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***Opsarius putaoensis*, a new species of subfamily Danioninae (Actinopterygii, Cyprinidae) from the Irrawaddy River basin in northern Myanmar**

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Abstract

Opsarius putaoensis, new species, is described from the Mali Hka River, a tributary of the Irrawaddy River in northern Myanmar. For convenience of identification, *Opsarius* sensu Rainboth (1991) in Southeast Asia and India can be divided into two species groups based on the number of anal-fin rays: (1) the *O. gatensis* species group with more than 12 branched anal-fin rays, and (2) the *O. barna* species group with fewer than 11 branched anal-fin rays. The remaining species of the *O. barna* species group can be divided into two species subgroups by the presence or absence of barbels: (1) the *O. chatricensis* species subgroup without barbels, and (2) the *O. barnoides* species subgroup with one or two pairs of barbels. *Opsarius putaoensis* sp. nov. is a member of the *O. chatricensis* species subgroup together with *O. chatricensis*, *O. arunachalensis*, and *O. barna*. *Opsarius putaoensis* is most similar to *O. chatricensis* in overall appearance, including the number of vertical bars and color pattern, but it differs from *O. chatricensis* by the following characters: insertion of dorsal not reaching posterior end of pelvic fin base vs. reaching, vertical bars 6–7 vs. 7–8, vertical bars extending to the lateral line vs. not, branched anal-fin rays 9 vs. 10, branched pelvic-fin rays 7 vs. 8, branched pectoral-fin rays 12, rarely 11 vs. 11, circumpeduncular scales 12 vs. 14, and scale rows between dorsal-fin origin and lateral line 7–8 vs. 6. It is distinguished from all other species of the genus *Opsarius* by a combination of the following characters: barbels absent, dentary with parallel rows of tubercles, snout much shorter than eye diameter, mouth gape below anterior edge of orbit, body deep with depth 25.6–33.3% SL, pectoral and pelvic axial scales lobate, lateral line completely perforated with 35–38 scales, scale rows between dorsal-fin origin and lateral line 7–8, predorsal scales 15, circumpeduncular scales 12, branched dorsal-fin rays 7, branched anal-fin rays 9, branched pelvic-fin rays 7, insertion of dorsal not reaching pelvic-fin base, body with 6–7 vertical bars, extending to lateral line, and distal edge of dorsal fin black.

Keywords: Taxonomy, Cypriniformes, Mali Hka River

Introduction

Barilius Hamilton is a genus of Cyprinidae that was originally erected as a subgenus of *Cyprinus* with *Cyprinus barila* Hamilton as the type. The genus was restricted to the Indian subcontinent and Southeast Asia according to a phylogeny based on morphological and osteological characters by Howes (1980). Rainboth (1991) suggested that most species of *Barilius*, including all Southeast Asian species, should be assigned to the genus *Opsarius* following Howes (1983). According to the diagnosis of *Barilius* sensu Howes (1980) and morphological (Howes 1980, 1983) and molecular (Tang *et al.* 2010; Liao *et al.* 2011) phylogenetic evidence, *Barilius* is restricted to five species characterized by an extremely shallow body: *B. barila*, *B. evezardi*, *B. modestus*, and *B. vagra* from India, and *B. mesopotamicus* from the Tigris-Euphrates basin; all other Indian and Southeast Asian species previously classified as *Barilius* are placed in the genus *Opsarius*. *Opsarius maculatus* was subsequently designated as the type species of *Opsarius* McClelland by Jordan (1919), and which is a junior synonym of *Opsarius tileo* (Hamilton) (Kottelat 2013; Knight *et al.* 2015). To date, there are 29 valid species in the genus *Opsarius* (Arunkumar & Moyon 2017; Arunkumar & Singh 2000; Barman 1986; Barman *et al.* 2011; Dishma & Vishwanath 2012; Knight *et al.* 2015; Kottelat 2013; Liao *et al.* 2011; Nath *et al.* 2010; Rainboth 1991; Selim & Vishwanath 2002; Tejavej 2012a, 2012b; Vishwanath & Manojkumar 2002).

