Zootaxa 1663: 47–57 (2007)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

A new species of *Psilorhynchus* (Teleostei: Psilorhynchidae) from the Ataran River Basin, Myanmar, with comments on the generic name *Psilorhynchoides*

KEVIN W. CONWAY[1] & MAURICE KOTTELAT[2]

[1]*Department of Biology, Saint Louis University, 3507 Laclede Avenue, St. Louis, MO 63109, USA. E-mail: conwaykw@gmail.com*
[2]*Route de la Baroche 12, Case Postale 57, 2952 Cornol, Switzerland & Raffles Museum of Biodiversity Research, Department of Biological Sciences, 6 Science Drive 2 #03-01, National University of Singapore, Singapore 119260. E-mail: mkottelat@dplanet.ch*

Abstract

Psilorhynchus robustus, new species, is described from the Ataran River drainage, Myanmar. It is distinguished by the presence of a large dark blotch situated posterodorsal to opercle opening, the upper lip separated from the rostral cap by a shallow groove, and 9 branched dorsal-fin rays. The status of *Psilorhynchoides* Yazdani, Singh & Rao is discussed.

Key words: Cypriniformes, Psilorhynchidae, *Psilorhynchus*, taxonomy, Myanmar

Introduction

Members of the genus *Psilorhynchus* McClelland are small cypriniform fishes with arched backs and flattened ventral surfaces, which are common inhabitants of the streams of the Ganges-Brahmaputra drainage of Bangladesh, India, Eastern Nepal and adjacent China and the Irrawaddy drainage in northern Myanmar and southwestern Yunnan (Rainboth, 1983; Vishwanath & Manojkumar, 1995). Seven species of *Psilorhynchus* are recognized: *P. sucatio* (Hamilton, 1822), *P. balitora* (Hamilton, 1822), *P. homaloptera* Hora and Mukerji, 1935, *P. pseudecheneis* Menon and Datta, 1964, *P. gracilis* Rainboth, 1983, *P. microphthalmus* Vishwanath and Manojkumar, 1995 and *P. arunachalensis* (Nebeshwar, Bagra & Das, 2007). Herein, we describe a new species of *Psilorhynchus* from the headwaters of the Ataran River basin, Myanmar.

Material and methods

Measurements and counts generally follow Hubbs & Lagler (1958). Measurements were taken on the left side with digital callipers to the nearest 0.1 mm. Our counts and measurements differ from Rainboth (1983) in several aspects and thus values provided here may not be strictly comparable with that work. In particular, we prefer to count the small posteriormost ray of the dorsal and anal fins articulating with the same pterygiophore as the preceding ray as one (vs. counting the last two unbranched rays articulating with the same pterygiophore in the dorsal and anal fins as one) and measure head length (HL) in the traditional fashion, from the tip of the snout to the posterior most point of the opercle (following Hubbs and Lagler, 1958). Selected specimens were cleared and doubled stained (c&s) for bone and cartilage study (Taylor and van Dyke, 1985). All fin ray counts, excluding those provided for *P. microphthalmus* and *P. arunachalensis*, were confirmed through the examination of cleared and stained specimens. Vertebral counts are based on c&s specimens and include the four Weberian centra. Values for the recently described *P. arunachalensis* are taken from Nebeshwar *et al.*

Accepted by L. Page: 21 Oct. 2007; published: 17 Dec. 2007

(2007) as this species is still known only from the type series, and thus unavailable for study. Collection abbreviations follow Leviton *et al.* (1985), except for IHB, Institute of Hydrobiology, Wuhan, and CMK, collection of the second author.

Comparative material: *Psilorhynchus balitora*. AMNH 13811, 14 (4 c&s), 33.8–42.2 mm SL; Myanmar: Upper Myanmar, Chindwin River, Irawaddy River Drainage. AMNH 15767, 1, 49.0 mm SL; India: Assam, Naga Hills, Keleki Stream, Emilomi. BMNH 1932.9.19.4–6, 3, 43.7–44.5 mm SL; India: West Bengal, Siliguri. OSUS 15545, 1, 36.0 mm SL; Nepal: Chitawan, Buri Rapti Khola River at Sauraha. OSUS 16471, 1, 20.7 mm SL; Nepal: Chitawan, Narayani River at Narayangarh. OSUS 16589, 2, 24.0, 25.0 mm SL; Nepal: Nawalparasi, Narayani River, upstream from Tiger Tops tended Camp. UMMZ 244782, 15 (3 c&s), 25.8–41.3 mm SL; India: West Bengal, Kartowoa River at Barrage in Ambari, Brahmaputra River Drainage. UMMZ 244849, 13, 24.5–36.5 mm SL; India: West Bengal, Tista River at Tista Barrage, Brahmaputra River Drainage.

Psilorhynchus gracilis. AMNH 43097, 5 (1 c&s), 20–34.5 mm SL; Bangladesh: Dinajpur Province, Mahanada River at Tetulia, in close vicinity of the dak bungalow. FMNH 94285, paratypes, 5, 30.5–38.1 mm SL; Bangladesh: Dinajur Province: Mahananda River at Tetulis, in close vicinity of the Dak Bungalow. UMMZ 205345, 5 (3 c&s), 34.5–40.0 mm SL; Bangladesh: Rangpur, Ghaghat River, 4mi East of Rangpur on Badargani Road, Brahmaptura River Draininage.

Psilorhynchus homaloptera. IHB 32501010001101, more than 100 specimens, 28 examined, 35.2–48.7 mm SL. IHB 74VII2094, 1, 93.9 mm SL. IHB 74VII2095, 1, 84.6 mm SL. KIZ 7409005, 1, 44.1 mm SL. KIZ 7409006, 1, 43.3 mm SL. KIZ 7409007, 1, 40.2 mm SL. KIZ 7409008, 1, 39.5 mm SL. KIZ 409009, 1, 44.4 mm SL; China: Tibet Autonomous Region: Yarlung Zangbo Jiang River, Motuo County, Brahmaputra River Drainage. USNM 327772, 1, 66 mm SL; India, Manipur.

