

A NEW SPECIES OF THE CYPRINOID GENUS *PSILORHYNCHOIDES* YAZDANI ET AL. (CYPRINIFORMES: PSILORHYNCHIDAE) FROM ARUNACHAL PRADESH, INDIA

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ABSTRACT

Psilorhynchoides arunachalensis, new species is described from the Brahmaputra basin in Arunachal Pradesh of Northeastern India. It belongs to the *Psilorhynchus homaloptera* and *P. pseudocheneis* group, for which genus *Psilorhynchoides* was erected by Yazdani *et al.* (1990) because of their morphological and osteological distinctiveness from *Psilorhynchus*. The new species is differentiated by the following characters: eight or nine simple pectoral fin rays; more number of vertebrae 43-45 and an intermediate number of lateral line scales 42-44 between the valid species *P. homaloptera* and *P. pseudocheneis* (38-41 and 48-50 respectively).

KEYWORDS

Arunachal Pradesh, freshwater fish, new description, *Psilorhynchoides arunachalensis* sp. nov.

ABBREVIATIONS

RGUMF - Rajiv Gandhi University Museum of Fishes;
MUMF - Manipur University Museum of Fishes; SL - Standard Length

Representatives of Psilorhynchidae are easily distinguished from other families of the order Cypriniformes by their depressed or more-or-less spindled-shaped body with flattened ventral surface anteriorly; more number of pectoral fin rays; greatly reduced air bladder and enlarged paired fins that have been modified to form an adhesive apparatus for burrowing purposes. Northeastern India comprised of several hill streams with varied drainage patterns offers a good habitat for the study of psilorhynchoid fishes. *Psilorhynchus* inhabits pebbly beds of small rapid-running streams at the base of hills, pools in the course of torrential streams and pools with muddy bed (Hora & Mukerji, 1935; Rainboth, 1983). *Psilorhynchoides* also dwells in similar habitat. Yazdani *et al.* (1990) erected the genus *Psilorhynchoides* which includes small-sized hill stream fishes whose body are depressed anteriorly and compressed posteriorly, back evenly arched without prominent elevation, ventral profile flat, snout spatulate, eyes small, situated dorsally on anterior half of head, mouth ventral and opening slightly arched, scales large, absent in ventral region of head and chest, simple pectoral-fin rays more than 7, lateral line more than 42, latero-posterior border of basipterygium with two lateral foramina, supraethmoid bearing large fossa, swim bladder enclosed in a bony capsule formed by dorsal rib, and urohyal bone thick, anterior tip developed in fork. They recognized two species, *P. homaloptera* (Hora & Mukerji) and *P. pseudocheneis* (Menon & Dutta).

Collections from Lohit, Siren, Kalpangi, Dikrong and Dirang rivers of Arunachal Pradesh (Brahmaputra drainage) included specimens of *Psilorhynchoides* which do not fit under any of the described species of the genus. The species is

described here as *Psilorhynchoides arunachalensis* sp. nov.

MATERIAL AND METHODS

The descriptions are based on formalin preserved specimens. Counts and measurements follow Kottelat (2001) and measurements were taken from point to point with digital calipers to 0.1mm. The number of specimens exhibiting a given count is indicated in parentheses. Fin rays and numbers of scales were counted under a zoom stereoscopic microscope. For osteological study, specimens were dissected and stained with alizarin following Hollister (1934). Vertebral count includes the first four vertebrae of weberian apparatus. Abdominal vertebrae were counted from the first four vertebrae of the weberian apparatus to the last vertebra bearing pleural rib and predorsal vertebrae, from the first four vertebrae of the weberian apparatus to the vertebra immediately anterior to the first dorsal-fin pterygiophore. Caudal vertebrae were counted from the vertebra immediately posterior to anal fin pterygiophore.

PSILORHYNCHOIDES ARUNACHALENSIS SP. NOV.

(Image 1^w; Figs. 2, 3b, 4b & 5b)

Material examined

Holotype: Male, 24.viii.2005, West Kameng district, Dirang river at Dirang (Brahmaputra river system), Arunachal Pradesh, India, 92.0mm SL, coll. Kenjum Bagra (RGUMF-0001).

