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Erethistoides sicula, a new catfish (Teleostei: Erethistidae) from India

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Abstract

A new species of erethistid catfish, *Erethistoides sicula*, is described from the Brahmaputra River drainage in northeast India. *Erethistoides sicula* differs from both *E. montana* and *E. pipri* in having a longer caudal peduncle (19.6–22.3% SL vs. 14.4–18.4) and shorter pectoral spine (14.6–28.0% SL vs. 30.7–32.1). It further differs from *E. montana* in having a dorsally projecting bony splint on the opercle immediately posterior to its articular facet with the hyomandibula (vs. splint absent) and from *E. pipri* in having a more slender head (13.4–15.1% SL vs. 16.4). The diagnostic characters of *Erethistoides* are discussed and four new synapomorphies are proposed to diagnose the genus.

Key words: *Erethistoides*, Erethistidae, Nepal, Ganges River drainage, South Asia

Introduction

Members of the genus *Erethistoides* are small erethistid catfishes traditionally diagnosed by a strongly depressed head and body and the presence of diverging serrations (antrorse on the distal half and retrorse on the proximal half) on the anterior edge of the pectoral spine. The genus, known from the sub-Himalayan region of the Indian subcontinent, currently includes two nominal species: *E. montana* Hora, 1950 and *E. pipri* (Hora, 1950).

During a recent ichthyological survey of the northern Bengal region in India, specimens of *Erethistoides* were obtained, which upon further study, proved to be an undescribed species. The species is described here as *Erethistoides sicula*, new species. It was also found that the traditional diagnosis of *Erethistoides* is inadequate due to variation in the morphology of the pectoral-spine serrations. Here, four new synapomorphies diagnosing *Erethistoides* are identified and briefly discussed.

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Material and methods

Measurements were made point to point with dial calipers and data recorded to tenths of a millimeter. Counts and measurements were made on the left side of specimens whenever possible. Subunits of the head are presented as proportions of head length (HL). Head length and measurements of body parts are given as proportions of standard length (SL). Measurements follow those of Ng & Dodson (1999). An asterisk following a meristic count (if present) indicates the value for the holotype.

Material examined in this study is deposited in the following institutions: University of Michigan Museum of Zoology, Ann Arbor (UMMZ); and the Zoological Survey of India, Kolkata (ZSI).

Erethistoides sicula sp. nov.

(Fig. 1)

Type material. Holotype: UMMZ 243718, 39.0 mm SL; India: West Bengal, Schutunga River (tributary of the Mansai River) at Ansole, 26°22'24"N 89°11'17"E; H. H. Ng et al., 12 April 2004.

Paratypes: UMMZ 243647 (12), 15.7–37.2 mm SL; data as for holotype.

Diagnosis. *Erethistoides sicula* differs from both *E. montana* and *E. pipri* in having a longer caudal peduncle (19.6–22.3% SL vs. 14.4–18.4) and shorter pectoral spine (14.6–28.0% SL vs. 30.7–32.1). It further differs from *E. montana* in having a dorsally projecting bony splint on the opercle immediately posterior to its articular facet with the hyomandibula (vs. splint absent; Fig. 2) and from *E. pipri* in having a more slender head (13.4–15.1% SL vs. 16.4). The key biometric differences separating the three species are given in Table 1.

TABLE 1. Diagnostic traits separating *Erethistoides sicula*, *E. montana* and *E. pipri*. Values are percentages of SL.

	E. sicula	*E. montana*	*E. pipri*
Pectoral-spine length	14.6–28.0	30.7–31.6	32.1
Length of caudal peduncle	19.6–22.3	17.0–18.4	14.4
Head width	20.9–26.1	22.4–24.7	16.4

Description. Biometric data given in Table 2. Head broad and strongly depressed; dorsal profile slightly convex posteriorly and ventral profile almost straight. Neurocranium covered by thin skin bearing numerous elongate and flattened plaque-like tubercles; neurocranium extremely rugose and ornamented with numerous ridges and bumps. Supraoccipital spine not reaching nuchal shield. Posterior projection of the

posttemporo-supracleithrum (=Weberian lamina of de Pinna, 1996) well developed, approximately same length as supraoccipital spine and extending parallel to either side of spine. Eye ovoid, horizontal axis longest; located entirely in dorsal half of head and with bony ridge on frontal dorsal to it. Orbit with free margin. Gill openings narrow, extending from posttemporal to longitudinal line through mouth corner.

