

## *Psilorhynchus bichomensis*, a new species of torrent minnow from Arunachal Pradesh, northeast India (Teleostei: Psilorhynchidae)

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### Abstract

*Psilorhynchus bichomensis*, a new species, is described from the Bichom River in Arunachal Pradesh, northeast India. The new species is characterised by the following characters: body elongate with 46 scales along lateral line, unbranched pectoral-fin rays 9–10, predorsal scales 13–14, circumpeduncular scales 8 and caudal fin peppered with transverse black bar on the lower lobe. The new species is compared with other congeners of the *Psilorhynchus homaloptera* species group.

**Keywords:** Psilorhynchid, New species, Identification key, Brahmaputra basin.

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### Introduction

The torrent minnows of the genus *Psilorhynchus* McClelland includes 29 species distributed in the Ganga-Brahmaputra drainage of northeastern India, Nepal, Bangladesh and southeastern Tibet, the Korkanhalla stream of Peninsular India, the Chindwin basin of Manipur and the Kaladan basin of Mizoram, India, the Irrawaddy drainage of northeastern and central Myanmar, the Ann Chaung drainage of western slope Rakhine Yoma, Myanmar and the Ataran River drainage of southern Myanmar (Rainboth 1983; Conway and Kottelat 2007; Arunachalam and Muralidharan 2008; Conway and Kottelat 2010; Shangningam and Vishwanath 2013a-c; Lalramliana et al. 2014; Conway and Britz 2015). Fishes of the genus *Psilorhynchus* are tentatively divided into the three species groups viz., *Psilorhynchus balitora* species group, *P. nudithoracicus* species group and *P. homaloptera* species group (Conway 2011; Conway et al. 2013). The *Psilorhynchus homaloptera* species group exhibits high unbranched pectoral-fin ray counts and high lateral-line scale rows (Conway 2011). Currently, seven species are recognised under the group including *P. homaloptera* Hora & Mukerji 1935, *P. rowleyi* (Hora & Misra 1941), *P. pseudecheneis* Menon & Datta 1964, *P. microphthalmus* Vishwanath & Manojkumar 1995, *P. arunachalensis* (Nebeshwar et al. 2007), *P. khopai* Lalramliana et al. 2014, and *P. konemi* Shangningam & Vishwanath 2016.

Ichthyological survey conducted in the Bichom River, Brahmaputra basin in East Kameng District of Arunachal Pradesh, revealed a species belonging to *Psilorhynchus homaloptera* species group that is readily distinguished from its congeners and is herein described as *Psilorhynchus bichomensis*, new species.

### Material and Methods

The specimens were fixed in 10% formalin and later transferred to 70% ethanol. Measurements were made on the left side of the specimens point to point with digital callipers to the nearest 0.1 mm. Counts, measurements and description follow Conway et al. (2013). The number in parentheses after a specific count indicates the frequency of that count. Fin rays and numbers of scales were counted under a stereo-zoom light microscope. Morphometric data are expressed in percentages of standard length or head length.

**Abbreviations used:** SL, standard length; HL, lateral head length. Collection codes: ZSI, Zoological Survey of India, Kolkata; MUMF, Manipur University Museum of Fishes, Canchipur.



**Figure 1.** *Psilorhynchus bichomensis*, ZSI FF 5908, holotype, 43.0 mm SL; India: Arunachal Pradesh: East Kameng District, Bichom River. A, lateral view; B, dorsal view; C, ventral view of body.

## Results

### *Psilorhynchus bichomensis* new species

(Fig. 1, Table 1)

**Common name:** Torrent minnow.

**Holotype:** ZSI FF 5908, 43.0 mm SL, India, Arunachal Pradesh, East Kameng District, Bichom River at Bana (Brahmaputra basin), 38 km from Seppa towards Ziro, 27°17'23"N 92°50'25"E, L. Kosygin & Party, 25 August 2015.

