

MYXOZOA

Compiled by Egil Karlsbakk

Myxozoa are multicellular but microscopic parasites of vertebrates (mainly fishes, but some amphibian and chelonian hosts are known) and invertebrates (mainly annelids, and mainly oligochaeta). Known life cycles describe sporogony in a vertebrate host producing myxospores. These infect an oligochaete or polychaete in which a different type of sporogony produces actinospores. A deviating myxozoan group also produce spores in freshwater bryozoans.

The list is based on an unpublished list, compiled by E. Karlsbakk, based on literature search and the Aquatic Sciences and Fisheries Abstracts. Almost exclusively original species descriptions have been used as the basis for species information. The preliminary list was then checked against other lists or sources: Gurley (1894), Thélohan (1895), Labbé (1899), Auerbach (1910), Kudo (1920), Shulman (1962), Shulman (1966), Naidenova *et al.* (1975), Donetz and Shulman (1984), Lom and Dyková (1992) and others. A total of 230 species are listed as valid, in addition, some important synonyms are included. It is likely that the actual number of species is much higher, since many fish species have never been examined. Also, many old myxozoan species described from several unrelated hosts will likely turn out to be complexes of sibling species (e.g. *Myxidium oviforme*).

The classification used is based on Lom and Dyková (1992). However, it differs in that; (a) the recent genus *Polysporoplasma* Sitjá-Bobadilla & Alvarez-Pellitero, 1995 is placed in family Sphaerosporidae and seems closely related to *Sphaerospora* Thélohan, 1892, (b) Genus *Paramyxoproteus* Wierzbicka, 1986 is considered as a synonym of *Schulmania* Kovaleva, Zubchenko & Krasin, 1983, (c) *P. reinhardtii* Wierzbicka, 1986 is a synonym of *S. quadrilobata* Kovaleva, Zubchenko & Krasin, 1983. The valid binomen for *Sphaerospora caudata* Parisi, 1910 is considered to be *Hoferellus caudatus* (Parisi, 1910) (large polysporic plasmodia, spore shape, posterior filaments).

Hosts are listed as valid genus or family of type host, and then other families or simply "other fishes" when the hosts are many and unrelated. When type hosts were not designated in the original description, the first listed is considered the type-host. Only the geographic distribution in the ERMS area is considered. However, several of the myxozoan species in the area are recorded also from, for instance, Australia and New Zealand.

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PHYLUM MYXOZOA

Class Myxosporea

Order Bivalvulida

Suborder Sphaeromyxina

Family Sphaeromyxidae

- Sphaeromyxa*
- | | |
|---|-----|
| <i>atherinae</i> Karataev & Iskov, 1984 | M |
| <i>balbianii</i> Thélohan, 1892 | A M |
| <i>gasterostei</i> Georgévitch, 1916 | A |
| <i>hellandi</i> Auerbach, 1909 | A |
| <i>incurvata</i> Doflein, 1898 | M |
| <i>longa</i> Dunkerley, 1921 | A |
| <i>minuta</i> Polyanskii, 1955 | A |
| <i>ovata</i> Dunkerley, 1921 | A |
| <i>sabrazesi</i> Laveran & Mesnil, 1900 | A M |
| <i>sevastopoli</i> Naidenova, 1970 | M |

Suborder Variisporina

Family Myxidiidae

- Myxidium*
- | | |
|--|-----|
| <i>adriaticum</i> Lubat, Radujkovic, Marques & Bouix, 1989 | M |
| <i>benthophilii</i> Naidenova, 1970 | M |
| <i>bergense</i> Auerbach, 1909 | A |
| <i>cochleatum</i> Yurakhno, 1991 | M |
| <i>coryphaenoidium</i> Noble, 1966 | A |
| <i>depressum</i> Parisi, 1912 | M |
| <i>euzeti</i> Lubat, Radujkovic, Marques & Bouix, 1989 | M |
| <i>gadi</i> Georgévitch, 1916 | A M |
| <i>giganteum</i> Doflein, 1898 | M |
| <i>incurvatum</i> Thélohan, 1892 | A M |
| <i>inflatum</i> Auerbach, 1909 | A |
| <i>intermedium</i> Dunkerly, 1921 | A |
| <i>laticurvum</i> Kabata, 1962 | A |
| = <i>M. trachinorum</i> Canning, Curry, Anderson & Okamura, 1999 | |
| <i>leei</i> Diamant, Lom & Dykova, 1994 | M |
| <i>macrocapsulare</i> Auerbach, 1910 | A |
| <i>melanocetum</i> Noble, 1966 | A |
| <i>melanostigmum</i> Noble, 1966 | A |
| <i>melanostomi</i> Naidenova, 1970 | M |
| <i>obliquelineolatum</i> Gaevskaya & Kovaleva, 1984 | A |

