

New Record of the Non-native species of Mayan Cichlid (*Cichlasoma urophthalmus* Günther, 1867) in Klawing River, Central Java, Indonesia

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ABSTRACT

Cichlasoma urophthalmus is a species of cichlid from Mexico and Central America. We found it in Klawing River, Central Java, Indonesia (7°20'19.2"S 109°22'15.7"E), outside their native. The Specimens of *C. urophthalmus* were captured using gill net with a mesh size of 40 mm on 19 November 2020. The live specimens were deposited at the Hydrobiology Laboratory, Brawijaya University, Malang, Indonesia (Hydro/MC/032/2021). There are positive and negative impacts on non-native fish appearance, especially those that are invasive such as *C. urophthalmus*.

Keywords: Alien fish. *Cichlasoma*. Mayan cichlid. Non-native fish.

Introduction

The invasion of foreign species has threatened freshwater ecosystems, especially lakes and rivers in Java. Several studies have reported finding alien fish species invading local waters and leading to the loss of freshwater fish diversity (Hasan *et al.*, 2019). Cichliformes fish have successfully invaded ecosystems in Java (Hasan *et al.*, 2020a). Cichlidae is a well-known spread and invades worldwide (Insani *et al.*, 2020; Hasan *et al.*, 2020a; 2020b). The spread of invasive species will decrease the biodiversity of native fish that resulted in what is termed biotic homogenization and is a worldwide phenomenon (Hasan and Tamam, 2019; Fadjar *et al.*, 2019; Islamy and Hasan, 2020). The ornamental fish trade, nutritional needs and recreational fishing is a crucial pathway

for the occurrence of alien fishes from disparate regions (Bijukumar *et al.*, 2015; Pratama *et al.*, 2019; Serdiati *et al.*, 2020).

C. urophthalmus Is a species of cichlid from Mexico and Central America (Froese *et al.*, 2019). *Cichlasoma* is a medium-sized fish range from 8 to 20 cm standard length (SL) (Chávez-Lopez *et al.*, 2005). A study reported a maximum of 30 cm in total length (TL) (Kullander, 2003). In this article, we report on the results of a field observation to the Klawing River, Central Java, Indonesia (7°20'19.2"S 109°22'15.7"E) and provide evidence for the occurrence of a non-native fish *C. urophthalmus*. We also present diagnostic information about *C. urophthalmus*. Then, we assess the negative and positive effect of introducing *C. urophthalmus* in the Indonesian water environment.

Materials and Methods

Specimens of *C. urophthalmus* were (Figure 2) captured using gill net gill nets with a mesh size of 40 mm on 29 November 2018 in the Klawing River, Central Java, Indonesia (7°20'19.2"S 109°22'15.7"E) (Figure 1). The specimens were preserved in 96% alcohol solution and deposited at the Hydrobiology Laboratory, Brawijaya University, Malang, Indonesia (Hydro/CT/012/2019). Diagnostic meristic and morphometric of the specimens were analyzed following Tortonese (1986).

Results and Discussion

Identification

Meristic and Morphometric characters of *C. urophthalmus* (Figure 2) are the total length of 153 mm; Standard length 120.74 mm; Head length 46.53 mm; Body depth 56.23 mm; Snout length 15.7; Eye diameter 11.72 mm; Interorbital width 15.76; Length of caudal peduncle 16 mm; Height of caudal peduncle 18.5 mm; Pre-dorsal length 51.4 mm; Post-dorsal length 91.03 mm; Caudal length 35.07 mm, Dorsal fin rays XVIII/11; Anal fin rays VII/9, Pelvic

fin rays I/5; Pectoral fin rays 15; Caudal fin rays 19/20.

Other specific morphological characters are as follows: covered by cycloid scales; has short gill rakers; 3 rows of scales on the cheek; maxilla and lower jaw equal; teeth widen; pectoral fin pointed; dorsal, pectoral and anal fins blunt; caudal scaly. Color: reddish-brown, anal fin faintly barred; caudal and soft dorsal fin sharply barred; there have several dark bars on the sides body; dark blotch at the corner of the operculum, big black spot on the base of the tail fin.