**Paratype:** ZSI FF 5907, 1, 54.4 mm SL; same data as holotype.

**Diagnosis:** *Psilorhynchus bichomensis*, a member of the *P. homaloptera* species group is distinguished from all other members by the following combination of characters: body elongate with 46 scales along the lateral line, unbranched pectoral-fin rays 9–10, scale rows around caudal peduncle 8, transverse scale rows from dorsal- to pelvic-fin origin 4/1/3, predorsal scales 13 or 14, scales between anus and anal-fin origin 14, caudal fin peppered with transverse black bar on the lower lobe.

**Description:** General body shape is shown in Figure 1. Morphometric data and the selected meristic characters are listed in Table 1. Body elongate, greatest depth at dorsal-fin origin. Dorsal profile rising gently from tip of the snout to occiput, then running straight and gently elevating to dorsal-fin origin, sloping gently to point opposite vertical through anal fin and then running straight towards caudal peduncle. Caudal peduncle shallow and moderately compressed. Ventral profile straight from the lower jaw to anal-fin origin, with slight dorsal

**Table 1.** Morphometric characters of *Psilorhynchus bichomensis* n. sp., ZSI FF 5907–5908, 43.0–54.4 mm SL, India, Arunachal Pradesh, East Kameng District, Bichom River at Bana (Brahmaputra basin).

	ZSI FF 5908 holotype	ZSI FF 5907 paratype	Mean
Standard Length (mm)	43.0	54.4	
<b>In % of SL</b>			
Body depth	14.0	13.2	13.6
Head length	22.0	21.0	21.5
Predorsal length	49.2	47.5	48.4
Prepectoral length	18.8	16.9	17.8
Prepelvic length	45.3	46.6	45.9
Preanal length	79.8	77.7	78.8
Snout-anus length	57.3	55.7	56.5
Anus-anal fin	20.1	20.4	20.3
Pectoral-fin length	27.2	25.4	26.3
Pelvic-fin length	22.0	21.0	21.5
Caudal-peduncle length	9.3	10.1	9.7
Caudal-peduncle depth	7.0	6.1	6.5
Length of last unbranched anal-fin ray	16.2	17.1	16.7
Length of last unbranched dorsal-fin ray	25.2	26.0	24.9
<b>In % of HL</b>			
Head width	72	73	72
Head depth	41	45	43
Snout length	48	54	51
Inter-orbital distance	40	44	42
Eye diameter	20	17	18
Mouth width	29	34	31

**Figure 2.** Oromandibular structures of *Psilorhynchus bichomensis*, ZSI FF 5908, holotype, 43.0 mm SL.

inclination from anal-fin origin posteriorly towards caudal fin.

Head greatly depressed, moderately broad with fine tubercles, ventral surface flat, length greater than body depth. Snout slightly spatulate, obtusely pointed, margins with scattered tubercles. Eye small, dorso-laterally located on head, with free orbital margin, not visible from ventral surface, situated almost entirely on posterior half of head. Inter-orbital space flat, width greater than eye diameter. Nostrils large, with conspicuous, rounded membranous flap between anterior and posterior openings, situated nearer to margin of eye than to tip of snout. Mouth inferior, transverse, arched, width shorter than snout length. Barbels absent. Rostral cap fused with upper lip, separated by shallow groove, posterior margin of rostral cap with scattered tubercles. Upper and lower jaw fully exposed, with sharp rasping edges (Fig. 2). Lower jaw followed by a squarish cushion that can be folded backwards. Cushion composed of two adnate tissue layers: deeper layer comprising the lower lip smooth, not continuous with upper lip around corner of mouth; and slightly thickened superficial layer, continuous with skin



**Figure 3.** Bichom River, type locality of *Psilorhynchus bichomensis*.

of isthmus, connected with rostral cap by a papillae-like skin fold around corner, expanded to form a small lobe at postero-lateralmost corner of mouth. Gill rakers absent.

