

Elements for an Ecological Characterization of a Lagoon in the Deltaic System of the Po and Adige Rivers : Porto Caleri

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The lagoon of Porto Caleri lies to the south of the Venetian lagoon, between the mouths of the Adige and Po rivers. Its origin is mostly due to the alluvial sediments from Adige, which is the third Italian river as length and the second one as catchment-basin after Po. Most of the original lagoon basin is now left out from the free exchange with the Adriatic Sea, to delimit fishing ponds ("valli"). Therefore the internal boundary is wholly artificial, in the form of low banks. The lagoon has two communications with the sea; the northern mouth supplies the main portion of the sea water exchange, while the southern one has even more narrowed its opening after the building of an embankment with a short bridge, which links up the mainland with the touristic port of Albarella on the homonymous island. Through the Varco Pozzatini dissalated waters flow into the lagoon from a lateral branch of the river Po (Po di Levante), whose inflow is retained by a littoral bar (Scanno Cavallari). Irregular inflows of low salinity waters may also come from the surrounding "valli", which produce high organic loads. From the northern Palude di Boccavecchia a few years ago freshwater flowed directly from Adige through a narrow canal ("Ghebo" della Testa), now silted up. Only traces of schorres persist after the marked subsidence of the last years.

Two mussel-breeding areas and a clam one are placed along the two canals directly influenced by the sea during the tidal cycles, that show an amplitude of about 60-80 cm.

A biological survey has been carried out in autumn 1989 in order to identify different ecological communities in macrobenthos. The complex hydrological pattern does not allow to define well diversifiable benthic communities in terms of salinity gradients, as observed in other estuarine systems (SCONFIETTI, 1988, *Crustaceana*, 52: 193-201). On the contrary different communities are explainable in terms of different rate of marine "vivification" (*sensu* D'ANCONA *et al.*, 1954, *Archo Ocean. Limnol.*, 9: 9-295) or of confinement gradients (*sensu* GUELORGET & PERTHUISOT, 1983, *Trav. Labor. Geol. Ecole sup. Paris*, 16: 1-136) (for a discussion, see SACCHI, 1985, *Mem. Biol. mar. Oceanogr.*, 15: 71-89). Five ecological communities can be mainly pointed out (fig. 1): A) a community remarkably influenced by the marine vivification and characterized by essentially marine or open lagoon species of hard substrata (wooden piles or banks): *Mytilus galloprovincialis* Lam., *Ostrea* sp. and *Crassostrea* sp., *Actinia equina* (L.), *Cryptosula pallasiana* (Moll), *Hyale perieri* (Lucas), *Littorina neritoides* (L.), *Fucus virsoides* J.Ag.; B) a banal lagoon community typical of confined sectors, poor as species distributed all over the lagoon, in which the most "marine" elements of the community A are absent; C) a community influenced by scarce freshwater inflows and, at the same time, subject to a still efficient water exchange, characterized by *Bowerbankia gracilis* (Leidy), *Conopeum seurati* (Canu), *Balanus eburneus* Gould, *Hyale perieri* (Lucas); D) a community made by elements of different origin, but dominated and characterized by large "masses" of *Ficopomatus (-Mercierella) enigmaticus* (Fauvel), to show the frequent freshwater influence; E) a very poor community, including large amounts of *Ulva* sp. and *Enteromorpha* sp.pl., *Haminea navicula* (Da Costa) and *Gammarus insensibilis* Stock, which are distributed all over the lagoon, but here present without other species, more sensitive to the drastic reduction of the vivification.

In a small internal bay, isolated by the main circulation of the water (community E), the presence of a very little spot of *Zostera marina* L. must be pointed out. In the lagoon of Porto Caleri we confirm the persistence of *Fucus virsoides*, which has here the southern limit of its characteristic north-Adriatic distribution (SACCHI *et al.*, 1983, *Rapp. Comm. int. Mer Médit.*, 28: 225-228), probably due to the strong ecological disjunction imposed by the large freshwater plume of the river Po into the sea (SACCHI, 1978, *Boll. Mus. civ. Stor. nat. Venezia*, 29 suppl.: 43-73).

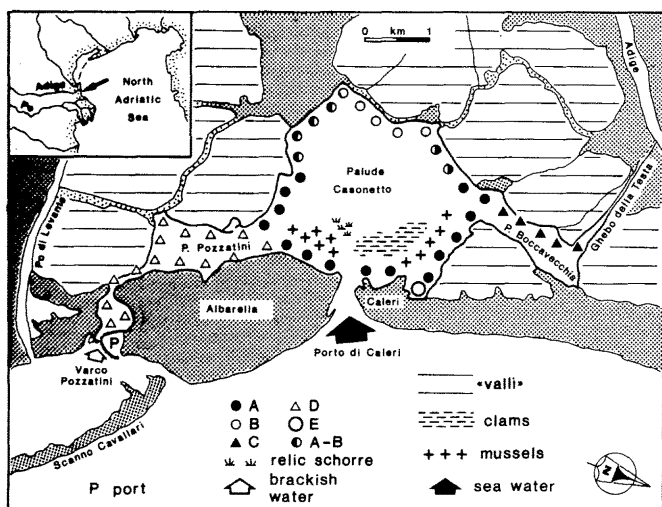


Fig. 1 - Ecological characterization of the lagoon of Porto Caleri.

In conclusion, we can distinguish two main hydrological sub-basin, characterized by almost separated circulations of the water: 1) a main basin, Palude Casonetto, influenced by the marine waters flowing through the Porto di Caleri and expanded towards Palude di Boccavecchia; 2) a secondary basin, Palude Pozzatini, where the strong dominance of *Mercierella* delimites the area influenced by the brackish waters of the Po river, flowing from its Levante branch through Varco Pozzatini. The difficult circulation in the inner sector of the lagoon causes a long-time stagnation of water masses with their high organic contents, coming from "valli", that actually cause important dystrophic crisis during the hottest months. The rational exploitation of the natural resources for the production of mussels and clams will be preserved in the next years only by a wise management of the active circulation of the water.