<i>oviforme</i> Parisi, 1912	A M	<i>hepseti</i> Thélohan, 1895	M
<i>parvum</i> Yurakhno, 1991	M	<i>informis</i> Auerbach, 1910	A M
<i>procerum</i> Auerbach, 1909	A	= <i>Ceratomyxa informis</i> (Auerbach, 1910) of authors	
<i>profundum</i> Zubchenko & Krasin, 1981	A	<i>koyaljovae</i> Bakay & Grudnev, 1998	A
= <i>M. noblei</i> Zubchenko & Krasin, 1980		<i>longipes</i> Auerbach, 1910	A
<i>pulchrum</i> Yurakhno, 1991	M	<i>macroformis</i> Gaevskaya & Kovaleva, 1984	A
<i>scorpii</i> Shulman-Albova, 1950	A	<i>polymorpha</i> Labbé, 1899	M
<i>sphaericum</i> Thélohan, 1895	A M	= <i>L. elongata</i> Thélohan, 1895 part	
<i>virensi</i> Gaevskaya & Kovaleva, 1984	A	<i>quadritaenia</i> Kovaleva & Zubchenko, 1984	A
<i>Zschokkella</i>		<i>renicola</i> Thélohan, 1895	A M
<i>admiranda</i> Yurakhno, 1993	M	<i>scombri</i> Pogoreltzeva, 1964	M
<i>dogieli</i> Pogoreltzeva, 1964	M	<i>simplex</i> Kovaleva & Zubchenko, 1984	
<i>hildae</i> Auerbach, 1909	A	<i>vikrami</i> Tripathi, 1948	A
<i>icterica</i> Diamant & Paperma, 1992	M	<i>Ceratomyxa</i>	
<i>iskovi</i> Kovaleva, Donetz & Kolesnikova, 1989	M	<i>acanthuri</i> Kpatcha, Diebakate, Faye & Toguebaye, 1996	
<i>kudoï</i> Moser & Noble, 1977	A	<i>allantoidea</i> Gaevskaya & Kovaleva, 1984	A
<i>mugilis</i> Sitjá-Bobadilla & Alvarez-Pellitero, 1993	M	<i>anguillae</i> Tuzet & Ormieres, 1957	M
<i>nova</i> Klokacewa, 1914	A M	<i>appendiculata</i> Thélohan, 1892	A M
<i>rovignensis</i> Nemeček, 1922	M	<i>arcuata</i> Thélohan, 1892	A M
<i>russelli</i> Tripathi, 1948	A	<i>artedielli</i> Polyanskii, 1955	A
<i>sturionis</i> Tripathi, 1948	A	<i>auerbachii</i> Kabata, 1962	A
<i>Coccomyxa</i>		<i>beloneae</i> Lubat, Radujkovic, Marques & Bouix, 1989	M
<i>morovi</i> Léger & Hesse, 1907	A M	<i>chromis</i> Lubat, Radujkovic, Marques & Bouix, 1989	M
Family Ortholineidae		<i>coris</i> Georgévitch, 1916	M
<i>Ortholinea</i>		= <i>Leptothecca coris</i> Stempel, 1918	
<i>divergens</i> (Thélohan, 1895)	A M	= <i>Leptothecca macrospora</i> of Kalenscher, 1927	
= <i>Sphaerospora divergens</i> Thélohan, 1895		<i>diplodae</i> Lubat, Radujkovic, Marques & Bouix, 1989	A M
<i>gobiusi</i> Naidenova, 1968	M	<i>drepanopsettae</i> Averintzev, 1908	A
<i>orientalis</i> (Shulman & Shulman-Albova, 1953)	A	<i>dubia</i> Dunkerley, 1921	A
<i>sakinachanumae</i> Ibragimov, 1988		<i>elegans</i> Jameson, 1929	M
Family Sinuolineidae		<i>globulifera</i> Thélohan, 1895	M
<i>Sinuolinea</i>		<i>herouardi</i> Georgévitch, 1916	M
<i>cyclopterina</i> Bazikalova, 1932	A	<i>hopkinsi</i> Jameson, 1929	A
<i>murmanica</i> Bazikalova, 1932	A	<i>inaequalis</i> Doflein, 1898	M
<i>rebae</i> Tripathi, 1948	A M	<i>labracis</i> Sitjá-Bobadilla & Alvarez-Pellitero, 1993	A M
<i>schulmani</i> Gaevskaya & Kovaleva, 1979	A	<i>lata</i> Dunkerley, 1921	A
<i>schulmani</i> Karataev & Iskov, 1984	M	<i>linospora</i> Doflein, 1898	M