Paired fins horizontally oriented. Ventral surface of pectoral and pelvic-fin bases thickened. Pectoral fin with IX–X, 7–8 rays; with rounded free margin; longer than head, reaching nearly to horizontal through dorsal-fin origin, reaching one scale row anterior to pelvic-fin origin when adpressed. Pelvic-fin with II.7 rays, shorter than pectoral; origin vertically opposite to one scale anterior to dorsal-fin origin, extending beyond anus. Dorsal fin with III, 8 rays, posterior edge straight to slightly concave, closer to snout tip than caudal-fin base. Anal fin long with II.6 rays, nearly reaching caudal-fin base when adpressed, posterior margin straight to slightly convex. Caudal fin with 10+9 principal rays, deeply emarginate, lower lobe slightly longer than upper, 4-5 dorsal and 5-6 ventral procurrent rays.

Scales cycloid, large. Lateral line running with 46 (2) scales, plus 2 (2) on caudal fin. Transverse scale rows from dorsal- to pelvic-fin origin 4/1/3, scale rows around caudal peduncle 8, predorsal scales 13 or 14, scales between anus and anal-fin origin 14. Abdominal region scaleless from mid-ventral region between pectoral and pelvic fin to anus.

**Coloration in preservative.** Body background colour oliveaceous pale. Occiput and dorsal surface of snout brown. Scales on flanks and dorsal surface with thin melanophores, posterior edges hyaline. Mid lateral scale slightly darker and appear as dark brown lateral stripe. Ventral surface immaculate. Anterior-most fin rays with diffuse melanophores, concentrated on fin bases. Dorsal-fin rays with thin brown melanophores, posterior margin hyaline. Paired fin bases concentrated with melanophores. Pectoral-fin rays with prominent thin brown melanophores along its interradiation. Pelvic-fin rays speckled with thin dark brown markings. Caudal-fin base peppered with dark melanophores, lower lobe with a short transverse dark band, extending to middle, margin hyaline.

In live, body background yellowish. Ventral surface between pectoral and pelvic fins silvery white. Fin pigmentation orange-light colour.

**Distribution and habitat:** *Psilorhynchus bichomensis* is presently known only from the Bichom River (Fig. 3), tributary of the Kameng River, Brahmaputra basin in Arunachal Pradesh, India (Fig. 4). The type locality, Bichom River, is cool, shaded and swiftly flowing with a gravel bottom, rocky bed substrate and numerous

