Zootaxa 4476 (1): 077–086
http://www.mapress.com/j/zt/

Article

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

https://doi.org/10.11646/zootaxa.4476.1.7
http://zoobank.org/urn:lsid:zoobank.org:pub:E84094BF-7993-445F-8123-4C1A2EAB27BE

The species of *Clupisoma* from Yunnan, China (Teleostei: Siluriformes: Ailiidae), with a comment on the validity of the family Ailiidae

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Abstract

After comparison of the types of the four species of *Clupisoma* recorded from Yunnan, China, no morphological differences between *Clupisoma nujiangense* Chen *et al.* and *C. yunnanensis* (He, Huang & Li) were found, and it is confirmed that the former is a synonym of the latter. *Clupisoma yunnanensis* occurs in the middle and lower of Nu-jiang, belonging to the Salween River basin. *Clupisoma longianale* (Huang) and *Clupisoma sinense* (Huang) are found in the lower Lancang-jiang, in the Mekong River basin. Using concatenated mitochondrial genes and nuclear genes, Wang *et al*. (2016) reconstructed the phylogeny of 38 species of catfishes belonging to 28 genera and 14 families. They reinstated the family, Ailiidae for a monophyletic Asian catfish group comprised of the three genera *Ailia*, *Laides* and *Clupisoma*. The family-group name Ailiidae was first proposed by Bleeker (1858) as Ailichthyoidei for a subfamily containing *Ailia* Gray. As such, there was no legitimate reason for Wang *et al*. (2016) to propose the Ailiidae as a new family group name but, instead, resurrect the existing name from the synonymy of the Shilbeidae.

Key words: Species status, *Clupisoma longianale*, *Clupisoma nujiangense*, *Clupisoma sinense*, *Clupisoma yunnanense*, Ailiidae

Introduction

The genus *Clupisoma,* belonging to the family Schilbeidae of Siluriformes, has been recorded from South Asia (India, Pakistan, Nepal, Bangladesh, and Myanmar), Southeast Asia (Thailand, Laos, Cambodia, and Malay Peninsula) and Yunnan, China (Chu & Kuang 1990; Zakaria-Ismail 1992; He *et al*. 1995; Rainboth 1996; Jayaram 1999; Kottelat 2001; Ferraris 2007; Chen 2010, 2013; Kottelat 2013; Zhang *et al*. 2016; Eschmeyer *et al*. 2018). In Yunnan, the genus has been found in the Lancang-jiang (the upper Mekong River) and the Nu-jiang (the upper Salween River) basins (Huang 1981; Chu & Kuang 1990; He *et al*. 1995; Chen 2010, 2013; Zhang *et al.* 2016).

Based on reconstructing the phylogeny of 38 species of catfishes, Wang *et al.* (2016) reinstated the family Ailiidae, as a monophyletic Asian catfish group comprised of the genera *Ailia*, *Laides*, and *Clupisoma*.

In China, Huang (1981) was the first ichthyologist studying the Schilbeidae from China. He described two new species of *Platytropius* from the Lancang-jiang basin in Yunnan: *P. longianalis* Huang, and *P. sinensis* Huang. Later, He *et al*. (1995) described *P. yunnanensis* based on specimens collected from Daojie in Baoshan County, Yunnan (Nu-jiang basin). Ng (1999) verified the specimens of *Platytropius sinensis* collected from the lower Mekong River and considered the species not to belong in *Platytropius*, but in *Clupisoma*.

After examining the type specimens of *Platytropius longianalis* and *P. sinensis*, Chen *et al*. (2005) agreed with the opinion of Ng (1999), and these two species belonged in *Clupisoma*. They also described a new species, *Clupisoma nujiangense*, based on specimens collected from Sanjiangkou in Mengnuo Township of Longling County, Nu-jiang basin. However, they did not notice the record of the *P. yunnanensis* in the Nu-jiang basin. The distance between the type localities of *P. yunnanensis* and *C. nujiangense* is not more than 50 kilometers. Later, both in the Checklist of Fishes of Yunnan (Chen 2013) and the Fishes of the Inland Waters of Southeast Asia (Kottelat 2013), *P. yunnanensis* was placed in the genus *Clupisoma*, and *C. nujiangense* was regarded as a synonym of the former. However, neither of the two authors explained the reason for the merger, so this

Accepted by L. Page: 17 May 2018; published: 13 Sept. 2018

synonymization should be investigated further. To answer this question, we examined the types of the four species recorded from Yunnan, China, and discuss their taxonomic status and validity. Finally, the usefulness of a separate family Ailiidae is discussed.

