Six years research on the Barnacles settlement in Genoa Harbour

by

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At the last meeting of the Benthos Committee held in Rome during the XXII Congress of CIESM, I described [RELINI 1970] the studies carried out in Liguria on the ecology of Barnacles [RELINI 1964, 66, 68*a*, *b*, 69, RELINI & GIORDANO 1969, RELINI & RELINI-ORSI 1969]. In the present paper I wish to refer to some results obtained over the last six-seven years in Genoa Harbour on the preferential settlement with depth, the distribution in polluted areas, the influence of water flow speeds on the settlement and on the growth of Barnacles.

a. Vertical distribution

From August 1965 to December 1971 asbestos panels have been immersed in the Eastern part of Genoa harbour at six dephts : surface, — 1 m, — 5 m, — 9 m, — 14 m and — 16 m. Panels were removed monthly and 3 monthly intervals.

Of 86.959 barnacles (basal diameter 2 mm), 78 % of the population was *B. amphitrite*, 17 % *B. eburneus*, 3,7 % *B. trigonus* and 0,8 % *B. perforatus*.

The first species, which is the most numerous at all dephts, seems to prefer depths of 5 to 9 m, where fiftyfour per cent of all *B. amphitrite* were found.

B. eburneus prefers panels at 9 - 14 m depth (57 %) and *B. trigonus* — 16 m depth panels (54 %). Fiftyfive per cent settled of *B. perforatus* was found at depths of 1 - 5 m.

b. Distribution in polluted areas

The settlement periods, distribution, growth and mortality of barnacles in Genoa harbour have been investigated using asbestos panels immersed at seven stations different in kind and degree of pollution sewage, oil, steel-works and thermic wastes have been considered. Of the four species mentioned above, *B. perforatus* was the least resistent while *B. amphitrite* was the most tolerant occuring at all stations with 80 % of the Barnacle population; it settles also at stations polluted by high concentrations of domestic sewage (O_2 cc 1 : 0-4,2 mean 2; N-NH_4 ug/1 : 95-1500; P-PO_4ug/1 : 58-313) although it could not survive for more than one month. *B. perforatus* and *B. trigonus* have been found only at five stations, but everywhere mortality of these two species was very high.

Surface pollution by oil does not seem to demage immersed Barnacles while steel-works pollution with high concentration of Iron (Fe ug/1 : max. 7698 mean 872 and Ammonia max. 1500 ug/1) reduces qualitatively and quantitatively the Barnacle population. Thermic pollution does not seem to modify settlement periods and growth rates of the barnacles [RELINI & RELINI-ORSI 1971].

c. The influence of water flow

The influence of different velocities of water flow on settlement and growth of Barnacles has been investigated by means of an experimental system expressly designed for this work [MOLLICA & TREVIS 1972, RELINI & ROSSI 1972]. Water flow higer than 1 m/sec prevents settlements of *B. amphitrite*. This

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Barnacles seems to be the most resistent animal among Ligurian fouling with regard to water movement. Lower velocities can improve the settlement of Barnacles, especially their growth and can decrease the time necessary for animals to mature. These observations were made only during the Summer months. Velocities higher than those preventing settlement have been tested to evaluate the growth rate of Barnacles attached on panels. Preliminary results, obtained during two weeks in August 1971, show that the growth of Barnacles stops at speeds higher than 3 m/sec. On the panels subjected to a speed of 2 m/sec and 2,5 m/sec the growth rate decreases respectively to about one half and to a quarter in comparison with growth of control panels barnacles, which were immersed at the same depth.

These results, although preliminary, indicate the importance of water flow speed on the behaviour of Barnacles and show that Barnacles will settle, growth and breed much better in moderatly running water than in calm with all implications on the prevention of fouling in pipes and conduits.

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