Psilorhynchus microphthalmus. NSMP-T 46803, paratype, 1, 59.0 mm SL; India: Manipur, 85 km south of Imaphal, Mombi, Manipur River.

Psilorhynchus pseudecheneis. BMNH 1958.9.1.10, 2, 65.5–103.5 mm SL; Nepal: Dhankuta District, Mewa Khola. KU 29517, 37 (3 c&s), 44.3–78.3 mm SL; Nepal: Sankhuwasabha, Arun River at confluence of Num and Kokta Rivers, 1 hour walk East of Num. KU 29519, 12 (3 c&s), 32.6–36.0 mm SL; Nepal: Sankhuwasbha/Bhojpur, Arun River at Manakaamana, 1 hour walk upstream from Tumlimgtar. USUM 327771, 2, 72.0–78.7 mm SL; India: Dudh Kosi. USNM 327772, 1, 64.6 mm SL; India: Manipur.

Psilorhynchus sucatio. AMNH 19648, 2 (1c&s), 28.3, 34.3 mm SL; India: West Bengal: Darjeeling District, Sevoke River. AMNH 43096, 5 (2 c&s), 13.7–17.6 mm SL; Bangladesh: Dinajur District, Tangam River at Thakurhaon, 200 yards upstream from bridge on road to sugar refinery. BMNH 1932.9.19.1–3, 3, 64.7–66.7 mm SL; India: West Bengal: Siliguri. BMNH 1985.9.16-35-38, 4, 48.5–52.7 mm SL; Nepal: Chitwan National Park, Naryani River. CAS 50289, 40 (6 c&s), 14–52.8 mm SL; Nepal: Chitawan Valley, Reu River near confluence with Rapti River. FMNH 93596, 4, 43.5–63.8 mm SL; Bangladesh: Rangapani Khal, creek, 6 km north north west of Jaintapur on Sylhet Shillong Highway. FMNH 94284, 5, 17.1–19.0 mm SL; Bangladesh: Dinajur District: Mahananda through Purnahaba, Tangam River at Thakurgaon, 200 yards from bridge on road to sugar refinery. OSUS 16679, 1, 39.5 mm SL; Nepal: Chitawan, Khoyeri Khola River, 10 km east of Nerayengarh on Raj Marg Hwy. OSUS 15957, 5, 45.1–54.5 mm SL; Nepal: Sunsari, Sapta Koshi River, Bought at fish market in Itahari. OSUS 16588, 1, 53.5 mm SL; Nepal: Nawalparasi, Narayani River, upstream from Tiger Tops Tented Camp. OSUS 15546, 1, 34.4 mm SL; Nepal: Chitawan, Buri Rapta Khola River at Saurcha. OSUS 16148, 1, 46.6 mm SL; Nepal: Nahalparasi, Marayoni River at Lainda Ghat. OSUS 15840, 2, 21.5, 27.0 mm SL; Nepal: Nawalparasi, Narayani River at Tribeni Ghat (above Tribeni Barrage). OSUS 15782, 2, 32.4, 36 mm SL; Nepal: Chitawan, Khageri: Khola R, 12 km east of Nerayengarh on Raj Marg Hwy. UMMZ 205346, 47, 19.2–55.5 mm SL; Bangladesh; Rangpur, Ghaghat River, 6 km east of Rangpur on Badargani road, Brahmaputra River Drainage. USNM 231694, 5, 14.7–19.6 mm SL: Bangladesh: Dinajur District: Tangam River at Thakurgaon, 200 yards upstream from bridge on road to sugar refinery, Mahananda

Drainage. USNM 274788, 1, 53.9 mm SL; Nepal: Royal Chitwan Park, River running past Gaida Game Lodge, upstream of junction with Rapi River. USNM 274804, 13, 28.4–48.7 mm SL; Nepal: Royal Chitwan Park, forest stream draining in to Rapi River.

***Psilorhynchus robustus*, new species**
Figure 1

Holotype. ZRC 51111, 60.3 mm SL; Myanmar: Kayin [Karen] State: stream "Chon Son" between Kyondaw and Phadaw, about 20km northwest of Payathouzu (at border with Thailand). K. Kubota, December 2002.

Paratypes. CMK 17773, 1, 54.8 mm SL; same data as holotype; ZRC 51113, 10; 53.3–66.1 mm SL; CMK 17941, 32 (3 cleared and stained); 49.1–68.1 mm SL; same data as holotype, March 2003.

Diagnosis: *Psilorhynchus robustus* is most similar to *P. gracilis* and *P. balitora* in overall body shape, meristics and colour pattern. It is distinguished from both species by the presence of a large dark blotch situated posterodorsally to opercle opening, extending along lateral-line scales 3–6 (vs. absence) and in having upper lip separated from the rostral cap by a shallow groove (vs. upper lip separated from rostral cap by a deep groove). It is further distinguished from *P. gracilis* by a greater mouth width (28–31 % HL vs. 20–25), head width (67–73 % HL vs. 56–61), head depth (55–58 % HL vs. 46–50), pre-pelvic distance (53–56 % SL vs. 47–50), pre-anal distance (78–83 % SL vs. 76–79), and caudal peduncle width (5–6 % SL vs. 3–4). *Psilorhynchus robustus* is distinguished from *P. arunachalensis*, *P. homaloptera*, *P. microphthalmus*, *P. pseudecheneis* and *P. sucatio* in having 9 branched dorsal fin rays (vs. 8). It is further distinguished from *P. microphthalmus*, *P. arunachalensis*, *P. homaloptera* and *P. pseudecheneis* by the lower number of unbranched pectoral rays (5 vs. 7 in *P. microphthalmus*, 8–9 in *P. arunachalensis* and *P. homaloptera* and 9–10 in *P. pseudecheneis*) and lateral line scales (32–34 vs. 39–40 in *P. microphthalmus*, 42–44 in *P. arunachalensis*, 43–44 in *P. homaloptera* and 46–48 in *P. pseudecheneis*) and from *P. homaloptera* and *P. pseudecheneis* by a greater body depth (19–23 % SL vs. 10–15 in *P. homaloptera* and 13–16 in *P. pseudecheneis*) and head depth (55–58 % HL vs. 41–45.5 in *P. homaloptera* and 38–42 in *P. pseudecheneis*).

