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Four new species and one new subspecies of the catfish genus *Corydoras* from Ecuador, Colombia and Brazil (Pisces, Siluriformes, Callichthyidae)

S. H. WEITZMAN & H. NIJSSEN

ABSTRACT

This paper contains figures and descriptions of four new species of *Corydoras*, *C. atropersonatus*, *C. orphnopterus*, from Ecuador, *C. simulatus* from Colombia, and *C. pauciradiatus* from Brazil. One new subspecies, *Corydoras pastazensis orcesi* from Ecuador is figured and described as new. The relationships of the new species with other species of *Corydoras* are discussed.

INTRODUCTION

The five new catfish forms described herein were discovered while preparing a review of the callichthyid genus *Corydoras*. Since it will be some time before our work on this large group is completed and published, we believe it desirable to publish these new forms now. The two species and one subspecies from Ecuador were sent to the National Museum of Natural History at Washington (United States National Museum), and the Zoölogisch Museum, Amsterdam by Professor Gustavo Orcés-V. of the Escuela Politecnica Nacional, Quito, Ecuador. The species from Colombia was received from Dr. Keith Nelson, and the specimens from Brazil were donated by Dr. Herbert R. Axelrod. Figure 4 was prepared by Mrs. Marcia Bakry. Comparative material was loaned by Professor George S. Myers and Dr. Warren C. Frehofer of Stanford University, Drs. James E. Böhlke and James C. Tyler of the Academy of Natural Sciences, Philadelphia, and Dr. Paul Kähsbauer of the Naturhistorisches Museum, Wien. We thank all these persons for their generosity and help. The junior author is greatly indebted to the authorities of the Smithsonian Institution for their financial support during his visit to Washington.

The classification of *Corydoras* is becoming exceedingly difficult. Most of the approximately 80 species are based primarily on colour pattern and

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proportional differences in body measurements. Meristic characters usually being the same or nearly the same. Population samples of these species are very limited, often restricted to a few specimens from one or at the most very few localities. Such inadequate samples prevent the necessary and urgently needed statistical comparison of population samples throughout the range of the various species with their close relatives.

Proportional differences sometimes have a relatively wide range, especially when measurements from specimens of an apparent single species from several widely separated localities are compared. Usually a sample from one geographical locality has consistent measurements and colour pattern; however, a few, or several hundred miles away the pattern and proportional measurements may vary, often considerably. The problem then to be solved is whether one, two, or more species are at hand. Without knowledge of the variation occurring in populations located in geographical areas between the samples at hand, consistent and logical systematic decisions are difficult to make. If the genus *Corydoras* is ever to be well understood, extensive analysis of population samples from adjacent stream drainages must be undertaken. Ecological conditions may isolate populations in tributaries of the same river system and any analysis of differences in these fishes will have to be closely correlated with ecological and distributional studies.

Three of the four species described below have very close relatives, and may eventually prove to be subspecies when adequate samples become available. At present, however, all are clearly distinguishable and we believe it is useful to describe these forms as new species. One form is described as a subspecies. The samples we have differ from its nearest relative only in colour pattern and that close relative lives in an adjacent river system.

Proportions are expressed in standard length (sl), head length (hl), or in the least depth of the caudal peduncle (dcp). Data for the holotype are given first, followed by data for the paratypes in parentheses. Measurements are taken to one tenth of a millimeter.

***Corydoras pastazensis orcesi* new subspecies (figs. 1, 6a)**

Holotype USNM 204358 ♀, 55.5 mm sl, Ecuador, Río Conambo near village Conambo (01°55' S, 76°51' W), Río Tigre system, Est. Pastaza. Coll. Pablo Mena, May, 1961.

4 paratypes USNM 203827, 50.0—55.6 mm sl, same data as holotype (2 specimens of this series deposited in ZMA 110.377).

5 paratypes USNM 203828, 48.5—64.0 mm sl, same data as holotype.

6 paratypes EPN 4480—4484b, 47.4—55.2 mm sl, same data as holotype (2 specimens of this series deposited in ZMA 110.378, another two specimens in BMNH 1970.4.17.3-4).

5 paratypes EPN 4172—4176, 49.4—58.9 mm sl, Ecuador, Río Pindo near confluence with Río Conambo, Río Tigre system, Est. Pastaza. Coll. Pablo Mena, August, 1956 (2 specimens of this series deposited in ZMA 110.379).

