



***EUTROPIICHTHYS CETOSUS*, A NEW RIVERINE CATFISH (TELEOSTEI: SCHILBEIDAE) FROM NORTHEASTERN INDIA**

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Abstract: *Eutropiichthys cetosus*, a new species of schilbeid catfish is described from the Kaladan River drainage in Mizoram, northeastern India. It can be distinguished from congeners in having a combination of the following characters: 49–52 total vertebrae, snout moderately rounded in lateral and slightly trilobed in dorsal views, fleshy narial flap not extending medially much past medial margin of naris, mouth rictus reaching vertical through middle of orbit, 25–35 rakers on the first gill arch, rough anterior edge of pectoral spine, 13–15 branched pectoral-fin rays, body depth at anal-fin origin 17.5–23.5 % SL, 43–49 branched anal-fin rays, and caudal peduncle depth 7.8–8.6 % SL. A revised key to the genus is provided.

Keywords: Kaladan River drainage, Mizoram, Ostariophysii, Siluriformes.

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INTRODUCTION

The Old World catfish family Schilbeidae is a moderately diverse group comprising 65 species in 14 genera (Ferraris 2007; Ferraris & Vari 2007; Ng & Vidhayanon 2011), of which approximately half (32 species) is known from Asia. The genus *Eutropiichthys* Bleeker, 1862, comprises medium-sized riverine species known from the Salween River drainage in western Thailand, westwards to the Indus River drainage in Pakistan. The genus has been recently revised (Ferraris & Vari 2007) and it comprises five species: *E. britzi* Ferraris & Vari, 2007 from the Irrawaddy River drainage in Myanmar; *E. burmannicus* Day, 1877 from the Irrawaddy and Sittang river drainages in Myanmar, and the Salween River drainage in Myanmar and western Thailand; *E. murius* (Hamilton, 1822) from the Ganges-Brahmaputra River system in Bangladesh, India and Nepal; *E. salweenensis* Ferraris & Vari, 2007 from the lower Salween River drainage in western Thailand; and *E. vacha* (Hamilton, 1822) from the Indus River drainage in Pakistan, Ganges-Brahmaputra River system in Bangladesh, Bhutan, India and Nepal, Mahanadi River drainage in India, and Surma-Meghna River system in Bangladesh.

During recent ichthyological surveys of the Kaladan River drainage in Mizoram, India, the second and third authors collected specimens of *Eutropiichthys*. Attempts to identify the specimens and detailed comparison of this material with congeners, revealed it to be a new species, described herein as *Eutropiichthys cetosus*. A revised key to the genus incorporating the results of this study is also provided.

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. Vertebrae and median-fin rays were counted from radiographs, while paired-fin rays were counted under a binocular dissecting microscope. 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 and counts follow those of Ferraris & Vari (2007) with the exception of the gill raker counts, which are expressed as epibranchial (upper limb)+ceratobranchial (lower limb)=total, and the additions of the head depth (measured at the base

of the supraoccipital process), snout to pectoral-fin spine base (measured from the tip of the snout to the base of the pectoral-fin spine), dorsal-fin base length (measured from the base of the dorsal-fin spinelet to the base of the last dorsal-fin ray) and the body depth at dorsal-fin origin (measured immediately anterior to the base of the first dorsal-fin spinelet). Numbers in parentheses following a particular meristic count are the number of individuals with that count. Asterisks after meristic counts indicate values for holotype. Material examined in this study is deposited in the following institutions: Academy of Natural Sciences of Drexel University, Philadelphia (ANSP); California Academy of Sciences, San Francisco (CAS, CAS-SU); Museum of Comparative Zoology, Harvard University, Cambridge (MCZ); Pachhunga University College Museum of Fishes, Aizawl (PUCMF); University of Michigan Museum of Zoology, Ann Arbor (UMMZ); National Museum of Natural History, Smithsonian Institution, Washington DC (USNM); and Lee Kong Chian Natural History Museum, Singapore (ZRC).

