PROC. BIOL. SOC. WASH.
92(1), 1979, pp. 10–22

SOME PHYLOGENETIC IMPLICATIONS OF A DISCOVERY OF *ASPIDORAS PAUCIRADIATUS* (PISCES: SILURIFORMES: CALLICHTHYIDAE) FROM THE RIO NEGRO IN BRAZIL

Stanley H. Weitzman and Martha H. Balph

Abstract.—*Aspidoras pauciradiatus* is redescribed on the basis of 10 specimens collected from the Rio Negro near Tapurucuara, Amazonas, Brazil. The occurrence of *Aspidoras* nearly 3,000 river kilometers beyond the previously known range of the genus brings into question statements by H. Nijssen and I. J. H. Isbrücker concerning the distribution and relationships of *Aspidoras* and *Corydoras*. Substantial variability in size of the frontal cranial frontanel may invalidate the use of this character to separate *Aspidoras* from *Corydoras*, although the two genera still may be distinct on the basis of the supraoccipital fossa. Additional collecting is needed to test further the hypothesis that *Aspidoras* and *Corydoras* should be recognized as separate genera.

Aspidoras pauciradiatus (Weitzman and Nijssen) has been known from two type specimens collected in 1961 from the Rio Araguaia near Aruaná, State of Goiás, Brazil (Weitzman and Nijssen, 1970) and from three aquarium specimens without known locality (Nijssen and Isbrücker, 1976). The objectives of this paper are: (1) to report on what may be 10 additional specimens of this species (Figs. 1–3) collected in 1972 from the Rio Negro near Tapurucuara, State of Amazonas, Brazil, over 3,000 river kilometers from the type locality and nearly that far out of the previously known range of the genus *Aspidoras* von Ihering; and (2) to discuss relationships between populations of *A. pauciradiatus* and between *Aspidoras* and *Corydoras* Lacépède in the light of this discovery.

Aspidoras pauciradiatus (Weitzman and Nijssen)
Figs. 1–3, Table 1

Synonymy.—See Nijssen and Isbrücker (1976:114).

Specimens examined.—1, holotype, National Museum of Natural History, United States National Museum (USNM) 191625, SL 23.2 mm, Brazil, State of Goiás, Rio Araguaia, near Aruaná (14°58′S, 51°04′W), H. R. Axelrod, 1960. 1, paratype, USNM 204363, SL 22.6 mm, same data as holotype. Ten distributed in museums as follows: 2, Academy of Natural Sciences, Philadelphia (ANSP) 136687; 2, British Museum (Natural History)

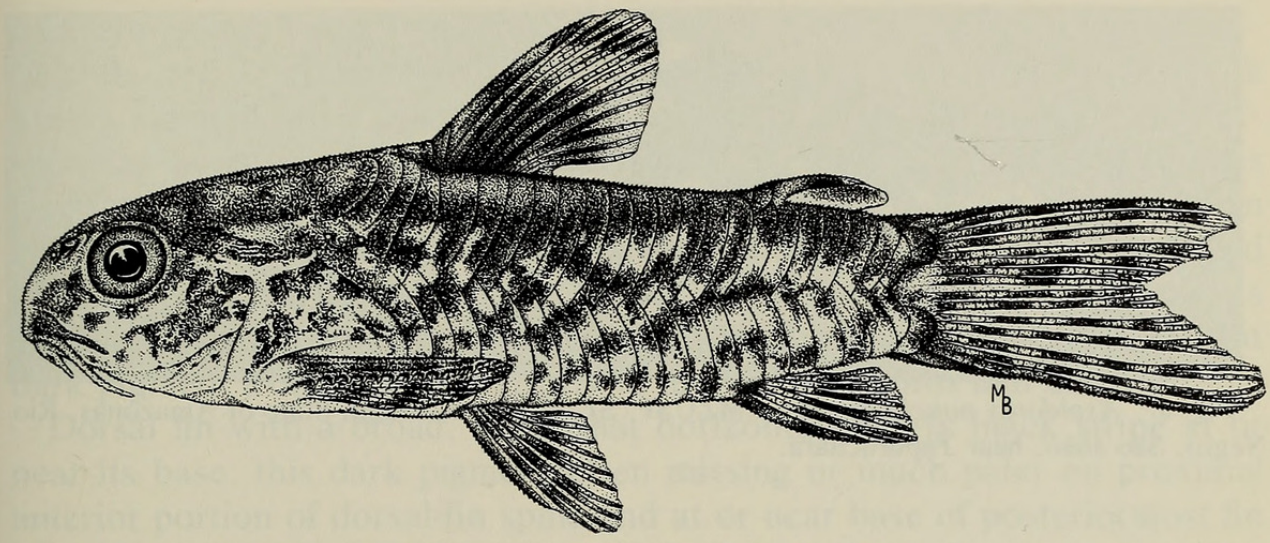

Fig. 1. *Aspidoras pauciradiatus*, ♂MZUSP, SL 16.5 mm, Brazil, State of Amazonas, Rio Negro, São João, near Tapurucuara.

