



First data on hydrobiological characterization of western Libyan sea area (August 2006)

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In this work hydrological data (CTD and ADCP), distribution of nutrients (NO₃, NH₄, PO₄), phytoplankton and suspended matter (TSM, POC and PON) are reported. Data were collected during the MedSudMed-06 oceanographic survey carried out in the framework of the FAO Regional Project MedSudMed (“Assessment and Monitoring of the Fishery Resources and the Ecosystems in the Straits of Sicily” funded by Italy and which promotes the scientific cooperation for fisheries research between four countries of the Central Mediterranean - www.faomedsudmed.org). A multidisciplinary investigation was carried out in the sea area in front of the western Libyan coast during August 2006. The main aim of the survey was the study of the spatial distribution of the different life stages of small pelagic fish species in relation to environmental parameters of the area, and in particular the correlations between chemical-physical and biological parameters. In this context, 74 water samples were collected from different depth levels of the water column (5, 25, 50, 100, 150, 200, 500, bottom), in 14 sampling stations. The hydrographic survey permitted to get evidence on the displacement along the coast of typical Mediterranean waters (AW, ISW and LIW) moving in opposite directions. The results of quantitative analyses point out that, in the summer

period, the phytoplankton association is generally characterized by abundant diatoms and dinoflagellates, rare coccolithophyceae and very rare silicoflagellates. A very high concentration of phytoplankton, in the first 100 meters, is localized in the easternmost part of the investigated area. The Dinoflagellates quantitative distribution show high density values (10000 ~ 3000 cell/l) in the first 25 meters in the western zone, while a lower concentration was found in the middle part of the area. Diatoms exhibit very high density values (400000 ~ 50000 cell/l) in the first 75 meters in the easternmost part, and a lesser density in the westernmost area. In general diatoms are the dominant phytoplankton compound in the western Libyan shelf. The Coccolithophores quantitative distribution show a gradual increase in the first 100 meters of the western-central zone (14000 ~ 500 cell/l), while rapidly decrease in the central–eastern part (400 cell/l density). A low grade of dissolution affects all calcareous phytoplankton species. The Silicoflagellates, as expected, show very low values and result confined only in the deeper western and central zones. The recognized assemblage is constituted only by *Dictyocha fibula* specimens that never overcome 400 cell/l density. Surface (0 – 25 m) concentrations of nitrate are elevated ($\sim 1.5 \mu\text{M/l}$) in the transect in front of Tripoli, as well as in the Zauara–Tripoli coastal area ($> 1.5 \mu\text{M/l}$, 25-60 m). The vertical distribution of dissolved nitrate ($1.48 \pm 1.32 \mu\text{M/l}$) shows an increasing trend with depth (max $6.08 \mu\text{M/l}$ at 700 m). Nitrate and ammonia show, as expected, opposite trends, in agreement with the recycling of respective nitrogenous compounds. The max value of ammonia ($4.68 \mu\text{M/l}$) was found at 5 m depth in the Zauara station. The values of reactive phosphate in surface layer (5 m) result more elevated in the Zauara transect, as well as in the coastal station in front of Tripoli ($\sim 0.6 \mu\text{M/l}$). The PO₄ vertical distribution do not appear regular in several investigated stations (PO₄ $0.38 \pm 0.19 \mu\text{M/l}$). The phosphorous and ammonia increments, recorded in the Zauara coastal area, are probably due to urban discharges. On the other hand, the relatively high nitrate concentration in the coastal Tripoli area could be interpreted as consequence of agriculture activities possibly using nitrogen fertilisers.

The incidence of Total Suspended Matter (TSM) was high in all considered samples, ranging between 7.60 and 19.65 mg/l. POC and PON are not elevated, but higher than those found in previous investigations in the Strait of Sicily. Higher POC values ($> 150 \mu\text{gC/l}$) were registered in the euphotic layer (max = $235.60 \mu\text{gC/l}$) overall in the off shore area, while in the near shore they were generally lower. The C/N ratio values show a general condition of equilibrium between the trophic components (autotrophy, heterotrophy, detritus). A better efficiency level of the autotrophic compartment was found in the eastern area, where C/N values ranged between 6 and 8. However, in the off shore area in front of Tripoli, higher C/N ratio values suggest that the phytoplankton community is not very efficient (C/N between 8 and 10). In conclusion, a better trophic equilibrium and a more efficient autotrophic community were found in

the eastern zone of the investigated area, where also the nutrient budget resulted to be enough to support the activities of the primary compartment. However in the western area between Zauara and Tripoli the trophic balance appears shifted towards the phytoplankton degradation processes.