Article ID：1674-8085(2016)03-0099-08

Pseudobagrus emarginatus (Regan, 1913), a valid Chinese bagrid species from the upper Yangtze River drainage (Teleostei: Bagridae)

CHENG Jian-li [1], ZHANG E [2], ZHANG Jian-qiang [1], *YANG De-guo [3]

(1. School of Life Sciences, Jinggangshan University, Ji'an, Jiangxi 343009, China;

2. Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan, Hubei 430072, China;

3. Key Lab of Freshwater Biodiversity Conservation Ministry of Agriculture, Yangtze River Fisheries Research Institute, CAFS, Wuhan, Hubei 430223, China)

Abstract：*Pseudobagrus emarginatus* is here regarded as a species distinct from *P. pratti*, and known only from the upper Yangtze River basin. It can be assigned to the species group comprising 18 species of *Pseudobagrus* characterized by having a smooth anterior margin of the pectoral-fin spine and short maxillary barbels not extending to the pectoral-fin insertion. It, along with *P. ussuriensis*, *P. adiposalis*, *P. brevicaudatus*, *P. kyphus* and *P. pratti*, differs from all congeners of the group in having a moderately forked caudal fin. *Pseudobagrus emarginatus* differs from *P. ussuriensis* and *P. adiposalis* in the number of vertebrae, dorsal-fin spine length, and *P. brevicaudatus* and *P. kyphus* in the structure of dorsal spine, and the presence or absence of the interspace between the supraoccipital process and the nuchal plate. It differs from *P. pratti*, in body depth, predorsal length, adipose-fin depth and caudal-peduncle depth. Both differ in many osteological characters related to the cranium, vomer, nuchal plate and pelvic girdle.

Key words: taxonomy; *Pseudobagrus*; the upper Yangtze river; redescription

CLC number: Q959.499 **Document code:**A DOI:10.3969/j.issn.1674-8085.2016.03.020

凹尾拟鲿(*Pseudobagrus emarginatus*)
——长江上游中国鲇类一有效种（硬骨鱼纲：鲿科）

程建丽 [1]，张 鹗 [2]，张建强 [1]，*杨德国 [3]

（1.井冈山大学生命科学院，江西，吉安 343009；2.中国科学院水生生物研究所，湖北，武汉 430072；3.农业部淡水生物多样性保护重点实验室，中国水产科学院长江水产研究所，湖北，武汉 430223）

摘 要：对中国鲿科鱼类系统分类学研究中发现，凹尾拟鲿为一不同于细体拟鲿(*P. pratti*)的有效种，仅分布于长江上游。凹尾拟鲿胸刺前缘光滑无锯齿，颌须较短，后伸不超过胸鳍起点，本属中同时具有这两个特征的还包括 18 个有效种。在这 18 个物种中，乌苏里拟鲿(*P. ussuriensis*)、长脂拟鲿(*P. adiposalis*)、短尾拟鲿(*P. brevicaudatus*)和越南拟鲿(*P. kyphus*)与凹尾拟鲿一样，具有中等分叉的尾鳍。凹尾拟鲿与乌苏里拟鲿和长脂拟鲿的区别在于游离脊椎骨数目和背刺长短等性状上，与短尾拟鲿和越南拟鲿在背刺后缘程度、枕骨棘与项背骨间的间距上存在差异。凹尾拟鲿与细体拟鲿在形态上最为相似，但在体高、背

Received date：2016-01-09; modified date:2016-03-08

Foundation item：This work was supported by Key Lab of Freshwater Biodiversity Conservation, Ministry of Agriculture (LFBC0807), the Educational Commission of Jiangxi Province of China (GJJ11718), the Natural Science Foundation of Jiangxi Province of China (20144BAB2150004), the Technology Bureau of Ji'an City of China ([2012]32-8), and the Doctoral Starting up Foundation of Jinggangshan University, China (jz10040).

Biographies: CHENG Jian-li (1981-), female, Wuhan City Hubei Province, lecturer, Ph. D, engaging in research of taxonomy and species diversity of fish (E-mail: chengjianli24@163.com);

ZHANG E (1965-), male, Huanggang City Hubei Province, professor, Doctoral tutor, Ph. D, engaging in research of taxonomy and evolution of fish (E-mail: zhange@ihb.ac.cn);

ZHANG Jian-qiang(1993-), male, Shuozhou City shanxi Province, Biological undergraduate studing at Jinggangshan University(E-mail: 15779682955@163.com);

*YANG De-guo (1964-), male, Jingzhou City Hubei Province, professor, master tutor, Ph. D, engaging in research of ecology and conservation biology of fish (Email: yangdg@yfi.ac.cn).

鳍前长、脂鳍高及尾柄高等性状上存在差别。同时，在颅骨、犁骨、项背骨及腰带等骨骼特征上也存在较大差异。

关键词：分类学；拟鲿属；长江上游；重新描述
中图分类号：Q959.499 **文献标识码**：A DOI:10.3969/J.issn.1674–8085.2016.03.020

During our taxonomic revision of Chinese bagrid catfishes, it is found that the problem with the identification of two species, *Pseudobagrus pratti* and *P. emarginatus*, is still unsettled. *Pseudobagrus pratti* was initially described in *Macrones* by Günther [1] on the basis of a single specimen caught by Pratt from Kia-Tiang-fu (now Leshan), Sze Chuen (now Sichuan) Province. Later, *P. emarginatus* was described in *Leiocassis* by Regan [2] based on small specimens (80 to 115 mm TL) also seized by Pratt from the same locality as *P. pratti*. Regan's original description of *P. emarginatus* provided no accompanying figures and diagnostic characters. Although both *P. pratti* and *P. emarginatus* have still been treated as two valid species from the upper Yangtze River basin [3-5], Watanabe's [6] examination of the type specimens of these two species showed that the observed differences between them were ontogenetic as the type specimen of *P. pratti* is large-sized, but those of *P. emarginatus* small-sized. For this reason, he concluded that *P. emarginatus* was a junior synonym of *P. pratti*.

