



## Description of a new genus and two new species of labeonine fishes from South China (Teleostei: Cyprinidae)

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### Abstract

A new genus and two new species are described from the Pearl River drainage in Guangxi Province, South China. *Hongshuia*, new genus, can be distinguished from all other Asian genera of the Labeonini by having a lower lip with its median lobe modified into a round, fleshy plate peripherally greatly protruded so as to form a ring-like fold that is posteromedially continuous with the mental region, and centrally sunken so as to form a round, flat, fleshy pad. This genus is distinct from all other Asian labeonine genera of the Garrina except for one newly described species of *Parasinilabeo* (*P. longibarbus*), *Pseudocrossocheilus*, and *Sinocrossocheilus*, in the presence of well-developed maxillary barbels. *Hongshuia* differs from the above three genera in the lower lip morphology, and further from both *Pseudocrossocheilus* and *Qianlabeo* in the number of pharyngeal tooth rows and from *Sinocrossocheilus* in the colour pattern. Two new species, *H. banmo* and *H. paoli*, differ in the distribution density and degree of development of papillae on the rostral fold, depth of indentations on the distal edge of the rostral fold, presence or absence of papillae on the lower lip, size and shape of tubercles on the tip of the snout and anterior portion of the lachrymal, length, position and colour pattern of the dorsal fin, and snout length.

**Key words:** *Hongshuia*, endemic species, freshwater fish, South China

### Introduction

The Labeonini (sensu Reid, 1982), which is essentially equivalent to the subfamily Labeoninae (sensu Chen *et al.*, 1984), aggregates a large number of cyprinid fishes widely distributed in the freshwaters of tropical Africa and Asia. It shows a high degree of morphological modification in its oromandibular structures unshared with other cyprinid fish groups, which is the basis for recognition of most of the included genera (Zhang *et al.*, 2000). The Labeonini is represented in Southeast Asia and South China by twenty-nine genera (pers. obs.).

South China falls in the easternmost extent of the known distribution of the Labeonini. The composition of Chinese Labeonini tends to be sparser in fish species, but more diverse at the generic level. In the monograph on Chinese cyprinid fishes by Zhang *et al.* (2000), there were 60 species or subspecies in 20 genera. This group also shows a high degree of endemism at the generic level in South China. Of Chinese Labeonini genera, seven are endemic to South China (Zhang *et al.*, 2000).

The generic-level diversity of Chinese Labeonini continues to rise as a consequence of recent works. Zhang and Chen (2004) described *Qianlabeo striatus* as a new genus and species from the upper Pearl River drainage in Guizhou Province; Zhang and Chen (2006) showed that *Bangana* also has representatives in South China, where it is represented by 13 valid species, all of which were previously placed in *Sinilabeo* Rendahl, 1932 (Zhang *et al.*, 2000); Zhang *et al.* (2006) made *Sinilabeo* Rendahl, 1932 available by fixing *S.*

*humuli*, as its type species, a new species from the upper Yangtze River drainage in Sichuan Province and Chongqing City; Zhang and Kottelat (2006) erected *Akrokolioplax* as a monotypic genus for *Epalzeorhynchos bicornis* Wu, 1977 from the Salween River drainage in Yunnan (South China), Myanmar and Thailand.

Our recent surveys in the Pearl River drainage in Guangxi Province yielded two undescribed species belonging to the Labeonini. These two species were initially recognized as *Sinocrossocheilus* Wu, 1977, but further comparison with the type species of this genus and with all other existing Asian Labeonini genera revealed that both should be assigned to their own genus, herein named *Hongshuia*.

## Material and methods

Measurements were taken point to point with digital calipers connected directly to a data recording computer and data recorded to the nearest 0.1 mm. Measurements and counts, made on the left side whenever possible, followed those of Kottelat (2001). Predorsal, prepectoral, prepelvic and preanal lengths were taken, respectively, from the anteriormost tip of the snout to the dorsal-, pectoral-, pelvic- and anal-fin origin. Interorbital width was taken between the upper margins of the eyes. Abdominal vertebrae and caudal vertebrae were counted from radiographs following the method outlined by Roberts (1989). The Weberian and urostylar complex are included, respectively, in the counts of the abdominal vertebrae and caudal vertebrae. The pharyngeal teeth are counted and presented in a formula utilizing Hubbs and Lagler's (1947) method, and the formula 2, 3, 5-5, 3, 2 indicates that the pharyngeal bones of both left and right sides bear three rows, with five teeth in the inner, three in the middle, and two in the outer row. The number of specimens with a given meristic count is indicated in parentheses after the count. All values for the holotype are indicated by asterisks. Measurements of parts of the head are presented as proportions of head length (HL). The head length and measurements of other parts of the body are expressed as percentages of standard length (SL).

The Chinese toponymy is utilized for the distribution data, and the international English toponymy, if available, is also provided in parentheses following the Chinese river name when it first appears in the present paper. Latitude and longitude coordinates of each locality were not provided in the original collection data, and are consequently inferred by the authors based on the best information available. The examined specimens are preserved in the collection of the Institute of Hydrobiology (IHB), Chinese Academy of Sciences, Wuhan and the collection of Maurice Kottelat.

## *Hongshuia*, new genus

**Type species:** *Hongshuia paoli*, new species

**Diagnosis.** *Hongshuia* is distinct from all other Asian labeonine fishes in having a lower lip with its median lobe modified into a round, fleshy plate peripherally greatly protruded so as to form a ring-like fold posteromedially continuous with the mental region and centrally sunken so as to form a round, flat, fleshy pad (Fig. 1A). It is separated from all other Asian labeonine fishes of the Garrina (sensu Rainboth, 1996) except for one newly described species of *Parasinilabeo* Wu, 1939 (type species: *Parasinilabeo assmilis* Wu and Yao, 1977), namely *P. longibarbus* Zhu, Lan and Zhang, 2006, *Pseudocrossocheilus* Zhang and Chen, 1997 (type species: *Crossocheilus bamaensis* Fang, 1981) and *Sinocrossocheilus* (type species: *Sinocrossocheilus guizhouensis* Wu, 1977) in having well-developed (vs. minute or absent) maxillary barbels.

