FishTaxa (2016) 1(2): 89-93
ISSN: 2458-942X
Journal homepage: www.fishtaxa.com

Article

Re-examination of the type series of *Parazacco spilurus* (Teleostei: Cyprinidae)

Taiki ITO*, Kazumi HOSOYA

Program in Environmental Management, Graduate School of Agriculture, Kindai University, 3327-204 Nakamachi, Nara 631-8505, Japan.
Corresponding author: E-mail: qqx36bd@gmail.com

Abstract

The genus *Parazacco* comprises two species viz. *P. spilurus* and *P. fasciatus*. The division of the genus into two distinct species that was maybe not warranted caused by the lack of clarity and incomplete data in previous descriptions of syntypes of *P. spilurus*. Therefore, we re-examined, redescribed, and illustrated the external morphology of syntypes of *P. spilurus*, type species of the genus. The syntypes were found to be smaller in body size than that of specimens observed in the original description of *P. fasciatus*, the conclusions are that the two species are not distinct and recommend that they be put under one species name, *P. spilurus*, although further study is recommended.

Keywords: *Aspius spilurus*, Northern Vietnam, Opsariichthines, Southern China.
Zoobank: urn:lsid:zoobank.org:pub:3DE57D37-0D8B-42FE-9AE1-35EA389D27FE

Introduction

The cyprinid fish genus *Parazacco* Chen, 1982 comprises two species viz. *Parazacco spilurus* (Günther 1868) and *P. fasciatus* (Koller 1927) distributing in mountain streams (Chen and Chu 1998; Yue and Chen 1998; Kottelat 2013). *Parazacco spilurus* distributes in the Pearl River system and *P. fasciatus* in the Hainan Island and northern Vietnam (Chen 1982; Kottelat 2013).

Parazacco spilurus was originally described as *Aspius spilurus* based on five specimens from Hong Kong, China, without type designation. This species is important for taxonomic study as type species of the genus *Parazacco*, since Günther's (1868) description was brief without any illustration. *Parazacco fasciatus* was described as a subspecies of *A. spilurus* based on 14 specimens from Hainan Island, China, by Koller (1927). Later ichthyologists considered the Hainan Island population as a subspecies, *P. spilurus fasciatus* (Chen 1982; Kuang 1986; Chen and Chu 1998). However, Kottelat (2001, 2013) treated this subspecies as a distinct species, *P. fasciatus* without providing any evidence. In light of the confusion regarding the identity of *P. spilurus* and its relevance to the classification of *P. fasciatus*, it is necessary to redescribe the type series since the detailed information of the type series of *P. spilurus* has not been provided. Therefore, we re-examined the morphological characteristics of the syntypes of *P. spilurus*.

Material and Methods

Counts and measurements followed Hubbs and Lagler (2004), except for the vertebral counts, which followed Hosoya (1983). The vertebrae were counted from radiographs, and the first four vertebrae were included as Weberian apparatus and one fused vertebra of the hypural complex. The lateral line scale counts did not include scales on the caudal fin base. The last two rays of the dorsal and anal fins were counted as one. Our methods for observation of the cephalic lateral line systems follow Fujita and Hosoya (2005). The terminology follows Arai and Kato (2003), with additional reference to Fujita and Hosoya (2005) as well.

The examined specimens of this study were deposited in the Natural History Museum, London (BMNH). The syntypes of *P. spilurus* were registered in BMNH under the catalogue number 1956. 2. 25. 1-5. The running number 1-5, however, has not been allocated to individual specimens. Here, we formally allocate the number to each specimen (see Fig. 1 and Table 1).

Accepted: 27 January 2016; Published: 1 February 2016 DOI: http://dx.doi.org/10.7508/fishtaxa.2016.02.004

Results

Parazacco spilurus (Günther 1868)

English name: Predaceous Chub

(Fig. 1)

Aspius spilurus: Günther, 1868: 311.

Zacco spilurus: Bănărescu, 1968: 308; Mai, 1978: 127.

Parazacco spilurus spilurus: Chen, 1982: 294; Chen and Chu, 1998: 38.

