

Aquatic Phycomycetes on the mud of the River Nile (Assiut, Egypt)

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Introduction

Many investigations have been done on aquatic Phycomycetes both from water and wet soils: COKER (1923), FORBES (1935 a, b), WATERHOUSE (1942), SUZUKI (1960 a, b), DAYAL & TANDON (1962), MILANEZ (1968), SCHMITT (1969), MILANEZ (1970), BENEKE & ALVIN (1970), RAI & MISRA (1977), DICK (1960, 1961, 1966, 1971) and FAJOLA & al. (1978).

In Egypt EL-HISSY (1974) isolated for the first time many species of aquatic fungi from the River Nile. In addition she studied the aquatic fungi recovered from 24 soil samples collected from different agricultural places in Egypt (EL-HISSY, 1979 b; 1979 c). Recently EL-HISSY & al. (1982) studied the seasonal fluctuations of aquatic fungi in the Nile water. However, no informations were given concerning the fungi of the Nile Mud.

Thus the aim of the present investigation was to study the seasonal periodicity of aquatic fungi in mud of the Nile near Assiut (from May, 1979 to April, 1981: 24 months).

Materials and methods

Mud samples from under water surface at the Nile margin (500 meter upstream of Assiut Barage) were collected monthly. The samples (in sterile plastic bags) were transferred in less than one hour to the laboratory.

The temperature and the pH value were recorded in situ. The contents of organic matter and total soluble salts, however, were determined in the laboratory.

Isolation of aquatic fungi: 100 gms of mud are mixed with 1000 ml sterile distilled water and gently shaken for 5 minutes and left again for about 10 minutes to settle. 100 ml of this wash water sample were introduced into a sterile Petri-dish (15 cm in diameter) containing sterilized hemp-seeds and three sterilized halves of *Zea mays* grains as baiting substances (THORNTON, 1970; EL-HISSY, 1982). Six replicate dishes were used. These dishes were left at room

temperature and at natural light. After 24 hours, the colonized seeds and grains were transferred to sterile filtered Nile water in sterile Petri-dishes which contained Penicillin (2000 units/L-water) to depress bacterial growth (ROBERTS, 1963). The dishes were then incubated at 22°C for 4–6 weeks during which the aquatic fungi colonizing the seeds and grains were weekly examined and identified. The identified aquatic fungi were purified on glucose-peptone (GP) agar medium according to WILLOUGHBY & PICKERING (1977).

The following references were used to identify the aquatic fungi isolated in this investigation; COKER (1923), FITZPATRICK (1930), JOHNSON (1956), SPARROW (1960), SCOTT (1961), WATERHOUSE (1967, 1968), SEYMOUR (1970).

Results and discussion

The twenty four mud samples collected during this investigation exhibited the following ranges: temperature: 13.5 to 29.0° C; pH value: 6.0 to 8.3; total soluble salts: 0.2 to 1.3 mg/100 gm dry mud; organic matter: 1.1 to 2.7 gm/100 gm dry mud.

The results presented in Table 1 show that the highest populations of aquatic fungal genera and species were found in October–December 1979, January–March, October–December 1980 and January–April 1981. These periods represent months when the mud temperature ranged between 13° C and 26° C. The poorest months were May – June – July 1979, May – June – July and September 1980, with mud temperatures ranging between 18° C and 29° C.

During the experimental period twenty-three species and one variety of *Olpidiosis saprolegniae* were collected which belong to nine genera of aquatic fungi. Five genera were of high seasonal occurrence viz. *Dictyuchus* (24 months), *Achlya* (23 months), *Saprolegnia* (17 months), *Pythium* (17 months) and *Isoachlya* (13 months).

Dichyuchus is the most common genus and was represented always during the experimental period. Four species of *Dictyuchus* were identified namely: *D. sterile*, of high (23 months), *D. monosporus* of moderate (11 months), *D. magnusii* and *D. carpophorus* of low (5 and 3 months respectively) seasonal occurrence. In the same region EL-HISSY & al. (1982) found already earlier the high seasonal occurrence of *Dictyuchus* in Nile water (represented by the same four species). In general *Dictyuchus* occurs rarely in Egyptian agricultural soils (EL-HISSY (1979 b), but *D. monosporus*, *D. magnusii* and *D. sterile* were also isolated from the surface and casts of earthworms (EL-HISSY, 1979 c). In Nigeria, FAJOLA & al. (1978) isolated *D. anomalus* NAGAI and *D. missouriensis* COUCH from the soils of two riverine sites in Abadan.