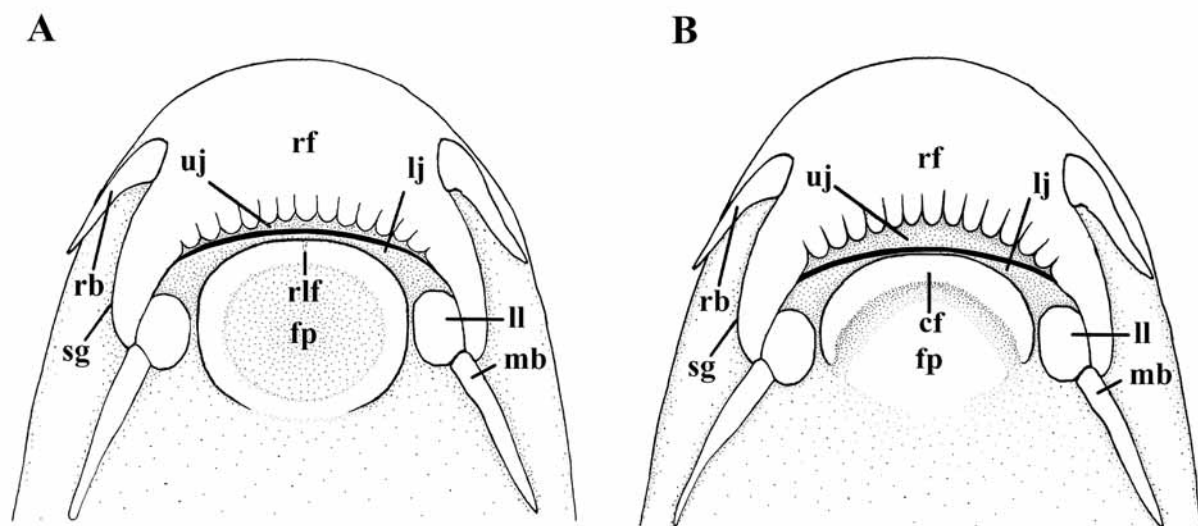
*Hongshuia* is further distinguished from *Parasinilabeo* (sensu Zhang, 2000) in having two (vs. three) rows of pharyngeal teeth, a crenulated (vs. non-crenulated) rostral fold disconnected (vs. connected) from the lower lip at the corners of the mouth, and no postlabial groove (vs. present, broadly interrupted or confined only in the side of the lower jaw). It has well-developed maxillary barbels, as found in *P. longibarbus*, but fur-

ther differs from *P. longibarbus* in having have 7 (vs. 8) branched dorsal-fin rays.

*Hongshuia* further differs from *Sinocrossocheilus* in the lower lip morphology [Fig. 1(a)– (b)] and in its color patterns [Fig. 3(a)–(c)]. In *Hongshuia*, the median lobe of the lower lip has a ring-like (vs. crescentic in *Sinocrossocheilus*) fleshy fold that surrounds (vs. caps) the round (vs. roughly triangular), flat (vs. slightly protruded) fleshy pad, and the posteromedian (vs. posterior) edge of the ring-like fleshy fold (vs. nearly triangular fleshy pad) is posteriorly continuous with the mental region. *Hongshuia* lacks the conspicuous black bar on the upper half of the flank immediately above the fifth lateral line scale present in *Sinocrossocheilus*.

*Hongshuia* further differs from *Pseudocrossocheilus* (sensu Zhang & Chen, 1997) in the lower lip morphology, and in the numbers of pharyngeal tooth rows and branched dorsal-fin rays. The lower lip morphology of *Pseudocrossocheilus* (see Zhang and Chen, 2004: 30, fig. 1f) is not shared with *Hongshuia* or even all other labeonine genera. *Pseudocrossocheilus* has a pair of mental grooves dividing the lower lip into two lateral lobes and one median lobe (vs. absent in *Hongshuia*); the median lobe is roughly square (vs. roughly round), greatly protruded with its anterior portion densely covered with papillae and its posterior portion not papillose (vs. peripherally greatly protruded to form a ring-like, papillose, fleshy fold and centrally sunken to form a round, flat, papillated, fleshy pad). *Hongshuia* has two (vs. three) rows of pharyngeal teeth and seven (vs. eight) branched dorsal-fin rays.

**Etymology.** The generic name is derived from the the Chinese name ‘*Hongshui He*,’ where the type species was collected. Gender: feminine.



**FIGURE 1.** Diagrammatic illustrations of oromandibular structures in: (A) *Hongshuia*; (B) *Sinocrossocheilus*. cf = crescentic fold of median lobe of lower lip; fp = fleshy pad of median lobe of lower lip; ll = lateral lobe of lower lip; lj = lower jaw; mb = maxillary barbel; rb = rostral barbel; rf = rostral fold; rlf = ring-like fold of median lobe of lower lip; sg = sublachrymal groove; uj = upper jaw.

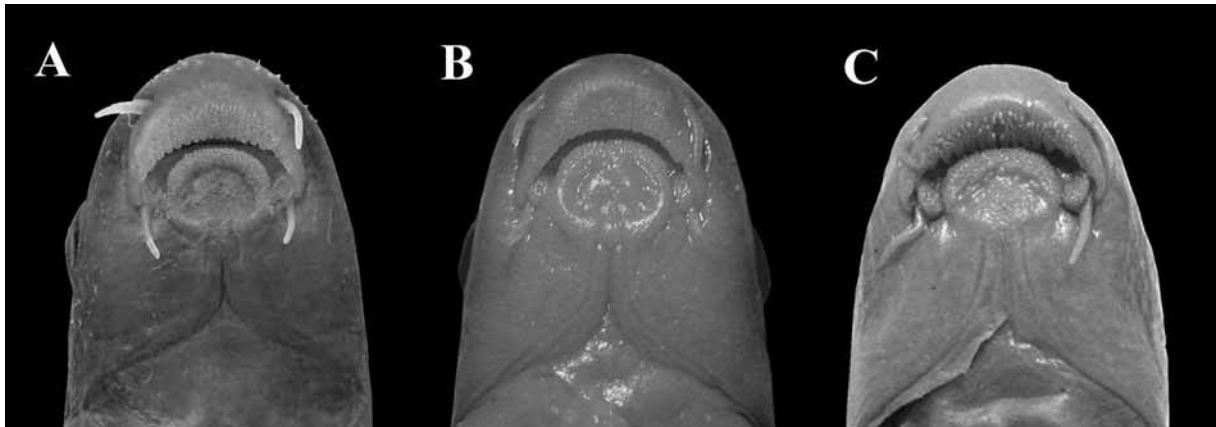
### *Hongshuia paoli*, new species

(Figs. 2A, 3A, 4A; Table 1)