TABLE 2. Biometric data for *Erethistoides sicula* (n=12).

	Holotype	Range	Mean±SD
%SL			
Head length	30.3	28.2–31.1	29.8±1.12
Head width	24.9	20.9–26.1	23.3±1.79
Head depth	14.1	13.4–15.1	14.0±0.55
Predorsal length	45.6	40.0–46.5	43.0±2.22
Preanal length	69.2	64.7–69.2	67.1±1.71
Prepelvic length	50.0	45.1–50.3	48.3±1.70
Prepectoral length	25.6	22.8–27.2	24.9±1.52
Body depth at anus	10.3	8.4–10.7	9.5±0.76
Length of caudal peduncle	19.6	19.5–22.3	20.7±0.82
Depth of caudal peduncle	4.6	4.1–5.1	4.6±0.36
Pectoral-spine length	25.6	14.6–28.0	24.0±4.55
Pectoral-fin length	32.6	27.3–34.5	31.3±2.40
Dorsal-spine length	18.2	17.5–21.4	18.8±1.34
Length of dorsal-fin base	13.1	11.0–14.6	13.2±1.04
Pelvic-fin length	11.8	11.8–17.5	16.8±1.96
Length of anal-fin base	17.7	13.4–20.3	14.7±2.17
Caudal-fin length	21.8	20.1–26.4	23.1±2.19
Length of adipose-fin base	12.3	10.4–13.6	12.3±1.16
Dorsal to adipose distance	12.8	12.8–16.9	14.9±1.65
Post-adipose distance	16.7	15.9–20.0	17.8±1.26
%HL			
Snout length	50.0	43.5–53.8	48.8±3.92
Interorbital distance	28.0	22.8–29.3	26.3±2.33
Eye diameter	13.6	13.6–19.1	16.8±1.92
Nasal barbel length	21.2	10.6–21.2	13.3±3.49
Maxillary barbel length	105.9	87.9–116.5	102.0±8.32
Inner mandibular barbel length	29.7	27.7–41.8	33.3±5.37
Outer mandibular barbel length	38.1	38.1–51.7	46.0±3.93

FIGURE 1. *Erethistoides sicula*, UMMZ 234718, holotype, 39.0 mm SL; dorsal, lateral and ventral views.

Mouth small, inferior and with papillate lips; upper jaw projecting beyond lower jaw. Oral teeth small and in irregular rows on all tooth-bearing surfaces. Premaxillary tooth band consisting of two quadratic patches on either side of midline; with conical teeth and exposed when mouth is closed. Dentary tooth band narrow, with conical teeth.

Barbels in four pairs. Nasal barbel very short and slender, extending just beyond posterior margin of posterior nares. Maxillary barbel slender, extending to middle of pectoral-fin base. Outer mandibular barbel extending just beyond base of posteriormost pectoral-fin ray; inner mandibular barbel shorter, almost reaching to base of pectoral spine.

Body broad and depressed, becoming more compressed towards caudal peduncle. Dorsal profile rising evenly but not steeply from tip of snout to origin of dorsal fin and sloping gently ventrally from origin of dorsal fin to end of caudal peduncle. Ventral profile horizontal to pelvic-fin base, then sloping gently dorsally from there to end of caudal peduncle. Skin with elongate and flattened plaque-like tubercles arranged in longitudinal rows along flanks. Lateral line complete and midlateral in position. Vertebrae 14+15=29 (6), 13+17=30 (1), 14+16=30 (3) or 14+17=31* (1). Abdomen smooth and flat, without adhesive apparatus.

Dorsal fin located about two-fifths along body; with 5 (12) rays and straight margin. Dorsal-fin spine compressed, straight and robust; depressed spine extending to a vertical line through tips of extended pelvic fins. Anterior margin of spine smooth, posterior margin with 24 small serrations.

Pectoral fin with stout, blade-like spine, sharply pointed at tip, and with 5 (4) or 6* (8) rays. Anterior spine margin with 8–25 strong serrations along entire length; proximal 4–13 serrations retrorse, distal 4–12 serrations antrorse; point at which serrations diverge at distal quarter of spine. Posterior spine margin with 4–10 strong serrations along entire length. Pectoral-fin margin straight anteriorly, slightly convex posteriorly. Coracoid with well developed posterior process, extending to two-thirds of distance between base of posteriormost pectoral-fin ray and pelvic-fin origin.