Eutropiichthys cetosus sp. nov. (Images 1, 2a)

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Type material

Holotype: PUCMF13024, 16.viii.2011, 121.8mm SL, 22°23'1.4"N & 92°57'39.3"E, vicinity of Kawlchaw Village, Lawngtlai District, Mizoram, India, coll. S. Lalronunga.

Paratypes: PUCMF13025 (5), 91.4–127.7 mm SL, data as for holotype.

Diagnosis

Eutropiichthys cetosus can be distinguished from all congeners, except for *E. burmannicus*, in having more rakers (25–35 vs. 15–20) on the first gill arch. It differs from *E. burmannicus* in the shape of the snout in both lateral (moderately rounded in *E. cetosus* sp. nov. vs. distinctly pointed in *E. burmannicus*; Image 2) and dorsal (slightly trilobed in *E. cetosus* sp. nov. vs. acutely angular in *E. burmannicus*; Images 2, 3) views, a deeper head relative to its length (68.7–77.1% HL vs. 65.4–67.5%HL), fewer branched pectoral-fin rays (13–15 vs. 15–17, rarely 15), and a more slender body (depth at dorsal-fin origin 19.2–23.5% SL vs. 23.7–25.3%SL; depth at anal-fin origin 17.5–23.5% SL vs. 23.2–26.3%SL; compare Images 1 and 3). The following unique combination of characters serves to further distinguish *E. cetosus* sp. nov. from congeners: 49–52 total vertebrae, fleshy narial flap not extending medially much past medial margin of naris,



Image 1. *Eutropiichthys cetosus* sp. nov., PUCMF 13024, holotype, 121.8mm SL, India: Mizoram, vicinity of Kawlchaw Village.

mouth rictus reaching vertical through middle of orbit, rough anterior edge of pectoral spine, 43–49 branched anal-fin rays, and caudal peduncle depth 7.8–8.6 % SL.

Description

General shape and appearance as in Image 1. Biometric data in Table 1. Body elongate, compressed. Body depth greatest at dorsal-fin origin. Dorsal profile of body nearly straight from rear of head to dorsal-fin origin and gently convex between posterior terminus of dorsal-fin base and caudal-fin origin. Ventral profile of body convex to anal-fin origin, then straight along base of anal fin. Vent located slightly anterior of anal-fin origin. Lateral line complete, midlateral, and extending onto basal fleshy portion of dorsal lobe of caudal fin, with short secondary branches extending obliquely above and below entire length of main portion of system. Total vertebrae 49 (1), 50 (2), 51 (2) or 52* (1).

Head compressed along entire length, subacute from lateral view and linear from dorsal view; depth much

greater than width. Opercular opening broad, extending from horizontal through anterior limit of lateral line to vertical through middle of pupil. Opercular membranes not connected to isthmus. Posteroventral margin of operculum with posteriorly directed, fleshy lobe; posterior portion of lobe rounded.

Anteriormost portion of snout subacute in lateral view. Snout margin slightly trilobed from dorsal view (Image 2a), but with lobes poorly defined. Anterior naris round, anteriorly directed, and located on anterior margin of snout. Posterior naris rounded. Posterior naris located slightly posterodorsal and medial to anterior naris. Width of posterior naris approximately equal to one-half of internarial distance. Anterior margin of naris with convex flap of skin extending medial of medial margin of naris for distance less than transverse extent of opening of naris.

Eye positioned laterally, visible from both dorsal and ventral views; middle of eye positioned slightly below horizontal through middle of vertical extent of head



Image 2. Dorsal and lateral views of heads of: (a) - *Eutropiichthys cetosus* sp. nov., PUCMF 13024, holotype, 121.8mm SL; (b) - *E. burmannicus*, ZRC 43514, 121.8mm SL, showing differences in snout shape. Images not to scale.



Image 3. *Eutropiichthys burmannicus*, ZRC 43514, 125.7mm SL; Myanmar: Mandalay.

and distinctly below horizontal through anterior naris. Anterior and posterior portions of eye covered laterally by connective tissue (adipose eyelid), but with ovoid, vertically elongate opening positioned lateral to pupil.