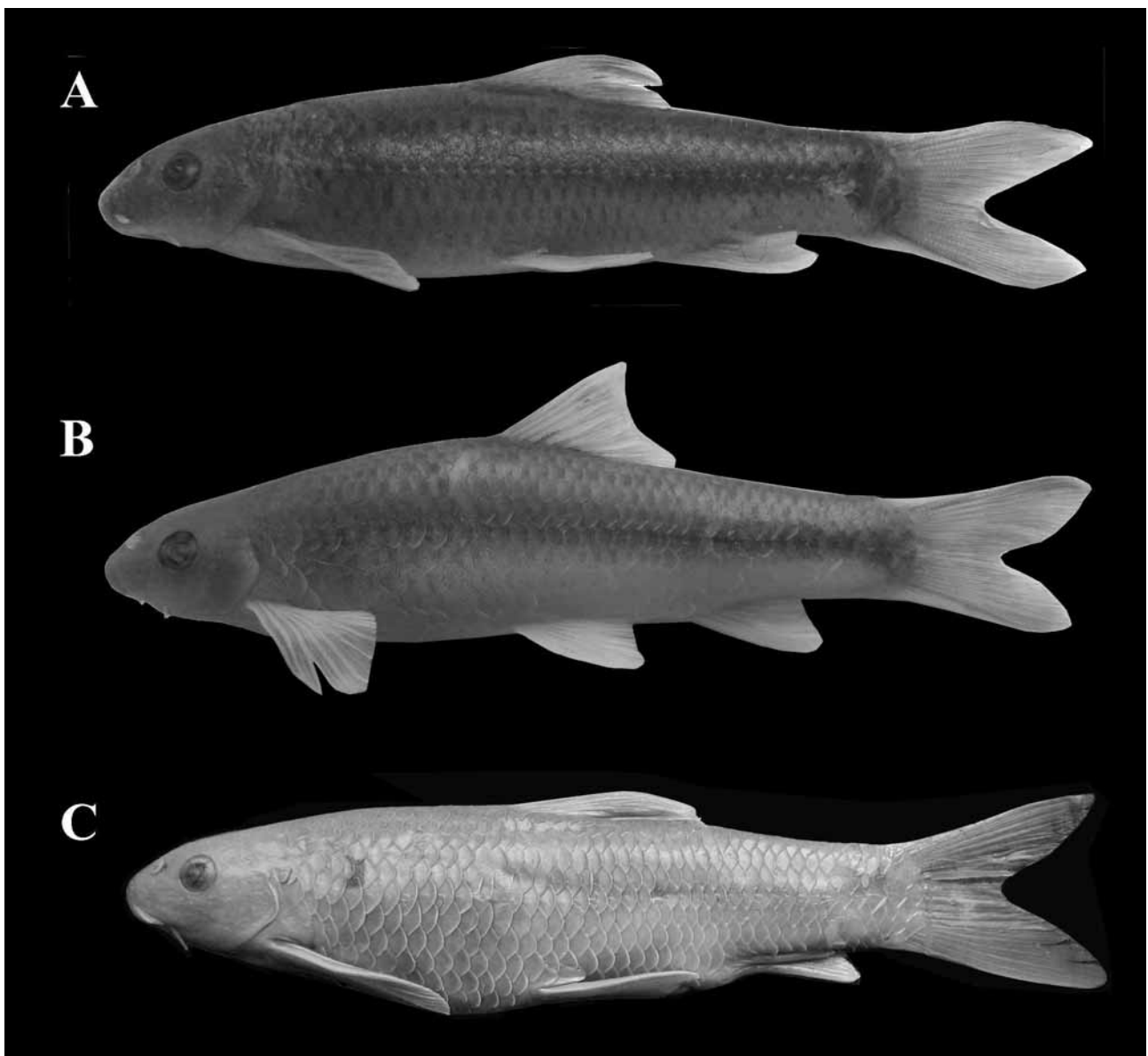
**Holotype:** IHB 200210911, 54. 3 mm SL, China, Guangxi Province, Pearl River drainage, Hongshui He, Pan-yang He stream at Baoli village, Fengshan County, approximately 24°33'N, 107°03'E; J. H. Lan; October, 2002.

**Paratypes:** IHB 200210900–10, 200210912–3, 14 ex., 47.2–65.4 mm SL, same data as holotype.

**Nontypes:** IHB, not catalogued, 15 ex., 31.8–38.3 mm SL, China, Guangxi Province, Pearl River drainage, Hongshui He in Linyun County, roughly 24°21'N, 106°33'E; J. H. Lan; October, 2002.



**FIGURE 2.** Lower lip morphology in: (A) *Hongshuia paoli*, IHB 200210911, holotype, 54.3 mm SL; (B) *Hongshuia banmo*, IHB 200410806, holotype, 57.4 mm SL; (C) *Sinocrossocheilus guizhouensis*, IHB 6650508, 59.0 mm SL.



**FIGURE 3.** Lateral view of: (A) *Hongshuia paoli*, IHB 200210911, holotype, 54.3 mm SL; (B) *Hongshuia banmo*, IHB 200410806, holotype, 57.4 mm SL; (C) *Sinocrossocheilus guizhouensis*, IHB 6650508, 59.0 mm SL.

