

# PHYTOPLANKTON CARBON-BIOMASS IN THE MEDITERRANEAN SEA

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## Abstract

In this study, we defined the phyto-carbon derived from 63 phytoplankton samples (216 species) collected from 9 stations and 7 depths located along a large scale (3188 Km) east-west longitudinal area (40°5'E - 32°67'E) of the Mediterranean Sea, in summer 1999. Species identifications and cell dimension measurements for cell bio-volume calculations [1] were performed in an inverted microscope. Conversion of cell bio-volume to cellular carbon-content was made with the application of equations found in the literature [2], [3].

*Keywords: Phytoplankton, Carbon, Biomass*

Quantifying the carbon content of phytoplankton cells is essential, because carbon is the main parameter used in models and in flux and budget studies for understanding the structure and dynamics of marine ecosystem and for evaluating the role of the ocean in global carbon cycles. A synopsis of the results of the present investigation are given in Tables 1 and 2. The average cell concentrations (Table 1) did not differ among the three dominant phytoplankton taxa since they were for diatoms:  $4.45 \times 10^3$  cells.L<sup>-1</sup> (30.7%); for dinoflagellates:  $4.67 \times 10^3$  cells.L<sup>-1</sup> (35.9%); and for coccolithophores:  $4.17 \times 10^3$  cells.L<sup>-1</sup> (33.3%). However, the average cell carbon content among these taxa (Table 2) showed significant differences because dinoflagellates contributed the maximal cell carbon content (average:  $18.71 \mu\text{g C.L}^{-1}$ ; 71.3%), the coccolithophores the minimal carbon content (average:  $0.38 \mu\text{g C.L}^{-1}$ ; 2.2%) and the diatom's relevant average was  $6.15 \mu\text{g C.L}^{-1}$  (26.5%).

Tab. 1. All stations' means and ranges of phytoplankton abundance (cells.L<sup>-1</sup> and % of total) for the three main phytoplankton groups along the east-west Mediterranean.

Taxa	Mean (Cells.L <sup>-1</sup> )	Range (Cells.L <sup>-1</sup> )	Mean (%)	Range (%)
Diatoms	$4.45 \times 10^3$	$3.29 \times 10^2 - 1.17 \times 10^4$	30.7	3.2 - 54.2
Dinoflagellates	$4.67 \times 10^3$	$2.97 \times 10^3 - 7.82 \times 10^3$	35.9	22.2 - 52.2
Coccolithophores	$4.17 \times 10^3$	$2.04 \times 10^3 - 6.15 \times 10^3$	33.3	9.5 - 51.8
Total Phytoplankton	$1.33 \times 10^4$	$1.03 \times 10^4 - 2.15 \times 10^4$		

Tab. 2. All stations' means and ranges of cell carbon ( $\mu\text{g.L}^{-1}$  and % of total) for the three main phytoplankton groups along the east-west Mediterranean Sea.

Taxa	Mean ( $\mu\text{g C.L}^{-1}$ )	Range ( $\mu\text{g C.L}^{-1}$ )	Mean (%)	Range (%)
Diatoms	6.15	0.72 - 18.81	26.5	6.2 - 64.6
Dinoflagellates	18.71	5.68 - 64.02	71.3	34.4 - 89.1
Coccolithophores	0.38	0.20 - 0.58	2.2	0.4 - 4.7
Total phytoplankton	25.24	11.71 - 75.54		

These data show that dinoflagellates were more carbon dense than diatoms and coccolithophores because of their bigger cell volume and confirm the information from the literature on the positive relationship of biovolume and carbon biomass in phytoplankton. The results also demonstrate the importance of dinoflagellates in the foodweb chain and the carbon cycle of the oligotrophic Mediterranean Sea during summer.

## References

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