Description: General body shape as in Figure 1. Morphometric and meristic data are listed in Tables 1–2. Body high, greatest depth at dorsal-fin origin. Dorsal profile arched, rising gradually to dorsal-fin origin, sloping steeply towards caudal peduncle. Ventral profile straight, from lower jaw to caudal-fin base.

Dorsal fin with iii. 9 rays. Anal fin with ii.6 rays. Branched caudal-fin rays 8-9+8-9 (8+8 in holotype), dorsal procurrent rays 5 or 6, ventral procurrent rays 6. Pelvic-fin rays ii.7 pectoral-fin rays v.11–12. Total number of vertebrae 34–35, consisting of 18+16(1) or 19+16(1).

Head and eye large, mouth inferior, snout rounded, ventral surface bordered by a deep longitudinal groove on each side. Rostral cap and upper lip fused, separated only by a narrow, shallow groove. Lower jaw covered by a thick squarish 'cushion' that can be folded backwards. 'Cushion' composed of two adnate tissue layers: a deeper layer, the lower lip, smooth, not continuous with upper lip around corner of mouth; and a superficial layer, papillated, thick, continuous with skin of isthmus and connected with rostral cap by a narrow strip of skin around corner of mouth, extended posteriorly and broadened as a flat, slightly papillated skin fold at posterolateral most corner of mouth (Fig. 2a). Large pre-epiphysial and post-epiphysial fontanelle. Five infraorbital bones (IO1-5); IO1-3 platelike; IO4-5 reduced in width, comprised of sensory canal only. Gill membranes joined to isthmus. Fifth ceratobranchial with 4 needle-like pharyngeal teeth, arranged in a single row. Swimbladder coated by thick peritoneal tunic, posterior chamber greatly reduced. Anterior chamber partially enclosed in a bony capsule formed anteriorly by lateral process of the 2nd vertebral centrum and laterally by the outer arm of the os suspensorium.

Paired fins horizontally placed. Pectoral fin almost reaching horizontal through dorsal-fin orgin. Pelvic-fin origin posterior to dorsal-fin origin, insertion opposite 3rd branched dorsal-fin ray. Anus positioned

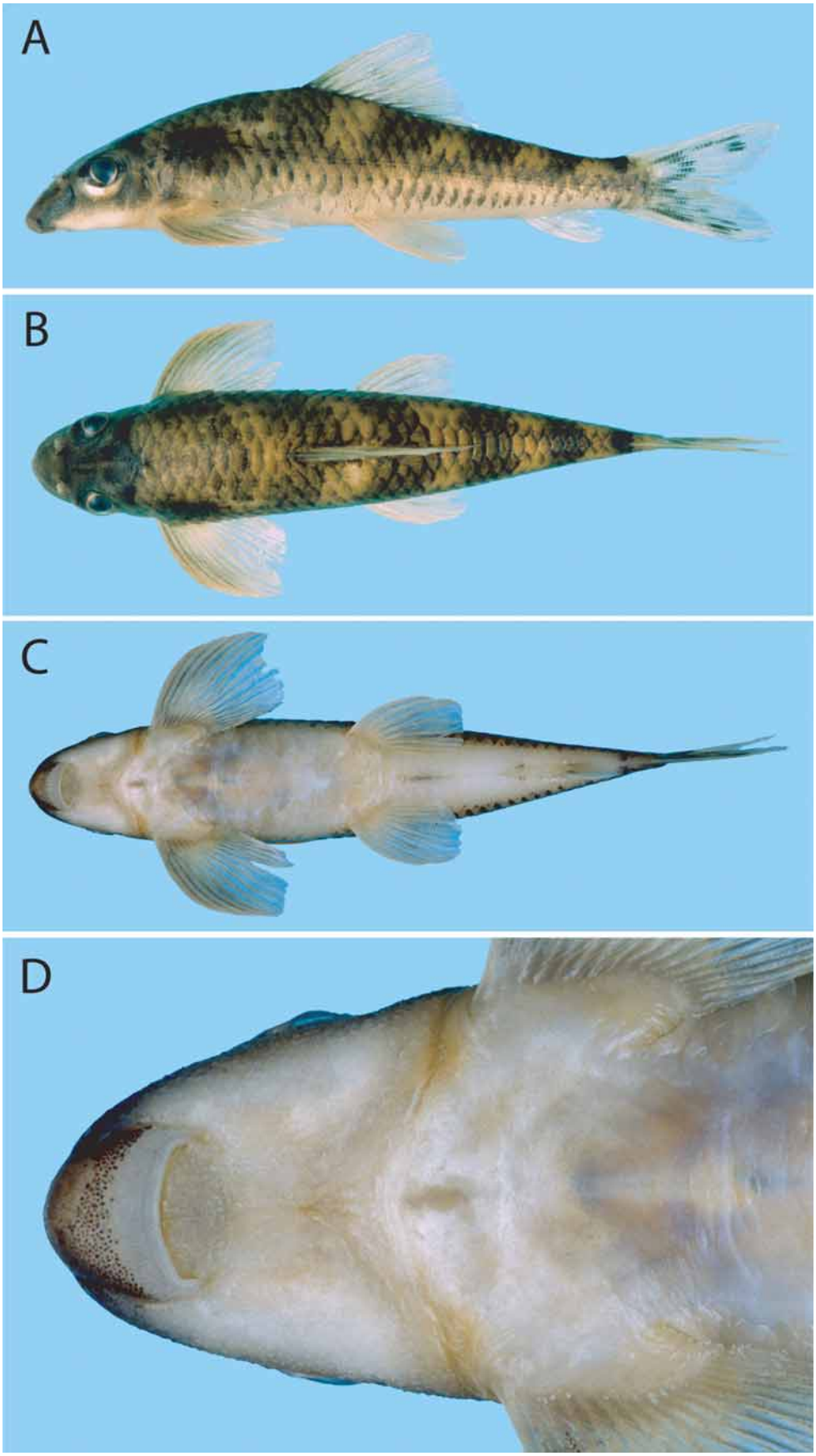

FIGURE 1. *Psilorhynchus robustus*, holotype, ZRC 51111, 60.3 mm SL. Myanmar: Ataran drainage. **A.** lateral view; **B.** dorsal view; **C.** ventral view; **D.** close-up of mouth.

