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Homatula wuliangensis (Teleostei: Nemacheilidae), a new loach from Yunnan, China

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Abstract

A new species of *Homatula*, *Homatula wuliangensis*, is described from the Lancang River of the Wuliang Mountain, Pu-Er City, Jingdong County, Yunnan Province, China. *Homatula wuliangensis* sp. nov. is readily distinguished from other species of *Homatula* by the combination of several morphological characters, including a long upper lobe of the caudal fin relative to the lower lobe, high and long dorsal adipose crest, series of 22–26 very closely aligned body markings, body scaled, and 41–42 vertebrae. In addition, *H. wuliangensis* differs from the similar species *H. anguillioides* in having shorter barbels, spots on the caudal fin, the origin of the pelvic fin under the last simple dorsal-fin ray, and a pointed axillary pelvic lobe divided from the body. The new species is further distinguished from the similar species *H. pysnolepis* in having shorter barbels, lacking a notch on the lower jaw, and lacking vermiform markings on top of the head.

Key words: Homatula, Paracobitis, Nemacheilidae, Yunnan, China

Introduction

The genus *Homatula* was described by Nichols (1925) as a subgenus of *Barbatula* with the type species being *Nemacheilus potanini* Günther 1896 from Minjiang (a tributary of Jinsha River, Sichuan, China). Because species of *Homatula* have adipose keels along the dorsal and ventral margins of the caudal peduncle highly resembling those of *Paracobitis* Bleeker 1863, many researchers have treated *Homatula* as a synonym of *Paracobitis* and traditionally ascribed all Chinese nemacheiline species with adipose keels of this nature to *Paracobitis* (Zhu & Wang 1985; Zhu & Cao 1988; Zhu 1989; Chu & Chen 1990; Ding & Deng 1990; Zhou & He 1993; Min *et al.* 2010). However, the type species of *Paracobitis*, as designated by Bleeker 1863, is *Cobitis malaptera* Cuvier & Valenciennes 1846 from Syria. All species of *Paracobitis* along the western slope of the Qinghai-Tibetan Plateau have 7 branched dorsal-fin rays in the majority of individuals and a truncate posterior margin of the caudal fin. In contrast, in all species from the Yunnan-Guizhou Plateau, on the eastern slope of Qinghai-Tibetan Plateau, the majority of individuals have 8 branched dorsal-fin rays and a rounded posterior margin on the caudal fin. Considering these morphological differences and the great geological disjunction by the Qinghai-Tibetan Plateau, we follow the suggestion of Kottelat (1990) and Bănărescu and Nalbant (1995) to treat these species as two independent lineages: all species endemic to the western slope of the Plateau as *Paracobitis*, and all species endemic to the eastern slope of the Plateau as *Homatula*.

Thus far, a total of 11 valid species of *Homatula* have been reported from the eastern slope of the Qinghai-Tibetan Plateau, China: *H. anguillioides* (Zhu & Wang 1985), *H. acuticephala* (Zhou & He 1993), *H. erhaiensis* (Zhu & Cao 1988), *H. variegata* (Sauvage & Dabry 1874), *H. longidorsalis* (Yang *et al*. 1994), *H. oligolepis* (Cao & Zhu in Zheng *et al.* 1989), *H. potanini* (Günther 1896), *H. wujiangensis* (Ding & Deng 1990), *H. nanpanjiangensis* (Min *et al.* 2010), *H. pycnolepis* (Hu & Zhang 2010), *H. laxiclathra* (Gu & Zhang 2012). Herein, we describe an additional species of *Homatula*.

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TABLE 1. Meristic and morphometric characters of *H. wuliangensis*, *H. anguillioides* and *H. pycnolepis.*

