



TWO NEW RECORDS FOR THE SPOTTED BETTA *Betta picta* (VALENCIENNES 1846) (ANABANTIFORMES, OSPHRONEMIDAE) FROM THE SOUTHERN PART OF CENTRAL JAVA, INDONESIA

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ABSTRACT: For the first time, the species *Betta picta* is registered for the southern part of Central Java (Indonesia), being recorded for two localities in the Progo River basin catchment, one in the Magelang and the other in the Bantul Regency, representing an extension of about 100km south to the nearest previously known distribution. These two new records were based on four specimens, three males and one female, collected in February 2019, which were identified as *Betta picta* since the males possess the main diagnostic features of the species: opercle with yellow-gold iridescence coloration, interrupted stripe below eyes, and a dark subdistal band on caudal and anal fins. Currently, this species is categorized as Near Threatened (NT) by the IUCN, and considering the negative effects of urbanization over the species natural habitats, the new records are important for the species conservation.

Keywords: conservation, distribution, ecology, fish, Java Fighting fish

Dois novos registros para o betta manchado *Betta picta* (Valenciennes 1846) (Anabantiformes, Osphronemidae) para a porção sul de Java Central, Indonésia

RESUMO: Pela primeira vez, a espécie *Betta picta* é registrada para a parte sul de Java Central (Indonésia), sendo registrada em duas localidades na bacia do rio Progo, uma na região de Magelang e outra na regência de Bantul, representando um extensão de cerca de 100 km ao sul até a distribuição mais próxima conhecida anteriormente. Esses dois novos registros foram baseados em quatro exemplares, três machos e uma fêmea, coletados em fevereiro de 2019, que foram identificados como *Betta picta*, pois os machos possuem as principais características diagnósticas da espécie: opérculo com coloração amarelo-ouro iridescente, listra interrompida abaixo dos olhos e uma faixa subdistal escura nas nadadeiras caudal e anal. Atualmente, esta espécie é classificada como Quase Ameaçada (NT) pela IUCN, e considerando os efeitos negativos da urbanização sobre os habitats naturais da espécie, os novos registros são importantes para a conservação da espécie.

Palavras-chave: conservação, distribuição, ecologia, peixes, Java Fighting fish

INTRODUCTION

Betta Bleeker 1849 is a freshwater fish genus, belonging to the family Osphronemidae, with a natural distribution in the Indo-China region, Malay Peninsula, and islands constituting the western Indonesia archipelago (Borneo, Java, and Sumatra) (Witte & Schmidt 1992, Roberts 1993, Schindler & Linke 2013). The mouth-brooding species *Betta picta* (Valenciennes in Cuvier & Valenciennes 1846) is popularly known as Spotted Betta or Java Fighting fish (Low & Lombantobing 2019). It was described from the surroundings of Bogor (then Buitenzorg), in the island of Java, Indonesia (Cuvier & Valenciennes 1846, Fricke et al. 2022). The species is known only from the island of Java, more specifically from west Java and the northern part of Central Java (Kottelat et al. 1993, Tan & Kottelat 1998, Low & Lombantobing 2019). Its easternmost record is in Ambarawa, Central Java province (Low & Lombantobing 2019). *Betta picta* was categorized as “Near Threatened” (NT) by the IUCN (International Union for Conservation of Nature) Red List Status, due to its restricted geographic distribution, and urban impacts and related threats to its natural habitats (Low & Lombantobing 2019). The aims of this paper is to record for the first time the occurrence of this species for two localities in the southern part of Central Java.

MATERIALS AND METHODS

We collected four live specimens, three males and one female, using a landing net. The collected specimens were labeled and fixed in 96% ethanol (Hasan et al. 2019a). After fixation and morphological examination, the specimens were deposited at the Generasi Biologi Indonesia Foundation (GBI). The morphological inspection followed Tan and Kottelat (1998) and Tan and NG (2005).

Examined material (All from Central Java, Indonesia):

Magelang Regency: *Betta picta*: GBI0042, male, 38.1 mm TL, Progo River basin, Spring waters (Fig 1), 7°30'18"S; 110°04'49"E, V. Hasan, 8 Feb. 2019 (Fig. 1).

Figure 1. Live specimen of *Betta picta* (male) (GBI0042) collected in Progo River basin, Magelang Regency, Java, Indonesia.



Bantul Regency: *Betta picta*: GBI0043, male, 33.0 mm TL, Progo River basin, slow-flowing river, 7°55'21"S; 110°14'05"E, S. Irwanjasmoro, 11 Feb. 2019. —GBI0044, male, 32.1 mm TL, Progo River basin, slow-flowing river, 7°55'21"S; 110°14'05"E, S. Irwanjasmoro, 11 Feb. 2019. —GBI0045, female, 31.2 mm TL, Progo River basin, slow-flowing river, 7°55'21"S; 110°14'05"E, S. Irwanjasmoro, 11 Feb. 2019 (Fig. 2).