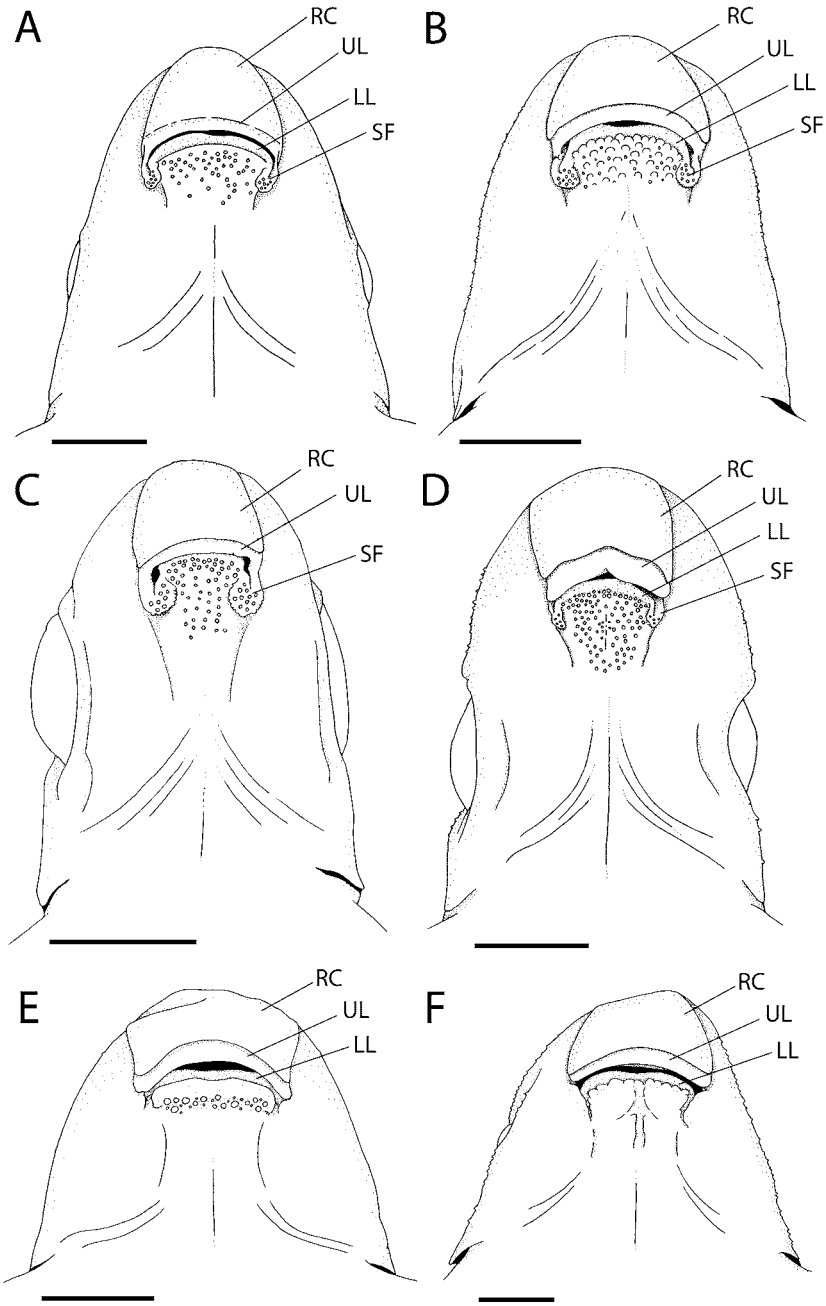

FIGURE 2. Mouth of: **A.** *Psilorhynchus robustus*, CMK 17941, 60.0 mm SL; **B.** *P. balitora*, UMMZ 244849, 35.0 mm SL; **C.** *P. gracilis*, UMMZ 205345, 33.0 mm SL; **D.** *P. sucatio*, UMMZ 205346, 56.5 mm SL; **E.** *P. pseudecheneis*, KU 29517, 37.0 mm SL; **F.** *P. homaloptera*, USNM 327772, 66.0 mm SL. Scale bars equal to 1 mm. Abbreviations: LL, lower lip; RC, rostral cap; SF, posterolateral skin fold; UL, upper lip. Rostral cap misshapen anteriorly in E and F.

between pelvic fins. Caudal fin emarginated, upper lobe slightly longer than lower lobe. Scales large, 32–34 along lateral line, plus 1–2 on base of caudal fin. 3.5/1/2 transverse scale rows from dorsal-fin origin to pelvic-fin origin, 10 around caudal peduncle. Scales absent from ventral surface between pectoral fins.

Coloration: In alcohol body background olive. Scales on flanks and dorsal surface edged with dark pigment. Dark pigment between pores of lateral line, forming an indistinct lateral streak. Occiput and dorsal surface of snout dark. Dorsal surface between occiput and dorsal-fin origin with one or two indistinct saddles. Five prominent dark saddles along dorsal surface between dorsal-fin origin and caudal-fin base, first situated at dorsal-fin origin, second between insertions of branched dorsal-fins rays 6–9, third between dorsal-fin and

anal-fin origin, fourth directly above anal fin and fifth situated anterior to caudal-fin base. Large dark blotch on flank, situated posterodorsal to opercle opening, extending across lateral line scales 3–6. Unbranched pectoral-fin rays and base of dorsal-fin rays edged with dark pigment. Caudal fin with irregular dark patterning. Peritoneal lining silvery, speckled with dark melanophores.

Distribution: Definitively known from headwaters of the Ataran basin in Myanmar (Fig. 3). See Kottelat (2003, 2004) for a more detailed description of the basin.

Etymology: From the Latin adjective robustus, meaning strong or robust, in allusion to the overall robust appearance of this species.

