

CARBON AND NITROGEN IN SUSPENDED ORGANIC MATTER (PARTICULATE
AND ZOOPLANKTON) IN NORTHERN ADRIATIC DURING 1979

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Carbon and nitrogen contents as well as C/N ratios of suspended organic matter (particulate matter, zooplankton) in Northern Adriatic were studied.

The distribution and the seasonal dynamics in lesser extent of the particulate organic carbon, nitrogen and phosphorus in the Gulf of Triest were described previously (Faganeli and Lenarčič, 1980) but almost nothing was known about the carbon and nitrogen composition of zooplankton. These studies were extended later to the whole Northern Adriatic with kind cooperation of CIM-Rovinj.

The sea water samples for particulate organic carbon and particulate nitrogen were collected from the surface and bottom layers using Van Dorn samplers at four stations in the Gulf of Triest monthly. At same stations the zooplankton samples were obtained by several vertical tows from near bottom to the surface using a 87 cm diameter nylon net of 250 μm mesh. Water samples for particulate matter were passed through 250 μm zooplankton net and then immediately filtered through 25 mm Whatman GF/C glass-fiber filters (precombusted at 480°C for 3 hours). Particulate and zooplankton samples from Northern Adriatic were collected from 8 Stations.

Particulate and zooplankton samples were freeze-dried and then allowed to dry in vacuum. Their organic carbon was determined using Coleman CH analyzer at reduced temperature 720°C in order to minimize the effects of carbonate dissociation. Nitrogen was determined by Coleman N analyzer at the combustion temperature 870°C accordingly to Pavlou et al. (1974). Acetanilide which closely approximates the C/N ratio of marine organic matter was used as a standard at both instruments.

Particulate organic carbon (POC) concentrations in the Gulf of Triest varried in the range from 146.87 - 3459.40 $\mu\text{g/l}$ in the surface layer. Somehow lower concentrations but with little alteration in bottom layers were observed. Surface concentrations were similar to those described by Faganeli and Lenarčič (1980) for 1976/77. The highest concentrations were obtained in the summer (July - August) due to high rate of primary POC production, though the POC dynamics

is not only the product of primary bioproduction but originates also from allochthonous contributions and DOC-POC equilibrium. Similar were POC concentrations in Northern Adriatic (range: 136.64 - 789.65 $\mu\text{g/l}$). The highest concentrations were detected near Po delta due to the river contribution and higher primary bioproduction (Revelante and Gilmartin, 1976), especially in spring. Higher POC concentrations were generally observed in surface layer.

Particulate nitrogen (PN) concentrations were somehow higher (range: 34.22 - 988.10 $\mu\text{g/l}$). The highest concentrations were observed in spring (May). PN concentrations in Northern Adriatic were similar with the gradually increased concentrations towards Po delta. Anyway, the PN concentrations observed were somehow higher than those described by Štirn (1969), until now first results for PN in Northern Adriatic, using different analytical techniques.

C/N ratio in particulate material from the Gulf of Triest was usually low indicating a high proportion of particulate protein. C/N ratios in the Northern Adriatic were higher with little and unregular alteration with depth (4.9 - 12.5).

Organic carbon of the net zooplankton in Northern Adriatic varried from maximum 27.49 % to minimum of 8.65 % of dry weight. In general carbon content showed higher values in colder part of the year and it was low in summer. Nitrogen content was again low ranging from 2.47 % to 6.06 % of dry weight. Seasonal variations were obtained for nitrogen too, and the smallest values appeared in summer. Low carbon and nitrogen percentages were generally accompanied by high ash content which could be as high as 63.60 % (dry weight). Approaching Po delta the carbon and nitrogen contents were increasing.

The net zooplankton examined showed C/N range from 3.1 - 10.9 with an average of 5.9 (by atoms). This values were slightly lower than commonly accepted value 6.2 for zooplankton (Redfield et al., 1963), however Fossato (1971) revealed even lower C/N values for the Gulf of Venice.

Table 1: Comparison of particulate and zooplankton organic C and N ranges in Northern Adriatic (in $\mu\text{g/l}$)

	Northern Adriatic		Gulf of Triest	
	C	N	C	N
Particulate matter	136.64 - 3333.06	12.82 - 402.81	141.20 - 3459.40	34.02 - 988.10
Zooplankton	C 0.84 - 11.65		N 0.24 - 3.11	

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Faganeli, J. and Malej, A.

"Carbon and nitrogen in suspended organic matter (particulate and zooplankton) in northern Adriatic during 1979"

Paper presented by J. Faganeli (Yugoslavia)

Discussion

G. Cauwet: Can you give a short description of the sampling and analytical technique used in the POC determination?

J. Faganeli: Water samples (1-3 l) for the POC analyses were first passed through 250 μ m zooplankton net and then filtrated through 25 mm Whatman GF/C glass-fiber filters, precombusted at 480°C for 3 hours at the maximal vacuum 200 torr.

J. Castelvi: Did you try to analyze the dissolved organic matter?

J. Faganeli: In the period 1976/77 we obtained some results of DON concentration in the Gulf of Trieste. DON comprised up to 85% of the total nitrogen in seawater.

Lj. Musani: Have you compared your POC results with other results?

J. Faganeli: Our POC and PN results are the highest results observed in the Mediterranean until now and are in the same range as those observed by Banoub (1970) in the English Channel.