

Schistura udomritthiruji, a new loach from southern Thailand (Cypriniformes: Nemacheilidae)

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Schistura udomritthiruji, new species, is described from streams draining to the Andaman Sea in southern Thailand between Takua Pa and Ranong. It is distinguished from congeners by the following characters: dark bars on the body much thinner in the anterior half of the body than in the posterior half; 9+8 branched rays in the caudal fin; males with suborbital flap; lateral line ends above base of anal fin; caudal fin hyaline and dark bars on posterior half of body more than twice as wide as interspaces.

Introduction

The genus *Schistura* is the largest genus within the family Nemacheilidae, containing at present about 190 nominal species. They are typically found amongst stones in moderately to fast flowing streams and rivers in foothill to mountainous habitats. The distribution area of the genus stretches from the Near East through the Indian subcontinent until Vietnam and southern China (Bănărescu, 1991). Except *S. maculiceps* from the Kapuas basin on Borneo, the southern margin of the distribution area is in the northern Malay Peninsular, from where two species, *S. geisleri* and *S. robertsi*, were reported. In recently collected material from southern Thailand we found a species of *Schistura* that is new to science and is described below.

Material and methods

The specimens were either fixed in 4 % formaldehyde and later transferred into 70 % ethanol for storage (ZRC 51724, ZRC 51725) or fixed and stored in 96 % pure ethanol (IAPG A2546-2552, A2455-2459, A1129-1131, A1780, CMK 21704, CMK 21705). All measurements and counts follow Kottelat (1990). Measurements were made point-to-point with dial callipers to the nearest 0.1 mm. Drawings were done using a camera lucida on an Olympus SZX7 stereomicroscope. Collection abbreviations: CMK, Collection of Maurice Kottelat, Cornol, Switzerland; IAPG, Institute of Animal Physiology and Genetics, Laboratory of Fish Genetics, Liběchov, Czech Republic; ZRC, Zoological Reference Collection, Raffles Museum of Biodiversity Research, Department of Biological Sciences, National University of Singapore, Singapore.

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Fig. 1. *Schistura udomritthiruji*, IAPG A2546, 40.1 mm SL; Thailand: Ranong Prov.: stream at Kapoe.

***Schistura udomritthiruji*, new species**
(Figs. 1-2)

Holotype. ZRC 51724, 35.3 mm SL; Thailand: Ranong Prov.: small stream draining into Andaman Sea upstream of Kapoe; 09°34'14"N 98°41'40"E; J. Bohlen & V. Šlechtová, 6 Apr 2007.

Paratypes. ZRC 51725, 35, 24.4-47.8 mm SL; same data as holotype. – IAPG A2546-2552, 7, 25.7-38.8 mm SL; same data as holotype. – IAPG A2455-2459, 4, 28.5-32.2 mm SL; Thailand: Phang Nga Prov.: Takua Pa R., ca 10 km upstream of Takua Pa; 08°46'1540"N 98°26'1340"E; J. Bohlen & V. Šlechtová, 5 Apr 2007.

Additional material (non-types). IAPG A1129-1131, 3, 31.8-32.7 mm SL; CMK 21704, 2, 32.2-33.7 mm SL; Thailand: Phang Nga Prov.: surrounding of Takua Pa; IAPG A1780, 1, 39.3 mm SL; CMK 21705, 1, 39.7 mm SL; Thailand: Phang Nga Prov.: no further data.

Diagnosis. *Schistura udomritthiruji* belongs to a group of *Schistura* in which the predorsal dark bars are much thinner than the posterior ones. It is distinguished from all other species in this group by the combination of the following characters: 9+8 branched rays in the caudal fin; males with suborbital flap, females without flap; lateral line ends above base of anal fin; caudal fin hyaline; and bars on posterior half of body more than twice as wide as interspaces.

Description. See Figures 1 and 2 for general appearance and Table 1 for morphometric data of holotype and 14 paratypes. A relatively small

nemacheiline loach with moderately elongated body. Body anteriorly slightly compressed, caudal peduncle compressed. Maximum body depth between pectoral-fin base and dorsal-fin origin. Head with increasing width between mouth and end of opercle. Depth of caudal peduncle 1.0-1.1 times in its length. Axillary pelvic lobe present and free. No adipose crest on dorsal or ventral midline of caudal peduncle. Largest known size 47.8 mm SL.

