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A new species of *Farlowella* Eigenmann and Eigenmann (Siluriformes: Loricariidae), a stickcatfish from Bolivia

MICHAEL E. RETZER
Center for Biodiversity, Illinois Natural History Survey, Champaign, IL 61820, USA.
E-mail: mretzer@inhs.uiuc.edu

Abstract

Farlowella altocorpus is described from six specimens from a single locality on the Río Coroico, a tributary of the Río Beni in Bolivia. *Farlowella altocorpus* is a member of the *Farlowella nattereri* Steindachner species group and can be distinguished from other members of that group by a unique combination of characters: snout tip to mouth length 73–87% of pectoral fin length in adults, body depth 69–79% of pelvic fin length, body depth 49–53% of distance between pelvic and pectoral fins, head length 1.94–2.28 times length of snout tip to mouth, mid-ventral plates keeled, pectoral fins reach origins of pelvic fins, not having first anal and dorsal fin spines entirely darkly pigmented, anterior median lateral plates 14–16, posterior median lateral plates 16–18, post-anal plates 22–23, and abdominal plates 22–31.

Key words: Loricariidae, *Farlowella*, Río Coroico, Bolivia, new species

Introduction

Retzer and Page (1996) identified six species groups within the genus *Farlowella* E igenmann and Eigenmann. Within the *Farlowella nattereri* species group, they recognized five species: *F. isbruckeri*, *F. hasemani*, *F. jauruensis*, *F. nattereri*, and *F. odontotumulus*. The *F. nattereri* species group has a wide distribution in the Amazon River and upper Paraguay River basins and in the Essequibo River of Guyana. Recent collections from Bolivia revealed a new species of *Farlowella*. The new species has the unique combination of diagnostic characters (3 rows of abdominal dermal plates, 5 rows of trunk lateral dermal plates, diamond-shaped second row of lateral dermal plates, and short breeding odontodes forming patches on head and body) of the *F. nattereri* species group and is described herein and is contrasted with the other species of the *F. nattereri* species group.

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Materials and Methods

Measurements (in mm) were made using dial or digital calipers. Counts and measurements follow Boeseman (1971), Retzer and Page (1996), and Schaefer (1997). Terminology of Schaefer (1997) with regards to lateral dermal plate patterns is followed although the method of counting anterior and posterior median plates follows Retzer and Page (1996). Statistical Package for Social Sciences (*SPSS 11*®) was used to explore mensural and meristic variation among the species of *Farlowella*. Analysis included descriptive statistics (means and ranges) of species and Principle Components Analysis (PCA). PCA of mensural data was based on Varimax rotation using the covariance matrix. Measurements were $\log_{10}$ transformed. Results of PCA were used to determine which mensural characters were likely to provide diagnostic characters of the new species. PCA was based on individuals over 110 mm SL to avoid the influence of size on the analysis.

The following comparative materials were used. Institutional abbreviations follow Leviton *et al*. (1985).

Farlowella altocorpus: Bolivia—INHS 99773, 1 ex. holotype; INHS 36972, 2 ex. paratypes; SIUC 23150, 3 ex. paratypes

Farlowella hasemani: Brazil—FMNH 55089, 1 ex.; FMNH 55090, 1 ex.

Farlowella isbruckeri: Brazil—INHS 32943, 1 ex. paratype; MCP 36601, 2 ex.; MZUSP 27704, 1 ex. paratype; MZUSP 37641, 1 ex. holotype.

Farlowella jauruensis: Brazil—FMNH 55088, 1 ex. holotype.

Farlowella nattereri: Brazil—MCP 36599, 1 ex.; MCP 36600, 1 ex.; MZUSP 56116, 1 ex.; MZUSP 56217, 2 ex.; NMW 46497, 1 ex. holotype. Bolivia—AUM 23719, 8 ex.; CAS 77322, 2 ex. syntypes of *Farlowella acestrichthys*; INHS 36996, 3 ex.; FMNH 106987, 1 ex. Peru—INHS 36630, 3 ex.; INHS 54710, 1 ex.; SIUC 37127, 1 ex.; SIUC 28112, 2 ex.; UMMZ 66480, 1 ex. syntype of *Farlowella acestrichthys*.