Description. — Body depth at origin of dorsal spine 3.0 (2.8—3.1) in sl. Body width at origin of pectoral spines 4.4 (4.2—4.6) in sl. Head length 3.3 (3.2—3.6) in sl. Distance between snout tip and posterior edge of supra-occipital 2.5 (2.4—2.6) in sl. Distance between snout tip and origin pectoral

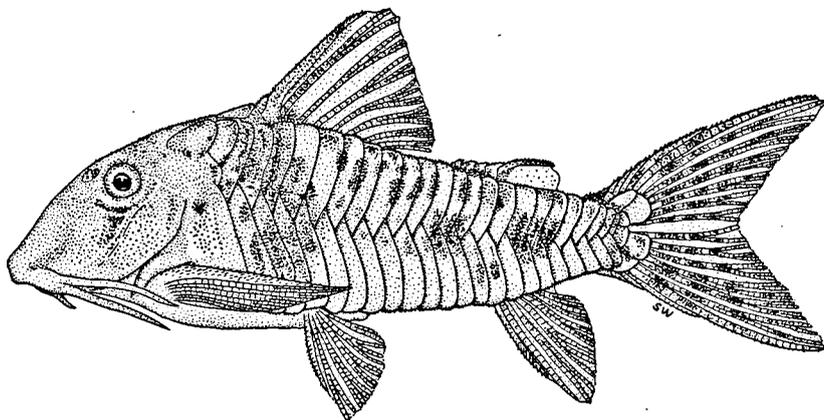


Fig. 1. *Corydoras pastazensis orcesi* new subspecies, holotype, USNM 204358, 55.5 mm sl.

spine 4.2 (3.9—4.5) in sl. Length dorsal spine 4.7 (3.8—4.8) in sl. Length pectoral spine 4.2 (3.8—4.5) in sl. Snout length 1.6 (1.5—1.7) in hl, 0.62—0.79 in dcp. Length bony orbit 4.1 (3.4—4.2) in hl. Least interorbital width 3.4 (2.9—4.0) in hl, 1.38—1.81 in dcp. Width coracoid area between anterior-most ventral body scutes 3.1 (2.8—4.4) in hl. Least depth caudal peduncle 2.3 (2.0—2.4) in hl.

Dorsal fin I,7. Pectoral fin I,9 (I,9—10). Anal fin ii,5. Pelvic fin i,5. Principal caudal rays 7/7. 26 (24—25) dorsolateral and 23 (22—23) ventrolateral body scutes. 4 (3—6) preadipose scutes. Two pairs of rictal barbels and one pair of mental barbels. Inner edge pectoral spine with large regular serrae (see fig. 6a). Fontanel elongate, 5.6 mm in holotype. Skin of intercoracoid area with minute spinules.

Colour in alcohol (see fig. 1 of holotype). — Ground colour of head and body very pale tan, almost pale yellow. Area dorsal to eyes and supraoccipital moderately grey, small triangle of moderately grey to black pigment below eye produces effect of a small mask. Dorsum of snout pale grey, not as dark as area above eyes. Side of face ventroanterior to eyes pale tan. Operculum dusky pale yellow. Both rictal barbels without dark pigment. Three prominent brown to black blotches on sides of body, largest below dorsal fin. Largest blotch vertical with convex posterior border, and primarily covers dorsolateral scutes 3 through 5 and ventral half of 6. Ventrolateral scutes 1 through 3 are extensively covered by this blotch, also dorsal half of fourth ventrolateral scute. Dorsolateral scutes rather irregularly pigmented with brown vertical bars, most specimens having pattern on these similar to that of holotype illustrated. In holotype two moderate sized blotches cover lateral scute junctions including ventral portions of dorsolateral scutes 13 through 16 and 19 to 21. These blotches also cover dorsal parts of ventrolateral scutes 10 to 13 and 17 through 19. In some paratypes a third small blotch present on

scute junctions of dorsolateral scutes 9 and 10 with ventrolateral scutes below. Base of caudal peduncle covered by a vertical bar of greyish pigment. Belly white.

Dorsal spine and membrane closely adjoining it lightly pigmented in black. Remainder of dorsal fin without dark pigment. Adipose fin without much pigment except at base of spine and along its distal one-half. Pectoral, pelvic, and anal fins without black spots. Caudal fin with 4 to 7 (5 in holotype) vertical black bands, pigment mostly confined to the rays.

Derivation of name. — In honour of Dr. G. Orcès-V., who provided the material.

Additional material of *C. pastazensis pastazensis* Weitzman, 1963:

7 specimens EPN 4253—4259, 49.5—62.0 mm sl, Ecuador, Río Bobonaza near Montalvo (02°06' S, 76°59' W), Río Pastaza system, Est. Pastaza. Coll. G. Herrera and Ramón Olalla, February, 1958 (3 specimens of this series deposited in ZMA 110.380).

4 specimens EPN 4136—4139, 38.3—58.5 mm sl, Ecuador, Lower Río Bobonaza, Río Pastaza system, Est. Pastaza. Coll. Ramón Olalla, December, 1957 (2 specimens of this series deposited in ZMA 110.381).

