

1 **ACCEPTED MANUSCRIPT**

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3 NEW DISTRIBUTIONAL RECORD OF THE BEARDLESS BARB *Cyclocheilichthys apogon*
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5 INDONESIA

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19 **NEW DISTRIBUTIONAL RECORD OF THE BEARDLESS BARB *Cyclocheilichthys apogon***
20 **(VALENCIENNES, 1842) (CYPRINIFORMES: CYPRINIDAE) FROM MADURA ISLAND,**
21 **INDONESIA**

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34 **ABSTRACT**

35 Beardless Barb *Cyclocheilichthys apogon* (Valenciennes, 1842) is a species known from
36 Southeast Asia, including Western Indonesia area (Borneo, Sumatra and Java). In Java Island, it was
37 previously found in the mainland area. This paper provides the first record of *C. apogon* in the
38 Lembung River, one of the major rivers in Madura Island, thereby extending the species distribution
39 up to 150 km northeast from the earlier record. The specimens of *C. apogon* were characterized as
40 follows: dorsal fin rays 12; anal fin rays 8–9; pectoral fin rays 17–18; lateral line scales 34–35. A
41 description of detailed morfological characters of a specimen are provided.

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43 **Keywords:** Cyprinid, distribution, freshwater fish
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45 **INTRODUCTION**

46 In the last glacial era, Southeast Asia and Western Indonesia (Sumatra, Borneo and Java) were
47 still connected as a single area called Sundaland, where many blocth rivers were connected to each
48 other, extending from Indochina to the Java Sea (Voris 2000). Major rises in sea level in the South
49 China Sea and Java Sea occurred in that era divided Sundaland into several archipelagos (Pubellier
50 and Morley 2014). This geographical change has resulted in the isolation of several freshwater fishes
51 (Hubert et al. 2015), one of which was the Beardless Barb *Cyclocheilichthys apogon* (Weber and de
52 Beaufort 1916).

53 *Cyclocheilichthys apogon* (Class: Actinopterygii; Order: Cypriniformes; Family: Cyprinidae)
54 is a freshwater fish native to the Southeast Asia and the Western Indonesia (Rainboth 1996; Kottelat
55 2001; Kenthao and Jearanaiprepam 2018). *Cyclocheilichthys apogon* ranged widely in the rivers
56 across the mainland Java area, which includes East Java, Central Java and West Java (Weber and de
57 Beaufort 1913; Roberts 1993). This paper reports the presence of *C. apogon* in the Lembung River,
58 Madura Island, and it is expected to increase the knowledge of the previously known distribution
59 range of this species.

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MATERIALS AND METHODS

Nineteen (19) live specimens of *C. apogon* were obtained from local fishermen during a fieldwork carried out on 22-23 March 2019 on Lembung River (7°02'21"S, 113°46'35"E) (Figure 1). Administratively, the site is located on Madura Island, Sumenep Regency, East Java Province, Indonesia. The fishing gear used by the fishermen was a small hook with bottom with molluscs as the baits (Stein et al. 2012).



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Figure 1. Lembung River, Madura Island, showing the location where *Cyclocheilichthys apogon* were collected 23 March 2019.

In order to ensure the validity of the species, the morphological character analysis of *C. apogon* was carried out based on Weber and de Beaufort's (1916) model.

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RESULTS AND DISCUSSION

The nineteen (19) live specimens of *C. apogon* had a total length between 7.8 and 16.1 cm and weight between 55.5 and 204 grams. Five (5) of them were used as preserved specimens in 96% alcohol solution (Hasan et al. 2019) and deposited at the Hydrobiology Laboratory, Universitas Brawijaya, Malang, Indonesia (UB.0002). The remaining fourteen (14) were kept as livestock at the

79 Fish Reproduction Laboratory, Brawijaya University, Malang, Indonesia. The 14 live specimens were
80 transported in polyethylene bags with oxygen.

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82 **Identification**

83 *Cyclocheilichthys apogon* is distinguished from the other species of *Cyclocheilichthys* by no
84 barbels in snout but there are conspicuous folds of the skin above upper lip. Other morphological
85 characters of the 5 preserved specimens are as follows: dorsal fin rays 12; anal fin rays 8–9; pectoral
86 fin rays 17–18; lateral line scales 34–35; head pointed, lips are swollen, with both lips evenly curved;
87 dorsal deeply concave, origin of dorsal is opposite to 13th scale of lateral line and nearly in the middle
88 of a line, connecting the end of the snout and the end of the shortest caudal rays, the location of which
89 is nearer to snout in young specimens, far behind the origin of ventrals; anal concave, with a rather
90 weak third spine that is longer than half head; pectorals reach the ventrals; ventrals are about equal to
91 the pectorals, reaching or surpassing the anal; caudal deeply incised, while the lobes are rounded.
92 Coloration in fresh specimen: yellowish brown, upper parts are dark brown, and each scale has a dark
93 spot at the base; vertical fins have darkish colours, the others more or less hyaline. There is a blotch
94 at the end of the lateral line. All of these characters were found in every specimen collected from
95 Lembung River, Madura Island (Fig. 2).

