



Article

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***Traccatichthys tuberculum*, a new species of nemacheiline loach from Guangdong Province, South China (Pisces: Balitoridae)**

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Abstract

Traccatichthys tuberculum, new species, is herein described from the Jian-Jiang, a coastal river in Guangdong Province, South China. Photo by Bosco P.L. Chan. This new species differs from all other Chinese congeners (i.e., *T. pulcher* and *T. zispi*) in interorbital width, caudal-peduncle length, and pectoral-fin length. It, together with *T. zispi*, lacks the color patterns of the dorsal and anal fins in *T. pulcher*, and differs from *T. zispi* in preanal length. *Traccatichthys tuberculum*, together with all other Chinese congeners, is distinct from the Vietnamese species, *T. taeniatus*, in the shape of the black bar on the caudal-fin base, and the color pattern of the anal fin.

Key words: Balitoridae, *Traccatichthys*, new species, Jian-Jiang, China

Introduction

Traccatichthys was initially erected by Freyhof and Serov (2001) to include two small, colorful species from Laos, central and northern Vietnam, and southern China: *T. taeniatus* (Pellegrin & Chevey 1936) and *T. pulcher* (Nichols & Pope 1927). Prior to the erection of *Traccatichthys*, both species were placed in *Micronoemacheilus* Rendahl 1944 (type species: *Noemacheilus cruciatus* Rendahl 1944) (Mai 1978; Zhu 1995; Kottelat 2001a, b). Freyhof and Serov (2001) concluded that the type species of *Micronoemacheilus* is actually a member of *Yunnanilus* based on their examination of the type material, and that the other two then-recognized species (*M. pulcher* and *M. taeniatus*) should be placed in their own genus, *Traccatichthys*. Prokofiev (2004) determined that two specimens from Hainan Island do not fit the original description of *M. pulcher* in body coloration, and thereby named them as *Micronoemacheilus zispi* (= *T. zispi*). Nguyen and Vo in Nguyen (2005) described *M. bacmeensis* (= *T. bacmeensis*) from northern Vietnam (Ha Giang and Bac Me provinces).

Our ongoing taxonomic research on Chinese nemacheiline loaches reveals that *Traccatichthys* has three species in South China. Two species were previously described: *T. pulcher*, currently known widely from the Pearl River basin in Guangdong, Guangxi and Guizhou provinces, the Yang-Jiang and the Tang-Jiang, two coastal rivers in Guangdong Province, and all coastal rivers in Guangxi Province, and *T. zispi*, so far known only from Hainan Island. The remaining species is unnamed, represented by material from the Jian-Jiang, a coastal river in Guangdong Province. The present study provides a description of this new species.

Materials and methods

All measurements were taken utilizing digital calipers to the nearest 0.1 mm. The last two rays in the dorsal and anal fins are separate to the base, but articulate on the same pterygiophore, and are counted as one. Head length is its lateral length taken from the anteriormost tip of the snout to the hindmost point of the operculum. All other

measurements and counts used here, made on the left side of individuals whenever possible, followed the methods of Kottelat (1990). Measurements of parts of the head are given as proportion of head length (HL), and HL and measurements of other parts of the body are presented as percentages of standard length (SL). Specimens examined are stored in the collection of the Museum of Aquatic Organisms at the Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan (IHB).



FIGURE 1. (A) *Traccatichthys tuberculum*, holotype, IHB 201105029, 87.7 mm SL; China: Guangdong: Jian-Jiang, a coastal river flowing into South China Sea; (B) *T. zispi*, IHB, uncatalogued, 54.6 mm SL, China: Hainan: Qiongzhong: Wanquan-He; (C) *T. pulcher*, IHB, uncatalogued, 64.5 mm SL, China: Guangxi: Luocheng: Liu-Jiang.

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(Fig. 1a)

Holotype. IHB 201105029, 87.7 mm SL; China: Guangdong Province: Jian-Jiang, a coastal river flowing into South China Sea, Xinyi County; collected by Z.W. Sun and Z.G. Jiang, May, 2011.