North Kachin of Myanmar is located in the Indo-Burma Region, one of the global hotspots of biodiversity. In the past four years, there have been two new genera, (*Malihkaia* Kottelat and *Mustura* Kottelat), more than ten new species (Cyprinidae: *Devario fangae* Kullander, *Devario myitkyinae* Kullander, *Altigena malihkaia* Zheng *et al.*; Cobitidae: *Lepidocephalichthys eleios*; Nemacheilidae: *Malihkaia aligera* Kottelat, *Mustura celata* Kottelat, *Schistura indawgyiana* Kottelat, *Schistura nubigena* Kottelat, *Schistura wanlainensis* Kottelat; Amblycipitidae: *Amblyceps improcerum* Ng and Kottelat; Sisoridae: *Oreoglanis hponkanensis* Chen *et al.*, and *Exostoma sectile* Ng and Kottelat) and seven new records (Kottelat 2015, Qin *et al.* 2017) of fishes discovered from this area. During a series of surveys conducted between November 2014 and December 2017 in the Mali Hka River drainage around the vicinity of Putao, North Kachin, Myanmar, we sporadically collected specimens of *Opsarius*, which we identify as a new species and describe herein as *Opsarius putaoensis*.

Materials and methods

Measurements were made point to point with dial calipers and recorded to the nearest 0.2 mm. Counts and measurements were made on the left side of the specimens following Chu & Chen (1989). Subunits of the head were measured as proportions of head length (HL). Head length and body measurements are presented as proportions of standard length (SL). Images of tubercles and nuptial pads were taken with an Olympus SZ61 and TouPCam microscope digital camera. The examined specimens are deposited at the Kunming Institute of Zoology (KIZ), Chinese Academy of Sciences (CAS), Kunming, China, and the Southeast Asia Biodiversity Research Institute (SEABRI), CAS, Nay Pyi Taw, Myanmar. Except for examined specimens, data from other species of *Barilius* and *Opsarius* are cited from literatures (Arunkumar & Moyon 2017; Arunkumar & Singh 2000; Barman 1986; Barman *et al.* 2011; Dishma & Vishwanath 2012; Husain 2012; Knight *et al.* 2015; Nath *et al.* 2010; Selim & Vishwanath 2002; Tejavej 2012a, 2012b; Vishwanath & Manojkumar 2002).

Opsarius putaoensis sp. nov.

(Figs. 1–3)

Holotype. KIZ QT20170033, 89.9 mm SL, Putao Market near Airport, Kachin, Myanmar, T. Qin, SS. Shu and P. Zaw, 21 Nov. 2017.

Paratypes. SEABRI QT20170032, SEABRI 20171007, 69.4–89.5 mm SL, 2 ex., collected with the holotype; SEABRI 20151021, 43.2 mm SL, 1 ex., Putao Market, Kachin, Myanmar, XY. Chen, T. Qin, SS. Shu and Yunn Mi Mi Kyaw, 25 Dec. 2015; SEABRI 20140030, 58.9 mm SL, 1 ex., Putao Market, XY. Chen and T. Qin, 20 Nov. 2014; SEABRI 20171876–1884, 57.1–82.0 mm SL, 9 ex., Putao market, T. Qin, SS. Shu and P. Zaw, 19 Dec. 2017.

Diagnosis. *Opsarius putaoensis* is distinguished from its congeners in the subcontinent of India and Southeast Asia based on the following combination of characters: barbels absent (vs. present in most species with fewer than 11 branched anal-fin rays, except *O. chatricensis*, *O. barna*, and *O. arunachalensis*); dentary with parallel rows of tubercles; snout much shorter than eye diameter; mouth gape below anterior edge of orbit; pectoral and pelvic axial scales lobate; lateral line completely perforated, with 35–38 scales; scale rows between dorsal-fin origin and lateral line 7–8; predorsal scales 15; circumpeduncular scales 12; branched dorsal-fin rays 7; branched anal-fin rays 9; branched pelvic-fin rays 7 (vs. 8 in most species except *O. ngawa*); insertion of dorsal-fin not reaching pelvic-fin base (vs. reaching in *O. chatricensis*); body with 6–7 vertical bars, extending to lateral line; and distal edge of dorsal fin black.

Description. Meristic and morphometric data listed in Table 1.

Head short and compressed. Head length usually larger than head depth. Mouth terminal, upper jaw slightly longer in some individuals, mouth cleft just below level of midpoint of eye, mouth corner below anterior edge of orbit. One row of small horny tubercles on ventral side of dentary around midline present, 1–3 rows of large horny tubercles on lateral aspects of dentary, median densely arranged (Figure 2). Small tubercles present on snout tip and anterior lachrymal. Eyes large, situated in anterior and upper half of head. Interorbital space convex. Gill membrane not connected to isthmus. Barbels absent, even in juveniles.