Farlowella odontotumulus: Brazil—MCP 36595, 5 ex. Ecuador—FMNH 99135, 1 ex. holotype. Venezuela—MCNG 25405, 1 ex. paratype.

Results

A PCA procedure revealed that the snout to mouth length, body depth at dorsal fin origin, body width at dorsal origin, orbit width, and fin-spine lengths accounted for a high proportion of variance among the species (Table 1).

Farlowella altocorpus, sp. nov

(Figs. 1, 2)

Holotype. INHS 99773, 170.15 mm SL, sex unknown. Bolivia: La Paz State: Río Beni

Basin: Río Coroico, Caranavi, 4 August 1995, L.M. Page, B.M. Burr, M.H. Sabaj, J. Sarmiento & A.S. Barrera.

Paratypes. INHS 36972, 2 ex., 87.82–91.69 mm SL; same data as holotype. – SIUC 23150, 3 ex., 69.59–138.89 mm SL same data as holotype.

TABLE 1. Component scores from PCA of the materials examined for individuals over 110 mm SL.

	Component			
Character	1	2	3	4
Pre-dorsal length	0.074	-0.014	0.097	-0.048
Standard length	0.067	0.056	0.056	-0.178
Head length	0.166	-0.101	0.091	-0.032
Snout-to-eye length	0.236	-0.127	0.054	-0.084
Snout-to-mouth length	0.644	-0.355	-0.064	-0.346
Orbit width	0.029	-0.476	1.406	-0.093
Body depth	-0.094	0.649	-0.376	-0.798
Dorsal fin length	-0.016	-0.126	0.140	0.544
Pectoral fin length	-0.067	0.004	-0.237	0.722
Pelvic fin length	-0.150	-0.067	-0.095	1.035
Anal fin length	-0.031	-0.136	-0.012	0.768
Snout-to-vent length	0.106	0.015	0.089	-0.204
Post-dorsal fin length	0.063	0.123	0.010	-0.323
Interorbital width	-0.039	0.234	-0.052	-0.222
Pectoral fin origin to pelvic fin origin length	-0.020	0.276	-0.147	-0.316
Body width	-0.136	0.474	-0.359	-0.208
Eye to dorsal fin origin length	-0.010	0.108	0.049	-0.122

Diagnosis: *Farlowella altocorpus* is a member of the *F. nattereri* group as defined by Retzer and Page (1996) and is distinguished from all non-members of this group except *Farlowella gracilis* Regan by having five rows of anterior lateral plates. The new species is distinguished from *F. gracilis* by having a snout-mouth length <50% of head length versus ≥ 50% in adults. *Farlowella altocorpus* is distinguished from other members of the *F. nattereri* group by possessing a unique combination of characters: snout tip to mouth length 73–87% of pectoral fin length in adults, body depth 69–79% of pelvic fin length, body depth 49–53% of distance between pelvic and pectoral fins, head length 1.94–2.28 times length of snout tip to mouth, mid-ventral plates keeled, pectoral fins reach origins of pelvic fins, not having first anal and dorsal fin spines entirely darkly pigmented, anterior median lateral plates 14–16, posterior median lateral plates 16–18, post-anal plates 22–23, and abdominal plates 22–31.

Description: Largest specimen is the holotype, 170.15 mm SL. Morphometric data given in Table 2.

Body of *Farlowella altocorpus* wide and deep relative to other *Farlowella* species. Snout short with tip slightly expands distally (Fig. 1). Head gently slopes forward from eye to base of snout; snout points upwards. Viewed dorsally, head roughly triangular with widest point at opercles and with weak preorbital ridge. Width of body posterior to dorsal fin noticeably less wide than anterior to dorsal fin. Visible portion of the cleithrum narrow and often in two parts. Pectoral fins long, reaching origin of pelvic fin. Pelvic fins extend beyond anus but do not reach origin of anal fin. Dorsal fin insertion slightly ahead of anal fin insertion. Three complete rows of abdominal plates.