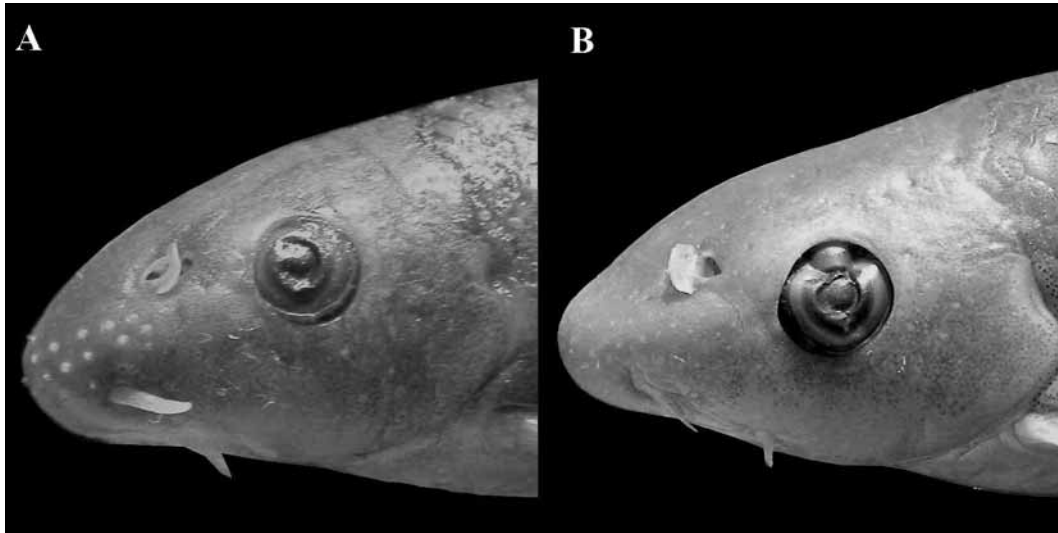
**Diagnosis.** A species of *Hongshuia* having rostral fold covered densely with well-developed papillae, deeply indented distal margin; median lobe of lower lip with ring-like fold and central fleshy pad papillated; tubercles on tip of snout and anterior portion of lachrymal large, tall, conical with sharp tips; long dorsal fin (length 23.7–26.9 % SL); dorsal fin origin nearer to tip of snout than to caudal-fin base; black blotches on middle interradial membranes between branched dorsal-fin rays; long snout (length 50.0–57.0 % HL).

**Description.** Morphometric data are given in Table 1. Refer to Figures 2A and 3A for general body appearance and morphology of the oromandibular structures, respectively. Body elongate, cylindrical anteriorly and slightly compressed posteriorly, with greatest body depth anterior to dorsal-fin origin and least depth of caudal peduncle nearer to caudal-fin base than to posterior end of anal-fin base. Dorsal profile of body from tip of snout to dorsal-fin origin slightly convex; somewhat concave from there to origin of dorsal procurrent caudal-fin rays. Ventral profile of body from tip of snout to anal-fin origin convex; slightly concave from anal-fin origin to origin of ventral procurrent caudal-fin rays.

**TABLE 1.** Morphometric data for type specimens of two *Hongshuia* species.

	<i>H. banmo</i> (n =10)			<i>H. paoli</i> (n =15)		
	Holotype	Range	Mean±SD	Holotype	Range	Mean±SD
SL (mm)	57.4	38.7–57.4	48.0±6.7	54.3	47.2–65.4	51.7±4.3
Percentage of SL						
Body depth	24.6	19.6–24.6	21.2±1.3	23.6	20.6–25.5	22.7±1.2
Head length	23.2	21.8–24.0	22.8±0.7	22.2	20.0–24.2	22.0±0.9
Caudal-peduncle length	17.0	17.0–20.9	19.6±1.1	18.3	15.8–20.3	18.6±1.4
Caudal-peduncle depth	11.9	10.5–11.9	10.9±0.3	13.3	11.7–13.3	12.6±0.4
Dorsal-fin length	21.8	21.8–23.4	22.7±0.4	24.7	23.7–26.9	24.8±1.0
Pectoral-fin length	20.2	20.2–24.3	22.8±1.0	21.8	20.4–23.3	22.2±0.8
Pelvic-fin length	17.4	17.4–19.4	18.5±0.7	19.3	17.6–20.6	18.9±0.8
Anal-fin length	18.1	17.9–20.4	18.9±0.9	18.9	17.8–22.5	19.7±1.2
Caudal-fin length	25.9	25.9–29.8	27.7±1.3	28.7	23.7–31.7	27.5±2.3
Predorsal length	51.6	47.6–51.6	48.6±1.1	49.8	47.7–51.6	49.5±1.0
Prepectoral length	21.9	18.7–21.9	20.5±0.8	22.9	20.5–24.3	22.7±0.9
Prepelvic length	53.6	47.7–53.6	48.7±1.2	52.8	51.3–57.4	52.9±1.4
Preanal length	76.4	69.7–76.4	72.6±1.2	73.8	71.6–77.6	73.8±1.5
Percentage of HL						
Snout length	45.1	42.5–47.9	45.2±1.8	55.3	50.0–57.0	53.4±2.0
Eye diameter	21.7	21.7–26.7	25.1±0.9	23.5	20.4–26.8	24.6±2.0
Interorbital width	56.1	47.3–56.1	50.8±2.4	54.9	54.9–61.9	57.9±2.0

Head relatively small, slightly depressed, longer than wide and wider than high. Eye small, dorsolaterally located in posterior half of head, with a wide, slightly convex interorbital space. Snout rounded when viewed dorsally, obtuse when viewed laterally, with many tubercles on tip of snout and anterior portion of lachrymal, irregularly organized in two rows (Fig. 4A); tubercles large, tall, conical with sharp tips. Side of snout with a shallow furrow running from rostral barbel base to lateral extremity of rostral fold along anteroventral border of lachrymal. Two pairs of well-developed barbels, equal to or somewhat shorter than eye diameter. Rostral barbels placed at anterior end of shallow furrow on side of snout. Maxillary barbels rooted at corner of mouth or next to lateral extremity of rostral fold, slightly longer than rostral barbels. Mouth inferior, slightly arch-shaped.



**FIGURE 4.** Tubercles on tip of snout and anterior portion of lachrymal in: (A) *Hongshuia paoli*, IHB 200210911, holotype, 54.3 mm SL; (B) *Hongshuia banmo*, IHB 200410806, holotype, 57.4 mm SL.