Pelvic-fin origin at vertical through middle of dorsal-fin base. Pelvic fin with i,5 (12) rays and slightly convex margin; tip of adpressed fin reaching anal-fin origin. Anus located at two-thirds of distance between pelvic- and anal-fin origins.

Adipose fin small, posterior end deeply incised. Fin located above posterior third of anal-fin base. Anal fin with iv,6* (11) or iv,7 (1) rays and slightly curved margin.

Caudal peduncle slender. Caudal fin forked, with i,5,5,i* (2) or i,5,6,i (10) principal rays; upper and lower lobes narrow and pointed, with lower lobe slightly longer than upper. Procurrent rays symmetrical, with 9–10 rays on each surface extending only slightly anterior to fin base.

Coloration. In 70% alcohol: dorsal and lateral surfaces of head and body light chocolate-brown, color somewhat unevenly distributed; tubercles along lateral line cream, forming faint thin midaxial stripe. A series of cream markings on head and body: first consisting of paired spots on snout immediately in front of anterior nares and on either side

of ethmoidal region; second consisting of paired spots on cheek region ventrolateral with respect to orbit, with cream coloration extending to maxillary barbels; third consisting of faint spot on supraoccipital process; fourth consisting of spot on nuchal plates; fifth consisting of transverse band spanning distance between dorsal and adipose fins and final consisting of transverse band on anterior half of caudal peduncle. Ventral surfaces of head and body cream. Dorsal fin hyaline, with faint transverse brown bands towards base and subdistally. Pectoral, pelvic and anal fins hyaline, sometimes with scattered melanophores. Caudal fin hyaline, with subdistal brown band. Maxillary barbels cream, annulated with brown rings; all other barbels cream.

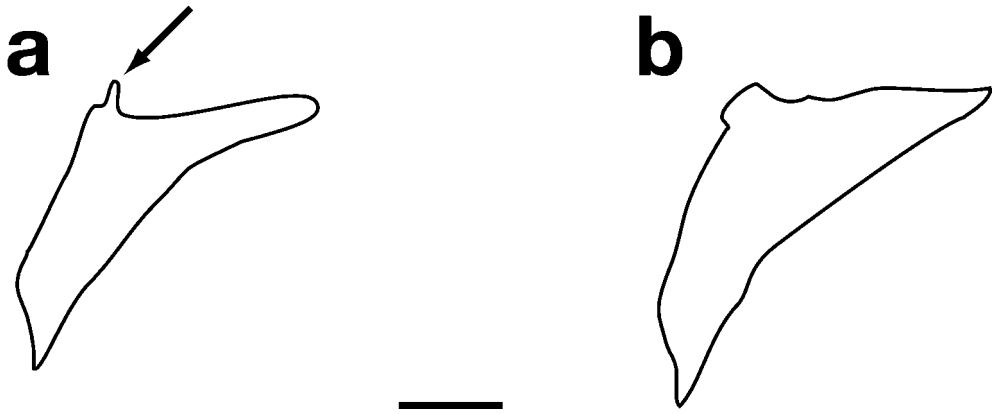

FIGURE 2. Outlines (mesial view) of right opercles of: a. *Erethistoides sicula*, paratype, UMMZ 243647, 36.1 mm SL; b. *E. montana*, UMMZ 243715, 37.5 mm SL. The bony splint posterior to the articular facet with the hyommandibula in *E. sicula* is indicated with an arrow. Scale bar represents 1 mm.

Distribution. Known from the Mansai River drainage, itself a tributary of the Brahmaputra River in northern West Bengal state in India (Fig. 3).

Habitat and biology. *Erethistoides sicula* was collected from a large, shallow, fast-flowing stream with a sandy bottom. The fish were usually found hiding in clumps of aquatic vegetation. Other fish species associated with this locality and habitat are: Cyprinidae - *Barilius shacra*, *Barilius vagra*, *Chagunius chagunio*; Psilorhynchidae - *Psilorhynchus balitora*, *Psilorhynchus sucatio*; Cobitidae - *Canthophrys gongota*, *Lepidocephalichthys guntea*; Balitoridae - *Acanthocobitis botia*, *Schistura savona*; Amblycipitidae - *Amblyceps mangois;* and Erethistidae - *Pseudolaguvia* spp.