However, the present study demonstrates that there are marked differences between *P. pratti* and *P. emarginatus* based on photographic examination of type specimens and comparison of the specimens, currently reported as these two species, deposited in the ichthyological collection of the Museum of Aquatic Organisms at the Institute of Hydrobiology, Chinese Academy of Sciences, China (IHB). In addition, marked differences are found in some osteological characters between both. All these findings confirm that *P. emarginatus* is a species distinct from *P. pratti*. The objective of this paper is to provide a re-description of *P. emarginatus*.

1 Materials and methods

On each specimen, 30 measurements were taken using dial calipers connected to a data recording computer and data recorded to the nearest 0.1 mm and 7 counts were conducted. Measurements and counts were taken on the same manner as Hubbs & Lagler [7], except as follows: the number of vertebrae, dorsal- and anal-fin rays. Their counts were taken from radiographs following the method of Watanabe [6]. Morphometric data for the specimens examined were given in Table 1. Measurements of parts of the head were presented as percentages of the head length (HL). The head length and measurements of other parts of the body were given as proportions of the standard length (SL). Osteological features were examined in the cleared and double-stained specimens which were prepared utilizing the modified methods of Dingerkus & Uhler [8] and Taylor & Van Dyke [9].

The specimens examined are deposited in the following collections: Natural History Museum, London (BMNH); and Museum of Aquatic Organisms of Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan (IHB). Morphometric data of specimens deposited in BMNH is from the worked data measured by Watanabe [6], except for as follows: total length, height of anal fin, maximum and minimum length of caudal fin are not involved.

Although in the absence of a direct examination of the holotype or other type specimens, the morphological characters of the specimens collected from the upper Yangtze River drainage we examined accorded with original description of these two species and observed by Watanabe [6]. Undoubtedly, the specimens examined from the upper Yangtze River basin represent *P. emarginatus* and *P. pratti*. The morphological data here used for *P. kyphus,* a species so far known only from Guangxi Province in China, is from Watanabe et al [10].

2 Results

2.1 *Pseudobagrus emarginatus* (Regan, 1913)

(Fig. 1-7, Table 1)

Leiocassis emarginatus Regan, 1913: 553 (Kia-tiang-fu, Sze Chuen); Department of Fishes, Hubei Institute of Hydrobiology, 1976 [11]: 167–179, Fig 150 (Min Jiang of the upper Yangtze River drainage in Ya'an City, Sichuan Province and Qing Jiang of the middle Yangtze River drainage in Hubei Province)

Pseudobagrus emarginatus: Cheng & Zheng, 1987 [3]: 951, Fig 1082 (the Yangtze River drainage); Wu, 1989 [12]: 247–248, Fig 161 (the Wu Jiang drainage and its tributaries of the upper Yangtze River drainage in Guizhou Province); Li, 1994 [5]: 465–467, Fig 364 (artery and tributaries of the upper Yangtze River drainage in Sichuan Province)

2.2 Material examined

BMNH 1891.6.13.21 (type), 4 ex., 74.6–101.0 mm SL, Kia-tiang-fu, Sichuan Province (photographs examined); BMNH 1969.4.15.66, 1 ex., 100.6 mm SL, Kwanshien area, Sichuan Province (photographs

examined); IHB 79Ⅳ0090–6, 79Ⅳ0098–0100, 10 ex., 70.4–170.0 mm SL, Jinsha Jiang of the upper Yangtze River drainage in Yibing City, Sichuan Province; IHB 97VI1524–5, 97VI1527–31, 97VI1533, 97VI1536, 97VI1538, 97VI1541–46, 16 ex., 72.5–110.6 mm SL, Jinsha Jiang of the upper Yangtze River drainage in Leibo County, Sichuan Province; IHB 970082–3, 970085, 98 0204–5, 99 0328, 6 ex., the upper Yangtze River drainage in Hejiang county, Sichuan Province; IHB 59V0033, 1 ex., 156.8 mm SL, Jialing Jiang of the upper Yangtze River drainage in Guangyuan City, Sichuan Province; IHB 8440071–2, 2 ex., 113.0–123.8 mm SL, Wu Jiang of the upper Yangtze River drainage in Yanhe County, Guizhou Province; IHB 0403036–7, 2 ex., 123.4–138.1 mm SL, Wu Jiang of the upper Yangtze River drainage in Chongqing Municipality.

Fig. 1 Lateral and ventral views of *P. pratti*, IHB 97 1002, 93.8 mm SL, China: Sichuan Province: the upper Yangtze River drainage in HeJiang County (A) and *P. emarginatus*, IHB 97 1525, 90.4 mm SL, China: Sichuan Province: Jinsha River of the upper Yangtze River drainage in Leibo County (B)

2.3 Diagnosis

Pseudobagrus emarginatus belongs to the species-group characterized by having a smooth anterior margin of the pectoral-fin spine and short maxillary barbels not extending to the pectoral-fin insertion. It is similar to *P. ussuriensis*, *P. adiposalis*, *P. brevicaudatus*, *P. kyphus* and *P. pratti* in having an emarginated caudal fin with the middle rays slightly longer than two-thirds of the longest ray, by which these species distinguished from all congeners of this species group, with deeply forded, and a rounded to truncated caudal fins. It is distinct from *P. ussuriensis* and *P. adiposalis* in having fewer vertebrae (39–43 vs. 44–47 in *P. ussuriensis* and 45–46 in *P. adiposalis*); dorsal-fin spine less than or equal to (vs. longer than) 1/2 HL; it is further distinguished from *P. ussuriensis* in having a narrow interspace between the supraoccipital process and the nuchal plate (vs. no interspace), and from *P. adiposalis* in having the vomer without (vs. with) bifurcation (vs. forked) posteriorly [13].