Materials and methods

Materials examined have been deposited at the Museum of the Kunming Institute of Zoology (KIZ), Chinese Academy of Sciences, and Museum of the School of Life Science, Yunnan University (YU). All measurements were taken point to point with digital readout calipers measuring to the nearest 0.1 mm. Methods for counts, measurements, and morphological terminology follow Hubbs and Lagler (1947). The information about specimens is given as follows: catalog number, total number of examined specimens (ex.), standard length (SL) with range of specimens in millimeters (mm), and collection locality including county, township, and river system. A locality with suffixes "-jiang" and "-he" means "river" in Chinese. Morphometric and meristic data are listed in Tables 1, 2, and 3.

Results

After examining the types of all four *Clupisoma* species recorded from Yunnan, China, it is confirmed that *C. nujiangense* Chen *et al*. is a synonym of *C. yunnanense* (He, Huang, & Li). Details of the three species of *Clupisoma* from Yunnan are as follows.

Clupisoma longianale (Huang)

(Fig. 1)

Platytropius longianalis Huang 1981: 438, fig. 5 (Holotype: KIZ 735118, Pu-Er County, Tongxing Township); Chu & Kuang 1990: 131 (Yunxian, Xiaoganlanba in Simao County, Menghan in Jinghong County).

Clupisoma longianalis: Chen *et al*. 2005: 570 (Lancang Jiang); Ferraris 2007: 357 (Lancangjiang [= Mekong River]); Chen in Yang *et al*. 2010: 509 (middle and lower Lancang-jiang); Chen 2013: 318 (middle and lower Lancang-jiang); Zhang *et al*. 2016: 181 (middle and lower Lancang-jiang).

Clupisoma longianale: Kottelat 2013: 251 (holotype: KIZ 735118, type locality: China: Yunnan: Simao Prefecture: Puer County: Tongxing Township, a tributary of Pu-Er River at Xiaoganlanba [Mekong basin]).

Material examined. Holotype: KIZ 735118, 138 mm SL; Yunnan: Pu-Er County: Tongxing Township, main stream of the Lancang-jiang. Paratype: KIZ 735125, 109.3 mm SL, collected with the holotype; KIZ 748127, 101.8 mm SL, Yunnan: Jinghong County: Menghan Township, main stream of the Lancang-jiang.

FIGURE 1. *Clupisoma longianale*, KIZ 735118, holotype, 138 mm SL; Yunnan: Pu-Er County: Tongxing Township, main stream of the Lancang-jiang, the upper Mekong River.