TABLE 2. Standard length (SL) and measurements as percentage of SL in holotype and paratypes of *Farlowella altocorpus.*

Measurement	Holotype	Paratypes	
		Range	Mean ±SD
Standard length (mm)	170.2	69.6–138.9	96.0±25.7
Pre-dorsal length	44.7	43.7–45.6	45.0±0.8
Head length	24.0	23.1–26.1	25.0±1.2
Snout-to-mouth length	11.3	10.2–13.2	11.7±1.2
Snout-to-eye length	19.7	19.0–22.0	20.7±1.2
Pectoral fin length	13.0	11.4–13.9	12.9±1.0
Pelvic fin length	8.7	6.9–9.4	8.1±0.9
Snout-to-vent length	39.7	40.0–41.6	41.0±0.7
Post-dorsal fin length	55.3	53.6–56.7	55.0±1.2
Interorbital width	5.3	5.1–5.6	5.3±0.2
Pectoral fin origin to pelvic fin origin length	12.4	11.1–13.3	11.7±0.9
Body width	6.6	6.4–8.1	7.0±0.7
Body depth	7.8	5.4–6.5	6.0±0.4
Eye to dorsal fin origin length	23.1	21.7–25.0	22.7±1.3

Number of teeth of upper left jaw 25–38; in lower left jaw 18–33. Total median lateral plates 32; pre-dorsal plates 8.

Overall coloration of specimens in alcohol light to dark brown. Snout dark brown under and on sides and light dorsally. A dorso-lateral dark stripe runs along sides of body from head and fades in intensity posterior to dorsal fin. Posterior edges of plates within dark lateral stripe behind eye may lack pigmentation. Contrasting near-pigmentless dorsal stripe from snout to dorsal fin that fades posterior to dorsal fin. Near-pigmentless ventrally from mouth to anal fin but more pigmented posterior to anal fin. Small dark spots may occur on dorsal and ventral near-pigmentless stripes.

Small spots of brown melanophores on spines and rays of anal, dorsal, pectoral, and pelvic fins. Interradial membranes clear. Brown bands on upper and lower rays and membranes of caudal fin (Fig. 2); pigmentation of interradial membranes of caudal fin darker in smaller specimens and faint in larger specimens.

Outer portion of upper lip pigmented with small discrete spots and inner portion unpigmented. Lower inner lip unpigmented and outer side with numerous faint melanophores.

FIGURE 1. *Farlowella altocorpus*, INHS 99773, holotype, 170.2 mm SL, dorsal, lateral, and ventral views. Photos by Michael Retzer.

FIGURE 2. Pigmentation of caudal fin of *Farlowella altocorpus*, SIUC 23150, 69.6 mm SL, lateral view. Photo by Michael Retzer.

Comparisons: *Farlowella altocorpus* is most similar to *F. hasemani* but differs in having a shorter snout-mouth length relative to the pectoral length in adults (73–87% in *F. altocorpus*, 91–110% in *F. hasemani*), and a shallower body depth relative to the pelvic fin length (69–79% in *F. altocorpus*, 86% in *F. hasemani*), fewer posterior median lateral plates (16–18 in *F. altocorpus*, 19-20 in *F. hasemani*), and pectoral fins reach origins of pelvic fins (vs. not reaching in *F. hasemani*). (Note that in Table 14 of Retzer and Page (1996), the snout-mouth length to pectoral length ratio for *F. hasemani* was incorrectly given as $\geq$1.0.)

Farlowella altocorpus differs from *F. nattereri* in having a shorter and broader snout. This difference is reflected in a shorter snout-mouth length relative to the pectoral length in adults (73–87% in *F. altocorpus*, 91–138% in *F. nattereri*, Fig. 3), and not having first anal and dorsal fin spines entirely darkly pigmented. Note that in Table 14 of Retzer and Page (1996), the snout-mouth length to pectoral length ratio is incorrect due to a typographic error. The correct value in the table should have been >1.0 and was correctly given in the description for the species on page 57. The addition of new data herein has lowered the value from 1.0 to 0.91.

The body depth of *Farlowella altocorpus* is not as deep as that of *F. hasemani* but is relatively deeper when compared to the other species of the *F. nattereri* species group. *Farlowella altocorpus* differs from *F. isbruckeri* in having a deeper body relative to pelvic fin length (69–79% in *Farlowella altocorpus*, 57–68% in *F. isbruckeri*), deeper body relative to pectoral fin length (45–51% in *F. altocorpus*, 37–41% in *F. isbruckeri*), and post-anal plates (22–23 in *Farlowella altocorpus*, 24 in *F. isbruckeri*).

