



A new species of *Metahomaloptera* (Teleostei: Balitoridae) from China

JIAN YANG^{1,2}, XIAOYONG CHEN^{1,3} & JUNXING YANG^{1,3}

¹Department of Systematic Zoology, Kunming Institute of Zoology, The Chinese Academy of Sciences, Kunming, Yunnan, 650223, P.R. China

²Graduate School of Chinese Academy of Sciences, Beijing, 100039, P.R. China

³Corresponding authors. E-mail: chenxy@mail.kiz.ac.cn; yangjx@mail.kiz.ac.cn

Abstract

A new species of *Metahomaloptera*, *M. longicauda*, is described from the lower Jinsha River, China. The new species is distinguished from other species of *Metahomaloptera* by the following combination of characters: pectoral fin with 11–15 branched rays, tip of pectoral fin extending beyond origin of dorsal fin, pelvic fin with 10–12 branched rays, pelvic-fin tip reaching or extending beyond anus, dorsal fin inserting before middle of body, tip of dorsal fin far from vertical line of caudal-fin base, head width 19.4–22.6% SL, pre-pectoral length 8.4–9.9% SL, pre-anal length 69.0–74.3% SL, caudal peduncle length 17.1–20.7% SL, eye diameter 14.6–16.6% HL, caudal peduncle depth 33.7–43.1% caudal peduncle length, mouth width 63.2–75.5% body width at pectoral-fin origin.

Key words: Balitoridae, *Metahomaloptera*, new species, China

Introduction

The hillstream loach genus *Metahomaloptera* was erected by Chang (1944), with *M. omeiensis* as the type species. Chang (1944) identified *Metahomaloptera* using the following characters: “head and anterior part of body greatly depressed and ventrally flattened; snout broad, rounded, and trenchant; eye superolateral, with free orbital margin; mouth inferior, crescent-shaped, and of moderate size, with 8 barbels, 4 rostral and 4 maxillary; upper lip narrow, with single row of papillae; both jaws provided with sharp horny edges; gill-opening very small, crescent-shaped, situated entirely above the base of pectoral; pectoral fin with 20–23 rays; pelvic fin with 17–21 rays.” Xie, *et al.* (1984) described a subspecies of *Metahomaloptera omeiensis*, *M. o. hangshuiensis*, from a tributary of the upper Yangtse River. At present, only one species of *Metahomaloptera* has been recorded from the upper Yangtse River. Chen (1990) recorded *M. omeiensis omeiensis* in Yanjin and Weixin, Yunnan Province, China, He also added a note regarding a specimen of *Metahomaloptera* collected in Fumin County, Yunnan, China, and listed some differences between this specimen and *M. omeiensis omeiensis*, but lacking enough material, did not describe it as a new species. The study below is based on the material of *Metahomaloptera* from the lower Jinsha River and some topotypic material of *M. omeiensis omeiensis*. The specimen recorded by Chen (1990), together with the specimens of the lower Jinsha River represent a new species, *M. longicauda*.

Material and methods

Counts and most measurements followed Chu & Chen (1989). Additional measurements, *viz.* pre-dorsal length, pre-pectoral length, pre-pelvic length and pre-anal length, were taken from the anteriormost tip of the

snout to, respectively, the dorsal-, pectoral-, pelvic- and anal-fin origins. Measurements were made with dial calipers and recorded to 0.1 mm. Specimens examined are deposited in the collection of the Kunming Institute of Zoology (KIZ), Chinese Academy of Sciences. Data of *M. omeiensis hanshuiensis* are from Chen & Tang (2000). Measurements of the head are presented as proportions of head length (HL). Head length and other measurements of body parts are presented as proportion of standard length (SL). Statistical analyses were carried out using SPSS 11.0 (SPSS Inc. Chicago, IL, USA).