Fig. 2. Specimens of *Cichlasoma urophthalmus* captured from Wanareja subdistrict, Cilacap, Central Tengah (7°18'32.3"S 108°38'17.4"E).

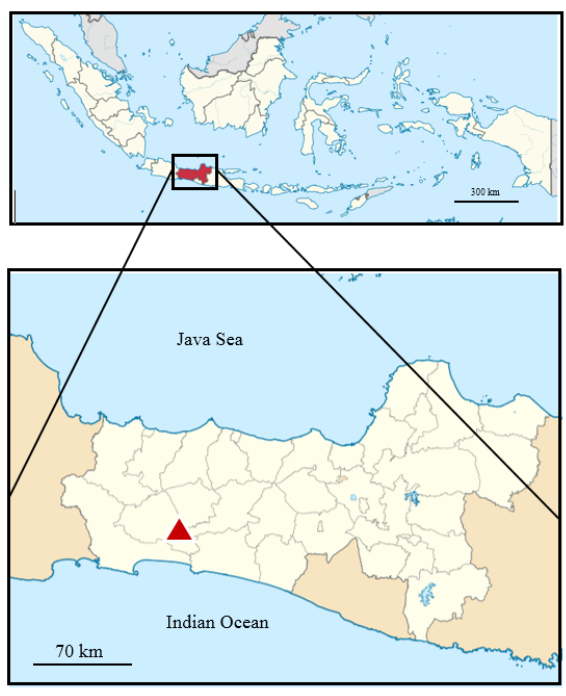


Fig. 1. The location of *C. urophthalmus* captured in Klawing River, Central Java, Indonesia (7°20'19.2"S 109°22'15.7"E).

Discussion

The fish *C. urophthalmus*, such as common Cichlidae, have the teeth and short intestine of a carnivore and diet studies have confirmed that adults are highly opportunistic predators, taking fish and a wide variety of macroinvertebrates (e.g., shrimp, annelids, gastropods, etc.) (Chávez-Lopez *et al.*, 2005). The marked trophic flexibility of this Cichlid fish is further evidenced by the high proportion of plant and detritus in several populations' diets (Chávez-Lopez *et al.*, 2005). *Cichlasoma* is highly aggressive and territorial, being most pronounced in adults during mating, spawning, nesting, and guarding of young (Martinez-Palacios *et al.*, 1993). Because of this character, *Cichlasoma* can become an invasive species and compete with other native fish species for resources.

The entry of non-native fish into local waters can increase the potential threat of extinction in small fish compared to local predator fish in terms of maximum feeding rate (Faria *et al.*, 2019). However, Non-native species may have neutral or even beneficial effects on native biota and ecosystems (Johnson

et al., 2009); others become invasive and establish spreading populations that negatively impact the recipient environment and its biota. Additive non-native species will also affect the ecosystem's synergizing; a network of beneficial direct and indirect interactions of community leads to a population burst of current species where the high abundance of the non-native species will reduce local populations even extirpating the native population (Braga *et al.*, 2017).

Another negative impact, such as biotic homogenization from non-native species, is possible to dominate in waters, synergistic disturbances in altered environments such as reservoirs, and cause negative ecological impacts on populations of native species River tributaries (Padial *et al.*, 2016). One subject requiring attention is the relationship between introduced fishes and their importance as vectors of diseases and parasites. Studies in Mexico have reported *C. urophthalmus* as host to a diverse assortment of parasites, including 71 different helminth species (Salgado-Maldonado 2006) and a tapeworm of the genus *Bothriocephalus*. Further researchers need to reobserve this population of fish in both adult and juvenile phases (Fadjar *et al.*, 2019). Besides, measurements of sexual dimorphism are also required to analyze the females' ratio in the reservoir (Pramono *et al.*, 2019). This also relates to the assay of a potential invasion.

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