Paratypes. IHB 201105004, 201105007–18, 201105020, 201105022–8, 201105030, 22 specimens, 54.5–75.1 mm SL, same data as holotype.

Diagnosis. *Traccatichthys tuberculum* differs from other Chinese species (*T. pulcher* and *T. zispi*) in having a wider interorbital space (width 39.1–48.4% HL vs. 27.4–33.7 in *T. zispi* and 27.2–35.4 in *T. pulcher*), a longer caudal peduncle (length 14.6–19.9% SL vs. 11.9–15.4 and 12.6–14.1; Fig. 2a), and longer pectoral fins (length 16.1–22.2% SL vs. 13.2–17.9 and 11.9–17.6; Fig. 2b). *Traccatichthys tuberculum* is similar to *T. zispi* (Fig. 1b) in

the shared absence of a black band along the leading dorsal-fin rays, subdistal and median black bands across the dorsal fin, and submarginal black streaks on the caudal-fin lobes that are characteristic of *T. pulcher* (Fig. 1c), but differs from *T. zipsi* in having a more anteriorly (vs. posteriorly) positioned anal fin (preanal length 72.0–76.5% SL (vs. 77.6–81.7). *Traccatichthys tuberculum*, is distinct from the Vietnamese species, *T. taeniatus*, in having a roughly round (vs. vertically elongated) black bar on the caudal-fin base, and in lacking a black band along the posterior part of the distal margin of the anal fin.

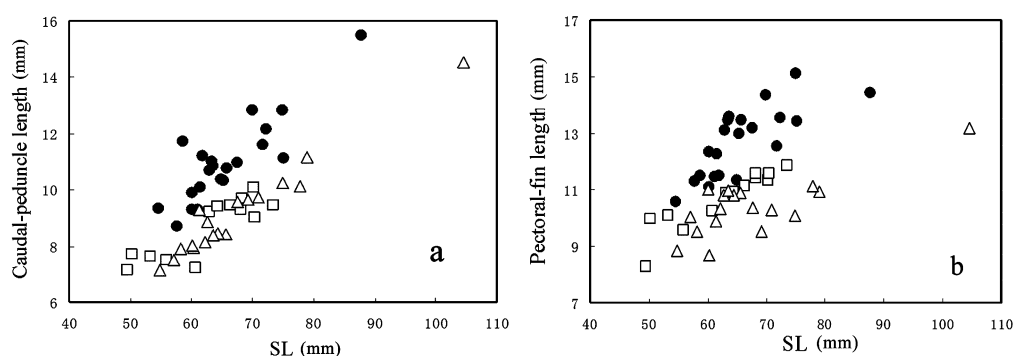


FIGURE 2. Relationship between (a) caudal-peduncle length and SL, and (b) between pectoral-fin length and SL in *T. tuberculum* (●), *T. zipsi* (□), and *T. pulcher* (△).

Description. Morphometric data for type specimens are given in Table 1. Body long, slightly spindle-shaped, anteriorly subcylindrical and posteriorly compressed laterally. Body densely scaled except for head. Dorsal profile of head slightly convex, predorsal profile of body straight. Dorsal-fin base and postdorsal profile somewhat concave. Ventral profile of head straight, of body from pectoral-fin insertion to anal-fin origin slightly convex; anal-fin base straight, postanal profile slightly concave. Greatest body depth anterior to dorsal-fin origin, least caudal-peduncle depth nearer to caudal-fin base than to posterior end of anal-fin base. Caudal peduncle stout, deeper than long.

Head slightly compressed laterally, width less than height, and roughly triangular in lateral view. Snout protruding, obtuse in dorsal view, longer than postorbital length of head; eye moderately large, close to dorsal profile of head; interorbital space convex, width shorter than snout length, and approximately 1.5 times eye diameter. Nostrils closer to anterior margin of eye than to snout tip; anterior and posterior nostrils closely positioned; anterior one pierced at extremity of short tube; posterior one oval, slightly larger than anterior one.

