
ACQUATINA LAGOON - ITALY

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The Acquatina marsh area is a coastal marsh lake located on the Adriatic Sea shore of the Salento peninsula about 13 km North-East of Lecce (40.4425N – 18.2376E). It is linked to the nearby sea by a channel 15 m wide and 400 m long (Fig.1). The principal freshwater inputs are a lateral ramification of the Giammatteo canal (Fig.2) (on the northern boundary of the lake) and rainfall. A long time ago the area was part of a system of marsh areas periodically invaded by the sea.

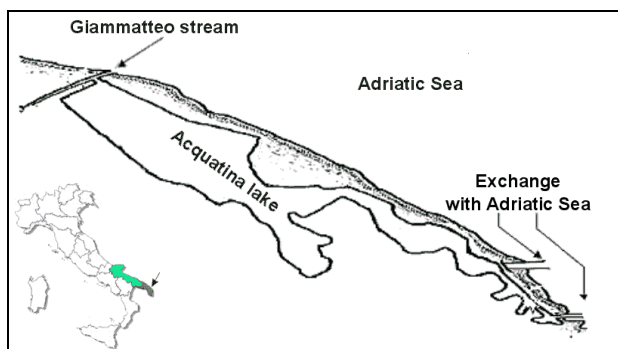


Figure 1: Location and map of Aquatina coastal marsh lagoon

In the nineteen-thirties, during reclamation work in the coastal marsh areas, the perimeter was embanked with brickwork that is still present.



Figure 2: View of the Giammatteo canal

From a geological point of view the area is characterised by a thick sedimentary carbonatic

layer of the Jurassic-Cretaceous Age (200-65 million years b.p.), above this there are quaternary sediments (2 millions years b.p) known as Calcareni del Salento formation.

The watershed of the Giammatteo canal is fed by precipitation and groundwater. The input from the canal is highly variable, depending on seasonal rainfall and intensive agricultural use.

The Acquatina area is characterized by a superficial saltwater-bearing stratum, whose relatively low depth causes its emergence in depressed areas.

The area presents the typical saltmarsh plant association of great importance: Mediterranean type shrubs (*Cistus*, *Pistacia lentiscus*, *Convolvulus althaeoides*), the salad steppe, various orchid species (Fig.3).



Figure 3: Yellow orchid

The sediments of the lake are colonized by *Cymodocea nodosa* and *Ruppia sp.*, one of the principal energy sources for detritus-based communities, while on the banks there are dense swamps of *Spartina juncea* and *Phragmites australis*.

Acquatina is a shallow lake, so that decomposition and biogeochemical processes in lake sediment strongly interfere with the nutrient dynamics in the water column. Nutrient availability, particularly

phosphorus availability, since phosphorus seems to represent the limiting factor for primary productivity, and water salinity affect abundance and spatial distribution of the phytoplankton primary producers. In the wet season, the phytoplankton community is principally constituted by nanoplanktonic taxa (*Cyanophyceae* and *Phytoflagellates*), while in the dry season the phytoplankton community is dominated by taxa in the microplankton size fraction, in particular *Diatoms* and *Dinoflagellates* (*Navicula* spp., *Cylindrotheca closterium*, *Prorocentrum micans* and *Prorocentrum minimum*). The abundance of marine species is increasing in the marsh due to recent improvement of the water exchange with the sea and marine species are substituting the freshwater ones.

The Acquatina coastal marsh is a field biological station of the University of Lecce, which is developing a Research Center for Experimental Aquaculture. *Anguilla anguilla*, *Spaurus aurata*, *Dicentrarchus labrax* and *Diplodus sargus* (Fig.4) are among the fish species occurring in the marsh.



Figure 4: *Diplodus sargus*

LaguNet (<http://www.dsa.unipr.it/lagunet/>) is a scientific observational network studying the fluxes of nutrients and other contaminants from lagoon catchments to the near coastal environment. The objectives of LaguNet are to support and encourage co-operation of research groups studying lagoons, wetlands and saltmarsh systems situated along the Italian coast and to evaluate the application of the LOICZ (Land Ocean Interactions in Coastal Zones, a core project of IGBP) biogeochemical flux model and typology classification to such sites.

The methodology has been applied by LOICZ to approximately 170 coastal environments worldwide; it is based on a mass balance approach and provides important information on the flux of

nutrients and ecosystem functions; the approach used is applicable to a majority of coastal ecosystems with data that are normally available from conventional monitoring campaigns. In this way it is possible to compare and to group aquatic systems having different characteristics based on properties related to biogeochemical cycles and to the ecosystem functions that result from these processes.



Figure 5: LaguNet sites around the Italian peninsula

On the basis of this experience and considering the paucity of LOICZ sites in the Mediterranean and Southern Europe it was decided to apply this methodology to a series of Italian coastal environments where sufficient data are available.

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