Farlowella altocorpus differs from *F. juarensis* in having a deeper body relative to pelvic fin length (69–79% in *F. altocorpus*, 64% in *F. juaruensis*) and a deeper body

relative to distance between pelvic and pectoral fin origins (49–53% in *F. altocorpus*, 47% in *F. juaruensis*). *Farlowella altocorpus* differs from *F. juaruensis* in having a shorter head length relative to snout tip to mouth length (1.94–2.28 times the length in *F. altocorpus*, 2.48 in *F. juaruensis*). Respectively, *F. altocorpus* differs from *F. juaruensis* in four meristic counts: anterior median lateral plates 14–16 versus 13, posterior median lateral plates 16–18 versus 14, post-anal plates 22–23 versus 24, and abdominal plates 22–31 versus 20.

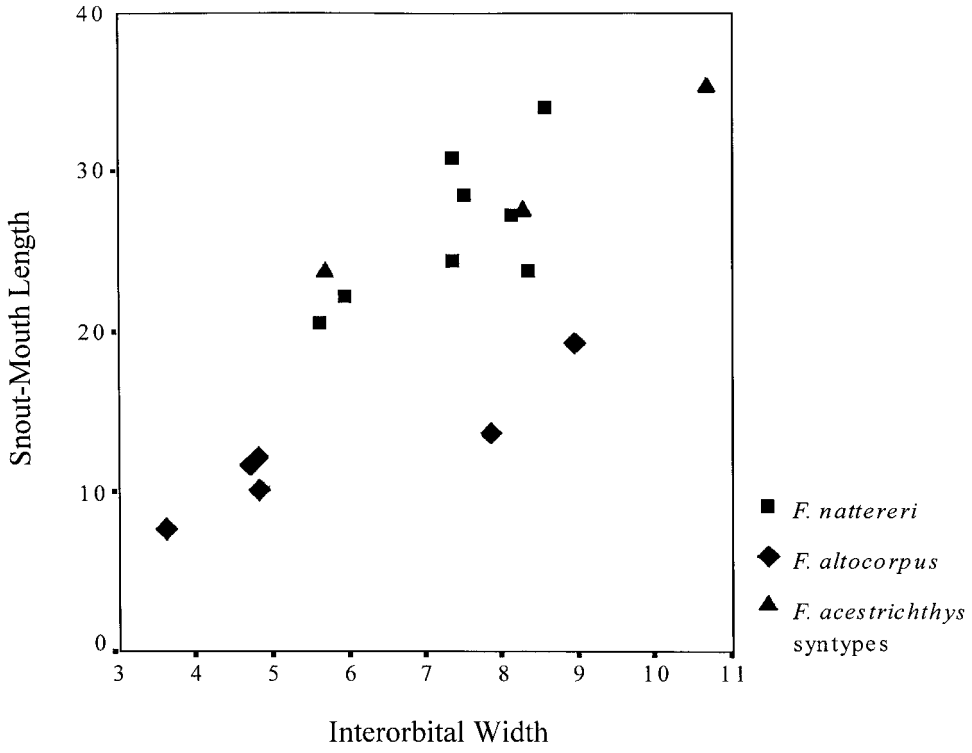

FIGURE 3. Plot of snout-mouth length against interorbital width of *Farlowella nattereri* from Río Beni, Peru (AUM 23719), *Farlowella altocorpus* and syntypes of *Farlowella acestrichthys*, a synonym of *Farlowella nattereri*.

Farlowella altocorpus differs from *F. odontotumulus* in having a deeper body relative to pelvic fin length (69–79% in *F. altocorpus*, 60–64% in *F. odontotumulus*) and a deeper body relative to distance between pelvic and pectoral fin origins (49–53% in *F. altocorpus*, 39–46% in *F. odontotumulus*), and in having a longer head length relative to snout tip to mouth length (1.94–2.28 times the length in *F. altocorpus*, 1.67 in *F. juaruensis*).

Mid-ventral lateral plate series of *F. altocorpus* is keeled; it is unkeeled in *F. isbruckeri* and *F. odontotumulus*.