Discussion. — *Corydoras pastazensis orcesi* and *Corydoras pastazensis pastazensis* Weitzman, 1963, differ only in colour pattern. Eleven additional specimens of *C. p. pastazensis* (only 4 were previously known) show a range of proportions and counts that almost completely overlap those of *C. p. orcesi*. There are differences in our population samples with regard to some measurements expressed as proportions of standard length and some that may show a difference in the two subspecies or populations; however, our samples are too small to provide significant information. For example the four types of *C. p. pastazensis* from near the mouth of the Río Bobonaza have a head length in standard length of 3.0 to 3.1, four additional specimens from the "lower" Río Bobonaza have 3.1 to 3.2, and seven additional specimens from the Río Bobonaza near Montalvo have 3.1 to 3.5 (3 with 3.5). There seems to be little correlation of head length to standard length in the sizes measured (38.3 to 62.0 mm sl) but some difference based on locality. In *C. p. orcesi*, 14 specimens from the Río Conambo near Conambo have a head length range of 3.2 to 3.5 (6 with 3.5), while five specimens from the Río Pindo near its confluence with the Río Conambo have a range of 3.3 to 3.6. Again there is little correlation between head length and standard length at the sizes measured (47.4 to 64.0 mm sl). Specimens of *C. p. orcesi* seem to differ less from some samples of *C. p. pastazensis* than some *pastazensis* samples differ from other *pastazensis* samples. However, there is some indication that *C. p. orcesi* may tend to have a smaller head than *C. p. pastazensis*. Unfortunately our samples are not sufficient for a useful statistical analysis.

C. p. orcesi differs from *C. p. pastazensis* in colour pattern by having the posterior border of the anterior vertical bar convex (concave in *C. p. pastazensis*). Note that the holotype of *C. p. pastazensis* illustrated by Weitzman (1963) has a very pale anterior vertical bar. This is darker in other specimens. *C. p. orcesi* has two moderate sized blotches on the scute junctions below the

posterior border of the dorsal fin and below the adipose fin. These are missing in *C. p. pastazensis* which has small spots and very pale blotches in this region. The difference in colour pattern is confirmed by the collectors: "... according to our collectors, ... there are some minor differences (principally concerning the coloration in life) between the fishes from the Pastaza system and those from the Río Tigre system." (Orcès in litt., January 27, 1970).

Our recognition of *C. p. orcesi* as a subspecies is in the nature of a prediction. *C. p. pastazensis* is known from the Río Pastaza system, that of *C. p. orcesi* from the Río Tigre. Both are found in the uplands (between 200 and 500 meters high) where the Río Conambo (tributary of the Río Tigre) and Río Bobonaza (tributary of the Río Pastaza) are parallel and no more than a few miles apart. Both the Río Tigre and the Río Pastaza are tributaries of the Río Marañon in Peru at elevations between 100 and 200 meters. Neither of these forms is known from the Río Marañon, a relatively well collected river. It may be that these two long snouted forms are confined to the "uplands", above 200 meters or so, and that each is now isolated from the other. The original migration that ultimately separated these two forms was probably through stream capture via small tributaries of the closely adjacent Río Bobonaza and Río Conambo.

***Corydoras atropersonatus* new species (figs. 2, 6b)**

Holotype USNM 204359, 38.8 mm sl, Ecuador, Río Conambo at mouth of Río Shione (about 02°00'S, 76°30'W), Río Tigre system, Est. Pastaza. Coll. Ramón Olalla, September 1960.

7 paratypes USNM 204360, 30.2—40.3 mm sl, same data as holotype (two specimens of this series deposited in ZMA 110.382).

8 paratypes EPN 4429—4436, 32.3—42.8 mm sl, Ecuador, Río Shione Yacu near its confluence with Río Conambo, Río Tigre system, Est. Pastaza. Coll. Ramón Olalla, September 1960 (three specimens of this series deposited in ZMA 110.385; two specimens in BMNH 1970.4.17.1-2). These eight specimens have been dried out.

1 paratype ZMA 110.386, 35.7 mm sl, Ecuador, exact locality not known. Coll. Ramón Olalla, no date (probably from Río Conambo, Río Tigre system, Est. Pastaza).

Description. — Body depth at origin of dorsal spine 2.6 (2.5—2.7) in sl. Body width at origin of pectoral spines 3.6 (3.5—3.8). Head length 3.2 (3.1—3.4) in sl. Distance between snout tip and posterior edge of supraoccipital 2.2 (2.1—2.3) in sl. Distance between snout tip and origin pectoral spine 3.5 (3.5—3.6) in sl. Length dorsal spine 3.8 (3.3—3.6) in sl. Length pectoral spine 3.5 (3.0—3.2) in sl. Snout length 2.0 (2.0—2.1) in hl, 0.92—1.06 in dcp. Length bony orbit 3.1 (2.8—3.1) in hl. Least interorbital width 2.4 (2.3—2.5) in hl, 1.12—1.20 in dcp. Width coracoid area between anterior most ventral body scutes 3.1 (2.5—3.1) in hl. Least depth caudal peduncle 2.2 (2.0) in hl.