Mouth inferior and transversely arched, with narrow opening. Lips thick, papillose; upper lip without median incision, covered with papillae arranged finely and regularly in two rows with large papillae of anterior row larger than those of posterior row; lower lip medially covered with many large papillae. Jaws covered by lips; upper jaw with well-developed processus dentiformis; lower jaw spoon-shaped, without median incision. Three pairs of barbels, two rostral pairs and one maxillary pair; inner rostral pair extending to corner of mouth, outer rostral pair reaching vertical through posterior nostril; maxillary barbel reaching vertical through posterior margin of eye. Lateral line complete, reaching caudal-fin base.

Dorsal fin with three simple and 12 branched rays; origin nearer to snout tip than to base of caudal fin; dorsal-fin base longer than its last simple ray. Pectoral fin with one simple and 12 branched rays; inserted immediately anterior to vertical through posteriormost point of operculum; tip of adpressed fin extending beyond midway to pelvic-fin insertion, almost to or slightly beyond a vertical line through dorsal-fin origin. Pelvic fin with one simple and seven branched rays, inserted posterior to vertical through dorsal-fin origin; tip of adpressed fin not extending to anal-fin origin. Anal fin with three simple and five branched rays; distal margin straight or slightly convex; origin closer to caudal-fin base than to pelvic-fin insertion; tip of adpressed fin, almost extending to caudal-fin base. Caudal fin with 7–8+8 = 15–16 branched rays; emarginate, upper and lower lobes equal in length.

Intestine short and straight, without zigzag loop behind posterior portion of U-shaped stomach. Gas bladder bipartite; anterior chamber invisible, entirely enclosed in capsule; posterior chamber long and oval.

TABLE 1. Morphometric data for three Chinese species of *Tracacichthys*.

	<i>T. zispi</i> (n = 13)	<i>T. pulcher</i> (n = 18)	<i>T. tuberculum</i> (n = 21)
	Range (mean $\pm$ SD)	Range (mean $\pm$ SD)	Range (mean $\pm$ SD)
SL (mm)	49.6–73.5 (62.6 $\pm$ 8.05)	54.8–104.4 (67.4 $\pm$ 11.50)	54.5–87.7 (66.4 $\pm$ 7.79)
As percentage of SL			
Body depth	22.1–27.7 (24.1 $\pm$ 1.61)	20.0–27.9 (23.2 $\pm$ 2.23)	20.7–26.9 (23.1 $\pm$ 1.69)
Head length	22.6–25.4 (24.2 $\pm$ 1.06)	20.7–25.6 (23.8 $\pm$ 1.38)	22.7–26.6 (24.3 $\pm$ 1.09)
Dorsal-fin length	13.2–17.9 (16.1 $\pm$ 1.19)	11.9–17.6 (15.4 $\pm$ 1.55)	16.1–22.2 (19.4 $\pm$ 1.64)
Pectoral-fin length	16.2–19.9 (17.2 $\pm$ 1.07)	12.6–18.3 (16.6 $\pm$ 1.57)	16.4–21.4 (19.3 $\pm$ 1.31)
Pelvic-fin length	11.5–14.7 (13.1 $\pm$ 0.94)	10.3–14.4 (12.8 $\pm$ 1.18)	13.7–17.4 (15.6 $\pm$ 1.06)
Anal-fin length	12.2–15.6 (13.8 $\pm$ 1.09)	11.7–15.6 (13.8 $\pm$ 0.90)	13.7–16.9 (15.2 $\pm$ 1.00)
Predorsal length	46.3–50.9 (48.8 $\pm$ 1.45)	45.7–49.7 (47.9 $\pm$ 1.30)	45.5–50.4 (47.6 $\pm$ 1.28)
Prepectoral length	23.9–28.8 (26.1 $\pm$ 1.47)	22.9–27.3 (25.5 $\pm$ 1.34)	24.2–28.7 (26.1 $\pm$ 1.16)
Preventral length	53.7–58.7 (55.5 $\pm$ 1.34)	52.1–56.3 (54.1 $\pm$ 1.24)	49.8–57.2 (52.9 $\pm$ 1.67)
Preanal length	77.6–81.7 (79.3 $\pm$ 1.27)	75.1–80.5 (78.1 $\pm$ 1.42)	72.0–76.5 (74.8 $\pm$ 1.19)
Caudal-peduncle length	11.9–15.4 (13.9 $\pm$ 0.93)	12.6–14.1 (13.4 $\pm$ 0.46)	14.6–19.9 (16.6 $\pm$ 1.24)
Caudal-peduncle depth	14.1–17.3 (15.6 $\pm$ 0.82)	13.1–15.9 (14.2 $\pm$ 0.68)	12.5–17.0 (15.2 $\pm$ 0.94)
Pectoral-pelvic distance	25.3–33.1 (29.4 $\pm$ 1.95)	25.9–32.5 (29.1 $\pm$ 1.75)	26.4–32.8 (29.4 $\pm$ 1.68)
As percentage of HL			
Eye diameter	16.6–22.1 (19.9 $\pm$ 1.58)	17.5–23.3 (20.8 $\pm$ 1.39)	16.2–22.4 (18.7 $\pm$ 1.71)
Snout length	39.4–48.0 (42.8 $\pm$ 2.47)	38.6–47.2 (41.9 $\pm$ 1.85)	40.7–48.9 (45.8 $\pm$ 1.91)
Interorbital width	27.4–33.7 (30.4 $\pm$ 2.00)	27.2–35.4 (30.8 $\pm$ 2.15)	39.1–48.4 (43.2 $\pm$ 2.61)
Postorbital length	34.9–39.6 (37.4 $\pm$ 1.32)	34.7–40.4 (37.2 $\pm$ 1.49)	32.3–41.9 (38.1 $\pm$ 2.38)