Paratypes: (19 specimens, all from Brahmaputra drainage, Arunachal Pradesh, India). 3 females, 24.viii.2005, West Kameng district, Dirang river at Dirang (Brahmaputra river system), Arunachal Pradesh, India, 104.0-106.0mm SL, coll. Kenjum Bagra (RGUMF-0002); 4 males, 3.iii.2005, Dikrong river at Doimukh, 65.7-77.2mm SL, coll. Gejom Lollen (RGUMF-0003); 5 males, 7.ii.2005, Siang river at Pasighat, East Siang district, 62.5-85.0mm SL, 2 females, Siang river at Pasighat, East Siang district, 65.3-70.0mm SL, coll. Karsen Nyori (RGUMF-0004); 2 exs., 31.x.2005, Sireng river at Rottung, East Siang district, 60.0-76.0mm SL, 1 female, Sireng river at Rottung, East Siang district, 72mm SL, coll. Kenjum Bagra (RGUMF-0005).

Etymology

After the name of the state from where it is collected, Arunachal Pradesh.

^w See Image 1 in the web supplement at www.zoosprint.org

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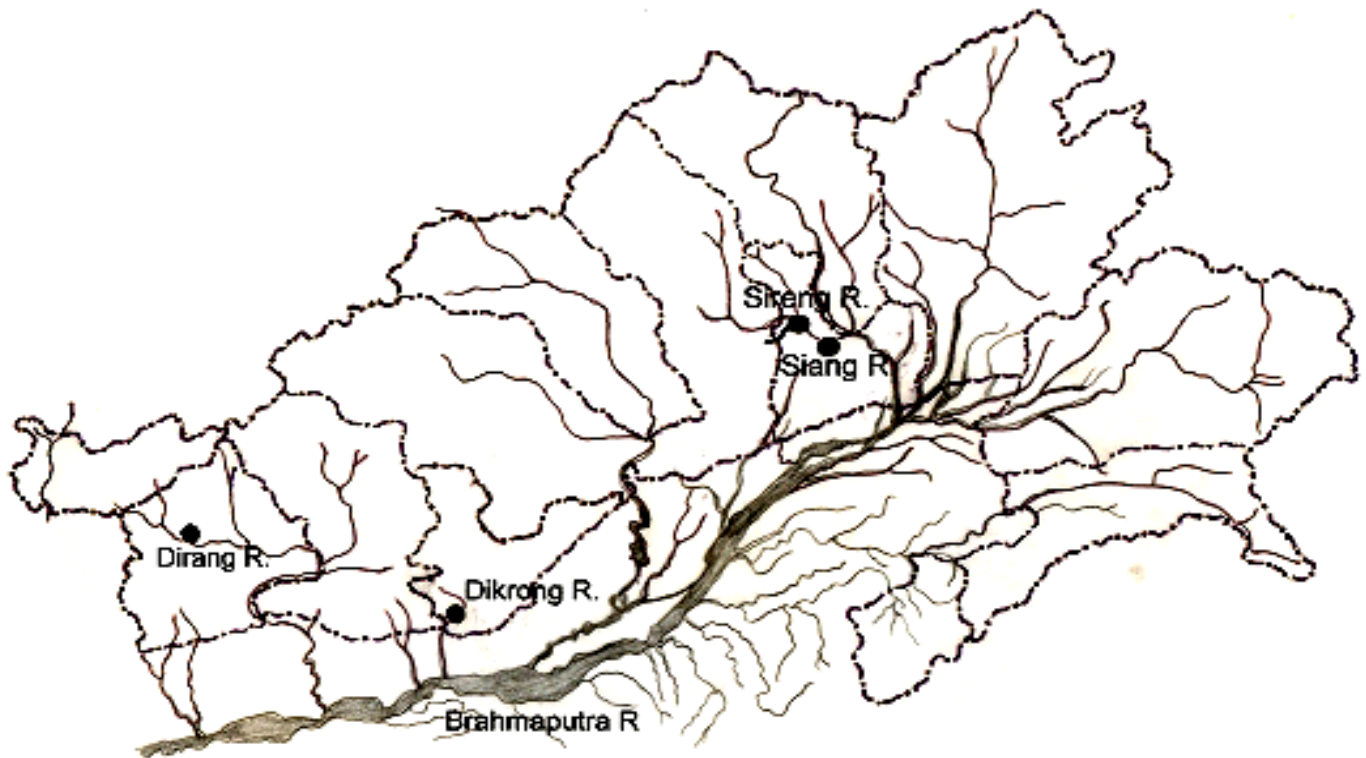