Dorsal fin I,7. Pectoral fin I,8 (I,8—I,9). Anal fin ii,5. Pelvic fin i,5. Principal caudal rays 7/7. 24 (24) dorsolateral and 21 (21—22) ventrolateral body scutes. 3 (2—4) preadipose scutes. Two pairs of rictal barbels and one pair of mental barbels. Inner edge of pectoral spine with small irregular serrae

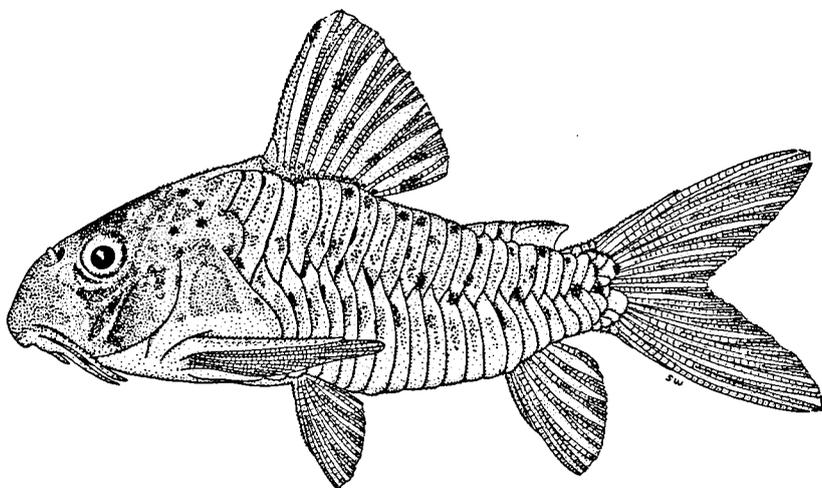


Fig. 2. *Corydoras atropersonatus* new species, holotype, USNM 204359, 38.8 mm sl. (see fig. 6b). Fontanel short, 1.5 mm in holotype. Skin of intercoracoid area naked.

Colour in alcohol (see fig. 2 of holotype). — Ground colour of head and body pale tan, somewhat darker on dorsum. Pigment dorsal and ventral to eyes organized into a distinct vertical mask. Black pigment on dorsum of snout and on supraoccipital very pale brown. Dorsal rictal barbels brown, ventral rictal barbels white. Dorsal portion of cleithrum pale brown. Small black spots more or less irregularly distributed on dorsolateral body scutes except that spots tend to occur more frequently at dorsal and ventral ends of scutes. Spots on ventrolateral scutes confined to dorsal 1/4 to 1/3 of each scute. An elongate pale vertical bar occurs in dorsal midregion of each ventrolateral scute and dorsal end of this bar which may bear enough pigment to form a noticeable dark spot.

Dorsal fin with dark brown to black pigment at its base. One or two rows of relatively thin, more or less horizontal dark bands on dorsal fin; pigment of these rows confined to fin rays. A small amount of brown pigment on spine and membrane of adipose fin. Pectoral, pelvic, anal, and caudal fin without pigment.

Derivation of name. — From the Latin “ater” meaning black and “personatus” meaning masked in reference to the large black vertical bar across the eyes.

Discussion. — *Corydoras atropersonatus* appears closely related to *Corydoras sychri* Weitzman, 1960, known only from the holotype. *C. atropersonatus* differs from *C. sychri* in having a shorter head (3.1–3.4 in *atropersonatus* and 2.9 in *sychri*), a shorter snout (2.0–2.1 in *atropersonatus* and 1.7 in *sychri*), a larger eye (2.8–3.1 in *atropersonatus* and 3.8 in *sychri*), and a

deeper caudal peduncle (2.0—2.2 in *atropersonatus* and 2.4 in *sychri*). *C. atropersonatus* has one or two horizontal bands in the dorsal fin. These are apparently absent in *sychri*. *C. atropersonatus* may or may not prove to be a subspecies of *sychri*; however, the single known specimen of *sychri* is without locality information and no reasonable comparison between the two forms is possible at present.

***Corydoras orphnopterus* new species (figs. 3, 6c)**

Holotype USNM 204361, 57.7 mm sl, Ecuador, lower Río Bobonaza between Montalvo (02°06'S, 76°59'W) and Chicherota, Río Pastaza system, Est. Pastaza. Collector and date unknown.

2 paratypes USNM 204362, 56.4—57.2 mm sl, same data as holotype (The larger paratype deposited in ZMA 110.383).

Description. — Body depth at origin of dorsal spine 2.6 (2.5—2.6) in sl. Body width at origin of pectoral spines 4.4 (4.1—4.2) in sl. Head length 3.3 (3.3—3.4) in sl. Distance between snout tip and posterior edge supraoccipital 2.4 (2.4) in sl. Distance between snout tip and origin pectoral spine 3.6 (3.6—3.8) in sl. Length dorsal spine 4.4 (4.5—4.7) in sl. Length pectoral spine 4.2 (4.0—4.1) in sl. Snout length 1.8 (1.8—1.9) in hl, 0.79—0.83 in dcp. Length bony orbit 3.6 (3.3—3.4) in hl. Least interorbital width 2.2 (2.1—2.2) in hl. 0.95—0.99 in dcp. Width coracoid area between anteriormost ventral body scutes 4.0 (2.5—2.8) in hl. Least depth caudal peduncle 2.2 (2.2—2.3) in hl.

Dorsal fin I,7. Pectoral fin I,9. Anal fin ii,5. Pelvic fin i,5. Principal caudal rays 7/7. 25 (25) dorsolateral and 22 (22-23) ventrolateral body scutes. 3 (3—4) preadipose scutes. Two pairs of rictal barbels and one pair of mental barbels. Inner edge of pectoral spine moderately and regularly serrated (see fig. 6c).

