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Schistura sexnubes, a new diminutive river loach from the upper Mekong basin, Yunnan Province, China (Teleostei: Cypriniformes: Nemacheilidae)

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Abstract: An ichthyofaunistic survey of Mekong tributaries in Lincang Prefecture, Yunnan Province, China yielded a new species of nemacheilid loach, herein described as *Schistura sexnubes* species nova. The new species is readily distinguishable from its congeners by the following combination of characters: 8+8 branched caudal fin rays, an incomplete lateral line, a dissociated caudal bar, a shallow caudal peduncle depth (7.6%−9.6% SL; respectively caudal peduncle 1.76−1.95 times longer than deep), a diminutive size of less than 50 mm SL, and no sexual dimorphism. A dorsocephalic pattern consisting of a black, forward directed V-shaped formation located between the nares, and a white, ovoid blotch on the upper operculum serves as an autapomorphy.

Keywords: *Schistura sexnubes*; New species; Mekong basin; Nemacheilidae; Yunnan

River loaches of the family Nemacheilidae are a typical ichthyofaunistic element of riverine environments in Southeast Asia. They preferably inhabit small and medium sized streams with swift current over rocky substratum. Evolutionarily, they are a very successful cypriniform family proven by their presence in almost every suitable biotope; there is merely a stream nemacheilid loaches do not populate. Up to six different nemacheilid species are populating suitable biotopes within the upper Mekong basin in Yunnan Province, China. Kottelat (1990: 16) reports the same number from Indochinese streams. This high number of related syntopic species reflects the availability of a variety of suitable different niches within the biotope and a high adaptation to these niches. A high niche adaptation grade minimizes evolutionary interspecific competition and maximizes the survival rate of a certain species. Among river loaches, the grade of rheophilia and substratum preference are apparently crucial factors in determining the distributional range (Endruweit, 2011).

With its remarkable hydrology and geology Yunnan province in Southwest China possesses excellent environmental conditions for the evolution of speciose fish assemblages. Although the upper Mekong basin, referred to as Lancangjiang River in China, is well known for its species richness (e.g. Zheng, Chen & Yang, 2009), to date just four species of the species-rich nemacheilid loach genus *Schistura* McClelland, 1938 sensu Zhu (1989) have been described from its basin. These are in chronological order of original description *Schistura conirostris* (Zhu, 1982), *S. latifasciata* (Zhu & Wang, 1985), *S. kloetzliae* Kottelat, 2000, and *S. bannaensis* Chen et al, 2005. Further *Schistura* species reported from the upper Mekong in China are *S. porthos* Kottelat, 2000, *S. macrocephalus* Kottelat, 2000, *S. breviceps* (Smith, 1945), *S. kengtungensis* (Fowler, 1936), *S. bucculenta* (Smith, 1945), *S. poculi* (Smith, 1945), *S. conirostris* (Zhu, 1982), and *S. pertica* Kottelat, 2000 (Zhu, 1989; Kottelat, 1990, 2001; Chen et al, 2005; Endruweit, 2011). The genus *Schistura* has degraded to a generic catch-all assemblage over time. It contains far more than one hundred valid taxa and is considered polyphylogenetic. It surely will be split up in several genera once the phylogenetic interrelationships of concerned species are better understood.

An ichthyofaunistic survey of Mekong tributaries in eastern Lincang Prefecture yielded five specimens

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belonging to a new species of the genus *Schistura,* which is described herein.

MATERIALS AND METHODS

Meristics, morphometrics and related terminology follow explanations given in Kottelat (1990). Measurements are taken point to point with a caliper and recorded to nearest 0.1 mm. Specimens were examined using a monocular Fenglin XSP-06. Location coordinates and altitudes were determined using a Global Positioning System (GPS) Garmin handheld device. Type series material was preserved in the field using 95% industrial ethanol and placed in the Kunming Institute of Zoology (KIZ), Chinese Academy of Sciences. A part of the comparative material is in the author's collection (EPC).

***Schistura sexnubes* sp. nov.**

Schistura latifasciata (nec Zhu & Wang, 1985), Chen et al, 2010: 400 (Nanzhaihe River, Mekong basin, Shuangjiang County, Yunnan, China)

Type series material

Holotype; KIZ2011000101, 33.4 mm SL; Mengmenghe River, Xiaoheijiang River subbasin, Mekong basin, Shuangjiang County, Lincang Prefecture, Yunnan Province, China; N23º33.045', E99º51.239', 1047 m a.s.l.; collected by Bisset M & Endruweit M, 2010-10-04.

