



***Botia udomritthiruji*, a new species of botiid loach from southern Myanmar (Teleostei: Botiidae)**

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Abstract

Botia udomritthiruji **sp. nov.** is described from the Tenasserim River drainage in southern Myanmar. It can be distinguished from congeners by its color pattern, consisting of five dark vertical bars on the body, with the central portion of these bars paler than its edges; with increasing age, the edges of these bars become more irregular and darker, and irregular dark spots on the pale interspaces begin to form, sometimes fusing with the edges of the vertical bars. In morphology, it differs from congeners by a combination of: body depth at anus 23.4–27.7% SL, caudal peduncle depth 15.9–18.7% SL, and 12 dorsal-fin rays. Evidence for considering *B. macrolineata* a junior synonym of *B. dario* and for considering *B. rostrata* a species distinct from *B. almorhae* is also presented here.

Key words: Tenasserim, Ostariophysi, Cypriniformes

Introduction

The Botiidae is a group of loaches inhabiting the rivers and streams of southern and eastern Asia. Although there is very strong support for the monophyly of the group (Sawada, 1982; Šlechtová *et al.*, 2006), the higher level relationships of the Botiidae were poorly known until recent studies showed them to be the sister group of all other loaches (Tang *et al.*, 2006; Šlechtová *et al.*, 2007). Until recently, the Botiidae was considered a subfamily of the Cobitidae (e.g. Nalbant, 1963), and morphological data from Sawada (1982) supports this hypothesis with two synapomorphies: (1) modification of the lateral ethmoid to form a movable structure articulating with the orbitosphenoid and (2) posterodorsal edge of supraethmoid-ethmoid complex articulating with the frontals. There has been no detailed study of the phylogeny of cobitoid fishes utilizing morphological data since Sawada (1982), so it is not possible at this point to verify Sawada's hypothesis using morphological data alone. The decision to elevate the Botiidae to family level in this study despite morphological evidence presented to the contrary in Sawada (1982) follows suggestions presented in recent morphological (Nalbant, 2002) and molecular studies (Šlechtová *et al.*, 2006; 2007; Tang *et al.*, 2005; 2006). Botiid loaches are easily characterized by their elongate snouts, the presence of two pairs or barbels at the tip of the snout, strongly forked caudal fins and their strongly compressed bodies; many species are exported in large numbers for the aquarium trade.

Recently, specimens of an unnamed botiid loach from the Tenasserim River drainage in southern Myanmar have been imported for the aquarium trade under the name “emperor botia” or “emperor loach”. Thanks to the assistance of Kamphol Udomritthiruj, I had the opportunity to examine this material and obtain information on the collecting locality. This uniquely patterned loach is herein described as a new species.

Material and methods

Measurements were made with dial calipers and data recorded to 0.1 mm. Counts and measurements were made on the left side of specimens whenever possible. Subunits of the head are presented as proportions of head length (HL). Head length itself and measurements of body parts are given as proportions of standard length (SL). Measurements and counts were made following Kottelat (1990), except for head length, which is measured as the lateral head length of Kottelat (1990). Numbers in parentheses after a meristic count indicate number of specimens observed with that count. Asterisks after a meristic count indicate the condition for the holotype.

Botia udomritthiruji sp. nov.

(Figs. 1–3)

Type material. *Holotype.* UMMZ 248184, 107.0 mm SL; Myanmar: Taninthayi division, Tenasserim River drainage in the vicinity of Same, 13°36'N 99°2'E; K. Jarutanin, 29 March 2007.

Paratypes. UMMZ 248185 (2), 58.9–81.9 mm SL; ZRC 50984 (14), 55.2–114.6 mm SL; data as for holotype. NRM 56791 (3), 68.8–97.5 mm SL; locality as for holotype; K. Jarutanin, February 1993.

Diagnosis. *Botia udomritthiruji* can be distinguished from congeners by its color pattern, which includes five dark vertical bars on the body, with the central portion of these bars paler than its edges; with increasing age, the edges of these bars become more irregular and darker, and irregular dark spots on the pale interspaces begin to form, sometimes fusing with the edges of the vertical bars. It can be further distinguished from congeners in having a unique combination of: body depth 23.4–27.7% SL (vs. 18.9–22.3 in *B. almorhae* and 19.7–24.0 in *B. kubotai*), caudal peduncle depth 15.9–18.7% SL (vs. 11.1–14.5 in *B. dario*), and 12 dorsal-fin rays (vs. 13–14 in *B. kubotai*).