Dorsal fin with three or four simple and 8½ branched rays. Anal fin with three simple and 5½ branched rays, not reaching caudal-fin base. Caudal fin with 9+8 branched rays, deeply forked, lobes rounded. Pelvic fins with 6 branched rays; origin under branched dorsal-fin ray 1-2; reaching slightly beyond half of distance to anal-fin origin; not reaching anus. Pectoral fin with 9 branched rays, reaching slightly behind half of distance between bases of pectoral and pelvic fins.

No scales on body in front of dorsal-fin except one row below and above lateral line; no scales on body in front of anal-fin base below lateral line except few irregular rows of scales. Lateral line ending above anal-fin base, with 61-74 pores. Cephalic lateral line system with 6 supraorbital, 4+10 infraorbital, 9 pre-operculo-mandibular and 3 supratemporal pores. Lips and barbels covered with unculi.

Anterior nostril pierced in front side of a flap-like tube, with a low anterior rim. Mouth about twice as wide as long (Fig. 3a). Processus denticiformis present, lips thick. Upper lip with a well-marked median incision and small furrows on its whole length. Lower lip with a median interrup-

tion and on each side 5-9 long furrows followed by smaller ones. Inner rostral barbel reaching corner of mouth, outer ones reaching to base of maxillary barbel, maxillary barbel reaching vertical through posterior rim of eye. Intestine with a sharp turn at stomach-outlet and a bend at some distance behind stomach (Fig. 3b).

Suborbital flap in males round or triangular.

Sexual dimorphism. Males with suborbital flap (absent in females). Smallest male specimen with distinct suborbital flap 29.3 mm SL. No sexual dimorphism in thickness or length of second branched pectoral-fin ray.

Coloration. Ground colour in freshly preserved specimens white to yellowish. Top of head dark grey or mottled; lips and rostral barbels with scattered black pigment cells. Body with 7-9 dark grey bars reaching ventrally at least to level of pectoral-fin base. Pre-dorsal bars usually divided vertically while still connected dorsally. With

increasing size, also post-dorsal bars divided until nearly all bars are divided. However, division always most pronounced in the pre-dorsal bars. A light blotch sometimes present inside dorsal part of bars. In some specimens pre-dorsal bars restricted to dorsal saddles. In interspaces of between first three bars, 1-7 narrow additional bars may appear along lateral midline. Bars under and behind base of dorsal-fin at least twice as wide as interspaces. In some specimens, pre-dorsal ground colour nearly as dark as bars, making bars difficult to observe (Fig. 2b). Black bar at base of caudal fin, interrupted by a light zone; ventral part of bar about double length of dorsal part of bar. Rays of all fins with some black pigmentation, especially at point of first branching in dorsal, caudal and anal fins, forming an indistinct row of dots in these fins. Distal half of last unbranched dorsal-fin ray black. Base of dorsal fin dark grey above body bars and hyaline above interspaces, giving impression of dark grey body bars extending on base of dorsal fin.

Table 1. Morphometric data of holotype and 14 paratypes of *Schistura udomritthiruji*.

	holotype	range	mean	SD
Standard length (mm)	35.3	30.6-47.8	37.5	
In percent of standard length				
total length	125.2	121.6-125.7	124.4	1.2
dorsal head length	19.8	18.9-21.5	20.2	0.9
lateral head length	23.5	21.5-23.4	22.2	0.6
predorsal length	53.0	49.2-53.5	51.8	1.2
pre-pelvic length	53.8	52.2-54.4	53.2	0.8
pre-anus length	68.6	66.9-74.6	70.9	2.1
preanal length	80.7	77.6-81.4	79.4	1.3
head depth at eye	10.5	9.8-10.8	10.2	0.3
head depth at nape	13.3	12.4-13.9	12.9	0.4
body depth	15.6	15.3-17.9	16.6	0.8
depth of caudal peduncle	12.7	11.8-13.8	12.8	0.6
length of caudal peduncle	13.0	12.0-14.0	13.4	0.5
snout length	7.6	7.1-9.0	8.1	0.6
head width at nares	8.5	7.5-9.0	8.4	0.4
maximum head width	14.4	13.0-14.6	14.0	0.5
body width at dorsal-fin origin	12.5	11.7-13.4	12.6	0.6
body width at anal-fin origin	7.6	6.1-7.7	7.0	0.5
eye diameter	4.5	4.1-5.5	4.6	0.4
interorbital width	6.2	5.1-6.5	5.8	0.4
height of dorsal fin	14.2	13.5-16.5	14.6	1.0
length of upper caudal-fin lobe	22.1	20.8-23.8	22.1	0.8
length of median caudal-fin ray	13.0	11.5-15.3	13.3	1.0
length of lower caudal-fin lobe	24.4	22.9-26.0	24.0	1.0
depth of anal fin	16.7	13.2-16.9	15.9	1.0
length of pelvic fin	16.7	15.3-17.9	16.5	0.8
length of pectoral fin	19.3	17.1-21.5	18.9	1.2



Fig. 2. *Schistura udomritthiruji*; a, ZRC 51724, holotype, male, 35.3 mm SL; Thailand: Ranong Prov.: stream at Kapoe; b, IAPG A2455, paratype, male, 28.5 mm SL, Thailand: Phang Nga Prov.: River Takua Pa.

