

Biodiversity Record: Mozambique tilapias lekking in Sungei Tampines

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Recommended citation. Chin LN (2022) Biodiversity Record: Mozambique tilapias lekking in Sungei Tampines. Nature in Singapore, 15: e2022011. DOI: 10.26107/NIS-2022-0011

Subjects: Mozambique tilapia, *Oreochromis mossambicus* (Actinopteri: Cichliformes: Cichlidae).

Subjects identified by: Tan Heok Hui.

Location, date and time: Singapore Island, Pasir Ris, Sungei Tampines; 23 September 2021; around 1615 and 1835 hrs.

Habitat: Freshwater. Urban canal with concrete banks and sandy substrate, under a bridge and upstream of a rubber inflated dam (Figs. 1, 2).

Observer: Chin Liying Nikki.

Observation: The low water level in the canal allowed clear views of the activities of tilapias from the bridge. No less than 20 male tilapias were seen constructing shallow, bowl-shaped pits in the substrate (Figs. 2, 3), of diameters about two to four times their body length (Fig. 3). Each male, recognised by his blackish body and white throat, would repeatedly scoop sand with his mouth and spit it out over the raised edge of his pit. Each male would circle his pit, possibly establishing territory, as well as surveying for nearby females which are pale brown or grey in comparison. Occasionally, males with neighbouring pits were seen ‘facing off’ without physical combat, and each male would then retreat backwards into his own pit (Fig. 4). Sometimes the males were seen ‘chasing’ other tilapias nearby that appeared to be females. They would return to their pit if these fish swam away. On one occasion, two dark individuals with white throats were seen swimming side by side and circling each other (Fig. 5). Images of the breeding site at 1619 hrs (Fig. 6A) and 1832 hrs (Fig. 6B) show that the number of pits at the site increased over the two hours. No heterosexual pairs were observed spawning.

Remarks: The Mozambique tilapia is a common, non-native fish that is established in bodies of freshwater and brackishwater all over Singapore (Tan et al., 2020). This highly social species is a polygynous, sexually dimorphic maternal mouthbrooder. Mature males aggregate in shallow margins of waterbodies and excavate circular depressions that are aggressively defended (Figs. 2–6). Each of the low-walled pits can be mistaken for a nest, but is instead a lek—an arena used by the resident male for courtship displays to attract receptive females in the vicinity. Such a communal courtship display is known as lekking. Each female will breed with a male of her choice, and the pair will spawn inside the arena. After the eggs are fertilised, the female collects them in her mouth, leaves the arena, and establishes a brooding territory elsewhere. She will carry the eggs in her mouth until they hatch and the young are free swimming. The mouth (buccal cavity) of the female tilapia actually functions as the nest. Meanwhile, the male will continue to spawn with multiple other females that choose him to father her brood (see Webb & Maughan, 2007).

The featured observation of two tilapias swimming side by side and circling each other in an arena (Fig. 5) is believed not to be a heterosexual spawning pair. That both wear similar dark masculine colouration suggests that it could be another male challenging the resident male for territorial possession. The ‘chasing’ behaviour of the males mentioned in the observation, although appearing to be aggressive, could possibly be part of the courtship displays aimed at attracting the attention of surrounding females.

Literature cited:

Tan HH, Lim KKP, Liew JH, Low BW, Lim RHB, Kwik JTB & Yeo DCJ (2020) The non-native freshwater fishes of Singapore: An annotated compilation. Raffles Bulletin of Zoology, 68: 150–195.

Webb A & Maughan M (2007) Pest Fish Profiles. *Oreochromis mossambicus* – Mozambique Tilapia. Australian Centre for Tropical Freshwater Research, James Cook University, 12 pp.



Fig. 1. The bridge over Sungei Tampines, below which lekking Mozambique tilapias were observed. An inflatable rubber dam downstream probably prevents the access of seawater upstream during high tides. (Photograph by: Chin Liying Nikki).



Fig. 2. A view of the canal at low water showing the distinctive, shallow, bowl-shaped leks constructed by breeding male tilapias. (Photograph by: Chin Liying Nikki).



Fig. 3. A male tilapia constructing a lek by scooping sand in his mouth and spitting it out beyond the raised edges. (Photograph by: Chin Liying Nikki).



Fig. 4. Two male tilapias in neighbouring leks in a 'face-off' with each other. (Photograph by: Chin Liying Nikki).



A



B

Fig. 5. Two tilapias with similar colour pattern swimming side by side (A) and circling each other (B) in a lek. It is not clear if they are two males challenging each other for lek possession. (Photographs by: Chin Liying Nikki).



A



B

Fig. 6. Side-by-side comparison of part of a lekking site at 1619 hrs (A) and 1832 hrs (B), showing progress of lek construction by male tilapias. There are at least seven arenas in the later picture. (Photographs by: Chin Liying Nikki).