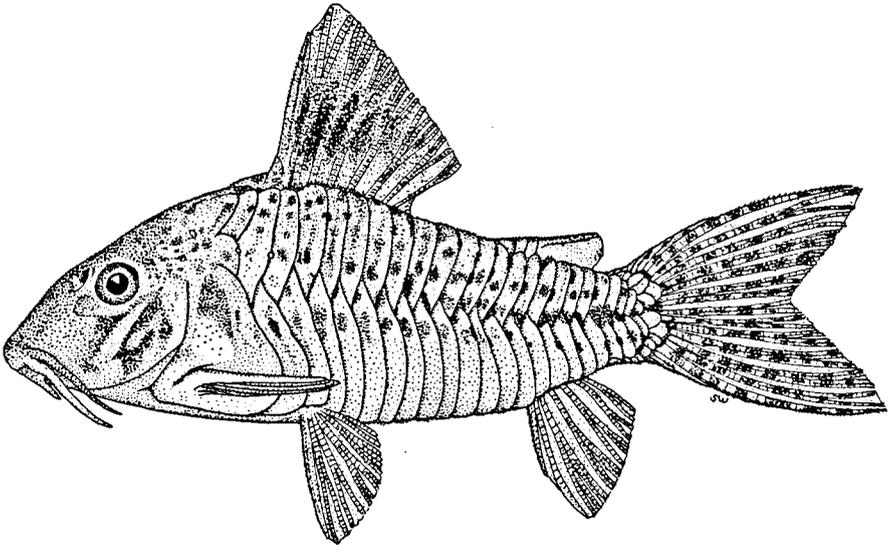


Fig. 3. *Corydoras orphnopterus* new species, holotype, USNM 204361, 57.7 mm sl.

Fontanel elongate, 4.7 mm in holotype. Skin of intercoracoid partly of totally (largest paratype) covered by mosaic plates.

Colour in alcohol (see fig. 3 of holotype). — Ground colour of body and head pale yellowish tan. Dorsum of head and snout dark, almost black. Area ventral to eye and anterior part of opercle black as illustrated in fig. 3. Black pigment around head, snout and eye extensive. Area posterior to eye pale brown. Dorsal rictal barbels brown. Ventral rictal barbels pale tan to white. Dorsal part of cleithrum with a prominent black blotch. Dorsolateral body scutes with pigment pattern as shown in fig. 3. Usually a row of spots just dorsal to junctions between dorsolateral and ventrolateral body scutes, a row of spots at junctions of body scutes and a final row just ventral to these junctions, consisting of a spot of black in dorsal portion of each ventrolateral body scute. Ventrolateral body scutes entirely without dark pigment except for a single dorsal row of spots. Belly region white where belly scutes absent or missing. Belly region pale yellowish tan where scutes present. Scutes impart yellowish tan colour.

Dorsal fin with a large black blotch isolated from pigment of body. Black blotch begins on center of length of dorsal spine and continues posteriorly becoming darkest on second through fourth dorsal fin rays. Only a small amount of black pigment extends posteriorly to darken bony parts of remaining rays. Membrane of dorsal fin deeply pigmented at centre of dark blotch. Adipose, pectoral, pelvic and anal fins colourless. Caudal fin with about 8 to 10 very narrow vertical bars, pigment being mostly confined to bony parts of fin rays.

Derivation of name. — From the Greek “orphnos” meaning dark or dusky and “pteron” meaning feather, wing or fin in reference to the black spot on the dorsal fin.

Discussion. — *C. orphnopterus* appears most closely related to *C. ambiacus* Cope, 1872, of which we examined the single holotype from the Rio Ampyiacu, Peru. *C. orphnopterus* differs from *C. ambiacus* in colour pattern. The black blotch on the dorsal fin of *C. orphnopterus* is confined to the central part of the fin, whereas in *C. ambiacus* black pigment occurs in the central part of the dorsal fin and extends ventrally to the basal black blotch on the dorsal part of the body. *C. orphnopterus* also has a smaller head (3.3–3.4 in *C. orphnopterus* and 3.1 in *C. ambiacus*). *C. orphnopterus* has the dorsal profile of the snout straight whereas it is distinctly concave in *C. ambiacus*, especially just dorsal to the “root” of the rictal barbels and anterior tip of the snout.

***Corydoras simulatus* new species (figs. 4, 6d)**

Holotype USNM 197615, 51.0 mm sl, Colombia, Río Ocoa near Puerto López (04°06'N, 72°57'W), Río Meta system, Est. Meta. Coll. Keith Nelson, August 23, 1961.

6 paratypes USNM 197616, 32.0–52.9 mm sl, same data as holotype (two specimens of this series deposited in ZMA 110.384).

1 paratype USNM 197667, 52.9 mm sl, Colombia, Caño Pochaquiario at Via Puerto López, Est. Meta. Coll. Keith Nelson, August 22, 1961.