Etymology. From the Latin *sicula*, meaning dagger, in reference to the short pectoral spines of this species. Used as a noun.

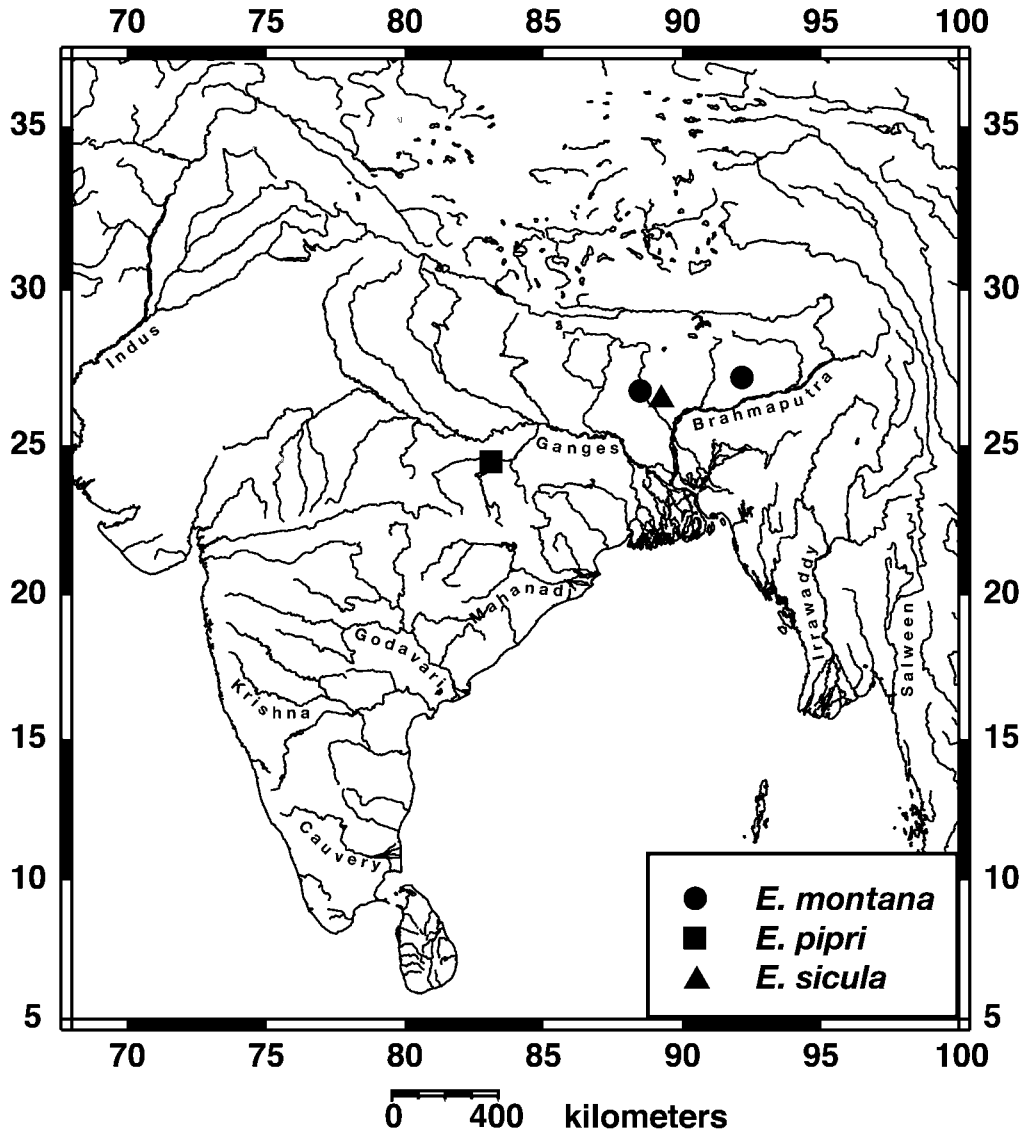

FIGURE 3. Map showing distributions of *Erethistoides sicula*, *E. montana* and *E. pipri*.

