

Offshore Buoy Fouling in the Ligurian Sea

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Due to the scarcity of available data on Mediterranean fouling far from the coast, we believe it would be useful to report on some observations carried out on ODAS 1 buoy (Oceanographic data acquisition system), which in January 1987 was positioned about 30 nautical miles off the coast at Genoa (43° 50' 19" N, 09° 06' 24" E) and moored on a bottom at 1100 m. The buoy is a 42 m long cylinder, 80 cm in diameter, with three flanged rings along the axis and a stabilizing disk at its end. Another reason for studying this buoy was the reported presence of a large amount of mussels when the buoy was recovered at the end of 1986 because of maintenance. The study begun in the summer of 1987 using observations, samples and photographs made by scuba-divers. Despite very strong currents that made diving and sampling operations difficult to carry out, till February 1990, fifteen dives and three samplings (table 1) were effected. The fouling settled in particular at the end of 1989 is described; while another note in these reports deals with the mussels' population development. Settlement near the surface is poor on account of breaking action of waves. There are small green algae and amphipod *Caprella andreae* Mayer; in this area limpets (*Patella caerulea* L., *Patella aspera* var. *tarentina*) Lam. and cirripeds *Lepas anatifera* L., *L. pectinata* Spengler e *L. hilli* (Leach) have been found. At the following depths Amphipoda become dominant. At 3 m *Caprellids* and *Jassa marmorata* Holmes cover almost all the available surface. Below 3 m some sea-urchins *Arbacia lixula* (L.) and *Paracentrotus lividus* Lamarck, and some bivalves *Hiatella rugosa* (Pennant) were found.

At 6 m depth flanged ring was covered by mussel byssus residuals and brown algae *Ectocarpus siliculosus* (Dyllwyn) Lyngbye. *M. galloprovincialis* Lam., were unfortunately removed in large numbers by unknown people in the summer of 1989. In summer in these first meters of depth the green algae *Enteromorpha compressa* (L.) Greville, *E. intestinalis* (L.) Link, *E. prolifera* (Muller) J. Agardh ssp. *prolifera* were present.

Below 6 m depth the compound ascidian *Diplosoma listerianum* (Milne-Edwards H.) became dominant in most part of the fouling community, which was composed by *Anomia ephippium* L., brown algae and Caprellid amphipoda, the latter decreasing in number with depth. At -15 m the second flanged ring formed an area, which was highly settled by mussels. Hydroids (*Bougainvillia ramosa* Van Beneden and *Obelia dichotoma* L.) occurred mainly in winter: they were more abundant and larger at deeper sites.

From 15 m downwards algal cover decreased considerably, leaving space to Didemnidae, which together with serpulids *Pomatoceros triquetus* (L.), *Spirobranchus polytrema* (Philippi), *Semivermilia cribrata* (O.G. Costa) become the dominant organisms. Few well-developed mussels and some small sea-anemones were also present. At 20-25m specimens of *Echinus acutus* Lam. and *Lima lima* (L.) were sampled. Other members of the fouling community were hydroids, bryozoans like *Aetea* sp., and sea-anemones of various species and sizes. The nudibranchs of genus *Eubranchus* and the gastropod *Lamellaria perspicua* (L.) were also collected.

The ring at 30 m was still heavily settled by mussels, other members of the community were a great number of hydroids and sea-anemones of various species and sizes (which are still under study), bivalves, among which the most frequent were *A. ephippium*, *H. rugosa* and small specimens of *Chlamys*. Among the mussels sampled at this depth Decapoda Crustacean *Pilumnus hirtellus* (L.), *E. villosissimus* (Rafinesque) and *Athanas nitescens* (Leach) were found several times.

Below 30 m some particular colourful organisms were observed, including large-sized pink sea-anemones, some specimens of *Spirographis spallanzani* Viviani and a colony of *Aplysion palmatum*.

The stabilizing disk on the upper surface was completely covered with bivalves. In July 1988, *Aequipecten opercularis* (L.), *Clamys varia* (L.), *Chlamys multistriata* (Poli), *Pecten jacobaeus* (L.), *Pallioillum incomparabile* (Risso), *Pseudamysium clavatum* (Poli) were dominant over the mussels. A year later (August 1989) the mussels had exceeded them in terms of biomass. Other bivalves *Pteria hirundo* (L.), *H. rugosa* and *Musculus subpictus* (Contraire) occurred.

In Table 1 some wet-weight values are recorded: the minimum amount of fouling occurred at 3 m, the maximum at 36 m with about 25 Kg/m².

date	depth	wet-weight	g/dm ²	dominant organisms
22.7.88	6 m	210 g	52.5	M, GA, A
	12 m	430 g	107.5	M, As, A
	25 m	360 g	90.0	M, As, A, E.
9.12.88	3 m	65 g	16.2	A, O, D
	6 m	565 g	141.2	M, A
	12 m	440 g	110.0	M, D
	30 m	845 g	211.2	M, O, As
	36 m	1000 g	250.0	M, P, O
6.8.89	6 m	spoiled	---	Byssus
	12 m	720 g	180.0	M, S, B, O
	30 m	440 g	110.0	M, S, D, B
	39 m	680 g	170.0	M, O, P, S

M = Mussels GA = Green Algae A = Amphipoda
O = Other Bivalves As = Ascidiens
P = Polychaets S = Serpulids B = Bryozoans

Bellan Santini et al. (1970) described fouling settled on panels immersed up to 4 year from 47 m to 830 m depth off Nice.

Tsikhon-Lukaina et al. (1977) have described some Cirripeds on buoy and different floating materials immersed in the Sicily Channel only during 23 days. Because of so different experimental conditions of the above works it is impossible a comparison with our data.

References

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