

Oreochromis niloticus (Nile Tilapia)

Family: Cichlidae (Cichlids and Tilapias)

Order: Perciformes (Perch and Cichlids)

Class: Actinopterygii (Ray-finned Fish)



Fig. 1. Nile tilapia, *Oreochromis niloticus*.

[<http://www.israquarium.co.il/Fish/IsraelFish/IsraelFishABC.html>- downloaded 15/11/11]

TRAITS. The Nile tilapia *Oreochromis niloticus* is indigenous to Africa and introduced to Trinidad and Tobago. It is an omnivore which feeds on plankton and aquatic plants. It can be used for weed control underwater. *Oreochromis niloticus* is famous in aquaculture and it is cultured as a food source in over seventy countries. It is cultured more than any other cichlid. It is of high economic value. Each Nile tilapia can grow up to about twenty four inches. They are very invasive and fast breeders. They are usually dark in colour but hybridisation in commercial rearing provides a difference in colour which tends to be more appealing to consumers. Recent studies have shown that this fish could possibly be used in the fight against malaria.

ECOLOGY. Tilapias prefer to stay in shallow waters for reproduction and feeding. This can be referred to as limitation in depth (Macintosh and De Silva 1984). Nile tilapias have limitations of being in deep waters due to temperature, and harmful gases such as carbon dioxide, hydrogen sulphide and ammonia. They are thermophiles and therefore can only survive if temperatures are not lower than fatal levels. Temperature should be high enough for reproduction and growth. Temperature tolerance depends on size. Younger fish can withstand more extreme temperature

fluctuations and increases than adults. *Oreochromis niloticus* is least tolerable brackish waters as compared to other tilapias.

SOCIAL ORGANIZATION. Grouped or territorial. *Oreochromis niloticus*, like other fish, travel in schools. They are among the most prominent freshwater species today. This fish has a wide range of places in which to settle since they can tolerate several physical parameters. Females do not have one specific home since the majority of their time is spent guarding and leading their young from danger. On the other hand, the male remains in his nesting zone. The male develops a nest by digging a hole into the ground. Here, defence mechanisms are portrayed and an attempt is made to attract a female for reproduction.

FEEDING BEHAVIOUR. Tilapias are macrophtyete-feeders. Adults feed mostly on filamentous algae and aquatic macrophytes. They have a diversified feeding routine with the vegetable component being dominant as well as an animal component. Nile tilapias are very efficient at harvesting plankton. They are considered filter feeders but do not physically filter through gill rakers. They instead secrete mucus from the gills and trap plankton.

Nile tilapias are not prone to disturbing the bottom of the pond. They efficiently browse on benthic organisms and detritus. Tilapias are not usually piscivorous, but juveniles feed on larval fish. They digest plant and animal protein efficiently, especially fibrous materials (Macintosh and De Silva 1984). Nile tilapias use pharyngeal plates of fine teeth to digest algae. They prefer blue green algae rather than green algae because of its digestibility. In enclosed or commercial ponds, when feed is given to the Nile tilapia, they rush to the surface of the water in a vigorous manner, with some of them even jumping above the water surface in an attempt to access the feed as quickly as possible. Feeding is uninterrupted when guarding the young except for mouth brooding females. Nile tilapias do not usually feed in waters of great depth.

SEXUAL BEHAVIOUR. Courting promotes sexual behaviour. When a female enters a male's territory, he firstly displays defence mechanisms to ensure that she is not an intruder. Once assured, he displays a series of slow movements with his body tilted downwards which usually attracts the female. This behaviour is followed by the male leading the female to a pit which he has dug. Courtship patterns follow which include shuddering movements and swimming around the nest while the male butts at the projected genital tube of the female (Mc Connell, 1983).

In these mouth brooders, courtship is followed by progeny where the female lays hundreds of eggs into the nest and instantaneously picks them up with her mouth. The male then sheds sperm over the site on which the eggs were laid. The female picks this up so that fertilisation occurs in her buccal cavity. Unfortunately, the female is then neglected by the male who then pursues other females with which he can once more begin courting.

PARENTAL BEHAVIOUR. In *Oreochromis niloticus*, social bonds between the mother and young are formed by the process of mouth brooding. By this method, extra attention is paid to the young and extensive care is portrayed. This species is well known for its uniparental custodial care that is carried out solely by the female (Balshine-Earn & Earn 1998). The mother carries a mouthful of eggs or fry for about a period of twelve days. Under these circumstances, feeding and breathing movements are constrained for the benefit of the young. In some cases, the young fish swim out of the mother's mouth before twelve days. The mother considers this unfavourable and snaps them back into her mouth until she believes that they are ready to be

released. After the young are released, they usually keep close proximity to their mother. Parental care is shown in the face of danger where they are allowed to return to the mother's mouth if threatened by a predator. The mother alerts the young of the predator's presence by steadily swimming backwards (Balshine-Earn & Earn 1998).

JUVENILE BEHAVIOUR. Juvenile fish are kept into the mother's mouth until she believes they are independent. At this stage, they are released into shallow waters and continue autonomous growth. They swim in schools and keep relatively close to their mother so they can easily return into her buccal cavity if threatened. Young fish of this species are able to better withstand extreme changes in temperature as compared to adult *Oreochromis niloticus*. Young *Oreochromis niloticus* are herbivores and become omnivores when they grow to an appropriate size. Tilapia fry grow very quickly and are able to reproduce in a matter of months.

ANTIPREDATOR/AGONISTIC BEHAVIOUR. The size of male Nile tilapia as well as the expanse of the territory in which they reside influence the aggressive behaviour displayed by them. This is also dependent on population density and range at which different organisms can interact with the Nile tilapia. They defend their territory by visual aggression and there is no real use of violence that can lead to physical harm to other fish. Inclusive of this are erect median fins, expansion of mouth, tail flicking which sends water against the lateral line of the imposter, butting and pursuing the opposing male by nipping (Mc Connell, 1939). The male Nile tilapia is most aggressive to other males of its species. However, if intruding females are encountered, they will be confronted in the same way unless she does not react. This will cause the male to switch his behaviour to courtship.

REFERENCES

- Balshine-Earn, S. and David J. D. Earn. 1998. "On the evolutionary pathway of parental care in mouth-brooding cichlid fish." *The Royal Society* (1998): 2217-2228. Accessed 12/11/11
- Macintosh, D.J., and De Silva, S.S. 1984. The influence of stocking density and food ration on fry survival and growth in *Oreochromis mossambicus* and *O. niloticus* female x *O. aureus* male hybrids reared in a closed circulated system. *Aquaculture* 41, 345-358.
- Mc Connell, L., trans., *The Biology and Culture of Tilapias* (ICLARM 1983)

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Posted online: 2011



Fig. 2. Young *Oreochromis niloticus*.

[<http://www.israqarium.co.il/Fish/IsraelFish/IsraelFishABC.html>- downloaded 15/11/11]



Fig. 3. *Oreochromis niloticus* making a nest to attract female for mating.

[<http://fishbase.sinica.edu.tw/summary/SpeciesSummary.php?id=2>-accessed 15/11/11]



Fig. 4. *Oreochromis niloticus* swimming in a school.

[<http://www.ars.usda.gov/is/AR/archive/aug09/strep0809.htm>-accessed 15/11/11]



Fig. 5. Mouthbrooding in *Oreochromis niloticus*: female releases fry from mouth.

[<http://www.ars.usda.gov/is/AR/archive/aug09/strep0809.htm>-accessed -15/11/11]

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