Description. — Body depth at origin of dorsal spine 2.8 (2.7—3.0) in sl. Body width at origin of pectoral spines 4.2 (4.2—4.6) in sl. Head length 3.1 (3.0—3.2) in sl. Distance between snout tip and posterior edge or supraoccipital 2.3 (2.1—2.4) in sl. Distance between snout tip and origin pectoral spine 3.5 (3.3—3.9) in sl. Length dorsal spine 4.9 (3.9—5.3) in sl. Length pectoral spine 4.8 (4.2—4.9) in sl. Snout length 1.6 (1.6—1.7) in hl, 0.62—0.75 in dcp. Length bony orbit 4.1 (3.7—4.2) in hl. Least interorbital width 3.2 (3.1—3.3) in hl, 1.29—1.42 in dcp. Width coracoid area between anteriormost ventral body scutes 4.6 (3.3—5.0) in hl. Least depth caudal peduncle 2.4 (2.2—2.6) in hl.

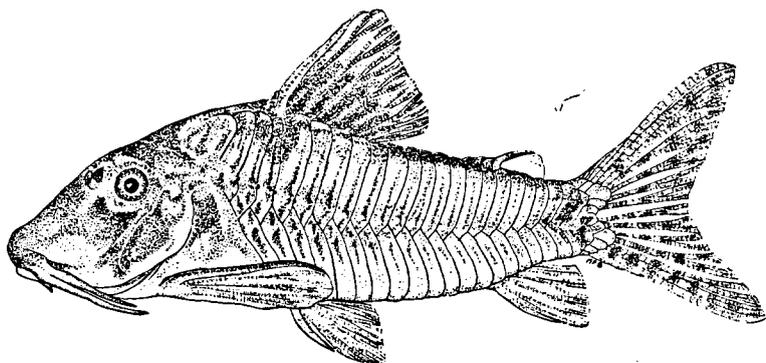


Fig. 4. *Corydoras simulatus* new species, holotype, USNM 197615, 51.0 mm sl.

Dorsal fin 1,7. Pectoral fin 1,9. Anal fin ii,5. Pelvic fin i,5. Principal caudal rays 7/7. 24 (24) dorsolateral and 22 (21—22) ventrolateral body scutes. 3 (2—3) preadipose scutes. Two pairs of rictal barbels and one pair of mental barbels. Inner edge of pectoral spine strongly serrated (see fig. 6d). Fontanel elongate, 5.0 mm in holotype. Skin of intercoracoid area naked, in some paratypes with minute spinules.

Colour in alcohol (see fig. 4 of holotype). — Ground colour of body and head pale greyish tan. Melanophores across dorsum of head, above and posterior to eyes, ventral to eyes, and on anterior part of operculum forming a mask. Remainder of head relatively pale but dorsum of snout relatively dark especially anterior to nostrils. Dorsal rictal barbels greyish, ventral rictal barbels pale tan. Dorsal part of cleithrum with black blotch, otherwise pale. Along junctions of dorsolateral and ventrolateral body scutes posterior to cleithrum and ventral to dorsal fin is a large, rather pale black blotch. Primary pigment of this blotch formed by especially dark vertical bands in center of both dorsal and ventral body scutes of this region. Dorsal scutes 2 through 9 and ventral scutes 1 through 7 or 8 especially dark, forming basis of blotch. These vertical lines present on remainder of scutes but pale, except on caudal peduncle where they form a black blotch. Another, smaller blotch present on dorsal parts of dorsolateral scutes 2 and especially 3 through 5. This blotch continuous with blotch on dorsal fin and connects by a thin black line to a

black band extending posterior from dorsal fin along dorsal part of dorsolateral scutes 8 through 24. This forms a black band connecting with blotch on caudal peduncle. In some paratypes, bands and blotches very pale, apparently due to varied method of preservation or varying time between death and preservation. In life all specimens with dark bands, blotches, and mask. Belly very pale tan to white; white in holotype.

Dorsal fin heavy with a ventrally located large black blotch. Distal half of dorsal fin without pigment in holotype. In some paratypes dorsal blotch faded but all specimens with well developed blotch in life. Distal 1/8 to 1/4 of dorsal fin in paratype without heavy, dark pigment and in some specimens about 3/4 of basal part of fin well pigmented, usually somewhat more pale distally. Adipose fin with small amount of black pigment along spine. Anal, pectoral, and pelvic fins almost without pigment. Caudal fin with about 7 faint narrow vertical brown to black bars in holotype, 6 to 9 bars in paratypes.

Colour in life. — Dark pigment pattern same as in alcohol but ground colour greyish, to pale blue grey. Pale yellowish (=tan) of preserved fish mostly due to colour of fixed muscle tissue beneath semitransparent body scutes. Kodachrome colour slides of living holotype and one paratype indicate a considerable amount of pale specular blue associated with dark pigment in life, especially on head and body. Some specular green flecks also occur ventral to eyes, on darkest part of operculum and over lateral portion of cleithrum.

