

Supplementary Materials

Supplementary Text

Comparative material

Liobagrus marginatus

SAULS 1006001–1006003, 63.0–81.5 mm SL, China, Sichuan Province, Pengzhou City, Tuojiang River; SAULS 1309001–1309003, 95.0–103.4 mm SL, China, Sichuan Province, Leshan City, Jinkouhe River; SAULS 1404004–1204005, 72.1–101.5 mm SL, China, Sichuan Province, Yaan City, Qingyijiang River; SAULS 1607001–1607004, 73.2–110.4 mm SL, China, Sichuan Province, Xuanhan County, Qianhe River; SAULS 2011008–2011010, 75.9–78.6 mm SL, China, Yunnan Province, Kunming City, Panlongjiang River.

Liobagrus nigricauda

BMNH 1904.1.26.42–43 (2), syntypes, 52.0–80.0 mm SL, China, Yunnan Fu [photograph examined].

Liobagrus kingi

ASIZB 19825 (11673) (1), holotype, 89.7 mm SL; 1933.11, China, Yunnan Province, Jinning County, Dianchi Lake [photograph examined]; SAFS 20201111–20201113, 40.0–98.0 mm SL, China, Sichuan Province, Chongzhou City, Minjiang River; SAU2101020–2101026, 51.1–102.6 mm SL, China, Sichuan Province, Qinglai City, Xihe River.

Liobagrus chenghaiensis

SAULS 1606005–1606010, 60.0–96.3 mm SL, China, Sichuan Province, Ningnan County, Jinshajiang River.

Liobagrus andersoni

CNUC 39021, 71.5 mm SL, South Korea, Han River [photograph examined].

Liobagrus obesus

CNUC 39022, 95.5 mm SL, South Korea, Mankyeong River [photograph examined].

Liobagrus mediadiposalis

CNUC 39020, 95.1 mm SL, South Korea, Nakdong River [photograph examined].

Liobagrus somjinensis

CNUC 39019, 87.7 mm SL, South Korea, Somjin River [photograph examined].

Liobagrus hyeongsanensis

CNUC 38547, holotype, 84.1 mm SL, South Korea, Hyeongsan River [photograph examined].

Liobagrus reinii

BMNH 1907.12.23.56–59, Japan [photograph examined].

Liobagrus styani

BMNH 1902.5.30.2–3, syntype, South Hupeh, China [photograph examined]; SAULS 2011022–2011032, topotype, 59.1–115.0 mm SL, China, Hubei Province, Chibi City, Juanshui River.

Liobagrus formosanus

BMNH 1909.4.28.23, holotype, China, Taiwan island [photograph examined].

Liobagrus nantoensis

FMNH 59080, Lectotype, 69.32 mm SL, China, Taiwan island [photograph

examined].

Liobagrus anguillicauda

SAULS 2010001, 30.7 mm SL, China, Fujian Province, Nanping City, Jianxi River;
SAULS 2011001–2011005, 32.5–60.0 mm SL, China, Fujian Province, Nanping
City, Jianxi River.

Liobagrus marginatoides

SAFS 2011013–2011023, 58.0–94.0 mm SL, China, Sichuan Province, Leshan City.

Liobagrus aequilabris

SAULS 2010002–2010012, 54.7–115.2 mm SL, China, Hunan Province, Yiyang City,
Zishui River; SAULS 2010013–2010017, 40.5–58.3 mm SL, China, Hunan
Province, Changsha City, Zhujiang River; SAULS 2011011–2011021, 102.8
–120.4 mm SL, China, Hubei Province, Lichuan City, Qingjiang River.

***Liobagrus brevispina* (nomen nudum)**

IHB 2013082661, paratype, 78.8 mm SL, China, Sichuan Province, Bazhong City,
Nanjiang River [photograph examined]; AL-BA-013, paratype, 73.0 mm SL,
China, Sichuan Province, Bazhong City, Nanjiang River.

Liobagrus huaiheensis

SAULS 2012001, holotype, 122.1 mm SL, China, Henan Province, Xinyang City,
Shihe River; SAULS 1904001–1904003, paratypes, 115.5–122.6 mm SL, Henan
Province, Xinyang City, Shihe River; SAULS 2012002–2012006, paratypes,
89.8–116.5 mm SL.

Liobagrus pseudostyani

SAFS 202011001, holotype, 116.0 mm SL, China, Sichuan Province, Yaan City,
Longxihe River; SAFS 202011002–202011007, paratypes, 76.0–100.0 mm SL,
Sichuan Province, Yaan City, Longxihe River.

Supplementary Table S1 GenBank accession numbers of sequences used in this paper.

