



Psilorhynchus magnaoculus, a new species of torrent minnow (Teleostei: Psilorhynchidae) from Myanmar

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Abstract

Psilorhynchus magnaoculus sp. nov. (Teleostei: Psilorhynchidae) is described from the Yu River, Sagaing region, Myanmar. The new species is distinctive in having a squarish snout, a large eye, contributing 42.6–43.6 per cent of head length, almost equal to the length of snout and a notch on the ethmoid region of the snout.

Keywords: Freshwater Fish, Myanmar, New Torrent minnow, Yu River

Introduction

The torrent minnows of the genus *Psilorhynchus* McClelland, 1839 (Teleostei: Psilorhynchidae) are small-sized fishes with arched backs and flattened ventral surfaces that occur in the fast-flowing, oxygen-rich streams in foothill and high elevation areas of the Himalayan, Indo-Burman and the Western Ghats (Rainboth, 1983; Arunachalam & Muralidharan, 2008; Conway & Britz, 2015). Members of the genus *Psilorhynchus* are categorized under three species groups: *Psilorhynchus balitora* species group, *P. nudithoracicus* species group and *P. homaloptera* species group (Conway, 2011).

During an ichthyological survey to the Yu River, Myanmar, the first author collected specimens of *Psilorhynchus* belonging to *P. balitora* species group that could not be assigned to any of the species known and represent an undescribed species, whose formal description is provided in the present paper as *Psilorhynchus magnaoculus* sp. nov.

Material and methods

The description of the species is based on ethanol-preserved specimens. Measurements were taken point-to-point, with digital callipers, on the left side of the specimens and recorded to the nearest 0.1 mm. Measurements were made on the left side of the specimens following Conway

& Kottelat (2010). Morphometric data are expressed in percentages of standard length (SL) and head length (HL). Fin rays and numbers of scales were counted under a Leica stereo-zoom microscope M205A. One paratype, ZSI FF 8212, 40.3 mm SL was radiographed using Sharp rays 100 MA x-ray imager. The total number of vertebrae is presented as the sum of abdominal plus caudal vertebrae, following Roberts (1989). Abdominal vertebrae were counted from the vertebrae of the weberian apparatus to the vertebra with its haemal spine anterior to the first anal fin pterygiophore. The weberian apparatus is counted as four vertebrae. Caudal vertebrae were counted from the vertebra with its haemal spine immediately posterior to the first anal-fin pterygiophore to the vertebra bearing the hypural plate. Numbers in parentheses after a specific count indicate number of specimens examined exhibiting that count. The comparative materials of all congeners of the *Psilorhynchus balitora* group are provided in the discussion section.

Results

Psilorhynchus magnaoculus sp. nov. (Figures 1a-c, 2)

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Type material: Holotype: Myanmar, Sagaing region, Tamu District, Yu River at Tamu (Chindwin River

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basin), 24°13'37"N 94°19'06"E, 28-xii-2018, collector? Shangningam (ZSI FF 8211). Paratypes: 3 specimens, 32.0–40.3 mm SL, same locality and label data as holotype (ZSI FF 8212). The specimens bear a red printed label: "*Psilorhynchus magnaoculus* sp. nov., Holotype or Paratype, Bungdon Shangningam* & Laishram Kosygin, Det. 2021.

Type depositary: The type specimens are deposited in the Zoological Survey of India (ZSI), Kolkata, India.

Description (Holotype): Biometric data of holotype and paratypes as in Table 1. Body elongate, deep, greatest depth at dorsal-fin origin. Dorsal profile arched, rising gradually to dorsal-fin origin, sloping gently towards caudal peduncle. Ventral profile straight from lower jaw to anal-fin origin dorsally inclined from anal-fin origin to caudal-fin base.

Head large. Mouth inferior, relatively wide. Eye large, contributing to 42.6–43.6 percent of head length, dorso-lateral located its diameter almost equal to snout length. Snout squarish anteriorly with a notch situated at the level of the ethmoid region anterior to nares, ventral surface bordered by deep longitudinal groove on each side.