***Metahomaloptera longicauda* sp. nov.**

(Fig. 1)

Type material. Holotype: KIZ 20060304, 41.9 mm SL, Chuanhedong village, Deze town, Zhanyi County, Yunnan Province, China; 25° 54' 9.4" N, 103° 34' 49.5" E; 2 Dec. 2006; J Yang, B Yang.

Paratypes: KIZ 20060305, 36.9 mm SL, 1 ex. Same data as holotype, KIZ 20060306, 43.5 mm SL, 1 ex. Tuole village, Zhanyi County, Yunnan Province, China; 25° 41' 28.2" N, 103° 33' 01.5" E; 1 Dec. 2006; J Yang, B Yang. KIZ 603672, 38.4 mm SL, 1 ex. Fumin, Yunnan Province, China.



FIGURE 1. *Metahomaloptera longicauda* sp. nov., KIZ 20060304, holotype, 41.9 mm SL. Dorsal, lateral and ventral views.

Diagnosis. *Metahomaloptera longicauda* is distinguished from *M. omeiensis omeiensis* in dorsal fin inserting before the middle of body (vs. dorsal fin inserting in the middle of body), having a longer pectoral fin (expanding beyond the dorsal-fin origin vs. not), anal fin far from caudal-fin base (vs. anal fin reaching base of caudal fin), pelvic fin reaching or expanding beyond anus (vs. pelvic fin far from anus), head narrow (head width 19.4–22.6% SL, vs. 22.7–30.2), pre-anal length 69.0–74.3% SL (vs. 80.7–87.4), having a longer (17.1–20.7% SL vs. 8.4–11.9) and more slender (caudal-peduncle depth 33.7–43.1% caudal-peduncle length vs. 62.7–87.6) caudal peduncle, eye small (eye diameter 14.6–16.6% HL vs. 16.7–23.9), mouth wide (mouth width 63.2–75.5% body width at pectoral-fin origin vs. 30.3–42.3). *Metahomaloptera longicauda* can be further distinguished from *M. omeiensis hangshuiensis* in having fewer blackish blotches along the median dor-

sal line from occipital region to base of caudal (8–9 vs. 10–15), a longer pectoral fin (extending beyond the dorsal-fin origin vs. not), more lateral-line scale rows (66–78 vs. 59–63), fewer branched pectoral rays (11–15 vs. 16–18), fewer branched pelvic rays (10–12 vs. 13–15), a longer (17.1–20.7% SL vs. 7.1–10) and more slender (caudal peduncle depth 33.7–43.1% caudal peduncle length vs. 76.9–111.1) caudal peduncle.

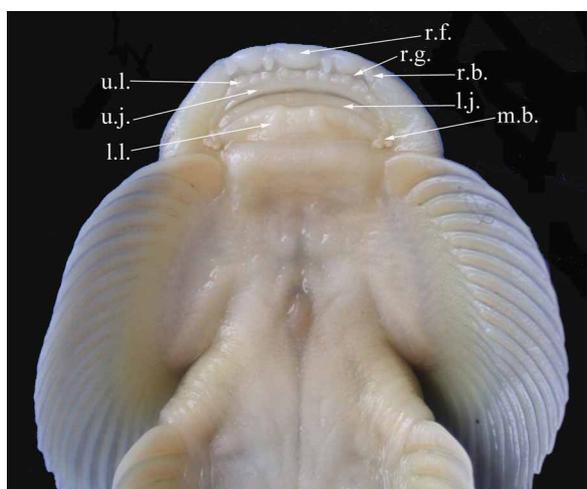


FIGURE 2. Ventral view of head of *Metahomaloptera longicauda* sp. nov., KIZ 20060304, holotype, 41.9 mm SL; l.j., lower jaw; l.l., lower lip; m.b., maxillary barbel; r.b., rostral barbel; r.f., rostral fold; r.g., rostral groove; u.j., upper jaw; u.l., upper lip.

