

**S1 Table. Homomeric ACCase sequence details.** Species names, taxonomy, protein identification, size, identification numbers and sources of sequences used for the phylogenetic analysis of homomeric ACCase.

Species	Taxonomy	Protein	Size	Identification	Source
<i>Toxoplasma gondii</i>	Apicomplexa	ACC1	2564	AAF04493	NCBI
<i>Toxoplasma gondii</i>	Apicomplexa	ACC2	1102	AAF04494	NCBI
<i>Toxoplasma gondii</i> (GT1)	Apicomplexa	ACCcase	2252	EEE20751	NCBI
<i>Toxoplasma gondii</i> (ME49)	Apicomplexa	ACC1	2599	XP_002369961	NCBI
<i>Toxoplasma gondii</i> (ME49)	Apicomplexa	ACC2	3399	XP_002370640	NCBI
<i>Toxoplasma gondii</i> (VEG)	Apicomplexa	ACC1	2612	EEE30125	NCBI
<i>Toxoplasma gondii</i> (VEG)	Apicomplexa	ACC2	3373	EEE28725	NCBI
<i>Cyclotella cryptica</i>	Bacillariophyceae	ACCcase	2089	AAA81471	NCBI
<i>Fragilariopsis cylindrus</i> (CCMP1102)	Bacillariophyceae	ACCcase	2045	274583	JGI
<i>Fragilariopsis cylindrus</i> (CCMP1102)	Bacillariophyceae	ACCcase	2302	145710	JGI
<i>Phaeodactylum tricorutum</i>	Bacillariophyceae	ACCcase	2093	54926	JGI
<i>Phaeodactylum tricorutum</i>	Bacillariophyceae	ACCcase	2283	55209	JGI
<i>Thalassiosira pseudonana</i>	Bacillariophyceae	ACCcase	2089	6770	JGI
<i>Thalassiosira pseudonana</i>	Bacillariophyceae	ACCcase	2251	12234	JGI
<i>Arabidopsis thaliana</i>	Brassicaceae	ACC1	2254	NP_174849	NCBI
<i>Arabidopsis thaliana</i>	Brassicaceae	ACC2	2356	NP_174850	NCBI
<i>Physcomitrella patens patens</i>	Bryophyte	ACCcase	2238	EDQ80874	NCBI
<i>Physcomitrella patens patens</i>	Bryophyte	ACCcase	2249	EDQ62113	NCBI
<i>Bigeloviella natans</i>	Chlorarachniophyta	ACC1	2031	92488	JGI
<i>Bigeloviella natans</i>	Chlorarachniophyta	ACC2	2053	18464	JGI
<i>Bathycoccus prasinos</i>	Chlorophyta	ACCcase	2120	CCO17834	NCBI
<i>Bathycoccus prasinos</i>	Chlorophyta	ACCcase	2177	CCO18633	NCBI
<i>Chlorella</i> sp. (NC64A)	Chlorophyta	ACCcase	1868	56737	JGI
<i>Micromonas pusilla</i> (CCMP1545)	Chlorophyta	ACCcase	2146	31755	JGI
<i>Micromonas pusilla</i> (CCMP1545)	Chlorophyta	ACCcase	2094	16401	JGI
<i>Micromonas</i> sp. (RCC2999)	Chlorophyta	ACCcase	2140	113382	JGI
<i>Micromonas</i> sp. (RCC2999)	Chlorophyta	ACCcase	2190	104872	JGI
<i>Ostreococcus lucimarinus</i>	Chlorophyta	ACCcase	2013	44400	JGI
<i>Ostreococcus lucimarinus</i>	Chlorophyta	ACCcase	1994	11	JGI
<i>Ostreococcus</i> sp. (RCC809)	Chlorophyta	ACCcase	2014	61393	JGI
<i>Ostreococcus</i> sp. (RCC809)	Chlorophyta	ACCcase	2060	36970	JGI
<i>Ostreococcus tauri</i>	Chlorophyta	ACCcase	2123	CAL50235	NCBI
<i>Ostreococcus tauri</i>	Chlorophyta	ACCcase	1983	CAL56314	NCBI
<i>Volvox carteri</i> f. <i>nagariensis</i>	Chlorophyta	ACCcase	2462	106840	JGI
<i>Chromera velia</i>	Chromerida	ACC1	2082	KF673098	Present study
<i>Chromera velia</i>	Chromerida	ACC2	-	KF673095-7	Present study
<i>Guillardia theta</i>	Cryptophyta	ACC1	2055	68771	JGI
<i>Guillardia theta</i>	Cryptophyta	ACC2	2171	72035	JGI
<i>Nannochloropsis gaditana</i>	Eustigmatophyceae	ACC1	2139	AFJ69228	NCBI
<i>Nannochloropsis oculata</i>	Eustigmatophyceae	ACC1	2,317	KF673100	Present study
<i>Nannochloropsis oculata</i>	Eustigmatophyceae	ACC2	2,362	KF673101	Present study
<i>Emiliana huxleyi</i> (1516)	Haptophyta	ACCcase	1577	455280	JGI
<i>Emiliana huxleyi</i> (1516)	Haptophyta	ACCcase	2013	449545	JGI
<i>Isochrysis</i> aff. <i>galbana</i> (TISO)	Haptophyta	ACC1	2134	KF673099	Present study
<i>Phytophthora infestans</i> (T30-4)	Heterokontophyta	ACC	2326	EEY68805	NCBI
<i>Phytophthora sojae</i>	Heterokontophyta	ACC	2310	EGZ09435	NCBI
<i>Aureococcus anophagefferens</i> (1984)	Pelagophyceae	ACCcase	1809	38836	JGI
<i>Aureococcus anophagefferens</i> (1984)	Pelagophyceae	ACCcase	2153	65524	JGI
<i>Ectocarpus siliculosus</i>	Phaeophyta	ACCcase	1848	Esi0198_0003	BOGAS
<i>Ectocarpus siliculosus</i>	Phaeophyta	ACCcase	799	Esi0592_0001	BOGAS