Mouth terminal, with opening large and posteroventrally angled. Posterior terminus of gape

at vertical through middle of pupil. Lower jaw slightly shorter than upper. Premaxillary tooth plate crescentic. Teeth on tooth plate slender, conical, and depressible, with approximately seven irregular rows at symphysis that progressively reduce to three or four irregular rows laterally. Teeth on posteromedial portion of tooth plate

Table 1. Biometric data for *Eutropiichthys cetosus* sp. nov. (n=6).

	Holotype PUCMF 13024	Range*	Mean \pm SD
Standard length (mm)	121.8	91.4–127.7	
%SL			
Snout to dorsal-fin origin	35.2	32.4–35.2	33.4 \pm 1.1
Snout to anal-fin origin	47.9	45.0–48.4	46.9 \pm 1.2
Snout to pelvic-fin insertion	36.3	36.3–38.4	37.3 \pm 0.7
Snout to pectoral-fin spine base	22.4	20.4–22.6	21.8 \pm 0.9
Length of dorsal-fin base	8.0	7.2–8.6	7.9 \pm 0.5
Dorsal-spine length	14.7	14.7–16.8	15.9 \pm 0.8
Length of anal-fin base	39.7	39.1–42.8	41.2 \pm 1.6
Length of first pelvic-fin ray	8.0	7.3–9.1	8.3 \pm 0.8
Length of first pectoral-fin ray	18.0	18.0–21.7	18.8 \pm 1.0
Length of pectoral-fin spine	17.0	16.7–19.7	17.6 \pm 1.1
Length of dorsal principal caudal-fin ray	25.4	21.5–27.3	24.4 \pm 2.3
Body depth at dorsal-fin origin	21.3	19.2–23.5	21.5 \pm 1.7
Body depth at anal-fin origin	20.4	17.5–23.5	21.1 \pm 2.1
Body width at pectoral-fin insertion	11.3	10.5–12.6	11.5 \pm 0.7
Caudal-peduncle depth	8.1	7.8–8.6	8.3 \pm 0.3
Head length	22.6	20.4–22.6	21.3 \pm 0.7
%HL			
Head depth	68.7	68.7–77.1	71.8 \pm 2.9
Interorbital distance	27.3	27.3–31.2	29.4 \pm 1.4

* Individual measurements of paratypes provided in Appendix 1.

larger than remaining teeth on that plate. Outermost teeth of upper jaw exposed laterally when mouth closed. Accessory premaxillary tooth plate extends from posterolateral margin of premaxillary tooth plate nearly to rear of gape. Teeth on accessory plate arranged in four or five irregular rows, with teeth largest medially and progressively decreasing in size laterally. Lateral teeth on accessory patch comparable in size to smallest teeth on premaxilla. Palatal tooth patch in form of parabolic arch extending posteriorly from midline to slightly past posterior terminus of accessory tooth patch. Anterior and lateral margins of palatal tooth patch closely applied to, but slightly separated from, posterior margin of premaxillary tooth patch and medial margins of accessory tooth patch. Teeth of palatal tooth patch slender and conical, with teeth of medial portion of patch largest and remaining teeth becoming progressively smaller posterolaterally. Largest teeth on

palate comparable in size to largest teeth on premaxilla. Dentary tooth plate parabolic with slender, conical teeth covering dorsal surface and extending onto lateral surface of dentary. Teeth on lateral surface of dentary visible in closed mouth. Teeth along medial portion of anterior one-half of dentary largest with remaining teeth becoming progressively smaller. Largest teeth on dentary approximately equal in size to largest teeth on premaxilla. Dentary with seven or eight irregular rows of teeth along entire length of tooth patch. Gill rakers on outer face of first arch 7+18=25* (1), 7+20=27 (2), 9+20=29 (1), 10+21=31 (1) or 11+24=35 (1).

Barbels in four pairs. All barbels rest in shallow groove in skin, at least basally. Nasal barbel thread-like and extending posteriorly from lateral margin of posterior naris to beyond vertical through posterior limit of opercle. Maxillary barbel extends from posterior of anterior naris to slightly past middle of pectoral fin. Mandibular barbels in two pairs; barbel bases originate in transverse row at level of posterior naris. Medial and lateral mandibular barbels extend posteriorly to transverse through pectoral-fin base.