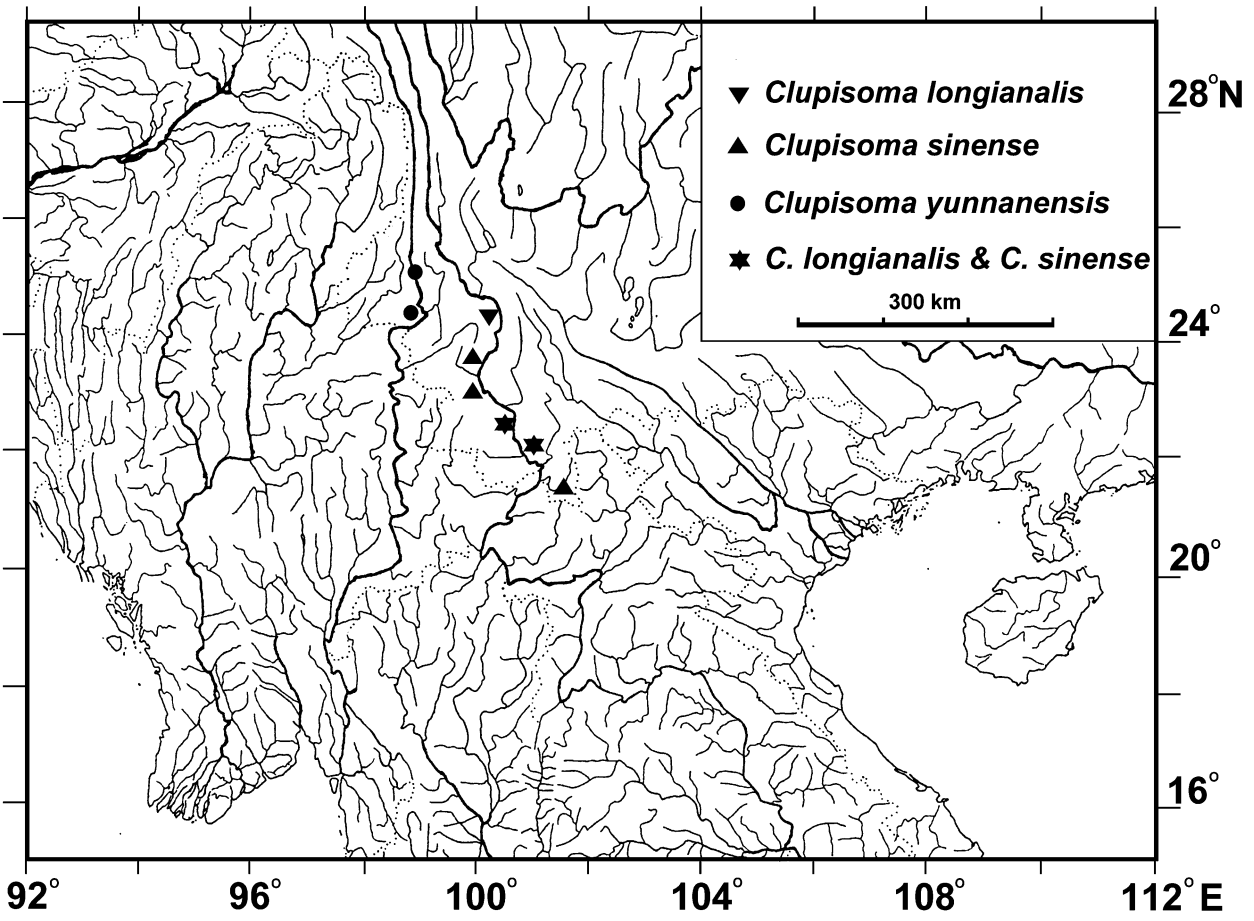

FIGURE 2. Map showing localities of *Clupisoma longianale*, *C. sinense*, and *C. yunnanensis* in Yunnan, China.

Diagnosis. Morphometric and meristic data are shown in Tables 1 and 2. *Clupisoma longianale* is distinguished from its congeners occurring in China by the following combination of characters: nasal barbel extending to or almost to dorsal-fin origin vertically (vs. extending only to pectoral-fin origin); maxillary barbel extending beyond middle of anal-fin base (vs. extending only to anal-fin origin); medial mental barbel extending to 1/3–1/2 of anal-fin base (vs. not extending beyond end of pectoral-fin); origin of pelvic fin located at middle of dorsal-fin base vertically (vs. located at end of dorsal-fin base vertically).

Distribution. Lower Lancang-jiang in Yunnan, China (upper Mekong River basin) (Fig. 2).

Remark. This species can be easily distinguished from its congeners by the possession of the longer nasal, maxillary, and medial mental barbels.

Clupisoma sinense (Huang)

(Fig. 3)

Platytropius sinensis Huang 1981: 437, fig. 1 (Holotype: KIZ 735124, China: Yunnan: Puer County: Xiaoganlanba); Chu & Kuang 1990: 129 (Shuanjiang County: Xiaoheijiang; Simao County: Xiaoganlanba; Lancang County: Menglang; Jinghong County: Menghan).

Laides sinensis: Rainboth 1996: 152 (mainstem of the Mekong, Cambodia).

Clupisoma sinensis: Ng 1999: 384; Chen *et al*. 2005: 570 (Lancang Jiang); Chen in Yang *et al*. 2010: 509 (middle and lower Lancang-jiang).

Clupisoma sinense: Ferraris 2007: 357 (Mekong River basin, including Lancangjiang (= upper Mekong River of Yunnan) and Malay Peninsula); Kottelat 2013: 252; Chen 2013: 318 (middle and lower Lancang-jiang); Zhang *et al*. 2016: 181 (lower Lancang-jiang).