Description. Biometric comparisons of *M. longicauda* and *M. omeiensis omeiensis* are presented in Table 1. Ventral view of head of *M. longicauda* is presented in Figure 2. Body elongate and compressed; head longer than width at pectoral-fin origin. Snout spatulate and broad; snout longer than half of head, 3–4 times eye diameter. Numerous small white tubercles on dorsal surface of head. Anterior and posterior nostrils closely situated; anterior nostril in short tubular flap. Eye small, 1/6 of head length; eye diameter slightly shorter than gill opening. Interorbital width shorter than snout length and less than 1/2 of head length. Gill opening very small, crescent-shaped, and situated entirely above base of pectoral fin. Mouth inferior, wide, and crescent-shaped; corner of mouth almost reaching pectoral-fin origin. Mouth with four pairs of barbels, rostral fold with four notches to accommodate rostral barbels, a fleshy lobe between two neighboring notches, and the inner fleshy lobe larger than the lateral two. Four rostral barbels of equal length. Fleshy lobe enlarged between rostral and maxillary barbels. Rostral fold and upper lip separated by shallow groove; upper lip with single row of papillae and continuous with lower lip at mouth corner. Maxillary barbels at corner of mouth; inner pair of barbels shorter and more slender than outer pair. Lower lip plain and thin. Jaws with sharp largely exposed horny edge. Lower jaw with radial ridges on surface.

Dorsal-fin origin located before middle of body with iii,8 rays. Dorsal-fin margin straight. Base of dorsal fin shorter than head length. Pectoral fin with 13 simple and 11–15 branched rays; fin expanded and inserted vertical of nostrils. Tip of pectoral fin overlapping anterior part of pelvic fin and extending beyond vertical origin of dorsal fin. Pelvic fin with 8–9 simple and 10–12 branched rays. Pelvic-fin origin anterior to vertical of dorsal-fin origin. Pelvic fins fused posteriorly; posterior edge reaching or extending beyond anus and far from anal fin. Expanded muscular band present above pelvic-fin base. Anal fin with ii,5 rays and far from caudal-fin base. Anus closer to anal-fin origin than to posterior edge of pelvic-fin base. Caudal fin shallowly emarginated; lower lobe slightly longer than upper lobe. Body covered with tiny cycloid scales. Lateral line complete, straight and with 66–78 scales.

TABLE 1. Biometric data for *Metahomaloptera longicauda* sp. nov. and *M. omeiensis omeiensis*.