Paratypes; 4 ex., KIZ2011000102-5, 28.8-37.4 mm SL; KIZ2011000103, dissected, male; same collection details as holotype; 1 ex., KIZ2005012401, 47.9 mm SL, gravid female, Nanzhaihe River, Xiaoheijiang River subbasin, Mekong basin, Mangna village, Gagao power station, Mengku Township, Shuangjiang County, Lincang Prefecture, Yunnan Province, China; N23º40.411', E99º52.142', 1152 m a.s.l.; collected by Chen XY, Pan XF & Yu GH, 2005-04-07, specimen excluded from meristics and morphometrics.

Comparative material

Schistura cryptofasciata Chen, Kong & Yang, 2005, holotype, type # KIZ20026453, database # KIZ2002009647, 60.3 mm SL; 3 ex., paratypes, type # KIZ20026454, 57, 64, database # KIZ2002009649, 51, 55, 40.2−93.5 mm SL; Nandinghe River subbasin, Salween basin, Yongde County, Lincang Prefecture, Yunnan Province, China, collected by Kong DP & Cui GH, 2002-06-12.

Physoschistura shuangjiangensis (Zhu & Wang, 1985), 7 ex., EPC1665-71, 32.7−55.2 mm SL; Xiaoheijiang River mainchannel, Mekong basin, Gengma County, Lincang Prefecture, Yunnan Province, China, collected by Bisset M & Endruweit M, 2010-10-05.

Schistura kloetzliae, 6 ex., KIZ2010003114-9, 37.1−48.8 mm SL; 10 ex., EPC1154-63, 38.8−50.6 mm SL; Nanxinghe River, Luosuojiang River subbasin, Mekong basin, Mengla County, Xishuangbanna, Yunnan Province, China, collected by Endruweit M, 2010-12-30; 1 ex., EPC0894, 39.1 mm SL; Luosuojiang River subbasin, Mekong basin, Menglun market, Mengla County, Xishuangbanna, Yunnan Province, China, collected by Endruweit M, 2010-12-30.

Descriptive details including morphometrics and meristics of *Schistura geisleri* Kottelat, 1990 and *S. spilota* (Fowler, 1934) were taken from Kottelat (1990); those of *S. diminuta* originate from Ou et al. (2011) and *S. latifasciata* from Zhu (1989).

Diagnosis

Schistura sexnubes species nova is readily identifiable by the following combination of characters: 8+8 branched caudal fin rays, an incomplete lateral line, a dissociated caudal bar, a shallow caudal-peduncle depth (7.6%−9.6% SL; respectively caudal-peduncle 1.76−1.95 times longer than deep), a diminutive size of less than 50 mm SL, and no sexual dimorphism. A dorsocephalic pattern consisting of a black, forward directed V-shaped formation located between the nares, and a white, ovoid blotch on the upper operculum serves as an autapomorphy.

Description

For selected morphometrics refer to Table 1.

Fin formula: D iv,8.5; P 11-12; V 9; A iii,5.5; C 8+8.

An elongated nemacheilid; body laterally compressed, body width at dorsal fin origin (8.0%−9.6% SL) and at anal fin origin narrow (4.5%−5.7% SL), body depth low (12.6%−14.1% SL). Pectoral fin long (20.1%−21.6% SL), but does not reach the origin of the pelvic fin; pelvic fin long (16%−18.4% SL), slightly surpassing anus, inserted slightly in front of to opposite to dorsal fin, distal margin of dorsal fin linear, caudal fin emarginated with pointed tips and lower lobe slightly longer than upper, visible in stretched fin condition (Figure 2). Axillary lobe well developed, posteriorly free. Caudal-peduncle depth shallow (7.6%−9.6% SL), without crest. Anus located 1-1.5 eye diameter in front of anal-fin origin, pre-anus length comparatively short (69.8%−72.2% SL).

Body irregularly scaled; patches with minute, cycloid scales distributed from the subdorsal area towards the peduncle, predorsal and ventral area devoid of scales. Lateral line incomplete, extension ranges from the end of the dorsal-fin base to the end of anal-fin base.