Rostral fold crenulated with a deeply indented distal margin, covered densely with well-developed papillae, disconnected from lower lip at corners of mouth, or terminating next to base of maxillary barbel. Upper lip absent. Upper jaw bearing a thick, flexible, cornified sheath, covered by rostral fold, disconnected from lower lip at corners of mouth. Lower lip divided into two lateral lobes and one median lobe. Lateral lobe small, elliptical, positioned between maxillary barbel base and median lobe, covered densely with well-developed papillae. Median lobe large, modified to form a round, fleshy plate and situated between two lateral lobes. Fleshy plate peripherally greatly protruded so as to form a ring-like fold and centrally sunken so as to form a round, flat, fleshy pad. Anterior half of this fold covered densely with well-developed papillae, but posterior half and pad sparsely covered with weakly developed papillae. Ring-like fold anteriorly separated from lower jaw by a transverse, deep, and arched groove; this groove prolonged backwards and posteromedially along lateral and posterolateral margins of ring-like fold to become a shallow groove separating them from mental region; posteromedian margin of this fold posteriorly progressively reduced to be continuous with mental region. Lower jaw with a thick, flexible, cornified cutting edge.

Dorsal fin with 3 unbranched and 7\*(15) branched rays, last one split to base; origin nearer to tip of snout than to caudal-fin base; last unbranched ray longer than HL; distal margin slightly concave. Pectoral fin with 1 unbranched and 13(6) or 14\*(9) branched rays; third and fourth branched rays longest; tip of depressed fin extending beyond halfway to pelvic-fin origin. Pelvic fin with 1 unbranched and 8\*(15) branched rays, inserted vertically behind dorsal-fin origin; second branched ray longest; tip of depressed fin not reaching anal-fin origin but beyond vent; axillary scales long, extending beyond basis of last ray. Anal-fin with 3 unbranched and 5\*(15) branched rays, last one split to base; origin closer to pelvic-fin origin and to caudal-fin base; distal margin slightly concave. Three scales between vent and anal-fin origin. Caudal deeply forked; upper and lower lobes equal in length and shape, with pointed tips.

Scales moderately large. Lateral line complete, horizontal, 36\*(8) or 37 (7) scales plus 3 scales on caudal-fin base. Predorsal midline scales smaller than flank scales, irregularly arranged, not embedded under skin. Circumpeduncular scales 16\*(15).  $\frac{1}{2}$  / 1 /  $\frac{1}{4}$  (15) scales in transverse row anterior to pelvic fin. Chest and belly scaled, scales along midventral region smaller than flank scales, embedded beneath skin. Air bladder bipartite, anterior chamber oval and posterior chamber stick-like or elongate, twice as long as anterior one. Pharyngeal teeth biserial; tooth pattern 3-5-5-3 (3), with compressed and pointed tips. Vertebrae: 23+15=38 (4), 23+16=39 (5), or 24 +15=39\*(6).

**Coloration.** Ground color of body gray dorsally and laterally, yellow ventrally. Dorsal and lateral portions of head light brown. An inconspicuous longitudinal black stripe extending along lateral line on flank and terminating in a large blotch on caudal-fin base, broad anterior to vertical through posterior end of anal-fin base, with its width occupying approximately two scales widths, but narrow on caudal peduncle, with about one scale width. Each scale on back and flank with dark chromatophores along exposed portion of its posterior margin to form a faint, dusky, crescentic mark. Dorsal fin with dark chromatophores on middle interradi al membranes between branched rays to form black blotches. Dorsal surface of pectoral fin with small, scattered, dark chromatophores along branched rays, more so along last unbranched ray; caudal fin dusky with an indistinct submargin stripe along lobe; all other fins hyaline.

**Distribution.** Known only from the Hongshui He of the Pearl River drainage in Fengshan and Linyun counties, Guangxi Province, South China (Fig. 5).