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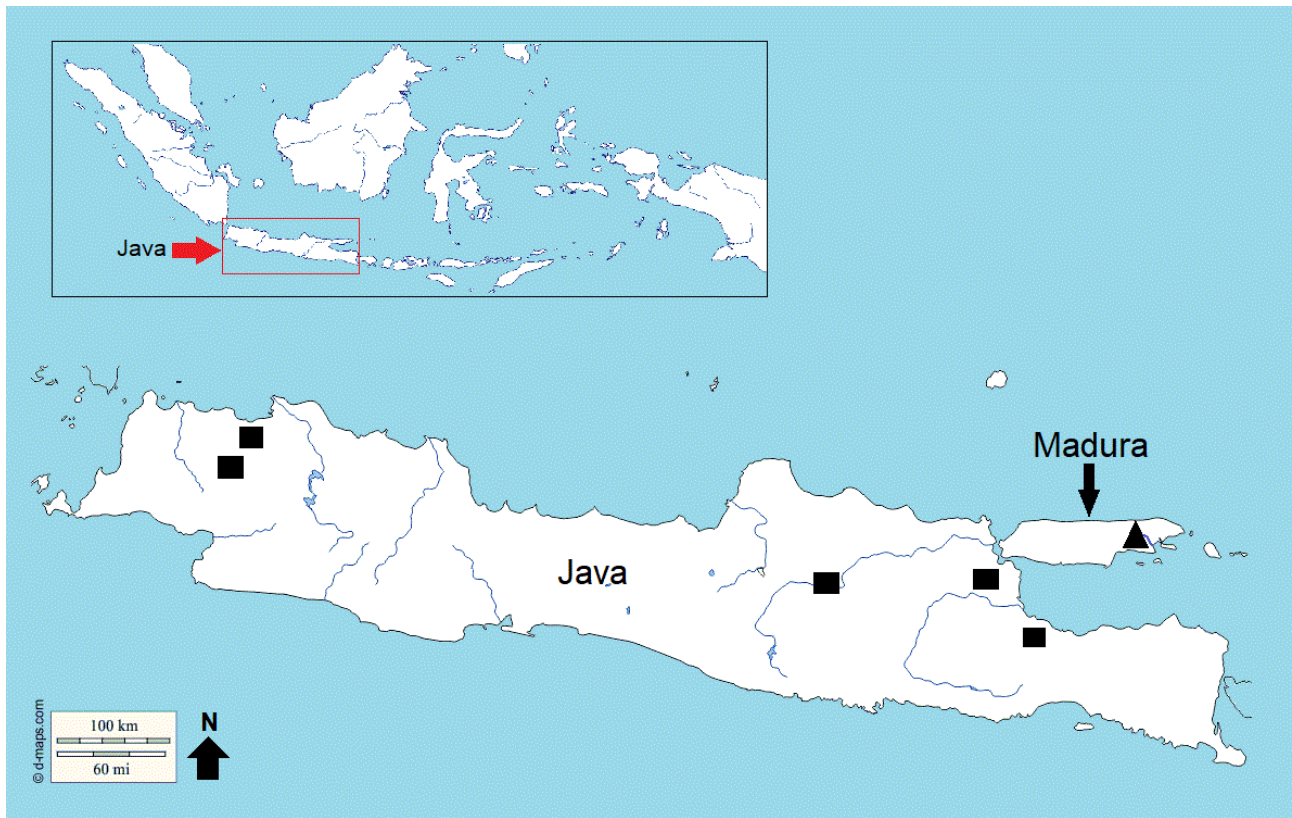
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98 Figure 2. Specimen of *Cyclocheilichthys apogon* captured on 23 March 2019 from Lembung River,
99 Madura Island.

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101 **Distribution**

102 The discovery of *C. apogon* in the Lembung River, Madura Island, is the first record of this
103 species beyond its type locality (mainland of Java: Batavia, Buitenzorg, Ngawi, Surabaya and
104 Pasuruan) (Weber and de Beaufort, 1916), and represents the easterly extension of previously known
105 distribution about 150 km (Figure 3).



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Figure 3. Known distribution of *Cyclocheilichthys apogon*. Black square are the previous records of the species based on Weber and de Beaufort's (1916) observation, mainland Java. Black triangle is the recent record on Lembung River, Madura Island.

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The record of *Cyclocheilichthys apogon* in the Lembung River, Madura Island, is the first record of this species in outside the mainland Java. For a native species, new records are important contributions for understanding species diversity and biogeography, among other biological topics (Souto-Santos 2019). As reported in this paper, the new record of *C. apogon* helped to improve the knowledge of the species as it extends the distribution range of the species further northeast.

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There are several studies on freshwater fish in Indonesia which are sometimes limited to single rivers. The case in Sumatra, Tan and Kottelat (2009) have recorded *Crossocheilus obscurus* Tan & Kottelat, 2008 on Batang Hari Basin, then Iqbal et al. (2017) added *C. obscurus* also recorded on Musi Basin where the distance between the location of the first and the second recording was more than 250 km. The discovery of *C. apogon* on Madura Island could be caused by the Lembung River was being connected to East Sunda River at last glacial era (Hanebuth et al. 2000; Sathiamurthy and Voris 2006), then being cut off and isolated due to rising sea levels. Besides geological factors, the spread of freshwater fishes outside the mainland could occur due to human introduction factors.

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CONCLUSION

Cyclocheilichthys apogon is a Southeast Asian native fish that is not only spread on the mainland of Java, but this fish also exists on the island of Madura whose position is at the eastern end of Java. The existence of *C. apogon* in a remote area added to the data on the distribution of fish in Indonesia.

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