

THE NUTRIENT CYCLES IN THE SALT BASINS ALONG THE MARINE LAGOONS OF MARSALA (WESTERN SICILY)^o

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Summary - The results are reported of a yearly cycle of chemico-physical investigations in three salt basins - one still in function and the other two no longer in production - situated along the coast of Marsala (W-Sicily). Significant differences are put into evidence either in the major hydrological parameters or in the benthic biotic communities between man-managed salt basins and abandoned ones.

Résumé - Les salines sont des écosystèmes typiquement artificiels, qui répètent, en un degré tout simplifié, les caractéristiques ambiantes des basses lagunes côtières. La salinité est le facteur pilote, qui oscille entre valeur basses durant l'hiver et atteint des niveaux très élevés en été. Les mêmes variations, selon un gradient, sont présentes entre les bassins externes "froids" et les internes "chauds", où a lieu la précipitation du sel. Dans ce travail sont reportées les données d'une recherche sur le cycle des sels nutritifs et les variations des paramètres chimico-physiques dans trois salines situées le long de la côte de Marsala (Sicile occidentale). Considérables variations de salinité, du contenu en sels nutritifs et des composantes biotiques ont été mises en évidence entre les bassins externes et internes de la même saline, et surtout entre les salines encore en production et les salines abandonnées.

The major nutrient-cycles and the overall variations of the main chemico-physical parameters have been investigated in three salt basins along the coast of Marsala, Western Sicily. Analyses have been carried out with a monthly periodicity over a whole yearly cycle. Salinity and temperature are the dominant factors. Salinity measurements throughout the year show values as low as 32‰ in winter, whereas in summer the values range from 50‰ in the outer basins to over 200‰ in the inner ones. Whereas man-managed basins show a lower sedimentation rate, a higher water-exchange and con-

siderably poorer biotic communities, abandoned basins are rich in silt and are populated by a variety of organisms, all strongly salinity and temperature-tolerant. As a result of man's influence, as well as of a reduced water exchange and very likely of a nutrient release from sediment, an advanced degree of eutrophication is evident in abandoned basins, which in midsummer also show a sensible dystrophication with an overall lowering of OD contents, a rise of H_2S in the interface water-mud and a sharper drop of Eh values in the top millimeters of the sediment cover. Water temperatures range from $10^\circ C$ in winter to $40^\circ C$ in summer. A rise in pH values occurs over March-August period (up 8.70), whereas lower values are registered in December (up 8.00). Despite high temperatures and salinities, OD contents in some basins are kept between 6 and 8 ppm also in summer. This is strictly related to benthic photosynthetic activities. In fact, due to the shallow waters, phytoplankton populations are poor and the benthic algal component, made up by Diatoms Cyanophita, and the Phanerogams appear to play a major role in biotic productivity. In spring a particular phenomenon is exhibited by *Acetabularia acetabulum* that assumes green, pink and purple colours in the same basins. The N content ($N-NH_3$ and $N-NO_3^-$) is always high in both kinds of basin, however the inner, so called "warm basins", show far greater amounts of ammonia. The soluble P is always very low; the total P is instead sensibly higher, and this difference might be due to its occurrence in the particulate reservoir. The N/P ratio is always very high, reaching values up to 1000, and it seems likely that the sediment layer be a P sink. There is evidence that it might also be a long-lasting unavailable pool of nutrients. A bacterial layer is present on the bottom, which is intensely red and orange coloured at the end of summer in cultivated salt basins.

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