

Between 1938 and 1991 a series of chemical, physical and biological tests were carried out on the water along the Marche Coast (PENNA *et al.*, 1989). This was in order to acquire better knowledge of the trophic state of the water and of the algae blooms that periodically appear in this area of the Adriatic Sea.

The conclusions that can be drawn are in agreement with the fact that in the years taken into consideration there have been no significant eutrophic phenomena in the water of the Central-Northern Adriatic and consequently there has been no algae flowering. The last significant episode was in 1984.

Instead, notable observations on other algae pollution phenomena have been found during the last few years (DEGOBBIS, 1989).

Above all, there has been the appearance of extracellular material or "mare sporco", as it was called in the past (HERNDL et PEDUZZI, 1988 a).

These phenomena appeared in August 1988, in July-August 1989 and in June-September 1991. During the appearance of the mucilages, tests were carried out on the dissolved oxygen along the water column of the area involved. On the basis of these tests, hypoxic and anoxic phenomena of the water can be excluded in all periods in which extracellular material appeared on the water surface.

Possible death of benthonic organisms such as MEL was due to forms of mechanical suffocation following accumulation of mucilaginous masses on the sea bed.

In 1988-89 the mucilages moved "en masse" to the upper part of the Adriatic where more consistent formation seemed to take place and to the South in Emilia, Marche and Abruzzo (RINALDI *et al.*, 1990). The reason for this was the North-South current that affect the Western coasts of the Adriatic (Fig. 1).

In 1991 the appearance of extracellular material followed a different pattern compared with previous years, both as regards the place of their formation and their diffusion. The mucilages appeared almost simultaneously in the entire Adriatic from Istria to Ancona, but in a much smaller quantity.

Along the Marche coast there was no great surface movement caused by North-South currents, contrary to what happened in 1988 and 1989.

In 1991 the formation of mucilaginous masses seemed to be of local origin and for this reason was in a much smaller quantity than in previous years.

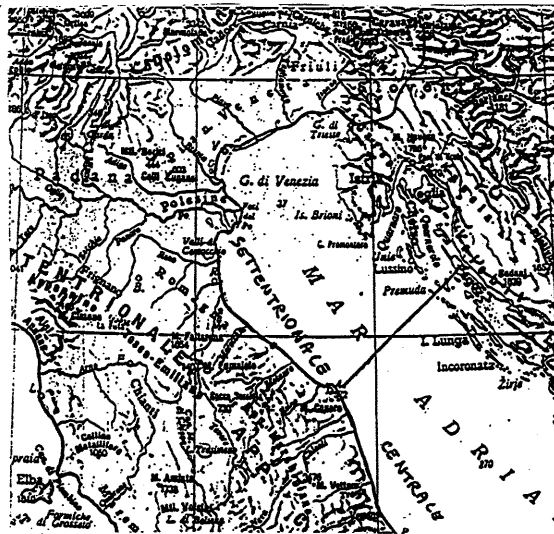


Fig. 1.

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In November 21984 Italian liquid gas carrier (LGC) "Brigitta Montanari" with more than 1300 tons of vinyl chloride monomer (VCM) sank in the middle Adriatic Sea at the depth of 82 m. Rudjer Boskovic Institute, Zagreb, Croatia, supervised hauling of the wreck and recovering the cargo. The salvage operation started in autumn 1985, but due to an accident it was stopped. Action was renewed in 1987 and successfully finished in spring 1988. More than 700 tons of VCM was recovered from the wreck but the rest was released to the environment.

Rudjer Boskovic Institute project "Exploring the Ecological Consequences of Sinking of LGC B.M." included the research of fouling on the wreck. Due to the fact that the fouling organisms were in the longest contact with the VCM leaking from the wreck (from the moment of larvae attachment till the hauling the wreck out), they can be one of the best indicators of toxic effects of VCM.

The fouling samples were taken on the 24th and 25th of June, 1988, during the last stage of the hauling, immediately after the wreck appeared on the water surface.

Qualitative samples were taken from the stern, low, portside, starboard, ropes, an quantitative sample was taken from the left side of the bow.

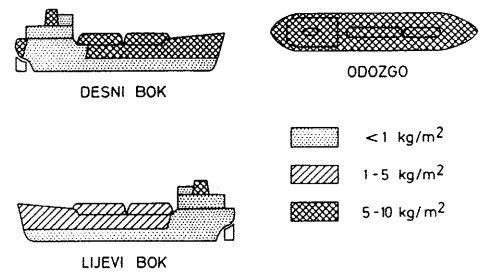
Fouling developed on the wreck that had rested at the depth of 82 m for 3 years was similar to the natural fouling of the circalitoral of the middle Adriatic. The element of the biocenosis "coraligen of lower horizon of littoral zone", the biocenosis "community of open-sea underwater rocks" and the elements of biocenosis "community of detrital bottom of the open inland area" on spots with settle sediment were found.

Decks, deck gears, masts, davits, stays, rescue boats, funnel, stern and portside of the bow were heavily overgrown. Less fouling was observed on starboard and starboard upperdeck, and there was almost no fouling on the hull below the water line, at the front side of the commanding bridge and a part of the portside. Fouling was less developed at the surfaces which were in vertical positions (surfaces with no sediment on them). Surfaces with some sediment were less overgrown and there were no fouling organisms on the parts which were lying on the seafloor. Besides exposition to sedimentation it is possible that chemical components of paints used on the ship also influenced the larvae attachment and growth.

Quantitative sample taken from 1 m<sup>2</sup> of the portside weighed 7765 g and total weight of fouling on the wreck was estimated at 10 tons.

Although more than 30 species were found the most abundant organism was *Pygmodonta cochlear* (Poli) (over 95% of biomass). Macroscopical analysis of a organisms showed no sign of either acute or chronic toxic effects of VCM.

\* Present address: Ulica kralja Dmitra Zvonimira 10, 57000 Zadar, Croatia



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