Pseudobagrus emarginatus differs from its sympatrically species *P. brevicaudatus*, as currently recognized, in having a smooth (vs. slightly serrated) posterior margin of the dorsal spine, a narrow interspace between the supraoccipital process and the nuchal plate (vs. no interspace), nasal barbels extending to posterior (vs. anterior) margin of eye, maxillary barbels extending to gill membrane (vs. just to posterior margin of eye), fewer gill rakers (7–8 vs. 9–11), shorter predorsal length (28.4–36.4% of SL vs. 37.4–40.2), dosal-fin spine (9.5–15.1% of SL vs. 17.1–21.3), and pectoral-fin spine (11.1–16.3% of SL [mean 13.7, SD 1.3] vs. 16.0–20.1 [mean 18.1, SD 1.8]), a narrower eye interspace (29.9–39.3% of HL vs. 39.6–44.3), a wider mouth (42.4–52.7 % of HL vs. 33.4–37.0).

Pseudobagrus emargiantus can be distinguished from another congeners assigned to this group with moderately forked caudal fin shape, named *P. kyphus*, which so far only known from Guangxi Province in China, in possessing a smooth (vs. serrated) posterior margin of the dorsal spine, more vertebrae (5+39–41 vs. 5+32–35), lower body (depth: 12.7–20.3% of SL [mean 17.1,SD 1.8] vs. 22.5–31.4 [mean 25.9, SD 1.9]), shorter dorsal-fin spine (length: 10.2–15.1% of SL [mean 12.5, SD 1.2] vs. 15.5–20.8 [mean 17.9, SD 1.3]), and a narrow interspace(vs. o interspace) between the supraoccipital process and the nuchal plate.

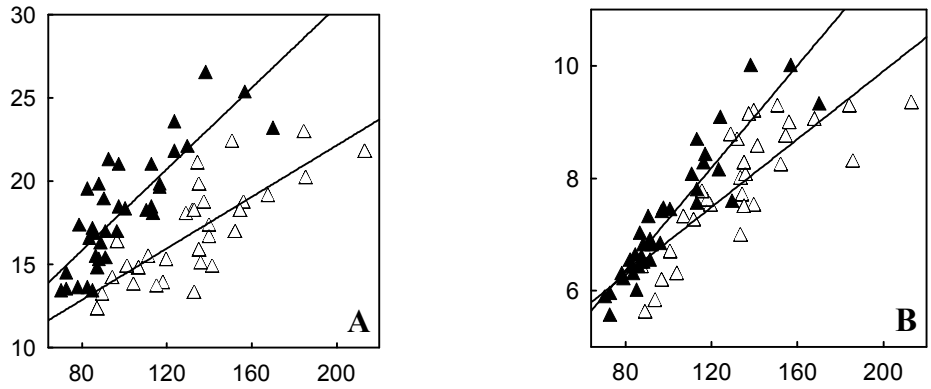
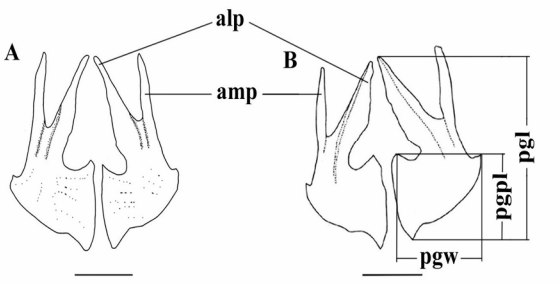


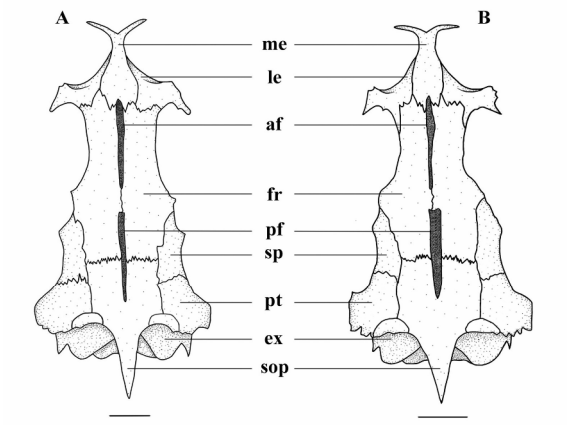
Fig. 2 Relationship between body depth and SL (A) and between caudal peduncle depth and SL (B) in *P. pratti* (△) and *P. emarginatus* (▲)