Figure 1. Collection sites and rivers of *Psilorhynchoides arunachalensis* sp. nov. in Arunachal Pradesh, India

Diagnosis

Psilorhynchoides arunachalensis sp. nov. can easily be differentiated from *P. homaloptera* in having more numbers of simple pectoral fin rays (8-9 vs. 7-8), branched caudal fin rays (9+8 or 9+9 vs. 8+7), total vertebrae (43-45 vs. 41-42); its narrower eye (3.9-5.3 vs. 5.5-5.8 % SL), head (14.0-15.6 vs. 15.7-16.9 % SL), mouth gap (5.2-6.7 vs. 6.6-7.2 % SL), body at anal-fin origin (5.8-7.2 vs. 7.3-7.9 % SL); shorter upper lip (6.4-7.5 vs. 7.5-8.1 % SL), snout (8.9-10.4 vs. 10.6-10.8 in % SL). It is also distinguished from *P. pseudocheneis* in having less number of lateral line scales (42-44 vs. 48-50), lateral transverse scales (3½-4½ / 2½-3 vs. 5½ / 3½); more numbers of predorsal scales (14-15 vs. 8-9); absence of transverse folds of skin on abdomen vs. presence.

Description

Morphometric data are in Table 1. Dorsal profile rising gently from tip of snout to origin of dorsal fin, then sloping very gently a little beyond to the point vertically from anal fin insertion, then running straight to the end of caudal fin. Ventral profile horizontal to vent, then very gently sloping dorsally to end of caudal peduncle. Caudal peduncle short, shallow and compressed laterally. Anus located far forward to anal fin, between ventral fins at ¼ its length.

Head moderately broad, depressed, obtusely pointed viewed from above and covered with thick hard skin with fine tubercles. Snout spatulate, hard with sparsely arranged fine tubercles. Eyes small, rounded, dorso-lateral with free margin and not visible from ventral surface; its situation almost entirely in the

posterior half of the head. Interorbital space flat and much wider than the orbit. Gill openings moderate, extending from post temporal region to a little beyond the pectoral fin base on ventral side. Nostrils fairly large with a conspicuous rounded membranous flap between anterior and posterior openings; its

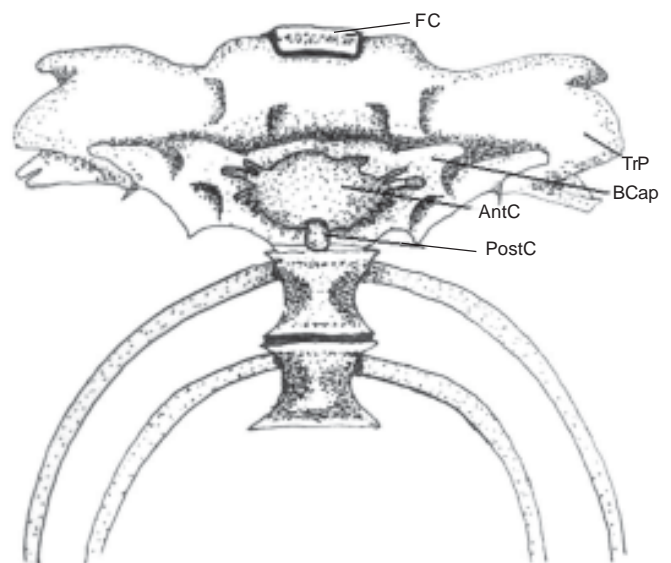


Figure 2. *Psilorhynchoides arunachalensis* sp. nov. Air bladder: showing anterior chamber enclosed in bony capsule & posterior chamber greatly reduced. FC - First centrum; TrP - Transverse process; BCap - Bony capsule; AntC - Anterior chamber; PostC - Posterior Chamber

