Parachromis managuensis in Java

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RANGE EXPANSION OF Parachromis managuensis (GÜNTHER, 1867) (PERCIFORMES, CICHLIDAE) IN JAVA, INDONESIA

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ABSTRACT
The Jaguar cichlid, Parachromis managuensis (Günther, 1867), is native to Central America, with introductions reported from West Java and Central Java (Indonesia). On 7-8 January 2019, sixteen specimens of P. managuensis were collected from Karangkates, the largest hydropower reservoir in East Java, Indonesia. A description of the morphological characters of specimens is provided.

Keywords: Cichlid, distribution, freshwater fish, Jaguar Guapote

INTRODUCTION
Parachromis managuensis (Günther, 1867), is a cichlid native to Costa Rica, Nicaragua, and Honduras (Conkel 1993), but it has been introduced to several other locations: North America (Fuller et al. 1999), South America (Magalhães and Jacobi 2013), Europe (Takács et al. 2015), and Southeast Asia (Agasen et al. 2006). Parachromis managuensis exhibits highly predatory habits and a tolerance to new habitats (Rosana et al. 2006; Agasen et al. 2006). Because of this, P. managuensis has the potential to become an invasive species (Yamamota and Annete 2000; Mandoza et al. 2015).

Parachromis managuensis is generally sold in the aquarium trade and has not been cultured openly. In Java, Indonesia, these P. managuensis come from natural freshwaters in the West Java (Dahruddin et al. 2016) and Central Java (Hedianto et al. 2013). Meanwhile, despite being used as a fisheries centre, there has been no previous record of exotic fish culture in Karangkates Reservoir, the largest hydropower reservoir in East Java. Therefore, the presence of P. managuensis in Karangkates Reservoir constitutes a new finding.

MATERIALS AND METHODS
Fish Sampling and Description of Study Sites
Sixteen (16) live specimens of P. managuensis were obtained from a local angler during fieldwork on 7-8 January 2019 at the Karangkates Reservoir (8°11'16"S; 112°27'22"E) (Figure 1). Administratively, the site is located in Malang Regency, East Java Province, Indonesia. The fishing gear used by the angler was a medium hook on the bottom and worms used as bait (Stein et al. 2012).
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Figure 1 Karangkates reservoir, East Java, showing the location where Parachromis managuensis was collected

Fish Identification

Diagnostic morphological characters of the specimens were analysed using the traits identified by Kullander and Hartel (1997) and Bussing (1998).

RESULTS AND DISCUSSION

Specimens Collection

The sixteen (16) live specimens of P. managuensis had a total length between 9.9 cm and 26.6 cm. Five (5) of them were preserved in 96% alcohol solution (Hasan and Tamam 2019) and deposited at the Hydrobiology Laboratory, Universitas Brawijaya, Malang, Indonesia (voucher no. Hb.Pm.I.2019). The remaining twelve (11) were kept as livestock at the Fish Reproduction Laboratory, Universitas Brawijaya, Malang, Indonesia. The 11 living specimens were transported in polyethylene bags with oxygen.

Diagnosis

The morphological characters of the specimens were as follows: large mouth, projecting lower jaw, prominent enlarged canine teeth, a more or less continuous black stripe between the eye and opercular margin, and another stripe between the eye and the lower angle of the opercle, and a row of black blotches along the middle of the side.

The fish could be distinguished from other members of the genus by having the expanded preopercle at the angle. It had silvery or golden-green to purple body colours and black spots on the fins and body. There were also numerous black spots on anal and caudal fins. The fish had moss green back, purple iridescence sides, and a whitish or yellowish belly. It also had whitish yellowish, or blue iridescence dorsal interspaces, and a black blotch on the caudal-fin base. All of these characteristics
were found in every specimen collected from the Karangkates Reservoir, East Java, Indonesia (Fig. 2).

Figure 2 Specimen of *Parachromis managuensis* captured on 8 January 2019, Karangkates Reservoir, East Java

**Distribution**

The discovery of *P. managuensis* in the Karangkates Reservoir is the first record of this species beyond its previous records (reservoirs in West Java and Central Java), and it represents an easterly extension of the previously-known distributions in Java by more than 490 km (Fig. 3). This record is an important contribution to the understanding of the dispersal of alien species in Indonesia.

We speculate that individual of *P. managuensis* were released into Karangkates Reservoir on East Java by Aquarists. They releasing their stocks usually without any specific reasons. Fishes simply outgrowing the tank, and they release them. As the reservoir does not used for any exotic fish culture industry, further investigation is warranted to determine the source of *P. managuensis* in East Java. Control and prevention of further introductions are needed to prevent *P. managuensis* from disturbing the local freshwaters ecosystems (Canonico et al. 2005; Zambrano et al. 2006).
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Figure 3. A. Distribution of Parachromis managuensis in Java (red square: West Java, blue square: Central Java, green square: East Java). B. Location of Karangkates Reservoir in East Java. The green square indicates the new record on P. managuensis.

CONCLUSION

Parachromis managuensis is a non-native fish that has not only spread on the mainland of West Java and Central Java, but this fish also exists on Karangkates Reservoir whose position is at the eastern of Java. The existence of P. managuensis in East Java adds to the data on the distribution of alien fish in Indonesia.

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