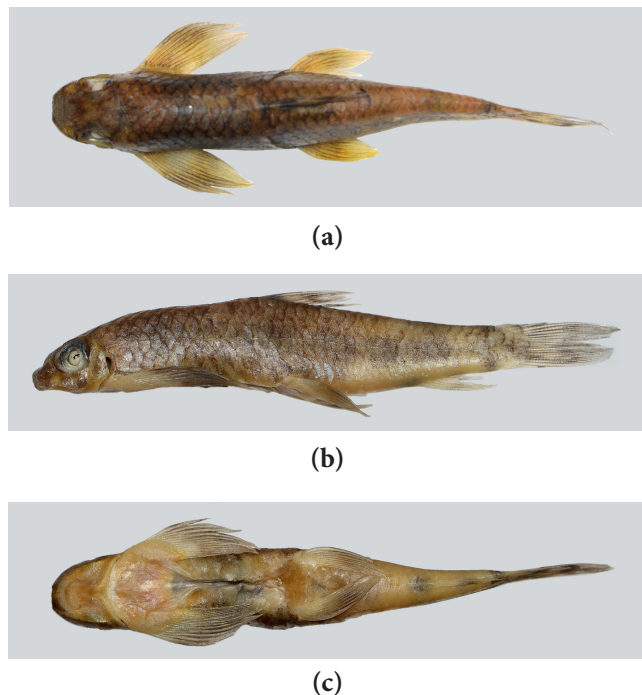


Figure 1. *P. magnaoculus* sp. nov., holotype, ZSI FF 8211, 47.5 mm SL; a. dorsal b. lateral c. ventral view.

Rostral cap fused with upper lip, separated by shallow groove. Lower jaw covered by thick squarish cushion that can be folded backwards, cushion composed of two adnate tissue layers: anteriorly located deeper layer, lower lip, smooth, not continuous with upper lip around corner of mouth; and posteriorly located superficial layer densely papillated, thick, continuous with skin of isthmus. Superficial layer connected with rostral cap by narrow strip of skin around corner of mouth, extended posteriorly, broadened as ridged, slightly papillated skin fold at posterolateral-most corner of mouth.

Dorsal fin with ii.9 rays, high, tip rounded, posterior edge weakly concave. Anal fin with ii.6 rays, long, posterior edge concave, reaching base of caudal fin. Caudal fin weakly forked, upper lobe slightly longer than lower. Principal caudal-fin rays 10+9, procurrent rays 4 dorsally and 3 ventrally. Pelvic-fin rays ii.7. Pelvic-fin origin posterior to dorsal-fin origin, opposite to 3rd branched dorsal-fin ray. Pectoral with fin v, 10(1) or vi, 11(3) rays. Pectoral fin reaching horizontal through dorsal-fin origin, reaching to two scale rows anterior to pelvic-fin origin when depressed. Skin on ventral surface of unbranched pectoral and pelvic-fin rays thickened.

Scales cycloid, fairly large, thin and more or less regularly arranged on body. Scales along lateral line 31(1) or 32(3), plus 2(4) on base of caudal fin. Transverse scale rows from dorsal-fin origin to pelvic-fin origin 3.5/1/2, scale rows around caudal peduncle 10, predorsal scales 11(3)–12(1). Anus close to pelvic fin, position 2(1)–3(3) scales posterior to pelvic-fin origin. Scales between anus and anal-fin origin 9(1) or 10(3). Scales absent from midventral region between pectoral fins. Total number of vertebrae 33, comprised of 22 abdominal and 11 caudal (Figure 2).