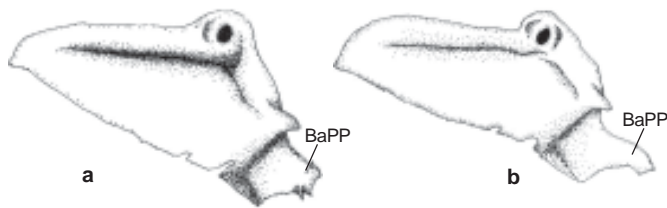


Figure 3. Dorsal view of right pelvic girdle: showing f basal plate process in a. *Psilorhynchoides homaloptera*; b. *Psilorhynchoides arunachalensis* sp. nov. BaPP - Basal plate process

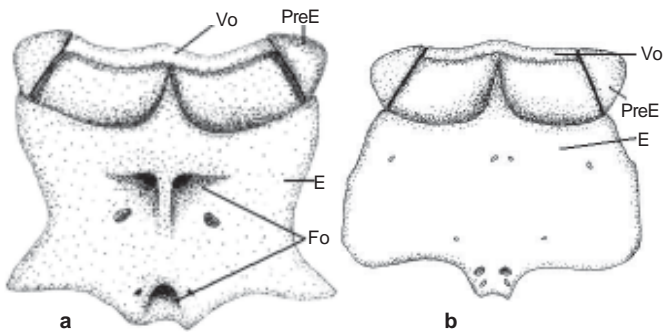


Figure 4. Dorsal view of ethmoid: showing the lateral margin and supraethmoid fossa in a. *Psilorhynchoides homaloptera*, b. *Psilorhynchoides arunachalensis* sp. nov. Vo - Vomer; PreE - Prethmoid; E - Ethmoid; Fo - Fossa

situation much nearer to anterior margins of the eyes than to the tip of the snout. Branchiostegal rays 4(4). Pharyngeal teeth in one row with 5(4) teeth; its tip hooked. Gill rakers and barbels absent

Mouth inferior, transverse and slightly arched. The upper lip hard, narrow and partly covered with rostral fold. The lower lip thick, fleshy and free from the lower jaw; with a shallow and narrow groove posteriorly to distinguish from its posterior superficial thick fleshy part. Upper and lower jaws provided with sharp rasping horny edges with a weakly developed knob on upper jaw and its counterpart, a notch on lower jaw. A fairly deep, distinct lateral horizontal furrow which marks off the mouth parts and the thick rostral fold, passing on either side from the post-labial groove extending anteriorly to the sides of the snout. The skin behind the lower lip smooth.

Dorsal-fin origin a little anterior to mid-length of the body and vertically a little behind the pelvic-fin origin; without spine, bearing ii, 7½ (20) rays with last simple and first branched rays longer and forming a dorsoposterior margin slightly concave and then straight. Anal fin with short base, its extension ⅔ length of caudal peduncle; ii, 5½ (20) rays; its last simple and first branched rays longer, forming a ventroposterior margin slightly concave and then almost straight. Caudal fin lunate with the lower lobe slightly longer, with 9+8(19), 9+9(1) branched rays; procurrent rays slightly anterior to fin base, 7(3) dorsal and 5(3) ventral. Pectoral fin greatly enlarged at base, horizontally placed and with broadly

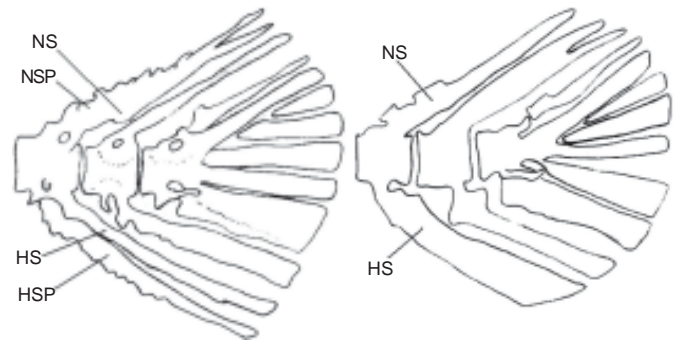


Figure 5. Last third vertebra: showing simple or divided neural and haemal spine in a. *Psilorhynchoides homaloptera*, b. *Psilorhynchoides arunachalensis* sp. nov. NS - Neural spine; NSP - Neural spine process; HS - Haemal spine; HPS - Haemal spine process