(BMNH) 1978. 18:1–2; 2, Museu de Zoologia da Universidade de São Paulo (MZUSP); 2, USNM 218375; 2, Zoological Museum of Amsterdam (ZMA) 115.205; SL 15.7–17.7 mm, Brazil, State of Amazonas, Rio Negro, São João, near Tapurucuara (00°24′S, 65°02′W), P. Vanzolini, 23 September 1972.

Diagnosis.—*A. pauciradiatus* may be distinguished from all other species of *Aspidoras* and from all species of *Corydoras* and *Brochis* Cope by the following combination of character states: dorsal fin I,6; anal fin I,5; pectoral fin I,7; medial border of pectoral-fin spine prominently serrated with 10–15 large spinules (Weitzman and Nijssen, 1970:129, Fig. 6); lateral body scutes 23/20; supraoccipital shield with a small, circular fossa on its central dorsal surface.

Description.—Morphometric and meristic data are in Table 1. We present measurements of more parameters than Nijssen (1970) suggests, because we

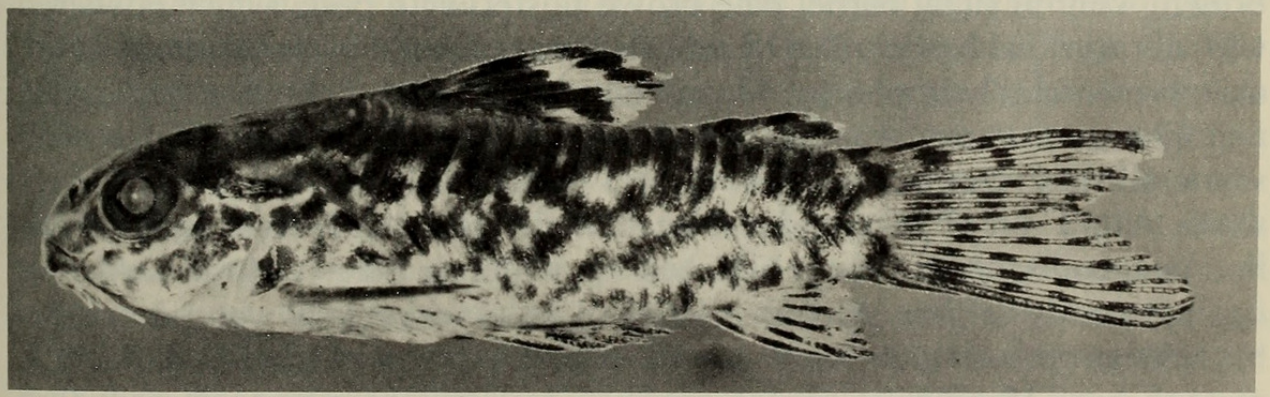

Fig. 2. *Aspidoras pauciradiatus*, ♂MZUSP, SL 16.5 mm, Brazil, State of Amazonas, Rio Negro, São João, near Tapurucuara.

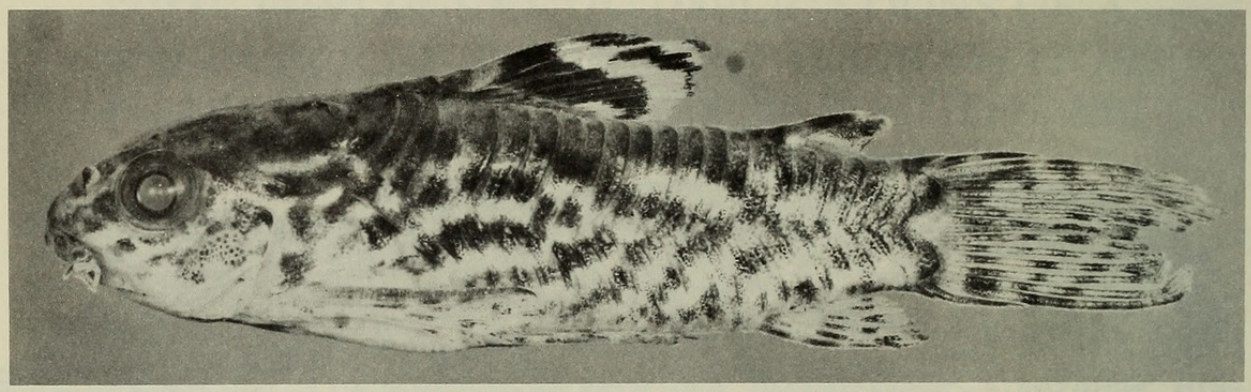

Fig. 3. *Aspidoras pauciradiatus*, ♀MZUSP, SL 17.4 mm, Brazil, State of Amazonas, Rio Negro, São João, near Tapurucuara.

believe these measurements may show useful interspecific and interpopulational differences and similarities in *Aspidoras*, *Corydoras*, and *Brochis*.