Colouration: In 70% ethanol, body background greyish brown dorsally extends up to 3/4th laterally, then pale white ventrally. Dorsum of head brown, five brown saddles, first, 3–4 scales broad posterior to occiput and extending up to pectoral-fin base, second, 4 scales wide, between 3–9 branched dorsal-fin rays, extending oblique up to anterior of pelvic-fin base; third and fourth respectively between dorsal-fin origin and caudal-fin base, and fifth, 2 scale wide, around caudal-fin base. Squarish to rectangular black patches on lateral line, patches obscured by the background pigmentation in region between lateral-line origin and middle of dorsal-fin base, posterior four

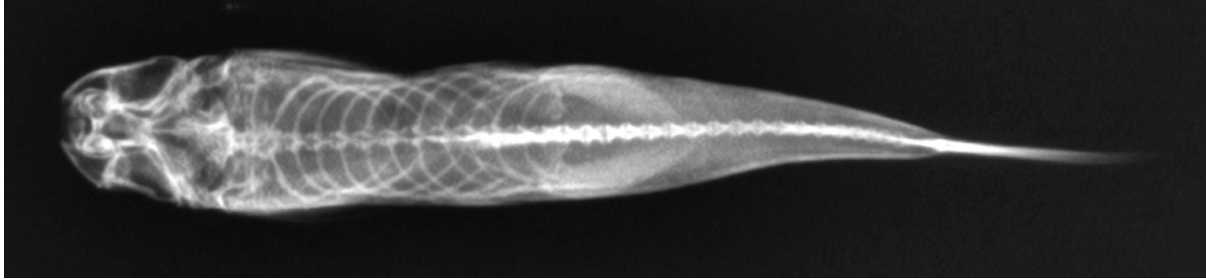


Figure 2. Radiograph of *P. magnaoculus* sp. nov.

Table 1. Biometric data of holotype and paratypes of *P. magnaoculus* sp. nov. (n=4).

	Holotype (ZSI FF 8211)	Paratypes (ZSI FF 8212)	Average	SD
Standard length (in mm)	47.5	32.0–47.5		
In percent of standard length				
Body depth	19.4	15.6–19.4	17.5	1.5
Head length	19.8	19.8–22.4	21.3	1.1
Pre-dorsal length	52.2	46.0–52.2	48.8	3.0
Pre-anal length	76.8	76.8–80.0	78.3	1.3
Pre-pelvic length	52.6	52.6–54.2	53.4	0.7
Pre-pectoral length	18.9	18.8–20.1	19.4	0.6
Pelvic fin length	22.1	22.1–25.1	23.7	1.4
Pectoral fin length	30.1	27.5–30.3	29.4	1.2
Anus-anal distance	15.8	14.1–15.8	14.7	0.7
Snout-anus distance	64.4	59.7–64.4	61.6	2.2
Length of last unbranched anal-fin ray	17.9	15.6–17.9	16.7	0.9
Length of last unbranched dorsal-fin ray	21.3	21.3–25.1	23.4	1.9
Caudal peduncle length	12.4	11.9–13.2	12.5	0.5
Caudal peduncle depth	10.1	09.0–10.2	09.8	0.5
In percent of head length				
Head depth	63.8	57.4–63.8	61.0	2.7
Eye diameter	43.6	42.6–43.6	43.0	0.4
Head width	74.5	73.0–74.5	73.5	0.6
Inter-orbital distance	45.7	42.2–45.7	43.3	1.6
Snout length	53.2	42.6–53.9	49.6	5.1
Mouth width	35.0	35.0–41.0	37.6	2.6