Pseudobagrus emarginatus differs from its superficially similar and sympatrically occurring species *P. pratti* in having deeper body (depth: 13.7–23.9% of SL [mean 18.5, SD 2.2] vs. 10.2–15.8 [mean 13.2, SD 1.5], see Fig 2A) and a deeper caudal peduncle (depth: 5.5–8.4% of SL [mean 7.4, SD 0.6] vs. 4.4–6.9 [mean 6.0, SD 0.7], see Fig 2B). These two species also differ in many osteological characters. In *P. emarginatus*, the mesethmoid has a T-shaped (vs. V-shaped) anterior part, with its posterior part nearly equal to (vs. greater than) the median part in width; the lateral ethmoid has a small, triangular projection on its posterior edge (vs. absent) (Fig3); Morphological differences in the nuchal plate (Fig 4) and pelvic girdle (Fig 5) between *P. emarginatus* and *P. pratti*: in *P. emarginatus*, the first nuchal plate, when viewed dorsally, is of a short (vs. long), roughly triangular form, without (vs. with) many serrations along its posterior edge; the first dorsal spine, when viewed dorsally, widens increasingly to form a nearly straight posterior edge (vs. sharply shortened and forming a papilla posteriorly); in *P. emarginatus*, anterolateral process of the pelvic girdle obtuse (vs. pointed) anteriorly and anteromedian process increasingly widened (vs. anteriorly not widened, and gradually widened from the position of its 1/3) from the tip, width of the pelvic girdle longer (vs. nearly equal to or slightly shorter) than the posterior length of the pelvic girdle, longer (shorter) than 1/2 of the length of pelvic girdle as well; in *P. emarginatus*, the vomer has a transverse anterior part with its width equal to (vs. less than) the length of its longitudinal posterior part; the distal end of the longitudinal posterior part of the vomer is pointed (vs. forked) (Fig 6).



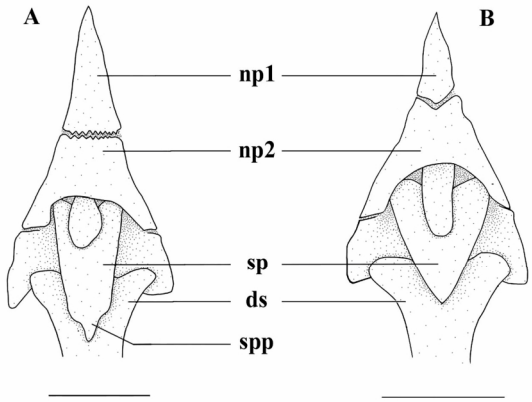
(amp = anteromedian process; alp = anterolateral process; pro = projection on inner side of anteromedian process. Scale bar = 2 mm)

Fig. 5 *P. emarginatus*.Dorsal view of pelvic girdle in (A) *P. pratti*; (B)



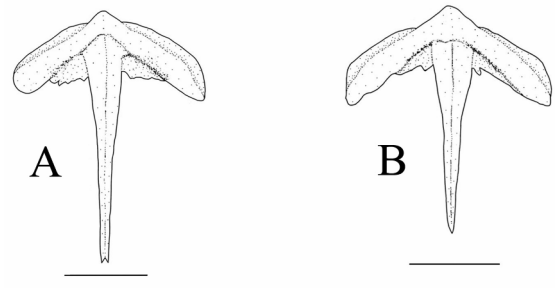
(af = anterior fontanelle; ex = extrascapular; fr = frontal; le = lateral ethmoid; me = mesethomoid; pf = posterior fontanelle; pt = pterotic; sop = posterior process of supraoccipital; sp = sphenotic. Scale bar = 2 mm)

Fig. 3 Dorsal view of cranium in: (A) *P. pratti*; (B) *P. emarginatus*



(ds = dorsal-fin spine; np1–3 = nuchal plate 1–3; sp = spinelet; spp = projection on distal margin of spinelet. Scale bar =2 mm)

Fig. 4 *P. emarginatus*.Dorsal view of dorsal spine base in: (A) *P. pratti*; (B)



(Scale bar = 2 mm)

Fig. 6 Dorsal view of vomer in (A) *P. pratti*; (B) *P. emarginatus*

2.4 Description

Morphometric data are given in Table 1. Head covered with thick skin, broad and moderately depressed, anterior profile of head rounded in dorsal view. Mouth arched and inferior in position with upper jaw longer than lower one. Interorbital space slightly convex, or nearly flattened. Snout broadly rounded when dorsally viewed, 2–3 times as eye diameter. Eye moderately small, rounded or elliptical horizontally, covered by thick membrane, dorsolaterally placed in anterior half of the head. Orbit with free margin.