Dorsal-fin origin located at anterior one-third of SL. Dorsal-fin base short, about equal to length of snout. Dorsal fin slightly smaller than pectoral fin; segmented rays preceded by spinelet and sharply pointed, slender spine. Spine smooth anteriorly and with 7–20 very fine serrations along distal one-half of posterior margin, with irregular surface but without distinct serrations along basal portion of that margin. Fin margin straight with rays becoming progressively shorter posteriorly; length of last ray about one-half that of first ray. Dorsal-fin rays II,7(6). Adipose fin small and oar-shaped, located above posterior one-third of anal-fin base. Caudal fin deeply forked, lobes pointed and nearly symmetrical. Outer principal rays about three times the length of middle rays. Principal caudal-fin rays i,7,8,i(6). Anal-fin origin located markedly anterior to vertical through middle of SL. Anal-fin base long. Anal-fin margin slightly concave anteriorly, nearly straight posteriorly; posterior ray shortest. Last fin ray without membranous connection to caudal peduncle. Anal-fin rays v,43 (1), v,45(2), v,46 (1), v,47* (1), or v,49(1).

Pelvic fin small, its length only slightly more than one-half that of pectoral fin. Pelvic-fin insertion located slightly posterior of vertical through dorsal-fin origin. Adpressed fin extending ventral of anus with tip of fin reaching slightly past urogenital pore but falling short of anal-fin origin. Pelvic-fin rays i,5 (6). Pectoral fin triangular, first branched ray longest. Tip of adpressed extends posteriorly to beyond vertical through terminus