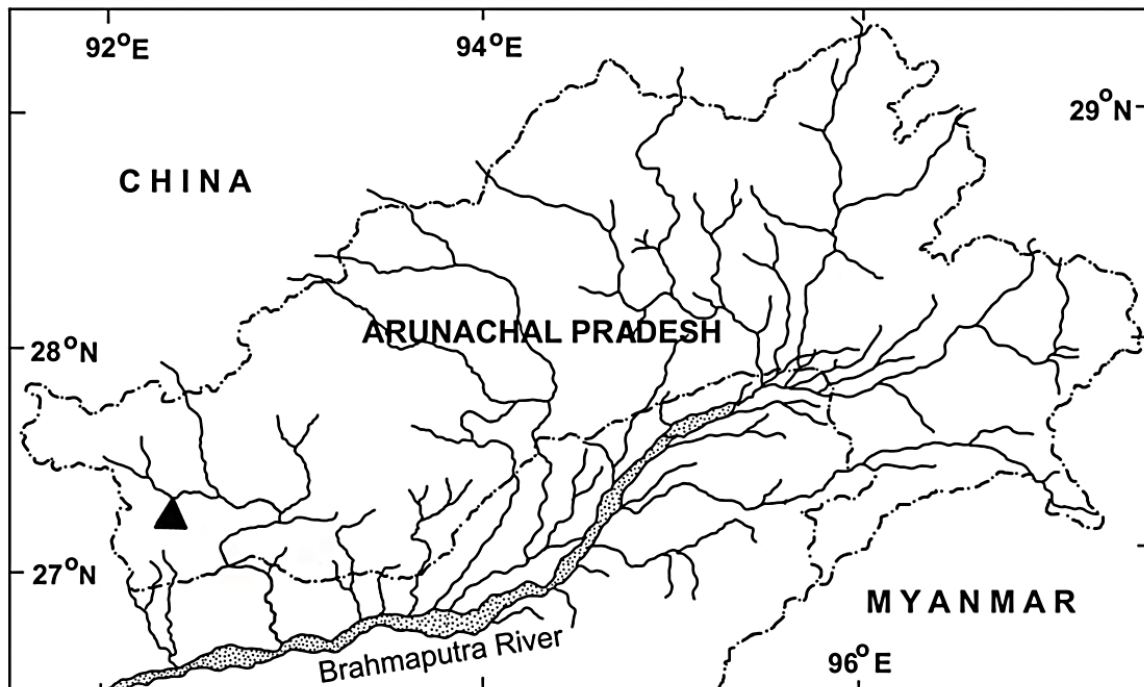


Figure 4. Map showing type locality of *Psilorhynchus bichomensis* (▲).

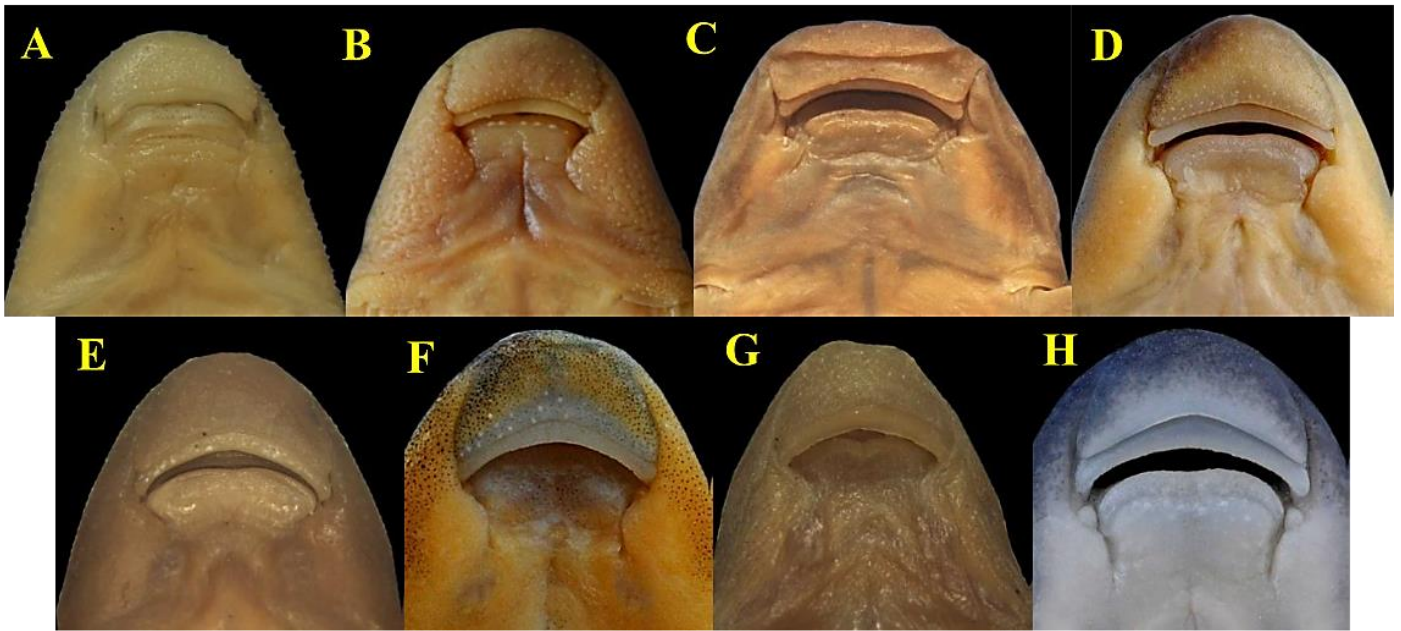
riffles. The species usually inhabits sandy substrate with pectoral fins spread horizontally while feeding at the bottom and adhering to rocks while at rest. Other species collected from the type locality includes *Barilius bendelisis*, *Devario aequipinnatus*, *Garra annandalei*, *G. kalpangi*, *Schizothorax richardsonii*, *Tor hexastichus* and *Opsarius barna*.