Table 1 Morphometric data of *Pseudobagrus pratti* and *P. emarginatus*

Characters	*P. pratti* (n = 24)		*P. emarginatus* (n = 37)	
	Range (Mean ± SD)		Range (Mean ± SD)	
SL	89.2–213.1 (137.0 ± 30.5)		70.4–170.0 (99.8 ± 22.8)	
% SL				
BDA	10.2–15.8	(13.2 ± 1.5)	13.7–23.9	(18.5 ± 2.2)
BD	27.8–34.6	(30.9 ± 2.0)	28.4–36.4	(33.8 ± 1.9)
PDL	56.7–65.8	(60.8 ± 2.6)	56.7–67.1	(63.0 ± 2.4)
PAL	42.8–52.8	(46.7 ± 2.6)	43.5–53.6	(49.7 ± 2.6)
PVL	17.9–24.9	(20.1 ± 1.8)	18.6–25.5	(22.5 ± 1.9)
PPL	7.3–13.9	(10.4 ± 1.6)	9.5–15.1	(12.3 ± 1.3)
DSL	11.5–18.9	(15.6 ± 1.7)	15.3–21.4	(17.7 ± 1.5)
DL	8.4–11.2	(9.9 ± 0.8)	9.2–12.5	(10.8 ± 0.8)
DBL	9.6–14.6	(11.7 ± 1.5)	11.1–16.3	(13.7 ± 1.3)
PSL	12.1–18.7	(14.9 ± 2.0)	14.9–20.2	(17.7 ± 1.4)
PFL	9.2–14.2	(11.7 ± 1.2)	11.0–14.4	(12.6 ± 0.8)
PVL	18.2–23.8	(21.4 ± 1.4)	17.3–24.3	(20.2 ± 1.8)
AL	2.6–5.0	(3.5 ± 0.5)	3.5–5.8	(4.7 ± 0.6)
AD	19.0–27.1	(23.5 ± 1.7)	20.2–29.1	(24.4 ± 2.2)
ABL	14.5–21.7	(18.6 ± 1.8)	13.5–20.9	(17.6 ± 1.7)
D-A	12.9–19.5	(16.4 ± 1.8)	12.1–17.4	(14.9 ± 1.4)
A-C	14.5–21.7	(18.6 ± 1.8)	14.1–20.4	(17.3 ± 1.5)
CPL	4.4–6.9	(6.0 ± 0.7)	5.5–8.4	(7.4 ± 0.6)
CPD	18.8–25.4	(21.5 ± 1.9)	20.2–26.6	(24.1 ± 1.5)
%HL				
HD	47.7–67.9	(56.1 ± 5.0)	55.5–84.1	(68.2 ± 6.5)
HW	65.0–79.3	(72.1 ± 3.7)	65.4–86.0	(78.3 ± 4.8)
SNL	34.2–40.5	(37.5 ± 1.5)	33.8–41.2	(37.5 ± 1.9)
IW	25.6–36.7	(32.1 ± 2.4)	29.9–39.3	(33.9 ± 2.4)
ED	11.5–18.2	(14.2 ± 1.7)	10.9–19.6	(15.4 ± 1.9)
MW	39.0–0.6	(44.8 ± 3.2)	42.4–52.7	(47.6 ± 2.8)
NL	17.7–33.9	(27.4 ± 3.4)	24.0–40.1	(30.5 ± 3.6)
ML	51.4–72.3	(58.6 ± 4.5)	50.3–81.7	(63.2 ± 6.2)
IML	18.1–32.8	(25.3 ± 3.6)	18.7–34.5	(27.9 ± 3.8)
OML	38.6–51.4	(45.4 ± 3.0)	39.5–59.8	(50.3 ± 5.6)

Anterior nostril forming a short tube near upper jaw. Nasal barbels reaching the posterior edge of eye, and located anterior to posterior nostrils. Maxillary barbels short, reaching or nearing the gill-membrane. Outer mandibular barbels shorter than the maxillary ones, reaching gill-membrane (rarely extending to the pectoral-fin spine insertions), and the inner mandibular barbels extending to posterior margin of the eye when laid back.

Tooth numerous, villiform, small and conical, in irregular rows on all tooth-bearing surfaces; premaxillary tooth plates broad, of equal width throughout, twice as long as its width, slightly wider than the vomerine tooth plate. Dentary tooth plates arched, broadest at symphysis narrowing laterally, of same width at symphysis as premaxillary tooth plate. Vomerine tooth plate arched and unpaired, continuous across midline, narrowest in the middle part and increasing gradually on both sides. Gill rakers 7–8: 7 (3), 8*(12), low, fleshy, and unossified; gill opening wide, extending above height of pectoral-fin base. Occipital process pointed, longer than the basal bone of dorsal-fin spine. Occipital process and basal bone separated by a large gap.

Body naked, elongated, moderately depressed anteriorly, and laterally compressed posteriorly, widest at or just posterior to pectoral-fin insertion and gradually tapering to compressed caudal peduncle; moderately depressed anteriorly, deepest at or just anterior to dorsal-fin origin. Predorsal profile of body gently convex; preanal profile horizontal or convex beyond the posterior margin of the head. Skin on body smooth without any enlarged tubercles, lateral line straight, complete and midlateral along side of body; the lateral line is visible as a thin line running from posterior end of head to middle of caudal fin base. Vertebrae 5+39–43: 39 (1), 40 (5), 41*(8), 43 (1).

Dorsal fin with small, U-shaped spinelet, tiny first spine, fairly strong second spine, and seven branched rays; distal margin convex; the second dorsal-fin spine smooth on anterior and posterior margins, and approximately 1/2 of HL. Dorsal-fin origin nearer to snout tip than to anal-fin origin, and closer to pectoral-fin insertion than to pelvic-fin insertion.

Pectoral-fin origin situated more dorsally than pelvic fin origin, with a spine and 8*(15) soft, branched rays, pectoral-fin spine strong, not reaching beyond pelvic-fin insertion when depressed. Anterior edge of pectoral spine smooth, with 7–10 (mean 8.8) strong serrations along posterior edge. Pectoral spine length about as long as dorsal-fin spine or longer. Cleithrum upwards, extending well beyond middle of pectoral-fin spine, with exposed process dorsal to pectoral-fin rays that tapers posteriorly to point.

Pelvic fin convex distally, with 6*(15) soft, branched rays; inserted, anus nearer to anal fin origin than to the posterior end of the pelvic fin. Males with a conical genital papilla not extending to base of the first anal-fin ray.

Anal fin base not so long, with 17 (3), 18*(7), 19 (4), 21 (1) rays and a convex distal margin, its base slightly shorter than adipose fin base. Anal fin origin nearer to the caudal fin base than to pectoral fin origin, or with equal distance.

Adipose fin inserted before a vertical at anal fin origin, with a convex distal margin for entire length and deepest at the 2/3 of the total length of the anal fin base to form a rounded apex, then sloping suddenly.