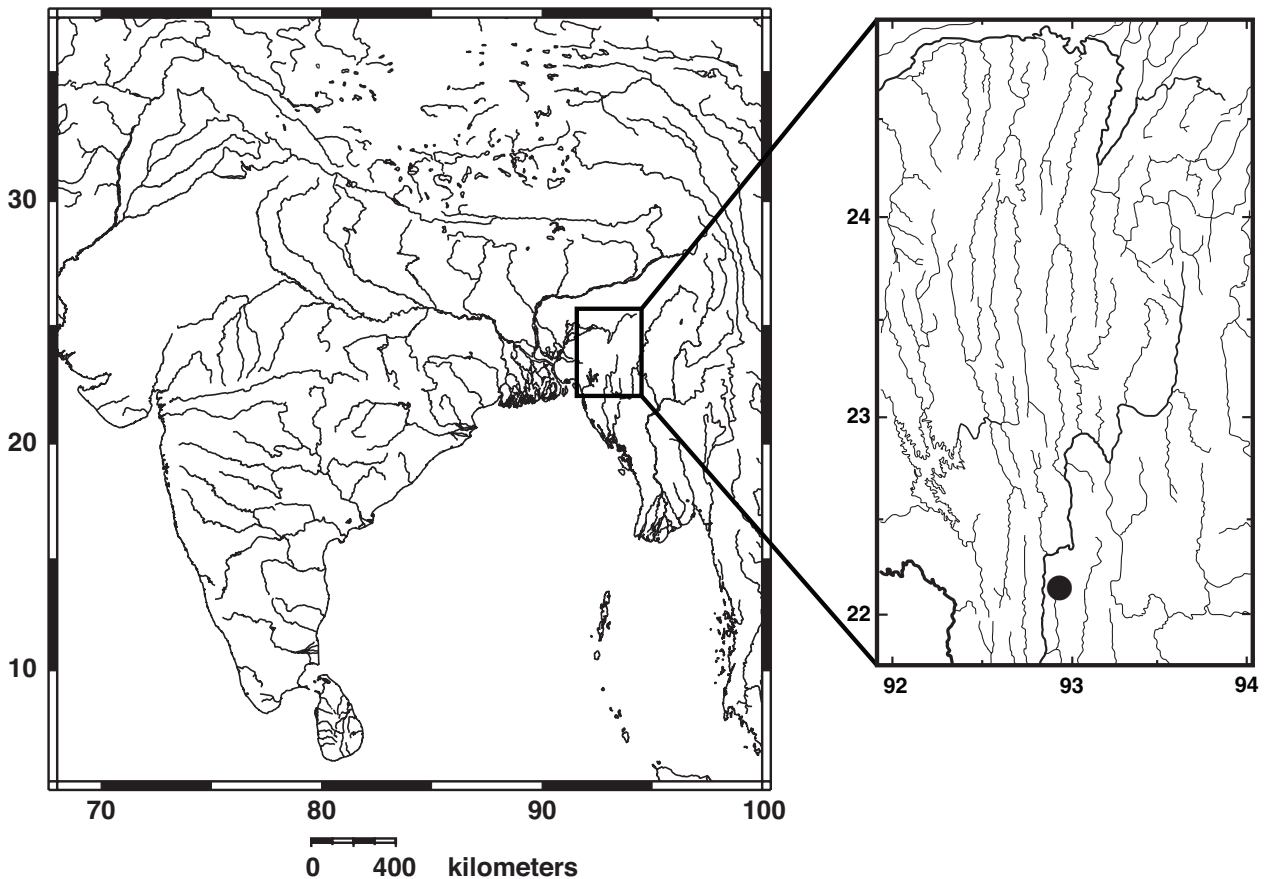


Figure 1. Map showing type locality of *Eutropiichthys cetosus* sp. nov.

of dorsal-fin base. Pectoral-fin spine slender, but more robust than that of dorsal fin; with fine roughened ridge anteriorly and 12–23 retrorse serrations on distal two-thirds of posterior margin. Pectoral-fin rays I,13,i* (3), I,14,i (1) or I,15 (2).

Coloration

In 70% ethanol: Body variably brown dorsally, pale gray on lateral and ventral surfaces, with melanophores decreasing in density ventrally. Dorsal half of head brown, ventral half pale gray. Dorsal and caudal fins unpigmented other than for diffuse, marginal, dark band. Adipose, anal and pelvic fins unpigmented. Pectoral fin with scattered melanophores on interradial membranes, particularly on dorsal half of fin; remainder of fin unpigmented. Maxillary and lateral mandibular barbels dusky on dorsal surfaces. Nasal barbel and medial mandibular barbel unpigmented.

Habitat and Distribution

This species is currently known only from the Kaladan River drainage in southern Mizoram (Fig. 1), although it

highly likely to occur in parts of the river drainage that flow through Myanmar as well. The Kaladan River (also known as Chhimtuipui in Mizoram) originates from the Chin Hills in Myanmar and debouches into the Bay of Bengal near Sittwe in Myanmar. The specimens were



Image 4. Type locality of *Eutropiichthys cetosus* sp. nov.

collected from a clear, slow and moderate flowing river with a depth of 1–4 m (Image 4).

Etymology

The specific epithet comes from the adjectival form of the Latin 'cetus', meaning a large sea animal (commonly referred to a whale). This name is used in allusion to the numerous gill rakers of this species, which are reminiscent of baleen in baleen whales.

DISCUSSION

Eutropiichthys cetosus sp. nov. is morphologically similar to *E. burmannicus*, but can be distinguished from it by the characters as outlined in the diagnosis.

Besides the higher number of gill rakers in the first gill arch (as outlined in the diagnosis), *E. cetosus* sp. nov. is further distinguished from *E. britzi* in having a lesser number of vertebrae (49–52 vs. 52–54), a more slender body (depth at anal-fin origin 17.5–23.5 % SL vs. 23.3–27.1 % SL) and caudal peduncle (depth 7.8–8.6 % SL vs. 9.2–11.0 % SL), and from *E. murius* (we follow Ferraris & Vari 2007 in considering *Pachypterus melanurus* Swainson, 1839 a junior synonym) in having a higher number of vertebrae (49–52 vs. 43–45), a more posteriorly-extended gape (mouth rictus reaching vertical through middle of orbit vs. anterior orbital margin), a rough (vs. smooth) anterior edge of the pectoral spine, more branched pectoral- (13–15 vs. 11 or 12) and anal-fin rays (43–49 vs. 32–37). In both *E. britzi* and *E. murius*, the fleshy flap along the anterior margin of the posterior naris proximally reaches beyond the medial margin of the naris by a distance equal to, or greater than, the transverse dimension of the posterior naris (vs. proximally reaching beyond the medial margin of the naris for a distance distinctly less than the transverse length of the posterior naris in *E. cetosus* sp. nov.). We follow Ferraris & Vari (2007) in considering *Pseudeutropius murius batarensis* a junior synonym of *E. murius*, although they raised the possibility that the two specimens on which Shrestha's (1981) description of *P. murius batarensis* is based might instead be a species of *Clupisoma*. Without directly examining the type specimens of *P. murius batarensis*, we are unable to verify Ferraris & Vari's hypothesis.