Discussion

Erethistoides was originally diagnosed from other erethistid genera in having a strongly depressed head and body, and the presence of diverging serrations (retrorse, or proximally directed, on the proximal half and antrorse, or distally directed in the distal half) on the anterior edge of the pectoral spine (Hora, 1950). This was opposed to only antrorse serrations on the anterior edge of the pectoral spine in *Hara* and bifurcate serrations in *Erethistes*. I have examined individuals of *Hara filamentosa* in which some of the proximalmost serrations on the anterior edge of the pectoral spine are retrorse (as in

Erethistoides) and not antrorse as typically reported for *Hara*. Therefore, the utility of the pectoral spine morphology as a useful diagnostic character for distinguishing the genera is doubtful. In my study on the phylogenetic relationships of the Erethistidae, I have identified two new unambiguous synapomorphies diagnostic for *Erethistoides*:

1. Neural spines of the first eight post-Weberian vertebrae strongly depressed, inflected posteriorly, and positioned in a groove formed by the prezygapophyses of the vertebrae immediately posterior (Fig. 4). The neural spines of the corresponding vertebrae in other erethistid genera are not as strongly depressed, and are not strongly deflected posteriorly.
2. An enlarged maxilla that is almost as long as the palatine (Fig. 5). The maxilla is half or less than half the length of the palatine in other erethistids.

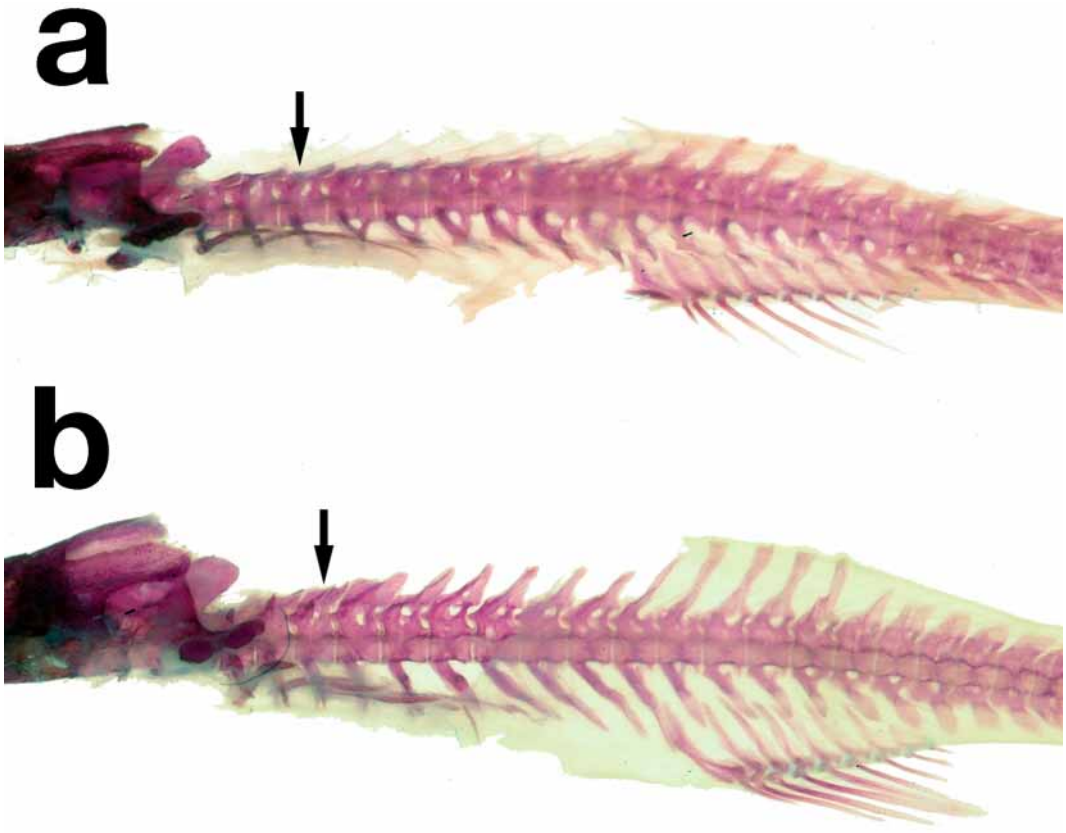

FIGURE 4. Vertebral column of: a. *Erethistoides sicula*, UMMZ 243647, 36.1 mm SL, and b. *Caelatoglanis zonatus*, UMMZ 243668, 34.3 mm SL, showing conditions of first eight post-Weberian vertebrae (indicated by arrows) for *Erethistoides* and other erethistids.