Body compressed. Dorsum outline almost straight, descending after dorsal-fin origin. Abdomen rounded, more

curved than dorsum. Dorsal-fin rays ii, 7 (14). Dorsal fin inserted posterior of posterior end of pelvic-fin base; distance between dorsal-fin origin and caudal-fin base almost equal to distance from dorsal-fin origin to middle to anterior orbit. Anal-fin rays ii, 9 (14). Anal-fin origin posterior of vertical through posterior of dorsal-fin base; anal-fin truncate, extending to around midpoint of caudal peduncle. Pectoral and pelvic fins with axillary lobes; soft, thin and long, about one third to one half length of pectoral and pelvic fins. Pectoral-fin rays i, 12 (14). Pectoral fin pointed, almost reaching pelvic-fin origin, reaching in some individuals; unbranched ray stiff. Pelvic-fin rays i, 7 (14). Pelvic-fin tip truncate, about one scale from anus. Anus just anterior to anal-fin origin. Caudal fin with 10+9 principal rays (14). Caudal fin deeply forked, tips pointed, lower lobe slightly longer than upper one. Lateral line complete, with 34–36+1–3 scales, total 35–38, mostly 37 (8) or 38 (4). Scale rows from dorsal-fin origin to lateral line 7 (3) or 8 (11); from lateral line to pelvic-fin origin 3 (14); from lateral line to anal-fin origin 3 (14). Predorsal scales 14 (3) or 15 (11). Circumpeduncular scales 12 (14).

TABLE 1. Morphometric and meristic data of *Opsarius putaoensis* sp. nov.

n = 14	Holotype	Range	Mean	SD
Standard length (mm)	89.9	43.2–89.9	69.1	13.9
Percentage of standard length				
Head length	25	23.9–28.6	26.1	1.3
Maximum head width	13.7	13.7–15.2	14.5	0.5
Head depth at supraoccipital	22.8	21.6–25.8	23.4	1.3
Predorsal length	51.1	51.1–56.5	54	1.6
Prepelvic length	45.6	45.6–51.4	47.9	1.5
Preanal length	67.6	66.4–73.0	69.2	1.7
Body depth at dorsal fin origin	29.1	25.6–33.3	30.2	1.9
Caudal-peduncle length	15.8	14.9–18.5	16.5	1.1
Caudal-peduncle depth	10.1	9.6–13.4	10.8	0.9
Dorsal-fin height	21.5	19.0–23.5	21.8	1.3
Dorsal-fin base length	15.2	12.7–15.3	14.2	0.9
Pectoral-fin length	21.5	20.6–24.4	22.1	1.2
Pelvic-fin length	16.7	15.0–19.0	17	1.1
Anal-fin length	14.3	13.9–18.2	15.6	1.2
Percentage of head length				
Snout length	25.3	18.4–27.5	22.7	2.5
Maximum head width	54.7	51.2–60.6	55.6	2.4
Head depth at supraoccipital	91.1	80.1–101.5	89.8	6.6
Eye diameter	30.7	27.3–40.0	35.1	3.2
Interorbital width	39.1	33.5–39.1	36.5	1.8
Caudal-peduncle length	63.1	55.6–70.6	63.1	3.9
Caudal-peduncle depth	40.4	37.1–50.4	41.5	3.4
Dorsal-fin rays	ii,7	ii,7		
Anal-fin rays	ii,9	ii,9		
Pectoral-fin rays	i,12	i,11–12		
Pelvic-fin rays	i,7	i,7		
Caudal-fin rays	9+8	9+8		
Lateral-line scales	38	35–38		
Scale rows between dorsal-fin origin and lateral line	7	7–8		
Scale rows between lateral line and pelvic-fin origin	3	3		
Scale rows between lateral line and anal-fin origin	3	3		
Predorsal scales	15	14–15		
Circumpeduncular scales	12	12		



FIGURE 1. *Opsarius putaoensis* sp. nov., KIZ QT20170033, holotype, 89.9 mm SL.



FIGURE 2. Ventral view of head of *Opsarius putaoensis* sp. nov., KIZ QT20170033, holotype, 89.9 mm SL.