Parazacco spilurus: Kottelat, 2001: 35; Kottelat, 2013: 140.

Description (Fig. 1 and Table 1)**:** Body moderately elongated and compressed. Head triangular in lateral view, compressed, length slightly greater than body depth; mouth wide with large gape; maxillary oblique and extended above anterior eye margin; front edge of the lower jaw prominent. No maxillary barbels; snout length 27.8-33.2 %head length (HL), anterior tip of snout pointed; interorbital width 0.8-1.0 times of the orbit diameter and 29.0-37.5 %HL; cheek narrow; eye large, in medial position. Opercle posteriorly roundish. Body depth 1.6-2.1 times of the body width and 21.3-24.5 %SL. Dorsal fin small, with origin behind ventral insertion; anal fin parallelogram shaped; caudal fin sharply forked. Ventral keel present from pelvic to anal fin.

Dorsal-fin rays iii,7, anal-fin rays iii,11-12, pectoral-fin rays i,12-14, pelvic–fin rays i,7-8 and Caudal-fin rays i,9,8,i. Lateral line complete, lateral line scales rows 44-46. Scale row from lateral line to dorsal-fin origin 9-10, from lateral line to anal-fin origin 3-4. Scales from dorsal-fin origin and occipital 19-22. Abdominal vertebrae 20-21; caudal vertebrae 20, total vertebrae 40-41.

Cephalic lateral line system well-developed (Fig. 2); composed of the following sensory canals and externally visible pores: infraorbital canal (IO) with 10 pores; preoperculomandibular canal (POM) with 13-15 pores; supraorbital canal (SO) with 8 pores; supratemporal canal (ST) with 2-3 pores; temporal canal (TC) with 3-5 pores. The SO with well-developed parietal branch; disjunct from the IO and TC. The POM terminating along posterior edge of preopercle, approximately midway along vertical arm of bone; disjunct from the TC. Right and left ST typically separate in all syntypes. The IO connected with the TC in two specimens, BMNH 1956. 2. 25. 1-2, but separation between the IO and TC was observed in three specimens, BMNH 1956. 2. 25. 3-5.

Color (in 70% ethanol): body is uniformly dark brownish (Fig. 1).

Remarks: The original description of the number of pharyngeal teeth by Günther (1868) might be based on BMNH 1956. 2. 25. 1 (Fig. 1 a), because the opercular region on the right side of only this specimen was dissected. We did not examine the pharyngeal tooth of other specimens to ensure specimen preservation.

Koller (1927) noted four diagnostic characters between *P. spilurus* and *P. fasciatus* (treated as *A. s. fasciatus* by the author) when referring to the original description of *P. spilurus* by Günther (1868). We reconfirmed that the syntypes of *P. spilurus* differ from the original description of *P. fasciatus* by having a more slender body (17.9-19.3 vs. 25 %Total Length (TL)), small head (23.7-25.0 vs. 28 %TL), and shorter snout (27.8-36.3 vs. 35.7-43.4 %HL). In addition, Koller (1927) noted another diagnostic character: a round dark brownish mark at the base of the caudal fin (vs. absent in *P. fasciatus*). Although Günther (1868) described a round dark brownish mark at the base of the caudal fin, the body color of all the syntypes has now faded (Fig. 1). The morphometric differences pointed out by Koller (1927) are unsuitable or questionable as diagnostic characters, because the syntypes of *P. spilurus* have smaller body sizes (37-56 mm TL) than those examined by Koller (1927) (90-140 mm TL). Allometric growth seems to be affected by their morphological differences (see Bookstein et al. 1985). Hence, it would be premature to treat *P. fasciatus* as a distinct species. We tentatively treat *P. fasciatus* as a subspecies of *P. spilurus*, although further morphological and genetic studies are required.

Material examined: *Parazacco spilurus*: BMNH 1956. 2. 25. 1-5, five specimens, 28.96-44.52 mm standard length (SL), inland mountainous region of Hong Kong, China.

