

Incidence and ecology of marine fouling organisms in the Eastern Harbor of Alexandria, Egypt

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The fouling communities developing on submerged test panels (sized 15x15cm) for short and long terms at the Eastern Harbor of Alexandria was investigated in relation to the prevailing environmental conditions. To give an idea of the respective period of immersion and it is possible to make interesting successional the growth and longevity of fouling groups inhabited on the submerged objects under the sea water.

The harbor is relatively small semicircular polluted bay. Its water temperatures ranged from 16°C to 28°C throughout the year and its salinities fluctuated within 38.1 to 39.4 ‰.

The larval stages of fouling organisms, namely; barnacles, polychaetes, ascidians, bivalves, bryozoans and hydroids leptomedusae appeared in the plankton samples throughout most of the year, with maximum persistence between May and September period. The number of larval stages in the plankton vertical hauls through May to September averaged 2824, 838, 300 and 236 org/m³ for polychaete trochophore larvae, naupliar stages of barnacles, veliger larvae and ascidian tadpole larvae, respectively. The attachment numbers and biomasses of fouling organisms increased as the period of immersion extended to 4 months or more (Table 1) depending on the season of immersion. Eight main groups of macro-organisms with 57 species were recorded on the submerged test panels. These groups comprised barnacles, calcareous tube worms, ascidians, bryozoans, amphipod building tubes, hydroids, algae and sponges. The calcareous forms were the most conspicuous fouling organisms. Four species of barnacles, namely; *Balanus amphitrite*, *B. eburneus*, *B. perforatus* and *B. trigonus* were recorded. Their survival extended for 8 successive months or more, showing maximum growth rate during the first two months. The calcareous tube worms were represented by 6 species; *Hydroides elegans*, *H. dianthus*, *H. dirampha*, *Serpula vermicularis*, *Pomatoceros triquetus* and *Spirorbis* sp. *H. elegans* appeared as the most dominant tube worms. The overcrowded tube worms could be persisted for about 3 successive months and can be easily displaced under external circumstances. The bryozoans, *Bugula neritina* and *B. turbinata* prevailed at the same time of the development of algae on the exposed panels except in summer. They appeared in large colonies reaching more than 20-bifurcations and could survive for about 4 successive months. The ascidians; *Ciona intestinalis*, *Styela partita*, *S. plicata* and *Ascidia mentula* developed well on the panels immersed for long durations. The first species thrived for short period extending for 2 or 3 months while the others persisted for 6 or 8 successive months.

Panels immersed for long durations during summer and early autumn were the most heavily populated by barnacles, ascidians, and bryozoans. The panels exposed for 2 to 6 successive months during spring and early summer, generally collected more individuals than did those exposed for same intervals during the rest of the year. Diameters of the largest specimens differed from month to month and the maximum sizes obtained for individuals recorded on panels exposed for 2 to 4 months during spring and summer months.

The seasonal occurrence of barnacle nauplius larvae in plankton indicates a high concentration during December in the vertical haul which yielded 2585 org/ m³, but it does not reflect the realist attachment number of barnacles grown on the monthly collectors during this period as well other fouling groups did. It may be due to low degree of temperature reached to 17 °C. During the last 23 years fouling populations at the Eastern Harbor were recorded by Banoub, 1960, Megally, 1970 and Ghobashy, 1976 in which great changes have been take place in the frequency occurrence and settlement density of fouling. In the present study the fouling biomass is greatly reduced that reflects the changes in the environmental conditions resulting from the intensity of pollution. The settlement density of fouling population on exposed panels for long intervals reflects that each community has an optimum intensity of attachment. Barnacles were able to survive for about 2.5 years under rearing conditions (El-Komi, 1988), whereas in natural population they persisted for only 3 or 9 successive months.

Table 1. The wet weight in grams of fouling organisms groups developed on submerged test panels (15x15 cm) for various immersion intervals during March 1980 to February 1984 in the Eastern Harbor of Alexandria.

Duration of immersion (months)	Algae	Hydr.	Boyzoans	Serp. uroids	Barn.	Ascidians	Other	Total
2	Mar-Apr	15	+	18	138	2	104	12
2	Jul-Aug	+	+	69	32	-	11	103
2	Sep-Oct	+	+	18	4	-	1	23
2	Oct-Nov	3	+	8	4	10	1	31
2	Nov-Dec	8	+	12	22	1	-	32
2	Dec-Jan	5	+	7	18	1	-	31
2	Jan-Feb	5	+	4	9	15	-	33
3	Mar-May	7	+	120	250	3	420	800
3	Jun-Aug	+	+	28	90	28	6	384
3	Sep-Nov	5	+	14	6	23	5	65
3	Oct-Dec	+	+	30	57	77	3	167
3	Nov-Jan	+	+	6	83	80	4	158
3	Dec-Feb	+	+	27	130	75	10	245
4	Mar-Jun	+	+	352	535	19	22	840
4	Jun-Sep	+	+	129	374	65	8	84
4	Sep-Dec	+	+	14	45	3	5	84
4	Oct-Jan	+	+	210	129	185	18	548
5	Mar-Jul	+	+	22	446	77	14	577
5	Jul-Oct	+	+	15	16	32	14	57
5	Oct-Feb	+	+	60	16	179	14	272
6	Mar-May	+	+	125	90	14	5	234
6	Jun-Aug	+	+	12	32	655	25	721
7	Mar-Sep	+	+	760	297	31	12	1030
8	Mar-Oct	+	+	35	425	22	5	565
9	Mar-Nov	+	+	42	33	563	84	721
10	Mar-Dec	+	+	147	32	455	142	783
11	Mar-Jan	+	+	88	45	335	290	774
12	Mar-Feb	+	+	238	90	440	320	1094

+ Present in few numbers; - Not observed

REFERENCES

BANOUB, N.W., 1960. Notes on the fouling of glass plates submerged in the Eastern Harbour of Alexandria. Notes and Memoires, Alex. Institute Hydrobiol., 64, 1-11.
 EL-KOMI, M.M., 1988. Studies on the reproductive biology of common barnacles. Ph.D. dissertation, University of Tokyo, Japan, pp. 119.
 GHOBASHY, A.F.A., 1976. Seasonal variation and settlement behaviour of the principal fouling organisms in the Eastern Harbour of Alexandria. Proc. 4th Intern. Congr. Mar. Corr. Fouling: 213-220.
 MEGALLY, A.H., 1970. Ecological study on marine fouling organisms in Eastern Harbour of Alexandria. M.Sc.Thesis, Univ. of Alexandria, pp. 250.