Morphosedimentary evolution pattern during the Late Quaternary of the Oliva-Pego Coastal Marsh System (Valencia, Spain)

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The Oliva-Pego coastal marsh is a small barrier-lagoon system, located in the southeastern end of the Valencian Gulf (Western Mediterranean - Fig. 1), bordered by two Prebetic mountains. The complex corresponds to the "choked lagoon" model from KJERFVE (1986). These landforms are usually found in microtidal coasts and they are characterized by their restricted connections to the open sea. However, the wetland deeps a quite steady paludal morphology with a widespread development of marshes but has not been fully filled despite the large amount of sediments that have been accumulated in the bassin, as this wetland is well supplied by groundwaters and it is placed on an area of enhanced land subsidence. This last factor is essential to the functionality of the system and thus this coastal landform can persist a long time (NICHOLS, 1989).

Geomorphological study and tectonic evolution of the area, as well as sedimentological, micropaleontological and chronological analysis of the materials from subaereal profiles and core-holes are carried out. We have added the information from electric soundings and ecoseismic profiles of the marine shelf.

We can observe from all these data, that the present morphosedimentary barrier-lagoon pattern is not similar to the ones developed during previous moments of the Late-Quaternary. In the Pleistocene record (mainly related to the isotopic states 4, 3 and 2 deposition) important thickness of weil oxygenated lagoonal sediments from fresh and/or brackish waters are detected. These features suggest that the ancient systems were larger and "leakier" with better connections between the open sea and the lagoon (VIÑALS, 1991). So, we can deduce that a well hydric exchange and entrances of marine waters with euryhaline fauna took place. Sedimentation in these environments was controlled mainly by chemical processes of precipitation, principally carbonates (some times they meant a 98% of the grains). The marine regressions caused the emergence and consequently the drying of the bottom of theses lagoons, together with the climatic aridity were responsible for the eolic erosion of the sediments surface.

The morphostratigraphic pattern of evolution derived from the sequential analysis and the tridimensional display of the units allows us to point out the following:

- The sedimentation of the last 125.000 years testify the development of barrier-lagoon complexes, where the lagoonal, marin and barrier facies alternances are observed (Fig.2).

- The sedimentary bodies geometry and the deposits sequences are the result of the relation between the high land subsidence late, the relative sea level oscillations and the kind and quantity of sediments that reach the coast.

- In a simplier morphostratigraphic approach and in the limited range of sedimentary settings in which insert the coastal environments migration, the lagoonal units represent episodes of marine regression or coastal progradation; while the beach-barrier and marine units are associated to sea positive pulses or transgressions, that often cause a coastal retreat.

The prequaternary palaeotopography bassin explains the perseverance in the formation of these coastal systems and the succesion of different morphosedimentary patterns from the Pleistocene to present time. The proximity of the mountains end to the coastline and the land subsidence have influenced the changes of the barrier-lagoon bodies morphology, causing the onlapping and retrogradation of the different highest sea levels. So, each new littoral body is more inland located than the older ones, chocking more and more the lagoons and changing them into small cellules or "pocket lagoons", that are closed by a very hermethic barrier that encourages the accumulation of the organic muds in the inner part of the system. This model reached its maximun development during the Flandrian transgression (5.7-10±100 and 5.330±90 BP).

Fig. 1: Surveyed area

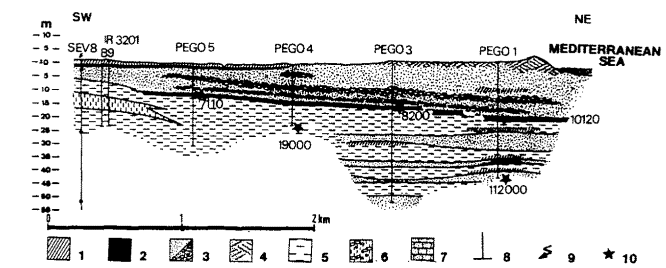

Fig.2: Barrier cross section of the Oliva-Pego Marsh. 1. Organic muds; 2. Presh/brackish marsh; 3. Beach-barrier/Marine environment; 4. Eolic deposits and dunes; 5. Lagoon; 6. Alluvial fan deposits: 7. Calcoarenitc formations; 8. Core-hole; 9. Electric sounding; 10. Absolute dating.