FIGURE 3. Fresh specimen of *Opsarius putaoensis* sp. nov., SEABRI 20151021, paratype, 43.2 mm SL.

Coloration. Six to seven black bars on lateral side of body and caudal peduncle; each bar about 3 scales wide. Anterior vertical bars on body long and reaching lateral line; 1–2 bars on caudal peduncle short, more like round blotch; 1 black cleithral blotch above gill opening present or absent. Small black spot on caudal-fin base present or absent. Distal edge of dorsal fin black; first, second, and fourth branched rays black, membrane hyaline, last unbranched ray black on lower half, upper half yellow. Anal fin hyaline, anterior and outer margins orange. Pectoral and pelvic fins hyaline. Caudal fin dark, posterior margin black.

Distribution. Rare, only known from Mali Hka River, near Putao, Kachin State, northern Myanmar (Figure 4). Other associated fish species recorded from the type locality include: Psilorhynchidae: *Psilorhynchus brachyrhynchus*; Cyprinidae: *Opsarius barnoides*, *Garra bispinosa*, *Placocheilus dulongensis*; Balitoridae: *Homalopteroides rupicola*; Nemacheilidae: *Schistura sikmaiensis*, *Schistura malaisei*.

Etymology. The specific name derived from the type locality of the new species in Putao plain, adjectival.

Remarks. *Opsarius putaoensis* is further differentiated from congeners based on the following characters: lateral-line scales 35–38 (vs. 30–32 in *O. profundus* and *O. bernatziki*; 32–36 in *O. koratensis*; 36–42 in *O. barna*, *O. barnoides*, *O. dogarsinghi*, *O. gatensis*, *O. infrafasciatus*, *O. nelsoni*, *O. ornatus*, *O. pulchellus*, and *O. signicaudus*; 42–45 in *O. howesi*, *O. lairokensis*, and *O. ngawa*; 47 in *O. bonarensis*; and 58–75 in *O. tileo*, *O. dimorphicus*, *O. pectoralis*, *O. radiolatus*, and *O. shacra*); predorsal scales 15 (vs. 16–18 in *O. ardens* and *O. bakeri*; 17–25 in *O. barnoides*, *O. bendelisis*, *O. bonarensis*, *O. dogarsinghi*, *O. howesi*, *O. infrafasciatus*, *O. kanaensis*, *O. lairokensis*, *O. ngawa*, *O. ornatus*, *O. profundus*, *O. radiolatus*, *O. shacra*, and *O. signicaudus*; and 28–30 in *O. tileo* and *O. pectoralis*); circumpeduncular scales 12 (vs. more than 14 in *O. barnoides*, *O. chatricensis*, *O. howesi*, and *O. pulchellus*; and 16–17 in *O. ngawa* and *O. dogarsinghi*); branched dorsal-fin rays 7 (vs. 8–9 in *O. gatensis*, *O. lairokensis*, and *O. pulchellus*; and 10–11 in *O. ardens*, *O. bakeri*, *O. canarensis* and *O. malabaricus*); branched anal-fin rays 9 (vs. 7–8 in *O. arunachalensis*, *O. bendelisis*, *O. howesi*, *O. pectoralis*, and *O. shacra*; 10–11 in *O. barna*, *O. barnoides*, *O. chatricensis*, *O. dimorphicus*, *O. koratensis*, *O. ngawa*, *O. lairokensis*, *O. ornatus*, *O. profundus*, *O. radiolatus*, and *O. tileo*; 11–12 in *O. nelsoni* and *O. pulchellus*; and 12–15 in *O. ardens*, *O. bakeri*, *O. canarensis*, *O. gatensis*, and *O. malabaricus*); body with 6–7 vertical bars (vs. 8–12 in *O. barna*, *O. bendelisis*, *O. dogarsinghi*, *O. kanaensis*, and *O. shacra*; and 13–16 in *O. barnoides*, *O. gatensis*, *O. howesi*, *O. lairokensis*, and *O. ngawa*); vertical bars extending to lateral line (not in *O. barnoides*, *O. chatricensis*, *O. kanaensis*, and *O. lairokensis*); and edge of dorsal fin black (vs. hyaline in *O. barnoides*, *O. howesi*, *O. infrafasciatus*, *O. lairokensis*, *O. ngawa*, and *O. signicaudus*).