Coloration in preservative. Top and sides of head black brown; ground color of back and upper half of flank above lateral line yellowish brown, and lower half below lateral line and abdomen white or grey. No spots or stripes on head. Back and sides of body with many irregular cross-shaped brownish blotches, especially in predorsal region; 15–16 herring-bone lines or chevrons fused to form longitudinal black stripe starting from above pectoral fin, extending along lateral line and terminating anterior to caudal-fin base; stripe darkest from above pectoral fin to anal-fin origin, with indented upper and lower margins. Black spot medially on caudal-fin base.

Dorsal fin crossed by subdistal and median dusky bands; simple rays black with hyaline distal edge. Caudal fin with longitudinal dark stripe on median rays and submarginal dark stripe along each lobe; distal margin dark.

Sexual dimorphism. Many breeding tubercles on each interrarial membrane of pectoral fin in males, missing in females. Genital papilla larger in females, inconspicuous in males.

Distribution. Known only from the Jian-Jiang, a coastal river in Guangdong Province, South China (Fig. 3).

Etymology. The specific epithet is from the Latin word *tuberculum*, referring to the presence of tubercles on the dorsal surface of the pectoral-fin rays; treated as a noun in apposition.

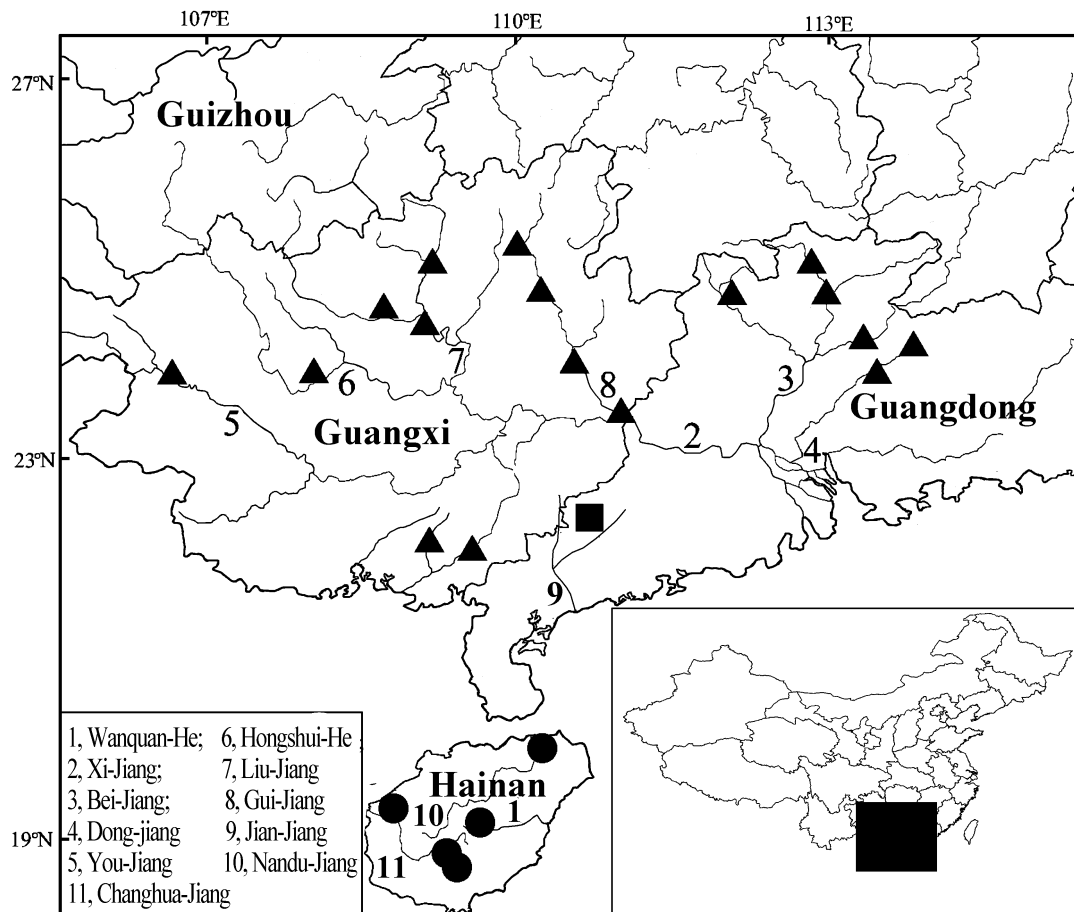


FIGURE 3. Distributions of the three described species of *Traccatichthys* in China: *T. zispi* (●), *T. pulcher* (▲), and *T. tuberculum* (■)

Discussion