Derivation of name. — From the past participle of the Latin “simulare” meaning to imitate, in reference to the similarity of the colour pattern of this new species to that of *Corydoras metae* Eigenmann, 1914, also from the Río Meta system and found with *C. simulatus*.

Discussion. — Although the colour pattern of *C. simulatus* superficially resembles that of the short snouted *C. metae* Eigenmann, 1914, in fact *simulatus* is closely related to the long snouted *C. septentrionalis* Gosline, 1940. We have compared the type specimens of *septentrionalis* with those of the new species and find that these two species have very similar colour patterns but that each species emphasizes a different part of the colour pattern. *C. simulatus* does have a large basal black blotch on the dorsal fin that is absent in *septentrionalis* but otherwise the colour patterns show relationship. *C. septentrionalis*, however, has the large black body blotch along the midside ventral to the dorsal fin greatly darkened and emphasized, whereas *C. simulatus* has this blotch relatively weak, both in life and in alcohol. The pigment on the body at the base of the dorsal fin is very dark and forms a distinct blotch in *simulatus*, whereas it is relatively weak and pale in *septentrionalis*. In both species the dorsal ends of the dorsolateral scutes bear dark pigment but this is very pale in *septentrionalis* and very dark, forming a black band in *simulatus*. Both species have dark pigment on the caudal peduncle but this appears darker in *simulatus*. The head of *simulatus* has much black pigment,

almost forming a rather diffused black mask across the eyes. The head pigment of *septentrionalis*, although with a similar distribution, is very pale without any indication of a mask.

C. simulatus tends to have a longer snout (1.6—1.7 in *simulatus* and 1.7—1.9 in *septentrionalis*), a narrower interorbital width (3.1—3.3 in *simulatus* and 2.7—3.0 in *septentrionalis* (except for one paratype which has 3.2)). The snout length expressed in the least depth of the caudal peduncle is different in the two species, being 0.62—0.75 for *simulatus* and 0.77—0.90 for *septentrionalis*. It may eventually prove that *simulatus* and *septentrionalis* are subspecies of a widely distributed species.

***Corydoras pauciradiatus* new species (figs. 5, 6e)**

Holotype USNM 191625, 23.2 mm sl, Brazil, Rio Araguaia near Aruana (14°58'S, 51°04'W), Est. Goiás. Coll. Herbert R. Axelrod, 1960. [An article on this collecting trip which mentioned finding this new *Corydoras* species was published by Axelrod, 1961].

1 paratype USNM 204363, 22.6 mm sl, same data as holotype.

Description. — Body depth at origin of dorsal spine 3.4 (3.3) in sl. Body width at origin of pectoral spines 3.9 (4.0) in sl. Head length 3.7 (3.7) in sl. Distance between snout tip and posterior edge of supraoccipital 2.7 (2.5) in sl. Distance between snout tip and origin pectoral spine 3.9 (3.8) in sl. Length dorsal spine 5.2 (4.9) in sl. Length pectoral spine 4.2 (4.0) in sl. Snout length 2.5 (2.5) in hl, 1.16 in dcp. Length bony orbit 3.7 (3.9) in hl. Least interorbital width 2.2 (2.3) in hl, 1.03—1.07 in dcp. Width coracoid area between anterior-most ventral body scutes 1.8 (2.1) in hl. Least depth caudal peduncle 2.1 (2.1) in hl.

Dorsal fin I,6. Pectoral fin I,7. Anal fin i,6. Pelvic fin i,5. Principal caudal rays 7/7. 23 (23) dorsolateral and 20 (20) ventrolateral body scutes. 2 (2) preadipose scutes. Two pairs of rictal barbels and one pair of mental barbels.

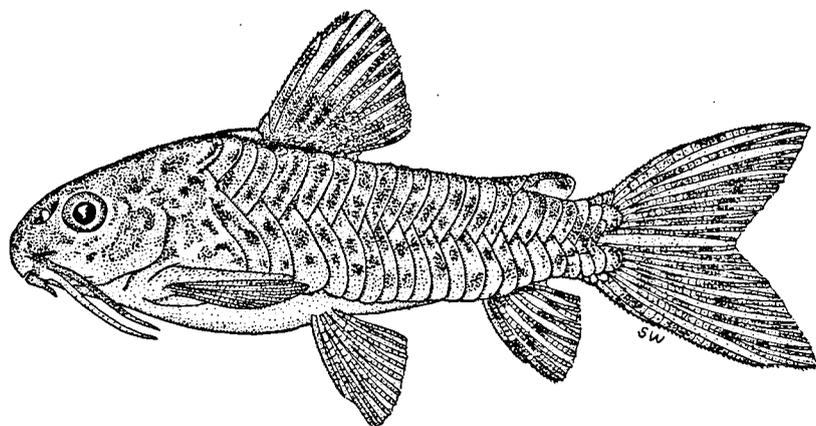


Fig. 5. *Corydoras pauciradiatus* new species, holotype, USNM 191625, 23.2 mm sl.

Inner edge of pectoral spine strongly serrated (see fig. 6e). Fontanel round, 0.7 mm in diameter in holotype and paratype, enclosed by frontals. Skin of intercoracoid area naked.