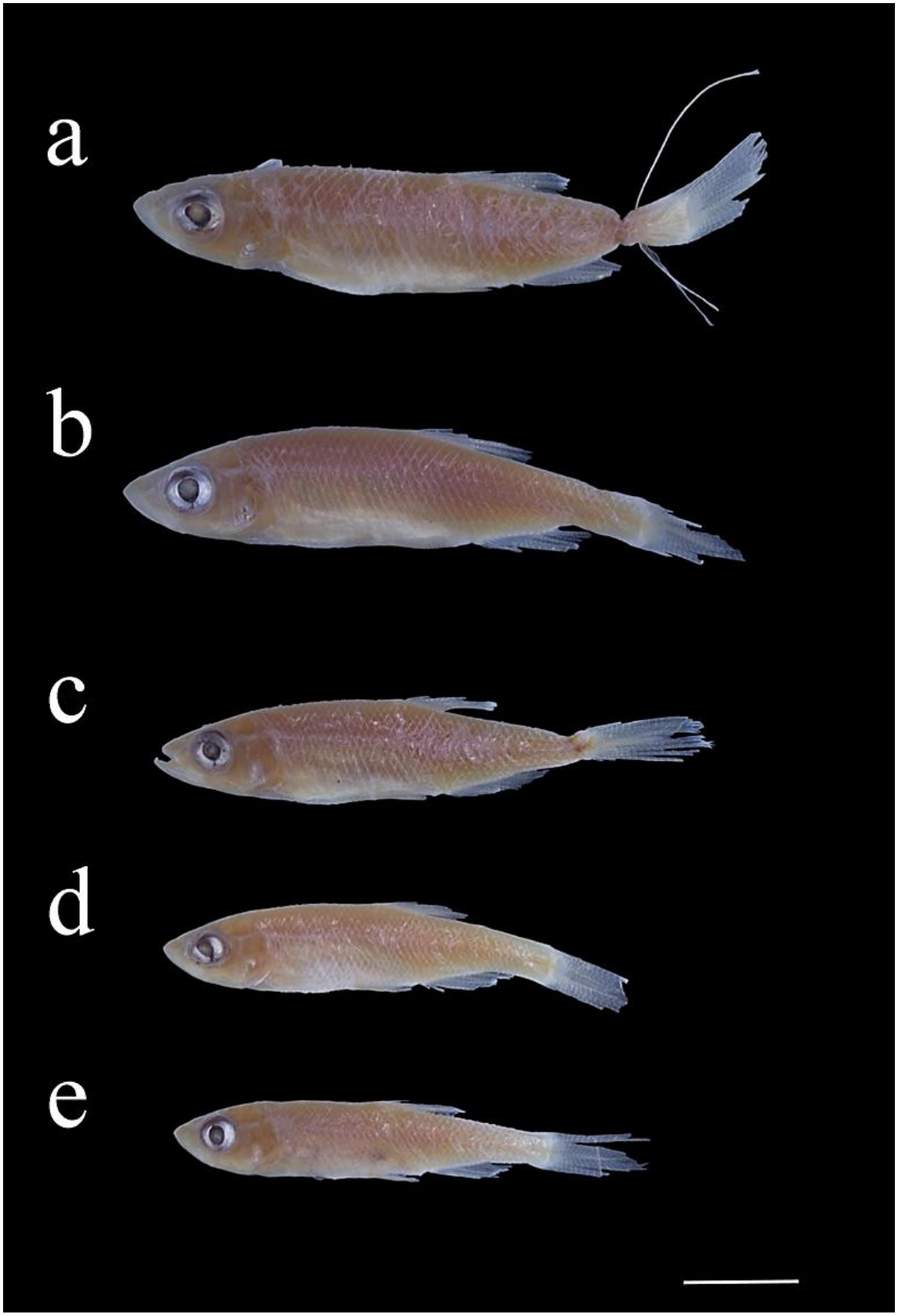

Figure 1. Type series of *Parazacco spilurus* (Günther 1868). (a) BMNH 1956. 2. 25. 1, 44.52 mm standard length (SL), (b) BMNH 1956. 2. 25. 2, 43.09 mm SL, (c) BMNH 1956. 2. 25. 3, 33.48 mm SL, (d) BMNH 1956. 2. 25. 4, 31.84 mm SL, and (e) BMNH 1956. 2. 25. 5, 28.96 mm SL (scale bar=10 mm).

