Evolution de la dynamique des peuplements de Micromycètes de la zone littorale roumaine de la mer Noire

Mucader APAS

Institut Roumain de Recherches Marines, Constantza (Roumanie)

Abstract

A big number of samples from the nearshore Romanian marine waters (1,300) have been analysed throughout 1981-1985 period. There had been identified 28 marine fungi belonging to the Phycomycetes class: Chytridiales, Saprolegniales, Peronosporales, Mucorales orders, and Deuteromycetes class: Blastomycetes, Coelomycetes orders are also presented. For the systematic account, criteria mentioned by Ainsworth and Sussmann (1968) and Kreger von Rij (1973) were used. For all five years, qualitative and quantitative analyses have been carried out, establishing also the frequency of either dominant and less representative species.

En poursuivant les recherches sur les peuplements de micromycètes du littoral roumain de la mer Noire (Apas, 1978; 1980 a,b), ce travail présente très succinctement des données concernant la dynamique des champignons accidentellement et rigoureusement marins de la zone mentionnée.

En vue des investigations, on a considéré un réseau de stations formé de 13 profils, perpendiculaires à la côte, chaque profil ayant trois stations à l'horizon 0 m des isobathes de 2, 5, 10 et 20 m. On a prélevé les échantillons mensuellement, pour mettre en évidence toutes les saisons biologiques. La méthode de prélèvement utilisée a été celle recommandée par Schlieper (1968). Pour isoler, cultiver et déterminer qualitativement les espèces de champignons des classes Deuteromycetes et Phycomycetes, on a employé la méthode de Gaertner (1965; 1968).

Nos recherches ont mis en relief quelques caractéristiques générales de l'évolution de ces organismes planctoniques. Le mycoplancton côtier a eu généralement des niveaux maximaux pendant les saisons biologiques de printemps et d'automne, ayant cependant des valeurs significatives au cours des mois d'été de la plupart des années de référence.

Durant les cinq années d'études (1981-1985), on a identifié 28 taxons (tableau 1). Parmi ceux-ci, les genres Cladosporium, Penicillium, Rhodotorula et Candida ont eu la domination quantitative, les espèces appartenant aux genres Rhodotorula et Candida ayant une fréquence élevée.

Le rapport entre les groupes taxonomiques a toujours été favorable aux champignons levuriformes, ainsi qu'on peut voir ci-dessous:

Groupe taxonomique	1981	1982	1983	1984	1985
Champignons filamenteux	25,85	25,83	33,77	21,66	27,45
Champignons levuriformes	74,15	74,17	66,23	78,34	72,55

De la moyenne totale de 246.225 spores par litre (pour les cinq années de recherche), environ 75 % revient aux champignons levuriformes. Le développement excessif des formes levuriformes atteste l'état de forte eutrophisation du milieu marin. Deux genres sont même responsables d'un phénomène de "floraison fongique", signalé au cours des années 1981 et 1984 - engendré par les espèces de Rhodotorula, et en 1985 - dû aux espèces de Candida.

La quantité moyenne totale de propagules oscillait, au cours des cinq ans, entre 6640 et 10.470 spores par litre, selon les stations.

Tableau 1

Structure qualitative de la mycoflore et fréquence (%) des espèces pendant la période 1981-1985