Description. Morphometric values as given in Table 1. Overall morphology as in Fig.1. Head and body strongly compressed. Head in lateral view acutely triangular, with gently convex dorsal and ventral margins. Eye ovoid, horizontal axis longest; located on dorsal half of head. Gill openings restricted, extending from just below posttemporal to just anterior to base of first pectoral-fin ray. Slit for erectile suborbital spine extending from vertical through one third distance between posterior margin of posterior nares and anterior margin of orbit to below vertical through posterior margin of orbit. Suborbital spine (part of modified lateral ethmoid) bifid and moderately curved, with long main process and shorter dorsocaudal process; main process extending to vertical through posterior orbital margin; both processes attached to side of head by flap of skin. Mouth horseshoe-shaped, rictus at vertical through anterior margin of anterior nares. Upper and lower lips thick, with numerous plicae. Upper lip with median shallow notch accommodating symphysis of lower lip. Lower lip interrupted at symphysis, with a pair of mental lobes located on either side. Mental lobes with pair of fleshy papillae anteriorly. Six pairs of barbels: two pairs of rostral, one pair of maxillary and one pair of mandibular barbels. Rostral and maxillary barbels of approximately equal length and longer than eye diameter; mandibular barbels shorter, about three-quarters of eye diameter.

Body deepest at origin of first dorsal-fin ray. Scales very small, partially overlapping and deeply embedded. Dorsal profile rising gently from tip of snout to origin of dorsal fin and sloping gently ventrally from origin of dorsal fin to end of caudal peduncle. Ventral profile straight or gently convex to pelvic-fin base, then straight or gently concave to anal-fin base and sloping dorsally to end of caudal peduncle. Dorsal-fin origin located slightly in front of pelvic-fin origin, slightly behind midpoint of body (considered in SL); dorsal fin with iii,9 (20) rays. Pectoral fin with ii,10 (2) or ii,11* (18) rays, reaching to vertical through base of first dorsal-fin ray. Pelvic fin with ii,6 (20) rays, and reaching beyond anus but not to base of first anal-fin ray. Origin of anal fin approximately at vertical through midway between base of last dorsal-fin ray and caudal-fin base;

anal fin with iii,5 (1) or iii,6* (19) rays. Caudal fin forked, with i,9,8,i (20) rays; lower lobe slightly broader and rounder than upper lobe.

TABLE 1. Morphometric data for *Botia udomritthiruji* (n=20).

| | Holotype UMMZ 248184 | Range | Mean \pm SD |
|------------------------|-------------------------|------------|-----------------|
| Standard length (mm) | 107.0 | 55.2–114.6 | |
| %SL | | | |
| Head length | 28.2 | 27.5–32.2 | 29.5 \pm 1.36 |
| Predorsal length | 52.4 | 51.4–55.8 | 53.4 \pm 1.41 |
| Prepelvic length | 53.4 | 53.1–57.7 | 55.0 \pm 1.37 |
| Preanal length | 77.7 | 74.8–79.7 | 78.0 \pm 1.37 |
| Body depth | 24.8 | 23.4–27.7 | 25.6 \pm 1.36 |
| Caudal peduncle depth | 15.9 | 15.9–18.7 | 17.2 \pm 0.80 |
| Caudal peduncle length | 15.3 | 15.3–19.2 | 17.0 \pm 1.21 |
| Body width | 15 | 13.6–16.4 | 14.6 \pm 0.76 |
| %HL | | | |
| Snout length | 60.3 | 50.6–61.9 | 55.2 \pm 3.18 |
| Interorbital distance | 29.5 | 27.6–33.7 | 29.9 \pm 2.08 |
| Eye diameter | 14.9 | 14.1–21.5 | 16.8 \pm 2.28 |

Coloration. Base color of all preserved material a light yellowish brown, darkening in time to light brown. In smallest available specimens (ca. 50–80 mm SL), body with a series of five dark vertical bars: first at nape, second approximately midway between nape and base of first dorsal-fin ray, third below dorsal-fin base, fourth approximately midway between base of last dorsal-fin ray and caudal-fin base, and last at caudal-fin base. Dark bars frequently with dark margins and pale central region, causing each bar to appear as double bar. Interspaces approximately as wide as dark bars. Head with vertical mark in shape of irregular inverted Y extending over orbit and with dark stripe on dorsal surface extending from just anterior to orbit to tip of snout (Figs. 2a–b).