Figure 2. Live specimens of *Betta picta* collected in Progo River basin, Bantul Regency, Java, Indonesia (GBI0043, GBI0044, and GBI0045).



RESULTS

Betta picta (Valenciennes 1846)

Specimens of *Betta picta* Figures 1 and 2

Identification

Specimens collected in the southern part of Central Java (Figs. 1 and 2) were identified as *Betta picta* based on diagnostic features proposed by Tan & Kottelat (1998), listed below.

The collected specimens have three features specific for males of *Betta picta*: opercle with yellow-gold iridescent coloration; interrupted stripe below eyes; and a dark subdistal band on caudal and anal fins. In addition, the specimens also present the following morphological characteristics: body compressed; snout deep blunt; mouth superior; dorsal and anal fins slightly pointed; dorsal fin placed relatively far back, and anal-fin base length almost half of standard length. Meristic data of the specimens are presented in Table 1.

TABLE 1. Meristic data of *Betta picta*.

Meristics data	Present study				Tan & Kottelat (1998)
	GBI0042 (male)	GBI0043 (male)	GBI0044 (male)	GBI0045 (female)	
Dorsal-fin rays	8	9	8	8	7-9
Pectoral-fin rays	12	12	12	12	12
Pelvic-fin rays	6	6	6	6	6
Anal-fin rays	21	22	22	22	21-23
Lateral scales	28	30	28	30	27-30
Pre-dorsal scales	21	20	20	20	19-21
Post-dorsal scales	10	11	11	10	9-11

Regarding the fresh or live coloration, the males specimens exhibited: body light brown; head and dorsal part of body darker brown; head with distinct pre and postorbital stripes; dorsal and anal fins with faint transverse bars; pectoral fin hyaline; pelvic fin with a white filament (Figs. 1 and 2).

New localities

Betta picta specimens were found in Magelang Regency, Progo River basin, spring waters, 7°30'18"S; 110°04'49"E, southern part of Central Java (Fig. 3 A); and Bantul Regency, Progo River basin, slow-flowing river, 7°55'21"S; 110°14'05"E, southern part of Central Java (Fig. 3 B).

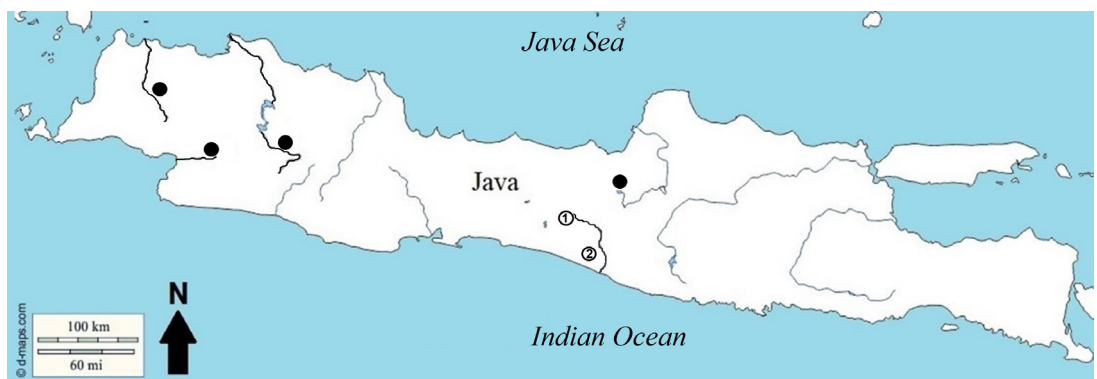
Figure 3. Localities where *Betta picta* specimens were collected. A. Spring water in the Progo River basin, Magelang Regency, central Java, Indonesia. B. Slow-flowing river of the Progo River basin, Bantul Regency, Central Java, Indonesia. Photographs by S. Irwanjasmoro.



DISCUSSION

The two localities (Magelang Regency and Bantul Regency – Fig. 3) where specimens of *Betta picta* were collected by this study are the first records of the species for southern part of Central Java, representing an extension of about 100km of the species distribution to the south (Fig. 4). As *Betta picta* is categorized as Near Threatened (NT) by the IUCN, and its areas of occurrence have been greatly affected by urbanization (Low & Lombantobing 2019), new records of occurrence are important for the conservation of the species. Therefore, the new records have a major relevance for the species conservation, in addition to increasing the geographical distribution of the species further south (Fig. 4).

Figure 4. Distribution of *Betta picta* in Java: black circles are the previous records in the Western Java and Northern part of Central Java based on Weber and de Beaufort (1922) and Tan and Kottelat (1998). The white circles are the new records from the southern part of Central Java: Magelang Regency (1); and Bantul Regency (2).