Material examined. Holotype: KIZ 735124, 110.1 mm SL, Yunnan: Pu-Er County: Tongxing Township, main stream of the Lancang-jiang. Paratypes: KIZ 735114–116, 3 ex., 164.3–175.4 mm SL, collected with the holotype; KIZ 735044, 734056, 2 ex., 146.7–200 mm SL, Yunnan: Jinghong County: Menghan Township, main stream of the Lancang-jiang; KIZ 737005, 1 ex., 187.7 mm SL, Yunnan: Lcncang County: Menglang; KIZ 75001, 764001, 2 ex., 219.8 mm SL and 254.4 mm SL, Yunnan: Shuangjiang County: Xiaoheijiang, a branch of Lancang-jiang; KIZ 7890578, 1 ex., 205.7 mm SL, Yunnan: Mengla County: Menglun Township, a branch of Lancang-jiang.

Diagnosis. Morphometric and meristic data are shown in Tables 1 and 2. *Clupisoma sinense* is distinguished from its congeners occurring in China by the following combination of characters: branched anal-fin rays 40–43 (vs. more than 47); dorsal-fin origin located at vertical through middle distance between pectoral-fin origin and pelvic-fin origin (vs. behind middle distance between pectoral-fin origin and pelvic-fin origin, or close to pelvic-fin origin); pectoral-fin spine not extending to pelvic-fin origin (vs. extending to or beyond pelvic-fin origin).

Distribution. Lower Lancang-jiang in Yunnan, China (upper Mekong River basin) (Fig. 2); Mekong River basin in Laos (Kottelat 2001), Thailand, and Cambodia; and the Malay Peninsula (Zakaria-Ismail 1992, Rainboth 1996, Ng 1999).

FIGURE 3. *Clupisoma sinense*, KIZ 890578, paratype, 110.1 mm SL; Yunnan: Mengla County: Menglun Township, Luosuo-jiang, an upper tributary of the Mekong River.

Clupisoma yunnanense (He, Huang & Li)

(Fig. 4)

Platytropius yunnanensis He, Huang & Li 1995: 281, fig. 1 (holotype: YU 8040066, type locality: China: Yunnan: Baoshan County (=Longyang District now): Daojie; Nujiang [Salween] basin).

Clupisoma nujiangense Chen, Ferraris & Yang 2005: 566, fig. 1 (holotype: KIZ 200310118, China: Yunnan: Baoshan City: Longling County: Mengnuo Township, Sanjiangkou, Nu Jiang River [Salween]); Ferraris 2007: 357 (Upper Salween River, Yunnan, China); Chen in Yang *et al*. 2010: 509 (lower Nu-jiang).

Clupisoma yunnanense: Kottelat 2013: 252, Chen 2013: 318 (middle and lower Nu-jiang).

Clupisoma yunnanensis: Zhang *et al*. 2016: 182 (Middle and lower Nu-jiang).

Material examined. Holotype of *Platytropius yunnanensis*: YU 8040066, 220 mm SL, Yunnan: Longyang District (=Baoshan County): Daojie Township, main stream of the Nu-jiang; Paratype of *Platytropius yunnanensis*: YU 8040127, 232 mm SL, collected with the holotype of *Platytropius yunnanensis*. Holotype of *Clupisoma nujiangense*: KIZ 200310118, 200 mm SL, Yunnan: Longling County: Mengnuo Township: Sanjiangkou, main stream of the Nu-jiang; Paratypes of *Platytropius yunnanensis*: KIZ 200310117, KIZ 200310119–120, KIZ 200310125–127, 6 ex., 203.7–241.7 mm SL, collected with the holotype of *Clupisoma nujiangense*.

Diagnosis. Morphometric and meristic data are shown in Tables 1 and 2. *Clupisoma yunnanense* is distinguished from its congeners occurring in China by the following combination of characters: palatal tooth patch consists of slender oblique bands that extends nearly to midline, clearly interrupted and not connected to each other (vs. crescent-shaped bands that extend to midline and almost connect to each other); lateral mental barbels short, not extending to ventroposterior margin of operculum (vs. extending to pectoral-fin origin or to anal-fin origin); pelvic fin short, only extending to anal-fin origin (vs. extending beyond anal-fin origin).