In specimens about 80–100 mm SL, sides of vertical dark bars on body becoming more wavy, few faint dark blotches (usually as vertical series of ovoid patches) appearing on interspaces. Dark head markings becoming more extensive, giving appearance of irregular pale lines on head (Fig. 2c).

In specimens above 100 mm SL, dark markings on interspaces more prominent, beginning to fuse with margins of vertical bars. Pale interspaces between dark head markings becoming more diffuse and irregular in outline (Fig. 2d).

Dorsal fin with dark broad basal bar, usually continuing from third vertical bar on body, and dark subdistal bar; subdistal bar frequently irregular and broken up into series of irregular blotches, particularly in some specimens above 100 mm SL. Pectoral fins with two or three irregular dark transverse bands on dorsal surface. Pelvic fins with dark sub-basal spot on dorsal surfaces of branched rays; spot sometimes absent in specimens under 80 mm SL. Anal fin with dark transverse sub-basal band, and in some specimens above 100 mm SL dark subdistal spot on second and third branched anal-fin rays; sub-basal band absent in specimens under 70 mm SL. Caudal fin with two to four dark wavy transverse bands on each lobe, anteriormost band continuous across entire fin.

Live coloration similar to preserved coloration, but may be more coppery in some individuals that show decreased contrast between vertical bars and base color (Fig. 3a) and brown in others (Fig. 3b). Lips and barbels suffused with strong red hue in some individuals.



FIGURE 1. *Botia udomritthiruji*, holotype, UMMZ 248184, 107.0 mm SL; Myanmar: Tenasserim River drainage.

Distribution. *Botia udomritthiruji* is known only from the Tenasserim River drainage (Fig. 4). This represents the first record of the genus from the Tenasserim River drainage, although its presence there is to be expected given that it has been previously recorded in adjacent river drainages.

Etymology. This species is named in appreciation after Kamphol Udomritthiruj, who provided the author with not only the type material and associated data for this species, but also material and data for other projects.

Discussion

The taxonomy of botiid loaches is not fully resolved, particularly for the South Asian species. Until recently, more than twenty species from throughout South, East and Southeast Asia have been referred to the genus *Botia*; the exact composition of *Botia sensu lato* differs because different numbers of valid botiid genera have been recognized by numerous authors (e.g. Taki, 1972; Chen, 1980). Kottelat (2004) then restricted the use of