Table 1: Monthly records of aquatic fungi baited and isolated at 22° C from mud samples near the margin of the River Nile (1979 – April 1981); High occurrence: more than 12 months (out of 24); Moderate occurrence: between 6–12 months; Low occurrence: between 3–5 months; Rare occurrence: less than 3 months.

Species	1979								1980								1981						
	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
<i>Achlya</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+
<i>A. colorata</i> PRINGSHEIM	-	-	-	-	-	-	+	+	+	+	+	+	-	-	-	-	-	-	+	+	+	+	+
<i>A. debaryana</i> HUMPHRY	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	+	+	-	-	-
<i>A. dubia</i> COKER	-	-	+	+	+	+	-	-	-	+	-	+	-	-	+	-	-	-	+	-	-	-	+
<i>A. flagellata</i> COKER	-	-	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	+
<i>A. hypogyna</i> COKER & PEMBERTON	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	+	+	+	+
<i>A. klebsiana</i> PIETERS	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	+	+	+
<i>A. prolifera</i> C. G. NESS	+	+	-	+	+	+	-	-	+	-	+	-	-	+	+	+	+	+	-	-	+	-	+
<i>A. proliferoides</i> COKER	-	-	+	-	+	+	+	-	+	+	-	+	+	-	-	-	-	-	-	-	-	+	-
<i>A. racemosa</i> HILDEBRAND	-	-	-	-	-	+	+	+	+	+	+	+	-	-	-	-	-	-	+	+	+	+	+
<i>A. species?</i>	-	+	+	-	-	+	+	+	+	+	-	-	-	+	+	+	-	-	-	+	+	+	-
<i>Saprolegnia</i>	-	+	-	+	-	+	+	+	+	+	+	+	+	-	-	+	+	+	+	+	-	+	-
<i>S. anisospora</i> de BARY	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-
<i>S. litoralis</i> COKER	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>S. ferax</i> (GRUITH) THURET	-	+	-	+	-	+	-	+	+	+	+	+	+	-	-	+	+	+	+	+	-	+	-
<i>S. species?</i>	-	-	-	+	-	-	+	+	+	+	-	-	-	-	-	-	-	-	+	+	+	+	-
<i>Allomyces</i>	+	-	+	-	-	-	-	+	-	+	+	-	-	-	-	+	-	-	-	-	-	-	+
<i>A. arbuscula</i> BUTLER	+	-	-	-	-	-	+	-	-	+	+	-	-	-	-	+	-	-	-	-	-	-	+
<i>A. species?</i>	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aphanomyces stellatus</i> de BARY	+	-	-	-	+	-	+	+	-	+	-	-	-	-	-	+	-	+	+	-	-	-	-
<i>Dictyuchus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>D. carpophorus</i> ZOPF	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-
<i>D. magnusii</i> LINDST.	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	+	+	-	-
<i>D. monosporus</i> LEITGEB	+	+	+	-	+	-	+	+	+	-	-	-	+	-	+	+	-	+	-	-	-	-	-
<i>D. sterile</i> COKER	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+

Table 1: Continued

Species	1979								1980								1981						
	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
<i>Isoachlya unispora</i> COKER & COUCH	-	-	+	+	-	-	+	+	+	+	+	+	-	-	-	-	-	-	+	+	+	+	+
<i>Olpidiopsis saprolegniae</i> var. <i>levis</i> COKER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
<i>Pythium</i>	+	-	-	+	+	+	+	+	+	-	-	-	+	+	+	+	-	+	+	+	+	+	-
<i>P. debaryanum</i> HESSE	-	-	-	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>P. intermedium</i> de BARY	+	-	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>P. thalassium</i> ATKINS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	+	-	-
<i>P. species?</i>	-	-	-	-	+	+	+	-	-	-	-	-	+	+	+	-	-	+	+	-	-	+	-
<i>Thraustotheca clavata</i> (de BARY) HUMPHREY	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	+

