Organelle inheritance and genome architecture variation in isogamous and anisogamous brown algae

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DISCOSPORANGIOPHYCIDAE ISHIGEOPHYCIDAE

DICTYOTOPHYCIDAE

FUCOPHYCIDAE

Isogamous taxa

Anisogamous taxa

Oogamous taxa



Asterisk(*): Unknown



Fig. S1. Classification of four subclasses of Phaeophyceae and the type of fertilization at the order level. (BACR: Brown algal crown radiation)



Fig. S2. Circular maps of the plastid genomes of four Ectocarpales species.



maturases
other genes
ORFs
transfer RNAs
ribosomal RNAs
origin of replication
introns
polycistronic transcripts

Fig. S3. Circular maps of the mitochondrial genomes of two Ectocarpales species.



Fig. S4. Co-linear alignment and phylogeny-based clustering of mtDNAs of 32 brown algal species

	Scytosiphon canaliculatus	Scytosiphon promiscuus (ð)	<i>Scytosiphon</i> promiscuus (२)	Petalonia binghamiae	Ectocarpus siliculosus (ð)	Cladosiphon okamuranus ¹
NGS Platform	Ion PGM	Ion PGM	Ion PGM	Ion PGM	Ion PGM	Illumina
No. reads	4,066,433	4,511,276	7,604,996	4,232,288	7,659,092	46,686,028
Total length (Mb)	1,137	1,375	2,781	1,028	2,752	13,916
N50 contig (bp) ²	2,478	4,860	1,829	3,533	8,679	21,705
Average coverage	193.5	371.2	494.8	470.9	159.9	99.4
Reference	This study	This study	This study	This study	This study	Nishitsuji et al. and this study

Table. S1. Plastid genome sequncing statistics

¹The whole genome sequencing of *Cladosiphon okamuranus* was conducted in Nishitsuji et al. (2016).

²The N50 value was calculated from the merged all assemblies

Table S2. Protein coding gene contents of plastid genomes used in the phylogenomic analysis. Presence of genes are indicated as filled boxes in each species (Duplicated genes are filled darker). Genes are categorized by their functions. Unidentified open reading frames (orf) are excluded. A 137 core genes are written in red.

								Phae	eoph	yceae)					
				Fuc	cales		La	minar	iales		Di	ctyota				
										<u> </u>						
Functional Categories	Protein Coding Gene	Count	Coccophora. langsdorfi	Sargassum. horneri	Sargassum.thunbergii	Fucus.vesiculosus	Costaria. costata	Saccharina.japonica	Undaria. pinnatifida	Pleurocladia.lacustris	Ectocarpus. siliculosus	Nadosiphon. okamuranu:	cytosiphon.canaliculatu	Scytosiphon.lomentaria	Petalonia. binghamiae	Dictyopteris. divaricata
Transprintion	abbV	14										O	N N			
Transcription	cbbX rbcB	14	-													
	rpoA	14														
	rpoB	14														
	rpoC1	14														
	rpoC2	14														
Translation		14														
Translation	syfB	14														
Ribosomal	rpl1	14														
proteins large	rpl2	14														
subunit	rpl3	14														
	rpl4	14														
	rpl6	14														
	rpl9	14														
	rpl11	14														
	rpl12	14														
	rp113	14														
	rpl16	14														
	rpl18	14														
	rpl19	14														
	rpl20	14	-													
	rpl21	14	rpl21													
	rpl23	14														
	rpl24	14														
	rpl27	14														
	rpl29	14														
	rpl31	14	-							-		mi32				-
	rpl33	14										19202				
	rpl34	14														
	rpl35	14														
	rpl36	14	-													
Ribosomal proteins small	rps1	14														
subunit	rps3	14														
	rps4	14														
	rps5	14														
	rps7	14	-													
	rps8	14														
	rps10	14														
	rps11	14														
	rps12	14														
	rps13	14														
	rps16	14														
	rps17	14														
	rps18	14														
	rps19	14														
Francis	rps20	14	-													
Metabolism-ATP	atpA	14														
synthase	atpD	14														
	atpE	14														
	atpF	14														
	atpG atpH	14														
	atpl	14														
Photosynthesis-	psaA	14														
Photosystem I	psaB	14														
	psaC	14														
	psaD	14														
	psaE psaF	14														
	psal	14														
	psaJ	14														
	psaL	14														
	psaM	14														

Table S2. continued

			Phaeophyceae													
				Fuc	ales		Lai	minari	ales			Ector	carpal	es	Di	ctyota
Functional Categories	Protein Coding Gene	Count	Coccophora.langsdorfii	Sargassum.horneri	Sargassum.thunbergii	Fucus.vesiculosus	Costaria. costata	Saccharina. japonica	Undaria. pinnatifida	Pleurocladia.lacustris	Ectocarpus. siliculosus	Cladosiphon.okamuranus	Scytosiphon.canaliculatus	Scytosiphon.lomentaria	Petalonia.binghamiae	Dictyopteris. divaricata
Photosystem II	psbA	14														
	psbB	14														
	psbC	14														
	psbD	14														
	psbE	14														
	psbF	14														
	psbH	14														
		14														
	psbK	14														
	psbL	14														
	psbN	14														
	psbT	14														
	psbV	14														
	psbW	14														
		14														
Cvtochrome	petA	14														
complex	petB	14														
	petD	14														
	petF	14														
	petG	14														
	petJ	14														
	petM	14														
	petN	14														
	ccs1	14														
	ccsA	14														
<i>l</i> letabolism	chll	14														
	chIB	14														
	chIL	14														
	rbcL	14														
	rbcS	14														
	thiG	14														
	thiS (ycf40)	14														
Cellular process	clpC	14														
	dna8 dnaK	14														
	drian ftsH	14														
	aroEL	14														
	secA	14														
	secG (ycf47)	14														
	secY	14														
	sufB (ycf24)	14														
	sutC (yct16)	14														
	acsF	14														
	ftrB	14														
	ilvB	14														
	ilvH	14														
Conserved	ycf3	14														
proteins	ycf4	14														
	ycf12	14														
	ycf10	10														
	vcf33	14														
	ycf34	14														
	ycf35	14														
	ycf37	14														
	ycf39	14														
	ycf41	14														
	ycf42	14														
	yc14b	14														
	ycf65	14														
	ycf66	14														
	Escp124_like	14														
	Escp152_like	14														
otal	72		139	139	139	139	139	139	139	141	144	144	143	143	144	139