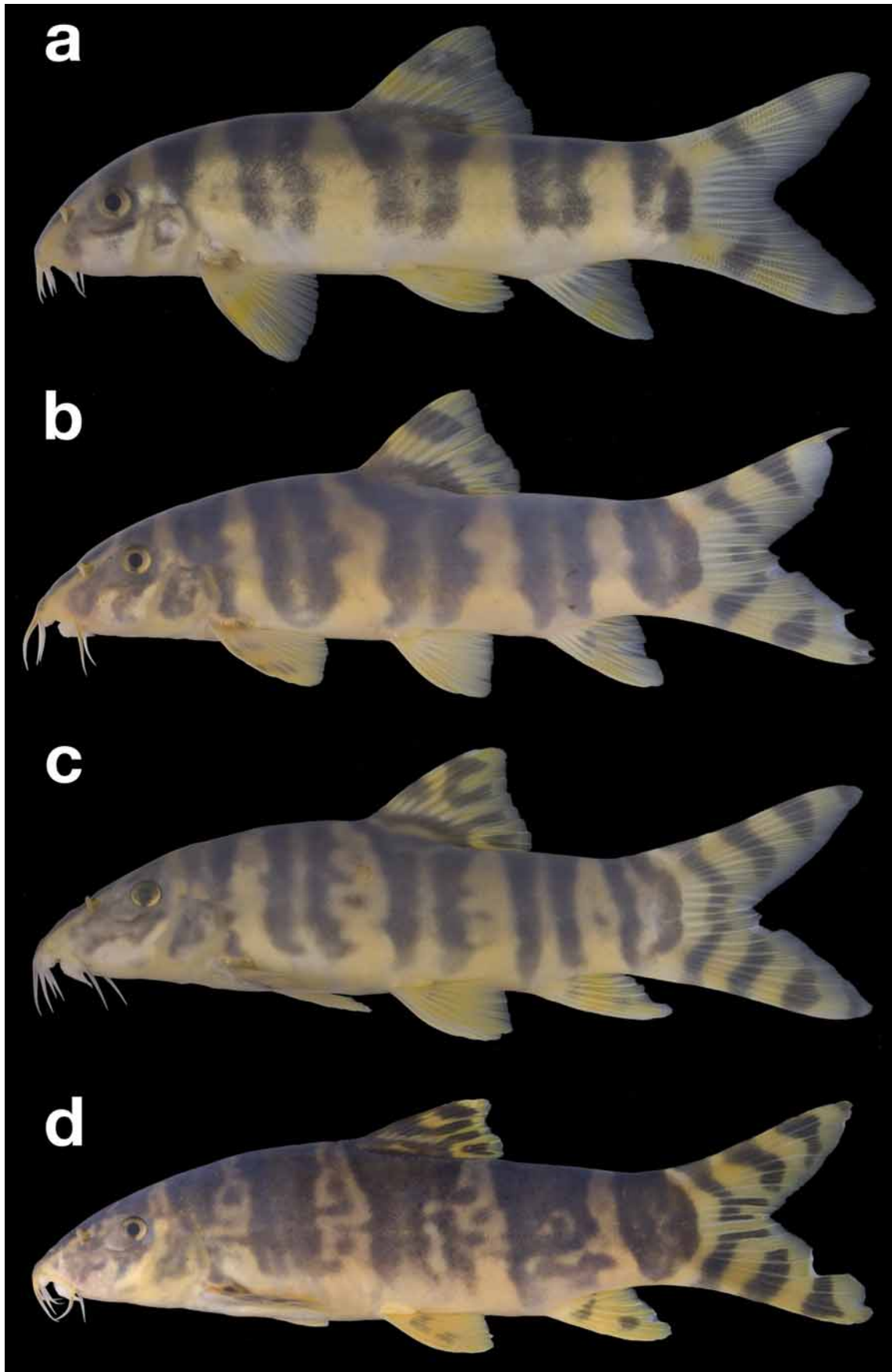


FIGURE 2. *Botia udomritthiruji*, showing ontogenetic change in color pattern: a. ZRC 50984, paratype, 55.2 mm SL; b. UMMZ 248185, paratype, 81.9 mm SL; c. ZRC 50984, paratype, 91.4 mm SL; d. ZRC 50984, paratype, 114.6 mm SL.



FIGURE 3. Live coloration of *Botia udomritthiruji*: a. ZRC 50984, paratype, 84.6 mm SL (photograph by H.W. Choy); b. aquarium specimen ca. 105 mm SL (not preserved; photograph by B.K.Y. Lee).

Botia to seven species from South and Southeast Asia diagnosed by the following characters: mental lobe developed into a barbel; fronto-parietal fontanelle narrow; anterior chamber of gas bladder almost entirely covered by bony capsule, posterior chamber large or reduced; anterior process of premaxilla entire, not surrounding a cavity, rostral process long, with distinct ridge along inner edge; top of supraethmoid narrow or broad, optic foramen very small; suborbital spine bifid and not strongly recurved; head naked. Although it was not possible to examine all of the osteological characters used above to diagnose *Botia*, *B. udomritthiruji* possesses a mental lobe developed into a barbel and a suborbital spine that is bifid and not strongly recurved. On the basis of these characters, the new species is assigned to *Botia* (sensu Kottelat).