Body rather heavyset. Snout blunt, rounded at tip. Two rictal and one mandibular barbel on each side of head. Small, bony prickles present on surfaces of all scutes, bones, and fin spines but not on belly or soft fin rays.

Color in alcohol.—Color of the holotype and paratype was described by Weitzman and Nijssen (1970). The Rio Negro specimens are described below.

Basic (''ground'') body and head color pale brown; markings brown to grayish brown, probably nearly black in life. Top of head very dark, nearly black in some specimens; no dark mask in area of eye. Dorsum of snout anterior to interorbital area paler than dorsum of head and with a pale brown band extending between posterior nares. Anterior to pale band, dorsum of snout mottled with more or less triangular or vermiform dark marks. Just ventral to nares, an irregular, nearly horizontal pale brown stripe extends from near snout tip posteriorly to anterior border of eye. Area ventral to this pale region with a broad dark brown stripe extending from snout tip and origin of dorsal rictal barbel posteriorly and dorsally to anterior border of eye. Often entire and always basal portion of dorsal rictal barbel dark brown. Ventral rictal barbel pale brown posterior to base, which is shared with dorsal rictal barbel; distal portion of ventral rictal barbel with scattered dark brown chromatophores. Mandibular barbel with a patch of dark chromatophores at base; free portion of mandibular barbel pale brown with scattered dark chromatophores. Area ventral and posterior to eye nearly white with a rim of dark pigment near border of eye. Opercle mostly with interconnecting dark brown blotches of moderate size; ventral border of opercle nearly white. Ventral portion of head, especially ventral area of branchiostegal rays and isthmus, without dark pigment patches or dark chromatophores. Mandibular region nearly white but bearing scattered dark chromatophores. Dorsolateral area of branchiostegal rays with scattered

dark chromatophores just ventral to opercle. Dorsum of body and supraoccipital region of head dark brown, often mottled with paler brown; dark brown pigment often confined to posterior borders of head plates and dorsolateral body scutes. External surface of cleithrum and coracoid bones heavily mottled with rather evenly spaced patches of closely set dark brown chromatophores. Sides of body with dark and very pale patches arranged as a series of clear to rather vague posteriorly pointing chevrons with apices at shared junctions of dorso- and ventrolateral body scutes. Belly without dark pigment from head posteriorly to area of pelvic fins and anus.

Dorsal fin with a broad, somewhat horizontal, nearly black stripe at or near its base, this dark pigment often missing or much paler on proximal anterior portion of dorsal-fin spine and at or near base of posteriormost fin rays. Distal to this dark stripe, dorsal-fin rays and membrane nearly white except for a more or less horizontal, very dark stripe extending from near distal tip of spine across distal portions of anterior three or four fin rays. Distal tips of spine and anterior fin rays white; distal tip of first fin ray sometimes black. Tips of middle fin rays may be black and distal third or half of posterior three rays white. Spine of adipose fin darkly pigmented, white at tip; remainder of adipose fin mostly black except at base. Caudal fin with four, five, or six irregular black vertical bars; pigment entirely or almost entirely confined to fin rays. Distal portions of circular body scutes at base of each caudal-fin lobe black. Anal fin pale except for three or four dark markings extending vertically across fin rays. Pelvic fins hyaline except for two or three broad, irregular rows of black bars across fin rays. Pectoral fins with four or five broad rows of dark bars on fin rays; anterior spine dark, especially where rows of fin-ray pigment extend onto spine.

Color in life.—A photograph in Axelrod et al. (1967:F 223.00) shows color in life of the paratype. Pigmentation of living Rio Negro specimens has not been observed.

Discussion

Relationship between Rio Araguaia and Rio Negro populations of Aspidoras pauciradiatus.—Specimens from the Rio Araguaia and from the Rio Negro resemble each other in many ways. These admittedly small samples do not differ in a majority of morphometric and meristic characters (Table 1). They also have nearly identical color patterns, as may be seen by compairing Figs. 1–3 with that in Nijssen and Isbrücker (1976:115, Fig. 5). Both are small forms relative to most species of *Aspidoras* and *Corydoras*; all specimens examined seemed to be sexually mature, and females contained eggs, at 16–23 mm in standard length. Fishes of both populations exhibit the following diagnostic combination of character states, defined for *A. pauciradiatus* by Weitzman and Nijssen (1970) or by Nijssen and Isbrücker

Table 1. Morphometrics and meristics of *Aspidoras pauciradiatus* from two localities.