Two additional synapomorphies that are not unique to *Erethistoides* have also been identified:

1. A fan-shaped mesethmoid lacking distinct cornua (vs. a Y-shaped mesethmoid in other erethistids; Fig. 5). This condition is shared only with *Ayarnangra*.
2. A strongly overhanging snout with the premaxillary tooth plates completely exposed when the mouth is closed (Fig. 1, ventral view). This condition is shared only with *Ayarnangra*. In other erethistid genera, the snout is not strongly overhanging and the premaxillary tooth plates are either not exposed, or only partially exposed when the mouth is closed.

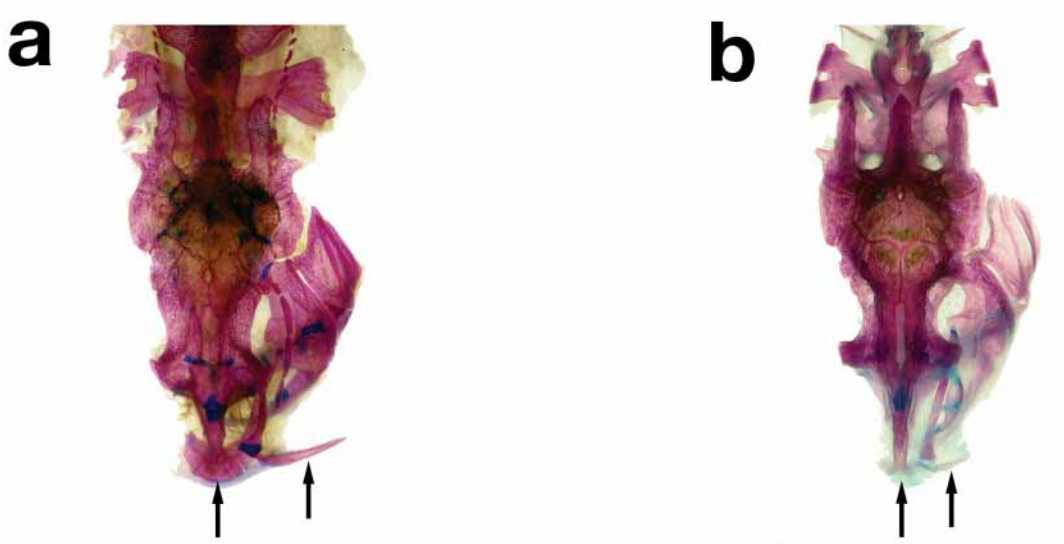

FIGURE 5. Dorsal views of skulls of: a. *Erethistoides montana*, UMMZ 243715, 37.5 mm SL, and b. *Caelatoglanis zonatus*, UMMZ 243668, 34.3 mm SL, showing conditions of mesethmoid and maxilla (indicated by arrows) for *Erethistoides* and other erethistids.

The differences in biometrics between *E. sicula* and *E. montana* are unlikely to be due to ontogeny alone. Biplots of pectoral-spine length (Fig. 6) and caudal-peduncle length (Fig. 7) against SL show that the slopes of the regression lines are significantly different (ANCOVA; $P<0.001$ in both cases). It should be noted that the plots of both *E. montana* and *E. pipri* for pectoral-spine and caudal-peduncle lengths all fall outside of the 95% confidence interval of the regression lines for *E. sicula* (Figs. 6a and 7a). The corresponding plots for *E. sicula* fall inside the 95% confidence interval for *E. montana* (Figs. 6b and 7b), but this is most likely the result of the extremely small sample size obtained (only a single specimen of *E. pipri* could be examined and hence regression lines could not be calculated). In any case, the presence of the bony splint on the posterodorsal edge of the opercle additionally diagnoses *E. sicula* from *E. montana*. This character is found useful for diagnosing the two species (i.e., it does not vary much intraspecifically). The condition of the posterodorsal edge of the opercle (i.e., whether the bony splint is

present) can be observed in non-osteologically prepared specimens by careful dissection of the skin surrounding the area.