There are several studies on Indonesia freshwater fishes, which are limited to single rivers. For example, ichthyofaunal surveys on many of the Java rivers conducted by Hasan et al. (2021a) provided a better understanding of the freshwater fish diversity in this area. New records of native freshwater fish are important for understanding species diversity and biogeography, among other biological topics (Hasan et al. 2019b, Udagedara et al. 2020, Hasan et al. 2021b).

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REFERENCES

- CUVIER, G.A., VALENCIENNES. (1846). Histoire naturelle des poissons. Tome dix-huitième. Suite du livre dix-huitième. Cyprinoïdes. Livre dix-neuvième. Des Ésoques ou Lucioïdes. v. 18: i-xix + 2 pp. + 1-505 + 2 pp., Pls. 520–553.
- FRICKE, R., ESCHMEYER, W.N., VAN DER LAAN, R. (2022). Eschmeyer's catalog of fishes: genera, species, references (<https://abre.ai/fi5V>). Electronic version accessed 01 September 2022.
- HASAN, V., TAMAM, M.B. (2019a). First record of the invasive Nile Tilapia, *Oreochromis niloticus* (Linnaeus, 1758) (Perciformes, Cichlidae), on Bawean Island, Indonesia. Check List, 15(1), 225–227.
- HASAN, V., SOEMARNO., WIDODO, M.S., WIADNYA D.G.R. (2019b). *Lobocheilos falcifer* (Valenciennes, 1842) (Cypriniformes, Cyprinidae): distribution extension in Java and first record from Tuntang River, Semarang Regency, Indonesia. Ecology, Environment and Conservation, 25(4), 1713–1715.
- HASAN, V., SOEMARNO., WIDODO, M.S., WIADNYA, D.G.R. (2021a). Beardless Barb *Cyclocheilichthys apogon* (Valenciennes, 1842) (Cypriniformes: Cyprinidae) in Madura Island, Indonesia. Biotropia, 28(3), 274–277.

- HASAN, V., VIEIRA, L.O., OTTONI, F.P., MASITHAH, E.D. (2021b). Two new localities for *Lobocheilos falcifer* (Valenciennes, 1842) (Teleostei: Cyprinidae), a rare and vulnerable freshwater fish species of Java, Indonesia. *International Journal of Aquatic Biology*, 9(4), 244–247. <https://doi.org/10.22034/ijab.v9i4.1285>
- KOTTELAT, M., WHITTEN, A.J., KARTIKASARI, S.N., WIRJOATMODJO, S. (1993). *Freshwater Fishes of Western Indonesia and Sulawesi*. Periplus Editions, Hong Kong, 221.
- Kottelat M., Tan H.H. (2008). Sinopse do gênero *Lobocheilos* em Java, Sumatra e Bornéu, com descrições de seis novas espécies (Teleostei: Cyprinidae). *Exploração ictiológica de águas doces*, 19: 27–58.
- LOW, B.W., LUMBANTOBING, D. (2019). *Betta picta*. The IUCN Red List of Threatened Species 2019: e.T169515A91308355. <http://dx.doi.org/10.2305/IUCN.UK.2019-2.RLTS.T169515A91308355.en>. Downloaded on 17 March 2020.
- ROBERTS, T.R. (1993). The Freshwater Fishes of Java, as Observed by Kuhl and van Hasselt in 1820–23. *Zoologische Verhandelingen*, 285,1–94.
- SCHINDLER, I., LINKE, H. (2013). *Betta hendra* – a new species of fighting fish (Teleostei: Osphronemidae) from Kalimantan Tengah (Borneo, Indonesia). *Vertebrate Zoology*, 63(1), 35–40.
- TAN, H.H., KOTTELAT, M. (1998). Redescription of *Betta picta* (Teleostei: Osphronemidae) and description of *B. falx* sp. n. from central Sumatra. *Revue Suisse De Zoologie*, 105(3), 557–568.
- TAN, H.H., NG, P.K.L. (2005). The fighting fishes (Teleostei: Osphronemidae: genus *Betta*) of Singapore, Malaysia and Brunei. *Raffles Bulletin of Zoology Supplement*, 13: 43–99.
- UDAGEDARA, S., DAHANAYAKA, D.D.G.L. (2020). Current status and checklist of seagrass in Sri Lanka. *International Journal of Aquatic Biology*, 8(5), 317–326.
- WITTE K, E., SCHMIDT, J. (1992). *Betta brownorum*, a new species of anabantoides (Teleostei: Belontiidae) from northwestern Borneo, with a key to the genus. *Ichthyological Exploration of Freshwaters*, 2,305–330.