rounded margin externally up to 7th or 8th simple ray and then straight margin up to 5th branched ray, and remaining rounded; fin with viii, 8(4), viii, 9(5), viii, 10(1), ix, 8(5), ix, 9(5) rays; the ventral side of the first 8 or 9 fin rays excluding proximal 1/4 to 1/5 length with soft membranous flat surface forming as a whole an adhesive apparatus of the fin rays; considerably longer than the head and separated from the pelvic fin by its own 1/3 length. Pelvic fin moderately enlarged, placed horizontally with oblique base and extending considerably beyond the anal opening with first branched ray more longer forming a slight concave margin and remaining straight; fin with ii, 7(20) rays. As in pectoral, the ventral surface of the first three fin rays excluding proximal 1/3 to 1/4 length with a soft membranous flat surface forming as a whole an adhesive apparatus.

Scales cycloid, fairly large, thin and more or less regularly arranged on the body. Lateral line with 42(8), 43(8), and 44(4) perforated scales along the mid-lateral line upto the caudal base and 3-4 scales on the caudal fin. Predorsal scales 13(1), 14(5), 15(8), 16(2), 17(3), 18(1), arranged irregularly along the mid-dorsum. Transverse scale rows: 3½-4½ / 1 / 2½-3½; 3(6), 4(14) rows between the dorsal-fin insertion and lateral line and 2(15), 3(5) rows between the lateral line and ventral-fin insertion. Caudal peduncular scale rows: 8(4), 9(7), 10(9); 3-5 rows above and three rows below lateral line. Scales along the pre-pelvic fin region larger and regularly arranged on each side with 7(3), 8(11), 9(6) scales. Scales between the anus to anal fin regularly arranged, wider and its posterior margin slightly constricted with 12(2), 13(10), 14(7), 15(1) scales. Undersurface of the body from chest to anus smooth and devoid of scales.

Osteological features: Total vertebrae 43(2), 44(1), 45(1); abdominal 19(3), 20(1); predorsal 13(4); caudal 14(4).

The air bladder greatly reduced with two chambers. The posterior chamber very much smaller than the anterior one. The transverse vertebral processes of the 2nd and 4th vertebrae modified into a bony capsule medially enclosing the anterior chamber leaving some part on ventral surface (Fig. 2). The extension of these processes on the lateral side forming a dorso-

Table 1. Comparative morphometric measurements between *Psilorhynchoides arunachalensis* sp. nov. and *Psilorhynchoides homaloptera* in % of SL.