Distribution. The lower of Nu-jiang, belonging to the upper Salween River basin (Fig. 2).

FIGURE 4. Comparisons between *Clupisoma yunnanensis* and *Clupisoma nujiangense*. (A) *C. yunnanensis*, YNU 8040066, holotype, 220 mm SL; Yunnan: Baoshan County: Daojie, main stream of the Nu-jiang, the upper Salween River. (B–C) *C. nujiangense*, KIZ 200310118, holotype, 200 mm SL; Yunnan: Longling County: Mengnuo: Sanjingkou, main stream of the Nu-jiang, the upper Salween River (C was the live coloration of the same specimens photographed by X.Y. Chen)

TABLE 1. Comparison of morphological characteristics of nominal species of *Clupisoma* from Yunnan, China

	C. longianale (Huang)	*C. sinense* (Huang)	*C. nujiangense* Chen *et al.*	*C. yunnanense* (He *et al.*)
Holotype locality	Yunnan: Pu-Er County: Tongxing Township	Yunnan: Pu-Er County: Tongxing Township	Yunnan: Longling County: Mengnuo Township: Sanjiangkou	Yunnan: Longyang District (=Baoshan County): Daojie Township
Distribution	Lower Lancang-jiang in China	Lower Lancang-jiang in China	The middle and lower of Nu-jiang	The middle and lower of Nu-jiang
n	3	10	8	2
Dorsal rays	I, 6	I, 5-7	I, 7	I, 6
Anal rays	ii-iii, 52–65	ii-iii, 40–43	ii-iii, 47–55	ii, 56–57
Pectoral rays	I, 12–14	I, 10–11	I, 12	I, 12
Pelvic rays	i, 5	i, 5	i, 5	i, 5
Caudal rays (upper/lower)	7+8	7+8	7+8	7+8
Mouth	subterminal	subterminal	subterminal	subterminal
Gill rakers	19–22	20–28	14–20	14
Air-bladder	Kidney shaped	Kidney shaped	--	Kidney shaped
Nasal barbel	Extending to or almost to dorsal-fin origin vertically	Extending to between middle line and posterior of eye	Extending beyond posterior of eye and never to pectoral-fin origin	Extending beyond posterior of eye and never to pectoral-fin origin
Maxillary barbel	Extending beyond middle of anal-fin base	Extending to distance between origins of pelvic and anal fins	Extending to end of pelvic fin	Extending to end of pelvic fin
Medial mental barbel	Extending to 1/3~1/2 of anal-fin base	Extending to posterior of operculum	Extending beyond pectoral-fin origin	Extending beyond pectoral-fin middle
Lateral mental barbel	Extending to anal-fin origin	Extending to pectoral-fin origin	Not extending to posterior of operculum and almost same length of nasal barbel	Not extending to posterior of operculum and almost same length of nasal barbel
Palatal tooth bands	Crescent-shaped bands that extend to midline and almost connect each other	Crescent-shaped bands that extend to midline and almost connect each other	Slender oblique bands that extend nearly to midline, obviously not connected to each other	Slender oblique bands that extends nearly to midline, obviously not connected to each other
Dorsal-fin origin	Nearly above the pelvic-fin origin	Between pectoral-fin origin and pelvic-fin origin	Behind middle of distance between pectoral-fin origin and pelvic-fin origin	Behind middle of distance between pectoral-fin origin and pelvic-fin origin
Length of pectoral spine	To pelvic-fin origin	Not extending to pelvic-fin origin; opposite anal-fin base	Extending to or beyond pelvic-fin origin	Extending to pelvic-fin origin
Pelvic-fin origin	Located at middle of dorsal-fin base vertically and middle of pectoral fin	Located at end of dorsal-fin base vertically and end of pectoral fin	Located at end of dorsal-fin base vertically and slightly before end of pectoral fin	Located at end of dorsal-fin base vertically and slightly before end of pectoral fin
Length of pelvic fin	Extending beyond anal-fin origin	Extending beyond anal-fin origin	Extending to anal-fin origin	Extending to anal-fin origin

TABLE 2. Morphometric data for species of *Clupisoma* from Yunnan, China.