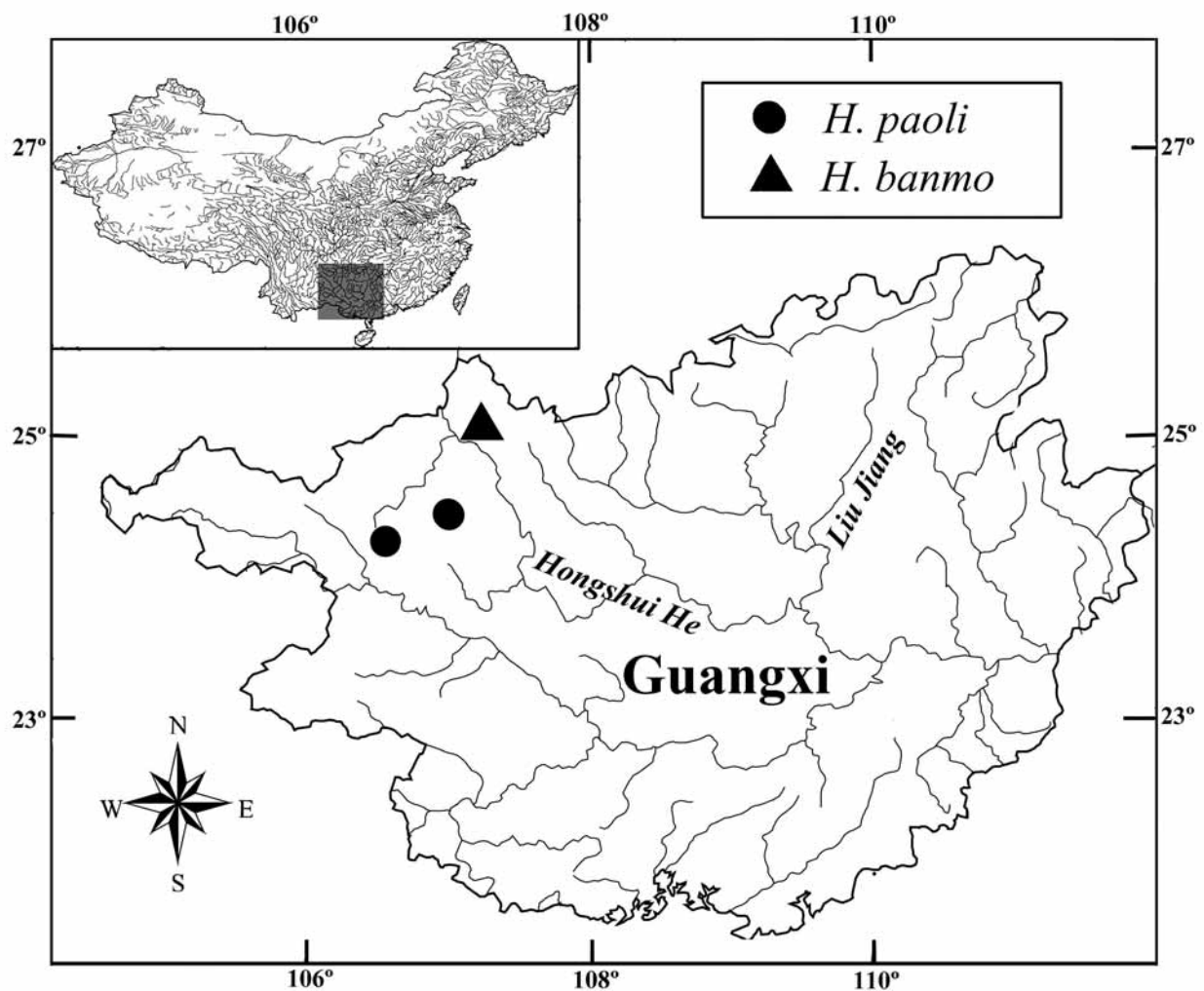


FIGURE 5. Map showing distributions of two species of *Hongshuia* in South China.

**Etymology.** The specific epithet is derived from the Chinese name of the type locality, ‘Pao Li,’ used as a noun in apposition.

**Comparison.** *Hongshuia paoli* can be distinguished from *H. banmo* in having a rostral fold covered densely (vs. sparsely) with well-developed (vs. weakly developed) papillae, with a deeply (vs. shallowly) indented distal margin; a median lobe of the lower lip with its ring-like fold and central fleshy pad (vs. anterior half of its ring-like fold) papillated; tubercles on the tip of the snout and anterior portion of the lachrymal large (vs. tiny), tall (vs. short), conical with sharp (vs. blunt) tips; a longer dorsal fin (length 23.7–26.9 % SL

vs. 21.8–23.4); dorsal fin origin nearer to the tip of the snout than to the caudal-fin base (vs. equidistant from the tip of the snout and caudal-fin base); black blotches on middle interradiation membranes between branched dorsal-fin rays (vs. absent); and a longer snout (length 50.0–57.0 % HL vs. 42.5–47.9).

***Hongshuia banmo*, new species**

(Figs. 2B, 3B, 4B; Table 1)

*Holotype*: IHB 200410806, 57.4 mm SL, China, Guangxi Province, Pearl River drainage, Hongshui He at Banmo village, Tian'e County, approximately 25°01'N, 107°10'E; J. H. Lan; October, 2004.

*Paratypes*: IHB, 200410805, 200410807-14, 9 ex., 38.7–46.3 mm SL, same data as holotype.

**Diagnosis.** A species of *Hongshuia* having rostral fold covered sparsely with weakly developed papillae, shallowly indented distal margin; median lobe of lower lip with anterior half of ring-like fold papillated; tubercle on tip of snout and anterior portion of lachrymal tiny, short, conical with blunt tips; short dorsal fin (length 21.8–23.4 % SL); dorsal-fin origin equidistant from tip of snout and caudal-fin base; no black blotch on middle interradiation membranes between branched dorsal-fin rays; and short snout (length 42.5–47.7 % of H).

**Description.** Morphometric data are summarized in Table 1. Refer to Figures 2B and 3B for general body appearance and morphology of the oromandibular structures, respectively. Body elongate, cylindrical anteriorly and slightly compressed posteriorly, with greatest body depth anterior to dorsal-fin origin and least depth of caudal peduncle nearer to caudal-fin base than to posterior end of anal-fin base. Dorsal profile of body from tip of snout to dorsal-fin origin somewhat convex; slightly concave from there to origin of dorsal procurrent caudal-fin rays. Ventral profile of body from snout tip to anal-fin origin rounded; slightly concave from anal-fin origin to origin of ventral procurrent caudal-fin rays.

Head relatively small, slightly depressed, longer than width and wider than height. Eye small, dorsolaterally located in middle of head, with a wide, slightly convex interorbital space. Snout rounded when viewed dorsally, obtuse when viewed laterally, with many tubercles on tip of snout and anterior part of lachrymal, irregularly arranged in two rows (Fig. 4B); tubercles tiny, short, conical with blunt tips. Side of snout with a shallow furrow extending from rostral barbel base to lateral extremity of rostral fold along anteroventral border of lachrymal. Two pairs of barbels, well-developed, almost equal to or shorter than eye diameter. Rostral barbels situated at anterior end of shallow furrow on side of snout. Maxillary barbels rooted at corner of mouth or next to lateral extremity of rostral fold, slightly longer than rostral barbels. Mouth inferior, slightly arch-shaped.

Rostral fold slightly crenulated with a shallowly indented distal margin, covered sparsely with weakly-developed papillae, disconnected from lower lip at corners of mouth, or terminating next to base of maxillary barbel. Upper lip absent. Upper jaw bearing a thick, flexible, cornified sheath, covered by rostral fold, disconnected from lower lip at corners of mouth. Lower lip divided into two lateral lobes and one median lobe. Lateral lobe small, oval or elliptical, covered sparsely with weakly-developed papillae, situated between maxillary barbel base and median lobe. Median lobe large, modified into a round, fleshy plate, positioned between two lateral lobes. Fleshy plate peripherally greatly protruded so as to form a ring-like fold, but centrally sunken so as to form a round, flat, fleshy pad. Anterior half of this fold covered sparsely with weakly-developed papillae, but posterior half and this fleshy pad smooth. Ring-like fold anteriorly separated from lower jaw by a transverse, deep, arched groove; this groove prolonged backwards and posteromedially along lateral and posterolateral margins of ring-like fold to become a shallow one separating them from mental region. Posteromedian of ring-like fold posteriorly progressively reduced to be continuous with mental region. Lower jaw bearing a thick, flexible, cornified cutting edge.