Habitat. The type locality of *S. udomritthiruji* at time of sampling (late dry season in April 2007) was a stream up to 8 m wide, but the riverbed would allow a 20 m wide river at high water level. The stream includes calm stretches, depressions (up to 1 m deep) as well as riffles (Fig. 4). All specimens of *S. udomritthiruji* were collected in the riffle section. The substrate in the riffle was gravel with few larger stones, and the maximum

water depth was 40 cm. Other fish species present were: *Schistura robertsi* (Nemacheilidae), *Homaloptera smithi* (Balitoridae), *Akysis pulvinatus* (Akysidae), *Hara filamentosa* (Erethistidae), *Mastacembelus armatus* (Mastacembelidae), and an unidentified goby (Gobiidae). At the time of sampling (late afternoon, cloudy day) the clear water had a temperature of 29.3 °C and a pH around 8.

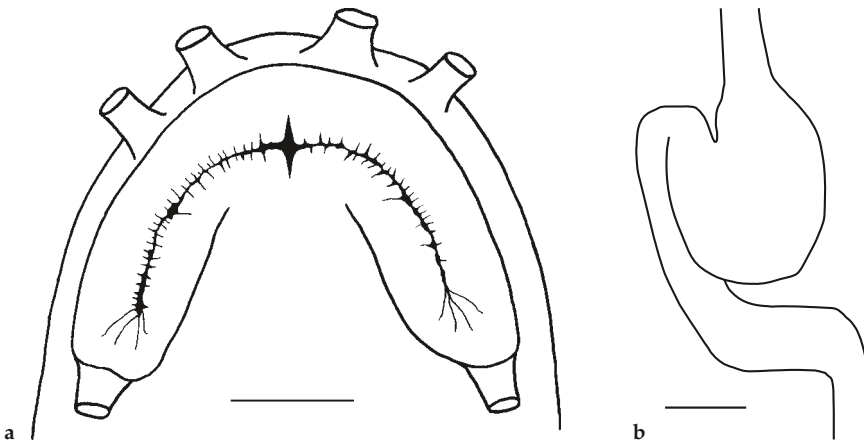


Fig. 3. *Schistura udomritthiruji*, ZRC 51725, 29.1 mm SL; a, mouth; b, digestive tract. Scale bars 1 mm.



Fig. 4. Stream above Kapoe, Ranong Prov., Thailand; view downstream and to the west. Type locality of *Schistura udomritthiruji* and of *Akysis pulvinatus*. Most specimens of type series of *S. udomritthiruji* were collected in the riffle in left foreground.

Distribution. Presently known only from two streams flowing into the Andaman Sea in southern Thailand between Takua Pa and Ranong (Fig. 5).

Ethymology. The species is named for Kamphol Udomritthiruj, who provided the first specimens and supported many of our projects.

Remarks. Kottelat (1990, 2000) provided the most comprehensive studies on Indochinese Nemacheilidae, including the genus *Schistura*. Using his identification key, *S. udomritthiruji* would belong to a group of species in which the bars on the body are much thinner in the anterior half of the body than in the posterior half. This group includes *S. bella*, *S. mahnerti*, *S. poculi*, *S. vinciguerrae* and potentially *S. paucicincta*. According to Jayaram (1981) and Vishwanath & Kongbrailatpam (2004), *S. multifasciata* and *S. reticulata* from northeast India also belong to this group. *Schistura udomritthiruji* differs from *S. paucicincta*, *S. poculi* and *S. reticulata* by having 9+8 branched caudal-fin rays (vs. 8+7). It differs from *S. paucicincta* and