	C. sinense (Huang) (10)				*C. longianale* (Huang) (3)				*C. yunnanense* (He *et al.*) (10)			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
SL (mm)	110.06	254.39	183.15	34.07	101.80	133.30	114.80	16.45	200.0	256.3	224.7	18.1
% standard length												
Body depth	19.7	26.7	21.8	1.7	22.7	26.4	24.2	1.7	23.6	31.0	26.0	2.3
HL	15.5	20.7	16.8	0.5	17.6	19.6	18.8	0.5	15.4	18.5	17.8	0.9
Predorsal length	26.8	34.4	29.0	0.8	28.9	31.4	30.3	0.8	21.6	31.9	28.8	2.8
Preventral length	36.9	44.4	39.4	1.0	30.7	34.2	33.0	1.0	30.3	38.0	35.1	2.2
Preanal length	46.7	60.2	51.2	2.4	41.4	43.3	42.4	2.4	39.8	50.1	45.9	2.9
Preadipose length	76.5	92.8	80.4	0.9	77.2	81.3	79.6	0.9	76.3	96.9	84.1	5.9
Caudal-peduncle length	12.0	15.5	13.4	1.2	10.3	11.3	11.0	1.2	8.4	11.2	10.0	0.9
Length of dorsal-fin base	4.9	8.1	5.9	0.4	5.1	8.0	6.9	0.4	5.4	6.9	6.2	0.5
Length of adipose-fin base	0.8	1.6	1.1	0.2	1.1	1.6	1.3	0.2	0.7	1.2	1.0	0.2
Length of anal-fin base	35.2	44.6	38.8	2.6	46.9	49.4	47.9	2.6	40.2	48.0	44.1	2.7
Length of dorsal fin	10.8	21.0	14.2	2.5	14.7	17.4	15.7	2.5	14.5	19.7	18.0	1.5
% head length												
Snout length	47.5	55.2	50.6	2.2	41.6	45.1	43.9	2.2	40.7	51.3	45.7	3.2
Head width	56.2	77.5	67.4	3.7	53.8	60.5	57.6	3.7	57.7	72.1	67.9	4.2
Head depth	74.3	87.2	80.5	4.3	75.2	82.7	78.3	4.3	69.4	83.5	76.4	5.0
Eye diameter	15.0	20.6	17.9	1.3	12.6	16.5	14.6	1.3	10.9	15.6	13.0	1.6
Mouth width	40.3	45.6	42.8	1.5	38.7	40.0	39.5	1.5	36.0	43.1	39.3	2.4
Body depth	125.0	142.8	130.2	6.9	118.5	149.8	129.3	6.9	132.7	170.6	146.1	11.8
Body depth at anus	122.3	149.6	134.1	10.0	122.1	136.2	127.1	10.0	133.4	161.5	144.7	9.8
Interorbital width	47.3	63.0	57.8	4.2	41.1	48.6	45.4	4.2	52.5	73.8	58.9	6.3
Caudal-peduncle length	66.4	99.2	80.6	9.8	52.8	63.8	58.5	9.8	49.2	61.5	56.1	3.9
Length of dorsal-fin base	27.8	39.0	35.0	3.1	28.8	40.7	36.5	3.1	29.1	39.9	35.0	3.6
Distance between dorsal-fin base and adipose-fin origin	235.4	294.8	272.0	9.3	230.3	252.7	239.9	9.3	229.3	292.6	250.4	17.7
Length of anal-fin base	211.7	266.2	231.8	18.8	248.2	266.3	255.6	18.8	218.8	269.7	247.9	15.8
Length of pelvic fin	54.5	69.9	62.3	6.0	51.9	64.6	56.5	6.0	52.4	65.2	59.1	4.1
Length of anal fin	47.1	75.4	63.2	10.6	66.3	73.3	69.1	10.6	51.7	73.4	64.3	5.9
Length of caudal fin	136.3	158.8	146.9	8.6	120.0	140.3	133.0	8.6	119.8	171.7	141.4	15.7
Length of dorsal fin	69.4	113.4	84.1	14.5	75.2	98.8	84.2	14.5	94.3	107.8	101.2	5.1
Length of pectoral fin	96.6	115.1	104.6	7.1	96.3	109.5	102.3	7.1	97.4	117.0	108.1	4.9
% caudal peduncle length												
Caudal peduncle depth	49.2	71.5	60.8	6.2	54.3	91.6	78.2	6.2	52.2	74.2	65.5	7.1
% body depth												
Head depth	53.9	69.7	61.5	5.3	55.2	64.9	61.0	5.3	46.9	61.6	52.5	4.4

