

Anguilla fisheries in Lake Manzalah, Egypt

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Eels were fished by professional fishermen from Lake Manzalah using fyke nets, with bags of different mesh sizes (30, 40 and 45 mesh bars per 50 cm) during the period from December 1984 to the end of March 1985. To ensure the best possible catch, nets were set parallel to the lake-sea connection in three parallel sets, each consisting of a 200 m long leader combined with 23 fyke nets.

Silver eels were separated from the catch and for each fish total length and total weight were measured; sex was determined by both micro and macroscopic examination of the gonads and the eels were grouped into definite females and those with lobulated organs. After proper treatment of otoliths age determination was made by reflected light against a black background. In the present study the calculation of age started at the first opaque freshwater ring.

From the analysis of the catch of the experimental fyke nets used during the present study, it was clear that the catch of eels was at its maximum during December, when it constituted 31.95% of the total catch. It decreased sharply in January to almost half this value, i.e. 16.58%, then reached its minimum in February and March (9.24% and 7.91%, respectively). This may show that the season of migration of silver eels from Lake Manzalah starts early in November or even sometimes in October.

The study of sex ratio in the eels catch showed that males constituted less than 1% of landed eels in December, then increased gradually in the following months reaching 100% in March. This would clearly indicate that females start their migration and leave freshwater grounds earlier than males. According to El-Gayar et al. (1985) the opposite occurs in Lake Edku and Lake Burullus where males are found to start migration earlier than females. On the average of the season, females constituted about 88% of the eel catch in Lake Manzalah, while during the same season (1984-85), females were 82% of the total eel production in Lake Burullus, and only constituted 20% in Lake Edku (El-Gayar et al., 1985).

The analysis of the size composition of 550 male and 655 female showed that males ranged between 33 and 49 cm in total length and that 68% of them were between 37 and 41 cm. Females, on the other hand, were much larger in size, ranging between 42 and 87 cm. 60% of them were in the length range of 58-71 cm.

Interpretation of annual rings layed on otoliths of 99 males and 132 females (Table 1) showed that males reach their silver stage earlier than females, i.e. after 4 years of freshwater life, and that migrating males are represented by six age groups, while females start migration after 6 years of freshwater life and the older individuals were 13 years old (freshwater life). Wide differences in growth rates between males and females were observed, females being much longer than males at any given age. Furthermore, wide length range in each age group is obvious with considerable overlapping with the following age groups.

Absolute value of growth in length (Δl) show that, for males, the rate of increase in length decreases progressively with age until the age of 9 years when it increases slightly. In contrast, length increments in females show no constant trend in variation with age. The same observation is true for variations of weight with age for each sex.

Table 1. Length and weight data of silver eels caught from Lake Manzalah (1984/85).

Eels with small and lobulated gonads						
Age	IV	V	VI	VII	VIII	IX
L (cm)	36.78	39.93	42.40	44.34	45.86	48.05
Wt (gm)	110.9	130.7	145.2	166.5	178.7	192.5
Females						
Age	VI	VII	VIII	IX	X	XI
L (cm)	47.07	54.24	62.10	69.7	74.3	79.08
Wt (cm)	227.8	300.8	565.0	774.3	977.0	1116.7
						1336.1
						1600

However, values of increment in weight relative to increment in length ($\Delta w/\Delta l$) clearly show an increase with age in the case of females, while it decreased in males. This would imply a state of deterioration in the condition of males as they grow longer.

The equations expressing the length-weight relationships of 148 males and 347 females were as follows:

$$\log W = 3.1734 \log L - 2.9451 \quad \text{for females} \quad (r=0.9656)$$

$$\log W = 3.1934 \log L - 2.9911 \quad \text{for males} \quad (r=0.9743)$$

The value of the slope of these equations indicate that females tend to grow heavier with respect to their length, while males tend to be very slim with growth in length.

For the calculation of the condition factor of silver eels we adopted the cubic relation $K=W/L^3$.

However, Frost (1945) tried to prove that eels do not obey the cube law because eels tend to become more bulky and heavier as they get longer. Yet, Burnet (1952) proved that eels obey the cube law in their length-weight relationship. In addition, Vladykov (1955) stated that the increase in fatness occurs in the eels at the stage when they descend to the sea.

