

EFFECTS OF EUTROPHICATION ON THE STRUCTURE OF THE COASTAL
PHYTOPLANKTON COMMUNITY

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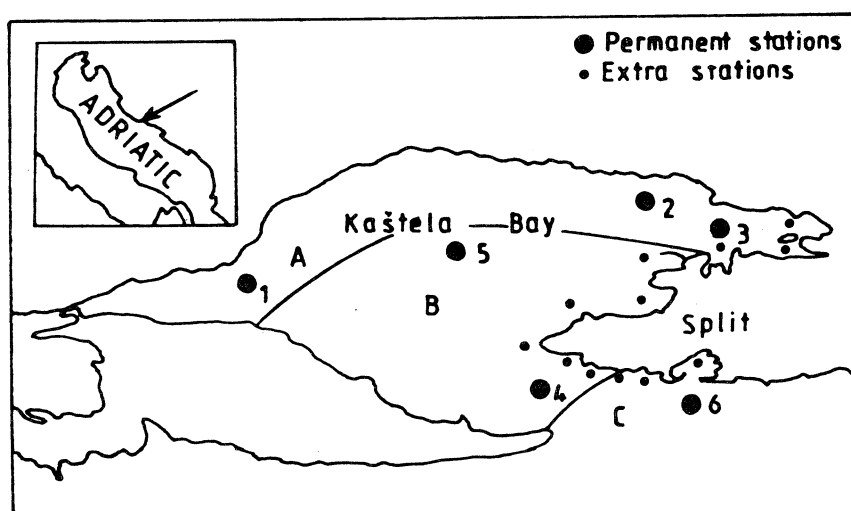
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SUMMARY: *The paper deals with preliminary results on an unusual phytoplankton bloom which occurred in the coastal waters of the town of Split (middle Adriatic) during summer 1984.*

RÉSUMÉ: *Le présent travail apporte des données préliminaires sur une poussée extraordinaire estivale du phytoplancton en 1984 dans les eaux côtières de Split (Adriatique centrale).*

Preliminary data on an unusual phytoplankton bloom which occurred in the wider area of the town of Split is described herein. The bloom lasted from June to September 1984. Six permanent stations were sampled, five of them in the Bay of Kaštela and one in front of the town port. In addition, during the bloom a series of extra stations were sampled depending on the development of the bloom (Fig.1).

Fig. 1. Study area



It has been already known that the phytoplankton community of the eastern part of the Kaštela Bay (Vranjic basin-Area A) differs

from that of the other parts of the Bay (Area B) and particularly from that in front of the town port (Area C) due to the poorer circulation of water masses as well as to the greater discharges of town outfalls. The greatest differences in the phytoplankton structure between these sites appear in summer. Thus, the quotient of similarity (SØRENSEN, 1948) for diatom and dinoflagellate populations in August 1984, between the areas A/B and A/C, didn't exceed 38.9 and 35.3 respectively, whereas the degree of similarity between B/C was much higher ($s\%=69.6$). At this time dinoflagellates were predominant in area A (exceeding 90% of the phytoplankton density), whereas the diatom component prevailed in areas B and C, making up between 65 and 81% of the phytoplankton.

Unordinarily rainy first six months of 1984. intensified terrestrial influence upon the coastal sea (Table 1).

Table 1. Precipitations in Split (measured by the Institute of Oceanography and Fisheries, Split)

January-June	Precipitations l/m ²
1951-84	397.6
1983	301.7
1984	442.6

It is assumed that this phenomenon supported to a considerable extent a very intensive diatom bloom which appeared at the beginning of June (*Leptocylindrus danicus*, *L. adriaticus*, *Nitzschia seriata*). However, at the end of June and the beginning of July an immense bloom of *Skeletonema costatum* spread all over the area, which, owing to the sudden temperature increase at the sea surface (from 18.5 on June 5 to 24.4°C on July 1), interfered with the ordinary dinoflagellate maximum. In the second half of July the sea got suddenly red after a longer period of stable meteorological conditions and high surface temperatures, even above 25°C. In the area A a monospecific bloom of *Gonyaulax polyedra* (1×10^7 cells/l on July 23 at the surface) provoked the change of colour, since in the areas B and C a monotype bloom of *Olisthodiscus luteus* was recorded at the same time (several tens of millions cells/l at the surface).

In area A *Eutreptiella pascheri* (1.5×10^5 cells/l) and *Calciosolenia murrayi* (2.2×10^5 cells/l) were codominant species, while in the *O. luteus* bloom a considerable part took *E. pascheri*, *Eutreptia lanowii* and *Carteria* spp. (The material was not counted due to the susceptibility of the organisms).

Weather change (southern winds) caused the disappearance of the bloom of *O. luteus*. However, *G. polyedra* continued to develop intensively inside the area A throughout August.

We assume that ecological differences between the area A (industrial and municipal waste waters, enclosed area of poor water exchange) and area C (vicinity of the port, building of the coast by large quantity of soil, more intensive water exchange with the Brač channel waters) are probable causes of the difference between these two blooms.

The blooms of *G. polyedra* has been recorded from area A, earlier, as well. The 1980 bloom was followed by mass mortality of marine organisms. Due to the intensive biological activity of the area during bloom (pH=8.4; O_2 ml/l=6.7; O_2 %=140) nutrient concentrations varied within ordinary ranges.

As to the bloom of *O. luteus* in the areas B and C it may be assumed that, among the other causes, the enlargement of the coast by the soil washed into the sea, enabled the explosion of *S. costatum*. Large quantities of *S. costatum* probably provided the media for the mass development of *O. luteus* (PRATT, 1966). Neither *O. luteus* nor the species itself have been recorded from the Adriatic, so far.