Caudal fin moderately forked with upper lobe longer than the lower one, with 8+9 principal rays, without any white or light colored margin.

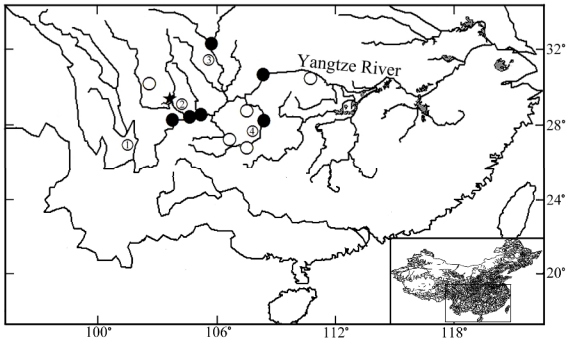
2.5 Coloration

Body brown-dark dorsally in formalin preserved specimens, slightly yellowish ventrally. In juveniles, light colored stripes present on neck, caudal peduncle and middle of body under the dorsal-fin, as body size increases, the color become fuzzier till invisible completely, and spots also exist in the medium part of dorsal fin.

2.6 Distribution

Only known from the main stream of the upper Yangtze River drainage and its tributaries, Wu Jiang R., Min Jiang R. and Jialing Jiang R. in Sichuan and

Guizhou provinces, and Chongqing Municipality, Southwest China (Fig. 7).



Yalong Jiang R.①, Min Jiang R. ② , Jialing Jiang R. ③ and Wu Jiang R.④

Fig. 7 Map showing distribution of *Pseudobagrus emarginatus* in China. Circles: localities of examined materials of *P. emarginatus*; dots: distribution of *P. emarginatus* based on literatures; star: type locality of the holotype

2.7 Sexual dimorphism

Females (13 specimens, 72.8–100.4 mm SL; mean 89.7; SD 7.6) smaller than males (23 specimens, 70.4–170.0 mm SL; mean 105.7; SD 26.9) in size. Pelvic fins reaching anal-fin origin in females, but not yet in males, and males with a longer urogenital papilla.

3 Discussion

In original description of *Pseudobagrus emarginatus*, Regan [2] insufficiently described it as a new species with neither any drawings nor distinct characters with other similar congeners based on 4 small specimens, which led many workers misidentified it as other *Pseudobagrus* species shared the similar distribution from the upper Yangtze River drainage. Chen et al [4] provided a description of *P. emarginatus* based on 3 specimens collected from the Han-shui of the middle Yangtze River in Hanzhong and Ankang cities in Shaanxi Province. Their specimens have 10–11 gill rakers and 5+44 vertebrae, thereby indicating that they are not identical to *P. emarginatus*.

The identification of the specimens by Cui [14] as *P. emarginatus* from Yunnan Province could not be ascertained. It is highly likely that they represent *P. brevicaudatus,* given that the accompanying figure clearly indicates that these specimens has shorter maxillary barbels extending far from opercular membrane, a strong and long dorsal spine and a slightly serrated posterior margin of dorsal spine.

Zheng & Dai [15] also reported as *P. emarginatus*, the specimens of Yunnan Province. Their description stated that the specimens had long maxillary barbels extending to the base of pectoral-fin spine in their description. This disagrees with the holotype of this species, and their accompanying figure, which indicates a species with short nasal barbels not reaching the posterior margin of the eye, and short maxillary barbels far from the base of the pectoral-fin spine, which obviously disobeyed their own description. The identity of these specimens need future study.

4 Comparative material examined

Pseudobagrus adiposalis: USNM 00177474, 1 ex., 160.0 mm SL, Taoyuan County, Taiwan Island [photograph and X-ray examined]. *Pseudobagrus albomarginatus*: NRM 10017, syntypes, 5 ex., 46.2–84.4 mm SL, Tang–tu–hsien (Dangtu County), Anhui, and NRM 25669, 1 ex., 126.0 mm SL, Tang–tu–hsien, Anhui (photograph and X–ray examined); IHB 200605264–7, 200605269–86, 200605268 (CS, 128.5 mm SL), topotypes, 23 ex., 118.7–196.0 mm SL; lower Yangtze River drainage in Dangtu County, Anhui Province. *Pseudobagrus analis*: AMNH 9680, holotype, 1 ex., 101.0 mm SL, Hokou (= Chaoshan), northeastern Kiangsi (=Jiangxi), China. [photograph and X-ray examined]. *Pseudobagrus brachyrhabdion*: IHB 89VII2156–65, 89VII2167–8, 12 ex., 100.0–213.3 mm SL, middle Yangtze River drainage: Yuan Jiang in Yuanling County Hunan Province, China; IHB 87V989–94, 6 ex., 116.0–187.4 mm SL, Qingshui Jiang, tributary to Yuan Jiang of middle Yangtze River drainage in Jinping County, Guizhou Province, China; IHB 8840755–8, 4 ex., 178.0–207.2 mm SL, Songtao He, tributary to Yuan Jiang of middle Yangtze River drainage in Songtao County, Guizhou Province, China; IHB uncatalogued, 4 ex., 83.3–180.7 mm SL, You Shui, tributary to Yuan Jiang of middle Yangtze River drainage in Longshan County, Hunan Province, China; IHB 84IV360–3, 84IV142–4, 7 ex., 82.8–128.0 mm SL, Oushui Jiang, tributary to Xiang Jiang of middle Yangtze River drainage in Zixing County, Hunan Province, China. *Pseudobagrus brevicaudatus*: IHB 586481, 584197, 584343, 584282, 584231, 584296, 6 ex., 93.8–122.0 mm SL, from Wu Jiang of the upper Yangtze River drainage in Mudong County, Sichuan Province. *Pseudobagrus crassilabris*: BMNH 1864.7.9.9., 1 ex., holotype(photographs examind);IHB 56 XII25651138, 56II28660064,56III1660090,56II28660061–2, 76IV6372, 76IV6374–8, 56II28660036, 56XII25651139, 13 ex., 66.5–199.3 mm SL, China, Guangdong Province, Lian Jiang, a tributary to Bei Jiang of the Pearl River drainage in Lianzhou City; IHB 660312–3, 660764, 3 ex., 50.7–197.4 mm SL, China, Guangdong Province, Lian Jiang, a tributary to Bei Jiang of the Pearl River drainage in Yangshan County; IHB 7676IV6257–8, 2 ex., 114.1–134 mm SL, China, Guangdong Province,

