatophores. Narrow brown band along sides of body, more evident on posterior half. Very small, sometimes indistinct, dark blotch immediately behind opercle, on lateral line. Black spot on caudal-fin base usually nearly round. Dark pigmented spot, more evident in smaller specimens, located anterior to and slightly separated from basal caudal spot. In larger specimens only spot on caudal-fin base evident. All fins hyaline.

DISTRIBUTION: Known only from the Río Apure basin of the Río Orinoco system in Venezuela (fig. 5), with specimens collected at the UNELLEZ Módulo (7°25′50″N, 69°35′30″W, where it occurs in sympatry with *A. microlepis*), at the Caño Caicara north of Mantecal, and at Caño Maporal, a stream that passes outside the southwest corner of the Módulo.

ETYMOLOGY: The specific name, *apurensis,* is an adjective derived from the geographical name, Apure, the river drainage in Venezuela where this species occurs.

REMARKS: Taphorn (1992) suggested that the specimens herein assigned to *Acestrorhynchus apurensis* could represent juveniles of *A. falcirostris,* a species that also has a relatively long snout and a small orbital diameter. This is based on his suggestion that the number of lateral-line scales might increase with overall increase in body size in *A. microlepis,* and if the same is true for *A. falcirostris* (which has a lateral-line scales count of 140–175), then the specimens herein described as *A. apurensis* would represent juveniles of *A. falcirostris.* In the present study, no increase in the number of lateral-line scales with overall increase in body size was observed in *A. microlepis.* The same applies for *A. falcirostris* (personal obs.). Furthermore, the small dark blotch immediately posterior to the opercle, at the origin of the lateral line, present in *A. apurensis* is absent in specimens of *A. falcirostris.* Menezes (1969b) described young specimens of the latter as having a wide axial band from tip of snout to caudal base, a pigmentation pattern absent in *A. apurensis.*

The present study exemplifies a particularly difficult problem in systematics, that of species delimitation. A common situation is one in which differences in one or more meristic or morphometric characters are found when comparing different populations. The question is then whether or not to recognize such populations as different species. The lack of a universal criterion for species delimitation often makes such decisions difficult.

In the case of *Acestrorhynchus apurensis* we observed that: (1) there is no overlap in orbital diameter between *A. microlepis* and the population herein assigned to *A. apurensis* in specimens of a comparable size range (detailed above, under the Diagnosis section of *A. apurensis*); (2) although represented only by juveniles, the population herein assigned to *Acestrorhynchus apurensis* is clearly

distinguished from congeners of small body size (i.e., *A. minimus, A. nasutus, A. isalineae,* and *A. maculipinna*—see Menezes [1969b] and Menezes and Géry [1983] for full descriptions of these species), and from juveniles of species with larger body sizes.

The differences outlined above clearly show the existence of a form sufficiently distinct from the other known species of *Acestrorhynchus* to be recognized as a new species.

TYPE MATERIAL EXAMINED: 20 specimens (20, 43.3–57.0). *Holotype:* VENEZUELA: MZUSP 48373 (57.0) Módulo de la UNELLEZ, Estado Apure, 11 July 1984. — *Paratypes:* VENEZUELA: MZUSP 37269 (4, 47.0–52.0), MCNG 11323 (11, 43.3–53.8), all taken with holotype; TNHC 14872 (4, 48.8–52.4) East Dike, Módulo de la UNELLEZ, Estado Apure, collected by K. O. Winemiller, 11 July 1984.

OTHER MATERIAL EXAMINED: 7 specimens (50.0–71.0). VENEZUELA: TNHC 13830 (1, 63.0) Caño Caicara at hwy N of Mantecal, Apure, collected by K. O. Winemiller, 12 August 1984; MCNG 10286 (6, 50.0–71.0) Caño Maporal, Apure, 16 June 1981.

KEY TO SPECIES OF *ACESTRORHYNCHUS* OF THE *MICROLEPIS* GROUP

1. 74–87 lateral-line scales; 22–27 longitudinal rows of scales around caudal peduncle; orbital diameter 31.3–41.5 of HL; distance from posterior margin of orbit to origin of dorsal fin always less than distance from latter to origin of caudal fin (Rio Negro and its tributaries, upper Río Orinoco Basin) ..... *A. grandoculis*
–. 96–131 lateral-line scales; 25–39 longitudinal rows of scales around caudal peduncle; orbital diameter 20.9–34.1 of HL; distance from posterior margin of orbit to origin of dorsal fin always greater than distance from latter to origin of caudal fin 2
2. Orbital diameter 20.9–24.0 of HL, snout 41.5–46.5 of HL, head length 31.4–34.0 of SL (Río Apure system, Apure, Venezuela) ..... *A. apurensis*
–. Orbital diameter 24.1–32.3 of HL in specimens less than 80 mm SL (22.9–34.1 for all examined specimens), snout 32.0–42.4 in HL, head length 24.9–31.4 in SL (Rio Amazonas, Río Orinoco basins, and series of rivers that drain Atlantic slopes of Guianas) ..... *A. microlepis*

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