Ecological continuum along a strong estuarine gradient within the Lagoon of Venice

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Strong environmental gradients often allow to distinguish associations of species which have similar ecological needs. However, these groups are far from being rigidly separated one another. Really, in this case the concept of association is essentially a statistic concept, concerning the frequence and the abundance of single species in sampling stations.

The lagoon of Venice proposes to ecologists a varied choice of environmental gradients, both natural and mainly induced by man. Among natural gradients in aquatic biotopes, perhaps the strongest one is linked to the salinity changes that occur crossing from freshwater to the sea. In the northern Venetian lagoon we can find one of the best estuarine gradients of the Mediterranean area, into which salinity gradually changes from nearly 0 to 33-34‰ along the lagoon bed of the river Dese (14 km length).

The concomitance of both an extended gradient and a comparatively high amplitude (about lm) of the tide also allows a partial analogysm with oceanic estuaries. Our previous papers have already discussed the zonation of ecological groups in relation to the salinity gradient, for both the sessile and scarcely mobile macrobenthos of hard substrata (SCONFIETTI R. & MARINO R., 1989, in *Topics in marine biology*, Ros J.D. (Ed.), *Scient. Mar.*, 53 (2-3): 655-661; SCONFIETTI R., 1991 (1989), *Riv. Idrobiol.*, 28, 1-2: 3-31).

Despite the exasperate essays, sometimes affecting ecological researches, of direct synthesis without the indispensable step of the analytical approach, here we point out the preminent importance of the species approach.

For Peracarids, that have largely showed their role as ecological markers (SCONFIETTI R., *Atti X Conv. Gruppo Ecol. Base "Gadio"*, Padova 1990, in press), the "common lagoon" species slake their distributions within the middle sector of the estuary, sometimes having a typical bell-shaped abundance (fig. 1). On the contrary, the "open lagoon" group includes species that are not specific lagoon elements, but extend their distribution towards the marine pole. Parallelly, some of the "true estuarine" species go up deeply towards the freshwater pole; for the tanaid *Heterotanais oerstedi*, some populations are known stable in rivers.

However, the partition of these 18 species, chosen as characteristics among a total pool of 40 species, into three ecological groups is mainly the result of statistical technics. As a matter of fact, the supposed originality of the lagoon communities may be observed here onlyfor the true estuarine group, that owes its own identity to the close relation with a strong influence by rivers, being strictly confined to the upper reaches. For the remaining groups the separation is only operative. They are constituted by elements whose distributions shade one into another along a clear ecological continuum. Their species belong to a one stock of marine provenance and probably link their ecological differences to different degrees of opportunism, that may cause the blooming of some populations not at their physiological, but their ecological optimum, in relation to the decrease of the interspecific competition (i.e. *Sphaeroma serratum*, SCONFIETTI R. & SOFFIANTINI R., 1988, *Rapp. Comm. int. Mer Médit.*, 31 (2): 59).

Therefore, the group of the so-called "lagoon species" is really a banal marine group deprived, through an ecological grid with more and more close mesh, of the more stenoecious elements, needing both high efficiency of seawater exchange and nearly stable values of salinity.

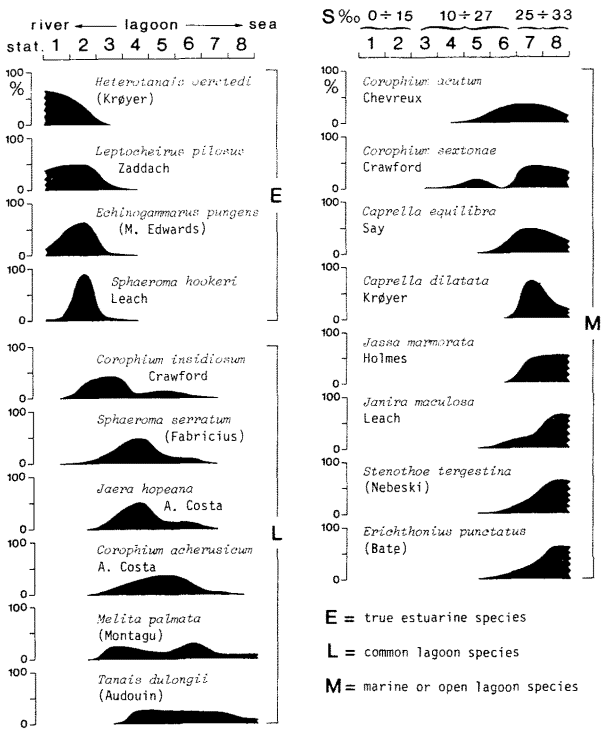

Fig. 1.- Zonation of the most frequent Peracarids along the lagoon course of the river Dese (lagoon of Venice). The salinity range from low to high water values.

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