Espèces	1981	1982	1983	1984	1985
Penicillium chrysogenum	5,34	19,17	9,21	8,88	8,67
Cladosporium algarum	8,64	7,74	8,31	9,70	8,60
Fusarium moniliforme	0,29	0	0	0	0
Fusarium oxysporum	0	0,48	0,13	0,19	0,34
Aspergillus niger	0,09	0,28	0,07	0	0
Aspergillus fumigatus	0	0	0	0,12	0,26
Mucor racemosus	0,14	0	0	0	0
Mucor sp.	0	0,20	0,13	0,47	0,27
Rhizopus nigricans	0	0	0	0,07	0,09
Rhizopus sp.	0,12	0,28	0,22	0	0
Epicoccum maritimum	0,16	0,06	0,13	0,27	0,15
Alternaria maritima	0,09	0,09	0,01	0,05	0,05
Trichoderma viride	0,73	0,19	0,04	0,03	0,03
Cephalosporium acremonium	0,18	0,37	0,18	0,22	0,38
Pullularia pulullans	0,02	0	0	0	0
Verticillium tenerum	0	0,71	0,17	0	0
Verticillium lecanii	0	0	0	0,04	0,10
Trichophyton mentagrophytes	0	0	0	0,10	0,19
Trichophyton sp.	0	0	12,34	0	0
Botryotrichum piluliferum	0	0	0	0,14	0,09
Champignons filamenteux non-identifiés	4,03	0,47	0	0	0
Rhodotorula glutinis	40,18	20,33	20,12	48,45	23,16
Candida albicans + C.maritima	20,43	28,20	23,09	0	0
Cryptococcus neoformans	10,39	10,73	8,37	2,13	5,39
Geotrichum candidum	2,39	7,57	9,27	5,77	2,26
Champignons levuriformes non-identifiés	6,74	3,15	0,11	0,06	0,10

Les recherches seront continuées, qualitativement aussi bien que quantitativement, en divers biotopes et zones de la mer Noire, en les complétant en même temps avec certains aspects éco-physiologiques.

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The role of marine Fungi in the degradation of sea grasses

V. CUOMO*, S. GRASSO**, F. VANZANELLA* and S. D'ANTONIO*

* Research Laboratories Ciba-Geigy, Torre Annunziata, Naples (Italy)
** Department of Animal Biology and Marine Ecology Cr. Sperone, Messina (Italy)

In marine coastal ecosystems, the production of macrophytes algae sea grasses, mangroves constitute the natural and most important food sources for marine invertebrates and vertebrates (Mann 1976). Approximately 5% of the macrophyte production is consumed directly by herbivores (Fenchel, 1972; Odum, Zieman and Heald, 1973) and the remainder must be converted to microbial biomass before it can be utilized by primary consumers (Hargrave, 1976; Yingst, 1976; Heinle, Harris, Ustach and Flemer, 1977, Tenore, 1977). Considerable information is available on the occurrence of marine fungi on wood and other cellulosic materials (Jones, 1976; Kohlmeyer and Kohlmeyer, 1979); however remarkably little is known about marine fungi growing on sea grasses such as Cymodocea, Posidonia, Thalassia and Zostera.

Few studies have been undertaken of the degradation of sea grasses in marine ecosystems.

Marsh plant degradation has been studied by Gessner (1976;1980), Crabtree and Gessner (1982), Torzilli and Andrykovitch (1980); seaweed by Tubaky (1969), Miller and Jones (1983) and Schatz (1984). Detailed studies of mangrove leaf breakdown had been reported by Fell and Newell (1981), and Cundell et al. (1979).

Breakdown and conversion of Posidonia oceanica leaf biomass had been reported by Cuomo (1986) and Cuomo et al. (1987a,1987b).

Detailed information is available on the colonization and enzymatic breakdown of lignicellulose material (Jones E.B.G. 1976; Leightley L.E. and Eaton R.A. 1977, Leightley L.E. 1980).

Marine lignicolous fungi have been shown to possess a wide range of enzymes capable of utilizing wood components: cellulose, xylan, glucomann and lignin (cellulases, hemicellulases, laccase, tyrosinase, laminarase), Tubaki (1969); Leightley L.E. (1980), Cuomo (1987a).

Degradation of sea grasses in marine ecosystems has been studied and the role of higher marine fungi in this process proves to be important. These studies have shown that a wide range of fungi is involved in the degradation.

Members of the Phycomycetes (Fell and Master; 1975) are early colonizers of mangrove leaves. These are later replaced by a wide variety of Ascomycotina and Deuteromycotina (Fell and Newell, 1981).

Similar cell wall degrading enzymes have been reported for a range of salt marsh fungi (Gessmer 1980; Torzilli and Andrykovitch 1980). The mechanical and biochemical breakdown of marine angiosperm leaves is a process that should be taken due note of and investigated further.

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