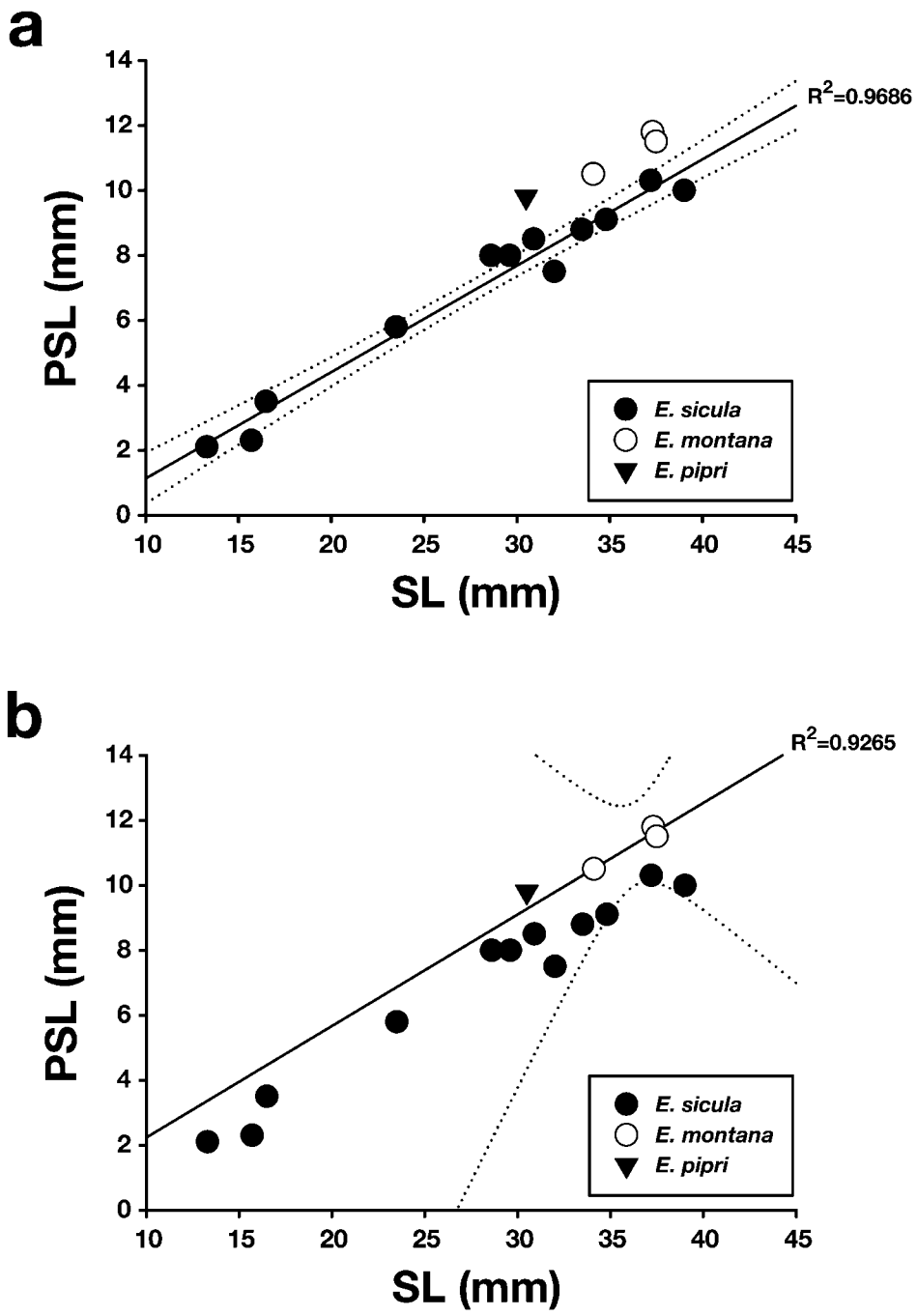

FIGURE 6. Scatterplots of pectoral-spine length (PSL) plotted against standard length for *Erethistoides sicula* and *E. montana*: a. with 95% confidence intervals of regression line for *E. sicula* (dotted lines); b. with 95% confidence intervals of regression line for *E. montana* (dotted lines).