Eutropiichthys cetosus sp. nov. further differs from *E. salweenensis* in having a lesser number of vertebrae (49–52 vs. 52–54), a rough (vs. smooth) anterior edge of the pectoral spine, a more slender caudal peduncle (depth 7.8–8.6% SL vs. 9.2–10.2) and from *E. vacha* (we

follow Ferraris & Vari 2007 in considering *Pachypterus punctatus* Swainson, 1839 a junior synonym) in the shape of the snout in both lateral (moderately rounded in *E. cetosus* vs. distinctly pointed in *E. vacha*) and dorsal (slightly trilobed in *E. cetosus* sp. nov. vs. acutely angular in *E. vacha*) views, and a more slender caudal peduncle (depth 7.8–8.6% SL vs. 8.8–10.4% SL).

The Kaladan River, lying between the Surma-Meghna River system in the north and the Chindwin-Irrawaddy River drainage in the east, harbours high endemism of hillstream fish fauna (Anganthoibi & Vishwanath 2010; Dishma & Vishwanath 2012; Lokeshwor & Vishwanath 2012; Ng et al. 2013). Our discovery of a new fish species typically found in the main channels of larger rivers in this drainage suggests that a similar level of endemism may also be found in the non-hillstream freshwater ichthyofauna of the Kaladan River drainage.

Comparative material

Eutropiichthys burmannicus: CAS 88816 (1), 113.7 mm SL, Bago Region, Sittaung River at Taungoo, 18°55'N & 96°25'E. ZRC 43514 (5), 108.7–193.3 mm SL, Myanmar: Mandalay Region, market in Mandalay (Image 3). Additional data from Ferraris & Vari (2007).

E. britzi: CAS-SU 39868 (7), 186.0–229.0 mm SL, Myanmar: Sagaing Region, market at Monywa, on Chindwin River. Additional data from Ferraris & Vari (2007).

E. murius: UMMZ 208724 (3), 93.3–108.1 mm SL; Bangladesh: Sylhet District, Sharigat bazaar, 35 km NE of Sylhet on Sylhet–Shillong highway, 25°4'N & 92°7'E. UMMZ 244742 (1), 86.0mm SL, India: West Bengal State, Mansai River, 1km after Amtala on Jalpaiguri-Coochbehar Road, 26°19'50"N & 89°14'4"E. USNM 316716 (2), 101.0–102.89 mm SL, India: Uttar Pradesh State, Kanpur, 26°28'N & 88°30'E. Additional data from Ferraris & Vari (2007).

E. salweenensis: CAS 76261 (holotype), 124.0mm SL; Thailand: Mae Hong Son Province, Salween River 20km upriver from Mae Sam Laep. Additional data from Ferraris & Vari (2007).

E. vacha: ANSP 85763 (1), 132.7mm SL, India: Mumbai. CAS 61841 (2), 88.8–135.9 mm SL, India: Odisha State, market at Sonapur, 20°50'N & 83°59'E. CAS 94224 (1), 212.5mm SL, India: Odisha State, Hirakud Reservoir or Sambalpur market. MCZ 4257 (1), 113.7mm SL, UMMZ 238802 (1), 144.0mm SL; India: West Bengal State, Kolkata. UMMZ 208293 (1), 178.8mm SL, Bangladesh: Comilla District, Meghna River, downstream from Gumti River mouth, 23°19'N & 90°38'E. UMMZ 208313 (1), 141.7mm SL, Bangladesh: Comilla District, Meghna River,

