

## Latitudinal and depth variation of microzooplankton grazing across the tropical and subtropical Atlantic Ocean

Laia Armengol, Gara Franchy, Adriana Rodriguez-Santos & Santiago Hernández-León

Instituto de Oceanografía y Cambio Global, IOCAG, Universidad de Las Palmas de Gran Canaria. Campus de Taliarte, 35214 Telde, Gran Canaria, Islas Canarias

### ABSTRACT

Microzooplankton is the main phytoplankton consumer in the ocean and the grazing exerted has important implications for food-web dynamics and carbon cycling. Using the modified dilution method, we have measured growth and mortality rates for picophytoplankton populations, total phytoplankton and nanoplankton along the tropical and subtropical Atlantic Ocean at different depths (100%, 80% and 1% light). A section from 15°S in the oligotrophic waters off Brazil to 28°N was performed, crossing the areas of different productivities (the equatorial upwelling, the Guinea Dome, the oceanic upwelling off Cape Blanc in western Sahara, and the oligotrophic waters of the Canary Current). The southern basin, was characterized by high surface temperatures, low chlorophyll and deep DCM. Here we observed the highest mortality rates in contrast to lower values in the area characterized by the oxygen minimum zone (OMZ). The highest mortality rates were observed in the oceanic upwelling off northwest Africa, below the surface chlorophyll maximum. Highest mortality rates were obtained during the first 12 hours of the experiment, being lower in 24h experiments. In the high nutrient area mortality rates were higher during the last 12 hours of the experiment. A similar result was found in amended-nutrient experiments. However, in non-amended nutrient conditions, grazing was maximum during the first 12 hours. We suggest that organisms exploit nutrients until they are depleted, whereas when they are non-limiting its assimilation is carried out gradually along the entire experiment.

## Understanding grazing experiments: length and nutrients addition effects

Laia Armengol, Gara Franchy, Adriana Rodriguez-Santos & Santiago Hernández-León

Instituto de Oceanografía y Cambio Global, IOCAG, Universidad de Las Palmas de Gran Canaria. Campus de Taliarte, 35214 Telde, Gran Canaria, Islas Canarias

### ABSTRACT

The dilution experiment is the most used method for measuring microzooplankton grazing rates in the ocean. The 2-point method, a simplification of the dilution method, has achieved less tedious and more workable procedures during oceanographic cruises. Standard experiments consist in incubating whole seawater (WSW) and a dilution of 5% WSW for 24 hours. However, there is scarce information about how the length of experiments and nutrient additions affects grazing rates. Here we show that mortality rate varied depending on the experiment length and nutrient addition. During the first 12 h, mortality rates were variable, especially for *Synechococcus*. However, higher grazing rates were achieved during the last 12 h of incubation for picoeukaryotes, *Synechococcus*, *Prochlorococcus* and total phytoplankton. Moreover, the longer incubation, the lower mortality rates. Grazing rates over 24 h were not significantly different in nutrient amended or non-amended experiments. However, enriched nutrient experiments showed higher and more variable grazing rates during the first 12 h. These results suggest that longer experiments may underestimate mortality rates, and nutrient addition affects phytoplankton in the early hours of incubation.