

PRELIMINARY LIST OF AQUATIC HYPHOMYCETES FROM CENTRAL BELARUS

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Abstract: Fifty four species of aquatic hyphomycetes are reported from watercourses of Central Belarus with notes on colonized substrates, frequencies of occurrence and maintained isolates. Of those, 15 species are reported from Belarus for the first time.

Key words: freshwater hyphomycetes, watercourses, distribution, Belarus.

Meaningful studies on aquatic hyphomycetes were not undertaken in Belarus until 1992. There is only a single paper reporting 13 species from watercourses of Minsk, the capital of Belarus (Stephanovich & Golubkov 1976).

Eighty four Belarus watercourses mainly located in Minsk region, in the Berezinsky Biosphere Reserve and in the National Park 'Golubye Ozera' were examined between 1992-1999. Submerged decaying substrates were collected and then incubated in standing distilled water in Petri dishes to induce sporulation (Webster & Descals 1981). Foam and scum samples were examined directly. Monoconidial isolates were obtained using routine isolation techniques and conidiation was stimulated by submerging strips of agar culture in standing or aerated distilled water.

Fifty four species of aquatic hyphomycetes were found during these studies (Tab. 1). Eleven of them were recorded also by Stephanovich & Golubkov (1976), 28 were published in our earlier contributions (Gulis & Stephanovich 1995, 1998a,b, Gulis & Marvanová 1998) and 15 are reported from Belarus for the first time. Two species seen by Stephanovich & Golubkov (1976) have not been found (*Dactylaria fusiformis* Shearer & J.L.Crane and *Tricladium patulum* Marvanová & Marvan). Five species appear undescribed (new spp. of *Anguillospora*, *Sporidesmium*, *Taeniolella* and *Tricladium*) and will be presented elsewhere.

The highest frequencies of occurrence (both FOW and FOS, see Tab. 1) were detected for *Anguillospora longissima* (96.4 % and 76.4 % respectively), *Tetracladium marchalianum* (81.0 % and 64.9 %) and *Alatospora acuminata* (70.2 % and 56.0 %). These species often dominate the aquatic hyphomycete communities also by number of conidia produced and, apparently, play an important role in leaf litter decomposition in freshwater. On the other hand, 59 % of the species appear to be rare (FOS <5 %); to some extent that may be caused by lack of long-term observations in the region.

Tab. 1. List of aquatic hyphomycetes found in watercourses of Central Belarus with notes on colonized substrates, frequencies of occurrence of species (%) and maintained isolates

Aquatic hyphomycete	Substratum	FOW	FOS	MI
<i>Actinospora megalospora</i> Ingold	P,Q,FS	7.1	3.1	2
<i>Alatospora acuminata</i> Ingold	Al,Ac,B,P,Q,S,T,U,G, W,UO,FS	70.2	56.0	3
* <i>A. flagellata</i> (Gönczöl) Marvanová	FS	1.2	0.5	-
<i>A. pulchella</i> Marvanová	Al,S,G,W,FS	4.8	2.1	2
<i>Anguillospora crassa</i> Ingold	Al,W,FS	10.7	7.3	2
*? <i>A. cf. furtiva</i> J.Webster & Descals	Ac,FS	3.6	2.6	-
<i>A. longissima</i> (Sacc. & Syd.) Ingold	Al,Ac,B,F,P,Q,R,S,T, U,G,W,UO,FS	96.4	76.4	9
? <i>A. pseudolongissima</i> Ranzoni	Al,P,G,W	8.3	4.7	1
* <i>Anguillospora</i> sp. 1	Ac,G	2.4	1.0	4
* <i>Anguillospora</i> sp. 2	W	1.2	0.5	2
* <i>Arcispora bisagittaria</i> Marvanová & Bärlocher	FS	1.2	1.0	-
<i>Articulospora tetracladia</i> Ingold	Al,F,P,Q,T,G,UO,FS	9.5	6.3	6
<i>Camposporium pellucidum</i> (Grove) S.Hughes	W,UO	2.4	1.0	1
<i>Clavariopsis aquatica</i> de Wild.	Al,Ac,P,Q,S,T,U,G, W,FS	44.0	33.0	7
<i>Clavatospora longibrachiata</i> (Ingold) Marvanová & Sv.Nilsson	Al,Ac,P,Q,S,U,G,FS	26.2	19.9	3
* <i>Culicidospora gravis</i> R.H.Petersen	FS	1.2	0.5	-
<i>Cylindrocarpon</i> sp.	Al,S,T,W,UO	9.5	6.3	2
<i>Dimorphospora foliicola</i> Tubaki	Ac,W	2.4	1.0	2
<i>Filosporella cf. annelidica</i> (Shearer & J.L.Crane) J.L.Crane & Shearer	W	1.2	0.5	1
<i>F. exilis</i> Gulis & Marvanová	G,W,UO	3.6	2.1	8
<i>F. versimorpha</i> Marvanová et al.	G	8.3	3.7	4
<i>Flagellospora curvula</i> Ingold	Al,Ac,P,S,U,G,W,FS	42.9	27.7	3
* <i>Fusarium cavispermum</i> Corda	P,W,FS	11.9	8.4	6
<i>Heliscella stellata</i> (Ingold & V.J.Cox) Marvanová	Al,FS	8.3	6.3	2
<i>Heliscus lugdunensis</i> Sacc. & Théry	Al,Ac,P,S,U,W,UO,FS	25.0	17.8	5
* <i>Lateriramulosa uniuinflata</i> Matsush.	FS	1.2	1.0	-
* <i>Lemonniera cf. alabamensis</i> Sinclair & Morgan-Jones	Al,FS	4.8	2.6	-
<i>L. aquatica</i> de Wild.	Al,Ac,B,F,P,Q,S,T,G, UO,FS	39.3	36.1	6
<i>L. filiformis</i> Dyko	Al,B,S,G,W,FS	4.8	4.2	3
<i>L. terrestris</i> Tubaki	Al,P,Q,S,U,FS	10.7	5.2	3