<i>sinuosa</i> Shulman, 1953	A	<i>longispina</i> Petruschewsk, 1932	A
<i>Davisia</i>		<i>macrospora</i> (Auerbach, 1909)	A
<i>amoena</i> Gaevskaya, Kovaleva & Umnova, 1980	A	= <i>Leptothecca macrospora</i> Auerbach, 1909	
= <i>D. longibrachia</i> of Kabata, 1962 part		<i>maenae</i> Georgévitch, 1929	M
<i>longibrachia</i> Kabata, 1962	A	<i>markewitchi</i> Iskov & Karataev, 1984	M
<i>newfoundlandia</i> Yoshino & Noble, 1973	A	<i>maxima</i> Gaevskaya & Kovaleva, 1980	
<i>ophidioni</i> Zaika, 1966	M	<i>merlangi</i> Zaika, 1966	M
<i>Myxoproteus</i>		<i>orientalis</i> (Dogiel, 1948)	A
<i>ambiguus</i> (Thélohan, 1895)	A M	<i>pallida</i> Thélohan, 1895	M
<i>caudatus</i> Shulman, 1953	A	<i>parva</i> (Thélohan, 1895)	A M
<i>elongatus</i> Shulman, 1953	A	<i>peculiaris</i> Yurakhno, 1991	M
<i>formosus</i> Kovaleva & Gaevskaya, 1979	A	<i>platichthys</i> (Fujita, 1923)	A
<i>irregularis</i> (Kabata, 1962)	A	<i>ramosa</i> Averintzev, 1908	A
= <i>Sphaerospora irregularis</i> Kabata, 1962		= <i>C. ramosa</i> Awerintzev, 1907 (<i>nomen nudum</i>)	
<i>meridionalis</i> Evdokimova, 1977	A	<i>reticulata</i> Thélohan, 1895	M
= <i>Conispora renalis</i> Sankurathri, 1977		<i>scorpaenarum</i> Labbé, 1899	M
= <i>M. meridionalis</i> of authors		<i>sparusaurati</i> Sitjá-Bobadilla, Palenzuela & Alvarez-Pellitero, 1995	A M
= <i>M. renalis</i> (Sankurathri, 1977)		<i>sphaerulosa</i> Thélohan, 1892	A M
<i>scoleciformis</i> Kovaleva & Gaevskaya, 1979	A	<i>tenuispora</i> Kabata, 1960	A
<i>Bipteria</i>		= <i>C. magna</i> Gaevskaya & Kovaleva, 1980	
<i>admiranda</i> Kovaleva, Zubchenko & Krasin, 1983		<i>trichiuri</i> Kpatcha, Diebakate, Faye & Toguebaye, 1996	
<i>Schulmania</i>		<i>truncata</i> Thélohan, 1895	A M
<i>aenigmatosa</i> Kovaleva, Zubchenko & Krasin, 1983		Family Sphaerosporidae	
<i>ovale</i> Kovaleva, Zubchenko & Krasin, 1983		<i>Sphaerospora</i>	
<i>quadriolobata</i> Kovaleva, Zubchenko & Krasin, 1983	A	<i>brevis</i> (Polyanskii, 1955)	A
= <i>Paramyxoproteus reinhardti</i> Wierzbicka, 1986		= <i>Leptothecca brevis</i> (Polyanskii, 1955)	
<i>Fabespora</i>		= <i>Myxoproteus brevis</i> Polyanskii, 1955	
<i>nana</i> Naidenova & Zaika, 1969	M	<i>caspiolosae</i> (Dogel, 1939)	M
Family Ceratomyxidae		<i>dicentrarchi</i> Sitjá-Bobadilla & Alvarez-Pellitero, 1992	A M
<i>Leptothecca</i>		<i>platessae</i> Woodcock, 1903	A
<i>adeli</i> Bakay & Grudnev, 1998	A	<i>rostrata</i> Thélohan, 1895	A M
<i>agilis</i> (Thélohan, 1892)	A M	<i>testicularis</i> Sitjá-Bobadilla & Alvarez-Pellitero, 1990	M
= <i>Ceratomyxa agilis</i> Thélohan, 1892		<i>Polysporoplasma</i>	
<i>chromis</i> Lubat, Radujkovic, Marques & Bouix, 1989	M	<i>mugilis</i> Sitjá-Bobadilla & Alvarez-Pellitero, 1995	M
<i>coelorrhyncha</i> Yoshino & Noble, 1973	A	<i>sparis</i> Sitjá-Bobadilla & Alvarez-Pellitero, 1995	A M
= <i>L. coelorrhynchus</i> of authors			
<i>elongata</i> Thélohan, 1895	A M		