The validity of *Traccatichthys* remains doubtful. In his description of *Micronoemacheilus zispi* as a new species from Hainan Island, Prokofiev (2004) commented that there are no unique diagnostic characters for *Traccatichthys* among the *Yunnanilus*-group defined by him to include the following six genera: *Eonemacheilus*, *Heminoemacheilus*, *Micronoemacheilus*, *Paranemacheilus*, *Protonemacheilus* and *Yunnanilus*. Based on this, he was reluctant to accept the generic status of *Traccatichthys*, but retained *Micronoemacheilus* in its current sense (Zhu 1989; Kottelat 1990). However, Prokofiev had no access to specimens of some aforementioned genera. His generic concepts require further evaluation. Additionally, *Micronoemacheilus*, as delimited by Prokofiev (2004), has no unique diagnostic characters among his *Yunnanilus*-group. This clearly means that one is not better than the other until the monophyletic nature of either *Micronoemacheilus* or *Traccatichthys* is confirmed in a phylogenetic context.

Prokofiev (2010) treated *Traccatichthys* as a valid genus, and referred it, *Micronoemacheilus*, and six other genera to the *Yunnanilus*-group. He provided a phylogenetic analysis of the Nemacheilinae based on morphological

characters, but his analysis did not include species of *Traccatichthys* and *Micronoemacheilus*. Accordingly, little is now known about phylogenetic relationships of these two genera with other nemacheiline loach genera, and it is impossible to have a phylogenetically based definition of *Traccatichthys* or *Micronoemacheilus*. To circumvent this problem and facilitate the description of the species here named, the taxonomic changes made by Freyhof and Serov (2001) are accepted in the present study; *Traccatichthys* is considered to be an available generic name.

