

SUPPORTING INFORMATION

Rhizarian ‘Novel Clade 10’ Revealed as Abundant and Diverse Planktonic and Terrestrial Flagellates, including *Aquavolon* n. gen. by David Bass, Tikhonenkov DV, Foster R, Dyal P, Janouskovec J, Keeling PJ, Gardner M, Neuhauser S, Hartikainen H, Mylnikov AP, Berney C

Table S1. Aquavolonida sequences in GenBank.

Table S2. Sequences of the PCR primers used in this study.

Video S1. *Aquavolon dientrani* swimming. Video can be accessed at <https://yadi.sk/mail/?hash=jsf7XwEScPTOsgvjNRSf5UTcbJ9iAjh6mG6I4cGmALw%3D>

Supplementary Table 1. Aquavolonida sequences in GenBank.

Accession No	Clone	Length	Lineage	Sample locality and type	Reference
AY919680	LG01-12	1729	NC10-A1	Lake George, North-Eastern New York, USA: euphotic water column (oligotrophic) - summer 1996	Richards et al. (2005) <i>Env. Microbiol.</i> 7:1413-1425.
AY919754	LG21-01	1737	NC10-A1		
AY642739	A50	1298	NC10-A1	Lake Aydat, Massif Central, France: euphotic water column (eutrophic) - Aug 2002	Lefranc et al. (2005) <i>Appl. Environ. Microbiol.</i> 71:59;
DQ243999	PCB7AU2004	1803	NC10-A3	Lake Pavin, Massif Central, France: oxycline (suboxic) water column (oligomesotrophic) - Aug 2004	Lefèvre et al. (2007) <i>Env. Microbiol.</i> 9:61-71.
EF196690	BA74	834	NC10-A3	Lake Bourget, Alps, France: water column (mesotrophic) - May/Aug 2005	Lepère et al. (2008) <i>Appl. Environ. Microbiol.</i> 74:294
EF196697	BA272	814	NC10-A3		
EF196707	BA400	810	NC10-A3		
EF196716	B9	879	NC10-A2		
EF196754	B1105	807	NC10-A2		
EF196757	B1110	900	NC10-A1		
EF196759	B1113	821	NC10-A2		
EU143892	MLB90_167	800	NC10-A2	Meiliang Bay, Lake Taihu, China: water column (eutrophic, shallow, subtropical) - Nov 2006	Chen et al. (2008) <i>Microb. Ecol.</i> 56:572-583.
EU162632	PC12SP2005	1796	NC10-A1	Lake Pavin, Massif Central, France: oxic water column (oligomesotrophic) - May/Jun/Jul 2005	Lefèvre et al. (2008) <i>PLoS ONE</i> 3:e2324.
EU162633	PCASSP2005	1794	NC10-A1		
FJ349632	051011_TZS1_W_T_1065	1065	NC10-A2	Lake Pontchartrain, Louisiana, USA: water column - Oct 2005	Amaral-Zetterler et al. (2008) <i>Environ. Sci. Technol.</i> 42;
FJ353183	C7p3_ML_153	1066	NC10-A2		
FJ410720	EBM54_96	800	NC10-A2	East Bay, Lake Taihu, China: water column (oligotrophic, shallow, subtropical) - date unspecified	Chen (2008) unpublished
FJ410763	ESA83_28	800	NC10-A2		
EU567283	DB_2703_3	1121	NC10-A1	unspecified: shallow anaerobic sediment - date unspecified	Bass et al. (2009) <i>Protist</i> 160:75-109.
EU567284	DB_2703_4	1053	NC10-A2		
GU067900	ESS270706.007	793	NC10-A2	Lake Esch-sur-Sure, Luxembourg: water column (meso-eutrophic) - Jul 2006	Masquelier et al. (2010) unpublished
GU067902	ESS270706.009	777	NC10-A2		
GU067903	ESS270706.010	845	NC10-A2		
GU067911	ESS270706.018	791	NC10-A2		
GU067921	ESS270706.028	1795	NC10-A2		
GU067929	ESS270706.036	866	NC10-A2		
GU067956	ESS270706.063	867	NC10-A2		
GU067966	ESS270706.073	790	NC10-A2		
GU067974	ESS270706.081	784	NC10-A2		
GU067979	ESS270706.086	830	NC10-A2		
GU067980	ESS270706.087	788	NC10-A2		
GU067986	ESS270706.093	835	NC10-A2		
HQ219347	AY2009C14	2567 (1775)	NC10-A3	Lake Aydat, Massif Central, France: euphotic water column (eutrophic) - Jul 2008	Monchy et al. (2011) <i>Env. Microbiol.</i> 13:1433-1453.
AB622281	K4JUN2009	1672	NC10-A1	Lake Kusaki, Gunma, Japan: water column - Jun/Jul/Aug 2009 - May 2010	Fujimoto et al. (2011) unpublished
AB622282	K5JUN2009	1686	NC10-A2		
AB622285	K1JUL2009	1707	NC10-A2		
AB622286	K2JUL2009	1686	NC10-A2		
AB622288	K4JUL2009	1694	NC10-A1		
AB622289	K5JUL2009	1688	NC10-A1		
AB622294	K1AUG2009	1672	NC10-A1		
AB622301	K8AUG2009	1708	NC10-A2		
AB622334	K3MAY2010	1716	NC10-A2		
AB622335	K4MAY2010	1686	NC10-A1		
JN207857	FP989	865	NC10-A2	Fresh Pond, McMurdo Ice Shelf, Antarctica: freshwater microbial mat - Jan 2005	Jungblut et al. (2012) <i>FEMS Microbiol. Ecol.</i> 82:416
HE655134	PC09_H3_BG_r_2	931	NC10-A1	Lake Bassa Granotes, Central Pyrenees, Spain: lake plankton - Jul 2008	Triadó-Margarit & Casamayor (2012) <i>Env. Microbiol.</i>
HE655237	PC09_B8_Lie_2	807	NC10-A3	Lake Liebreta, Central Pyrenees, Spain: lake plankton - Jul 2008	
HE655261	PC10_D9_Lie_5	808	NC10-A3		
HE655270	PC10_G11_Lie_1	929	NC10-A3		
HE655275	PC10_H1_Lie_1	806	NC10-A3		
HE655276	PC10_H10_Lie_2	794	NC10-A3		
HE655342	PC11_B5_MdA_4	810	NC10-A3	Lake Muntanyó d'Àrreu, Central Pyrenees, Spain: lake plankton - Jul 2008	
HE655347	PC11_F2_MdA_1	809	NC10-A3		
HE655359	PC04_D3_Pla_1	933	NC10-A1	Lake Plan, Central Pyrenees, Spain: lake plankton - Jul 2008	
JF730776	Ch842mE7	1705	NC10-A2	Char Lake, Canada: Arctic lake water column - Aug 2008	Charvet et al. (2012) <i>Polar Biol.</i> 35:733-748.
AB721017	DW4_2010	1677	NC10-A1	Kiryu, Gunma, Japan: Motojuku water purification plant - 2010/2011	Fujimoto et al. (2012) unpublished
AB721019	DW6_2010	1691	NC10-A2		
AB721026	RW2_2010	1682	NC10-A1		
AB721028	RW4_2010	1684	NC10-A2		
AB721039	RW15_2010	1702	NC10-A2		
AB721040	RW16_2010	1677	NC10-A2		
AB721071	DW2_2011	1700	NC10-A2		
AB721073	RW1_2011	1700	NC10-A2		
AB721075	RW3_2011	1694	NC10-A2		
AB771803	K6JUN2010	1684	NC10-A2	Lake Kusaki, Gunma, Japan: water column - Jun/Aug/Oct/Nov/Dec 2010 - Jan 2012	Fujimoto et al. (2012) unpublished
AB771806	K9JUN2010	1673	NC10-A1		
AB771807	K10JUN2010	1674	NC10-A1		
AB771817	K2AUG2010	1686	NC10-A2		
AB771825	K10AUG2010	1678	NC10-A1		
AB771830	K3OCT2010	1688	NC10-A2		
AB771831	K4OCT2010	1684	NC10-A1		
AB771834	K7OCT2010	1676	NC10-A2		
AB771836	K9OCT2010	1682	NC10-A1		
AB771845	K8NOV2010	1680	NC10-A1		
AB771848	K11NOV2010	1677	NC10-A1		
AB771849	K12NOV2010	1685	NC10-A1		
AB771863	K14DEC2010	1678	NC10-A1		
AB771903	K10JAN2012	1674	NC10-A1		
JN547284	BR2-5	1588	NC10-A1	Lake Baikal, Russia: water column - date unspecified	Lepère et al. (2012) unpublished
KC306544	BT_Euk_C4	1199	NC10-A3	Hainich National Forest, Germany: groundwater from karstified limestone aquifer - Jun 2010	Risse-Buhl et al. (2013) <i>J. Eukaryot. Microbiol.</i> 60:4
AB996630	O5	894	NC10-A1	Lake Biwa, Shiga, Japan: lake hypolimnion - date unspecified	Mukerjee et al. (2014) unpublished