Stomach sac-shaped, large; intestines with one loop; loop does not reach stomach, creating a Z-shape (Figure 3);

Table 1 Comparison of selected morphometrics of *Schistura sexnubes* sp. nov., *S. cryptofasciata*, *Physoschistura shuangjiangensis* and *S. kloetzliae*

	Schistura sexnubes sp. nov.					*Schistura cryptofasciata*				*Physoschistura shuangjiangensis*				*Schistura kloetzliae*			
	Holotype	Paratypes; *n*=4				*n*=4				*n*=7				*n*=17			
		mean	min	max	*SD*	mean	min	max	*SD*	mean	min	max	*SD*	mean	min	max	*SD*
SL (mm)	33.4	33.1	28.8	37.4	4.0	66.2	40.2	93.5	22.2	43.6	32.7	55.2	7.5	44.3	37.1	50.6	4.1
in % SL																	
Dorsal HL	20.7	19.5	19.3	19.8	0.2	22.2	20.7	23.6	1.2	21.6	20.1	22.9	1.1	19.0	17.2	21.0	0.9
Lateral HL	22.2	21.4	20.9	21.9	0.4	24.8	23.9	25.6	0.9	23.4	21.8	24.4	1.0	20.6	19.6	22.7	0.8
Predorsal length	53.3	52.0	51.4	53.5	1.0	51.1	50.3	53.1	1.3	51.8	51.2	52.7	0.5	52.9	49.6	55.3	1.5
Head depth (at eye)	10.8	10.1	9.5	11.0	0.7	12.1	10.7	14.2	1.5	11.9	11.0	12.3	0.4	10.8	9.7	12.1	0.7
Head depth (at nape)	12.6	11.2	10.5	12.2	0.9	13.7	12.4	16.4	1.8	14.5	13.9	15.2	0.5	12.5	11.1	13.7	0.7
Body depth	14.1	13.3	12.6	13.7	0.5	17.1	14.4	19.7	2.1	18.7	17.9	20.5	0.9	16.4	13.9	21.3	2.1
Depth caudal peduncle	8.7	8.5	7.6	9.6	0.8	13.5	11.7	15.0	1.4	11.7	11.0	13.0	0.7	12.1	10.8	13.9	0.8
Head width (at nares)	7.5	7.6	7.2	8.0	0.4	13.0	10.2	15.9	2.3	10.3	9.5	13.2	1.3	9.1	7.7	10.4	0.7
Body width (dorsal origin)	9.6	8.6	8.0	9.3	0.6	15.0	12.7	17.4	2.0	13.6	12.5	15.9	1.2	13.0	10.7	15.7	1.4
Body width (anal origin)	5.7	5.1	4.5	5.6	0.5	10.3	7.7	12.3	1.9	8.6	7.4	10.4	1.0	8.1	7.0	10.0	0.9
Eye diameter	4.2	4.6	3.7	5.2	0.6	3.8	3.0	5.0	0.8	4.2	3.9	4.5	0.2	3.7	3.2	4.9	0.4
Interorbital width	5.1	5.3	4.8	5.9	0.4	7.6	7.0	8.3	0.7	8.5	8.0	9.0	0.3	6.5	5.7	7.2	0.4
in % dorsal HL																	
Body depth	68.1	68.1	64.4	71.2	3.0	77.1	61.1	87.4	11.4	86.9	78.3	92.2	5.9	86.5	69.2	109.5	11.7
Depth caudal peduncle	42.0	43.6	39.3	48.6	3.9	61.2	49.5	66.7	8.1	54.4	48.8	59.5	4.4	63.8	55.1	75.0	4.3
Length caudal peduncle	78.3	80.0	76.8	85.7	4.0	76.4	67.4	86.1	9.8	68.2	60.0	74.4	4.6	78.7	70.7	88.6	5.9
Head width (at nares)	36.2	39.0	37.3	41.1	1.9	58.7	43.2	70.4	11.5	48.0	41.3	62.9	7.6	47.7	41.0	53.8	4.3
Body width (dorsal origin)	46.4	44.3	41.1	47.1	3.0	67.9	53.7	77.4	10.7	62.9	55.8	70.9	5.1	68.2	56.0	81.5	7.4
Body width (anal origin)	27.5	25.9	23.2	28.6	2.4	46.7	32.6	54.7	10.1	40.0	33.7	46.4	4.4	42.8	36.9	50.7	3.8
Eye diameter	20.3	23.4	19.2	27.1	3.3	17.2	14.4	21.1	2.9	19.4	17.3	21.6	1.5	19.6	17.0	23.1	1.7
Interorbital width	24.6	27.3	24.7	30.4	2.3	34.4	30.5	37.9	3.2	39.5	36.0	43.2	2.6	34.4	28.2	38.1	2.6
Length pelvic fin	78.3	87.9	82.1	92.9	5.2	71.3	68.2	74.2	2.5	85.7	78.2	96.4	5.8	86.6	76.1	103.6	7.6
Length pectoral fin	101.4	108.0	102.7	111.9	3.8	82.3	78.4	87.4	4.0	102.7	93.5	112.6	7.7	105.2	94.9	116.9	6.8
Ratios																	
Dorsal HL/max head width	1.50	1.53	1.43	1.69	0.11	1.27	1.14	1.46	0.15	1.28	1.14	1.43	0.11	1.37	1.28	1.51	0.06
Body depth/body width	1.47	1.54	1.42	1.68	0.11	1.14	1.10	1.18	0.04	1.39	1.26	1.51	0.08	1.27	1.08	1.48	0.12
Head width/body width	1.44	1.49	1.40	1.70	0.14	1.18	1.14	1.27	0.06	1.26	1.10	1.39	0.09	1.08	0.91	1.26	0.10
Interorbital width/eye diameter	1.21	1.18	1.00	1.31	0.15	2.06	1.45	2.32	0.41	2.04	1.82	2.26	0.13	1.76	1.33	2.19	0.20
Length/depth caudal peduncle	1.86	1.84	1.76	1.95	0.09	1.25	1.09	1.38	0.12	1.26	1.03	1.42	0.14	1.24	1.03	1.46	0.10