Character	Specimens from Rio Araguaia (n = 2)			Specimens from Rio Negro (n = 10)				
	$\bar{X}$	SD	Range	$\bar{X}$	SD	Range	*t*	*P*[1]
Standard length (mm)	22.8	0.5	22.4–23.1	16.7	0.7	15.7–17.7	12.09	**
Head length[2]	28.4	0.9	27.7–29.0	30.2	0.8	28.8–31.5	3.07	*
Snout tip to dorsal-fin origin[2]	46.2	0.4	45.9–46.4	49.0	1.2	47.5–51.0	3.18	**
Snout tip to anal-fin origin[2]	80.2	1.1	79.5–81.0	81.4	1.5	78.5–83.9	1.03	NS
Snout tip to adipose-fin origin[2]	87.0	0.6	86.6–87.5	86.7	2.4	83.5–91.4	0.13	NS
Snout tip to anterior border of anus[2]	54.8	1.5	53.7–55.8	57.1	1.2	55.2–58.9	2.46	*
Greatest body depth[2]	30.4	0.6	29.9–30.8	30.3	0.8	28.8–31.6	0.04	NS
Least depth of caudal peduncle[2]	13.0	0.6	12.6–13.4	15.6	0.8	14.1–17.0	4.36	**
Distance between anterior bases of coracoids[2]	13.6	0.3	13.4–13.8	11.6	1.0	9.4–13.3	2.43	*
Snout length[3]	42.6	1.6	41.5–43.8	42.9	2.7	38.0–47.7	0.10	NS
Least width of bony interorbital[3]	44.2	1.6	43.1–45.3	46.6	2.1	43.5–50.0	1.54	NS
Greatest diameter of orbit[3]	28.6	0.8	28.1–29.2	32.6	1.4	29.6–34.0	3.66	**
Greatest depth of ventral infraorbitals[3]	5.4	3.4	3.0–7.8	7.3	2.0	4.0–9.8	1.21	NS
Length of frontal cranial fontanel[3,4]	13.2	5.3	9.4–16.9	21.1	1.7	18.5–24.5	4.44	**
Length of predorsal plate[3]	19.4	0.8	18.8–20.0	19.2	2.4	15.4–23.5	0.13	NS
Greatest head width[3]	83.8	5.3	80.0–87.5	80.4	3.9	74.0–86.3	1.08	NS
Length of ventral rictal barbel[3,4]	92.2	6.6	87.5–96.9	61.2	2.6	56.0–64.7	11.24	**
Dorsal-fin spine length[3]	70.6	1.9	69.2–71.9	79.4	4.0	74.0–86.0	2.78	*
Adipose-fin spine length[3]	30.2	1.5	29.2–31.3	33.1	2.6	28.0–37.5	1.48	NS
Pectoral-fin spine length[3]	89.2	2.0	87.7–90.6	91.7	3.2	87.5–97.5	1.02	NS
Number of azygous predorsal-fin scutes	1.0	0.0	—	1.0	0.0	—	—	—
Number of azygous preadipose-fin scutes[5]	2.0	0.0	—	2.5	0.5	2–3	1.29	NS

Table 1. Continued.

Character	Specimens from Rio Araguaia (n = 2)			Specimens from Rio Negro (n = 10)				
	$\bar{X}$	SD	Range	$\bar{X}$	SD	Range	t	P[1]
Number of dorsolateral body scutes[5]	23.0	0.0	—	22.8	0.4	22–23	0.65	NS
Number of ventrolateral body scutes[5]	20.0	0.0	—	19.8	0.4	19–20	0.65	NS
Number of dorsal-fin rays	6.0	0.0	—	6.0	0.0	—	—	—
Number of pelvic-fin rays	5.0	0.0	—	5.0	0.0	—	—	—
Number of anal-fin rays[5]	5.0	0.0	—	5.1	0.3	5–6	0.43	NS
Number of pectoral-fin rays[5]	7.0	0.0	—	7.1	0.3	7–8	0.43	NS
Number of principal caudal-fin rays, dorsal lobe	7.0	0.0	—	7.0	0.0	—	—	—
Number of principal caudal-fin rays, ventral lobe	7.0	0.0	—	7.0	0.0	—	—	—
Number of spinules on posteromedial border of pectoral-fin spine[5]	14.5	0.7	14–15	11.4	1.0	10–13	4.02	**

[1] Two-tailed test. * indicates $P < 0.05$; ** indicates $P < 0.01$; NS (not significant) indicates $P > 0.05$.