<i>Hoferellus</i>		<i>improvisus</i> Izyumova in Shulman, 1966	M
<i>caudatus</i> (Parisi, 1910)	A M	<i>merlucii</i> (Perugia, 1891)	M
= <i>Mitraspora caudata</i> (Parisi, 1910)		<i>muelleri</i> Bütschli, 1882	A M
= <i>Sphaerospora caudata</i> Parisi, 1910		= <i>M. mülleri</i>	
<i>Myxobilatus</i>		<i>mugauratus</i> Landsberg & Lom, 1991	M
<i>convexum</i> Yurakhno, 1991	M	= <i>M. mugilis</i> Pogoreltseva, 1964	
<i>platessae</i> (Bazikalova, 1932)	A M	<i>mugchelo</i> Landsberg & Lom, 1991	M
<i>Palliatius</i>		= <i>M. mugilis</i> Parenzan, 1966	
<i>indecorus</i> Shulman, Kovaleva & Dubina, 1979	A	<i>mugilis</i> (Perugia, 1891)	M
<i>mirabilis</i> Shulman, Kovaleva & Dubina, 1979	A	<i>parenzani</i> Landsberg & Lom, 1991	M
Family Chloromyxidae		= <i>M. branchialis</i> Parenzan, 1966	
<i>Chloromyxum</i>		<i>parvus</i> Shulman, 1962	M
<i>dogieli</i> Kovaleva, 1988	A	<i>petruschewskii</i> Zhukov, 1964	A
<i>kotorensis</i> Lubat, Radujkovic, Marques & Bouix, 1989	M	<i>raibauti</i> Fall, Kpatcha, Diebakate, Faye & Toguebaye, 1997	
<i>leydigi</i> Mingazzini, 1890	A M	<i>spinacurvatura</i> Maeno, Sorimachi, Ogawa & Egusa, 1990	M
<i>osmanovi</i> Karataev, 1983	M	<i>Thelohanellus</i>	
<i>ovatum</i> Jameson, 1929	M	<i>pyriformis</i> (Thélohan, 1892)	
<i>partistriatus</i> Kovaleva, Donetz & Kolesnikova, 1989	M	<i>Heneguya</i>	
<i>psetti</i> Kovaleva, Donetz & Kolesnikova, 1989	M	<i>brachideuteri</i> Kpatcha, Faye, Diebakate, Fall & Toguebaye, 1997	
<i>schulmani</i> Kovaleva, 1988	A M	<i>kayarensis</i> Kpatcha, Faye, Diebakate, Fall & Toguebaye, 1997	
<i>striatellus</i> Kovaleva, 1988	A	<i>mbourensis</i> Kpatcha, Faye, Diebakate, Fall & Toguebaye, 1997	
<i>trachuri</i> Iskov & Karataev, 1984	M	<i>neapolitana</i> Parisi, 1912	M
Family Auerbaehiidae		<i>ouakamensis</i> Kpatcha, Faye, Diebakate, Fall & Toguebaye, 1997	
<i>Auerbachia</i>		<i>priacanthi</i> Kpatcha, Faye, Diebakate, Fall & Toguebaye, 1997	
<i>pulchra</i> Lom, Noble & Laird, 1975	A	<i>symphodae</i> Lubat, Radujkovic, Marques & Bouix, 1989	M
Family Alatasporidae		<i>yoffensis</i> Kpatcha, Faye, Diebakate, Fall & Toguebaye, 1997	
<i>Alataspora</i>		Order Multivalvulida	
<i>africana</i> Shulman, Kovaleva & Dubina, 1979	A	Family Trilosporidae	
<i>caproi</i> Gaevskaya & Kovaleva, 1984	A	<i>Trilospora</i>	
<i>contrariocapsularia</i> Shulman, Kovaleva & Dubina, 1979	A	<i>minuta</i> Kovaleva & Zubchenko, 1984	A