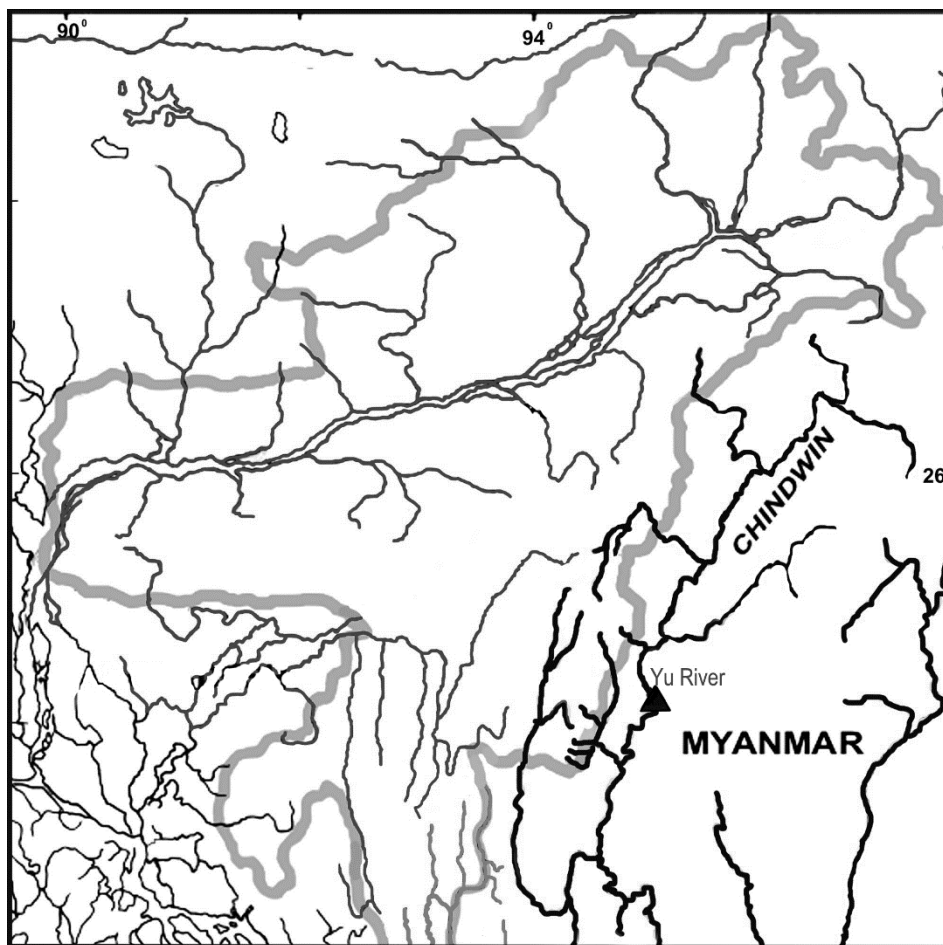


Figure 3. Map showing the type locality of *P. magnaoculus* sp. nov. (▲).

patches, last smallest one on caudal-fin base. Dorsal-fin rays with two rows of spots, one on base and another in middle of the fin. Anal fin immaculate. Paired fin rays with thin melanophores from middle to distal margin. Caudal fin with two black bars, one complete bar in middle, and another incomplete near base of caudal fin.

Diagnosis: *Psilorhynchus magnaoculus* sp. nov. belongs to the *P. balitora* species group (sensu Conway, 2011). The new species is notable from all the congeners in having a squarish snout a larger eye, contributing 42.6–43.6 percent of head length, almost equal to the length of snout; a notch on the ethmoid region and caudal fin with two bars.

Etymology: The species is named after the large eye (Latin), ‘magnaoculus’, noun in apposition.

Distribution: *Psilorhynchus magnaoculus* sp. nov. is presently known only from the Yu River, Chindwin basin in Myanmar (Figure 3).

Discussion

The *Psilorhynchus balitora* species group forms the largest of the three species groups assigned by Conway (2011). There are seventeen species under the group, which includes *P. brachyrhynchus* Conway & Britz 2010; *P. breviminor* Conway & Mayden 2008a; *P. chakpiensis* Shangningam & Vishwanath 2013a; *P. gokkyi* Conway & Britz 2010; *P. maculatus* Shangningam & Vishwanath 2013b; *P. ngathanu* Shangningam & Vishwanath 2013c; *P. olliei* Conway & Britz 2015; & *P. piperatus* Conway &

Britz 2010 from the Chindwin-Irrawaddy drainage; *P. pavimentatus* Conway & Kottelat 2010 from the Ann Chaung drainage; *P. amplicephalus* Arunachalam *et al.* 2007 from the Barak-Surma-Meghna drainage; *P. balitora* (Hamilton 1822); *P. hamiltoni* Conway *et al.* 2013, *P. kamengensis* Dey *et al.* 2020; *P. nahlongthai* Dey *et al.* 2020 & *P. nepalensis* Conway & Mayden 2008b from the Ganga-Brahmaputra drainage; *P. kaladanensis* from the Kaladan drainage & *P. rahmani* Conway & Mayden 2008b from the Karnaphuli drainage.