<b>Species</b>	<b>Taxonomy</b>	<b>Protein</b>	<b>Size</b>	<b>Identification</b>	<b>Source</b>
<i>Ectocarpus siliculosus</i>	Phaeophyta	ACCase	1049	Esi0367_0023	BOGAS
<i>Ectocarpus siliculosus</i>	Phaeophyta	ACCase	166	Esi0403_0027	BOGAS
<i>Aegilops tauschii</i>	Poaceae	ACC2	2258	ACD46664	NCBI
<i>Aegilops tauschii</i>	Poaceae	ACC1	2311	ACD46679	NCBI
<i>Triticum urartu</i>	Poaceae	ACC2	2260	ACD46670	NCBI
<i>Triticum urartu</i>	Poaceae	ACC1	2311	ACD46677	NCBI
<i>Cyanidioschyzon merolae</i>	Rhodophyta	ACCase	2719	CMM188C	CMGP
<i>Galdieria sulphuraria</i>	Rhodophyta	ACC2	2482	EME32530	NCBI

**Supplemental table 2  $\beta$ -carboxyltransferase subunit of heteromeric ACCase** Species names, taxonomy, protein identification, size, identification numbers and sources of sequences used for the phylogenetic analysis of the  $\beta$ -carboxyltransferase subunit of heteromeric ACCase.