Figure 1 *Schistura sexnubes* sp. nov., holotype, KIZ2011000101, 33.4 mm SL, lateral, dorsal, ventral view; scale bar=10 mm

Figure 2 *Schistura sexnubes* sp. nov., paratype, KIZ2011000104, 30.6 mm SL, lateral view, freshly dead

air bladder without free posterior chamber.

Head sharply triangular with a pointed snout when viewed dorsally (dorsal head length 1.43−1.69 times max. head width), dorsal profile of head convex when viewed laterally; head width at nares narrow (7.2%−8.0% SL; 36.2%−41.1% dorsal HL). Eyes not visible when viewed ventrally; eye diameter moderate (3.7%−5.2% SL; 19.2%−27.1% dorsal HL); interorbital width narrow (4.8%−5.9% SL; 24.6%−30.4% dorsal HL). Suborbital flap absent. Mouth inferior and moderately arched. Upper lip thick, smooth and continuous; lower lip thick, slightly furrowed and discontinuous, with a broad median concave widely exposing lower jaw axially. Upper jaw with a broad and deep processus dentiformis entirely covered by upper lip; lower jaw without median incision (Figure 4). Two pairs of rostral and one pair of maxillary barbels; all barbels short, inner rostral barbels reaching corner of mouth, outer rostral barbels clearly surpassing corner of mouth, maxillary barbels reaching vertical line through center of eye.

Largest recorded size is 47.9 mm SL (KIZ2005012401, paratype).

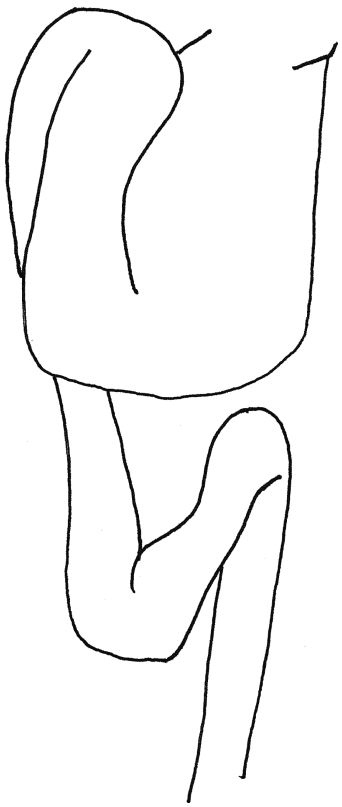

Figure 3 Gastrointestinal tract of *Schistura sexnubes* sp. nov., paratype, KIZ2011000103

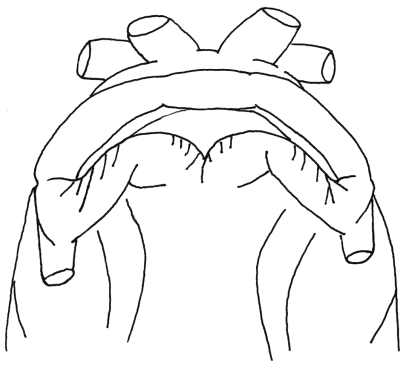

Figure 4 Mouth structure of *Schistura sexnubes* sp. nov., paratype, KIZ2011000105