Discussion

According to our comparison, morphological characteristics do not separate *Clupisoma yunnanense* from *C. nujiangense* (Tables 1 and 3); *C. nujiangense* is a synonym of *C. yunnanense*. *Clupisoma yunnanense* can easily be distinguished from the two species of *Clupisoma* in the Lancang-jiang of Yunnan, and from the species of *Clupisoma* occurring in the lower Salween River (Chen *et al*. 2005).

The genus *Clupisoma* has been placed in the family Schilbeidae of the order Siliuriformes for a long time. However, Wang *et al*. (2016) suggested that it should be moved to a separate family Ailiidae. Based on sequence data from the mitochondrial genes COI, cyt *b*, and 16S rRNA, as well as the nuclear genes RAG1 and RAG2, Wang *et al*. (2016) proposed the phylogeny of 38 species of catfishes belonging to 28 genera and 14 families. They erected the family Ailiidae for a monophyletic Asian catfish group, comprised of three genera *Ailia*, *Laides*, and *Clupisoma*. But do we need a separate family Ailiidae?

After analyzing the previous study results, we draw the following conclusions:

(1) The family-group name Ailiidae was first proposed by Bleeker (1858: 39) as Ailichthyoidei for a subfamily containing *Ailia* Gray (Ferraris 2007; Van der Laan *et al*. 2014). As such, there was no legitimate reason for Wang *et al*. (2016) to propose the Ailiidae as a new family group name but, instead, resurrect the existing name from the synonymy of the Schilbeidae.

(2) The family Schilbeidae is obviously a non-monophyletic assemblage. Genera in Schilbeidae occur in African and Asian rivers, and the species are divided into two monophyletic groups in molecular phylogenetic trees, with the two groups being distantly related to one another (Sullivan *et al*. 2006; Wang *et al*. 2016). We agree with suggestion by Hardmann (2005) and Ferraris (2007) that African species of the Schilbeidae may be more closely related to other African catfishes than to any Asian member of the Schilbeidae, in which case the name Ailiidae would be the valid name for the Asian group.

The three genera in Asia do indeed form a monophyletic group (*Ailia* (*Laides*, *Clupisoma*)) (Sullivan *et al*. 2006; Wang *et al*. 2016) that constitute the family Ailiidae. The taxonomic status of other genera in Schilbeidae from Asia is unclear. Wang *et al*. (2016) placed *Eutropiichthys, Proeutropiichthys*, and *Silonia* in Schilbeidae citing the study result of Mo (1991) in which the taxonomic status of the three genera was not discussed. Instead, Eschmeyer *et al*. (2018) placed these three genera in Ailiidae according to Wang *et al*. (2016). Obviously, this was based on circular reasoning, which also indicates that the taxonomic status of all genera in the Schilbeidae are worthy of further study in order to determine in which families they belong.

(3) The familial status options for the *Ailia* clade. If *Ailia* and its close relatives are recognized as the sister group to the genera listed by Wang *et al*. (2016) as the Horabagridae, three options are available: 1) Treat the *Ailia* clade as a family without recognizing subfamilies. Wang *et al*. (2016) chose this option. 2) Treat the *Ailia* clade (*Ailia* (*Laides*, *Clupisoma*)) and the *Horabagrus* clade (*Horabagrus*, *Pseudeutropius*) as a family without a separate family-group name, both clades as subfamilies (Wang *et al*. 2016: fig. 2, fig. 4 from Sullivan *et al*. [2006]). 3) Treat the *Ailia* clade and *Horabagrus* clade as separate families (Wang *et al*. 2016: fig. 1, fig. 3).