[2] Expressed as percentage of standard length. Arcsine transformations of the percentages were used in computing the value of t.

[3] Expressed as percentage of head length. Arcsine transformations of the percentages were used in computing the value of t.

[4] Homogeneity of variances could not be assumed in the two samples ($P < 0.05$, F-test). However, a nonparametric method (Mann-Whitney U-test) indicated a difference between the two distributions significant at the 0.05 level.

[5] Square-root transformations of counts were used in computing the value of t.

(1976): a small, circular fossa on the dorsal surface of the supraoccipital, sometimes with a minute opening into the skull cavity; lateral body scutes 23/20; dorsal fin I,6; pectoral fin I,7.

Although the Rio Araguaia and Rio Negro specimens exhibit a number of similarities, they differ in certain respects. In Rio Araguaia specimens the rictal barbels extend beyond the eye to reach the posterior border of the opercle, whereas in Rio Negro specimens these barbels do not reach the posterior border of the eye. The frontal cranial fontanel is circular to oval in outline in the Rio Araguaia fishes but is elongate and oval in those from the Rio Negro. Dark pigment is absent from the pectoral and pelvic fins of Rio Araguaia specimens but is present on those of Rio Negro specimens. Finally, the two samples show statistically significant differences in 11 of 31 morphometric and meristic characters (Table 1).

The significant differences between the Rio Araguaia and Rio Negro specimens most likely reflect genetic differences between the two populations, although certain alternative explanations are possible and the samples are small. If the differences are hereditary, we cannot at present determine whether the Rio Araguaia and Rio Negro specimens represent different species or geographical variants of a single species, as collections of small fishes from intervening localities are fragmentary. Future sampling in such areas may indicate whether or not morphologically intermediate forms exist and thus help to resolve this issue. In the meantime, we think it best to act conservatively by classifying the Rio Negro specimens as *A. pauciradiatus*.

Relationship between Aspidoras *and* Corydoras.—Nijssen and Isbrücker (1976) characterize *Aspidoras* by its possession of two cranial fontanels—a frontal fontanel that is shared with other callichthyid genera and a supraoccipital fontanel (fossa) unique to *Aspidoras*. They further note that the frontal fontanel is much smaller and more circular in outline in *Aspidoras* than in the closely related genus *Corydoras*. They found the structure of the skull roof to be essentially similar in 400 specimens representing 13 species of *Aspidoras* and observed "no intermediate structure" (1976:109) in more than 100 species of *Corydoras*.

Our recent discovery of specimens presumed to be *A. pauciradiatus* from the Rio Negro, as well as a reevaluation of some earlier material, obscures in part the taxonomic distinction between *Aspidoras* and *Corydoras*. The Rio Negro fishes did possess a frontal cranial fontanel and a supraoccipital fossa, but the frontal fontanel was significantly longer than in Rio Araguaia specimens (Table 1). Furthermore, individual variation, particularly within the Rio Araguaia sample, was considerable. The holotype from the Rio Araguaia exhibits a small, nearly circular frontal fontanel, similar to other species of *Aspidoras* as illustrated by Nijssen and Isbrücker (1976:126, Fig. 16), whereas the paratype from the same locality has a relatively elongate frontal fontanel that more closely resembles those of the Rio Negro speci-

mens and certain species of *Corydoras*. One could speculate that an enlarged frontal fontanel is paedomorphic for *A. pauciradiatus*, associated with its pygmyism and therefore progenic, although the interpopulational and individual variation that we observed in adults of this species might not support this interpretation. Adults of large species of *Aspidoras* and especially *Corydoras* show a considerable amount of interspecific variation in frontal fontanel size. Significant intraspecific differences in the size of the frontal fontanel in adults of *A. pauciradiatus*, as well as substantial interspecific variation in this character in *Corydoras*, causes us to question the use of the size or shape of the frontal fontanel to distinguish *Aspidoras* from *Corydoras*, as the structure of this fontanel may be more labile than was previously supposed.

The supraoccipital fontanel or fossa appears to be found only in *Aspidoras* among adults of the callichthyid genera, as pointed out by Nijssen and Isbrücker (1976:109). We could find no evidence of an isolated supraoccipital fossa in adult or juvenile specimens of *C. pygmaeus* Knaack (USNM 218355, 5 specimens, SL 10.2–18.1 mm); *C. aeneus* Gill (ZMA, 2 specimens, SL 10.6–10.7 mm); *C.*, c.f. *caquetae* Fowler (USNM 218358, 130 specimens, SL 7.3–36.9 mm); *C. elegans* Steindachner (USNM 218359, 105 specimens, SL 21.2–33.0 mm); *C. barbatus* Jenyns (USNM 100916, 6 specimens, SL 36.8–70.7 mm); and *C. eques* Steindachner (SU-CAS 17746, 10 specimens, SL 7.8–33.5 mm).