Color in ethanol

A distinctive dorsocephalic pattern consisting of a black mask on whitish light gray ground; a black, forward directed V-shaped formation located between the nares; a white, ovoid blotch on the operculum; no pattern in suborbital area despite a thin margin of the cephalic mask (Figure 5). Body with 5−6 irregularly shaped saddle blotches interconnected over dorsal midline and usually somewhat vertically elongated reaching below midline of flank; in some specimens not extending over the ventral midline; usually broadest at dorsal midline.

Some saddle blotches may be dissociated into a saddle and a blotch at flank midline. Saddles in predorsal area sometimes interconnected, generally more irregular than in postdorsal area. Despite 5−6 saddle blotches there is one blotch, located on the lower half of the caudal peduncle as the posteriormost blotch before the basal caudal bar. This blotch stretches from the flank midline and reaches down to the ventral midline, interconnected over the ventral midline in large specimens (KIZ2011000102-3, paratypes). All blotches black on whitish ground coloration. Basal caudal bar dissociated into a distinctive black elongated blotch skewed upwards, upper end showing towards the head, and a smaller faint blackish blotch in the upper half, slightly skewed upwards like the lower blotch. A fine black line along flank midline from head to caudal fin base.

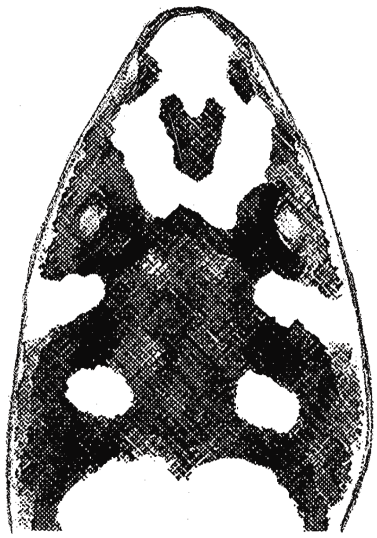

Figure 5 *Schistura sexnubes* sp. nov., dorsocephalic pattern

Dorsal fin with an anterior base spot generated by the third saddle blotch. Dorsal fin with a broad, but faint grayish submarginal band, rest of fin hyaline. Caudal fin with a faint light gray central band. Paired fins and anal fin hyaline with a whitish gloss.

Life coloration

See Figure 2 for a picture of a freshly dead specimen showing life coloration; like color in ethanol, but ground coloration of flanks and suborbital area silver; ventral area whitish beige; dorsocephalic ground coloration light brown. Dissociated caudal bar pattern with upper blotch not faint, but distinct.

Etymology

The specific epithet 'sexnubes' is Latin meaning 'six clouds'; an allusion to the color pattern of six saddle blotches, like clouds hanging down the sky; a noun in apposition.

Ecology

At the time of the visit on 2010-10-04, the Mengmenghe River was 20-30 m wide evincing an elevated water level and highly turbid water typical of the rainy season. There were no submerged plants; the bottom was covered by rocks, pebbles and sand. The biotope seemed to be adversely affected by an overhaul of the neighboring provincial road. *Schistura sexnubes* was found among rocks along the shallow shores in a water depth of 10-40 cm with moderate to fast current. Syntopic benthic species were: Nemacheilidae: *Schistura cryptofascia*ta; Sisoridae: *Glyptothorax laosensis*; Clariidae: *Clarias* sp. *Schistura sexnubes* seems to be rare at its type locality. A large batch of nemacheilids consisting of two species was obtained from this location. Around 250 specimens of nemacheilids were collected yielding only five specimens for the type series of *S. sexnubes*. All the rest were identified as *S. cryptofasciata.* The bulk of the predominant *S. cryptofasciata* was given away to locals for food. Hence, the exact number of yielded specimens is unknown.

The Nanzhaihe River, where one of the paratypes was obtained, had a water flow velocity of 0.5 m/s, 21 °C water temperature, and a pH of 5.4 on 2005-04-07 (Chen XY, pers. communication).

The elongated lower caudal fin lobe in *S. sexnubes* indicates niche preference for rapidly running waters over a richly structured bottom substratum, such as rocks and boulders. This specific caudal fin type enables a specimen to rush in high currents from one shelter (crevices between rocks) to another nearby; thereby indicating this species is rheophilous.

