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## ENGLISH SUMMARY

Although Egypt has a wide and great areas of surface water represented in the Mediterranean and Red Seas, Suez Canal, lakes, River Nil river and many fish farms; we still import a large amount of fish to compensate the shortage in the fish production Egyptian person has only 11 Kg fish / year while in other countries, this level increased to reach 70 Kg / year in Japan.

It is important to protect the natural stock of fish in the different water bodies by good fishing managements. The life cycle of fishes include a sensitive stage in the juveniles are concentrated in nursery grounds far from the adult. The nursery ground includes coral reef habitats, inshore sheltered areas bays and costal lakes.

The aim of this work was to determine the species composition and abundance of juvenile and small fishes in the two sites, Timsah lake and Great Bitter Lakes in Suez Canal. Fishes were collected monthly in the period from May 2001 to October 2002 also some ecological aspects such as mechanical analysis for the sediment and organic matter content were studies.

The present study concerned with four dominant species, two species of juvenile fishes *Rhabdosargus haffara* (Sparidae) and *Pelates quadrilineatus* (Theraponidae); and the other two of small fishes *Engraulis encrasicolus* (Engraulidae) and *Leiognathus klunzingeri* (Leiognathidae).

Biological aspects of the four dominant species, which include species composition, abundance, length-weight relationships, Condition factor, growth pattern, and food habits. The reproductive biology was studies for the two small fish species only.

### **I-Ecological studies**

#### **1- Sediment analysis**

Mechanical analysis and organic matter of the sediment of the two sites indicate that Timsah Lake and Bitter Lakes had sandy bottom, but Timsah Lake has high organic matter content than Bitter Lakes.

## 2-Species composition

The structure of the fish community inhabiting the two sites of the present study, revealed 15 juvenile fish species and seven small fish species belonging to 19 families as follow:

- Juvenile fishes: 12 fish species in Timsah Lake (42%) and 13 fish species in Bitter Lakes (58%) of all the juveniles collected.
- Small fishes: 6 species in Timsah Lake (39.7%) and 5 species in Bitter Lakes (60.3%) of all small fishes collected.

## 3-Abundance

Bitter Lakes accounted not only the largest number of juvenile fish species but also the largest number of individual being 1060 representing 58% of all juvenile collected and 8014 individual of small fishes, representing 60.3% of all small fishes collected.

## II- Biological studies

### 1-Length- weight relationship

Length-weight relationships were significant; indicate isometric growth in species 1, 2 and 4 and negative allometric growth in species 3. as shown in the following formula:

1- Log W = - 1.8073+ 2.9634 Log L	<i>Rhabdosargus haffara</i>
2- Log W = -2.042 + 3.195 Log L	<i>Pelates quadrilineatus</i>
3- Log W = -1.957 + 2.6825 Log L	<i>Engraulis encrasicolus</i>
4- Log W = -2.0712 +3.1882 Log L	<i>Leiognathus klunzingeri</i>

### 2-Condition factor (K & Kn)

The value of K and Kn are quite similar and followed the same pattern in *Rhabdosargus haffara*; *Pelates quadrilineatus* and *Leiognathus klunzingeri*. They are low in small fishes, increased in medium and large size fishes, where *Engraulis encrasicolus* showed another pattern where the highest values were recorded in small fishes and the lowest values were shown in the large fishes.

### 3-Length frequency Distribution

The juveniles of *Rhabdosargus haffara* were found from April to August while *Pelates quadrilineatus* was detected in all months with very low percentage in winter. Small fish species, *Engraulis encrasicolus* and *Leiognathus klunzingeri* were found all over the year.

#### 4-Growth

There was a clear increase in the growth of *Rhabdosargus haffara* in spring and summer where as *Pelates quadrilineatus* showed high growth in spring and autumn. In small fish species, *Engraulis encrasicolus* and *Leiognathus klunzingeri* there was no clear pattern of growth through the whole period of study.

#### 5-Food habits

Food and feeding biology were investigated include the intensity of feeding, annual composition of the diet, seasonal variation in diet composition and variation in diet with length for the four main species.

In *Rhabdosargus haffara* intensity of feeding were very low. They are bottom feeder, prying predominantly on small crustaceans and polychaetes. Molluscs and diatoms were eaten in small quantity are. The diet composition varies considerably with the fish size. In small fishes *R. haffara* depend on copepods and cladocera mainly in their diet, as they grow they feeds on small fishes.

In *Pelates quadrilineatus*, indicates high rate of feeding intensity. It was benthic feeder, the predominant food items were polychaetes, benthic crustaceans, fish larvae and bivalve. There were no changes in the diet composition with growth.

In *Engraulis encrasicolus* there was a high rate of feeding intensity. It was a planktivore, the dominant food items were mysids, amphipods, copepods, tannids and cumacea. Other items eaten in small quantities are ostracods, fish parts and bivalve. There was no change in the diet composition with size.

In *Leiognathus klunzingeri*, the intensity of feeding showed low rate of feeding activities. It was benthic feeder, prying predominantly on amphipods, polychaetes, copepods, and cladocera. Other items ingested in small amounts were cumacea, leaches, bivalve and diatoms. It is clear that there is no change in diet composition with increase in length.

#### 6-Reproductive biology

Reproductive biology of *Leiognathus klunzingeri* and *Engraulis encrasicolus* were studied the two species have a definite reproductive cycles. Breeding season of *L. klunzingeri* extended from May to September whereas *Engraulis encrasicolus* spawns from May till December

1-The percent of male to female was 1-1.35 in *L. klunzingeri* and 1-1.3 in *E. encrasicolus*

2-Length at first sexual maturity of *L. klunzingeri* was 6.1 in male and 5.1 cm in female whereas in *E. encrasicolus* it was 7 cm in male and 7.25cm in female

3- G SI reaches its maximum value in June in the both two species.

4-Fecundity of *L. klunzingeri* varied from 195 to 6844 whereas it varied from 113 to 3321 in *E. encrasicolus*.

The study indicated that the regression relationship between fecundity and fish length (L); body weight (W); and ovary weight (OW) were significant and expressed by the following formula:

For *Leiognathus klunzingeri*

$$\text{Log F} = 1.037 + 2.808 \text{ Log L} \quad (r = 0.9683)$$

$$\text{Log F} = 2.9076 + 0.9216 \text{ Log W} \quad (r = 0.9667)$$

$$\text{Log F} = 3.9255 + 0.4998 \text{ Log O.W} \quad (r = 0.9594)$$

For *Engraulis encrasicolus*

$$\text{Log F} = 0.4238 + 2.6454 \text{ Log L} \quad (r = 0.9902)$$

$$\text{Log F} = 2.144 + 1.4297 \text{ Log W} \quad (r = 0.9064)$$

$$\text{Log F} = 3.9426 + 1.009 \text{ Log O.W} \quad (r = 0.9422)$$

### RECOMMENDATIONS

- 1- Timsah lake and Bitter lakes are considered of the nursery grounds, the non managed fishing by the commercial beach seine net can resulted in drastic deterioration of juvenile stock resources in them
- 2- The extensive use of such fishing is considered as the most destructive methods to the nursery grounds. Therefore it is necessary to put an end to beach seine method and it is recommended to improve and regulate fishing effort in Timsah Lake and Bitter lakes.