**Etymology:** The species is named after the type locality, the Bichom River.

### Discussion

*Psilorhynchus bichomensis* belongs to the *P. homaloptera* species group by having an elongate body with 46 lateral-line scales and 9–10 unbranched pectoral-fin rays. It can be easily differentiated from all the members except *P. pseudecheneis* of *P. homaloptera* species group by having fewer circumpeduncular scales (8 vs. 10 in *P. arunachalensis*, *P. homaloptera*, *P. khopai*, *P. konemi*, *P. microphthalmus* and *P. rowleyi*). However, *P. bichomensis* is different from *P. pseudecheneis* in the presence (vs. absence) of regularly arranged 13–14 predorsal scales, transverse scale rows from dorsal- to pelvic-fin origins (4/1/3 vs. 4½/1/2½), absence (vs. presence) of large flap-like structures supported by highly modified cycloid scales along the ventral surface of the body between the insertion of the paired fins, longer head (21.0–22.0 vs. 17.4–20.4% SL), longer prepectoral (16.9–18.8 vs. 12.5–16.2% SL), shorter anus-anal fin distance (20.1–20.4 vs. 23.9–27.0% SL), longer last unbranched anal-fin ray (16.2–17.1 vs. 13.8–16.4% SL), longer last unbranched dorsal-fin ray (25.2–26.0 vs. 17.3–22.1% SL), lesser head width (72–73 vs. 77–84% HL), smaller eye diameter (17–20 vs. 47–52% HL) and lesser inter-orbital distance (40–44 vs. 47–52% HL).

*Psilorhynchus bichomensis* further differs from *P. arunachalensis* by having more lateral-line scales (46 vs. 42–44), fewer predorsal scales (13–14 vs. 16–17), longer head (21–22 vs. 17.0–20.5% SL), lesser body depth (13.2–14 vs. 15.0–19.0% SL), shorter caudal peduncle (9.0–10.1 vs. 12.0–16.0% SL), more unbranched dorsal-fin rays (III vs. II), shorter pelvic fin (21–22 vs. 45.3–50% SL), longer dorsal fin (25.2–26.0 vs. 18.4–23.7% SL) and longer anal fin (16.2–17.1 vs. 13.1–16.0% SL). It differs from *P. homaloptera* by having more unbranched pectoral-fin rays (IX–X vs. VIII), unbranched dorsal-fin rays (III vs. II), more lateral-line



**Figure 5.** Mouth parts of *Psilorhynchus homaloptera* species group. (A) *P. bichomensis*, (B) *P. arunachalensis*, (C) *P. pseudocheneis* (D) *P. homaloptera*, (E) *P. khopai*, (F) *P. rowleyi*, (G) *P. microphthalmus*, and (H) *P. konemi*.

scales (46 vs. 37–40), more transverse scale rows from dorsal- to pelvic-fin origins (4/1/3 vs. 3½/1/2½), lesser head depth (41–45 vs. 48–61% HL), more principal caudal-fin rays (10+9 vs. 9+8), more scales between anus and anal-fin origin (14 vs. 12), smaller eye diameter (17–20 vs. 22–32% HL) and abdominal region scaleless from mid-ventral region between paired fins to anus (vs. abdominal region naked except one scale anterior to the anus). It is distinguished from *P. khopai* by having more lateral-line scales (46 vs. 39–41), transverse scale rows from dorsal- and pelvic-fin origins (4/1/2 vs. 3½/1/2½), more principal caudal-fin ray on upper lobe (10 vs. 9), more scales between anus and anal-fin origin (14 vs. 11–12), longer head (21–22 vs. 18.8–20.2% SL), shorter caudal peduncle (9.3–10.1 vs. 12.3–14.5% SL), longer last unbranched dorsal-fin ray (25.2–26.0 vs. 20.1–24.4% SL).