Colour in alcohol (see fig. 5 of holotype). — Ground colour of body and head pale tan. No mask present but melanophores dense between eyes and over supraoccipital bone, producing a dark brown colour on posterior dorsum of head. Dorsum of snout pale brown with 7 to 8 moderate sized brown spots in a triangular pattern with one end of triangle at snout tip. Small brown spots (as in fig. 5) arranged over sides of body and head. Spots tend to be arranged in a linear longitudinal pattern, each row occurring on 6 to 10 scutes. Posterior end of each row converges toward junction between dorsolateral and ventrolateral body scutes. Thus posteriorly, dorsal rows of spots converge ventrally toward ventral rows of spots which converge dorsally. The effect vaguely resembles a series of posteriorly pointing cheverons. This can best be seen in a live colour photograph of paratype on page F-223.00 of "*Corydoras* U-6" in Axelrod, et al. (1962). Belly pale tan, without dark pigment. Dorsal rictal barbels brown, ventral rictal barbels white.

Dorsal fin with a large basal black blotch, on rays and membrane and one or two distal narrow horizontal bands. Pigment of these bands confined to fin rays. Adipose fin with some pigment dorsally in both specimens; adipose spine with black pigment. Pectoral and pelvic fins without dark pigment. Anal fin with one or two rows of pigment, confined to the fin rays and forming a band. Caudal fin with about five rows of narrow black bars, third from anterior band being darkest. Distal bar almost not distinguishable. Pigment confined to fin rays.

Colour in life. — We have not seen this species alive but the colour photograph in Axelrod et al. (1962), p. F-223.00 of the paratype shows the brown spots to be black and much more distinctly defined than in the preserved specimens. The dorsal fin blotch is very sharply delimited. The ground colour of the body and head appears to be a pale yellow brown with a white belly from between the coracoids all the way back to the anterior origin of the anal fin.

Derivation of name. — From the Latin "paucus" meaning few, and "radius" meaning ray of the sun or spoke of a wheel, hence rays of a fin. In reference to the few dorsal and pectoral fin rays.

Discussion. — *C. pauciradiatus* does not seem related to any known species of *Corydoras*. In small size and possession of dark markings on the body it resembles *Corydoras cochui* Myers and Weitzman, 1954 [see also Weitzman, 1956] and *C. raimundi* Steindachner, 1907. However, neither of these species has a strongly serrated pectoral spine nor six dorsal fin rays as does *pauciradiatus*. Also the life colour pattern in *cochui* (with predominantly brown markings) and *pauciradiatus* (with predominantly black markings) is different

in both pattern and colour. *C. raimundi* has 25 dorsolateral scutes, *pauciradiatus* 23, and *C. raimundi* has a very short dorsal spine, (7.8—8.3 in *raimundi* and 4.9—5.2 in *pauciradiatus*). In addition to these differences, *C. pauciradiatus* possesses a circular fontanel similar to that found in *Aspidoras rochai* von Ihering, 1907. The genus *Aspidoras* differs from *Corydoras* in having a short supraoccipital process, so that the first two pairs of dorsolateral body scutes meet each other across the dorsal midline anterior to the predorsal scute. In *C. pauciradiatus* the supraoccipital tends to be shorter than normally found in other *Corydoras* species but the first dorsolateral body scutes are well separated. *C. pauciradiatus* further differs from members of the genus *Aspidoras* in having 7 rather than 8 pectoral rays, 6 rather than 7 dorsal rays, 23 rather than 25 or 26 dorsolateral body scutes, and 20 rather than 22 ventrolateral body scutes.

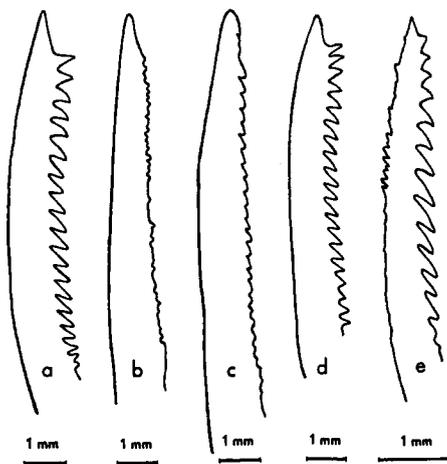


Fig. 6. Ventral view of left pectoral spine of paratypes of : a, *C. pastazensis orcesi* n. spp. 55.6 mm sl; b, *atropersonatus* n. sp. 40.3 mm sl; c, *C. orphnopterus* n. sp. 57.2 mm sl; d, *C. simulatus* n. sp. 52.9 mm sl; e, *C. pauciradiatus* n. sp. 22.6 mm sl.

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Dr. S. H. Weitzman
Division of Fishes
U.S. National Museum
Washington D. C. 20560. — USA.

Dr. H. Nijssen
Instituut voor Taxonomische Zoölogie (Zoölogisch Museum)
Universiteit van Amsterdam
Plantage Middenlaan 53
Amsterdam-C. — The Netherlands.