Traccatichthys pulcher extensively occurs in river basins of Hainan Island, the Pearl River basin in Guangxi, Guangdong and Guizhou provinces, and coastal rivers in Guangxi and Guangdong provinces (Zhu 1995; Qiu *et al.* 2008). This species was initially described by Nichols and Pope (1927) based on a single small specimen of 42 mm SL from Nodda (Nada), Hainan Island. The accompanying figure (plate XXVI, fig. 2) shows dorsal- and caudal-fin color patterns including a black streak among the leading dorsal-fin rays, two (subdistal and median) black bands across the dorsal fin and a submarginal black streak along each caudal-fin lobe. Our photographic examination revealed that the type material has larger eyes than originally described, their diameter being about three times in head length. This value is slightly less than 3.5 given in the original description. A possible reason for this difference is shrinkage of the type material stored in preservative, presumably owing to the loss of water, making the eyes relative larger. However, the taxonomy of *T. pulcher* is still poorly understood.

This study indicated that the specimens traditionally identified as *T. pulcher* involve three species: *T. zispi*, *T. pulcher*, and *T. tuberculum*. This is congruent with the recent study on genetic variation and phylogeographic patterns by Qiu *et al.* (2008) for *M. pulcher* from Guangxi and Guangdong provinces, and Hainan Island. Three genetically distinct lineages were recovered in their neighbor-joining tree calculated from a total of 39 haplotypes of the mtDNA cytochrome *b* gene. The first lineage included populations of six coastal rivers (Nanliu-Jiang, Beilun-He, Dongzhong-He and Fangcheng-He in Guangxi Province, and Tan-Jiang and Moyang-Jiang in Guangdong Province) and the Xi-Jiang of the Pearl River basin in Guangdong and Guangxi provinces. Careful examination indicated that populations from the Pearl River basin have dorsal- and caudal-fin color patterns typical for *T. pulcher*, and a narrower interorbital space, its width 27.2–38.9% HL, which contains the index value of 33.3 calculated from the data provided in the original description. Undoubtedly, Qiu *et al.*'s (2008) first lineage represents *T. pulcher*. The second lineage included the population of the Jian-Jiang, and is the population described here as *T. tuberculum*. *Traccatichthys tuberculum* lacks dorsal- and caudal-fin color patterns found in *T. pulcher*, and has a relatively wider interorbital space compared with this species (width 39.1–48.4 vs. 27.2–35.4% HL). The third lineage included populations from the Wanquan-He and Nandu-Jiang in Hainan Island. Examination showed that specimens from this island match the original description of *T. zispi*.

Dorsal- and caudal-fin color patterns of *T. pulcher* are missing in specimens of Hainan Island, the type locality of this species, but exhibited by those of the Pearl River basin in Guangxi, Guangdong and Guizhou provinces, and coastal rivers of Guangxi and Guangdong provinces. There are several possibilities for the fact that no specimens of *T. pulcher* have subsequently been found in Hainan Island. The first is that available habitats of this species have been sampled inadequately; however, Hainan Island has been well sampled, even though the species has not been collected. One of us (B. P. Chan) also conducted a three-year fish survey of Hainan Island, but did not collect any specimens of *T. pulcher* from the rivers near its type locality or elsewhere from Hainan Island. The second explanation is that anthropogenic activities and climate change over the more than eighty years since the original description of *T. pulcher* caused the extirpation of *T. pulcher* from Hainan Island. However, this cannot explain why its sympatrically occurring species *T. zispi* (see below for its identification) survives. The third, more reasonable, explanation is that the origin of the type specimen of *T. pulcher* is unreliable. Although its original description stated that the type locality was Nodda (= Nada) of Hainan Island, it may have been caught elsewhere. A similar case can be seen for *Bangana decora* (Peters 1881). The type locality in the original description was given as Hong Kong, but it does not naturally exist there. Its known distribution is in the Pearl River basin. The export of *B. decora* as food fish from the Pearl River basin resulted in its occurrence in Hong Kong (Wu *et al.* 1977). More likely, the type material of *T. pulcher* was occasionally brought from the mainland of China to Hainan Island. If this is true, *Traccatichthys* is represented in Hainan Island only by one species. The body coloration of specimens of Hainan Island matches the original description of *T. zispi*, and the investigation of Qiu *et al.* (2008) indicated that the Hainan Island population is genetically distinct. Therefore, the Hainan Island specimens are *T. zispi*.