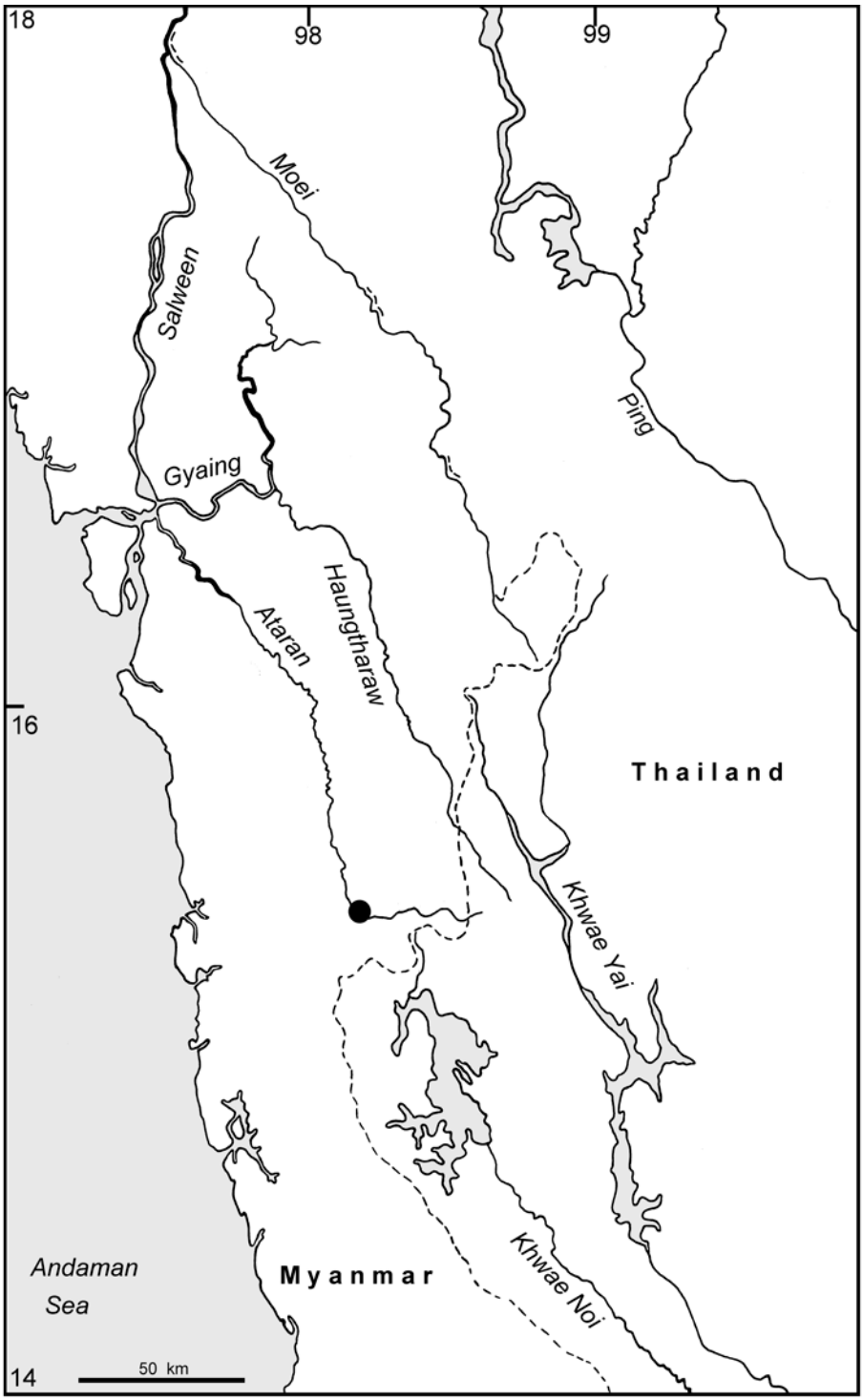

FIGURE 3. Ataran and lower Salween drainages, showing type locality of *Psilorhynchus robustus*.

TABLE 1. Morphometric data for *Psilorhynchus robustus* (holotype and 10 paratypes), *P. balitora* (n = 10), *P. gracilis* (n = 9), *P. homaloptera* (n = 36), *P. pseudecheneis* (n = 10) and *P. sucatio* (n = 10).

	P. robustus				*P. balitora*			*P. gracilis*		
	Holo-type	Range	Mean	SD	Range	Mean	SD	range	Mean	SD
Standard length	60.3	40.1–68.1					30.5–45.2			34.5–43.0
In percents of SL										
Body depth	22.7	18.8–22.7	20.4	1.3	16.5–24.6	19.9	2.9	14.8–18.8	16.9	1.6
Head length	22.0	20.1–22.0	21.4	1.0	20.5–24.4	22.2	1.3	20.2–21.9	21	0.6
Pre-dorsal length	48.9	47.2–48.9	48.2	0.8	47.0–51.8	49.7	1.6	46.2–49.9	47.9	1.4
Pre-pectoral length	21.8	20.0–21.8	21.6	0.8	19.0–24.1	21.3	1.6	19.8–22.6	20.9	1.0
Pre-pelvic length	52.7	53.3–55.7	53.3	1.5	51.0–58.2	54.2	2.6	47.5–50.6	48.7	1.2
Pre-anal length	78.5	78.5–82.7	81.0	1.5	77.0–86.0	81.6	2.4	76.3–79.6	77.5	1.7
Distance from snout to anus	59.7	61.5–63.8	62.9	1.0	59.5–65.9	62.5	2.2	54.0–59.8	57.4	1.6
Distance from anus to anal fin	19.2	18.2–20.1	19.1	1.3	16.8–21.7	18.9	1.7	19.1–22.1	20.8	1.0
Caudal-peduncle length	13.9	9.3–13.9	11.3	1.5	10.4–12.8	11.6	0.7	12.1–15.2	13.2	1.1
Caudal-peduncle depth	7.9	7.5–8.4	7.8	0.4	7.4–9.3	8.2	0.6	7.2–8.1	7.4	0.4
Caudal-peduncle width	6.8	4.6–6.8	5.5	0.9	3.6–5.8	4.6	0.7	2.6–3.5	3.2	0.3
Pectoral–fin length	24.7	24.7–26.1	25.2	0.7	22.4–26.7	24.5	1.4	20.9–23.4	22.3	0.9
Pelvic-fin length	20.6	18.8–20.6	20.0	0.5	16.8–20.9	19.3	1.4	16.8–20.6	18.2	1.1
Length of last unbranched anal ray	15.0	13.1–15.4	14.4	1.1	13.6–16.8	15.4	1.1	12.3–16.6	14.5	1.5
Length of last unbranched dor-sal ray	23.2	19.6–23.4	21.5	1.7	18.0–25.3	22.2	2.5	19.9–25.2	22.3	1.6
In percents of HL										
Head width	68.4	67.2–72.7	70	1.8	69.6–79.0	73.9	2.6	56.6–61.6	59.0	1.8
Head depth	55.2	55.2–58.4	56	0.8	58.2–63.2	60.7	2.5	46.3–50.0	48.6	1.2
Eye diameter	35.5	33.3–35.9	34.5	0.9	26.9–34.2	30.3	2.6	29.3–32.9	31.6	1.2
Snout length	?53.7	52.8–54.7	53.5	0.9	42.3–48.3	46.2	2.5	44.7–49.4	46.3	1.8
Interorbital width	37.9	37.9–43.7	40.6	2.1	39.8–45.5	42.6	1.8	34.6–38.5	36.1	1.7
Mouth width	29.5	28.0–31.0	29.0	1.1	29.0–33.3	31.5	2.5	20.5–25.6	23.0	1.8