Distribution

Schistura sexnubes is only known from the Xiaoheijiang River subbasin, Mekong basin, Shuangjiang County, Lincang Prefecture, Yunnan Province, China (Figure 6).

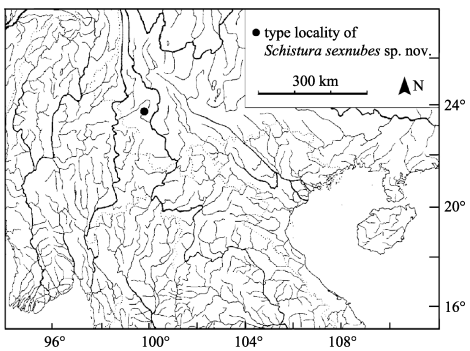

Figure 6 Type locality of *Schistura sexnubes* sp. nov.

DISCUSSION

The herein described new species *Schistura sexnubes* is readily distinguished by its unique dorso-cephalic color pattern. This autapomorphic characteristic paired with the comparatively small maximum size of less than 50 mm SL makes the species within nemacheilid loaches identifiable at first glance. Further specific characteristics are per diagnosis 8+8 branched caudal fin rays, an incomplete lateral line, a dissociated basal caudal bar and a shallow caudal-peduncle depth (7.6%−9.6% SL; respectively caudal peduncle 1.76−1.95 times longer than deep). Additionally, meristics and morphometrics (see Table 1) support proper identification.

Chen et al (2010) misidentified *Schistura sexnubes* as *S. latifasciata*. According to Zhu (1989) *S. latifasciata* is diagnosed by pectoral fin rays 9−10 (*vs*. 11−12 in *S. sexnubes*), pelvic fin rays 7−8 (*vs*. 9 in *S. sexnubes*), caudal fin rays 9+8 (vs. 8+8 in *S. sexnubes*), standard length is 5.3−6.4 times body depth (*vs*. 7.11−7.96 in *S. sexnubes*), and 3.9−4.4 times head length (*vs*. 4.84−5.19 in *S. sexnubes*), lateral head length is 5.6−7.6 times eye diameter (*vs*. 4.06−5.57 in *S. sexnubes*), interorbital width is 1.3−1.9 times eye diameter (*vs*. 1.00−1.31 in *S. sexnubes*), caudal-peduncle length is 1.1−1.3 times in caudal-peduncle height (*vs*. 1.76−1.95 in *S. sexnubes*), lateral line complete (*vs*. incomplete in *S. sexnubes*), and a broad midlateral dark stripe (*vs*. fine stripe in *S. sexnubes*).

The suborbital flap is an apomorphic character of males of species within the genus *Nemacheilus* Bleeker, 1863 sensu Zhu (1989). There is no species known in which females show this character; hence, it is considered sexual dimorphic. All five type specimens of *Schistura sexnubes* including paratype KIZ2011000103, which was dissected and identified as a male, do not possess a suborbital flap. However, the development of this apomorphic character may be seasonally induced. It may be well developed during the breeding season and in turn reduced after spawning. The breeding season is most probably linked to the beginning of the rainy season in spring providing plentiful food supply for the fry. The type material was obtained in October at the end of the rainy season, at a time when the suborbital flap should be reduced provided that it shows seasonal variation. Just one day after the type material of *S. sexnubes* was obtained, though, the mainchannel of the Xiaoheijiang River yielded *Physoschistura shuangjiangensis* specimens showing a well developed suborbital flap in males. Kottelat (1990: 90) state, that the “absence (of sexual dimorphism） is a character state difficult to use”, which should be respected for identification of loaches in general and applied for the diagnosis of *S. sexnubes* as well. *Nemacheilus shuangjiangensis* was placed in *Physoschistura* by Chen et al (2010).