The new species *P. bichomensis* is distinguished from *P. konemi* by having more unbranched pectoral-fin rays (IX–X vs. VII–VIII), more lateral-line scales (46 vs. 39–40), more transverse scale rows from dorsal- to pelvic-fin origins (4/1/3 vs. 3½/1/2½), more principal caudal-fin rays (10+9 vs. 9+8), more scales between anus and anal-fin origin (14 vs. 12), lesser body depth (13.2–14.0 vs. 17.4–21.1% SL), lesser caudal-peduncle depth (6.1–7.0 vs. 7.6–9.5% SL), longer last unbranched dorsal-fin ray (25.2–26 vs. 19.7–24.1% SL) and lesser head depth (41–45 vs. 51–61% HL). It is distinguished from *P. microphthalmus* by having more unbranched pectoral-fin rays (IX–X vs. VII–VIII), more lateral-line scales (46 vs. 37–38), more transverse scale rows from dorsal- to anal-fin origins (4/1/3 vs. 3/1/2), more predorsal scales (13–14 vs. 11–12), absence (vs. presence) of one oblique band on the pectoral fin, lesser body depth (13.2–14.0 vs. 16.0–18% SL), longer pectoral fin (25.4–27.2 vs. 22.1–24.2% SL), longer pelvic fin (21.0–22.0% SL vs. 19.0–20.0), lesser head depth (41–45 vs. 55–60% HL) and smaller eye diameter (17–20 vs. 21.2–24.0% HL). It differs from *P. rowleyi* by having more unbranched pectoral-fin rays (IX–X vs. VII), more lateral-line scales (46 vs. 39–42), more transverse scale rows from dorsal- to pelvic-fin origins (4/1/3 vs. 3½/1/2), smaller eye diameter (17–20 vs. 22–32% HL), more scales between anus and anal-fin origin (14 vs. 10–12), longer head (21.0–22.0 vs. 17.5–19.6% SL), shorter caudal peduncle (9.3–10.1 vs. 12.8–16.2% SL), head depth (41–45 vs. 49.2–61.9% HL), smaller eye (17–20 vs. 21.7–31.5% HL) and more unbranched dorsal-fin rays (III vs. II).





**Figure 6.** Lateral views of *Psilorhynchus homaloptera* species group. (A) *P. arunachalensis* ZSI FF 7000, 89.66 mm SL, (B) *P. pseudecheneis* ZSI F1229/2, paratype, 83.0 mm SL, (C) *P. homaloptera* ZSI F 11792/1, holotype, 54.4 mm SL, (D) *P. khopai* ZSI FF 5412, paratype, 8.18 mm SL, (E) *P. microphthalmus* ZSI FF 5489, paratype, 52.06 mm SL, (F) *P. konemi* MUMF 12142, holotype, 59.4 mm SL, (G) *P. rowleyi* ZSI F 13461, lectotype, 75.5 mm SL and (H) *P. bichomensis* ZSI FF 5908, holotype, 43.0 mm SL.

The mouth part of all members in the *P. homaloptera* species group (Fig. 5) possesses a reduced skin flap located at the postero-lateral corner of mouth compared to other congeners (Conway and Kottelat 2007; Conway et al. 2012). Unlike the other members of the group, *P. bichomensis* shows feebly developed papillae-like lobe at the corner of the mouth with the upper and lower jaws fully exposed. All members of the *P. hamoloptera* species group (Fig. 6) except *P. konemi* exhibits distinct spots in the mid-dorsal region between occiput and dorsal-fin origin and 2–6 dark brown round to squarish markings on the lateral sides of the body along the lateral-line scales. *Psilorhynchus bichomensis* has plain body without any markings. The new species shares similar character with *P. konemi* in having plain body without bars, saddles, spots or markings. However, *P. bichomensis* is different from *P. konemi* in having a more slender body with uniform pale yellowish colorations vs. slightly arched body with olive brown.