Among most of the *Corydoras* adults that we examined, the frontal fontanel bifurcated only the anterior tip of the supraoccipital; however, in juveniles it extended posteriorly through the supraoccipital almost to the bone's midpoint, the region where the supraoccipital fossa occurs in species of *Aspidoras*. In adults of *C. elegans* (USNM 218359) the frontal fontanel bifurcated the anterior portion of the supraoccipital bone into right and left halves. These observations suggest that the supraoccipital fossa of *Aspidoras* may have evolved as an isolated section of a frontal fontanel that originally extended deeply into the supraoccipital. It further seems possible that the supraoccipital fossa is neotenic for large species of *Aspidoras* but progenic for the pygmy species *A. pauciradiatus*. If such is the case, it is conceivable that the supraoccipital fossa is independently derived (and hence non-homologous) in pygmy and non-pygmy species of *Aspidoras*, a circumstance which could lessen the utility of this character for separating *Aspidoras* from *Corydoras*.

Further problems are posed by the discovery of a population of a species of *Aspidoras* almost 3,000 river kilometers out of the known range of the genus (Fig. 4). Previously, the genus *Aspidoras* was known only from a fairly restricted area in southern and eastern Brazil (including the Paraná basin, a few eastern coastal drainages to the north and south of the Rio São Francisco, and southern portions of the Rio Tocantins and the Rio Xingú);

Fig. 4. Distribution of *Aspidoras* based upon Nijssen and Isbrücker (1976:130, Figs. 20–21), with the addition of the Rio Negro locality reported here for *A. pauciradiatus*. Circle enclosing star represents type locality of *A. pauciradiatus*, black circle represents Rio Negro locality of same, and black dots represent localities of other species of *Aspidoras*.

it was believed never to have occupied the main Amazon basin (Nijssen and Isbrücker, 1976). Conversely, *Corydoras* was known to be widely distributed in the Orinoco and Amazon basins, the Guianas, the eastern highlands of Brazil, many of the eastern coastal streams of Brazil, and the Paraná basin in Paraguay (Fig. 5). On the basis of these ostensible differences in distribution, Nijssen and Isbrücker (1976) concluded that *Corydoras* might be more advanced than *Aspidoras* if the presumptive ancestor of both gen-