...continued.

Table 1 continued.

	P. homaloptera			*P. pseudecheneis*			*P. sucatio*		
	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD
Standard length	35.2–93.9			62.0–76.5			41.0–65.7		
In percents of SL									
Body depth	10.6–14.9	13.5	0.9	13.3–15.7	14.5	0.8	15.6–20.5	17.8	1.8
Head length	18.4–21.1	19.7	0.8	18.4–20.4	19.2	0.7	19.8–22.3	21.1	0.8
Pre-dorsal length	49.3–51.9	50.9	1.1	47.0–50.2	47.7	1.0	45.7–48.9	46.9	1.1
Pre-pectoral length	16.8–21.2	18.9	1.2	13.5–16.2	14.4	0.8	19.6–23.0	21.3	0.9
Pre-pelvic length	44.0–49.0	46.1	1.5	43.0–44.8	44.8	1.2	47.9–51.8	48.9	1.3
Pre-anal length	75.1–82.1	77.9	1.7	78.6–83.0	80.8	1.3	77.7–81.0	79.0	1.3
Distance from snout to anus	53.0–57.2	54.8	1.2	53.2–55.7	54.5	0.9	55.2–57.8	56.4	1.0
Distance from anus to anal fin	18.2–23.6	21.5	1.4	25.5–27.0	26.2	0.7	21.7–24.6	23.0	0.9
Length of caudal peduncle	11.2–14.6	13.0	1.0	11.0–13.5	12.1	0.9	13.2–15.8	15.0	0.9
Depth of caudal-peduncle	5.0–6.4	5.8	0.4	5.8–6.9	6.3	0.3	5.1–7.4	6.3	0.8
Length of caudal peduncle	2.3–4.0	3.3	0.4	2.8–3.6	3.3	0.3	3.0–4.6	3.7	0.6
Pectoral–fin length	24.1–29.0	26.6	1.3	25.9–27.8	26.8	0.7	16.4–21.2	18.4	
Pelvic-fin length	18.0–22.4	20.2	1.0	18.1–21.0	19.6	0.9	16.7–21.7	18.4	
Length of last unbranched anal ray	12.5–15.7	14.5	1.0	11.8–13.6	13.2	0.7	11.1–14.9	12.9	1.5
Length of last unbranched dorsal ray	18.1–22.9	21.3	1.5	18.9–21.6	20.2	1.0	24.1–29.2	25.9	1.7
In percents of HL									
Head width	72.2–77.6	75.6	1.5	77.3–81.0	80.1	1.5	59.1–64.4	61.8	2.0
Head depth	41.0–45.5	43.2	1.4	38.3–42.0	39.6	1.5	39.5–44.6	41.9	2.0
Eye diameter	17.2–21.0	19.2	1.0	14.1–16.7	15.5	1.0	23.9–26.7	25.1	0.9
Snout Length	50.0–56.4	53.0	2.4	50.0–57.0	54.2	2.0	48.4–54.0	51.7	1.7
Interorbital width	45.8–48.8	47.3	0.9	47.6–52.3	50.2	1.6	48.1–53.8	51.1	1.9
Mouth width	35.2–38.5	36.1	0.9	33.1–36.7	35.3	1.2	22.5–26.2	24.4	1.2

Discussion

The genus *Psilorhynchus* was created by McClelland (1839) for the species described by Hamilton (1822) as *Cyprinus balitora* and *C. sucatio.* Hora (1920) first revised the genus, though he did not have access to *P. sucatio*. He later split *Psilorhynchus* (Hora, 1921a), creating the new genus *Parapsilorhynchus* for the species *P. tentaculatus,* and redescribed *P. sucatio* based on fresh material (Hora, 1921b). Since Hora's revision several authors have further defined the genus (Mukerji, 1933; Jayaram, 1981; Rainboth, 1983; Yazdani *et al.*, 1990).

TABLE 2. Meristic data for *Psilorhynchus robustus* (holotype plus 10 paratypes), *P. balitora* (n = 10), *P. gracilis* (n = 9), *P. homaloptera* (n = 36), *P. pseudecheneis* (n = 10) and *P. sucatio* (n = 10). '-' indicates that values are not available.

