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Observations on *Tilapia* Fisheries in Lake Manzalah (Egypt)

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Lake Manzalah has long been recognized as the most important fishery ground among the Nile Delta lakes connected to the Mediterranean. According to available catch statistics, its yield has progressively increased from 37 kg/feddan during 1920-29 to 70 kg/feddan during 1962-66 to about 260 kg/feddan in 1979-84. This increase in the total yield per unit area was mostly attributed to the improvement of the productivity of the lake as a result of the progressive increase in nutrient load discharged into the lake by various sources of agricultural and wastewater rich in nutrients (HOSNY, 1987).

Beside these quantitative changes, the lake's fishery was subjected to qualitative variations in its yield that were governed by changes in its water properties, thus during 1930-35 when the average salinity was 24 mg/l, Lake Manzalah was primarily a marine-species-based fishery, when mullets constituted about 80% of its landings. With the gradual freshening of the lake water (average water salinity 8.3 mg/l during 1963-65 to 2.4 mg/l in 1982), it was transferred to a tilapia-based fishery. Quantitatively, tilapia fishery in the lake has increased progressively both in terms of tonnage and percentage reaching about 82.8% of the total yield of the lake during the period 1981-83.

Although it is a common agreement that tilapias constitute the major component of the fisheries of the lake, yet, their percentage contribution to the total catch varied widely according to the method of assessment used by different authors. In the present study tilapias were found to constitute 77.8% of the Tahaweet catch and 72.3% of the Nasha catch, while in the catch of Balla nets they only constituted 61.7%. On the average tilapias constituted about 73.2% of the catch of the three nets used. The last mentioned figure fairly represent the actual percentage of tilapias relative to the total yield from the lake, since the catch of these three gears represent more than 75% of the total landed catch in the lake.

Tilapia population in Lake Manzalah is composed of four species, viz.: Oreochromis aureus, O. niloticus, Tilapia zillii and Sarotherodon galilaeus. The order of abundance of tilapia species was also found to vary according to the method of assessment. The present study proved that the order of relative abundance of the four tilapias by weight are as follows :

	O. aureus	T. zillii	O. niloticus	S. galilaeus
Tahaweet	23.6	37.6	13.3	20.8
Nasha	43.9	29.95	20.0	6.0
Balla	45.6	22.8	24.7	6.9
Average	34.4	33.2	16.5	15.9

The averaging of this relative abundance, however, cancels the effects of gear selectivity and efficiency towards a given species or size. From the average, therefore, it is clear that O. aureus and T. zillii were the most abundant in the lake. The low percentage occurrence of O. niloticus and S. galilaeus may be due to the high rate of exploitation exerted on them in the last few year, being 0.7534 and 0.5345, respectively (HOSNY, 1987). Moreover, the reduction of the O. niloticus stocks reflected on their catch could be explained on the basis of its reduced tolerance to low water temperatures (CHERVINSKY and LAHAV 1976). During the present study, the lowest recorded water temperature was 10C and this is well tolerated by all of the four tilapias inhabiting the lake. However, massive kills of O. niloticus were frequently observed in the early morning following very cold winter nights when temperatures less than 10C must have occurred.

On the other hand, the relative abundance of O. aureus and T. zillii would be explained on the basis of interspecific superiority over S. galilaeus and O. niloticus, respectively. O. aureus is dominating on the expense of S. galilaeus in a similar way as was found in Lake Kinneret. GOPHEN et al (1983) mentioned that this was due to the interspecific competition between the two species, both are mouthbrooders of comparative fecundity, and spawn during the same period, they have a high degree of niche overlap and both feed on phytoplankton. However, O. aureus have the advantage of being able to shift to zooplankton when phytoplankton is not available. Moreover, O. aureus have a wider range of tolerance to salinity variations than S. galilaeus and is thus able to cope with salinity variations in the different zones of the lake.

The preponderance of T. zillii over O. niloticus is partly explained by the relative aggressiveness, both need species type of bottom and vegetation to live within (ITA 1978), but T. zillii is far more aggressive than O. niloticus (CHEN 1976). Furthermore, T. zillii is more euryhaline.

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