Values of the condition factor of females showed progressive waves of decrease and increase with increasing length, while males showed a continuous decrease in condition with length. The average value of condition factor for each sex being 2.3661 ± 0.2851 for females, and 1.9475 ± 0.1718 for males. This again shows the high degree of robustness that females possess over males.

Comparison of values of condition factors with previous studies show that although they were all performed on yellow eels (Sinha and Jones, 1967; Ezzat et al., 1984), yet values of the exponent 'n' and the values of 'k' obtained in the present study lie within the normal range for this species.

References

- El-Gayar, F.M.H., R. Koura, N.M. Dowidar, M.M. Abu-Mostafa, and C.F.H. Hosny 1985. Report on Eels Fisheries in Northern Delta Lakes. General Authority for Development of Fish Wealth, Evaluation of Fishing gears Series 1: 105p. (Unpublished Manuscript).
- Ezzat, A., A.A. Al-Kholy and S. El-Serafy 1984. Age and growth of *Anguilla anguilla* L. in Lake Manzalah, Egypt. Bull. Inst. Oceanogr. & Fish. ARE, 10: 81-92.
- Sinha, V.R.P. and J.W. Jones 1967. On the age and growth of the freshwater eel (*Anguilla anguilla*). J. Zool., Lond., 153: 99-117.

Rapp. Comm. int. Mer Médit., 31, 2 (1988).

Detergents in Lake Borollos

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Harmful effects of detergents in natural waters may result from their general impact on the biogeochemical cycle of other pollutants and biogenic elements. It may also increase the solubility of many toxic substances. An increased concentration of surfactants in natural waters affects the exchange processes of gases and ions as well as colloid stability and formation of solid phases in natural aquatic systems. Here we present detergent concentration data measured by spectrophotometric method during the period January - December 1987 in Lake Burullus. Detergents content ranged between a maximum of 0.89 mg eq. LAS/l recorded in April and a minimum of zero recorded during winter months.

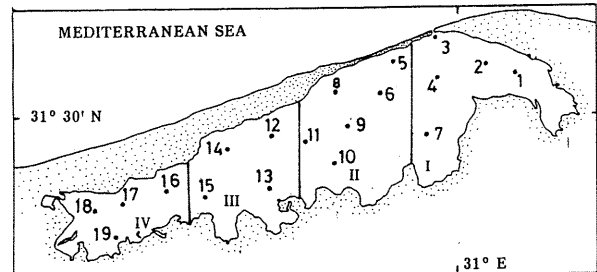


Fig. 1. Location of sampling stations and the 4 subdivisions (basins) of Lake Borollos.

For the sake of the present discussion the lake was divided into 4 basins which are connected to each other (Fig. 1). Fig. 3, shows the monthly distribution of detergent concentrations during January through December 1987 at the four basins of the Lake Borollos. It can be noticed that basin I had the highest concentration especially during April and May. Fig. 4 represents the frequency distribution of the concentration of methylene blue active substances in Lake Burullus surface water during the year 1987.

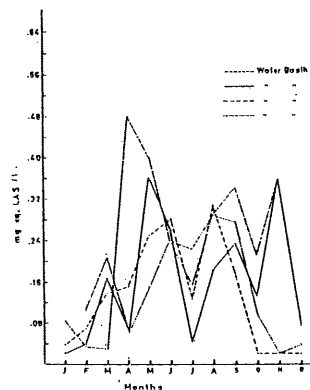


Fig. 3. The monthly change of detergents concentrations in Lake Borollos (mg eq. LAS / l)

The results indicate that Lake Burullus is not heavily polluted with detergents. Detergents concentrations was on the average of 0.17 mg eq. LAS/l. Parts of the lake in front of Boughaz area contained higher concentrations than any other parts of the Lake.

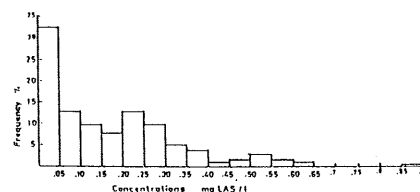


Fig. 4. Frequency distribution of concentration of detergents in Lake Borollos during January - August, 1987

It also shows that pollutions of sea water in the area of Alexandria, Abu Qir Bay west of the Boughaz area could be the main source of pollution, by detergents. The study also Points to the possibility of using detergents as tracer for urban pollution for marine environment.

Rapp. Comm. int. Mer Médit., 31, 2 (1988).