Species	Locality	Accession number	Reference
<i>Liobagrus chengduensis</i> 1	Xihe River, Qionglai City, Sichuan Province, China	ON638203	This study
<i>Liobagrus chengduensis</i> 2	Xihe River, Qionglai City, Sichuan Province, China	ON638204	This study
<i>Liobagrus chengduensis</i> 3	Xihe River, Qionglai City, Sichuan Province, China	ON638205	This study
<i>Liobagrus chengduensis</i> 4	Xihe River, Qionglai City, Sichuan Province, China	ON638206	This study
<i>Liobagrus chengduensis</i> 5	Xihe River, Qionglai City, Sichuan Province, China	ON638207	This study
<i>Liobagrus chengduensis</i> 6	Xihe River, Qionglai City, Sichuan Province, China	ON638208	This study
<i>Liogarus pseudostyani</i> 1	Xiejianghe River, Dayi City, Sichuan Province, China	ON638209	This study
<i>Liogarus pseudostyani</i> 2	Longxihe River, Yaan City, Sichuan Province, China	ON638210	This study
<i>Liobagrus aff. kingi</i> 1	Xihe River, Qionglai City, Sichuan Province, China	ON638211	This study
<i>Liobagrus aff. kingi</i> 2	Xihe River, Qionglai City, Sichuan Province, China	ON638212	This study
<i>Liobagrus huaiheensis</i> 1	Shihe River, Xinyang City, Henan Province, China	ON638213	This study
<i>Liobagrus huaiheensis</i> 2	Shihe River, Xinyang City, Henan Province, China	ON638213	This study
<i>Liobagrus styani</i>	Xianning City, Hubei Province, China	KY653576	NCBI
<i>Liobagrus aequilabris</i>	Unknown	KY653674	NCBI
<i>Liobagrus anguillicauda</i>	Unknown	KY653651	NCBI
<i>Liobagrus marginatus</i>	Unknown	KY653578	NCBI
<i>Liobagrus kingi</i> ?	Unknown	KC193779	NCBI
<i>Liobagrus obesus</i>	South Korea	DQ321752	NCBI
<i>Liobagrus andersoni</i>	South Korea	DQ321753	NCBI
<i>Liobagrus reinii</i>	Japan	LC333217	NCBI
<i>Liobagrus mediadiposalis</i>	South Korea	KX265422	NCBI
<i>Liobagrus somjinensis</i>	South Korea	MN756661	NCBI
<i>Liobagrus</i> sp.	South Korea	KX265431	NCBI
<i>Xiurenbagrus xiurenensis</i>	Hongshuihe River, Guangxi Province, China	DQ192464	NCBI
<i>Xiurenbagrus gigas</i>	Hongshuihe River, Guangxi Province, China	EU490936	NCBI

Supplementary Table S2 Morphometric measurements of type specimens of *Liobagrus chengduensis* **sp. nov.** and sympatric species.

Morphometrics	Holotype	Paratypes n=8	<i>L. pseudostyani</i> n=8	<i>L. aff. kingi</i> n=10
Standard length (mm)	39.9	35.2–46.9	76.0–162.2	67.4–98.5
% of standard length				
Head length	22.6	23.0–24.4	23.0–26.3	19.3–23.5
Body depth	14.8	13.9–15.1	13.8–17.8	12.9–15.1
Dorsa-fin base length	7.5	8.5–9.6	9.2–10.8	10.2–12.3
Anal-fin base length	20.6	17.5–19.5	20.1–22.3	17.6–20.8
Adipose-fin base length	27.3	29.3–32.2	22.0–23.6	28.4–32.6
Caudal peduncle length	18.5	18.6–19.5	18.6–21.1	18.8–21.6
Caudal peduncle depth	14.5	14.6–16.8	14.5–17.1	13.4–16.4
Dorsal-fin spine length	6.5	5.5–5.9	5.9–7.0	6.5–7.8
Pectoral-fin spine length	5.3	5.1–6.6	6.0–7.2	4.2–5.2
Caudal-fin length	17.5	18.0–18.2	14.0–17.0	11.5–16.4
Anus to pelvic-fin insertion	5.0	5.5–6.6	6.0–7.0	4.5–6.0
Anus to anal-fin origin	8.0	9.0–10.7	7.5–9.2	5.2–8.2
Predorsal length	28.6	28.9–29.3	28.2–29.4	25.5–28.9
Prepectoral length	19.3	21.4–22.2	19.5–21.2	17.3–20.0
Prepelvic length	42.4	40.7–42.4	47.3–49.8	44.5–47.9
Preanal length	62.7	62.1–62.4	59.1–61.6	59.7–62.6
Dorsal to adipose-fin origin	27.3	31.1–33.7	34.3–38.6	28.9–33.1
% of head length				
Head width	75.6	66.7–69.0	73.2–80.3	72.0–88.3
Head depth	48.9	48.0–57.1	45.0–56.6	50.3–56.8
Snout length	23.3	20.0–28.6	22.5–27.4	25.5–26.9
Mouth width	50.0	45.0–47.6	58.4–66.9	56.5–61.4
Interorbital width	27.8	27.0–28.6	32.1–38.3	30.4–35.6
Nasal barbel length	44.4	40.0–46.7	65.3–85.0	64.4–79.1
Maxillary barbel length	46.7	46.7–50.0	100.0–115.0	88.4–102.8
Inner mandibular barbel length	39.1	38.1–40.0	55.0–70.0	47.6–58.6
Outer mandibular barbel length	65.6	65.0–66.7	95.0–106.0	82.9–94.3
Width between anterior nares	14.4	12.0–14.3	16.2–25.3	10.6–13.0
Width between postoral nares	16.7	19.0–20.0	32.1–33.5	25.3–29.4

