

**TABLE S3.** List of the RBCS sequences used in phylogenetic analysis. Accession numbers for GenBank entries and contig ids for MMETSP\* are listed.

	ORGANISM	SOURCE (Database)	ACCESSION NUMBER/CONTIG	
Euglenozoa	<i>Euglena longa</i>	GenBank	KT818574	
	<i>Euglena gracilis</i>	GenBank	132143	
	<i>Eutreptiella gymnastica</i> CCMP1594	MMETSP	CAMNT_0046443149	
	<i>Eutreptiella gymnastica</i> NIES-381	MMETSP	CAMNT_0000678951	
Chloroplastida	<i>Chlamydomonas reinhardtii</i>	GenBank	XP_001702409	
	<i>Arabidopsis thaliana</i> 1B	GenBank	NP_198659	
	<i>Arabidopsis thaliana</i> 2B	GenBank	NP_198658	
	<i>Arabidopsis thaliana</i> 3B	GenBank	NP_001119331	
	<i>Oryza sativa</i>	GenBank	AAR19268	
	<i>Ostreococcus tauri</i>	GenBank	XP_003084235	
	<i>Osterococcus lucimarinus</i>	GenBank	XP_001422165	
	<i>Glycine max</i>	GenBank	AF303939	
	<i>Medicago truncatula</i>	GenBank	KEH21539	
	<i>Micromonas pusilla</i>	GenBank	XP_003064624	
	<i>Zea mays</i>	GenBank	CAA70416	
	<i>Vitis vinifera</i>	GenBank	XP_002276967	
	<i>Selaginella moellendorffii</i>	GenBank	XP_002991566	
	<i>Volvox carteri</i>	GenBank	XP_002955679	
	<i>Physcomitrella patens</i>	GenBank	BAC87878	
	<i>Pyramimonas amyliifera</i>	MMETSP	CAMNT_0041894263	
	<i>Pyramimonas obovata</i>	MMETSP	CAMNT_0006872053	
	<i>Pyramimonas parkeae</i>	MMETSP	CAMNT_0035469105	
	<i>Chlamydomonas moewusii</i>	GenBank	P17537	
	<i>Dunaliella salina</i>	GenBank	AAU93597	
	<i>Haematococcus pluvialis</i>	GenBank	ABB17556	
	<i>Chloromonas</i> sp.	GenBank	AAD00448	
	<i>Bathycoccus prasinos</i>	GenBank	XP_007511178	
	<i>Coccomyxa subellipsoidea</i>	GenBank	XP_005648578	
	<i>Auxenochlorella protothecoides</i>	GenBank	KFM22871	
	Glaucophyta	<i>Cyanophora paradoxa</i>	GenBank	NP_043239
		<i>Cyanoptyche gloeocystis</i>	MMETSP	CAMNT_0041991067
	Cyanobacteria	<i>Synechococcus</i> sp. JA-3-3Ab	GenBank	YP_474645
		<i>Gloeobacter violaceus</i>	GenBank	NP_925104
		<i>Anabaena variabilis</i>	GenBank	YP_324405
		<i>Acaryochloris marina</i>	GenBank	YP_001516118
		<i>Cyanothece</i> sp. PCC 7425	GenBank	WP_012628805
	Chlorarachniophyta	<i>Amorphochlora amoebiformis</i> 1	GenBank	ABW97363
<i>Amorphochlora amoebiformis</i> 2		GenBank	ABW97364	
<i>Amorphochlora amoebiformis</i> 3		GenBank	ABW97365	
<i>Bigelowiella natans</i> 1		GenBank	AAP79188	
<i>Bigelowiella natans</i> 2		GenBank	AAP79189	
<i>Gymnochlora stellata</i>		GenBank	ACF24549	

\*MMETSP - Marine Microbial Eukaryote Transcriptome Sequencing Project (<http://marinemicroeukaryotes.org/>)