Traccatichthys zispi was first described in *Micronoemacheilus* by Prokofiev (2004) as a new species from Hainan Island. Prokofiev made a comparison of the new species with its closely related species, *T. taeniatus*, from

Laos, and central and northern Vietnam; the main difference between the species was body coloration. Compared with *T. taeniatus*, *T. zispi* has a shorter longitudinal midlateral stripe on the flank, and lacks a dark stripe from the snout tip across the eye to the occiput. Careful examination of the material caught in 2008 from Hainan Island revealed that it matches the original description of *T. zispi* except for body coloration. A dark stripe from the snout tip across the eye to the occiput is present in some of the 60.6–92.3 mm SL specimens (uncatalogued in IHB). It seems that the presence or absence of the dark stripe is probably size-related and /or depends on the state of preservation. Underwater photographs of live specimens taken for *T. zispi* exhibit a distinct dark stripe proceeding from the snout tip across the eye to the occiput and a longer longitudinal midlateral black stripe extending from the upper extremity of the gill opening to the caudal-fin base (Fig. 4). The length of the stripe varies among individuals. Clearly, the above two characters cannot be used to distinguish *T. zispi* from *T. taeniatus*.



FIGURE 4. Underwater photograph of *Traccaticthys zispi* from the Nandu-He basin at Fanjia (near the type locality), Danzhou City, Hainan Province, South China.

Pellegrin and Chevey (1936) described *Nemacheilus pulcher* var. *taeniata* on the basis of a single 90-mm SL specimen from Thiong Khé (Phu tho), Rouge River, Tonkin, northern Vietnam. In the original description, this species has the dorsal-fin origin closer to the snout tip than to the caudal-fin base, a broad black stripe extending from the upper extremity of the gill opening to the caudal-fin base and ending with more marked spots, and smaller eyes (diameter 4.5 in head length). Later, both Mai (1978) and Zhu and Cao (1987) regarded it as a junior synonym of *T. pulcher*, but Freyhof and Serov (2001) followed Rendahl (1944) to consider it a distinct species. *Traccaticthys taeniatus* occurs in Vietnam and Laos (Kottelat 2001a, b; Freyhof & Serov 2001; Nguyen 2005); however, *T. taeniatus* is currently recognized as a species complex. Kottelat's (2001a) figures for the specimen of this species depict two species. The lower specimen on figure 254 is from Vietnam, Quang Ninh Province, a small coastal stream between the Red River and the border with China; it has the dorsal-fin origin closer to the snout tip than to the caudal-fin base and a broad black stripe from the upper extremity of the gill opening to the caudal-fin

base, and thus represents *T. taeniatus* s.str., as do the specimens in Kottelat's (2001b) figure 69 from the Red River basin at Hagiang Province and in Freyhof and Serov's (2001) figure 55 from the Lô River, Vietnam. Freyhof and Serov (2001) asserted that China lay within its range, but this is not confirmed. The other species is represented by the upper specimen in Kottelat's (2001a) figure 254 from Laos, Houapham Province in the Song Chu basin, which enters the sea at Thanh Hoa in Vietnam. This species, here referred to as *T. aff. taeniatus*, has a shorter (vs. longer in *T. taeniatus*) midlateral stripe that extends from above the midway of the pectoral fin to the vertical through the middle of the dorsal-fin base (vs. through the posterior end of the dorsal-fin base), and no black distal edge of the posterior anal-fin rays (vs. present).

Both *T. tuberculum* and *T. zispi* differ from *T. taeniatus* and *T. aff. taeniatus* in the presence of a roughly round (vs. vertically elongated) black bar on the caudal-fin base. It is further distinct from *T. taeniatus* in the absence of a black band on the distal edge of the posterior anal-fin rays (vs. present) and possibly larger (vs. smaller) eyes, and from *T. aff. taeniatus* in having a longer midlateral stripe extending from above the midway of the pectoral fin to the posterior end of the dorsal-fin base, or even to the caudal-fin base (vs. the vertical through the middle of the dorsal-fin base).