Distribution: *Farlowella altocorpus* is currently known only from a single locality on the Río Coroico, (Río Beni Basin), La Paz State of Bolivia.

FIGURE 4. *Farlowella acestrichthys*, syntype, UMMZ 66480, 183.3 mm SL, photo by Michael Retzer.

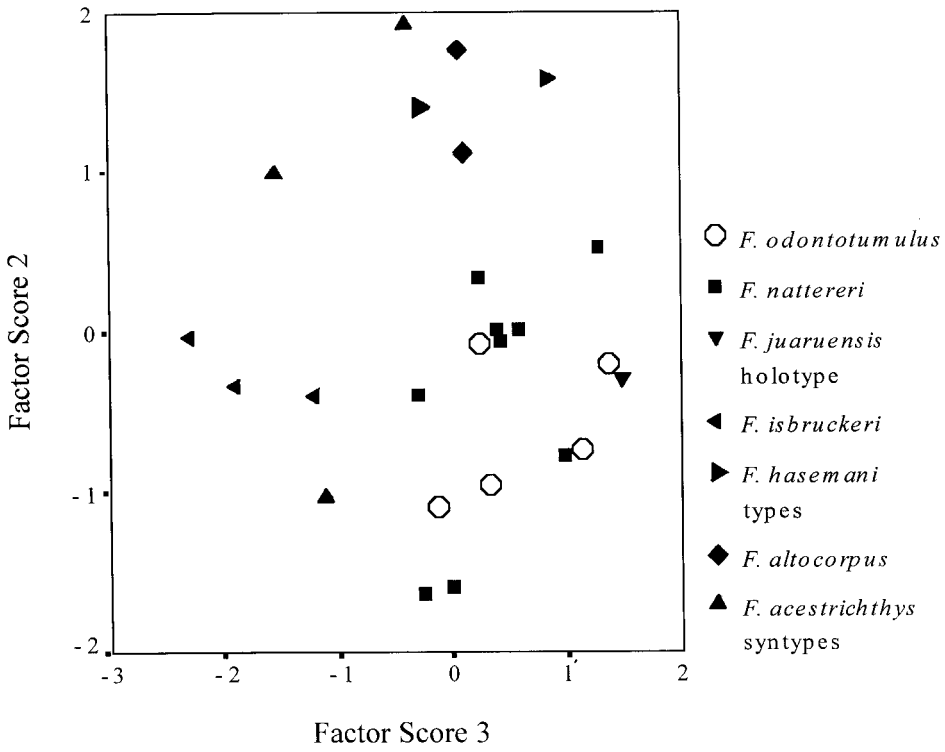

FIGURE 5. Plot of PCA factor scores for six species of the *Farlowella nattereri* species group and the syntypes of *Farlowella acestrichthys*, synonym of *Farlowella nattereri*.

Etymology: From Latin, *alto*, meaning deep, and *corpus*, meaning body. The species epithet, *altocorpus* refers to its relatively high (*alto*) or deep body (*corpus*) relative to most of the other species of *Farlowella*.

Comments: The upper Rio Beni is also the type locality of *Farlowella acestrichthys* Pearson. Retzer and Page (1996) considered *F. acestrichthys* to be a junior synonym of *F. nattereri*. Comparison of *F. altocorpus* to the *F. acestrichthys* syntypes indicates that the species are easily distinguished from each other. *Farlowella altocorpus* has a distinctly shorter and broader snout relative to *F. acestrichthys* (Figs. 1, 4). Retzer and Page (1996) also commented that *F. nattereri* is a complex of species. This observation is reflected in the plot of factor scores (Fig. 5). In Figure 5, the syntypes of *F. acestrichthys* are separate from specimens identified as *F. nattereri* (AUM 23719) that are also from the type locality of *F. acestrichthys*. As noted by Retzer and Page (1996), closer examination of populations of this wide-ranging species will be required to accurately access *F. nattereri*. One of the syntypes of *F. acestrichthys* (CAS 77322) does appear to group with *F. altocorpus* and *F. hasemani*; however, this is likely to be an artifact of the PCA because of the very large size of the specimen, 221.8 mm SL.

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