Character	<i>P. arunachalensis</i> sp. nov. (10 specimens including holotype)			<i>P. homaloptera</i> (4 specimens) MUMF 4066-4067 & 2 uncatalogued specimens		
	Range	Mean	± SD	Range	Mean	± SD
Standard length	65.7-106.0	-	-	76.7-104.0	-	-
Body depth	14.1-18.9	15.9	1.53	15.8-16.9	16.4	0.55
Head length at nape	17.0-20.5	18.8	1.18	18.3-20.4	17.9	1.86
Head height at nape	9.8-12.0	10.8	0.83	9.3-10.0	9.7	0.35
Head width at opercle	14.0-15.6	15.0	0.68	15.7-16.9	16.3	0.60
Snout length	8.9-10.4	9.8	0.61	10.6-10.8	10.7	0.12
Eye diameter	3.9-5.3	4.8	0.57	5.5-5.8	5.6	0.15
Interorbital space	7.2-8.1	7.7	0.30	7.6-8.4	8.0	0.40
Gape width	5.2-6.7	5.8	0.47	6.6-7.2	6.9	0.32
Upper lip length	6.4-7.5	6.8	0.34	7.5-8.1	7.7	0.32
Rostral fold width	6.7-8.3	7.2	0.46	7.2-7.8	7.5	0.31
Rostral fold length	3.2-4.3	3.7	0.37	3.8-4.0	3.9	0.10
Body width at anal	5.8-7.2	6.6	0.49	7.6-7.9	7.7	0.10
Caudal peduncle length	12.0-15.9	13.5	1.36	12.8-13.8	13.4	0.53
Caudal peduncle height	5.6-7.8	6.4	0.68	7.3-7.9	7.6	0.31
Dorsal-fin height	18.4-23.7	21.4	2.16	20.8-22.3	21.8	0.83
Pectoral-fin length	23.9-26.4	24.9	1.00	23.5-24.5	23.8	0.58
Ventral-fin length	19.4-20.8	20.4	0.80	18.9-20.7	19.6	0.96
Anal-fin height	13.8-16.4	15.0	0.88	15.1-15.3	15.2	0.12
Pre-anal length	79.0-83.9	81.6	1.69	78.7-80.5	79.4	0.95
Pre-anus length	56.0-62.6	58.6	2.26	58.7-60.9	59.7	1.11
Pre-ventral length	45.3-49.8	47.3	1.59	47.8-48.9	48.3	0.56
Predorsal length	48.9-55.5	51.1	2.10	48.4-50.3	49.3	0.95

ventrally flattened chamber with lateral mouth and two distinct spinous processes on each side of ventral surface.

The basipterygium of the pelvic girdle shield like; its length more than breath, broadest at the region of the first pelvic-fin ray insertion. On this region, a prominent foramen for connecting the basipterygium with the 7th vertebral rib. The basal plate of the basipterygium with a prominent elongated process posterolaterally (Fig. 2). The 7th pleural rib which supports the pelvic girdle thicker and broader than the remaining ribs.

Dorsal surface of ethmoid bone flat, more or less straight lateral margin and not having supraethmoid fossa (Fig. 3). The median frontal suture deviates from left to right in S shaped manner.

The pharyngeal bones triangular in shape with five teeth in one row; the teeth set close together, almost of uniform length and thickness, hooked at the tip. Last three vertebrae support the caudal fin rays. The second last neural spine simple or divided distally. The last third haemal and neural spine simple with weakly developed specialized neural process proximally (Fig. 4).

Tuberculation: Tuberculation is more on male specimens. In a specimen of 62.5mm SL has prominent tuberculation, i.e., irregularly arranged 5 or 6 transverse rows of prominent tubercles including a distinct posteriormost marginal row on rostral fold. The scales about four or five rows above pectoral fin base, orbital region, operculum and dorsal surface of head are densely tuberculated. Middle surfaces of the remaining scales with sparsely scattered tubercles. Tuberculation on scales gradually less on posterior side. All the exposed posterior margins of scales with a row of tubercles. On ventral side of pectoral fin, proximal 1/4 to 1/5 length of the first seven or eight rays and the whole length of the remaining fin rays

including the secondary branched rays with a row of prominent tubercles. Likewise, in pelvic fin also, proximal 1/3 to 1/4 length of the first three fin rays and whole length of the remaining fin rays including the secondary distal branched rays with a row of prominent tubercles. On dorsal surface, the whole length of the entire fin rays of pectoral and pelvic fin with a row of tubercles. A flap of skin formed by the folding of skin on the bases of first eight pelvic fin rays with a pad of tubercles. The whole length of all the fin rays of dorsal, anal and caudal fin with a row of fine tubercles on each side. Undersurfaces of the chins sparsely studded with minute tubercles. Such prominent tuberculation is not observed in all the male specimens. In female specimens, no tubercles on fin rays and tuberculation on the scale surfaces and margins are very less. A row of tubercles on posterior margin of rostral fold and anterior margin of posterior superficial part of lower lip with a row of 6-8 prominent tubercles with minute papillae behind.