Table 1. Measurements expressed as percentage, and counts of the syntypes in *Parazacco spilurus*.

Catalogue number	BMNH 1956. 2. 25. 1	BMNH 1956. 2. 25. 2	BMNH 1956. 2. 25. 3	BMNH 1956. 2. 25. 4	BMNH 1956. 2. 25. 5
Measurements					
Total length (mm)	55.77	54.08	46.57	40.55	37.44
Standard length (mm)	44.52	43.09	33.48	31.84	28.96
As % of standard length					
Head length	31.4	30.6	32.9	31.7	31.7
Head depth	18.0	18.8	20.1	20.3	20.5
Body depth	24.0	23.8	24.5	22.8	21.3
Body width	12.9	14.0	11.5	13.9	10.4
Depth of caudal peduncle	–*	8.3	–*	10.0	8.5
Length of caudal peduncle	17.0	15.6	19.0	15.8	19.7
Predorsal length	60.0	58.3	61.4	59.8	58.9
Preanal length	72.5	70.9	74.1	67.4	73.8
Preventral length	56.6	50.9	55.0	48.9	54.4
Dorsal origin to caudal base	43.0	48.0	47.6	41.9	44.7
Pectoral origin to pelvic insertion	29.3	24.3	24.9	23.7	23.3
Length of longest dorsal ray	27.1	21.2	24.5	21.3	15.4
Length of longest anal ray	19.5	20.3	12.4	17.8	15.8
Length of longest pectoral ray	16.9	20.3	21.5	14.1	22.8
Length of dorsal fin base	14.4	13.5	13.3	12.3	12.0
Length of anal fin base	17.4	17.1	20.2	20.1	15.5
As % of head length					
Snout length	33.2	27.8	28.9	30.1	32.8
Cheek length	49.9	45.9	49.5	41.3	47.8
Cheek depth	12.6	16.9	14.8	13.7	16.4
Upper jaw length	44.5	43.8	43.5	45.0	43.9
Interorbital width	29.0	32.5	31.8	37.0	37.5
Orbital diameter	32.8	31.9	37.4	37.3	40.5
Counts					
Dorsal fin rays	iii, 7	iii, 7	iii, 7	iii, 7	iii, 7
Anal fin rays	iii, 12	iii, 12	iii, 11	iii, 12	iii, 11
Pectoral fin rays	i, 13	i, 12	–*	i, 12	i, 14
Pelvic fin rays	i, 8	i, 7	i, 8	i, 8	i, 7
Principal caudal fin rays	i, 9, 8, i	i, 9, 8, i	i, 9, 8, i	i, 9, 8, i	i, 9, 8, i
Lateral line scales	–*	44	–*	46	44
Scales above lateral line to dorsal fin origin	9	9	10	10	10
Scales below lateral line to anal fin origin	3	3	3	4	4
Scales of dorsal fin origin to occipital	19	22	22	22	22
Number of total vertebrae	20 + 20	21 + 20	20 + 20	21 + 20	21 + 20

* Unable to count or measure, because the specimens were damaged.