The taxonomy used here follows that of Kottelat (2004), except in the case of *B. macrolineata* and *B. rostrata*. My examination of material referable to *B. dario* from the Ganges and Brahmaputra river drainages and comparison with the illustration and data in Teugels *et al.* (1986) reveal no significant differences in morphometrics, meristics or color pattern. *Botia macrolineata* is said to be distinguished from *B. dario* by a smaller eye, but I could discern no differences in eye diameter as measured from material examined (13.2–25.0% HL) and that reported by Teugels *et al.* (1986) (21.8–24.9% HL). Given this result, I therefore conclude that *B. macrolineata* is a subjective junior synonym of *B. dario*. Kottelat (2004) also considers *B. rostrata* a possible junior synonym of *B. almorhae*, following Menon (1992). I have examined a specimen identified as *B. rostrata* from Bangladesh (UMMZ 208800), which is in close agreement with the original description (Günther, 1868). This specimen is noticeably different both in color pattern (see Fig. 5 for a comparison of *B. rostrata* and *B. almorhae* of approximately the same size) and in body depth from *B. almorhae* (24.4% SL in *B. rostrata* vs. 18.9–22.3 in *B. almorhae*). Based on the evidence above, I consider *B. rostrata* to be a valid species.

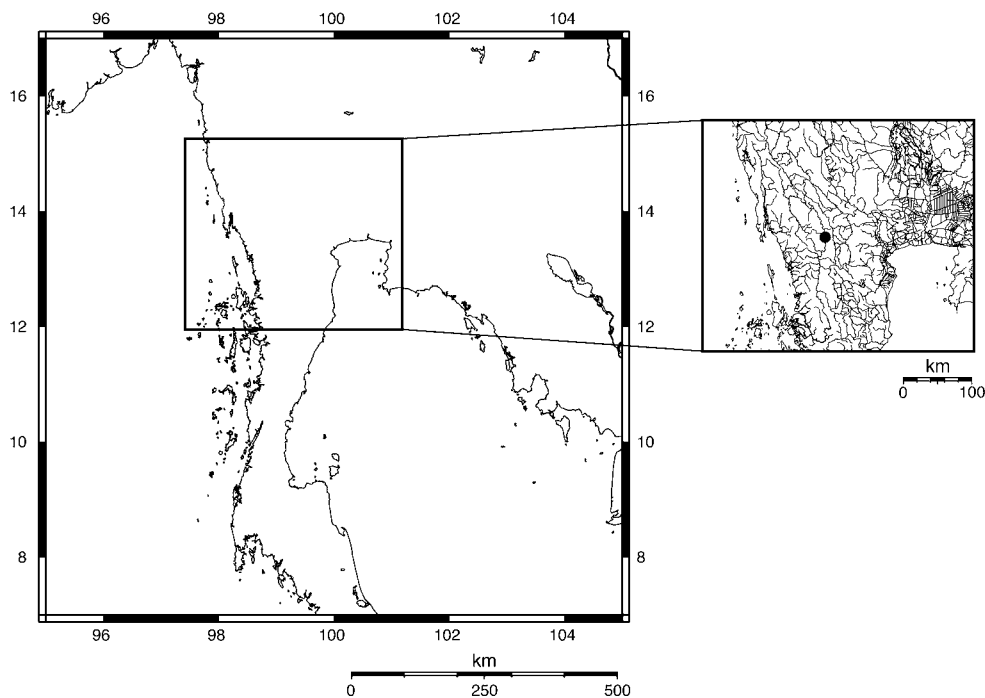


FIGURE 4. Map showing type locality of *Botia udomritthiruji*.

Two other species of *Botia* are known from Myanmar: *B. histrionica* and *B. kubotai* (fide Kottelat, 2004). *Botia udomritthiruji* can be easily distinguished from both by color pattern: the vertical bars on *B. histrionica* are narrower, with the interspaces about 1.5–2 times (vs. approximately equal to) the width of the bars; in specimens larger than ca. 70 mm SL, the vertical bars in *B. histrionica* become very irregular or completely dissociated into a series of irregular, anastomosing stripes (vs. vertical bars always present in *B. udomritthiruji* of all sizes; compare Fig. 2 with Kottelat, 2004: Fig. 3). *Botia kubotai* possesses three black stripes and five black bars enclosing a series of elongate yellow blotches and never possesses distinct vertical bars any time during its ontogeny (Kottelat, 2004: Fig. 1). *Botia udomritthiruji* can be further distinguished from *B. kubotai* in having a deeper body (23.4–27.7% SL vs. 19.7–24.0) and fewer dorsal-fin rays (12 vs. 13–14).