Characters	<i>Metahomaloptera longicauda</i> sp. nov.										<i>Metahomaloptera omeiensis omeiensis</i> (n=11)						
	Holotype		Paratypes								Average	S.D.	Range	Average	S.D.	Range	
	20060304	20060306	20060305	603672	603672	20060305	20060306	20060305	603672	603672							
SL (mm)	41.9	43.5	36.9	38.4	38.4	36.9	36.9	36.9	36.9	36.9	36.9	36.9	40.2	3.1	30.9-57.8	40.4	10.0
HL	10.6	11.0	9.7	9.2	9.2	9.7	9.7	9.7	9.7	9.7	9.7	9.7	10.1	0.9	7.8-13.4	9.8	2.0
% SL																	
Body depth	16.7	18.9	18.7	15.6	15.6	18.7	18.7	18.7	18.7	18.7	18.7	18.7	17.5	1.6	13.9-22.4	17.6	2.5
Head length	25.3	25.3	26.3	24.0	24.0	26.3	26.3	26.3	26.3	26.3	26.3	26.3	25.2	1.0	22.5-26.4	24.6	1.4
Snout length	14.6	15.6	14.6	12.4	12.4	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.3	1.4	11.5-15.2	13.9	1.1
head width	22.4	22.6	22.1	19.4	19.4	22.1	22.1	22.1	22.1	22.1	22.1	22.1	21.6	1.5	22.7-30.2	26.6	2.0
head depth	12.3	13.3	13.1	10.2	10.2	13.1	13.1	13.1	13.1	13.1	13.1	13.1	12.2	1.4	11.6-14.2	12.7	0.8
Eye diameter	3.7	4.1	4.4	3.9	3.9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.0	0.3	3.9-6.0	4.9	0.7
Pre-dorsal length	42.3	45.3	44.4	43.4	43.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	43.8	1.3	46.9-53.6	50.1	2.0
Pre-pectoral length	9.2	8.9	9.9	8.4	8.4	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.1	0.6	11.3-16.5	14.3	1.6
pre-pelvic length	33.0	34.2	33.8	32.5	32.5	33.8	33.8	33.8	33.8	33.8	33.8	33.8	33.4	0.8	33.7-50.6	41.8	4.6
Pre-anal length	72.1	69.0	73.7	74.3	74.3	73.7	73.7	73.7	73.7	73.7	73.7	73.7	72.3	2.4	80.7-87.4	84.0	1.9
Caudal-peduncle length	20.7	20.7	17.2	17.1	17.1	17.2	17.2	17.2	17.2	17.2	17.2	17.2	18.9	2.0	8.4-11.9	10.2	1.1
Caudal-pectuncle depth	7.0	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.3	0.2	6.7-8.2	7.4	0.6
% HL																	
Head depth	48.4	52.5	49.7	42.5	42.5	49.7	49.7	49.7	49.7	49.7	49.7	49.7	48.3	4.2	46.8-60.2	52.0	4.4
Body depth	65.8	74.6	71.0	65.1	65.1	71.0	71.0	71.0	71.0	71.0	71.0	71.0	69.1	4.5	55.0-99.6	72.1	13.3
Snout length	57.6	61.8	55.4	51.8	51.8	55.4	55.4	55.4	55.4	55.4	55.4	55.4	56.6	4.2	49.6-60.6	56.6	3.2
Eye diameter	14.6	16.1	16.6	16.4	16.4	16.6	16.6	16.6	16.6	16.6	16.6	16.6	15.9	0.9	16.7-23.9	20.1	2.2
Dorsal fin base	71.3	71.9	71.7	70.5	70.5	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.4	0.6	52.0-78.1	66.6	9.2
Interorbital distance	46.9	50.5	44.7	50.5	50.5	44.7	44.7	44.7	44.7	44.7	44.7	44.7	48.2	2.8	42.7-59.5	47.2	5.1
Caudal-peduncle depth /length	33.7	35.9	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	38.9	4.9	62.7-87.6	73.3	8.9
Mouth width/Body width at pectoral-fin origin	63.9	63.2	64.7	75.5	75.5	64.7	64.7	64.7	64.7	64.7	64.7	64.7	66.8	5.8	30.3-42.3	35.3	3.4

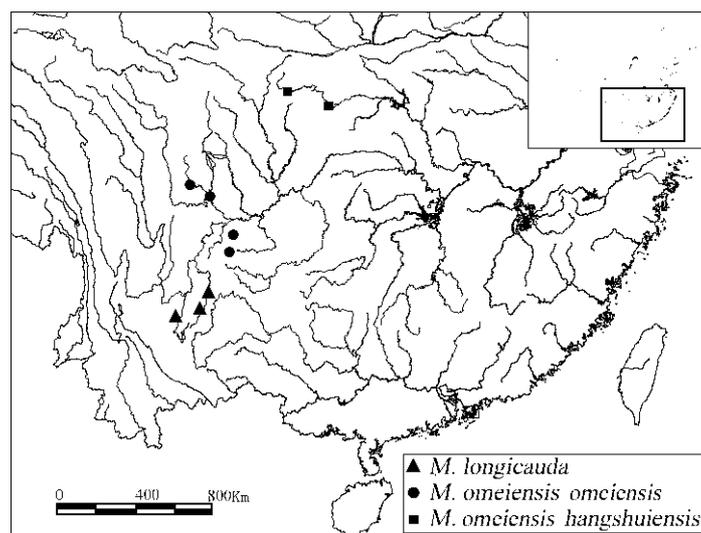


FIGURE 3. Map showing the distribution of *Metahomaloptera longicauda* sp. nov., *M. omeiensis omeiensis* and *M. omeiensis hangshuiensis*.