<i>lepidum</i> Gaevskaya & Kovaleva, 1979	A	<i>muscularis</i> Priebe, 1987	A
<i>serenum</i> Gaevskaya & Kovaleva, 1979	A	<i>Unicapsula</i>	
<i>solomoni</i> Yurakhno, 1988	M	<i>pfugfelderi</i> Schuberg, Sprague & Reinboth, 1975	M
<i>tetricum</i> Gaevskaya & Kovaleva, 1979	A	Family Kudoidae	
<i>Pseudalataspora</i>		<i>Kudoa</i>	
<i>berysi</i> Kovaleva & Gaevskaya, 1988	A	<i>camarguensis</i> Pampoulie, Marques, Crivelli & Bouchereau, 1999	A M
<i>pontica</i> Kovaleva, Donetz & Kolesnikova, 1989	M	<i>clupeidae</i> (Hahn, 1917)	A
<i>sebastei</i> Bakay & Grudnev, 1998	A	= <i>Chloromyxum clupeidae</i> Hahn, 1917	
<i>umbraculiformis</i> Gaevskaya & Kovaleva, 1984	A	= <i>Chloromyxum</i> sp. Auerbach, 1910	
Family Parvicapsulidae		<i>histolytica</i> (Pérard, 1928)	A
<i>Parvicapsula</i>		= <i>Chloromyxum histolyticum</i> Pérard, 1928	
<i>asymmetrica</i> Shulman, 1953	A	<i>insolita</i> Shulman & Kovaleva in Kovaleva, Shulman & Yakovlev, 1979	A
<i>schulmani</i> Kovaleva & Gaevskaya, 1981	A	<i>kabatai</i> Shulman & Kovaleva in Kovaleva, Shulman & Yakovlev, 1979	A
<i>unicornis</i> Kabata, 1962	A	<i>lunata</i> Lom, Dyková & Lhotákova, 1983	M
<i>Neoparvicapsula</i>		<i>nova</i> Naidenova, 1975	A M
<i>ovalis</i> Gaevskaya, Kovaleva & Shulman, 1982	A	= <i>K. quadratum</i> (Thélohan, 1895) of Naidenova, 1970	
Suborder Platysporina		<i>quadratum</i> (Thélohan, 1895)	A M
Family Myxobolidae		<i>stellula</i> Yurakhno, 1991	M
<i>Myxobolus</i>		<i>thyrsites</i> (Gilchrist, 1924)	A
<i>aeglefini</i> Auerbach, 1906	A		
= <i>M. esmarkii</i> Woodcock in Johnstone & Woodcock, 1906			
= <i>M. lairdi</i> Moser & Noble, 1977			
<i>asymmetricus</i> (Parisi, 1912)	M		
<i>bizerti</i> Bahri & Marques, 1996	M		
<i>branchialis</i> (Markewitsch, 1932)	A M		
= <i>Lentospora branchialis</i> Markewitsch, 1932			
= <i>Myxosoma branchialis</i> (Markewitsch, 1932)			
<i>episquamalis</i> Egusa, Maeno & Sorimachi, 1990	A M		
= <i>M. exiguus</i> Théloha, 1895 of Bahri & Marques, 1995			
= <i>M. sp.</i> Menezes, 1984			
= <i>M. sp.</i> Overstreet & Howse, 1977			
<i>exiguus</i> Thélohan, 1895	A M		
= <i>Myxosporidium mugilis</i> Perugia, 1891			
<i>gobii</i> Naidenova, 1975	M		
= <i>M. naidenovae</i> Shulman, 1984			
<i>goreensis</i> Fall, Kpatcha, Diebakate, Faye & Toguebaye, 1997			
<i>hamensis</i> Fall, Kpatcha, Diebakate, Faye & Toguebaye, 1997			
<i>ichkeulensis</i> Bahri & Marques, 1996	M		