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OCCURRENCE AND PERIODICITY OF SAPROLEGNIACEAE IN YATELY LAKE

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Abstract

Sixteen species of fungi were isolated and identified in the water samples of Yately Lake using hemp seeds as baits. *Achlya americana, A. racemosa, Dictyuchus monosporus, Fusarium solani, Pythium proliferem and Saprolegnia diclina* were present in the monthly water samples of the lake throughout the year. Members of Saprolegniaceae occurred in highest number in August and September but thheir frequency of occurrence declined in winter months and the lowest number was found in February. Species of *Fusarium* and *Pythium* which are not members of the water mould family were also encountered.

Introduction

Studies on the ecology of Saprolegniaceae have been carried out in a variety of waters although there have been more investigations of lotic waters (Kaushik & Hynes, 1971; Newton, 1971; Willoughby & Archer, 1973; Park, 1974) than lentic waters (Roberts, 1963; Dick, 1971, Novotny & Tews, 1975; Khulbe, 1980). Most of the papers published on the ecology of water moulds relate to seasonal periodicity (Roberts, 1963; Meyers *et al.*, 970; Conway, 1970; Willoughby & Archer, 1973; Khulbe, 1980) and hydrogen ion concentration (Lund, 1934; Roberts, 1963; Misra, 1982). The present study reports the seasonal periodicity of Saprolegniaceae in Yately Lake.

Materials and Methods

The lake at Yately from which water samples were collected was one designated as Yately No. 4 (Grid reference 824616). It is an artificial, eutrophic, man made lake formed from flooded gravel excavations, roughtly 1500 m^2 in area and upto 1.5 m. deep. It is situated near the river Black-water in Hampshire, 55 m above sea level. For the most part the banks were lined with trees of *Alnus glutinosa, Salix purpurea, S. viminalis* and *Ulmus glabra.* Open streches has a carpet of grass on one side. The sides of the narrow littoral vegetation included plants such as *Alisma plantagoaquatica, Juncus* spp., *Mentha aquatica, Myosotis scorpiodes* and *Polygonum amphibiun.* The lake was shallow and during the late summer contained large amount of submerged macrophytic vegetation consisting largely of *Elodea canadensis* and *Myriophyllum spicatum* in addi-

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tion to a rich phytoplankton flora typical of an eutrophic lake. Yately 4 contained a large fish population and was fished extensively by anglers. The samples of water were taken at monthly intervals in 1973. The pH of the water ranged from 7.0–7.7.

Sterilized 250 ml flasks with wide necks were submerged in an inverted position into the water to a desired depth, filled with water and the screw top lids replaced while still under water. Three water samples were collected each month from the southern bank of Yately 4. One sample was taken from the confluence of water and land, second at 5 cm depth below the water surface about 5 cm away from the bank and a third from the water at a depth of 10 cm and about 75 cm away from the bank. Fifty sterilized hemp seeds were added to each flask within 6 h of collection and kept in darkness for 24 h at room temperature. Five seeds were then transferred in a sterilized plastic dish containing 20 ml mixture of distilled water and tap water in a 1:1 ratio. Penicillin and streptomycin @ 200 ppm each were used to suppress bacterial growth. Of a total of 30 dishes with hemp seed baits prepared each month, 15 of these were incubated at 18°C in a cooled incubator in darkness and the remainder at 4°C in a refrigerator. All fungal cultures growing around hemp seeds in the dishes were examined microscopically at 3 to 5 days interval over a five week period.

Results and Discussion

Sixteen species of fungi belonging to 5 genera were isolated from the water samples of Yately Lake using hemp seeds as bait (Table 1). Water samples collected in August yielded highest number of fungal species and the lowest number was recorded in February. *Achlya americana, A. racemosa, Dictyuchus monosporus, Fusarium solani, Pythium proliferum* and *Saprolegnia diclina* occurred regularly from December 1972 to November 1973 and the highest frequency of occurrence was recorded in August. *Achyla flagellata, A. apiculata, A. prolifera* and *Fusarium culmorum* were found relatively in higher numbers during September. *Saprolegnia diclina* was isolated throughout the year from Yately Lake whereas *Saprolegnia monica* and *S. mixta* were not encountered in winter months.

Misra (1982) from an Indian lake reported an increase in the frequency of occurrence of water fungi during winter months which is contrary to this report. This difference in the frequency of occurrence could be mainly due to the fact that Yately Lake is situated in a temperate zone and is subjected to severe winter and considerable low temperature as compared to the Indian lake situated in a tropical country. The lakes situated on the plains of India attain a high temperature of water during summer months and the temperature of water during winter months are sufficient and conducive for the growth and multiplication of life forms including water moulds. Schmidt (1967) reported presence of the species of *Achyla, Dictyuchus* and *Saprolegnia* around pollens of pine, leaves of

Table 1. Periodic frequency in the occurrence of fungi in water samples of Yately Lake using hemp seed as bait.

Fungal species	Dec. 1972	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov. 1973
Achlya americana	9	10	10	12	12	14	12	13	25	13	10	11
A. flagellata	–	–	–	–	–	15	–	15	26	43	2	2
A. apiculata	10	–	–	–	–	20	12	10	18	39	–	–
A. prolifera	3	–	–	–	13	13	13	16	20	40	–	–
A. racemosa	14	11	10	12	13	14	17	15	22	18	13	10
A. radiosa	–	–	–	–	–	19	20	22	–	–	–	–
Dictyuchus monosporus	2	1	10	15	16	13	13	18	23	30	15	8
D. achlyoides	–	–	–	–	–	–	–	8	10	–	–	–
Fusarium culmorum	–	–	–	–	–	–	–	10	17	42	–	–
F. solani	10	8	12	15	10	12	13	18	30	35	10	8
Pythium proliferum	11	13	12	39	30	47	41	40	50	20	25	12
Saprolegnia diclina	4	3	2	1	9	10	8	15	20	9	2	3
S. ferax	–	2	–	10	12	12	–	13	10	15	12	10
S. monoica	–	–	–	–	10	15	16	–	15	10	26	–
S. litoralis	–	2	3	4	15	–	13	–	28	26	22	3
S. mixta	–	–	–	9	–	–	10	–	20	10	–	–
Total number of species isolated	8	9	7	9	10	12	12	13	15	14	10	9

Paspalum and hemp seeds lying in water. The presence of these fungi around such natural substrates was considered due to the effect of chaemotaxis for the zoospores of these fungi. Willoughby (1969) reported zoospores of *Lagenidium giganteum* to be attracted by chitinous substrates. During the present studies, 16 species belonging to 5 genera of fungi were isolated by using hemp seeds as bait and the hemp seeds are well known to be chaemotactic for water moulds. The species of *Fusarium* and *Pythium* do not fall into the category of water moulds. It is however, possible that wind-borne conidia of *Fusarium* landed on floating objects in the lake water and so also soil inhabiting spores of *Pythium* which tend to grow and increase in number in the moist soil and were, therefore, present in the water samples. This could explain their occurrence along with the water moulds in the water samples of Yately lake.

The findings of this work are more or less similar to the works of Roberts (1963) and Sparrow (1968) dealing with water fungi of the same geographical area. There appears a seasonal periodicity in the occurrence of water fungi as well in the frequency of occurrence of the members of Saprolegniaceae in various seasons at Yately Lake.

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