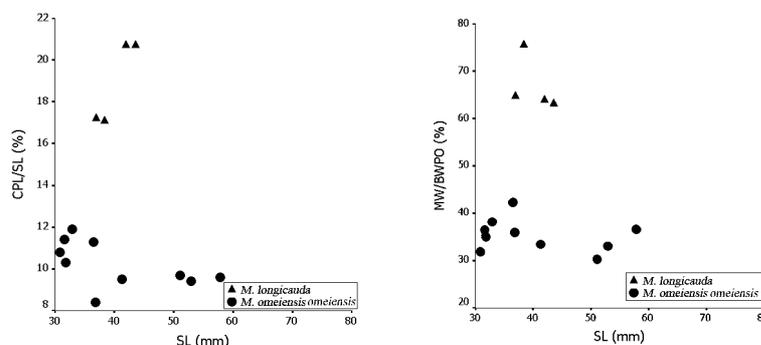


FIGURE 4–5. 4. Scatterplot of caudal peduncle length (CPL)/standard length (SL) against standard length for *Metahomaloptera longicauda* and *M. omeiensis omeiensis*. 5. Scatterplot of mouth width (MW)/body width at pectoral-fin origin (BWPO) against standard length for *Metahomaloptera longicauda* sp. nov. and *M. omeiensis omeiensis*.

Coloration. After fixed in 10% formalin and storage in 75% ethanol, body is dark grey. Median dorsal line with 8–9 blackish blotches from occipital region to base of caudal fin; 2–3 blotches anterior to dorsal-fin origin and 5–6 posterior to dorsal-fin origin. Dorsal-fin rays dark grey with two blackish bands. Caudal and anal fins with one wide vertical blackish band.

Distribution. Presently known from the Niulan Jiang River and the Pudu River (tributaries of the lower Jinsha River) (Fig. 3).

Habitat and ecology. In Tuole (Niulan Jiang River), the river is clear and fast flowing, 8–20 m wide, 0.5–2 m deep, and with a pH 6.0. The river substrate is sand, cobbles and boulders. *Metahomaloptera longicauda* was collected in the rapid water amongst boulders. Other fishes found in the same locality include *Discogobio yunnanensis* (Cyprinidae), *Abbottina rivularis* (Cyprinidae), *Pseudorasbora parvus* (Cyprinidae), *Beaufortia szechuanensis* (Balitoridae), *Sinogastromyzon dezeensis* (Balitoridae), *Triplophysa grahami* (Balitoridae), *Schistura fasciolata* (Balitoridae) and *Liobagrus marginatus* (Amblycipitidae). In Deze (downstream of Tuole), the habitat is the same as that at Tuole, but more species coexist with *M. longicauda*. Those include the species listed above and *Carassius auratus auratus* (Cyprinidae), *Pseudogyrincheilus procheilus* (Cyprinidae), *Rhinogobius brunneus* (Gobiidae), *Rhodeus ocellatus* (Cyprinidae) and *Paracobitis variegatus variegatus* (Balitoridae).

Etymology. A noun from the Latin *longus*, meaning long, and *caudal*, meaning the tail of an animal, in reference to the species having a longer caudal peduncle when compared with *M. omeiensis omeiensis* and *M. omeiensis hangshuiensis*.

Discussion. To date, only one species containing two subspecies is considered valid in *Metahomaloptera* (Chen & Tang, 2000; Tang & Chen, 2000), viz. *M. omeiensis omeiensis* Chang, 1944, *M. omeiensis hangshuiensis* Xie, Yang & Gong, 1984. The description of *M. longicauda* raises the number of known species in the genus to two. The significantly longer caudal peduncle and wider mouth of *M. longicauda* easily distinguishes it from *M. omeiensis omeiensis* (Figs. 4, 5).