Psilorhynchus magnaoculus sp. nov. belongs to the *P. balitora* species group. It is distinct from all members of the group in having a larger eye diameter (42.6–43.6 % HL vs. 21.0–37) and squarish snout (vs. rounded snout). Furthermore, it can be distinguished from all its congeners except *P. gokkyi* in having a notch on the ethmoid region. In addition to the aforementioned characters of large eye and snout morphology, *P. magnaoculus* sp. nov. is distinctive from the other members of the *P. balitora* species group inhabiting the Irrawaddy drainage from Myanmar in having a greater head width (73.0–74.5 % HL vs. 62.9–65.4 in *P. pipperatus*; 64.0–71.6 in *P. gokkyi*; 64.3–70.2 in *P. brachyrhynchus*; 67–72 in *P. olliei* and 68.4–73.4 in *P. breviminor*). Additionally, it is distinguished from *P. brachyrhynchus* in having more brachioistegal rays (3 vs. 2), posteriorly positioned pelvic fin (pre-pelvic length: 52.6–54.2 % SL vs. 48.2–52.4), shorter anus–anal distance (14.1–15.8 % SL vs. 18.5–22.3), and greater mouth width (35–41 % HL vs. 28.4–35.2); from *P. breviminor* in having a greater head depth (57.4–63.8 % HL vs. 51.0–55.8), lesser body depth (15.6–19.4 % SL vs. 21.5–24.4) and fewer unbranched dorsal and anal fins rays (ii vs. iii); from *P. gokkyi* in having a posteriorly positioned pelvic fin (pre-pelvic length: 52.6–54.2 % SL vs. 48.0–50.4), shorter anus–anal distance (14.1–15.8 % SL vs. 19.7–23.1), greater mouth width (35–41 % HL vs. 28.4–34.5); from *P. pipperatus* in having lesser body depth (15.6–19.4 % SL vs. 21.2–21.8) and caudal fin with two bars (vs. caudal fin with an approximately symmetrical pattern of small black blotches) and from *P. olliei* in having a lesser body depth (15.6–19.4 % SL vs. 21.6–26.2), longer pectoral fin (27.5–30.3 % SL vs. 24.1–26.3), shorter anus–anal distance (14.1–15.8 % SL vs. 19.2–22.8), greater head depth (57.4–63.8 % HL vs. 50–54), and a greater mouth width (35–41 % HL vs. 27–33).

Furthermore, *P. magnaoculus* sp. nov. can be distinguished from its congeners occurring in the

Chindwin River basin from India in having a longer pectoral fin (27.5–30.3 % SL vs. 23.3–26.4 in *P. ngathanu*; 24.5–25.8 in *P. chakpiensis*; 25.3–27 in *P. maculatus*). It is further distinguished from *P. chakpiensis* in having fewer unbranched dorsal fin rays (ii vs. iii), posteriorly positioned pelvic fin (pre-pelvic length: 52.6–54.2 % SL vs. 49.3–52.5), shorter caudal peduncle (11.9–13.2 % SL vs. 17.8–20.5), longer pelvic fin (22.1–25.1 % SL vs. 17.7–22.1), shorter snout (42.6–53.9 % HL vs. 75.9–81.9) and greater mouth width (35–41 % HL vs. 28.3–31.4); from *P. ngathanu* in having a shorter pre-pectoral distance (18.9–20.1 % SL vs. 20.0–23.1), longer pelvic fin (22.1–25.1 % SL vs. 20.2–22.4) and shorter anus–anal distance (14.1–15.8 % SL vs. 19.0–21.3) and from *P. maculatus* in having fewer lateral line scales (31–32 vs. 35–36), shorter snout length (42.6–53.9 % HL vs. 55–68) and caudal fin with two bars (vs. caudal fin densely speckled with small dark clusters of melanophores).