Colour: In preservative, the fish has laterally a series of 6-12 dark blotches, posterior most extending onto the caudal fin. The numbers of blotches increase and become more distinct with size. In specimen having 12 blotches, the anterior most blotch is midway between the pectoral and pelvic-fin base. In specimens having six blotches, the first blotch is below the middle of dorsal-fin base. The blotches gradually decrease in size and are less conspicuous posteriorly. These blotches appear more less continuous as a dusky stripe. This stripe is more distinct in juvenile. In large specimens, anterior region of the stripe diminishes. In adult specimens, 10-11 blotches over a narrow mid-dorsal stripe runs from nape to caudal base. The ground colour of body on dorso-lateral region from is grayish to yellowish-brown and white or yellowish-white ventrally. Head dark dorsally and white ventrally. Caudal fin with a

proximal spot and dusky outer rays on both dorsal and ventral lobes. The whole dorsal surface of pectoral and ventral fin dark grayish to yellowish-brown and ventral surface white to light brown.

Sexual dimorphism: Males with tuberculation on all fin rays; more tuberculation on head region, exposed surfaces and margins of scales; relatively narrower body (14.1-17.9 vs. 16.0-18.9% SL) and longer caudal peduncle (13.0-15.9 vs. 12.0-13.5% SL).

DISCUSSION

Psilorhynchoides arunachalensis sp. nov. differs from *P. homaloptera* in having more numbers of simple pectoral fin rays, caudal fin rays and total vertebrae; narrower eye and mouth gape; shorter upper lip and snout (Table 1). It also differs in having an entire and simple neural and haemal spine on last third vertebra. In *P. homaloptera*, neural and haemal spine with a process along the whole length; proximal $\frac{3}{4}$ length of the processes with serrated margins anteriorly and divided distally about $\frac{1}{4}$ and $\frac{3}{4}$ of their lengths respectively from their respective spines. The new species also differs from *P. pseudecheneis* in having less numbers of lateral line scales (42-44 vs. 48-50), lateral transverse scales ($3\frac{1}{2}$ - $4\frac{1}{2}$ / $2\frac{1}{2}$ -3 vs. $5\frac{1}{2}$ / $3\frac{1}{2}$); more numbers of predorsal scales (14-15 vs. 8-9) and in the absence of transverse folds of skin in abdomen.

Rainboth (1983), while describing *Psilorhynchus gracilis* from Bangladesh, recognized *P. balitora*, *P. sucatio*, *P. pseudecheneis* and *P. homaloptera* under the same genus. Vishwanath & Manojkumar (1995), while describing *P. microphthalmus*, also put *P. balitora* and *P. homaloptera* under the same genus. They were probably not aware of the work of Yazdani *et al.* (1990), who distinguished *Psilorhynchoides* from *Psilorhynchus* by the absence of scales on chest (vs. presence), more than seven simple pectoral fin rays (vs. 4-6), lateral line scales more than 40 (vs. 32-33), anterior foramen broad (vs. long and slender), swim bladder enclosed in a bony capsule (vs. free). They also mentioned several differences in the osteology of *Psilorhynchus balitora* and *Psilorhynchoides homaloptera* but finally adopted the differences as generic differentiating characters. Thus detailed

examination of osteology of other *Psilorhynchus* may be necessary to clearly differentiate the two groups.

The species under description has no fossa on the supraethmoid region and two foramina on basiptyrgium, although Yazdani *et al.* (1990) mentioned the presence of the fossa and two foramina as generic characters. However, the new species is distinct from *Psilorhynchus* as it has other characters, i.e., bony capsule of the swim bladder, ossified shield like basiptyrgium with a lateral foramen, lateral line more than 40, more than seven simple pectoral fin rays. Thus the species is presently kept under genus *Psilorhynchoides*.

COMPARATIVE MATERIAL

Psilorhynchoides homaloptera: 2 exs., 2.x.2000, Iyei river at Noney, Tamenglong district, Manipur (Brahmaputra basin), 76.7-77.3mm SL, coll. K. Nebeshwar (MUMF 4076-4077); 2 exs., March 2005, Umtrao river, Byrnihat, Norbong, Ribhoi district, Assam (Brahmaputra basin), 81.2-83.5 mm SL, coll. I. Dhanabir (Uncataloged specimen)

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