

Mozambique Tilapia *Oreochromis mossambicus* (Peters, 1852) (Perciformes : Cichlidae): New Record from Masalembo Island, Indonesia

¹Septina F. Mangitung, ²Veryl Hasan*, ²Wahyu Isoni, ¹Novalina Serdiati and ³Fitri Sil Valen

¹Universitas Tadulako, Faculty of Animal Husbandry and Fisheries, Aquaculture Department, Kampus Bumi Tadulako, Palu, Central Sulawesi, Indonesia, 94118

²Universitas Airlangga, Fisheries and Marine Faculty, Fish Health Management and Aquaculture Department, Surabaya 60115, East Java, Indonesia

³Generasi Biologi Indonesia Foundation, Zoology Division, Gresik 61171, East Java, Indonesia

(Received 27 September, 2020; Accepted 13 November, 2020)

ABSTRACT

Mozambique Tilapia *Oreochromis mossambicus* (Peters, 1852) is native to East Africa, with introductions reported from Kangean Island, east end of Java Sea (Indonesia). On 17–18 June 2019 specimens of *O. mossambicus* were captured from estuary in Masalembo Island. These records are among first of this species from an island in the middle of Java Sea. A description of morphological characters of a specimen is provided.

Key words: Cichlid, Tilapia, Distribution, Meristic, Morphology

Introduction

Mozambique Tilapia *Oreochromis mossambicus* (Peters, 1852), a species of the Cichlidae family, is one of the most successful invasive fish species worldwide (Maddern *et al.*, 2007; Martin *et al.*, 2010). It is now introduced to many countries for aquaculture and exotic fish (Costa–Pierce, 2003; Canonico *et al.*, 2005). *Oreochromis mossambicus* exhibits tolerance to fluctuations in salinity (de Moor *et al.*, 1986; Shelton and Popma, 2006). It can have negative impacts on brackish and freshwater communities through competition for food, niche and other resources, and as a vector of disease causing pathogens (Barker *et al.*, 2002; Cucherousset and Olden, 2011).

Tilapias have generally spread in mainland Indonesia where aquaculture activities have been underway for some time (Basuki and Sri, 2014). Previous record showed this species was found on Kangean

Island in the east end of Java Sea (Hasan *et al.*, 2019a). Masalembo, isolated islands in the middle of Java Sea, is a conservation area and has no record of culturing Tilapia. The presence of *O. mossambicus* on Masalembo Island constitutes a new record.

Materials and Methods

We collected fishes using fish trap 17–18 June, 2019 in estuary. Collected specimens were labelled and fixed in 5% formalin solution (Hasan *et al.*, 2019a) and deposited at the Hydrobiology Laboratory, Brawijaya University, Malang, Indonesia (HB.Om.VI.2019). Administratively, the site is located in Sukajeruk Village, Sumenep Regency, East Java Province, Indonesia. Diagnostic morphometrics and meristic of the specimens were analyzed following Trewavas (1983).

Results

Several specimens collected in Masalembu Island were identified as *Oreochromis mossambicus* (Fig. 1). Specific morphological characters are as follows: Snout long; forehead with relatively large scales, starting with two scales between the eyes followed by nine scales up to the dorsal fin. Snout duckbill-like due to enlarged jaws, often causing upper profile to become concave. Pharyngeal teeth very fine and dentigerous area with narrow lobes, blade in adults longer than dentigerous area; lower gill rakers 14–20; dorsal spines 15–18; dorsal soft rays 10–13; caudal fin not densely scaled; anal spines 3; anal soft rays 7–12; vertebrae 28–31. Coloration: basic body coloration silvery grey; spiny part of dorsal fin light with dark mottling; soft dorsal, caudal, anal and ventral fins blackish; pectoral fins colorless; dark blotch at corner of operculum.



Fig. 1. Specimen of *Oreochromis mossambicus* HB.Om. VI.2019 captured on 18 June 2019 from Masalembu Island (Photograph by V. Hasan).

Discussion

Tilapias in general are listed among the top 100 worst alien species around the globe and have successfully established in more than 90 countries on five continents (all except Antarctica) (de Silva *et al.*, 2004; Russell *et al.*, 2012). Estuary conditions on Masalembu Island, namely salinity 14–27 ppt, temperature 29–31 °C, current velocity 6.5 cm/s and depth 0.7–0.9 m, are ideal for *O. mossambicus* survival, growth and reproduction (Riede, 2004).