Supplementary Table S3 Comparisons of major diagnostic characters of *Liobagrus* species with serrated posterior edge of pectoral-fin spine.

	<i>L.</i> <i>chengduensi</i> <i>s</i>	<i>L.</i> <i>marginatus</i>	<i>L.</i> <i>nigricaud</i> <i>a</i>	<i>L. kingi</i>	<i>L.</i> <i>chenghaiensi</i> <i>s</i>	<i>L.</i> <i>pseudostyan</i> <i>i</i>	<i>L.</i> <i>huaiheensi</i> <i>s</i>	<i>L.</i> <i>andersoni</i>	<i>L.</i> <i>mediadiposali</i> <i>s</i>	<i>L.</i> <i>obesus</i>	<i>L.</i> <i>somjinensis</i>	<i>L.</i> <i>hyeongsanensi</i> <i>s</i>
Upper/lower jaw in length	<1	≤1	<1	≤1	≤1	>1	>1	≤1	>1	=1	>1	>1
Marked incision at confluence between adipose and caudal-fin	Present	Present	Absent	Present	Present	Absent	Present	Present	Present	Absent	Present	Absent
Caudal-fin shape	Rounded	Sub-truncate	Rounded	Rounded	Sub-truncate	Rounded	Rounded	Sub-truncate	Sub-truncate	Rounded	Sub-truncate	Rounded
Serrations on posterior edge of pectoral-fin spine	3–4	2–6	>0	2–4	2–5	2–3 (disappeared in adult)	2–3	0–3 (disappeared in adult)	4–6	3–5	4–6	2–3
Anal-fin rays	15–16	11–14	Unknown	9–12	10–12	16–19	15–17	15–16	13–14	15–17	14–16	15–18
Post-Weberian Vertebrae	36–37	34–38	Unknown	Unknown	35–39	39–40	35–37	39–40	40–44	38–40	38–44	38–41
Anus location	Close to pelvic-fin insertion	Close to pelvic-fin insertion	Close to pelvic-fin insertion	Close to anal-fin origin	Close to pelvic-fin insertion	Close to pelvic-fin insertion	Close to pelvic-fin insertion	Close to anal-fin origin	Close to pelvic-fin insertion	Close to anal-fin origin	Close to pelvic-fin insertion	Close to pelvic-fin insertion

Supplementary Table S4 Genetic distances of *cyt b* determined using MEGA v6 among 15 species of *Liobagrus*.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 <i>L. chengduensis</i>															
2 <i>L. aequilabris</i>	0.114														
3 <i>L. andersoni</i>	0.099	0.098													
4 <i>L. angullicauda</i>	0.120	0.046	0.111												
5 <i>L. huaiheensis</i>	0.098	0.099	0.069	0.104											
6 <i>L.sp.</i>	0.104	0.130	0.123	0.137	0.125										
7 <i>L. aff. kingi</i>	0.087	0.098	0.085	0.105	0.083	0.101									
8 <i>L. kingi</i> ?	0.103	0.069	0.092	0.079	0.095	0.116	0.093								
9 <i>L. marginatus</i>	0.097	0.111	0.087	0.115	0.091	0.115	0.084	0.042							
10 <i>L. mediadiposalis</i>	0.116	0.132	0.121	0.132	0.118	0.060	0.121	0.119	0.120						
11 <i>L. obesus</i>	0.103	0.107	0.076	0.112	0.046	0.130	0.083	0.098	0.092	0.119					
12 <i>L. pseudostyani</i>	0.087	0.106	0.091	0.106	0.084	0.121	0.077	0.102	0.101	0.128	0.081				
13 <i>L. reinii</i>	0.114	0.142	0.134	0.142	0.137	0.096	0.124	0.139	0.136	0.110	0.141	0.116			
14 <i>L. somjinensis</i>	0.109	0.135	0.120	0.141	0.124	0.048	0.123	0.120	0.115	0.056	0.130	0.121	0.103		
15 <i>L. styani</i>	0.105	0.040	0.107	0.054	0.110	0.137	0.104	0.076	0.119	0.133	0.133	0.102	0.143	0.138	