**Key to species of the *Psilorhynchus homaloptera* species group:**

1. Presence of regularly arranged scales in the predorsal region ..... 2  
 Absence of scales in the predorsal region ..... *P. pseudecheneis*
2. Scales rows around caudal peduncle 8; lateral-line scales 46 ..... *P. bichomensis*  
 Scale rows around caudal peduncle 10; lateral-line scales less than 46 ..... 3
3. Unbranched dorsal-fin rays two ..... 4  
 Unbranched dorsal-fin rays three ..... *P. khopai*
4. Scales along the predorsal region 12–15 ..... 5  
 Scales along the predorsal region 16–17 ..... *P. arunachalensis*
5. Principal caudal-fin rays 9+8; scale from lateral line to pelvic-fin origin 2½ ..... 6  
 Principal caudal-fin rays 9+9; scale from lateral line to pelvic-fin origin 2 ..... 7
6. Body with blotches; ventral region scaleless except one scale anterior to vent; total vertebrae 41 ..... *P. homaloptera*  
 Body without blotches; ventral region scaleless from mid-ventral region between pectoral and pelvic fin; total vertebrae 42..... *P. konemi*
7. Lateral-line scales 37–38; total vertebrae 36 ..... *P. microphthalmus*  
 Lateral-line scales 39–42; total vertebrae 41..... *P. rowleyi*

**Comparative material:** *Psilorhynchus arunachalensis* Nebeshwar, Bagra & Das 2007: ZSI FF 7000, 5, 58.2-91.4 mm SL: India: Arunachal Pradesh, East Kameng District, Seppa, Pare River, tributary of Kameng River (Brahmaputra basin).

*Psilorhynchus konemi* Shangningam & Vishwanath 2016, MUMF 12142, 59.4 mm SL, holotype, India: Manipur. – ZSI FF 5993, paratypes, 3, 58.0–69.1 mm SL, India: Manipur; Chandel District; Chakpi River at Dujang River, 24°11' N 93°57' E (Chindwin basin).



*Psilorhynchus khopai* Lalramliana, Solo, Lalronunga & Lalnuntluanga 2014: ZSI FF 5412, 2, paratypes, 63.7-82.4 mm SL: India: Mizoram; Saiha District; Khopai village, Tuisi River (Kaladan basin).

*Psilorhynchus microphthalmus* Vishwanath & Manojkumar 1995: MUMF 101, paratypes, 4, 48.7-58.6 mm SL. – ZSI FF 5489, paratype, 51.5 mm SL: India: Manipur; Chandel District, Chakpi River at Mombi (Chindwin basin).

*Psilorhynchus pseudecheneis* Menon & Datta 1964: ZSI F 1229/2, paratypes, 4, 75.0-83.0 mm SL: Eastern Nepal; Dudhkosi River (Kosi basin).

*Psilorhynchus rowleyi* (Hora & Misra 1941): ZSI F 1341/1, syntypes, 2, 60.3-75.5 mm SL: Myanmar: Kora (Vernay-Hopwood Upper Chindwin Expedition). – MUMF 12010–12022, 56.0-73.2 mm SL: India: Manipur; Chandel District; Chakpi River at Dujang (Chindwin basin).

*Psilorhynchus homaloptera* Hora & Mukerji 1935: ZSI F 11792/1, holotype, 54.4 mm SL. – ZSI F11976/1, paratypes, 4, 52.2-56.8: India: Nagaland; Zunheboto District; Emilomi; Keleki stream (Brahmaputra basin).

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