Dorsal fin with three unbranched and 7\* (10) branched rays, last one split to base; origin equidistant from



tip of snout and caudal-fin base; last unbranched ray shorter than HL, distal margin slightly concave. Pectoral fin with one unbranched and 13\*(7) or 14 (3) branched rays; third and fourth branched rays longest; tip of depressed fin reaching beyond midway to pelvic- fin origin. Pelvic fin with one unbranched and 7\*(10) branched rays, inserted vertically behind dorsal-fin origin; second branched ray longest; tip of depressed fin not reaching anal-fin origin but beyond vent, axillary scales long, extending beyond basis of last ray. Anal-fin having three unbranched and 5\*(10) branched rays, last one split to base; distal margin somewhat concave; origin nearer to pelvic-fin origin and to caudal-fin base. Two scales between vent and anal-fin origin. Caudal deeply forked; both lobes pointed, upper slightly longer than lower

Scales moderately large. Lateral line complete, horizontal, 37\*(8) or 38 (3) plus 3 scales on caudal- fin base. Predorsal midline scales smaller than flank scales, irregularly arranged, not embedded under skin. Circumpeduncular scales 16\*(10).  $1/2$  /  $1/4$   $1/2$  \*(10) scales in transverse row anterior to pelvic fin. Chest and belly scaled; scales along midventral region smaller than flank scales, embedded beneath skin. Air bladder bipartite, anterior chamber oval and posterior chamber stick-like or elongate, twice as long as anterior one. Pharyngeal teeth biserial; teeth pattern 3,5-5,3 (1), with compressed and pointed tips. Vertebrae 23+16 =39 (3), 24 +15=38 (5), or 24+16 = 40\*(2).

**Coloration.** Ground color of body yellow, slightly lighter ventrally. Dorsal and lateral parts of head grayish. An indistinct longitudinal black stripe extending along lateral line on flank and ending in a large blotch on caudal-fin base, broad anterior to vertical through posterior end of anal-fin base, with its width occupying approximately two scales widths, but narrow on caudal peduncle, with one scale width. Each scale on back and flank above second scale row below lateral line with dark chromatophores along exposed portion of its posterior margin forming a faint, dusky, crescentic mark. Dorsal fin with a black base, and all rays hyaline. Dorsal surface of pectoral fin with a lot of small, scattered, dark chromatophores along branched rays, more so on last unbranched ray. Caudal fin dusky with an indistinct submargin stripe along lobe. All other fins hyaline.

**Distribution.** Known only from the Hongshui He of the Pearl River drainage in Tian'e County, Guangxi Province, China (Fig. 5).

**Etymology.** The specific epithet is derived from the Chinese name of the type locality, 'Ban Mo,' used as a noun in apposition.

## Discussion

There are three basic patterns of oromandibular structures among Southeast and East Asian genera of the Labeonini (Zhang & Chen, 2004; Zhang *et al.*, 2006). The first one is characteristic of the subtribe Labeonina (= Labeones of Rainboth, 1996), in which the upper lip is separated from the skin of the snout by a deep groove, with its base more or less covered by a rostral fold. It occurs in seven genera found in Asia: *Osteochilus* Günther, 1868 (type species: *Rohita melanopleura* Bleeker, 1852), *Henicorhynchus* Smith, 1945 (type species: *Henicorhynchus lobatus* Smith, 1945), *Bangana* Hamilton, 1822 (type species: *Cyprinus dero* Hamilton, 1822), *Schismatorhynchos* Bleeker, 1855 (type species: *Lobocheilus heterorhynchos* Bleeker, 1853), *Labeo* Cuvier, 1816 (type species: *Cyprinus niloticus* Forsskal, 1775), *Labiobarbus* van Hasselt, 1823 (type species: *Labiobarbus leptocheilus* Valenciennes, 1842) and *Lobocheilos* Bleeker, 1853 (type species: *Labeo falcifer* Valenciennes, 1842). The second pattern is exhibited in *Qianlabeo* and *Sinilabeo*. These two genera have an upper lip present only on the side of the upper jaw, exposed or uncovered by the rostral fold; the median portion of the upper jaw lacks an upper lip and, instead, bears a thin, flexible and cornified sheath. The third pattern is present in the subtribe Garrina (= Garrae sensu Rainboth, 1996), whose upper lip is greatly reduced or replaced by a rostral fold that entirely covers and is separated from the upper jaw by a deep groove. It is found in *Hongshuia* and is typical of the following genera: *Epalzeorhynchos* Bleeker, 1855 (type species: *Barbus kalopterus* Bleeker, 1850), *Akrokolioplax*, *Parasinilabeo*, *Sinocrossocheilus*, *Crossocheilus* Kuhl and van

Hasselt, 1823 (type species: *Crossocheilus oblongus* Kuhl and van Hasselt, 1823), *Rectoris* Lin, 1935 (type species: *Rectoris posehensis* Lin, 1935), *Paracrossochilus* Popta, 1904 (type species: *Paracrossochilus bicornis* Popta, 1904), *Pseudocrossocheilus*, *Discogobio* Lin, 1931 (type species: *Discogobio tetrabarbatus* Lin, 1931), *Discocheilus* Zhang, 1997 (type species: *Discolabeo wui* Chen and Lan, 1992), *Garra* Hamilton, 1822 (type species: *Cyprinus lamta* Hamilton, 1822), *Placocheilus* Wu, 1977 (type species: *Discognathus caudofaciatus* Pellegrin and Chevey, 1936), *Pseudogyrinocheilus* Fang, 1933 (type species: *Discognathus prochilus* Sauvage and Dabry, 1874), and *Semilabeo* Peters, 1880 (type species: *Semilabeo notabilis* Peters, 1880).

Among the subtribe Garrina, *Hongshuia* is morphologically similar to *Sinocrossocheilus* s. str., which has been revised by Zhang and Huang (unpubl. data) to include only two species: viz. *S. guizhouensis* and *S. labiatus* Su, Yang and Cui, 2003 known, respectively, from the Wu Jiang and Chishui He of the upper Yangtze River drainage in Guizhou Province. Both share well-developed maxillary barbels, seven branched dorsal-fin rays, two rows of pharyngeal teeth, and a rostral fold disconnected from the lower lip at the corners of the mouth, but differ in the details of the lower lip morphology and in their colour pattern. See the diagnosis section for details

*Hongshuia* also shares the presence of a crenulated rostral fold disconnected from the lower lip at corners of the mouth with *Crossocheilus*, *Epalzeorhynchus*, *Paracrossochilus*, and *Akrokolioplax*. In addition to its unique morphology of the lower lip, *Hongshuia* can be easily distinguished from these genera by the presence of two (vs. three) rows of pharyngeal teeth. It further differs from *Crossocheilus* (sensu Roberts, 1989) in lacking an upper lip that is well-developed and separated from the upper jaw, margined with minute projections, connected with the lower lip around corners of the mouth (vs. present); from *Epalzeorhynchus* (sensu Kottelat, 2001) in the absence of one pair of rostral lobes on the snout positioned between the sublachrymal groove and rostral barbel (vs. presence); from *Akrokolioplax* in lacking one pair of rostral flaps on the snout positioned far from the rostral barbel and sublachrymal groove (vs. present); and from *Paracrossochilus* (sensu Roberts, 1989) in the lack of a papillated upper lip separated from the upper jaw, well-developed on the sides, with the median part absent or vestigial (vs. presence).