Wu Shui, a tributary to Bei Jiang of the Pearl River drainage in Lechang City; IHB 76IV7936, 140.6 mm SL, 2 ex., China, Guangdong Province, Weng Jiang, a tributary to Bei Jiang of the Pearl River drainage in Wengyuan County; IHB 76IV5801, 76IV5803, 76IV5809, 76IV5811–9, 76IV5821–9, 76IV5831, 76IV5834–5, 76IV7041, 76IV7043–5, 76IV7047, 29 ex., 45.0–149.9 mm SL, China, Guangdong Province, Bei Jiang of the Pearl River drainage in Shaoguan City. *Pseudobagrus fui*: IHB 992344–56, 992361, 14 ex., 60.7–112.5 mm SL; China; Chongqing City: upper Yangtze River drainage in Mudong Town of Ba'nan County; IHB 2519, (1), 98.4 mm SL, China: Sichuan Province: Min River of upper Yangtze River drainage in Leshan City; IHB 586052–3, 586017, 3 ex., 112.4–124.9 mm SL, China: Sichuan Province: Jialing Jiang of upper Yangtze River drainage in Nanchong City; IHB 200520743, 581038, 584352, 583168–9, 5 ex.,101.9–126.4 mm SL,China: Chongqing City: upper Yangtze River drainage in Mudong Town of Ba'nan County; IHB 586122–4, 3 ex., 84.3–107.5 mm SL, China: Chongqing City: Jialing Jiang of upper Yangtze River drainage in Hechuan County; IHB 5343, 1 ex., 120.5 mm SL, China: Chongqing City: Jialing Jiang of upper Yangtze River drainage in Beibei County; IHB 746490, 1 ex., 117.8 mm SL, China: Sichuan Province: Tuo Jiang of upper Yangtze River drainage in Hushi Town of Luzhou City; IHB uncatalogued, 3 ex., 111.3–133.8 mm SL, no precise data in Chongqing City; IHB 73VI1493, 79III0089, 2 ex., 87.4–129.9 mm SL, China: Sichuan Province: Jinsha Jiang of upper Yangtze River drainage in Yibing City; IHB uncatalogued, 3 ex., 104.4–110.5 mm SL, China: Chongqing City: upper Yangtze River drainage in Fuling County; IHB 6650207, 1 ex., 112.5 mm SL, China: Guizhou Province: Wu River of upper Yangtze River drainage in Si'nan County; IHB uncatalogued, 1 ex., 118.1 mm SL, China: Guizhou Province: Chishui He, a tributary of upper Yangtze River drainage in Maotai Town.*Pseudobagrus gracilis*:IHB 89VII 2157–65, 12 ex., 100.0–213.3 mm SL, the middle Yangtze River drainage: Yuan Jiang in Yuanling County, Hunan Province, China; IHB 87V989–94, 6 ex., 116.0–187.4 mm SL; middle Yangtze River drainage: Qingshui Jiang, tributary to Yuan Jiang in Jinping County, Guizhou Province, China; IHB 8840755–8, 4 ex., 178.0–207.2 mm SL; middle Yangtze River drainage: Songtao He, tributary to Yuan Jiang in Songtao County, Guizhou Province, China; IHB uncatalogued, 4 ex., 83.3–180.7 mm SL; middle Yangtze River drainage: You Shui, tributary to Yuan Jiang in Longshan County, Hunan Province, China; IHB 84IV360–3, 84IV142, 84IV143 (C&S), 84IV144, 7 ex., 82.8–128.0 mm SL; middle Yangtze River drainage: Oushui Jiang, a tributary to Xiang Jiang in Zixing County, Hunan Province, China. *Pseudobagrus longirostris*: IHB 583120, 581026, 58286, 582077, 581041, 590437, 6 ex., 107.2–218.0 mm SL, China, Chongqing City, upper Yangtze River drainage; IHB 6452365–6, 645268–9, 6452372–3, 6452375, 6452377–81, 12 ex., 116.8–261.8 mm SL, China, Hubei Province, middle Yangtze River drainage in Shishou City. *Pseudobagrus nitidus*: IHB 5.445, 560054, 6987, 3 ex., 86.6–127.4 mm SL, China, Sichuan Province, Min Jiang of upper Yangtze River drainage in Leshan City; IHB 20070600500–04, 5 ex., 92.0–117.5 mm SL, China, Fujian Province, Min Jiang drainage in Jianyang City;IHB 20070600533–542, 10 ex., 93.0–115.3 mm SL, China, Fujian Province, Min Jiang drainage in Nanping City; IHB 551839–42, 551844, 551846–8, 570083, 57141, 57191, 560116, 560305, 560013, and 3 uncatalogued, 17 ex., 67.6–135.5 mm SL, China, Hubei Province, Liangzi Lake connected to middle Yangtze River in Wuchang County;IHB 73X1528,73X 1534, 73X1628–9, 73X1849–50,73X1751–3,73X1794,73X1796, 73IV0155, 73IV 0158–62, 73IV 0168, 63V0685–7, 63V0768, and 8 uncatalogued, 30 ex., 65.9–141.4 mm SL, China, Hu'nan Province, Dongting Lake connected to middle Yangtze River; IHB 63IV0064, 63IV0157–65, 63IV0185, 63IV0408–10, 63IV0275, 63IV0457, 63IV0463–4, 63IV0466, 63IV0621, 63IV0623, 21 ex., 82.1–121.3 mm SL, China, Jiangxi Province, Boyang Lake connected to lower Yangtze River drainage in Hukou County; IHB 580095, 580189, 580098, 580207, 580257–8, 580170–1, 580297, 580302–3, 580305, 580319, 580474, 582260–3, 581038–42, 581123, 580989 and 1 uncatalogued, 26 ex., 79.8–162.8 mm SL, China, Heilong Jiang drainage; IHB 0005–0011, and 3 uncatalogued, 10 ex., 85.7–140.1 mm SL, China, Liaoning Province, Liao He in Niuzhuang Town; IHB 0235, 1 ex., 144.5 mm SL, China, Hebei Province, Yongding He of Hai He drainage in Guanting Town; IHB 0319, 1 ex., 135.5 mm SL, China, He'nan Province, Yellow River drainage; IHB 1.734, 1.736–7, 1.739, 4 ex., 84.0–122.0 mm SL, China, Jiangsu Province, lower Yangtze River drainage in Nanjing City; IHB 80X0179–89, 80X0191 –3 and 5 uncatalogued, 19 ex., China, Jiangsu Province, lower Yangtze River drainage in Jiangdu County. *Pseudobagrus omeihensis*: AMNH 15217, holotype, 1 ex., 103mm, Omeihsein, Sxechwan, China [photographs and X-ray examined]. *Pseudobagrus pratti*: BMNH 1891.6.13.25, 1 ex., holotype, 184.3 mm SL, Kia-tiang-fu, Sichuan Province (photographs examined); IHB 971002, 971004–6, 990144, 970930, 980203, 990329, 8 ex., 93.8–152.4 mm SL, the upper Yangtze River in Hejiang county, Sichuan Province; IHB 78IV0221, 78IV0222, 79IV0547, 79IV0546, 79