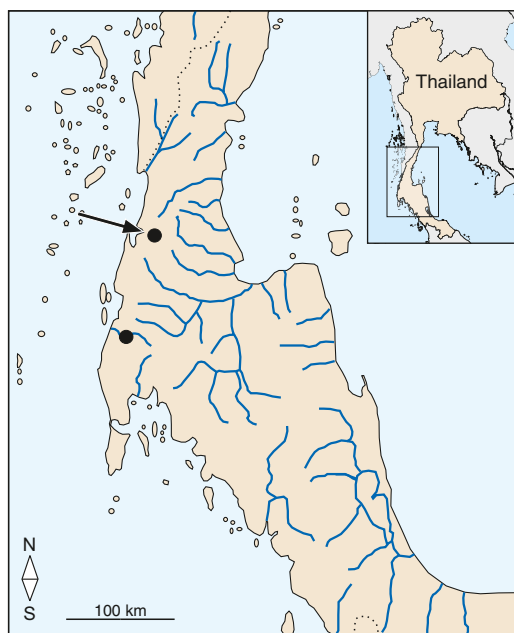


Fig. 5. Distribution of *Schistura udomritthiruji* in southern Thailand. Arrow indicates type locality.

S. vinciguerrae by the presence of a suborbital flap in males (vs. absence); from *S. mahnerti*, *S. multifasciata* and *S. bella* by the incomplete lateral line ending above the base of the anal fin (vs. complete). *Schistura udomritthiruji* further differs from *S. mahnerti*, *S. poculi* and *S. vinciguerrae* by having the dark bars on the posterior half of the body more than twice as wide as the interspaces (vs. at most as wide as interspaces). Additionally, it differs from *S. mahnerti* by having a hyaline caudal fin (vs. red) and from *S. bella* by the absence of a whitish stripe on the dorsal half of caudal peduncle (vs. presence). *Schistura udomritthiruji* differs further from *S. multifasciata* by the absence of four or more distinct vertical bars on the caudal fin (vs. presence) and from *S. reticulata* by having fewer bars on the body (7-9 vs. 17-29). Two species of *Schistura* are known from the Malay Peninsula: *S. geisleri* and *S. robertsi*. *Schistura udomritthiruji* differs from *S. robertsi* by having a longer lateral line (reaching at least to anal-fin base, vs. reaching to pelvic-fin base), by the presence of a suborbital flap in males (vs. absence), by the anterior nostril not reaching eye (vs. terminated by a filament reaching to middle of eye), and by the presence of an axillary pelvic lobe (vs. absence). *Schistura udomritthiruji* differs from *S. geisleri* by the shape of the suborbital flap in males (round or triangular vs. hammer-shaped), by having the first branched pectoral-fin ray equally thick in males and females (vs. thickened in males). Further, the colour pattern of *S. geisleri* is very distinctive: a whitish background with a midlateral row of 5-8 black blotches and a mid-dorsal row of 6-8 saddles (vs. bars in *S. udomritthiruji*).

Comparative material. *Schistura bella*: IAPG A1172-1179, 8; Thailand: Chiang Mai Prov.: River Mae Nam Fang.

S. geisleri: IAPG A1237-1269, 33; Thailand: Chiang Mai Prov.: River Mae Nam Taeng.

S. mahnerti: IAPG A0800-0803, 4; Thailand: Mae Hong Son Prov.: Mae Nam La Luang.

S. poculi: IAPG A0828-0832, 5; Thailand: Mae Hong Son Prov.: Mae Nam La Ka. – IAPG A0960-0969, 10; Thailand: Chiang Mai Prov.: Doi Chiang Dao. – IAPG A1276-1281, 6; Thailand: Chiang Mai Prov.: Doi Inthanon.

S. robertsi: IAPG A2424-2427, 4; Thailand: Phang Nga Prov.: stream coming from Sri Phang Nga National Park. – IAPG A2553, 1; Thailand: Ranong Prov.: stream draining into Andaman Sea upstream of Kapoe. – IAPG A2445-2453, 9; Thailand: Phang Nga Prov.: small forest stream NW of Phang Nga.

S. vinciguerrae: IAPG uncat., 1; Myanmar: Kachin state: surrounding of Putao.

Acknowledgements

First of all, we are grateful to Kamphol Udomritthiruj for the first specimens of the new species and for his continuous support during our work on Southeast Asian fishes. Further thanks to Jörg Freyhof and especially Maurice Kottelat for their highly valuable advices on the manuscript. This study was financed by grants 206/08/0637 and 206/05/2556 of the Czech Science Foundation, No A600450508 of the Grant Agency of the Academy of Sciences of the Czech Republic, No. MSM6007665801 of University of South Bohemia, No. 27788 of Ministry of Education, Youth and Sports FRVŠ, by the IRP IAPG No. AV0Z50450515 and the Biodiversity Research Centre LC 06073.

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Received 20 January 2009

Revised 4 November 2009

Accepted 5 January 2010