The close relationship of *Hongshuia* with *Discocheilus*, *Placocheilus* and *Discogobio* is indicated by two rows of pharyngeal teeth, a character that can be used to separate all of them plus *Sinocrossocheilus* from all other existing Asian labeonine genera. Zhang (2005) revealed that *Discocheilus*, *Placocheilus* and *Discogobio* constitute a monophyletic lineage with *Garra* among the Labeonini. The above four genera, usually called the 'disc-bearing group,' are uniquely characterized by possessing a lower lip modified into a mental disc whose posterior margin is free and discontinuous with the mental region. *Hongshuia* can be separated from the disc-bearing genera in the presence of two pairs of well-developed barbels (vs. one pair or absent, weakly developed), and a rostral fold disconnected (vs. connected) from the lower lip at the corners of the mouth. According to the developmental degree of the continuity between the median lobe of the lower lip and mental region, it is highly likely that the pattern of the lower lip morphology exhibited by *Hongshuia* is intermediate between that of *Sinocrossocheilus* and the disc-bearing group. Even so, we are hesitant to conclude that the lower lip morphology is homologous to that in the disc-bearing group, *Hongshuia* and *Sinocrossocheilus* without a phylogenetic analysis of all Labeonini genera.

The differences in the lower lip morphology between *Hongshuia* and *Sinocrossocheilus* are minor, but have important ecological implications. The Labeonini is usually composed of species that are adapted to rapid-water habitats and feed on diatoms, filamentous algae and organic detritus, and has a high diversity of morphological modifications in oromandibular structures unmatched by any other cyprinid group (Zhang *et al.*, 2000). These morphological modifications includes the degree of development and specialization of the rostral cap and lips, and the presence or absence of horny jaw sheaths on the jaws in addition to, or in place of, the normal lips (Roberts, 1982). No doubt, the success of the Labeonini as one of the major groups adapted for the rapid-water is mainly credited to the diversity of oromandibular structures. The lips and associated structures (=oromandibular structures), in different fish groups, are greatly modified in relation to the characteristic

mode of feeding, food preference and the mode of life exhibited by the fish (Pinky *et al.*, 2004). In *Sinocrossocheilus* the median lobe of the lower lip is modified into two portions: a crescentic, papillated fold and a slightly protruded, papillated, roughly triangular fleshy pad. Presumably, this papillose crescentic fold is functionally similar to Ojha and Singh's (1992) arched lower lip (= anteromedian lobe of the lower lip of Zhang *et al.*, 2002) of *Garra lamta* (Hamilton, 1822), which works as a food scraper. This papillated, roughly triangular fleshy pad is analogous to the densely papillated, triangular area of a central callous pad (see Zhang, 2005: fig.11B) of the mental disc modified from the lower lip of Chinese species of *Discogobio*. Scanning electron microscopic study on the mental disc of *Discogobio yunnanensis* (Regan, 1907) proved that papillae on the surface of the triangular area of its central callous pad have numerous brush-like tentacles that may assist the fish in its firm anchorage to the substrate (Zhou *et al.*, 1993). The median lobe of the lower lip in *Hongshuia* is modified into a papillose, greatly protruded, ring-like fold and a round, sunken, slightly papillated, flat fleshy pad. These structures possibly work as not only food scrapers, but also a sucking apparatus functionally analogous to the mental disc found in *Garra*, that enables the fish to adhere to the surface of the substrates and protect it from being swept away by fast-flowing waters. The dissimilarity of the lower lip morphology between *Hongshuia* and *Sinocrossocheilus* is indicative of different ecological strategies. The differences in the lower lip morphology and their probable functions are considered here to be justifications for establishment of *Hongshuia* as a genus distinct from *Sinocrossocheilus*.

The generic recognition of *Hongshuia* also reflects the allopatric distribution between it and *Sinocrossocheilus*, as well as their color pattern dissimilarity. *Hongshuia* is known only in the Hongshui He of the Pearl River drainage in Guangxi Province while *Sinocrossocheilus*, composed of only two species *S. guizhouensis* and *S. labiatus*, is distributed in the upper Yangtze River drainage.

## Comparative material

*Akrokolioplax bicornis*: IHB 64.8.1 (holotype), 108.8 mm SL, Salween River drainage, Yunnan, China. *Crossocheilus reticulatus*: IHB 78V0265–7, 78V0275, 3 ex., 54.0–66.2 mm SL, Mekong River drainage, Yunnan, China. *Epalzeorhynchus kalopterus*: CMK 11613, 3 ex., 30.5–75.2 mm SL, Kapuas drainage, Borneo, Indonesia. *Paracrossochilus vittatus*: CMK 10831, 1 ex., 64.3 mm SL, Batang Ai drainage, Sarawak, Malaysia. *Parasinilaeo assimilis*: IHB 75IV29–32, 75IV626–7, 6 ex., 78.0–93.0 mm SL, Pearl River drainage in, Guangxi, China. *Pseudocrossocheilus bamaensis*: IHB 743119, 743136, 73422, 76092, 4 ex., 100.0–108.0 mm SL, Pearl River drainage, Guangxi, China; *P. liuchengensis*: IHB 82VII1521–3, 82VII1528, 4 ex., 68.0–81.0 mm SL, Pearl River drainage, Guangxi, China. *Qianlabeo striatus*: IHB 800858 (holotype), 800933, 800879, 8000892, 800917, 5 ex., 57.2–67.5 mm SL, Pearl River drainage, Guizhou, China. *Sinocrossocheilus guizhouensis*: IHB 6650415–6, 6650503–5, 6650508, 6 ex., 53.0–76.0 mm SL, Wu Jiang of upper Yangtze River drainage, Guizhou, China.

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