Psilorhynchus magnaoculus sp. nov. is additionally distinguished from *P. amplicephalus*, *P. balitora*, *P. hamiltoni*, *P. kamengensis*, *P. nahlongthai*, *P. nepalensis* and *P. pavimentatus* in having more principal caudal-fin rays (10+9 vs. 9+8) and from *P. kaladanensis*, *P. kamengensis*, *P. nahlongthai*, *P. pavimentatus* and *P. rahmani* in having fewer unbranched dorsal-fin rays (ii vs. iii). It differs from *P. balitora* and *P. nepalensis* by the presence (vs. absence) of a post-epiphysial fontanelle; from *P. kamengensis*, *P. nahlongthai*, *P. pavimentatus* and *P. rahmani* in having a longer caudal peduncle (11.9–13.2 % SL vs. 9.1–11.5); from *P. amplicephalus* in having a longer pectoral fin (27.5–30.3 % SL vs. 17.5–19.6) and from *P. hamiltoni* in having more branchiostegal rays (3 vs. 2), and fewer lateral-line scales (31–32 vs. 34–35).

Comparative Materials

Psilorhynchus amplicephalus: paratype, 48.2 mm SL; India: Assam, Silchar, Balishwar River at Malidor village (MSUMNH 8), additional information from Arunachalam *et al.* (2007).

Psilorhynchus balitora: 3 specimens, 41.9–56.0 mm SL: India: Manipur, Churachandpur district, Tuivai River (MUMF 5058): 2 specimens, 57.0–62.2 mm SL, Meghalaya, west Garo hills, Josekgre Chising Nokrek Biosphere Reserve (ZSI/ERS/V/F 2718).

Psilorhynchus brachyrhynchus: 4 specimens, 41.2 – 45.0 mm SL: India, Manipur, Chandel district, Bulledam stream, a tributary of the Chakpi River (ZSI FF 8221).

Psilorhynchus breviminor: 5 specimens, 41.6–48.7 mm SL; India: Manipur, Chandel district, Chakpi River at Ducho–Dujang confluent (MUMF 12001–12005).

Psilorhynchus chakpiensis: holotype and paratypes, 6, 45.7–53.1 mm SL; India: Manipur, Chakpi River at Chakpikarong (MUMF 12071–12076).

Psilorhynchus maculatus: holotype and paratypes, 3, 47.2–61.2 mm SL; India, Manipur, Ukhrul district, Challou River at Poi village (MUMF 12082–12084).

Psilorhynchus kamengensis: holotype, 49.6 mm SL; India, Arunachal Pradesh, West Kameng district, Kameng River at Tippi (ZSI FF 8422), additional information from Dey *et al.* (2020).

Published information used for comparison: Conway & Britz (2010) for *P. gokkyi* and *P. piperatus*; Conway *et al.* (2013) for *P. hamiltoni*; Conway & Kottelat (2010) for *P. pavimentatus*; Conway & Mayden (2008b) for *P. nepalensis* and *P. rahmani*; Conway & Britz (2015) for *P. olliei* and Dey *et al.* (2020) for *P. nahlongthai*.

