ALGAL UNDERGROWTH OF POSIDONIA OCEANICA BEDS IN THE GULF OF NAPLES : FLORISTIC STUDY

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RESUME : Les Rhodophyceae (Ceramiales et Cryptonemiales surtout) sont dominantes en nombre d'espèces et en Recouvrement. Le Recouvrement total est très faible. Vers la limite inférieure de l'herbier (-30m), la sous-strate est assez différente de ce qu'elle est vers 4-5m; en particulier, les espèces infralittorales ne sont plus très représentées.

INTRODUCTION : The flora epiphytic on *Posidonia oceanica* (Linnaeus) Delile rhizomes has been studied from the phytosociological standpoint by MOLINIER (1) in Corsica and BOUDOURESQUE (2,3) in the Bouches-du-Rhône and the Var Departments (France). In the frame work of a research on minimal area of algal undergrowth in the *Posidonia oceanica* herbiers, we have collected some samples around Ischia Island (Gulf of Naples, Italy) in September 1977. The data, which deal with only one season, are not sufficiently numerous for valuable comparisons, and some methodological differences with previous works have to be pointed out : cover values are referred to the surface of the sea floor (400 cm2) and not to that of the rhizomes; algae growing on rhizomes have been considered together with those covering pebbles or forming free concretions among the rhizomes. Thus, comparisons and conclusions are to be regarded as only tentative.

GENERAL CHARACTERS OF THE UNDERGROWTH : The Total covering is very slight (averaging 42%). The Percentage cover (weighted means) of dominant species is : *Acrosorium uncinatum* 10.2%, *Peyssonnelia rubra* 7.9%, *Fosliella zonalis* 1.8%, *Jania rubens* 1.3%. Rhodophyta are largely dominant, especially Ceramiales (Qualitative Dominance QD = 39.0%, Dominance as a function of Percentage cover CD = 34.4%) and Cryptonemiales (QD = 12.5%, CD = 42.8%).

VARIATIONS WITH DEPTH : At 4-5m depth, the community is dominated by *sciaphilous* and *infralittoral sciaphilous* groups (Table I); at 30m depth, a considerable regression of *infralittoral* groups is seen, their place being occupied by species lacking a precise ecological significance (UWKE). There is a remarkable increase with depth of specific richness, equitability and Reproduction density of the community.

CONCLUSIONS : As in the Bouches-du-Rhône and Var areas (3), *Posidonia* rhizomes are to be regarded as an unfavourable substratum for algal epigrowth (very small values for Total cover). The high number of species,

depth	4-5 m	15 m	30 m
Ecological groups and supergroups			
IHdB (infralittoral, hard bottoms)	1.6	1.4	1.2
Infralittoral sciaphilous groups	41.0	44.3	8.2
Sciaphilous groups	49.4	14.6	36.0
Circalittoral groups	0.1	1.1	2.0
Other groups :			
MRsl (midlittoral groups)	0.1	0.2	0.9
PhIsl (photophilous, infralittoral)	1.6	18.0	2.3
ETNsl (eutrophic, thionitrophilous)	1.7	1.0	0.3
PL (Posidonia leaves)	+	-	1.2
UWKE (ubiquitous, without known ecol.)	4.6	19.3	47.8
	100.1	99.9	99.9

Table I : Dominance as a function of Percentage cover (CD).

whose majority has irrelevant Percentage cover, seems to be a consequence of the availability of space which allows any diaspore, trapped by *Posidonia* leaves, to initiate its development in the understory. The considerable reduction of infralittoral species occuring before the lower limit of the prairie gives us a first answer to the question raised by BOUDOURESQUE and FRESI (4) on the value of *Posidonia oceanica* as principal indicator for the lower limit of the infralittoral zone.

In contrast with the leaf epiflora, which has developped a remarkable adaptation to an original substrate, the understory flora seems to fail in occuping an apparently more favourable substrate, which remains a relatively free place.

depth	4-5 m	15 m	30 m
Number of living shoots of *Posidonia* m^{-2}	675	650	200
Number of dead shoots of *Posidonia* m-2	150	150	375
Total covering of the flora	54.2%	40.3%	32.7%
Number of species per sample	70.3	77.0	88.0
Diversity (Shannon)	3.16	3.99	4.45
Equitability	0.52	0.64	0.69
Reproduction density (dG)	0.08	0.05	1.22

Table II : Parameters of the prairie and of its undergrowth

REFERENCES :

(1) MOLINIER R., 1960. *Vegetatio*, Den Haag, 9(3-5) : 121-192+217-312.
(2) BOUDOURESQUE C.-F., 1968. *Rec. Trav. Stat. mar. Endoume*, Fr.,43 (59) : 45-64.
(3) BOUDOURESQUE C.-F., 1974. *Bull. Mus. Hist. nat. Marseille*, 34 : 269-283.
(4) BOUDOURESQUE C.-F., FRESI E., 1976. *Boll. Pesca Piscic. Idrobiol.*, Ital., 31(1-2) : 129-143.