Achlya is also of high seasonal occurrence and is present throughout the experimental period except November 1980. This genus contributed 9 species, three of which were of high seasonal occurrence namely: *Achlya proliferata*, *A. racemosa* and an unidentified *Achlya* species and four of moderate seasonal occurrence namely: *A. colorata*, *A. dubia*, *A. hypogyna* and *A. proliferoides*; remaining two species were of low seasonal occurrence. EL-HISSY & al. (1982) mentioned also that *Achlya* was of high seasonal occurrence (24 months) in Nile water.

Pythium did not show any regular trend but was also of high occurrence and is represented by four species namely: *P. debaryanum*, *P. intermedium*, *P. thalassium* and an unidentified species. EL-HISSY & al. (1982) reported that in Nile water the same four species of *Pythium* are found with moderate seasonal occurrence. On the other side EL-HISSY (1978 c) isolated only two species of *Pythium* from the casts and surface of earthworms. EL-SHAROUNY (1980) recorded that in Egyptian soils *Pythium* is relatively frequent during the cold months and almost absent in summer months.

In mud samples *Saprolegnia* is also of high seasonal occurrence but absent in June and July, 1979 and 1980. This genus was represented by four species namely. *S. ferax*, *S. anisospora*, *S. litoralis* and an unidentified species. Examining Nile water EL-HISSY & al. (1982) recorded *Saprolegnia* (7 species) also with high seasonal occurrence.

Isoachlya (represented by *I. unisporea*) was encountered during 13 months (high occurrence) but predominates in winter time. Similar results obtained SUZUKI (1960 b).

Aphanomyces stellatus and *Allomyces arbuscula* were both of moderate seasonal occurrence (8 and 7 months respectively). In Egypt the two genera were previously isolated from Nile water (EL-HISSY, 1979 a) and from soils (EL-HISSY, 1979 b, c).

Thraustotheca clavata – also isolated from Nile water (EL-HISSY, 1974) – was also of moderate occurrence (6 months).

It must be mentioned that *Olpidiopsis saprolegniae* var. *levis* was isolated for the second time in Egypt after being recorded earlier EL-HISSY & al. (1982) from Nile water in the same region.

In general it can be observed that the aquatic fungi recovered from the mud of the Nile were nearly the same as those detected in Nile water from the same locality (EL-HISSY & al. 1982).

Bibliography

- BENEKE, E. S. & ALWIN, L. R. (1970). Aquatic fungi of Parque Nacional de Itatiaia in the state of Rio de Janeiro. – *Rickia Arq. Bot. Estado Sao Paulo, Ser. Criptogam.* 5: 51–64.