The first establishment of Tilapias is believed to have occurred in Java in the 1930s as a result of an aquarium release of *O. mossambicus* (Courtenay and Williams, 1992). Due to intensive aquaculture, *Oreochromis mossambicus* now occurs in all brackish and freshwater of mainland Indonesia. Its presence on the island of Masalembu, 162 km from the nearest mainland (East Java) and 179 km from the previous record (Kangean Island), represents a new record (Fig. 2).

We speculate that *O. mossambicus* was released into estuary in Masalembu Island by local people and the purpose is not clear. As the island does not have an aquaculture industry, further investigation is warranted to determine the source of *O. mossambicus* in Masalembu Island. The control and prevention of further introductions is needed so that alien fish does not disturb the aquatic ecosystem (Hasan and Tamam, 2018; Hasan *et al.*, 2019b; Hasan *et al.*, 2020a; Hasan *et al.*, 2020b).

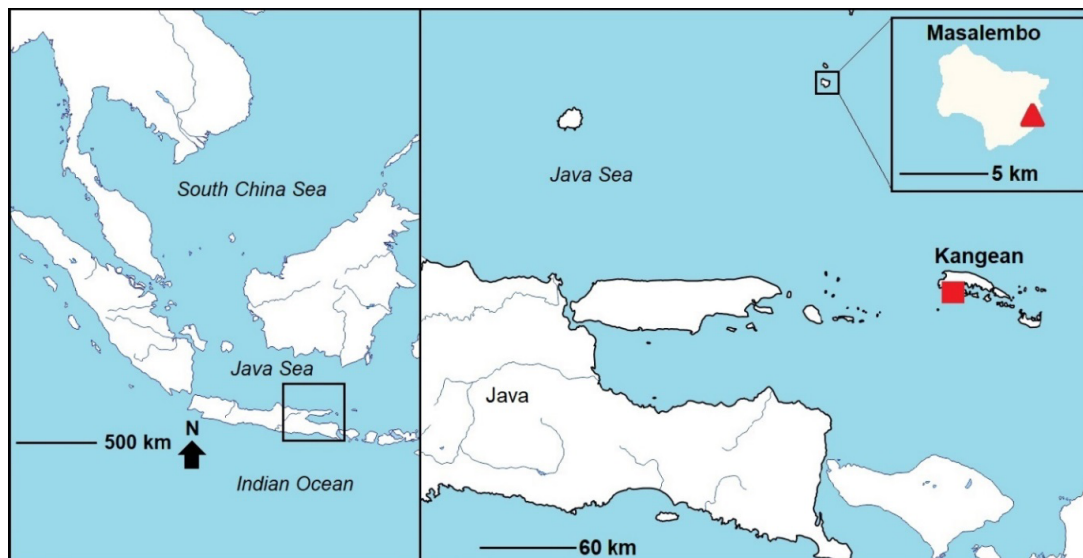


Fig. 2. Range expansion of *Oreochromis mossambicus* in Java Sea. Red square is the previous record of the species in Kangean Island, red triangle is the recent record from Masalembu Island.

