



# First record of the invasive Nile Tilapia, *Oreochromis niloticus* (Linnaeus, 1758) (Perciformes, Cichlidae), on Bawean Island, Indonesia

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## Abstract

In 2018 we captured specimens of *Oreochromis niloticus* (Linnaeus, 1758) from Danau Kastoba, a crater lake on Bawean (Indonesia), a small, isolated island in the Java Sea. Additional individuals were later photographed. These records are among first of this species from an isolated island, in the Java Sea. A description of meristic and morphometric features of a specimen are provided.

## Key words

Cichlid, freshwater fishes, isolated island, Java Sea.

**Academic editor:** Gabriela Echevarría | Received 15 November 2018 | Accepted 7 February 2019 | Published 15 February 2019

**Citation:** Hasan V, Tamam MB (2019) First record of the invasive Nile Tilapia, *Oreochromis niloticus* (Linnaeus, 1758) (Perciformes, Cichlidae), on Bawean Island, Indonesia. Check List 15 (1): 225–227. <https://doi.org/10.15560/15.1.225>

## Introduction

*Oreochromis niloticus* Linnaeus, 1758 is a tilapia native to the Nile (Africa) and now introduced to many countries worldwide for aquaculture (Ishikawa et al. 2012). *Oreochromis niloticus* exhibits fast growth (Qiang et al. 2014) and tolerance to new habitats (Kulac et al. 2014, Abdel-Tawwab 2015). Because of these attributes, *O. niloticus* has the potential to become an invasive species and compete with other fish species for resources (Gu et al. 2015).

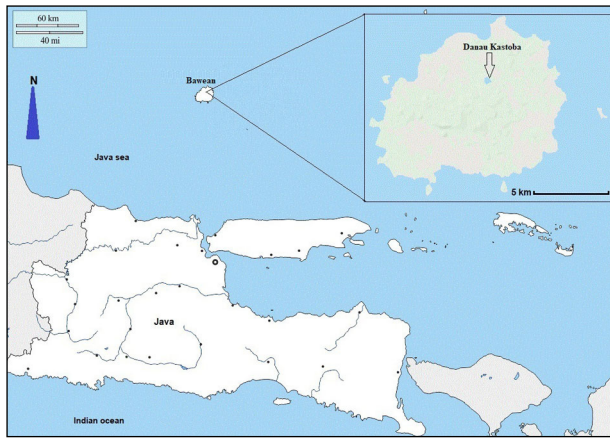
In Indonesia, *O. niloticus* is generally spread in mainland waters where aquaculture activities have been underway for some time (Basuki and Sri 2014). Bawean, a small, isolated island in the Java Sea, is a fisheries center, but there is no record of culturing tilapia there. The existence of *O. niloticus* on Bawean constitutes a new record.

## Methods

Specimens of *O. niloticus* were captured with gill net on 20–21 October 2018. The specimens were preserved in 96% alcohol solution and deposited at the Hydrobiology Laboratory, Brawijaya University, Malang, Indonesia (Hydro/On/XII/2019). Diagnostic meristic and morphometrics of the specimens were analyzed following Tor-tonese (1986). Additional specimens of *O. niloticus* were photographed at the same location on 21 January, 2019.

## Results

**New records.** (Figs 1, 2). Indonesia: Java Sea: Bawean: Danau Kastoba (05°46'17.1" S, 112°40'18.8" E), 20–21 Oct. 2018, coll. by M.B. Tamam (4 spec., Hydro/On/XII/2019, total length 5–14 cm). Same location, 21 Jan. 2019, obs. by V. Hasan (16 spec., photographed).



**Figure 1.** Location of Danau Kastoba on the island of Bawean in the Java Sea.



**Figure 2.** Danau Kastoba location where *O. niloticus* found in Bawean Island (photograph by M.B. Tamam)

**Identification.** Meristic and Morphometric characters of *O. niloticus* are given in Table 1. Other specific morphological characters are as follows: scales cycloid; gill rakers short; 3 rows of scales on cheek; maxilla and lower jaw equal; teeth widen; pectoral fin pointed; dorsal, pectoral and anal fins blunt; caudal scaly. Coloration: anal fin faintly barred; caudal and soft dorsal fin sharply barred; about 9 narrow dark bars on sides body; dark blotch at corner of operculum.

**Table 1.** Meristic and morphometric of *Oreochromis niloticus* from the Danau Kastoba, Bawean Island ( $n = 4$  specimens).

Character	Meristic
Dorsal fin	XV+10
Pectoral fin	11
Anal fin	VIII+10
Pelvic fin	I+5
Lateral line scales	30
Character	Morphometric (cm)
Total length	11.6
Standard length	9.7
Head length	3.1
Body depth	7.3
Eye diameter	0.8
Snout length	0.7

## Discussion

*Oreochromis niloticus* has been introduced to more than 90 countries around the world for both fresh and brackish water aquaculture (Fitzsimmons 2001). This species is one of the top 10 introduced species of animals in the world (Picker and Griffiths 2011).

Indonesia is the second largest producer of *O. niloticus* in the world after China (FAO 2017). Due to intensive aquaculture, *O. niloticus* now occurs in all fresh and brackish waters of mainland Indonesia. Its presence on the island of Bawean, in the middle of Java Sea and 153 km from the nearest mainland (Fig. 3), is new record.

We speculate that *O. niloticus* was released into Danau Kastoba on Bawean by local people. The purpose is not clear. As the island does not have an aquaculture industry, further investigation is warranted to determine the source of *O. niloticus* on Bawean Island. The control and prevention of further introductions is needed so that *O. niloticus* does not disturb the natural ecosystem (Speziale et al. 2012).

## Acknowledgements

We thank the Ministry of Finance of the Indonesian Education Fund Management Institute (LPDP) as the Scholarship Program sponsor and for funding our work no. 20160221035555

## Authors' Contributions

VH collected the data and wrote the text, MBT facilitated with field work. All authors corrected, revised and discussed the data.

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**Figure 3.** *Oreochromis niloticus*, Danau Kastoba on Bawean (photograph by V. Hasan).

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