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FULL LENGTH ARTICLE

Fisheries and biodiversity of the beach seine catch from the Eastern Harbor, Alexandria, Egypt

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Abstract In the present study, the catch of beach seine operating in the Eastern Harbor of Alexandria (Egypt) during the fishing season of 2009 was investigated. Fishing is allowed all year except for some weeks in the winter. Catch efficiency was estimated to be 37.94 kg/haul and catch rate was 25.29 kg/h. The catch was classified into economic (60.24%) and non-economic (39.76%) species. The total number of species caught in the Eastern Harbor was 46 species (31 economic, 15 non-economic) belonging to 31 families (16 economic, 15 non-economic). The economic category of species was dominated by the immigrant sardine species *Herklotsichthys punctatus* while the non-economic category was dominated by *Engraulis encrasicolus*. Eight species were lessepsian. In terms of abundance, seven species were recorded during four seasons, seven species occurred in three seasons; ten species were found in two seasons while the rest occurred in one season only. Species compositions, size composition, the length-weight relationships as well as age composition for some dominant species were investigated. Fishing in sheltered places or nursery grounds with small meshed nets (0.5 cm) causes drastic danger to the fish populations of the Eastern Harbor.

Introduction

Beach seine is widely used along the Egyptian Mediterranean coast in front of the Nile Delta, where the nursery grounds of most fishes occur (Faltas and Akel, 2003). The beach seine causes a considerable increase in the landing of unwanted species and catches large quantities of juveniles (small sizes of economic species) which are considered as contributors to the future stocks (Faltas and Akel, 2003).

The chemistry and hydrography of the Eastern Harbor were studied. Shriadah and Emara (1991) found that the concentrations of copper and chromium were correlated with oxidizable organic matter, suggesting that complexation may play an important role in the distribution of these elements. According to Said and Maiyza (1987), the highest values of water temperature were observed at the surface and bottom during the summer time. On the other hand, the maximum salinity values were observed near El-Boughaz and the effect of the polluted domestic sewage was clear on the surface salinity during the spring and summer months. A decrease in the

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oxygen content was observed in May, July and September in both surface and bottom waters. The results of Maiyza and Said (1988), revealed the bad effect of the domestic sewage on the oxygen content of the Eastern Harbor which reached the oxygen depletion state due to the organic activities on the heavy domestic sewage materials that accumulated on the sediments.

Zaghloul (1988) found two layers: a dilute surface layer characterized by lower salinity, low dissolved oxygen, high dissolved phosphate and silicate, high specific alkalinity, low sechi disk transparency and a dense phytoplankton standing crop. The second layer was at the bottom which was characterized by a higher density, higher salinity, lower dissolved oxygen, lower dissolved silicate, lower specific alkalinity and lower phytoplankton standing crop. El Komi (1991) found that the intensity of fouling on exposed test panels for long duration is considerably more than the total fouling developed on exposed panels for a short term, successively during the same period. Abdalla et al. (1995) found that the harbor was characterized by a high nutrient load particularly phosphate, nitrate and ammonia. Its oxygen content shows wide variations between surface and near bottom. The harbor sustained a high density of phytoplankton and community characterized by the dominance of eutrophication tolerant algal species.

The aim of the present work is to study the beach seine fishery, (statistics, species and size composition, length–weight relationships and age composition), in terms of biodiversity and catch efficiency to assess and provide management suggestions. This will help in covering the lack of information about the fishery of the beach seine in the Eastern Harbor since 1987.

Materials and methods

Study area

The Eastern Harbor is a semi-enclosed protected embayment covering an area of about 2.8 km^2, occupying the central part of Alexandria coast (Said and Maiyza, 1987). The southern border of the harbor has been reinforced by concrete blocks, while its northern part is protected by an artificial wave breaking.

It is bordered to the east by a land projection (El-Silsila). The harbor is connected to the Mediterranean Sea through El-Boughaz and El-Silsila openings. In most places, the harbor is shallow, with an average depth of about 5 m. The deepest part (12 m) lies near El-Boughaz inlet. The bottom slopes down gradually toward El-Boughaz opening and the center of the harbor (El–Geziry et al., 2007) (Fig. 1).

Fishing operation

The net in use was about 200 m long. There are two wings about 90 m long for each one with 7.5 cm mesh size. The wing was followed by a narrower part with a 2.5 cm mesh size and length of about 10 m. The cod end is with a mesh size 0.5 cm and length of about 10 m. There is an additional rope for each wing to help in pulling the net to the shore.

Two men on a small boat, release the net to the water in a semi-circle shape. Two teams pull both sides of the net to the shore. Two men jump into the water to close the front side of

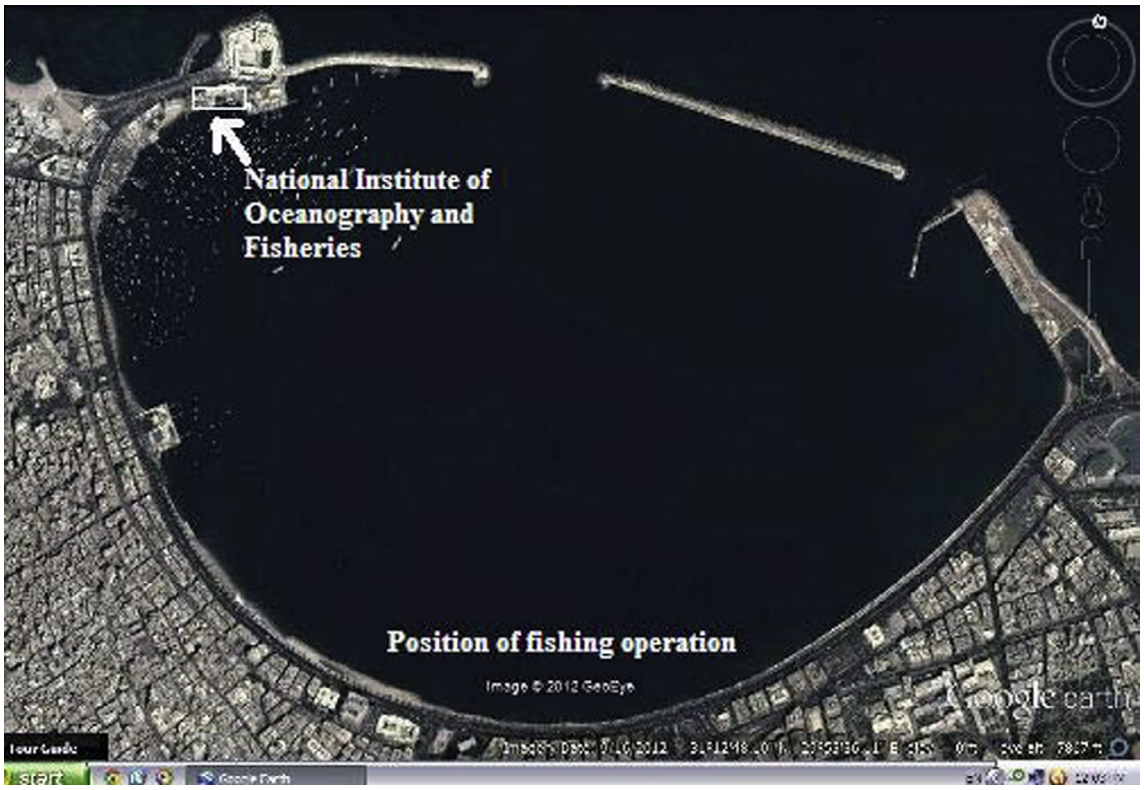

Figure 1 Eastern Harbor, Alexandria. (Source: Google earth).