The large batch size obtained from the Mengmeng-he River contained just five specimens of *Schistura sexnubes* herein used as type series material, while *S. cryptofasciata* was abundantly present in all age classes. Both species can be easily differentiated. *Schistura sexnubes* differs from *S. cryptofasciata* in having 8+8 branched caudal fin rays *vs*. 9+8, an incomplete lateral line *vs*. complete, and a smaller adult size reaching less than 50 mm SL *vs*. more than 90 mm SL. Both species also differ notably in morphometrics; lateral head length shorter (20.9%−22.2% SL in *S. sexnubes vs*. 23.9%−25.6% SL in *S. cryptofasciata*), body depth shallower (12.6%−14.1% vs. 14.4%−19.7% SL), caudal-peduncle depth shallower (7.6%−9.6% *vs*. 11.7%−15.0% SL; 39.3%−48.6% *vs*. 49.5%−66.7% dorsal HL; respectively caudal peduncle 1.76−1.95 times longer than deep *vs*. 1.09−1.38 times), head width at nares narrower (7.2%−8.0% *vs*. 10.2%−15.9% SL; 37.3%−41.1% *vs*. 43.2%−70.4% dorsal HL), body width narrower (at dorsal origin: 8.0%−9.3% *vs*. 12.7%−17.4% SL, 41.1%−47.1% *vs*. 53.7%−77.4% dorsal HL; at anal origin: 4.5%−5.7% *vs*. 7.7%−12.3% SL, 23.2%−28.6% *vs*. 32.6%−54.7% dorsal HL), and interorbital width narrower (4.8%−5.9% *vs*. 7.0%−8.3% SL; 24.6%−30.4% *vs*. 30.5%−37.9% dorsal HL; respectively interorbital width 1.00−1.31 times eye diameter vs. 1.45−2.32 times). These striking differences rule out that *S. sexnubes* are juvenile *S. cryptofasciata*, as in the case of the former *S. cryptofasciata* was originally described from Lincang Prefecture, but from the adjacent Salween basin. This is the first record from the Mekong basin. Another nemacheilid occurring in both basins in this region is *Schistura poculi* (Smith, 1945).

Schistura sexnubes differs from sympatric *Physoschistura shuangjiangensis* in having 8+8 branched caudal fin rays vs. usually 9+8, an incomplete lateral line vs. complete, and in suborbital flap absent vs. present. In terms of morphometrics both species differ in head depth shallower (at eye: 9.5%−11.0% SL in *S. sexnubes vs*. 11.0%−12.3% SL in *P. shuangjiangensis*; at nape: 10.5%−12.6% *vs*. 13.9%−15.2% SL), body depth shallower (12.6%−14.1% *vs*. 17.9%−20.5% SL), caudal-peduncle depth shallower (7.6%−9.6% *vs*. 11.0%−13.0% SL; 39.3%−48.6% *vs*. 48.8%−59.5% dorsal HL; respectively caudal-peduncle 1.76−1.95 times longer than deep *vs*. 1.03−1.42 times), head width at nares narrower (7.2%−8.0% *vs*. 9.5%−13.2% SL; 36.2%−41.1% *vs*. 41.3%−62.9% dorsal HL), body width narrower (at dorsal origin: 8.0%−9.6% *vs*. 12.5%−15.9% SL, 41.1%−47.1% *vs*. 55.8%−70.9% dorsal HL; at anal origin: 4.5%−5.7% *vs*. 7.4%−10.4% SL, 23.2%−28.6% *vs*. 33.7%−46.4% dorsal HL), and interorbital width narrower (4.8%−5.9% *vs*. 8.0%−9.0% SL; 24.6%−30.4% *vs*. 36.0%−43.2% dorsal HL; respectively interorbital width 1.00−1.31 times eye diameter *vs*. 1.82−2.26 times).

These considerable differences in meristics and morphometrics rule out the possibility that *S. sexnubes* are juveniles of *P. Shuangjiangensis*.

Phenotypically, *Schistura sexnubes* most closely resembles *S. kloetzliae* Kottelat, 2000, a rheophilous species, which is very common in suitable habitats throughout the Nanlahe River and Luosuojiang River subbasins, Mekong basin, Yunnan Province, China (Endruweit, 2011). The holotype of *S. kloetzliae* (NRM 33199) was obtained from Mengla market, which is within the Nanlahe River subbasin. According to Kottelat (2000) this species also occurs southwards within the Mekong basin in Louangnamtha Province, Laos. Although both species occur in the same basin their distributional ranges do not overlap. *S. sexnubes* and *S. kloetzliae* share 8+8 branched caudal fin rays, and a dissociated basal caudal bar as common characters. In the former species the lateral line is incomplete, but may reach the end of anal fin base, while it is complete or incomplete reaching at least the origin of the anal fin in the latter. Hence, the little overlap in the lateral line extension does not serve to tell these species apart. Morphometrically, *S. sexnubes* can be distinguished from *S. kloetzliae* by body depth deeper (1.42−1.68 *vs*. 1.08−1.48 times body width), head wider (1.40−1.70 *vs*. 0.91−1.26 times body width), interorbital width narrower (1.00−1.31 *vs*. 1.33−2.19 times eye diameter), and caudal-peduncle length longer (1.76−1.95 *vs*. 1.03−1.46 times caudal-peduncle depth). Furthermore, *S. sexnubes* possesses a basic color pattern of 5−6 irregularly shaped black saddles and a black blotch restricted to the lower half of the caudal-peduncle in front of the basal caudal bar over whitish ground coloration while *S. kloetzliae* have a series of black midlateral blotches, usually interconnected with irregular blotches at dorsal midline and a black bar on the caudal-peduncle in front of the basal caudal bar over beige ground coloration.