Species	Taxonomy	Protein	Size	Identification	Source
<i>Escherichia coli</i> (K12)	Bacteria	$\beta$ -CT	304	P0A9Q5	NCBI
<i>Arabidopsis thaliana</i>	Brassicaceae	$\beta$ -CT	488	P56765	NCBI
<i>Auxenochlorella protothecoides</i>	Chlorophyta	$\beta$ -CT	388	AEU08409	NCBI
<i>Bryopsis hypnoides</i>	Chlorophyta	$\beta$ -CT	353	ACX33787	NCBI
<i>Chara vulgaris</i>	Chlorophyta	$\beta$ -CT	293	ABA61965	NCBI
<i>Chlorococcum humicola</i>	Chlorophyta	$\beta$ -CT	337	ADZ15145.1	NCBI
<i>Chlamydomonas reinhardtii</i>	Chlorophyta	$\beta$ -CT	369	133238	JGI
<i>Chlorella variabilis</i>	Chlorophyta	$\beta$ -CT	388	ADZ04992	NCBI
<i>Chlorella vulgaris</i>	Chlorophyta	$\beta$ -CT	411	BAA57908	NCBI
<i>Coccomyxa subellipsoidea</i> (C-169)	Chlorophyta	$\beta$ -CT	628	ADV29875	NCBI
<i>Dunaliella salina</i>	Chlorophyta	$\beta$ -CT	349	ABO33321	NCBI
<i>Helicosporidium</i> sp.	Chlorophyta	$\beta$ -CT	471	ABD33968	NCBI
<i>Leptosira terrestris</i>	Chlorophyta	$\beta$ -CT	599	ABO69279	NCBI
<i>Nephroselmis olivacea</i>	Chlorophyta	$\beta$ -CT	627	AF137379_28	NCBI
<i>Oltmannsiellopsis viridis</i>	Chlorophyta	$\beta$ -CT	342	ABB81983	NCBI
<i>Oocystis solitaria</i>	Chlorophyta	$\beta$ -CT	411	ACQ90742	NCBI
<i>Parachlorella kessleri</i>	Chlorophyta	$\beta$ -CT	441	ACQ90907	NCBI
<i>Pedinomonas minor</i>	Chlorophyta	$\beta$ -CT	381	ACQ90825	NCBI
<i>Pseudendoclonium akinetum</i>	Chlorophyta	$\beta$ -CT	312	AAV80676	NCBI
<i>Trebouxia aggregata</i>	Chlorophyta	$\beta$ -CT	515	ABX82657	NCBI
<i>Trebouxiophyceae</i> sp.	Chlorophyta	$\beta$ -CT	622	AFQ93852	NCBI
<i>Volvox carteri</i> f. <i>nagariensis</i>	Chlorophyta	$\beta$ -CT	478	82311	JGI
<i>Anabaena variabilis</i> (ATCC 29413)	Cyanobacteria	$\beta$ -CT	316	YP_320706	NCBI
<i>Microcystis aeruginosa</i> NIES-843	Cyanobacteria	$\beta$ -CT	316	BAG05575	NCBI
<i>Nostoc azollae</i> (0708)	Cyanobacteria	$\beta$ -CT	317	ZP_03766652	NCBI
<i>Huperzia lucidula</i>	Lycopodiophyta	$\beta$ -CT	316	AAT80716	NCBI
<i>Paulinella chromatophora</i>	Rhizaria	$\beta$ -CT	288	ACB42560	NCBI
<i>Cyanidium caldarium</i>	Rhodophyta	$\beta$ -CT	267	Q9TLW3	NCBI
<i>Cyanidioschyzon merolae</i>	Rhodophyta	$\beta$ -CT	273	CMV207C	CMGP
<i>Galdieria sulphuraria</i>	Rhodophyta	$\beta$ -CT	549	EME28527	NCBI
<i>Gracilaria tenuistipitata</i> var. <i>liui</i>	Rhodophyta	$\beta$ -CT	293	AAT79592	NCBI
<i>Porphyra purpurea</i>	Rhodophyta	$\beta$ -CT	288	P51198	NCBI
<i>Porphyra umbilicalis</i>	Rhodophyta	$\beta$ -CT	288	AFC39868	NCBI
<i>Porphyra yezoensis</i>	Rhodophyta	$\beta$ -CT	288	Q1XDT9	NCBI
<i>Chaetosphaeridium globosum</i>	Streptophyta	$\beta$ -CT	297	AAM96498	NCBI
<i>Chlorokybus atmophyticus</i>	Streptophyta	$\beta$ -CT	296	ABM87949	NCBI
<i>Staurastrum punctulatum</i>	Streptophyta	$\beta$ -CT	307	AAX45681	NCBI
<i>Zygnema circumcarinatum</i>	Streptophyta	$\beta$ -CT	297	AAX45794	NCBI