Relationship between the physico-chemical parameters and the macrobenthic fauna in the soft substratum of the Homa Fisheries Lagoon

Mesut ONEN and Ozdemir YARAMAZ

Ege University, Fisheries College, Iskele-Urla-IZMIR (Türkiye)

Homa fisheries lagoon is located between the Gediz River and the Çamalti Salthern (Fig. 1). Its consists in two basins: the basic fisheries lagoon (7 Km long, 5 Km wide and 1200 Ha surface) and a smaller and shallower basin (3.4 Km long, 1.2 Km wide and 300 Ha surface).

This investigation was carried out in the basic fisheries lagoon which has a maximum depth of 0.8 m and a mean depth between 0.4-0.5 m. There are three gates which connect the lagoon to the sea, but only one of them is working now.

Physicochemical data and benthonic samples have been taken at 5 stations seasonaly (January, March, July and September) during three years, 1989-1991. The following parameters were measured: temperature and salinity (portable thermometer, Mohr-Knudsen method), pH (Varila pHmeter) and dissolved oxygen (Winkler method).

Sediment samples were taken by means of a Van Veen Grap that can hold 3.3 l of sediments. For each sampling date and station, 10 l of sediments were collected. Organisms were separated by sieving through a 2 mm mesh and fixed with 10 % formaldehyde. The results of the study of the benthonic samples are shown in Tables 1 and 2.

Table 1. Total number of individuals and species for each sampling station found in the 12 samples taken during 1989-91.

Stations	N°species	N°individuals
1	22	2630
2	20	3747
3	15	6570
4	16	5888
5	14	5071

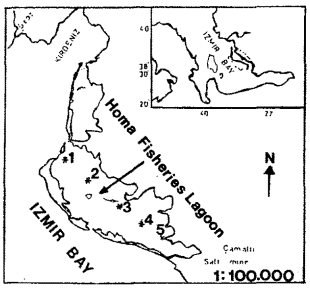

Figure 1. Sampling stations.

The ranges of the measured physico-chemical parameters were: temperature 5-26 °C (Fig. 2, A), salinity 34.51-73.54 ppt (Fig. 2, B), pH 6.94-8.40 (Fig. 2, C), dissolved oxygen 4.4-11.6 mg·l^{-1} (Fig. 2, D).

At the end of the studies, maximum salinity 73.54 ppt and minimum dissolved oxygen 4.4 mg·l^{-1} have been found. The numbers of species and individuals change depending on the station and season. Some species number decrease, some species number increase (*Abra pellucida, Chrinomus* sp.) especially in the summer months. In addition, we observed the blooms of *Lyngbya macuscuta.*

Table 2. Total number of species and individuals found for each taxonomic group in Homa fisheries lagoon.

Tax. Groups	N species	N individuals
Polychaeta	13	204
Mollusca	7	11364
Crustacea	9	908
Diptera (Larvae)	1	11438
Total	**30**	**23914**

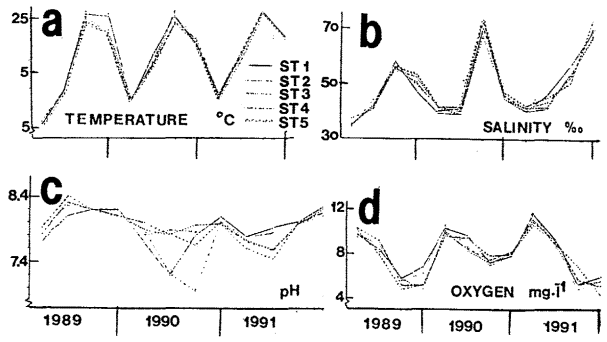

Figure 2. Physico-chemical parameters in Homa fisheries lagoon

REFERENCES

ONEN M., 1990.- Süyo (Homa) Dalyani Fiziko-Kimyasal parametrleri ile Makrobentik organizmalrin da^llmlnln araftrilmasl. E. Ü. Fen Bil. Enst. Su. Ür. Anabilim Dall (Doktora Tezi) Bornova - Izmir.