References

- Barker, D.E., Cone, D.K. and Burt, M.D.B. 2002. *Trichodinam urmanica* (Ciliophora) and *Gyrodactylus pleuronecti* (Monogenea) parasitizing hatchery reared winter flounder, *Pseudopleuronectes americanus* (Walbaum): effects on host growth an assessment of parasite interaction. *Journal of Fish Disease*. 25 : 81–89.
- Basuki, F. and Sri, R. 2014. Analysis on the Survival Rate and Growth of Larasati Tilapia (*Oreochromis niloticus*) F5 seed in Saline Media. *Procedia Environmental Sciences*. 23 : 142–147.
- Canonico, G.C., Arthington, A. McCrary, J.K. and Thieme, M.L. 2005. The effects of introduced tilapias on native biodiversity. *Aquatic Conservation Marine and Freshwater Ecosystems*. 15 : 463–483.
- Costa–Pierce, B.A. 2003. Rapid evolution of an established feraltilapia (*Oreochromis* spp.): the need to incorporate invasionscience into regulatory structures. *Biological Invasions*. 5 : 71–84.
- Courtenay, W.R. and Williams, J.D. 1992. Dispersal of exotic species from aquaculture sources, with emphasis on freshwater fishes. In: Rosenfield A, Mann R (Eds) *Dispersal of Living Organisms into Aquatic Ecosystems*. University of Maryland Sea Grant Program. College Park. 49–81.
- Cucherousset, J. and Olden, J.D. 2011. Ecological impacts of non–native freshwater fishes. *Fisheries*. 36 (5) : 215–230.
- De Moor, F.C., Wilkinson, R.C. and Herbst, H.M. 1986. Food and feeding habits of *Oreochromis mossambicus* (Peters) in hypertrophic Hartbeesport Dam. South Africa. *South Africa Journal of Zoology*. 21: 170–176.
- De Silva, S., Subasinghe, R., Bartley, D. and Lowther, A. 2004. *Tilapias as alien aquatics in Asia and the Pacific*. A Review. FAO Fisheries Technical Paper, Rome, 453 pp.
- Hasan, V., Pratama, F., Malonga, W.A.M. and Cahyanurani, A.B. 2019a. First record of the Mozambique Tilapia *Oreochromis mossambicus* Peters, 1852 (Perciformes: Cichlidae) on Kangean Island, Indonesia. *Neotropical Biology and Conservation*. 14 (2): 207–211.
- Hasan, V., Mukti, A.T. and Putranto, T.W.C. 2019b. Range expansion of the invasive Nile tilapia *Oreochromis niloticus* (Perciformes: Cichlidae) in Java sea and first record for Kangean island, Madura, east Java, Indonesia. *Ecology, Environment and Conservation*. 25 (July Suppl. Issue): S187–S189.
- Hasan, V. and Tamam, M.B. 2019. 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., Widodo, M.S., Faqih, A.R., Mahasri, G., Arief M., Valen, F.S., Tamam, M.B., Yonarta, D., Pratama, F.S. and Fitriadi, R. 2020s. Presence of striped flying barb *Esomus metallicus* (Teleostei, Cyprinidae) from west Sumatra, Indonesia. *Eco. Env. & Cons.* 26 (August Suppl. Issue): S73–S75.
- Hasan V., Widodo M.S., Islamy R.A. and Pebriani D.A.A. 2020b. New records of alligator gar, *Atractosteus spatula* (Actinopterygii: Lepisosteiformes: Lepisosteidae) from Bali and Java, Indonesia. *Acta Ichthyol. Piscat.* 50 (2) : 233–236.
- Hasan, V., Faqih A.R. and Maftuch. 2020c. Range expansion of *Parachromis managuensis* (Günther, 1867) (perciformes, cichlidae) in Java, Indonesia. *BIOTROPIA*, in press.
- Maddern, M.G., Morgan, D.L. and Gill, H.S. 2007. Distribution, diet and potential ecological impacts of the introduced Mozambique mouthbrooder *Oreochromis mossambicus* Peters (Pisces: Cichlidae) in Western Australia. *Journal of the Royal Society of Western Australia*. 90 : 203–214.
- Martin, C.W., Valentine, M.M. and Valentine, J.F. 2010. Competitive interactions between invasive Nile tilapia and native fish: The potential for altered trophic exchange and modification of food webs. *Plos One*. 5 (12): 1–6.
- Riede, K. 2004. *Global Register of Migratory Species from Global to Regional Scales*. Final Report of the R&D-Projekt 808 05 081. Federal Agency for Nature Conservation, Bonn, 329 pp.
- Russell, D.J., Thuesen, P.A. and Thomson, F.E. 2012. A review of the biology, ecology, distribution and control of Mozambique tilapia, *Oreochromis mossambicus* (Peters, 1852) (Pisces: Cichlidae) with particular emphasis on invasive Australian populations. *Reviews in Fish Biology and Fisheries*. 22: 533–554.
- Shelton, W.L. and Popma, T.J. 2006. *Biology*. In: Lim CE, Webster CD (Eds). *Tilapia: Biology, Culture, and Nutrition*. Haworth Press, New York, 1–49.
- Trewavas, E. 1983. Tilapiine fishes of the genera *Sarotherodon*, *Oreochromis* and *Danakilia*. British Museum (Natural History), London, 583 pp.