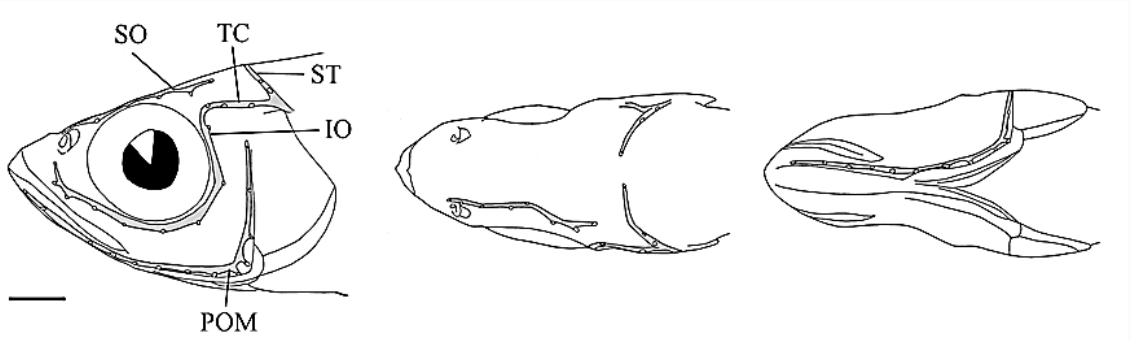

Figure 2. Diagram of the cephalic lateral line system in a syntype of *Parazacco spilurus*. BMNH 1956. 2. 25. 2, 43.09 mm standard length (SL). IO infraorbital canal, POM preoperculomandibular canal, SO supraorbital canal, ST supratemporal canal, and TC temporal canal (scale bar=2 mm).

Acknowledgements

We are grateful to Mr. J. Maclaine and Mr. D. Nicholson (BMNH) for loaning the type materials.

Literature cited

Arai R., Kato K. 2003. Gross morphology and evolution of the lateral line system and infraorbital bones in bitterlings (Cyprinidae, Acheilognathinae), with an overview of the lateral line system in the family Cyprinidae. The University Museum, The University of Tokyo, Bulletin 40: 1-42.

Bănărescu P.M. 1968. Revision of the genera *Zacco* and *Opsariichthys* (Pisces, Cyprinidae). Věstník Československé Společnosti Zoologické 32: 305-311.

Bookstein F.L., Chernoff B., Elder R.L., Humphries J.M., Smith G.R., Strauss R.E. 1985. Morphometrics in evolutionary biology. The Academy of Natural Sciences of Philadelphia. Philadelphia. 277 p.

Chen Y.Y. 1982. A revision of opsariichthine cyprinid fishes. Oceanologia et Limnologia Sinica 13: 293-299.

Chen Y.Y., Chu X.L. 1998. Danioninae. In: Y.Y. Chen (Ed.). Fauna Sinica. Osteichthyes. Cypriniformes II. Beijing, Science Press. pp: 19–61.

Fujita T., Hosoya K. 2005. Cephalic lateral line systems in the Far Eastern species of the genus *Phoxinus* (Cyprinidae). Ichthyological Research 52: 336-342.

Günther A. 1868. Catalogue of the fishes in the British Museum. Catalogue of the Physostomi, containing the families Heteropygii, Cyprinidae, Gonorhynchidae, Hyodontidae, Osteoglossidae, Clupeidae, Hirocentridae, Alepocephalidae, Notopteridae, Halosauridae, in the collection of the British Museum. Volume seventh. Order of the Trustees. London, 512 p.

Hubbs C.L., Lagler K.F. 2004. Fishes of the Great Lakes Region. Revised edition. University of Michigan Press. Michigan. 276 p.

Hosoya K. 1983. Geographic variation of number of vertebrae in *Squalidus*. The Freshwater Fishes 9: 43-48.

Koller O. 1927. Fische von der Insel Hai-nan. Annalen des Naturhistorischen Museums in Wien 41: 25-49.

Kottelat M. 2001. Freshwater fishes of northern Vietnam. A preliminary checklist of the fishes known or expected to occur in northern Vietnam with comments on systematics and nomenclature. Environment and Social Development Unit, East Asia and Pacific Region, The World Bank. Washington DC. 123 p.

Kottelat M. 2013. The fishes of the inland waters of Southeast Asia: a catalogue and core bibliography of the fishes known to occur in freshwaters, mangroves and estuaries. Raffles Bulletin of Zoology 27: 1-663.

Mai D.Y. 1978. Identification of the fresh-water fishes of North Vietnam. Scientific and Technology, Publisher. Ha Noi. 340 p.

Yue P.Q., Chen Y.Y. 1998. China red data book of endangered animals. Pisces. Science Press, Beijing, Hong Kong, New York. 247 p.