THE DECLINE OF A POPULATION OF THE SEA URCHIN *PARACENTROTUS LIVIDUS* IN THE BAY OF PORT-CROS (VAR, FRANCE)

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ABSTRACT : Censuses of the Paracentrotus *population, using the same procedure, took place in May 1979 and March-May 1980, before and after the occurrence of a disease, along a permanent transect.*

In May 1979 a permanent transect was established in the Bay of Port-Cros (1)to monitor changes in seagrass communities and some sedentary organisms in them, and an initial census of the *Paracentrotus lividus* population was made along the transect. A one metre square divided into a grid of 25 squares, each 20 cm x 20 cm, was displaced sequentially along the transect line (4) and all individuals (measuring more than 20 mm horizontal diameter) were counted in the metre square on each placement.

Subsequently, the *Paracentrotus* population became infected by a disease. Thus the initial census acquired special ecologic significance. A second census of the *Paracentrotus* population was made along the permanent transect between March and May 1980, using the same procedure as the earlier one.

RESULTS : The results of the two censuses (Table I) show some noteworthy features :

- The *Paracentrotus* population greatly declined between the censuses; nevertheless, the population is still very high in comparison with urchin populations in the Corsican coast.

- The relative distribution of urchins along the permanent transect is fairly similar in both censuses. Population peaks occur, in both censuses, on the outer slope of the barrier reef, in the region of degradation of the *Posidonia oceanica* meadow and of sediment "wash out" (where the "matte" is deprived of its sedimentary substrate), sites co-incident with the occurrence of urchin "nurseries" (4). Urchins are no longer to be found on the barrier reef or in the dead "matte".

- Nevertheless, the decline ratio of *Paracentrotus* is not uniform along the transect (Table I) : it lies between 10% and 74%.

Benthic community	Distance from shore (m)	Number of Paracentrotus		Density of Paracentrotus m^{-2}		Decline of Paracentrotus (per cent)
		1979 census	1980 census	1979 census	1980 census	
Inner lagoon with Cymodocea nodosa	0-30	0	0	0	0	unchanged
Barrier-reef of Posidonia oceanica	31-54	70	18	2.9	0.8	- 74 %
Outer slope of the barrier-reef (healthy Posidonia or dead matte with patches of live Posidonia	55-72	510	142	28.3	7.9	- 72 %
Dead matte	73-90	65	17	3.6	0.9	- 74 %
Degraded deep Posidonia meadow	91-108	292	163	16.2	9.1	- 44 %
Healthy deep Posidonia meadow	109-148	239	216	6.0	5.4	- 10 %

TABLE I : Decline-ratio of Paracentrotus lividus along the permanent transect.

Finally, the reliability of our censuses over a two months period, then between night and daytime countings, was investigated along a part of the permanent transect : the histograms are fairly similar.

CONCLUSIONS : We assume that the disease only acquired its spectacular character because of the high population density of urchins in the Bay of Port-Cros. In Corsica, on the seaward side of the Regional Natural Park, where *Paracentrotus* occurs in low densities and in a natural equilibrium, the disease passed almost unnoticed.

It is also of interest that the decline of urchins has promoted an explosive growth of epiphytes on *Posidonia* leaves, especially on the inner edge of the barrier reef, despite the occurrence of a few grazing gastropods. Studies, currently in progress, will lead to the understanding of these secundary effects of the disease.

Such mass mortality by disease of populations of sea urchins has already been observed : JOHNSON (2) and PEARSE and HINES (3) relate that dense populations of the "red sea urchin" *Strongylocentrotus franciscanus* were decimated by disease and describe the following expansion of seaweeds.

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