

Inestability of the meromixis in the Coastal Lagoon of Cullera

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The variation of some limnological parameters in the lagoon of Cullera (Spain), an elongated coastal lagoon with estuarine water circulation (Fig. 1), was studied during the annual cycle of 1987. Although the lagoon showed a sharp pycnocline during the whole year, which oscillated between 1 and 2 m of depth depending on the interactions between sea and freshwater, an oxycline was only present from May to October (Fig. 2, C). In this period vertical gradients of light, sulfide, conductivity and nutrients determined the presence of dense populations of green phototrophic bacteria, mainly *Chlorobium phaeovibriodes*, which developed a plate located around 2 m of depth. Its density distribution along the year is shown by the isopleths of bacteriochlorophyll *e* (Fig. 2, D).

This lagoon, as many others coastal lagoons, is subjected to great fluctuations, thus the annual cycle of 1987 was very different from that recorded some years ago (MIRACLE and VICENTE, 1985; ROJO and MIRACLE, 1989). In 1980, this lagoon was described as showing ectogenic meromixis, because it had a permanent sea water wedge, that only disappeared after the flood which took place in autumn 1982. During those years a steep pycnocline divided two water layers: a flowing oligohaline water layer above a saline anoxic layer. Because of the destruction of the sand bar in that flood, the lagoon did not show more a permanent meromixis and was like an estuary. In this study the halocline is much more superficial and the lagoon has a strong marine influence. This influence causes the oxygenation of the deepest waters, reaching progressively more superficial waters towards the oxycline arriving to contact with the epilimnetic oxygenated waters. This fact together with the effect of a new flood which occurred in November 1987 disturbed completely the summer column structure and the phototrophic bacteria population totally disappeared after this date.

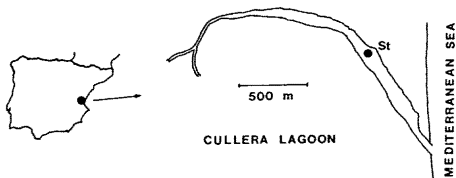


Figure 1. Geographical situation and outline of Cullera lagoon. St: Sampling station.

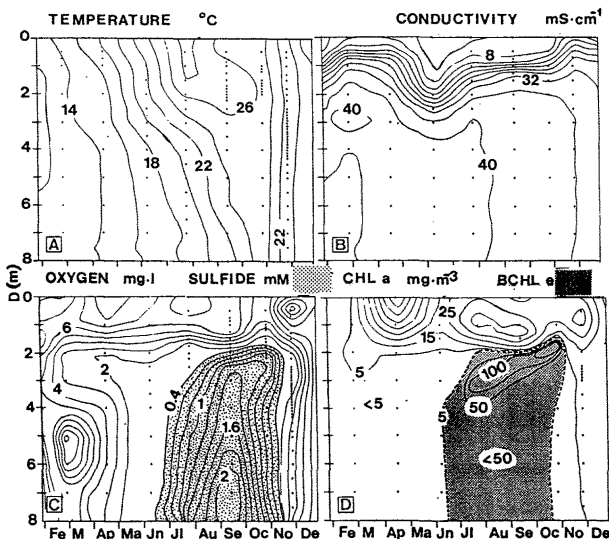


Figure 2. Isoleths representing depth and temporal distributions of some limnological parameters in the lagoon of Cullera. A: Temperature; B: Conductivity; C: Oxygen and sulphide; D: Algal chlorophyll *a* and bacteriochlorophyll *e* from *Chlorobium phaeovibriodes*.

REFERENCES

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