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Methodological aspects and first results of the study of decomposition of *Phragmites australis* Trin. in the coastal wetland "Albufera de Mallorca" (Spain)

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Aspects of decomposition of *Phragmites* have been experimentally studied in the Albufera de Mallorca. The objectives were twofold: to determine the effect of different shapes and mesh size of containers on decomposition rates of leaves and culms. Secondly, to carry out parallel studies on fungal colonization of the decomposing fractions.

The Albufera de Mallorca has a surface area of 24 Km2. The temperature range for water in lagoons is 10 to 29°C. The salinity in these lagoons in the different areas is very variable and depends mainly on drainage rates in the rainy seasons (MARTINEZ, 1988).

In December 1990 standing dead leaves and culms were collected and stored air dry. In March 1991 they were cut into portions and triplicate random samples were put in 2 mm mesh bags (6.6 g) and 5 mm mesh cages (7-10 g dry wt). Leaves were recovered after 32 and 92 days, and culms after 121 and 211 days.

In the laboratory samples were grossly blended and sampled for mycological studies, and the dry weight of the remaining matter determined.

Results

A. Weight loss.

The loss of leaf biomass in bags after 32 days was half that of the cages. After 92 days incubation differences are not so significant (63% and 71.2% respectively) (Table 1).

	Cummulative days	mesh-size (mm)	loss weight	decomposition rate (in %).
leaf	32	2	0.73±0.09	0.343
	32	5	1.39±0.29	0.659
	92	2	3.99±0.10	0.548
	92	5	4.72±0.18	0.835
culms	32	2	2.66±0.32	0.188
	32	5	2.58±0.16	0.209
	92	2	3.51±0.16	0.087
	92	5	3.85±0.10	0.087

Table 1- Decomposition of *Phragmites* leaves and culms

Differences in loss of culm biomass were not so great between bags and cages. The values obtained at 121 and 211 days incubation are very similar.

POLUNIN (1982) stated that 80% of the weight loss of *Phragmites* leaf biomass in the first 20 days is due to leaching. This allows us to presume that the 2 mm mesh may interfere more significantly than that of 5 mm in this process.

Table 2 shows the instantaneous decomposition rate (K) calculated according to the exponential model of OLSON (1963). The decomposition values obtained for either leaves or culms in both types of container are very similar. Differences are not important in the final results. But there is a great difference between K values for leaves and culms. These differences are clearly shown for half decomposition times (T 1/2). In contrast to our results, MASON & BRYANT (1975) and ANDERSON (1978), using 4 and 0.25 mm mesh bags, obtain values for half decomposition times of 7-11 months. These marked discrepancies are probably mainly due to the difference in temperatures, as their studies were carried out in England (52° lat.).

	Cummulative days	mesh-size (mm)	loss weight	Kx100	T1/2
leaf	92	2	60.31	1.3	53.32
	92	5	71.22	1.7	40.77
culms	211	2	30.71	0.119	581.0
	211	5	33.04	0.121	574.8

Table 2.- Decomposition of *Phragmites* leaves and culms. K= coefficient of regression. T 1/2 = time of semi-decomposition

B. Preliminary mycological observations.

Plant tissue was surface sterilized with bleach and subdivided into two portions. One was moist-incubated at 15°C in sterile Petri dishes under NUV to induce fruiting, and the other was cut into small portions (approx. 2mm square) using sterile technique for pure culture. These were immersed in antibacterial isolation media, the resulting colonies being transferred individually onto 2% malt extract agar or *Phragmites* leaf agar. After incubation at room temperature, or at 15°C with or without NUV, sporulating or fruiting colonies were examined microscopically, and the remaining were submerged for two or more days in autoclaved Albufera or distilled water in Petri dishes under the same conditions, to induce sporulation of aquatic states.

Species determinations are underway, but it may be concluded at this stage that practically the entire plant biomass of both leaves and culms appeared to be colonized by microfungi, and that these belonged to very few species, (a probable case of saprophytic spacialization) mainly to presumably terrestrial lepto-sphaeriaceous ascomycetes and pycnidial coelomycetes (often fruiting at the bottom of the plates), with only some hyphomycetes. Submerged incubation of cultures proved unsuccessful, but that of *Phragmites* culm fragments yielded numerous conidia of a dematiaceous scolecosporous aquatic hyphomycete (in the genus *Anguillospora*) which is apparently new to science. Many isolates remained sterile, probably due to inadequate sporulation conditions, and this problem is now being looked into.

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