The color pattern of *B. udomritthiruji* is unique within the genus and is most similar to that of *B. dario*, a species known from the Ganges and Brahmaputra river drainages in the northern part of the Indian subcontinent, which also shows a pattern of distinct vertical bars. However, *B. dario* possesses more vertical bars on the body (7 vs. 5) with narrower interspaces (interspaces narrower than vertical bars vs. approximately equal), and always lacks any distinct dark markings on the interspaces (vs. dark markings always present on specimens above ca. 85 mm SL). Furthermore, *B. dario* possesses a slenderer caudal peduncle than *B. udomritthiruji* (11.1–14.5% SL vs. 15.9–18.7).

Botia udomritthiruji is easily distinguished from *B. almorhae* and *B. birdi* in having distinct vertical bars (vs. vertical bars Y-shaped, anastomosing or indistinct), and from *B. striata* in having only 5 (vs. 8–10) vertical bars that lack (vs. with) a distinct pale stripe in the middle of each vertical bar. *Botia udomritthiruji* further differs from *B. almorhae* in having a deeper body (23.4–27.7% SL vs. 18.9–22.3). *Botia udomritthiruji* differs from the sole specimen of *B. rostrata* examined in lacking (vs. with) pale spots within the dark vertical bars (compare Figs. 2a and 5b).

Comparative material

Botia almorhae: MCZ 4028 (3), 39.1–50.2 mm SL; India: Himachal Pradesh, Markanda River. UMMZ 244792 (2), 45.9–57.3 mm SL; ZRC 50985 (2), 50.6–51.8 mm SL; India: West Bengal, Kartowoa River at

barrage in Ambari, 26°35'40.0"N 88°29'48.0"E. UMMZ 244844 (7), 44.3–58.4 mm SL; ZRC 50986 (3), 47.2–50.8 mm SL; India: West Bengal, Tista River at Tista barrage, 26°45'1.0"N 88°35'11.0"E.



FIGURE 5. Lateral views of: a. *Botia almorhae*, UMMZ 244844, 44.3 mm SL; b. *B. rostrata*, UMMZ 208800, 42.6 mm SL, showing differences in color pattern and body depth.

B. birdi: Data from Kullander *et al.* (1999).

B. dario: CAS 94008 (17), 63.5–89.0 mm SL; India: Bihar, Ganges river at Patna. UMMZ 208723 (64), 41.2–92.3 mm SL; Bangladesh: Sylhet, Sharighat bazaar, 3.5 km NE of Sylhet on Sylhet–Shillong highway, Surma (Meghna) drainage, 25°4'N 92°7'E. UMMZ 244948 (1), 87.2 mm SL; India: West Bengal, Hooghly River at Ranaghat. ZRC 50983 (5), 40.0–48.6 mm SL; India: West Bengal, Bhagirathi River at crossing point between Kalna and Nisinghapur, 23°13'33.0"N 88°32'41.4"E.

B. histrionica: CAS 88808 (2), 41.8–72.2 mm SL; Myanmar: Mandalay markets. CAS 88887 (1), 96.1 mm SL; Myanmar: Kachin, Myitkyina market. Additional data from Kottelat (2004).

B. kubotai: ZRC 47750 (4), 34.4–43.2 mm SL; ZRC 49185 (3), 43.9–55.7 mm SL; Thailand: aquarium trade. Additional data from Kottelat (2004).

B. rostrata: UMMZ 208800 (1), 42.6 mm SL; Bangladesh: Piyain Gang River at Songram Punji, 400 m from Indian border.

B. striata: ZRC 9425–9428 (4), 27.1–35.8 mm SL; ZRC 38900 (4), 29.3–33.7 mm SL; India: aquarium trade. Additional data from Narayan Rao (1920).

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