	H.wuliangensis	*H.wuliangensis*			*H.anguillioides*			*H. pycnolepis*		
	KIZ2008008158	range	mean	n	range	mean	n	range	mean	n
Standard length (SL)	181.9	64.6–191.1	113.5	33	68.8–143.3	93.4	12	67.0–145.6	105.02	50
Meristic characters										
Dorsal-fin rays	III, 8 $^{1}/_{2}$	III, 8 $^{1}/_{2}$		33	III, 8 $^{1}/_{2}$		12	III, 8 $^{1}/_{2}$		6
Caudal-fin rays	17	17		33	17		12	17		6
Anal-fin rays	III, 5 $^{1}/_{2}$	III , 5 $^{1}/_{2}$		33	III , 5 $^{1}/_{2}$		12	III, 5 $^{1}/_{2}$		6
Pectoral-fin rays	I, 10	I, 9–10		33	I, 9–10		12	I, 10–11		6
Pelvic-fin rays	I, 7	I, 7		33	I, 7		11	I, 7		6
Vertebrae	42	41–42		10	37–39		10	40–41		2
As % SL										
Body depth (BD)	13.3	11.9–16.1	14.1	20	15.2–17.2	16.0	11	15.2–18.0	16.2	6
Head length (HL)	18.5	18.5–22.9	20.6	20	21.9–23.8	22.9	11	19.4–21.0	20.2	6
Predorsal length	43.7	43.7–48.3	45.5	20	46.0–48.7	47.3	11	42.3–48.2	460	6
Prepelvic length	44.6	44.3–49.3	46.2	20	49.8–51.5	50.6	11	47.4–51.4	48.8	6
Preanus length	6.40	62.4–68.6	65.4	20	67.4–69.7	68.1	11	64.1–70.6	66.3	6
Preanal length	6.77	67.0–72.0	68.9	20	70.7–73.2	72.1	11	68.8–74.5	71.0	6
Caudal-peduncle length	22.7	18.7–24.2	21.5	20	16.8–19.5	18.4	11	18.2–21.8	19.9	6
Caudal-peduncle depth	12.5	11.4–13.3	12.2	20	10.7–12.9	11.5	11	11.4–12.9	11.9	6
Morphometric characters in % BD										
Head depth	76.4	72.5–86.9	77.8	20	73.4–81.8	77.8	11	64.2–78.8	71.1	6
Caudal-peduncle depth	94.4	76.7–95.1	86.9	20	68.5–73.8	71.8	11	67.9–77.3	73.8	6
As % HL										
Eye diameter	45.2	11.5–15.7	13.0	20	12.4–15.6	14.2	11	12.3–13.8	12.9	6
Interorbital width	30.1	27.2–30.1	28.6	20	27.2–32.2	30.4	11	26.7–30.5	29.4	6
Snout length	70.0	42.9–47.1	44.8	20	40.3–45.4	43.3	11	42.0–45.0	44.2	6
Head width	54.8	64.3–72.8	67.3	20	61.9–69.3	65.9	11	66.0–73.6	69.1	6
As % upper lobe of caudal-fin length										
Lower lobe of caudal-fin length	79.7	78.3–88.2	83.1	19	91.4–99.2	95.2	11			
As % caudal-peduncle length										
Caudal-peduncle depth	55.2	48.9–65.8	57.0	20	55.6–69.0	62.7	11	51.8–66.7	60.1	6

Materials and Methods

All measurements and counts were made following methods of Kottelat (1990) and were routinely taken from the left side. X-rays of specimens were used to count vertebrae. Measurements were made point to point with dial calipers to the nearest 0.1 mm. Species of *Homatula* examined were from the collection of the Kunming Institute of Zoology Chinese Academy of Sciences, Kunming (KIZ). Abbreviations used in this paper are shown in Table 1.

FIGURE 1. *Homatula wuliangensis* (holotype, KIZ 2008008158, 181.9 mm SL): lateral and dorsal views.

***Homatula wuliangensis* sp. nov.**
(Fig. 1)

Holotype. KIZ 2008008158, 1 ex., 181.9 mm SL; Wuliang Mountain (24°17′26.6″N; 100°39′03.6″E–24°20′37.5″N; 100°41′18.2″E, 1274–1781 m above sea level), Lancang River, at Jingdong County, Pu-Er City, China, 13 Dec. 2008.

Paratypes. KIZ 2008008156–157(2), 159–172(14), 175–176(2), 179(1), 184(1), 197(1), 199–201(3), 203(1), 205(1), 207(1), 211(1), 214–215(2), 316–318(3), 33 ex., 64.6–191.1 mm SL, locality data as for holotype.