Traccatichthys bacmeensis was initially described by Hao and Binh in Nguyen (2005), but without an accompanying illustration. The type locality is the Bac Me, Hagiang Province, Vietnam, in the Red River basin. It is very close to the border with Yunnan Province, South China. In the original description, this species differed from *M. pulcher* (here *T. taeniatus*) in the presence of 12–13 branched dorsal-fin rays (vs. 11), the pelvic-fin insertion nearer to the snout tip than to the caudal-fin base (vs. closer to the caudal-fin base), and the dorsal-fin origin closer to the snout tip than to the caudal-fin base (vs. closer to the caudal-fin base). Based on our examination of Chinese species of *Traccatichthys*, there are intraspecific variations in the first two characters (Table 1). They do not work well for distinguishing between *T. taeniatus* and *T. bacmeensis*. The specimens identified by Hao and Binh in Nguyen (2005) as *M. pulcher* (= *T. taeniatus*) have 11 branched dorsal-fin rays, and a forward-positioned dorsal fin, its origin closer to the caudal-fin base than to the snout tip, not fitting the original description of *T. taeniatus*, and their taxonomic status needs further study; however, their material of *T. bacmeensis* matches the original description of *T. taeniatus* as it has 12–13 branched dorsal-fin rays and a forward-placed dorsal fin, with its origin closer to the snout tip than to the caudal-fin base. The specimen in Kottelat's (2001b) figure 69 identified as *T. taeniatus* was collected from the same locality as the type material of *T. bacmeensis* (pers. comm.). It is possible that *T. bacmeensis* is a junior synonym of *T. taeniatus*.

Comparative material

Traccatichthys zispi: all from China: Hainan Prov.: IHB 76V9152, 76V9155, 76V9610–12, 88V3006, 6, 50.2–70.3 mm SL; Qiongzong County, Wanquan-He; IHB 76V4404–6, 3, 49.6–63.0 mm SL; Chengpo County, Nandu He; IHB 76VI7101–2, 2, 66.4–70.4 mm SL; Changjiang County: Changhua Jiang; IHB 76V8982–83, 2, 64.4–68.2 mm SL; Hongqi County, Nandu He.

Taccatichthys pulcher: IHB 93IV0001, 76IV6053–6, 76IV6058, 6, 54.8–78.9 mm SL; China: Guangdong Province: Lechang County, Bei Jiang of Pearl River basin; IHB 76IV5859–61, 76IV5863–6, 7, 58.2–70.9 mm SL; China: Guangdong Province: Shaoguan County, Bei Jiang of Pearl River basin; IHB 76IV7865–9, 5, 57.1–104.4 mm SL; China: Guangdong Province: Wengyuan County, Bei Jiang of Pearl River basin.

Schistura fasciolatus: IHB 87V844–5, 83V1014, 83V1016, 4, 60.9–77.0 mm SL; China: Guizhou Province: Rongjiang County, Duli Jiang of Pearl River basin.

Yunnanilus plenrotaenia: IHB 600725, 1, 65.0 mm SL; China: Yunnan Province: Xiaguan County, Yangbi Jiang of upper Mekong River basin; IHB 646770, 646773, 2, 43.9–51.1 mm SL; China: Yunnan Province: Wase County, a tributary of Erhai Lake system; IHB 78V1751, 78V1755, 579053, 579060, 4, 39.9–56.6 mm SL; China: Yunnan Province: Dali County, Erhai Lake.

Lefua costata: IHB 762742–5, 4, 29.8–50.2 mm SL; China: Inner Mongolia Province: Duolun County, Shandian He.

Heminoemacheilus zhengbaoshani: IHB 741803, 741806, 2, 71.4–75.6 mm SL; China: Guangxi Province: Du'an County, Hongshui He of Pearl River basin.

Paranemachilus genilepis: IHB790001, 790008, 2, 59.4–70.0 mm SL; China: Guangxi Province: Fuying County, Hongshui He of Pearl River basin.

Data for *Protonemacheilus* and *Eonemachilus* are from Prokofiev (2004).

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