IV4546, 42IV2152, 42IV2520, 42IV4546, 2152, 2520, 4546, 11 ex., 132.1–213.1 mm SL, Min Jiang of the upper Yangtze River drainage in Leshan City, Sichuan Province; IHB 5132, 5358–9, 3 ex., 89.2–119.3 mm SL, Jialing Jiang of the upper Yangtze River drainage in Beipei County, Chongqing Municipality; IHB 583087, 586480, 2 ex., 117.8–139.7 mm SL, and 1 specimens uncatelgued, 150.8 mm SL, Wu Jiang of the upper Yangtze River in Chongqing Municipality; IHB 78IV0154, 78III0380, 970084, 980067–8, 990145–6, 7 ex. Jinsha Jiang of the upper Yangtze River drainage in Yibing City, Sichuan Province. *Pseudobagrus taeniatus*:BMNH 1873.7.30.73, holotype, 1 ex., 127.3 mm SL, Shanghai (photograph and X-ray examined); SFU 22070, 59A0165, 59A0048, 59A0155, 59A0166, 5 ex., 109.5–201.3 mm SL, Huangpu Jiang at Wusong, Baoshan County, Shanghai Municipality. *Pseudobagrus tenuis*: BMNH 1873.7.30.72, holotype, 1 ex., 266.7 mm SL, Shanghai City (photograph and X–ray examined); ESFI, uncatalogued, 1 ex., 339.2 mm SL, Chongming Island in Shanghai City; SFU 23415, 23420, 23425–6, 4 ex., 152.8–247.8 mm SL, Shanghai Municipality. *Pseudobagrus trilineatus*: IHB 76VII021–4, paratypes, 4 ex., 53.07–64.9 mm SL, Luofu mountain in Boluo County, Guangdong Province, China. *Pseudobagrus truncatus*: BMNH 1891.6.13.24, syntype, 1 ex., 83.0 mm SL, Kia-tiang-fu, foot of Omie-shan (=O'mei Shan), Sichuan Province [photograph and X-ray examined]; IHB 78IV550–1, 79IV0542–5, 78IV0395, 79IV0501, 78IV0219–20, 10 ex., 95.0–167.2 mm SL, and uncatalogued, 1 ex., 124.1 mm SL, Min Jiang of the upper Yangtze River drainage in Leshan City, Sichuan Province. *Pseudobagrus ussuriensis*: IHB 580055, 580281, 580377, 580556, 580930, 580951, 580967, 581025, 581027–9, 581050, 581120, 581124, 581128, 581158, 581225, 581456, 18 ex., 91.0–226.5 mm SL, and uncatlogued, 1 ex., 117.1 mm SL, Heilong Jiang drainage in Heilongjiang Province.

Acknowledgement

We express our gratitude to S. Schaefer (AMNH), P. Campbell (BMNH) and J. T. Williams (USNM), E. Ahlander and Fang Fang (NRM) for providing us with photographs and X-rays of type specimens of some *Pseudobagrus* species. We would also like to thank F. Li for checking specimens in ECSFRI, and W. Q. Tang and J. Q. Yang of SFU for granting access to examine specimens.

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