	P. robustus	*P. balitora*	*P. gracilis*	*P. microphthalmus*	*P. sucatio*	*P. homaloptera*	*P. pseudecheneis*
Dorsal-fin rays	iii.9	iii.9	iii.9	ii.8	ii.8	ii.8	ii.8
Anal-fin rays	ii.6	ii.6	iii.6	ii.6	ii.6	ii.6	ii.6
Branched caudal-fin rays	8–9+8–9	7–8+7–8	9+8	8+7	9+8	9+8	9+8
Pelvic-fin rays	ii.7	ii.7	ii.7	ii.7	ii.7	ii.7	ii.7
Pectoral-fin rays	v.11–12	vi-vii.10–11	iv–v.11–13	vii.10	iv.8–9	viii–ix.10–12	ix–x.10–12
Lateral-line scales	32–34	32–34	33–34	39–40	32–35	43–44	46–48
Scales between dorsal and pelvic fins	3.5/1/2.	3.5/1/2.	3.5/1/2.	3.5/1/2.	3.5/1/2.	4/1/2.	4/1/2.
Circumpeduncular scales	10	10	10	10	10	10	8
Abdominal vertebrae	18–19	16–18	17	-	18–19	-	23–25
Caudal vertebrae	16	15–16	17	-	16–18	-	24–25
Total vertebrae	34–35	31–34	34	-	34–37	-	47–50

The new species, *P. robustus*, can be assigned to the genus *Psilorhynchus* (*sensu* Rainboth, 1983) based on the following combination of characters: back arched, ventral surface flattened; mouth small and inferior; barbels absent; gill-membranes joined broadly to isthmus with aperture extending ventrally to base of pectoral fin; paired fins inserted horizontally; scales large, 32–34 in lateral line; dorsal fin with iii.9 rays, anal fin with iii.6 rays, pectoral with v.11–12 rays, pelvic fin with ii.7 rays; 5th ceratobranchial with 4 pharyngeal teeth, arranged in a single row; pre-epiphysial fontanel present; posterior swimbladder chamber greatly reduced, anterior chamber partially enclosed in a bony capsule formed anteriorly by the lateral process of the 2nd vertebral centrum and laterally by the outer arm of the os suspensorium (= 4th pleural rib of other authors).

Though the interrelationships within the genus *Psilorhynchus* are currently unknown, the new species appears to be more closely related to those species of *Psilorhynchus* with a papillated skin fold at the postero-lateral most corner of the mouth (Fig. 2), specifically *P. balitora*, *P. gracilis* and *P. sucatio*. Of these three species, *P. robustus* is most similar in terms of meristics to *P. balitora* and *P. gracilis* (Table 2) as both have 9 branched dorsal-fin rays and 3 unbranched anal-fin rays (vs. 8 and 2, respectively).

Based on examination of the four Indian species available to them (*P. balitora*, *P. homaloptera*, *P. pseudecheneis*, *P. sucatio*), Yazdani *et al.*, (1990) divided the species of *Psilorhynchus* into two genera, *Psilorhynchus* sensu stricto and *Psilorhynchoides* for the inclusion of *P. homaloptera* (type species) and *P. pseudecheneis*. This decision was based on a number of differences that they observed between the external appearance of *P. homaloptera* and *P. pseudecheneis*, and *P. balitora* and *P. sucatio*, and in the osteology of *P. homaloptera* and *P. balitora*, including: body flattened anteriorly and compressed laterally towards posterior half of the body in *Psilorhynchoides* (vs. body more or less spindle shaped with distinct convexity of the dorsal profile with peak at dorsal-fin origin in *Psilorhynchus*); broad based paired fins, well spread out horizontally (vs. narrow based, not so much spread out horizontally); small eyes (vs. eyes fairly large); scales absent on chest (vs. present); 8–10 unbranched pectoral-fin rays (vs. 4–6); lateral line scales numbering above 40 (vs. 32–33, as counted by Yazdani *et al.*); skull broad (vs. long and slender); supraethmoid fossa (= post-epiphysial fontanelle) present in *P. homaloptera* (vs. absent in *P. balitora*); ethmoid-frontal fontanelle (= pre-epiphysial fontanelle) long and slender in *P. homaloptera* (vs. short and broad in *P. balitora*); dorsal ribs of second and fourth vertebrae forming a bony capsule enclosing the anterior swim bladder chamber in *P. homaloptera* (vs. dorsal ribs of second and fourth vertebrae just folded with lateral openings); urohyal thick and catapult shaped with forked anterior tips in *P. homaloptera* (vs. urohyal a more compact shaft-like structure with anterior tips only a little forked in *P. balitora*); lateral foramen present on postero-lateral border of basipterygium in *P. homaloptera* (vs. absent in *P. balitora*).

TABLE 3. Summary of characters used by Yazdani *et al.* (1990) to distinguish the genus *Psilorhynchoides* from *Psilorhynchus* and their distribution across 7 species of *Psilorhynchus*. [1] taken from Chen, 1981; [2] from Yazdani *et al.*, 1990.

	P. robustus	*P. balitora*	*P. gracilis*	*P. microphthalmus*	*P. sucatio*	*P. homaloptera*	*P. pseudecheneis*
Scales on chest	absent	present/ absent	absent	absent	present/ absent	absent	absent
Lateral-line scales	32–34	32–34	33–34	39–40	32–35	43–44	46–48
Unbranched pectoral-fin rays	5	4	4–5	7	4	8–9	9–10
Skull	broad	broad	broad	-	broad	broad[1]	broad
Pre-epiphysial fontanelle	long/slender	short/ broad	long/slender	-	long/slender	long/slender[1]	long/slender
Post-epiphysial fontanelle	present	present/ absent	present	-	absent	present[1]	present
Anterior swimbladder chamber	free	free	enclosed in bone	-	free	free[1]/enclosed in bone[2]	free
Urohyal condition	shaft-like	shaft-like	shaft-like	-	shaft-like	catapolt-shaped[2]	catapolt-shaped
Lateral foramen of basipterygium	absent	absent	absent	-	present	present	present