Key to the species of *Eutropiichthys* (modified from Ferraris & Vari 2007)

1. Anal fin with 32–37 branched rays; pectoral fin with 11 or 12 branched rays (Ganges-Brahmaputra river system in Bangladesh, India and Nepal) *E. murius*
Anal fin with 43–55 branched rays; pectoral fin with 13–17 branched rays 2
2. Gill rakers on first arch 22–35 3
Gill rakers on first arch 15–20 4
3. Snout distinctly pointed and acutely angular when viewed laterally and dorsally respectively; head depth 65.4–67.5% HL; body depth at dorsal-fin origin 23.6–25.3% SL (Irrawaddy and Sittang river drainages in Myanmar; Salween River drainage in Myanmar and western Thailand) *E. burmannicus*
Snout moderately rounded and slightly trilobed when viewed laterally and dorsally respectively; head depth 68.7–77.5% HL; body depth at dorsal-fin origin 19.2–23.5% SL (Kaladan River drainage in India and possibly Myanmar) *E. cetosus* sp. nov.
4. Fleshy narial flap extending medially past medial margin of naris, nearly reaching midline of head (Irrawaddy River drainage in Myanmar) *E. britzi*
Fleshy narial flap not extending medially much past medial margin of naris 5
5. Pectoral spine with smooth anterior margin; snout bluntly rounded in lateral view; total vertebrae 52–54 (lower Salween River basin, in western Thailand) *E. salweenensis*
Pectoral spine with rough anterior margin; snout distinctly pointed in lateral view; total vertebrae 49–51 (Indus River drainage in Pakistan; Ganges-Brahmaputra river system in Bangladesh, Bhutan, India and Nepal; Mahanadi River drainage in India; Surma-Meghna river system in Bangladesh) *E. vacha*

just upstream of Chandpur at Jahasmarachar, 23°15'N & 90°39'E. UMMZ 208444 (1), 117.5mm SL, Bangladesh: Barisal District, Meghna River at Gazipur Char, 22°47'N & 90°43'E. UMMZ 237501 (1), 294.6mm SL; Pakistan: Punjab Province, Jhelum River at Jhelum. USNM 165030 (1), 178.2mm SL, Pakistan: Punjab Province, Ravi River at Lahore. Additional data from Ferraris & Vari (2007).

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Appendix 1. Biometric data for *Eutropiichthys cetosus* sp. nov. (paratypes).

	Paratype PUCMF 13025	Paratype PUCMF 13025	Paratype PUCMF 13025	Paratype PUCMF 13025	Paratype PUCMF 13025
Standard length (mm)	127.7	113.0	104.7	102.4	91.4
%SL					
Snout to dorsal-fin origin	33.8	32.4	33.9	32.4	32.9
Snout to anal-fin origin	46.4	47.3	46.5	45.0	48.4
Snout to pelvic-fin insertion	38.4	37.5	37.7	37	37.1
Snout to pectoral-fin spine base	21.9	20.4	21.2	22.4	22.6
Length of dorsal-fin base	7.4	8.1	7.2	8.0	8.6
Dorsal-spine length	16.8	15.5	16	16.5	16.1
Length of anal-fin base	40.7	42.5	39.1	42.4	42.8
Length of first pelvic-fin ray	7.3	7.7	9.1	9.0	8.9
Length of first pectoral-fin ray	18.3	18.2	18.9	20.7	18.4
Length of pectoral-fin spine	17.6	17.1	17.2	19.7	16.7
Length of dorsal principal caudal-fin ray	21.5	27.3	24.5	26.0	21.8
Body depth at dorsal-fin origin	19.2	22.5	22.7	19.7	23.5
Body depth at anal-fin origin	20.7	22.2	22.2	17.5	23.5
Body width at pectoral-fin insertion	11.4	12.1	10.5	11.3	12.6
Caudal-peduncle depth	7.8	8.4	8.4	8.6	8.5
Head length	21.5	20.4	21.1	21.0	21.4
%HL					
Head depth	71.2	77.1	72.3	71.6	69.9
Interorbital distance	28.8	29	31.2	29.3	30.6