Discussion

The taxonomy of the genus *Barilius* is complicated. As summarized by Liao et al., 2011: "Howes (1980) identi-

fied two groups within *Barilius* (*sensu lato*) corresponding to the genera *Barilius* and *Opsarius*. Howes (1980) diagnosed *Barilius* by combination of six characters: (1) long jaws, (2) hyomandibular condyles well separated, (3) scales with many radii, (4) body shallow, (5) barbels in two pairs and (6) tubercles small and poorly developed. All characters diagnosing *Opsarius* include (1) pectoral and pelvic axial scales lobate or fleshy, (2) palatine extended laterally, supporting rostral barbel when present and (3) parallel rows of tubercles on dentary." Based on the unavailability of most materials for comparison, a systematic review of the validities and diagnoses of species of *Opsarius* is out of the scope of this study.

Opsarius putaoensis **sp. nov.** is most likely a member of *Opsarius*. It can be distinguished from members of *Barilius sensu* Howes (1980) in having pectoral and pelvic axial scales lobate or fleshy, parallel rows of tubercles on the dentary, and a deep body. It can be further distinguished from species of *Barilius* by barbels absent (vs. two pairs of barbels present) and larger scales. *Barilius mesopotamicus* was recently proved to cluster with *B. barila* and *B. vagra* (Liao et al., 2011). *Opsarius putaoensis* **sp. nov.** can be distinguished from it by lacking barbels (vs. a pair of rostral barbels present), a much deeper body, a complete lateral line (vs. incomplete); 7 branched dorsal-fin rays (vs. 9), and 9 branched anal rays (vs. 13).

For convenience of identification, *Opsarius sensu* Rainboth (1991) in Southeast Asia and India can be divided into two species groups based on the number of anal-fin rays: (1) the *O. gatensis* species group with more than 12 branched anal-fin rays, including *O. ardens*, *O. bakeri*, *O. canarensis*, *O. gatensis*, and *O. malabaricus*; while *O. nelsoni* and *O. pulchellus* have 11–12 branched anal-fin rays; and (2) the *O. barna* species group with fewer than 11 branched anal-fin rays, including *O. putaoensis*, *O. arunachalensis*, *O. barna*, *O. barnoides*, *O. bernatziki*, *O. bonarensis*, *O. chatricensis*, *O. dimorphicus*, *O. dogarsinghi*, *O. howesi*, *O. infrafasciatus*, *O. kanaensis*, *O. koratensis*, *O. lairokensis*, *O. maculatus*, *O. ngawa*, *O. ornatus*, *O. pectoralis*, *O. profundus*, *O. radiolatus*, *O. shacra*, *O. signicaudus*, and *O. tileo*. *Opsarius putaoensis* with 9 branched anal-fin rays is a member of the *O. barna* species group. Within the *O. barna* species group, *O. dimorphicus*, *O. pectoralis*, *O. shacra*, and *O. tileo*, with more than 58 lateral-line scales are distinguished from other species in the group, including *O. putaoensis* **sp. nov.**, with fewer than 47 lateral-line scales. *Opsarius nelsoni* and *O. pulchellus* can be further distinguished from others by the unique anterior position of the anal fin (anal-fin origin opposing the 1-2nd branched dorsal-fin rays) and extremely developed tubercles on head, fins, and body. *Opsarius bonarensis* has 47 lateral-line scales vs. fewer than 45 in the remaining species including *O. putaoensis*. *Opsarius putaoensis* **sp. nov.** can be further distinguished from *O. bonarensis* in possessing a greater body depth at the dorsal-fin origin (25.6–33.3 SL vs. 21.7–22.2% SL).

The remaining species of the *O. barna* species group can be divided into two species subgroups by the presence of barbels: (1) the *O. chatricensis* species subgroup with species lacking barbels, including *O. chatricensis*, *O. putaoensis* **sp. nov.**, *O. barna*, and *O. arunachalensis*; and (2) the *O. barnoides* species subgroup, with species with one or two pairs of barbels, including *O. dogarsinghi*, *O. barnoides*, *O. ngawa*, *O. kanaensis*, *O. lairokensis*, *O. radiolatus*, *O. maculatus*, *O. profundus*, *O. signicaudus*, *O. bernatziki*, *O. ornatus*, *O. infrafasciatus*, *O. koratensis*, *O. howesi*, and *O. bonarensis*.