The placement of *P. homaloptera* and *P. pseudecheneis* within a separate genus appears to have been followed only by Nelson (1994, 2006) and Nebeshwar *et al.* (2007), with other authors retaining them in *Psilorhynchus*. Though characters of osteology featured prominently in Yazdani *et al.*'s characterization of *Psilorhynchoides*, they only examined the osteology of a few specimens (number unknown) representing only two species, one for each genus (*P. homaloptera* for *Psilorhynchoides* and *P. balitora* for *Psilorhynchus*). Based on observations of a large number of cleared and stained specimens, representing 5 species (*P. balitora*, *P. gracilis*, *P. pseudecheneis*, *P. robustus*, *P. sucatio*), encompassing a greater geographic range than material examined by Yazdani *et al.* (Nepal, India, Bangladesh & Myanmar vs. India) it is clear that the characters used to define the genus *Psilorhynchoides* are not restricted to *P. homaloptera* and *P. pseudecheneis* but have a mosaic distribution within *Psilorhynchus* (summarised in Table 3). Though it is true that *P. homaloptera* and *P. pseudecheneis* exhibit a more elongate body and a higher number of unbranched pectoral-fin rays and lateral line scales than all other species of *Psilorhynchus* (Tables 1–3), we prefer to retain these species within *Psilorhynchus* pending the outcome of a forthcoming phylogenetic analysis (Conway, in prep.).

The earlier eastern extent of the range of *Psilorhynchus* was the Irrawaddy drainage. The discovery of the genus in the Ataran drainage leaves a gap as there is no published record from the Salween drainage, located between the previous two. The presence of *Psilorhynchus* is expected in the Salween, and indeed we have information that suggests that the genus is present in its tributary Mae Nam Moei, but this awaits specimen-based confirmation.

Acknowledgments

We are pleased to thank Katsuma Kubota for the gift of the material of the new species. We thank B. Brown, R. Arrindell (AMNH), D. Nelson (UMMZ), D. Catania (CAS), J. Maclaine, O. Crimmen, P. Campbell (BMNH), A. Bentley (KU), T. Echelle (OSUS), J. Williams (USNM) and G. Shinohara (NSMP-T) for the loan of specimens and S. He, E. Zhang (IHB), J. Yang, X. Chen (KIZ), P. Willink and K. Swagel (FMNH) for permission to examine material under their care. Extended thanks to D. Nelson, D. Catania and A. Bentley for the permission to clear and stain specimens of *Psilorhynchus*. KWC would like to thank R. L. Mayden, Saint

Louis University and the National Science Foundation's Cypriniformes Tree of Life Initiative as part of the NSF Assembling the Tree of Life Initiative (DEB 0431326) for financial support.

Literature cited

Hamilton, F. (1822) *An Account of the Fishes found in the River Ganges and its Branches*. Archibald Constatable and Co., Edinburgh, Scotland, 405 pp.

Hora, S.L. (1920) Revision of the Indian Homalopteridae and of the genus *Psilorhynchus* (Cyprinidae). *Records of the Indian Museum*, 19, 195–215.

Hora, S.L. (1921a) Notes on fishes in the Indian Museum. I. On a new genus of fish closely resembling *Psilorhynchus*, McClelland. *Records of the Indian Museum (Calcutta)*, 22, 13–17.

Hora, S.L. (1921b). Notes on the fishes of the Indian Museum. XXXIII. On some new or rare species of fish from the Eastern Himalayas. *Records of the Indian Museum*, 22, 731–744.

Hubbs, C.L. & Lagler. K.F. (1958) *Fishes of the Great Lakes Region*. Cranbrook Institute of Science Bulletin 26, Bloomfield Hills, Michigan, 213 pp.

Jayaram, K.C. (1981) *The Freshwater Fishes of India, Pakistan, Bangladesh, Burma and Sri Lanka*. Zoological Survey of India, Calcutta, 475 pp., pls. 1–13.

Kottelat, M. (2003) *Parambassis pulcinella*, a new species of glassperch (Teleostei: Ambassidae) from the Ataran River Basin (Myanmar), with comments on the family-group names Ambassidae, Chandidae and Bogodidae. *Ichthyological Exploration of Freshwaters*, 14, 9–18.

Kottelat, M. (2004) *Botia kubotai*, a new species of loach (Teleostei: Cobitidae) from the Ataran River basin (Myanmar), with comments on botiine nomenclature and diagnosis of a new genus. *Zootaxa*, 401, 1–18.

Leviton, A.E., Gibbs, R.H.Jr., Heal E. & Dawson, C.E. (1985) Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia*, 1985, 802–832.

McClelland, J. (1839) Indian Cyprinidae. *Asiatic Researches*, 19, 217–471.

Mukerji, D.D. (1933) Report on Burmese fishes collected by Lt. Col. R. W. Burton from the tributary streams of Mall Hka River of the Myitkyna district (Upper Burma). *Journal of the Bombay Natural History Society*, 36, 812–831.

Nebeshwar, K., Bagra, K. & Das, D.N. (2007) A new species of the cyprinoid genus *Psilorhynchoides* Yazdani *et al.* (Cypriniformes: Psilorhynchidae) from Arunachal Pradesh, India. *Zoo's Print Journal*, 22, 2632–2636.

Nelson, J.S. (1994) *Fishes of the World*, 3rd edn. Wiley, New York, 600 pp.

Nelson, J.S. (2006) *Fishes of the World*, 4th edn. Wiley, New York, 601 pp.

Rainboth, W.J. (1983) *Psilorhynchus gracilis*, a new cyprinoid fish from the Gangetic lowlands. *Proceedings of the California Academy of Sciences*, 43, 67–76.

Taylor, W.R. & Van Dyke G.C. (1985) Revised procedures for staining and clearing small fishes and other vertebrates for bone and cartilage study. *Cybium*, 9, 107–119.

Vishwanath, W. & Manojkumar, W. (1995) Fishes of the cyprinoid genus *Psilorhynchus* McClelland from Manipur, India, with description of a new species. *Japanese Journal of Ichthyology*, 42, 249–253.

Yazdani, G.M., Singh D.F. & Rao, M.B. (1990) *Psilorhynchoides*, a new genus for the cyprinid fish, *Psilrohynchus homaloptera* Hora & Mukerji and *P. pseudecheneis* Menon & Data, with a definition of the subfamily Psilorhynchinae (Cyprinidae). *Matsya*, 15/16, 14–20.