- COKER, W. C. (1923). The Saprolegniaceae with Notes on Other Water Molds. – Univ. of North Carolina Press, Chapel Hill, North Carolina., 201 pp., 63 pl.
- DAYAL, R. & TANDON, R. N. (1962). Ecological studies of some aquatic Phycomycetes. – *Hydrobiologia* 20: 121–127.
- DICK, M. W. (1960). *Aplanopsis spinosa* sp. nov. – *Trans. Br. mycol. Soc.* 42: 43–60.
- (1966). The Saprolegniaceae of the environs of Bleham Tran: sampling techniques and the estimation of propagule numbers. – *J. Gen. Microbiol.* 42: 257–282.
- (1971). The ecology of Saprolegniaceae in lentic and littoral muds with a general theory of fungi in the lake ecosystem. – *Journal of General Microbiology*, 65: 325–337.
- EL-HISSY, F. T. (1974). Freshwater fungi in Egypt. – *J. Bot.* 17: 187–189.
- (1979 a). Seasonal fluctuations of freshwater fungi in River Nile. – The first scientific conference of Egyptian Graduate Abroad, London (in press).
- (1979 b). On the aquatic fungi of Egyptian soil. – *Bulletin of Fac. of Science, Assiut Univ.* (in press).
- (1979 c). Aquatic and terrestrial fungi from the surfaces and the casts of earthworms in Egypt. – *Bulletin of Fac. of Science, Assiut Univ.* (in press).
- MOUBASHER, A. H. & EL-NAGDY, M. A. (1982). Seasonal fluctuations of freshwater fungi in River Nile (Egypt). – *Zeitschrift für Allgemeine Mikrobiologie* (in press).
- EL-SHAROUNY, H. M. (1980). Studies on root-infecting fungi with special reference to *Pythium*. – Ph. D. Thesis Bot. Dept. Faculty of Science, Assiut University.
- FAJOLA, A. O., ALASADURA, S. O. & OGBONNA, C. I., (1978). Some aquatic phycomycetes from riverine soils in Ibadan, Nigeria. – *Nova Hedwigia*, 29: (3–4), 905–911.
- FITZPATRICK, H. M. (1930). The lower fungi hycomycetes 331 pp. McGraw-Hill Book company, INC. New York and London.
- FORBES, E. J. (1935 a). Observations on some British water moulds (Saprolegniales and Blastocladales). – *Trans. Br. Mycol. Soc.* 19: 221–234.
- (1935 b). Water moulds of the Manchester District. – *Mem. proc. Manchester Lit. Phil. Soc.* 79: 1–11.
- JOHNSON, T. W. (1956). The genus *Achlya*: morphology and taxonomy. – University of Michigan Press. 180 pp, 22 pl.
- MILANEZ, A. (1968). Aquatic fungi of the “Cerrada” region of Sao Paulo state: 1 first results. *Rickia Arq. Bot. Estado Sao Paulo, Ser. Criptomag.* 3: 97–109.
- (1970). Contribution to the knowledge of aquatic phycomycetes of Sao Paulo state. 1. Oomycetes from the west region. – *Rickia Arq. Bot. Estado Sao Paulo, ser. Criptomag.* 5: 23–43.
- RAI, J. N. & J. K. MISRA (1977). Aquatic fungi from alkaline ponds and soils. – *Kavaka* 5: 73–78.
- ROBERTS, R. E. (1963). A study of the distribution of certain members of the Saprolegniales. – *Trans. Br. Myc. Soc.* 46: 213–224.
- SCHMITT, J. A. (1969). Some observations on aquatic Phycomycetes from Lake Texoma and adjacent parts of Oklahoma. – *Southwest Nature* 12 (3): 311–320.
- SCOTT, W. W. (1961). A monograph of the genus *Aphanomyces*. – *Tech. Bull.* 151, Va. Agr. Exp. sta., 95 pp., 9 pls. Va. Polytech. Inst. (Blacksburg).
- SEYMOUR, R. L. (1970). The genus *Saprolegnia*. – 124 pp. Verlag J. Cramer, Germany.
- SPARROW, F. K. (1960). Aquatic Phycomycetes. – 2nd ed. Ann Arbor: University of Michigan Press. (1–1073).
- SUZUKI, S. (1960 a). Seasonal variation in the amount of zoospores of aquatic Phycomycetes in lake Shinseiko. – *Botan. Mag. (Tokyo)* 73: 483–486.
- (1960 b). The seasonal variation of aquatic fungi in Senshunike pond. – *Japan. J. Limnol.* 21: 271–278.

- THORNTON, M. L. (1970). Transport of soil dwelling aquatic Phycomycetes by earthworms. – Trans. Brit. Myc. Soc. 55 (3), 391–397.
- WATERHOUSE, G. M. (1942). Some water moulds of the Hogsmill River collected from 1937 to 1939. – Trans. Br. Myc. Soc. 25: 315–325.
- (1967). Key to *Pythium* PRINGSHEIM. – Pages 1–15 in Mycol. Pap. 109, Commonw. Mycol. Inst. Kew, Surrey, England.
- (1968). The genus *Pythium* PRINGSHEIM. – Pages 1–71, Mycol. Pap. 110, Commonw. Mycol. Inst. Kew, Surrey, England.
- WILLOUGHBY, L. G. & PICKERING, A. D. (1977). Viable Saprolegniaceae spores on the epidermis of the salmonid fish *Salmo trutta* and *Salvelinus alpinus*. – Trans. Br. myc. Soc. 68: 91–95.

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