Opsarius putaoensis **sp. nov.** is most similar to *O. chatricensis* in overall appearance, number of vertical bars, and color pattern, but it differs from *O. chatricensis* by the following characters: insertion of dorsal not reaching posterior end of pelvic fin base vs. reaching, vertical bars 6–7 vs. 7–8, vertical bars extending to lateral line vs. not, branched anal-fin rays 9 vs. 10, branched pelvic-fin rays 7 vs. 8, branched pectoral-fin rays 12, rarely 11 vs. 11, circumpeduncular scales 12 vs. 14, scale rows between dorsal-fin origin and lateral line 7–8 vs. 6 (as 7 in the text, but 6 from Fig. 1).

Opsarius putaoensis **sp. nov.** is different from *O. arunachalensis* in body shape and color pattern: snout is much shorter than the eye diameter (vs. longer), eye diameter average 35.1 vs. 18.6% HL, mouth gape below anterior edge of orbit vs. far away from orbit, deeper body, body depth 25.6–33.3% SL vs. 20.4–20.8, lateral line complete vs. incomplete, and body with 6–7 vertical bars vs. no vertical bars, instead with spots on each scale.

Opsarius putaoensis **sp. nov.** is similar to *O. barna* in body shape, length of fins and color pattern, and it can be distinguished from *O. barna* (data from Selim and Vishwanath, 2002) by the following characters: vertical bars 6–7 vs. 9–11, branched pelvic-fin rays 7 vs. 8, branched pectoral-fin rays 12, rarely 11 vs. 14, 35–38 lateral-line scales vs. 39–42, last ray of dorsal not extending to caudal base vs. often extending to, body depth 25.6–33.3 vs. 23.4–23.4% SL, head length 23.9–28.6 vs. 20.8–21.6% SL, head depth at supraoccipital 80.1–101.5 vs. 75.5–78.3% HL, eye diameter 27.3–40.0 vs. 25.6–25.8% HL, and caudal-peduncle length 55.6–70.6 vs. 80.6–80.6% HL.

Six species of *Opsarius*, *O. barnoides*, *O. chatricensis*, *O. dogarsinghi*, *O. kanaensis*, *O. lairokensis*, and *O.*

ngawa have been reported from the Irrawaddy-Chindwin drainage. *Opsarius putaoensis* **sp. nov.** is sympatric with *O. barnoides* in the Putao region and it can be readily distinguished from the latter by: barbels absent vs. two pairs of barbels present, vertical bars 6–7 vs. 14–15, reaching lateral line vs. not reaching, branched anal-fin rays 9 vs. 10–11, predorsal scales 15 vs. 19–21, dorsal fin edged black vs. hyaline, and anterior and outer margin of anal fin orange vs. hyaline.

Opsarius putaoensis **sp. nov.** resembles *O. dogarsinghi* by similar body shape, a black margin on the dorsal fin, and fin ray count, but it can be readily distinguished from the latter by: barbels absent vs. two pairs of barbels present, vertical bars 6–7 vs. 8–9, predorsal scales 15 vs. 20, caudal-fin base with or without spot vs. with a large vertical spot, anterior and outer margin of anal fin orange vs. black marks present.

Opsarius putaoensis **sp. nov.** can be readily distinguished from *O. ngawa* by: barbels absent vs. two pairs of barbels present, lower jaw without a symphysis and upper jaw without a notch vs. both with, vertical bars 6–7 vs. 13–14, branched anal-fin rays 9 vs. 10–11, predorsal scales 15 vs. 21–22, lateral-line scales 35–38 vs. 42–43, and circumpeduncular scales 12 vs. 16–17.

Opsarius putaoensis **sp. nov.** can be readily distinguished from *O. kanaensis* by: barbels absent vs. one pair of maxillary barbels present, vertical bars 6–7 vs. 8–10, extending to lateral line vs. not, predorsal scales 15 vs. 20–22, and caudal-fin base with or without spot vs. with a round blue-black spot and overlapped by the last vertical bar.

Opsarius putaoensis **sp. nov.** can be readily distinguished from *O. lairokensis* by: barbels absent vs. two pairs of barbels present, vertical bars 6–7 vs. 14–16, extending to lateral line vs. not, branched anal-fin rays 9 vs. 11, branched dorsal-fin rays 7 vs. 8, predorsal scales 15 vs. 21, and lateral-line scales 35–38 vs. 44.