In the latter two cases, the relationship between the *Ailia* clade and the *Horabagrus* clade is uncertain. Although molecular data estimate relationships between the taxa, results vary if different outgroup and ingroup representation is chosen, and different molecular markers and different methods of tree construction are used (Wang *et al*. 2016, fig. 1–4). Although genetic evidence provide important taxonomic information, morphological differences are still the most basic, convenient, and efficient method for identifying and classifying taxa, and cannot be abandoned. More morphological studies of the phylogenetic relationship between members of the families Schilbeidae and Ailiidae are highly recommended.

TABLE 3. Morphometric data comparison between *Clupisoma nujiangense* and *C. yunnanense.*

	C. nujiangense Chen *et al*. (8)				*C. yunnanense* (He *et al*.) (2)			
	Min	Max	Mean	SD	Min	Max	Mean	SD
SL (mm)	198.7	256.3	225.5	20.34	214.5	227.4	220.0	9.12
% standard length								
Body depth	23.6	31.0	25.8	2.5	26.2	27.8	27.0	1.1
HL	15.4	18.5	17.8	1.0	17.8	18.2	18.0	0.3
Predorsal length	21.6	31.9	28.4	3.1	30.2	30.5	30.3	0.2
Preventral length	30.3	37.1	34.7	2.2	35.8	38.0	36.9	1.5
Preanal length	39.8	48.4	45.2	2.7	47.5	50.1	48.8	1.8
Preadipose length	76.3	96.9	84.8	6.5	80.8	81.5	81.1	0.6
Caudal-peduncle length	8.4	11.0	9.7	0.8	10.9	11.2	11.0	0.2
Length of dorsal-fin base	5.4	6.7	6.2	0.5	6.0	6.9	6.5	0.6
Length of adipose-fin base	0.7	1.2	0.9	0.2	1.1	1.1	1.1	0.0
Length of anal-fin base	40.2	48.0	43.6	2.7	44.4	47.3	45.9	2.0
Length of dorsal fin	14.5	19.7	17.8	1.6	18.7	19.2	19.0	0.4
% head length								
Snout length	41.9	51.3	46.8	2.6	40.7	42.3	41.5	1.2
Head width	64.5	71.1	68.6	2.2	57.7	72.1	64.9	10.2
Head depth	71.1	83.5	77.0	4.9	69.4	78.2	73.8	6.3
Eye diameter	10.9	15.6	13.0	1.6	11.4	14.6	13.0	2.3
Mouth width	36.0	43.1	39.1	2.5	38.0	42.1	40.1	2.9
Body depth	132.7	170.6	145.2	13.2	146.6	152.2	149.4	3.9
Body depth at anus	133.4	161.5	142.9	10.0	147.6	156.1	151.9	6.1
Interorbital width	52.5	73.8	59.5	6.7	52.8	59.8	56.3	5.0
Caudal-peduncle length	49.2	60.1	54.8	3.2	61.0	61.5	61.3	0.3
Length of dorsal-fin base	29.1	39.9	34.8	3.7	32.9	38.7	35.8	4.1
Distance between dorsal-fin base and adipose-fin origin	229.3	292.6	249.7	19.9	249.2	256.6	252.9	5.2
Length of anal-fin base	218.8	269.7	246.3	16.5	243.6	265.2	254.4	15.3
Length of pelvic fin	52.4	65.2	59.3	4.6	57.4	59.1	58.3	1.2
Length of anal fin	51.7	73.4	64.3	6.3	60.4	68.6	64.5	5.8
Length of caudal fin	120.0	171.7	144.1	14.3	119.8	119.8	119.8	
Length of dorsal fin	94.3	107.8	100.2	5.3	104.8	105.5	105.2	0.5
Length of pectoral fin	97.4	117.0	108.3	5.6	107.1	107.3	107.2	0.1
% caudal peduncle length								
Caudal peduncle depth	52.2	74.2	65.5	7.4	59.8	71.6	65.7	8.4
% body depth								
Head depth	46.9	61.6	53.3	4.5	47.3	51.4	49.3	2.9

Acknowledgments

We thank Professor J.X. Yang and Experimentalist L.N. Du from Kunming Institute of Zoology, Chinese Academy of Sciences, assistance in examining specimens; thanks to Mr. Z.G. Wu from the School of Life Sciences, Yunnan University, for providing the convenience of specimen examination. This work was supported by the National

Natural Science Foundation of China (NSFC 31160419) and the First-class Discipline Construction Project-Forestry (No. 51600625).

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