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References

- Arunachalam, M and Muralidharan, M. 2008. Description of a new species of the genus *Psilorhynchus* (Teleostei: Psilorhynchidae) from a Western Ghats stream in southern India. *Raff. Bull. Zool.*, **56**: 405–414.
- Arunachalam, M. Muralidharan, M and Sivakumar, P. 2007. *Psilorhynchus amplexcephalus*, a new species from Balishwar River of Assam, India. *Curr. Sci.*, **92**: 1352–1354.
- Conway, K.W and Britz, R. 2010. Three new species of *Psilorhynchus* from the Ayeyarwaddy River drainage, Myanmar (Teleostei: Psilorhynchidae). *Zootaxa*, **2616**: 31–47. <https://doi.org/10.11646/zootaxa.2616.1.2>
- Conway, K.W and Britz, R. 2015. *Psilorhynchus olliei*, a new species of torrent minnow from eastern Myanmar (Ostariophysi: Psilorhynchidae). *Ichthyol. Explor. Freshw.*, **25**: 347–356.
- Conway, K.W and Kottelat, M. 2010. Two new species of torrent minnow (Ostariophysi: Psilorhynchidae) from western Myanmar. *Raff. Bull. Zool.*, **58**(2):259–267.
- Conway, K.W and Mayden, R.L. 2008a. *Psilorhynchus breviminor*, a new species of psilorhynchid from Myanmar (Ostariophysi: Psilorhynchidae). *Ichthyol. Explor. Freshw.*, **19**: 111–120.
- Conway, K.W and Mayden, R.L. 2008b. Two new species of *Psilorhynchus* (Ostariophysi: Psilorhynchidae) with the redescription of *P. balitora*. *Ichthyol. Explor. Freshw.*, **19**: 215–232.
- Conway, K.W, Dittmer, D.E, Jezisek, L.E and Ng, H.H. 2013. On *Psilorhynchus sucatio* and *P. nudithoracicus*, with the description of a new species of *Psilorhynchus* from northeastern India (Ostariophysi: Psilorhynchidae). *Zootaxa*, **3686**: 201–243. <https://doi.org/10.11646/zootaxa.3686.2.5> PMid:26473215
- Conway, K.W. 2011. Osteology of the South Asian genus *Psilorhynchus* McClelland, 1839 (Teleostei: Ostariophysi: Psilorhynchidae), with investigation of its phylogenetic relationships within the order Cypriniformes. *Zool. J. Linn. Soc.*, **163**: 50–154. <https://doi.org/10.1111/j.1096-3642.2011.00698.x>
- Dey, A. Choudhury, H. Mazumder, A. Bharali, R. Thaosen, S and Sarma, D. 2020. *Psilorhynchus kamengensis*, a new species of fish (Teleostei: Psilorhynchidae) from northeast India. *Vert. Zool.*, **70**(2): 101–110.
- Dey, A. Choudhury, H. Mazumder, A. Thaosen, S and Sarma, D. 2020. *Psilorhynchus nahlongthai*, a new fish species (Teleostei: Psilorhynchidae) from the Brahmaputra drainage, northeast India. *J. Fish. Biol.*, <https://doi.org/10.1111/jfb.14251>. PMid:31900922
- Hamilton, F.B. 1822. An account of the fishes found in the river Ganges and its branches. Archibald Constable and Company, Edinburgh and London. <https://doi.org/10.5962/bhl.title.59540>
- Rainboth, W.J. 1983. *Psilorhynchus gracilis*, a new cyprinoid fish from the Gangetic lowlands. *Proc. Cal. Acad. Sci.*, **43**: 67–76.
- Roberts, T.R.1989. The freshwater fishes of western Borneo (Kalimantan, Barat, Indonesia). *Mem. Cal. Acad. Sci.*, **14**: 1–210.
- Shangningam, B.D and Vishwanath, W. 2013a. A new species of *Psilorhynchus* (Teleostei: Psilorhynchidae) from the Chindwin basin of Manipur, India. *Zootaxa*, **3694**(4): 381–390. <https://doi.org/10.11646/zootaxa.3694.4.6>
- Shangningam, B.D and Vishwanath, W. 2013b. *Psilorhynchus maculatus*, a new species of torrent minnow from the Chindwin basin, Manipur, India (Teleostei: Psilorhynchidae). *Ichthyol. Explor. Freshw.*, **24**: 57–62.
- Shangningam, B.D and Vishwanath, W. 2013c. *Psilorhynchus ngathanu*, a new torrent minnow species (Teleostei: Psilorhynchidae) from the Chindwin Basin, Manipur, India. *Ichthyol. Res.*, **31**: 27–31. <https://doi.org/10.1007/s10228-013-0368-5>