Diagnosis. A species of *Homatula* with extremely longe upper lobe of caudal fin relative to lower lobe; adipose keel developed as high and long ridge, extending anteriorly almost to posterior margin of dorsal-fin base; very closely aligned lateral bars on body, numbering more than 22 (22–26); body scaled; vertebrae 4+41(8)–42(2).

Description. Counts and proportional measurement are shown in Table 1.

Body elongate, anterior portion subcylindrical, posterior portion compressed, body depth 16.2% (15.2–18.0%) SL. Body entirely covered by small scales, with scattered scales on breast. Dorsal and ventral profiles almost straight. Anus at least one diameter to anal-fin base.

Head slightly depressed, naked, length 20.6% (18.5–22.9%) SL; snout blunt, length 44.8% (42.9–47.1%) HL; anterior nostril forming a valve, close to posterior nostril. Eye ovoid, horizontal axis longest, slightly closer to snout tip than to posterior margin of operculum. Interorbital width 28.6% (27.2–30.1%) HL. Mouth inferior, upper jaw with a median *processus dentiformis* (defined by Kottelat 1990); lower jaw lacking a notch. Three pairs of barbels; inner rostral barbels not reaching mouth corner; outer rostral barbels extending to mouth corner; maxillary barbels extending to middle of eye.

Lateral line complete and straight, with 114–115 pores. Cephalic lateralis system with 7 supraorbital, 4+11 infraorbital, 9 preoperculomandibular and 3 supratemporal pores.Vertebrae 4+41(8 specimens)–42(2 specimens).

Dorsal-fin margin straight, with iii, $8^{1}/_{2}$ rays. Tip of dorsal fin extending close to or reaching vertical line from anus. Pectoral fin with i, 9–10 rays. Pectoral fin extending about $^{1}/_{3}$ distance from its origin to pelvic-fin origin. Pelvic fin with i, 7 rays. Origin of pelvic fin under vertical from dorsal-fin origin. Pelvic fin extending half of distance from its origin to anal-fin origin, but not reaching anus. Prepelvic length 48.8% (47.4–51.4%) SL. Pelvic

axillary lobe with pointed tip. Anal fin with iii, $5^{1}/_{2}$ rays. Anal fin reaching less than $^{1}/_{2}$ distance from anal-fin origin to caudal-fin base. Caudal fin without spots; fin rounded with upper lobe clearly longer than lower lobe; lower-lobe length 83.1% (78.3–88.2%) of length of upper lobe of caudal fin. Depth of caudal peduncle 86.9% (76.7–95.1%) in body depth. Ventral and dorsal adipose keels supported by rudimentary rays; dorsal keel well developed, extending forward nearly to dorsal-fin base, ventral keel extending nearly to vertical at end of anal-fin base.

In dissected specimens (KIZ 2008008165–66, 71; 131.4, 129.7 and 109.8 mm SL), intestine forming a small zigzag loop anteriorly but not reaching posterior surface of U-shaped stomach. Gas bladder osseous, anterior chamber invisible, fully enclosed in capsule; posterior chamber rudimentary.