Colonization rates and dispersal as essential parameters in the confinement theory to explain the structure and horizontal zonation of lagoon benthic assemblages

Angel PEREZ-RUZAFA and Concepcion MARCOS-DIEGO

Dpto. de Ecologia, Fac. de Biologia, Universidad de MURCIA (Spain)

In place of parameters such as salinity, ionic composition, etc., the confinement theory proposes renovation-rates of vital elements in marine water as the main factor to explain the composition and structure of benthic assemblages and the observed gradients in population-density, biomass, specific richness, and diversity, in coastal lagoons (GUELORGET & PERTHUISOT, 1983).

However, this model is not altogether free from difficulties. Data cited in the bibliography, and the results of our work at the Mar Menor lagoon (SE Spain) (PEREZRUZAFA, 1989), show that the distribution of some communities and macrophytic meadows, like those *Caulerpa prolifera, Ruppia cirrhosa,* etc., display patch-distributions, related to the nature of the bottom, physical and chemical composition of sediments, minimum temperatures, wave-energy or hydrodynamism, and depth, instead of horizontal gradients. These species can inhabit zones other than those predicted by the model of GUELORGET & PERTHUISOT (1983). Furthermore, some assemblages, of fishes and other vagile macroinvertebrates, do not respond to the predicted gradients, and recent colonizers show temporary gradients in horizontal zonation.

We propose that lagoon zonation and community structure must be considered in terms of a new conceptual model. This includes a multifactorial approach in which lagoon-assemblages composition is related, on the one hand, to reproduction and growth-rates as result of adaptations and energetic costs to physical and chemical factors, and, on the other, to the confinement concept reinterpreted as the capability of open-sea organisms to colonize the paralic environments. In this way, interspecific competition between colonizers and paralic species can be one of the essential factors determining community structure. In resolving equations of competition, population growth-rates also include colonization or effective settlement rates. Thus, disadvantages in competition can be compensated for if immigration rates are high enough, so that competitive equilibrium is permitted. This would explain the higher diversities observed near the channels of communication with the open sea and the different patterns shown by sessile and vagile fauna.

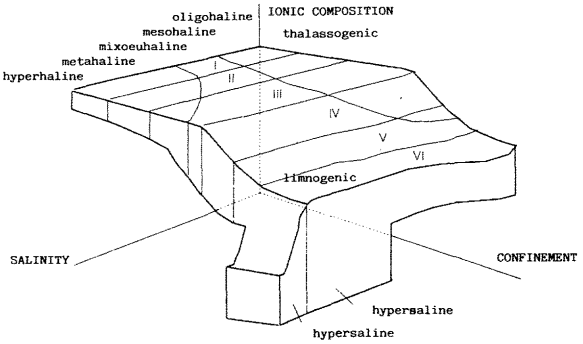

Fig. 1 - Body water and biological zonation classification according to some of the main factors that determine them.

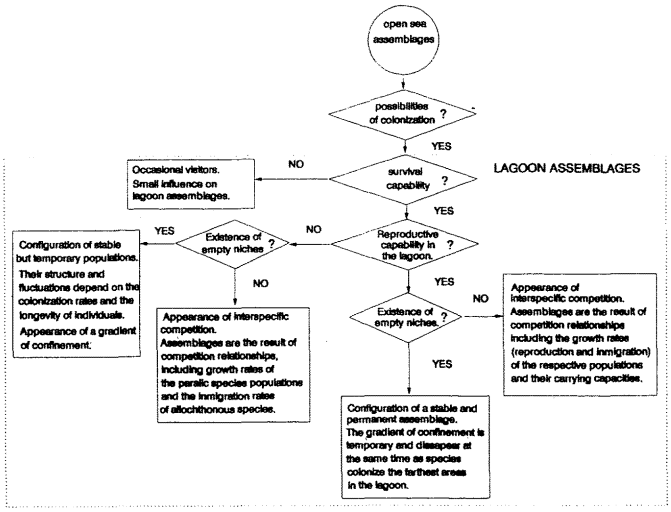

Fig. 2 - Conceptual model to explain the structure of lagoon benthic assemblages.

REFERENCES

GUELORGET O. & PERTHUISOT J.P., 1983.- Le domaine paralique. Expressions géologiques, biologiques et économiques du confinement. *Travaux du laboratoire de géologie,* 16: 1-136.

PEREZ-RUZAFA A., 1989.- *Estudio ecologico y bionomico de los poblamientos bentonicos del Mar Menor (Murcia, SE de Espana).* Tesis Doctoral. Universidad de Murcia: 751 pp.

Rapp. Comm. int. Mer Médit., **33,** (1992).