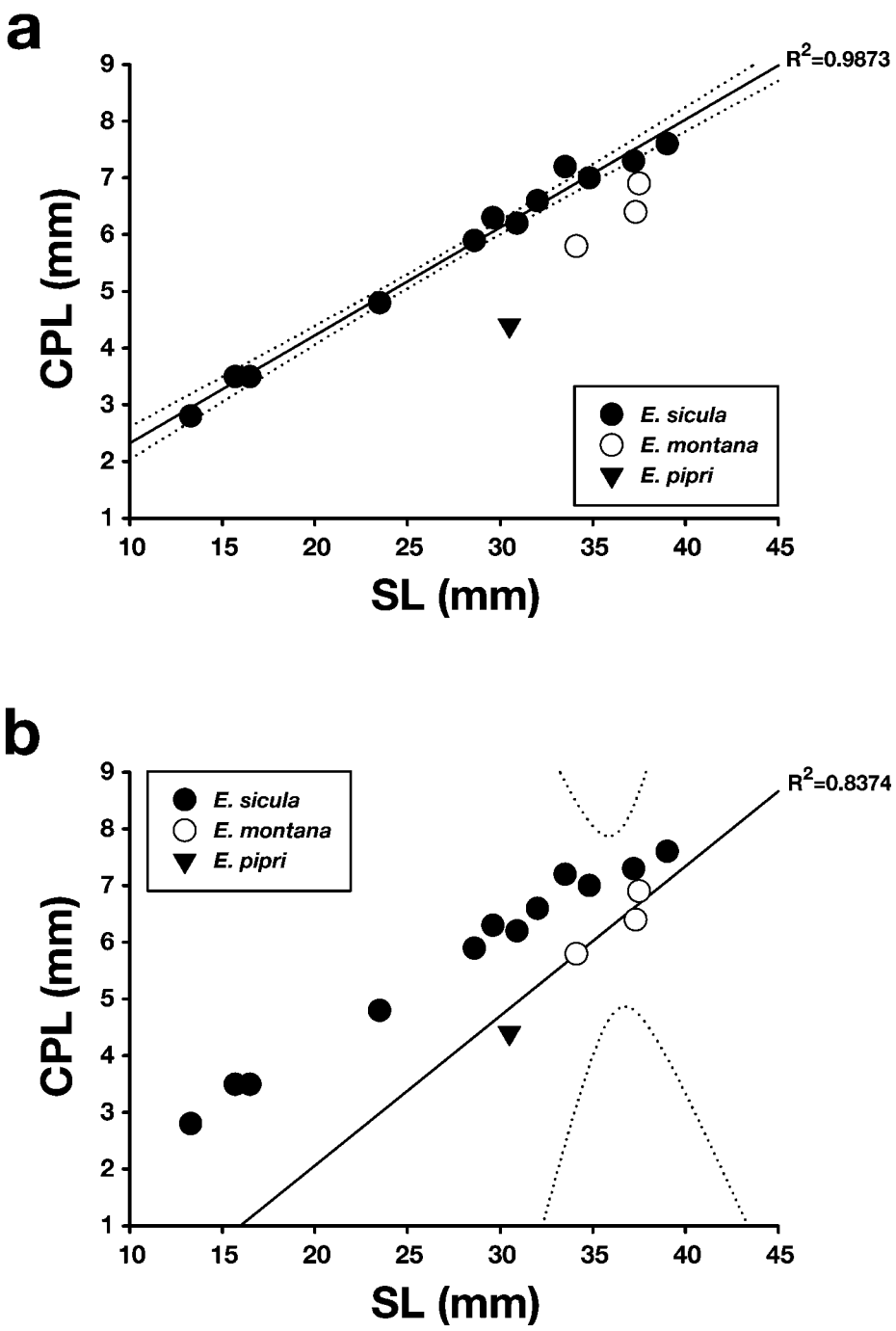

FIGURE 7. Scatterplots of caudal-peduncle length (CPL) plotted against standard length for *Erethistoides sicula* and *E. montana*: a. with 95% confidence intervals of regression line for *E. sicula* (dotted lines); b. with 95% confidence intervals of regression line for *E. montana* (dotted lines).

Erethistoides sicula and *E. montana* occur sympatrically in the Brahmaputra River drainage. The presence of more than one species of small catfishes with specific habitat requirements (and of limited vagility) in only one river drainage highlights the hidden nature of the biodiversity of this region and emphasizes the need for more extensive ichthyofaunal surveys.

Comparative material

Erethistoides montana: ZSI F314/2, syntype, 37.3 mm SL; India: Assam, Darrang district, streamlets around Tangla. UMMZ 243715, 34.1–37.5 mm SL; India: West Bengal, Tista River at Tista barrage.

Erethistoides pipri: ZSI F315/2, holotype, 30.5 mm SL; India: Uttar Pradesh, Mirzapur district, Rihand River at Pipri.

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