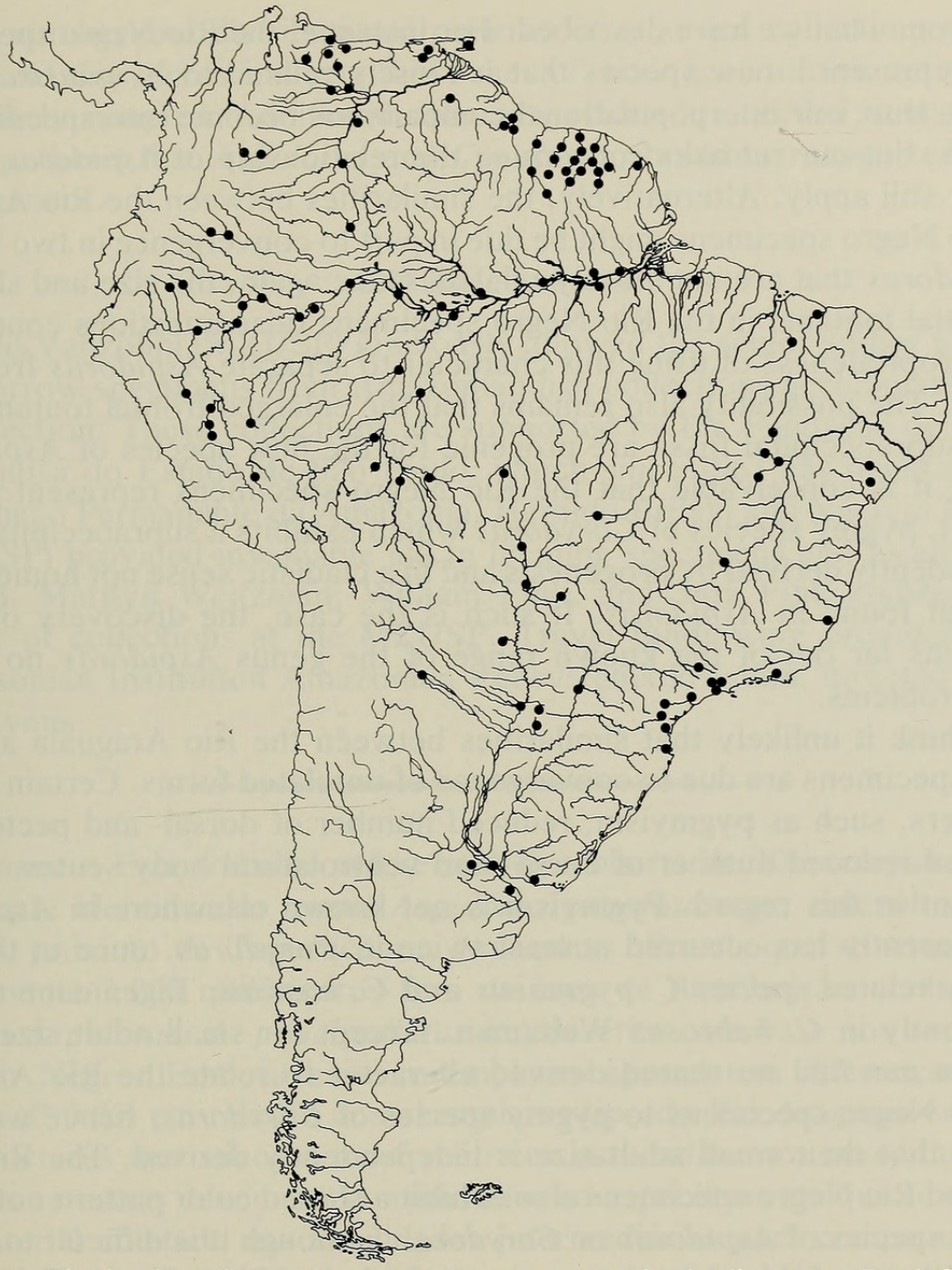

Fig. 5. Distribution of *Corydoras* based upon reports in the literature. Doubtful or non-specific localities have been excluded. Although Nijssen (1970:59, Fig. 35) indicates *Corydoras* from the Rio Magdalena in Colombia, this locality may be in error (e.g. see Eigenmann, 1923:65, 220, 228; Miles, 1947:100).

era was restricted to southern and eastern Brazil. That specimens of *A. pauciradiatus* have now been found in the upper central portion of the Amazon basin brings these authors' statements concerning the distribution and relationships of *Aspidoras* and *Corydoras* into question.

Our discussion to this point is based upon an assumption that the Rio Negro specimens do in fact represent *A. pauciradiatus*. If they do not, their bearing upon the relationship of *Aspidoras* and *Corydoras* may or may not

differ from what we have described. For instance, the Rio Negro specimens might represent a new species that is closely related to *A. pauciradiatus*. If this is true, our interpopulational comparisons become interspecific comparisons, but our remarks concerning the relationship of *Aspidoras* to *Corydoras* still apply. Alternatively, the similarities between the Rio Araguaia and Rio Negro specimens might be due in part to convergence in two species of *Aspidoras* that are not closely related. Once again, the size and shape of the frontal fontanel in the Rio Negro specimens raise questions concerning the appropriateness of using this character to separate *Aspidoras* from *Corydoras*. The possibility also remains that the enlarged frontal fontanel and/or the supraoccipital fossa are progenic for the new species of *Aspidoras*. Finally, it is conceivable that the Rio Negro specimens represent a new, aberrant, pygmy species of *Corydoras* which exhibits a supraoccipital fossa independently derived by progenesis and in a cladistic sense not homologous with that found in *Aspidoras*. If such is the case, the discovery of these specimens far out of the known range of the genus *Aspidoras* no longer poses problems.

We think it unlikely that similarities between the Rio Araguaia and Rio Negro specimens are due to convergence of unrelated forms. Certain shared characters, such as pygmyism, reduced number of dorsal- and pectoral-fin rays, and reduced number of dorso- and ventrolateral body scutes, appear important in this regard. Pygmyism is not known elsewhere in *Aspidoras* but apparently has occurred at least twice in *Corydoras*, once in the presumably related species *C. pygmaeus* and *C. hastatus* Eigenmann and independently in *C. habrosus* Weitzman. Except for small adult size, however, we can find no shared derived character to relate the Rio Araguaia and Rio Negro specimens to pygmy species of *Corydoras;* hence we think it likely that their small adult size is independently derived. The Rio Araguaia and Rio Negro specimens also exhibit a shared color pattern not found in other species of *Aspidoras* or *Corydoras*, although it is difficult to assess the usefulness of this character as a test of relationships. Since, on balance, a few apparently derived characters are shared only by the Rio Araguaia and Rio Negro specimens, we believe that the two forms are closely related. Although the derivation of the supraoccipital fossa in these pygmy forms could be independent of that in large species of *Aspidoras*, we suspect that the supraoccipital fossa probably is homologous in all forms that exhibit it.