Metahomaloptera is restricted to the lower Jinsha River (the name the Yangtse River in Yunnan Province) and the upper Yangtse River (Sichuan, Shanxi and Hubei Province) (Fig. 3). The distribution of *M. omeiensis hangshuiensis* is described by Chen & Tang (2000) as the Hanshui River. Chang (1944) indicated that the rudimentary nature of the gill-opening in *Metahomaloptera* must be of generic significance, and *Metahomaloptera* is obviously more specialized and advanced than *Sinogastromyzon*. Chen (1980) discussed the phylogenetic position of *Metahomaloptera* based on an osteological study, corroborated the hypothesis of Chang (1944) that *Metahomaloptera* is more specialized and advanced than *Sinogastromyzon*. *Metahomaloptera* is adapted to fast-flowing streams, and many of the morphological features are adaptations to the special environment. Notable adaptations includes those of the mouth, pelvic fin, maxillary barbels and gill-opening, and the depressed body and head. These specialized characters are always used to distinguish genera and species. Their function and importance in phylogenetic analyses should be studied further.

Comparative material. *Metahomaloptera omeiensis omeiensis*: KIZ 795676, 51.1 mm SL, Yaan, Sichuan Province, China; KIZ 840157, 53.0 mm SL, KIZ 840158, 57.8 mm SL, Emei, Sichuan Province, China; KIZ 82100932 41.3 mm SL, KIZ 82100944, 36.6 mm SL, KIZ 82100943, 36.9 mm SL, Weixin, Yunnan Province, China; KIZ 82101071, 32.9 mm SL, Yanjin, Yunnan Province, China; KIZ 2004008087, 31.8 mm SL, KIZ 2004008086, 30.9 mm SL, KIZ 2004008088, 31.6 mm SL, Shizi village, Baishui River, Yanjin, Yunnan Province, China.

Acknowledgments

We are grateful to thank Mr. Yang Bo for his help in the field work. We thank Richard L. Mayden, Saint Louis University, USA, for help in improving the manuscript. We also thank two anonymous reviewers for their valuable suggestions for improvement of the original manuscript. This research is supported by National Basic Research Program of China (2003CB415103) and Major Research Plan of National Natural Science Foundation of China (90411002).

References

- Chang, H.-W. (1944) Notes of the fishes of western Szechwan and eastern Sikang. *Sinensia* 15, 27–60.
- Chu, X.-L. & Chen, Y.-R. (1989) *The Fishes of Yunnan, China. Part I: Cyprinidae*. Beijing: Science Press (in Chinese).
- Chen, Y.-R. (1990) Homalopteridae. In *The Fishes of Yunnan, China. Part II*. Chu, X.-L. & Chen, Y.-R., (eds.), pp. 82–111. Beijing: Science Press (in Chinese).
- Chen, Y.-Y. (1980) Systematic studies on the fishes of the family Homalopteridae of China III. Phyletic studies of the Homalopterid fishes. *Acta Zoologica Sinica* 5, 200–211.
- Chen, Y.-Y. & Tang, W.-Q. (2000) Homalopteridae. In *Fauna Sinica, Osteichthyes, Cypriniformes III* (Yue P.-Q., ed.), pp. 438–567. Beijing: Science Press (in Chinese).
- Tang, W.-Q. & Chen, Y.-Y. (2000) Study on taxonomy of Homalopteridae. *Journal of Shanghai Fisheries University* 9, 1–10.
- Xie, C.-X., Yang G.-R. & Gong, L.-X. (1984) The homalopterid fishes from Hubei Province, China, with description of a new species and a new subspecies. *Journal of Huazhong Agriculture College* 3, 62–68 (in Chinese).