Supplementary Table S2. Sequences of the PCR primers used in this study.

Primer name	Primer sequence	Sense	Position^a	Specificity	PCR strategy^b
V2f-NC	CGR RGC YAG RTC ATT CAA ATT TCT G	forward	246-270	all NC10	2
V4f-nc10	GCA GGC TTA TTG CTG TGA ATA C	forward	749-770	core NC10	F
C5f-NC	GGC CAG AGG TGA AAT TCT ATG	forward	871-891	all NC10	2
C6r-nc10	GCT CCA CTT CTT GGG TGC	reverse	1129-1147	core NC10	F
s1259F	AGG ATT GWC AGR TTG MAG HTC	forward	1201-1221	all Cercozoa	E
C7f-NC10	GAT TGA TCT GTC TGG TTA ATT CCG A	forward	1268-1292	core NC10	1
C7r-nc10	ATC GGA ATT AAC CAG ACA GAT CAA	reverse	1270-1293	core NC10	F
V8r-NC	GGT TRT AWR CTC GCT GAW HGC AAC	reverse	1451-1474	all NC10	2
V8f-NC10	GTT GCG ATC ARC GAG YWT ACA ACC T	forward	1451-1475	core NC10	1
C9r-NC	CGT ART CAA TGC AYG CTG ATG ACR	reverse	1571-1594	all NC10	2
EndoR1	CGA CTT CTC CTT CCT CTA ARY RDT AWG	reverse	1710-1736	anti-Filosa	1 and E
sB2n	CCT ACG GHD ACC TTG TTA CGA CTT CTC	reverse	1728-1754	anti-Filosa	1 and E

^a Position given using NC10 environmental clone AY2009C14 (accession number HQ219347) as a reference.

^b 1 = primers used to explore core ("planktonic") NC10 diversity; 2 = primers used to explore the whole NC10 diversity; E = primers used to generate Endomyxa-enriched clone libraries; F = primers matching the FISH probes designed to target part of core NC10.