

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

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The Appearance of Pink Coloured Mussels (*Mytilus galloprovincialis* Lamarck) on the Western Coast of the Istrian Peninsula

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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. aburatus*, *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*, *Pomatocerus 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 thateach 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.

The appearance of mussels with pink coloured inner part of the shell (nacreous layer) was registered for the first time at several places on the Western coast of the Istrian peninsula during the phytoplankton bloom in the mid-summer of 1989. At present, the incidence of pink mussels, according to the information of several persons, has never been observed further south along the Yugoslav coast. In February and March 1990, a survey of mussel populations was made to elucidate the problem on the appearance of pink mussels.

Samples (53 to 75 specimens) were collected from natural and commercial mussel populations at various localities of the Istrian peninsula. Mussels were measured by the vernier caliper, and were divided into three length groups.
- smallest mussels with specimens shorter than 20 mm,
- mussels between 20 and 40 mm, and
- mussels longer than 40 mm.

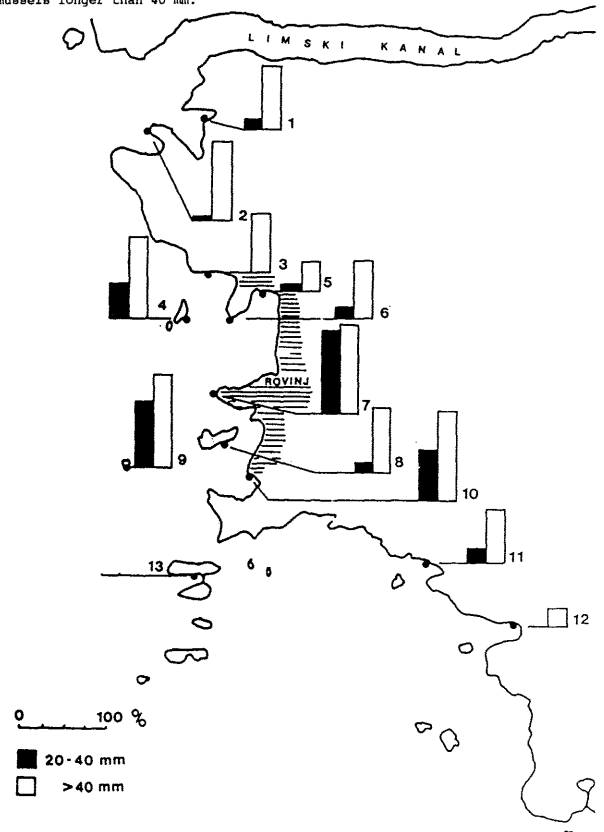


Fig. 1 - Incidence and percentages of pink mussels (*Mytilus galloprovincialis* Lamarck) in the Rovinj area. Sampling stations: Valalta (1), cap Faborza and Saline (2), Leso (3), Figarola Island (4), Valdibora (5), Muccia (6), Rovinj (7), Katarina Island (8), Banjole Island (9), Lone (10), Polari (11), Vestar (12) and Red Island (13).

At some places investigated mussels larger than 40 mm were scarce, and this group sometimes comprehended less than 25 specimens per analysis.

Preliminary observations indicate the following results:

1. Pink mussels are present in natural populations along the coast of the Istrian peninsula, especially in the Rovinj, Porec and Vrstar areas.
2. In the Rovinj area, pink mussels were abundant in more polluted zones, on the coast close to the town and tourist zones (Fig. 1).
3. Not one pink mussel was observed among the mussels smaller than 20 mm in length.
4. The smallest pink coloured mussel was 22 mm in length.
5. The highest incidence of pink mussels occurred in the group of specimens longer than 40 mm in length.
6. In one mussel a number of pink pearls was found.
7. The pink coloured nacreous shell layer was also observed in other bivalve species.
8. Investigations area in course, and will be continued till autumn months.

According to the results, we suppose that the pink mussel shell indicates some disturbance in the normal shell formation (Wilbur 1961), which appears to be in connection with the increased degradation of the northern Adriatic Sea environment (Degobbis 1989; Zavodnik et al. 1989), due to the intensive inflow of various pollutants, or it could be attributed to same pathogen agents.

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Duration of immersion (months)	Period of immersion										Total wet weight	
	Mar-Apr	Apr-May	May-Jun	Jun-Jul	Jul-Aug	Aug-Sep	Sep-Oct	Oct-Nov	Nov-Dec	Dec-Jan		
2	287	104	2	138	69	21	11	103	31	1	1	287
3	18	8	8	12	22	1	1	57	52	1	1	183
4	15	1	1	1	1	1	1	1	1	1	1	15
5	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1	1	1	1
13	1	1	1	1	1	1	1	1	1	1	1	1

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