Tab. 1 (Cont'd)

Aquatic hyphomycete	Substratum	FOW	FOS	MI
<i>Lunulospora curvula</i> Ingold	Al	1.2	0.5	2
<i>Margaritispora aquatica</i> Ingold	Al,Ac,G,FS	10.7	5.2	4
<i>Mycocentrospora acerina</i> (R.Hartig) Deighton	FS	2.4	1.0	-
<i>Porocladium aquaticum</i> Descals	G,FS	3.6	2.6	3
* <i>Sporidesmium</i> sp.	P,G,W,UO	17.9	10.5	9
* <i>Taeniolella</i> sp.	UO	1.2	0.5	2
<i>Tetracladium marchalianum</i> de Wild.	Al,Ac,B,F,P,Q,R,S,T, U,G,W,UO,FS	81.0	64.9	7
<i>Tetracladium maxilliforme</i> (Rostrup) Ingold	FS	1.2	0.5	-
<i>T. setigerum</i> (Grove) Ingold	Al,B,F,P,Q,S,T,G,W, UO,FS	29.8	16.8	3
* <i>Tricellula aquatica</i> J.Webster	FS	3.6	1.6	-
<i>Tricladium angulatum</i> Ingold	Al,Ac,B,F,P,Q,R,S,U, G,W,UO,FS	42.9	32.5	6
? <i>T. anomalum</i> Ingold	FS	1.2	0.5	-
* <i>T. castaneicola</i> B.Sutton	FS	1.2	0.5	-
? <i>T. gracile</i> Ingold	Al,FS	6.0	3.1	-
<i>T. splendens</i> Ingold	Al,S,W,UO,FS	7.1	5.2	2
* <i>Tricladium</i> sp.	G	4.8	1.6	4
<i>Triscelophorus monosporus</i> Ingold	Al,P,S,T,G,W,FS	10.7	7.3	3
* <i>Triscelophorus</i> sp.	FS	2.4	1.0	-
<i>Tumularia aquatica</i> (Ingold) Descals & Marvanová	FS	1.2	0.5	2
<i>Vargamyces aquaticus</i> (Dudka) Tóth	Al,P,Q,R,U,G,W, UO,FS	25.0	14.7	7
<i>Varicosporium delicatum</i> S.H.Iqbal	G,UO	1.2	0.5	4
<i>V. elodeae</i> W.Kegel	B,S,G,FS	4.8	3.1	3
<i>V. tricladiiforme</i> A.Roldán & Marvanová	G,FS	23.8	12.6	6
<i>Volucrispora graminea</i> Ingold, P.J.McDougall & Dann	Al,FS	4.8	2.1	1
Total	-	-	-	155

Al = *Alnus glutinosa* (L.) Gaertn.; Ac = *Acer* spp.; B = *Betula pendula* Roth; F = *Fraxinus excelsior* L.; P = *Populus* spp.; Q = *Quercus robur* L.; R = *Rhamnus cathartica* L.; S = *Salix* spp.; T = *Tilia cordata* L.; U = *Ulmus laevis* Pall.; G = grass blades; W = woody substrates; UO = unidentified or other substrates; FS = foam and/or scum.

FOW = frequency of occurrence in watercourses (84);

FOS = frequency of occurrence in pooled samples (191). Pooled sample consists of all substrates or foam/scum collected from a single locality at a particular time.

MI = number of maintained isolates.

* = new records for Belarus.

In Belarus watercourses aquatic hyphomycetes were commonly encountered on autumn-shed leaves of alder (*Alnus glutinosa*), poplar (*Populus* spp.) and willow (*Salix* spp.) — 26, 18 and 17 species, respectively. However, unexpectedly high species diversity was supported by grass blades and wood (25 and 23 species, respectively). Moreover, some rare species (*Filosporella* spp., *Anguillospora* sp. 1, *Porocladium aquaticum*, *Varicosporium delicatum*, *Tricladium* sp.) were found only on the above mentioned substrates. Some aquatic hyphomycetes were detected on substrates unusual for these fungi such as floating decaying leaves of *Nuphar lutea* (L.) Smith, *Potamogeton* spp., *Polygonum* sp., *Filipendula* sp., stems of *Equisetum* spp., needles of *Pinus sylvestris* L., onion scales, dead larvae of aquatic insects. Foam and scum which is a trap for aquatic organisms yielded the most diverse assemblage of aquatic hyphomycete conidia represented by 40 species.

Altogether 592 monoconidial isolates of aquatic hyphomycetes were obtained and studied. Of those 155 isolates (41 species) are maintained in the Culture Collection of the Department of Botany, Belarus State University and they are available on request. Some of the isolates according to Dr L.Marvanová (pers. comm.) cannot be assigned to any known species. Thus, they represent a valuable stock for future studies.

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