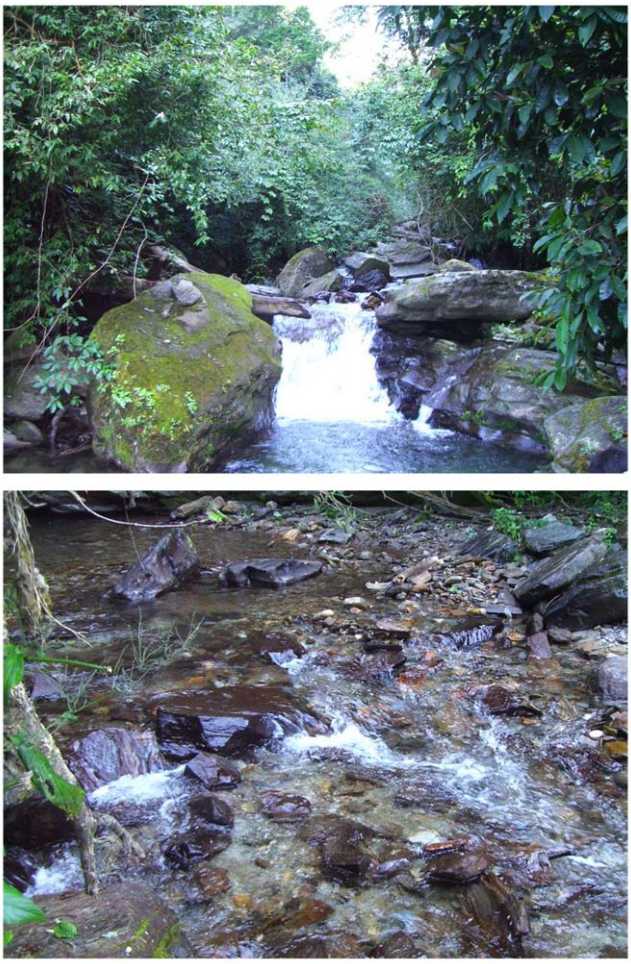
Color in preserved specimens (fixed in 10% formalin, preserved in 75% alcohol). (Fig. 1) Head dark brown, snout and lips grayish, nostril light, cheeks maculated. Body dark brown with 22–26 vertical bars; each bar at least twice as wide as light interspaces; anterior bars thinner; bars anterior to caudal peduncle split vertically into two or three bars. Abdomen yellow. Dorsal fin with three dark brown rows, one at base, second close to distal margin (producing a prominent light margin), and third located medially. Pectoral and pelvic fins white, dark on dorsal side. Anal fin white, dark at base. Caudal fin and adipose keels dark gray. Caudal-fin base with a blurry dark, basal bar.

Color in life. Color pattern overall similar to that in alcohol, although a little darker. Caudal and dorsal fins and adipose keel with bright red tint.

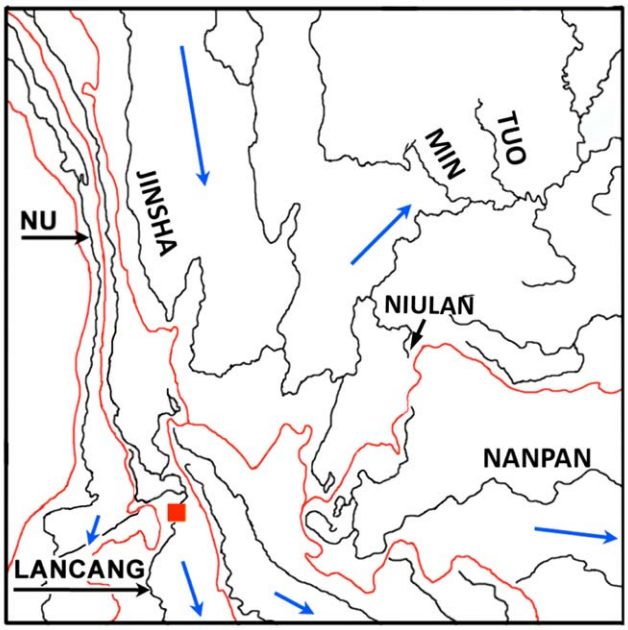
Etymology. From Latin, refering to the Wuliang Mountain.

Habitat. *Homatula wuliangensis* occurs in streams of mountain valleys in areas with swift current over rocky and stony substrates, interspersed with sand and gravel in higher elevation reaches (1781 m asl) and in areas with slower current in the lower reaches (1274 m asl) (Fig. 2a, b).

Distribution. Known from the Baimushan River of the Lancang River basin in Wuliang Mountains, Yunnan, China (Fig. 3).



←**FIGURE 2.** Typical habitats of *Homatula wuliangensis* in Wuliang Mountains, Yunnan, China.



↑**FIGURE 3.** Distribution of *Homatula wuliangensis* (red square). Red lines outline drainage basins. Blue arrows illustrate direction of flow for the Qinghai-Tibetan Plateau.

Comparisons

Homatula wuliangensis belongs to the genus *Homatula* in having a rounded caudal fin and adipose keels along the dorsal and ventral midlines of the caudal peduncle supported by rudimentary rays. *Homatula wuliangensis* is most similar to *H. anguillioides* from Eryuan, Lancang River, and *H. pycnolepis* from Yangbi River, a tributary of Lancang River, in having the following combination of characters: body entirely scaled, scales scattered between pectoral fins; lateral line complete; body depth uniform or progressively slightly more depressed posterior to the origin of the dorsal fin.