At this time we do not have sufficient information to make an objective judgment concerning the relationship of *Aspidoras* to *Corydoras*. Despite questions raised by the discovery of the Rio Negro specimens, we tend to favor the idea that *Aspidoras* is phylogenetically distinct from *Corydoras* on the basis of the supraoccipital fossa. We also suspect that *Aspidoras* and *Corydoras* may differ in head shape and body shape, although we do not have access to sufficient material to examine this possibility at present.

The number and distributional patterns of recorded collections of *Aspidoras* and *Corydoras* indicate that fishes of these genera have not yet been adequately sampled. Additional collecting efforts are needed to test further the hypothesis that *Aspidoras* and *Corydoras* should be recognized as separate genera.

Acknowledgments

Paulo Vanzolini (MZUSP) graciously allowed the senior author to survey and borrow specimens from Amazonian fish collections accumulated under his direction. These collections are supported by the Fundacão de Amparo à Pesquisa do Estado de São Paulo, which since 1967 has maintained the Expedicão Permanente da Amazônia. Heraldo Britski and Naercio Menezes (MZUSP) provided invaluable aid in locating specimens and locality information. Marilyn Weitzman, William Fink, and Sara Fink assisted in the survey of collections at the MZUSP. Travel funds were provided by the Smithsonian Institution Amazonian Ecosystems Program, directed by Clifford Evans.

Resumo.—Este trabalho refere-se à descoberta de 10 exemplares tentativamente identificados como *Aspidoras pauciradiatus,* coletados no Rio Negro, próximo de Tapurucuara, Amazonas, Brasil, que se situa aproximadamente 3.000 quilômetros fora da área de distribuição conhecida do gênero *Aspidoras*. *A. pauciradiatus* é redescrita com base nos exemplares do Rio Negro. Embora esses exemplares apresentem diferenças significantes (P 0.05) em relação aos exemplares-tipo do Rio Araguaia em 11 dos 31 caracteres meristicos e morfométricos estudados, nós acreditamos que as duas amostras devem ser consideradas co-específicas até que se disponha de material coletado nas localidades intermediárias para comparações. Se os exemplares do Rio Negro não são *A. pauciradiatus,* é possível que eles reprentem uma nova espécie intimamente relacionada a esta espécie.

A ocorrência de *Aspidoras* na parte central superior da Bacia Amazônica demonstra que as considerações feitas por Nijssen e Isbrücker (1976) sobre a distribuição de *Aspidoras* e *Corydoras* e sobre as relações entre esses gêneros precisam ser realiadas. A considerável variação interindividual e interpopulacional do tamanho da fontanela craniana frontal nos adultos de *A. pauciradiatus,* bem como a variabilidade interespecífica deste caráter em *Aspidoras* e particularmente em *Corydoras,* leva-nos a questionar o uso do tamanho da fontanela craniana frontal para separar *Aspidoras* de *Corydoras*. Os dois gêneros pode ainda ser distinguidos com base na fossa supraoccipital, embora seja admissível que esta estrutura tenha surgido independentemente em diferentes espécies, sendo por isso não homóloga no sentido

cladístico. Assim, o reconhecimento de *Aspidoras* como um "taxon" diferente de *Corydoras* pode ou não ser uma medida apropriada. Coletas posteriores poderão ajudar a resolver estes problemas.

Literature Cited

Axelrod, H. R., C. W. Emmens, D. Sculthorpe, W. Vorderwinkler, and N. Pronek. 1967. Exotic tropical fishes: M 3.00–121.00, P. 2.00–93.00, C 3.00–48.00, F 1.00–608.00.—T. F. H. Publications, Jersey City.

Eigenmann, C. H. 1923. The fishes of western South America, I.—Mem. Carnegie Mus. 9(1):1–346.

Miles, C. 1947. Los peces del Rio Magdalena.—Ministerio de la Economia Nacional, Colombia, i–xxviii plus 214 pp.

Nijssen, H. 1970. Revision of the Surinam catfishes of the genus *Corydoras* Lacépède, 1803 (Pisces, Siluriformes, Callichthyidae).—Beaufortia 18(230):1–75.

———, and I. J. H. Isbrücker. 1976. The South American plated catfish genus *Aspidoras* R. von Ihering, 1907, with descriptions of nine new species from Brazil (Pisces, Siluriformes, Callichthyidae).—Bijdragen Tot de Dierkunde 46(1):107–131.

Weitzman, S. H., and H. Nijssen. 1970. Four new species and one new subspecies of the catfish genus *Corydoras* from Ecuador, Colombia and Brazil (Pisces, Siluriformes, Callichthyidae).—Beaufortia 18(233):119–132.

(SHW) Department of Vertebrate Zoology, Smithsonian Institution, Washington, D.C. 20560; (MHB) Department of Wildlife Science, Utah State University, Logan, Utah 84322.