Schistura sexnubes shares with *S. geisleri* Kottelat, 1990 the dissociated basal caudal bar, the shallow caudal peduncle depth, and the diminutive size of less than 50 mm SL. *S. sexnubes* can be distinguished from *S. geisleri* by having 8+8 vs. 9+8 branched caudal fin rays and the absence of sexual dimorphism vs. presence sexual dimorphism. Males of *S. geisleri* possess a distinctive hammer-shaped suborbital flap and thickened first branched pectoral fin ray. Furthermore, *S. sexnubes* differs from *S. geisleri* in head length shorter (dorsally: 19.3%−20.7% *vs*. 21.2%−23.5% SL; laterally: 20.9%−22.2% *vs*. 22.2%−24.9% SL), head depth shallower (at eye: 9.5%−11.0% *vs*. 11.0%−12.9% SL; at nape: 10.5%−12.6% *vs*. 12.7%−15.1% SL), body depth shallower (12.6%−14.1% *vs*. 15.2%−22.0% SL), body width at anal fin origin narrower (4.5%−5.7% *vs*. 6.3%−10.1% SL), eye diameter smaller (3.7%−5.2% *vs*. 5.2%−7.1% SL), and interorbital width narrower (4.8%−5.9% *vs*. 5.9%−7.5% SL). *S. geisleri* is distributed over upper reaches of the Chao Phraya River basin, Thailand and small drainages in peninsular Thailand. Its range does not overlap with those of *S. sexnubes*.

Schistura spilota (Fowler, 1934) is also distributed within the upper reaches of the Chao Phraya River basin and shares with *S. sexnubes* the dissociated caudal bar. *S. sexnubes* is readily distinguishable from *S. spilota* by having 8+8 *vs*. 9+8 branched caudal fin rays, lateral line incomplete *vs*. complete, size smaller (less than 40 mm SL vs. reaching at least 88 mm SL), predorsal length longer (51.4%−53.5% v*s*. 46.8%−50.4% SL), body depth shallower (12.6%−14.1% *vs*. 15.1%−17.8% SL), caudal-peduncle depth shallower (7.6%−9.6% *vs*. 10.2%−13.9% SL; respectively caudal-peduncle 1.76−1.95 *vs*. 1.25-−1.53 times longer than deep), head width at nares narrower (7.2%−8.0% *vs*. 9.4%−13.4% SL), body width at dorsal fin origin narrower (8.0%−9.6% *vs*. 9.9%−12.9% SL). Neither species possesses sexual dimorphism.

Ou et al (2011) described *Schistura diminuta* from five specimens obtained from the Sekong River, lower Mekong basin, Stung Treng Province, northern Cambodia. With mature individuals featuring a largest recorded size of 19.5 mm SL (paratype, IFReDI, uncat.), *S. diminuta* is considered the smallest species within its genus. The new species *S. sexnubes* possesses a basal caudal bar dissociated into two black blotches, while *S. diminuta* has a pattern reduced to one central, black, ovoid blotch. Apart from the adult size and basal caudal bar pattern there are meristic and morphometric differences; *S. sexnubes* differs from *S. diminuta* in having 8+8 branched caudal fin rays vs. 7+7, body more slender (body width at dorsal fin origin: 8.0%−9.6% *vs*. 12.8%−14.7% SL; at anal fin origin: 4.5%−5.7% *vs*. 6.1%−8.3% SL), and interorbital width narrower (4.8%−5.9% vs. 6.6%−7.2% SL). Although both species occur within the same basin, their distributional ranges do not overlap. With a linear distance of more than 1200 km between the two type localities, these species can surely be considered allopatric.

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