Homatula wuliangensis is distinguished from all members of the genus *Homatula* except *H. anguillioides*, *H. pycnolepis*, *H. erhaiensis* and *H. acuticephala* by having a densely scaled body. *Homatula wuliangensis* is easily distinguished from *H. erhaiensis* and *H. acuticephala* in having a more uniform body depth vs. body depth clearly becoming more depressed posterior to origin of dorsal fin, and more vertical bars (22–26 vs. 10–18). *Homatula wuliangensis* can be further distinguished from *H. erhaiensis* in having more vertebrae (41–42 vs. 37–38), and can be further distinguished from *H. acuticephala* in having a blunt snout (vs. pointed snout) and lacking a notch on the lower jaw (vs. developed notch).

Homatula wuliangensis is distinguished from *H. anguillioides* in having shorter barbels (maxillary barbels extending to the middle of the eye vs. past posterior margin of eye); lower jaw lacking a notch (vs. lower jaw with a small notch), axillary pelvic lobe with a pointed tip (vs. blunt tip); caudal fin with the upper lobe prominently longer than the lower one, length of lower lobe of caudal fin 83.1% (78.3–88.2%) length of upper lobe of caudal fin (vs. 95.2%, 91.4–99.2%); more developed dorsal keel, depth of caudle peduncle 86.9% (76.7–95.1%) in body depth (vs. 71.8%, 68.5–73.8%); caudal fin lacking spots (vs. dark round spots on caudal fin); vertebrae 41–42 (vs. 37–39).

Homatula pycnolepis differs from *H. wuliangensis* in having a developed notch on the lower jaw (vs. lacking notch); most bars on anterior part of the body just reaching medioventral line (vs. surpassing); a slender caudal peduncle, depth 73.8% (67.9–77.3%) in body depth (vs. 86.9%, 76.7–95.1%); body depth 16.2% (15.2–18.0%) SL (vs. 14.1%, 11.9–16.1%), pelvic-fin base more posterior, prepelvic length 48.8% (47.4–51.4%) SL (vs. 46.2%, 44.3–49.3%).

Comparative materials

Homatula acuticephalus, holotype, KIZ 784141, 1 ex., 106.5 mm SL, Lake Haixihai, Eryuan County, Dali City, Yunnan Province, China, 1978.

Homatula anguillioides, KIZ 2008006532–43, 12 ex., 68.8–143.3 mm SL, Yousuo Spring, Eryuan County, Dali Prefecture, Yunnan Province, China, 2008.

Homatula pycnolepis, KIZ 1998004817(1), 819(1), 822(1), 825(1), 2009006–007(2), 6 ex, 120.1–177.1 mm SL, Yangbi County, Yunnan Province, China, 1998 to 2009.

Homatula oligolepis, KIZ 1985000829, 1 ex., 169.7 mm SL, KIZ 774557–560, 4 ex., 75.5–114.2 mm SL, Zhanyi County, Yunnan Province, China, 1985 to 1977.

Homatula potanini, KIZ 200800645?549, 5 ex., 62.9–85.5 mm SL, Yibin City, Sichuan Province, China, 2008.
Homatula variegata longidorsalis, holotype KIZ 874048, 1 ex, 82.0 mm SL; paratypes KIZ 874042–043 (2), 045–047 (3), 050 (1), 198–216 (19), 25 ex., 46.1–89.5 mm SL, Yiliang County, Yunnan Province, China, 1987.
Homatula variegata variegata, KIZ 82101110–117 (8), 120–127 (8), 134–145 (12), 28 ex., 63.0–119.0 mm SL, Yanjing and Weixin County, Yunnan Province, China, 1982.

Homatula nanpanjiangensis, holotype, KIZ 1994000023, 1 ex., 86.4 mm SL; paratypes: KIZ 1994000018–022, 024–037, 19 ex., 64.7–89.4 mm SL, from Niujie River (24°57′46.9″ N; 104°13′09.2″ E), a tributary of Nanpanjiang River, at Niujie Village, Luoping County, Qujing City, China, 1994, collected by Li Weixian.

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