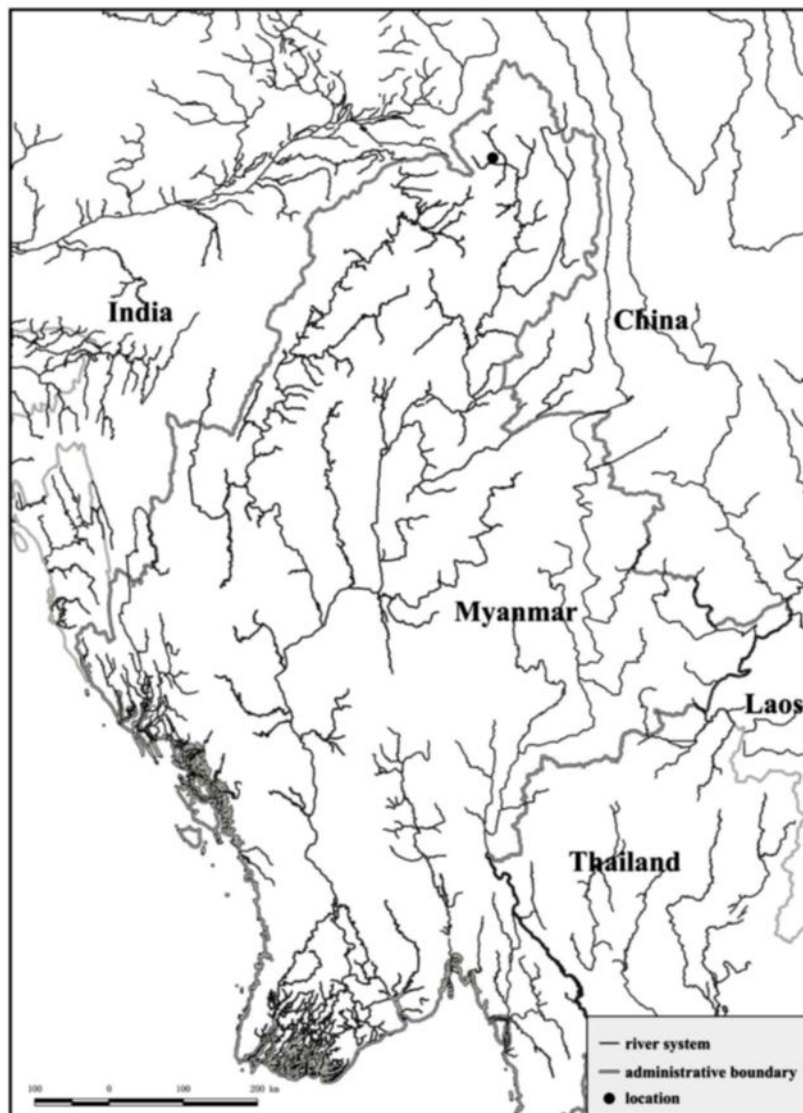


FIGURE 4. Distribution of *Opsarius putaoensis* **sp. nov.**

Though the species of *Opsarius* can be differentiated from one another according to publications currently available, direct comparison of specimens of most species is lacking in most studies. Considering a wide distribution range and rich species diversity of this genus, a systematic review and molecular phylogeny of the genus *Opsarius* species is seriously needed.

Comparative material

Opsarius dorgarsingi. SEABRI 20170116, 121, 127, 139, 4 ex., 51.0–64.9 mm SL, Taung Wan Twin stream, Irrawaddy drainage, Yimabin Village, Meiktila, Myanmar. SEABRI 20181250, 1 ex., 37.6 mm SL, Saw Stream, border between Chin State and Magway, Myanmar. *O. barnoides*. SEABRI 20140132, 1 ex., 69.2 mm SL, a stream near Rat Baw Village, Putao, Kachin, Myanmar. SEABRI 20140171–178, 8 ex., 53.5–91.4 mm SL, Naungmun, Putao, Kachin, Myanmar. SEABRI 20150400–402, 3 ex., 93.4–108.8 mm SL, Zeyar stream near Zeyar Dan Village, Hponkanrazi Wildlife Sanctuary, Kachin, Myanmar. SEABRI 20181117, 1 ex., 46.6 mm SL, Manipur River, Chin state, Myanmar. SEABRI Uncatalogued, 4 ex., 76.7–88.0 mm SL, Yin stream near Yinseik Village, Magway, Myanmar.

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