

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

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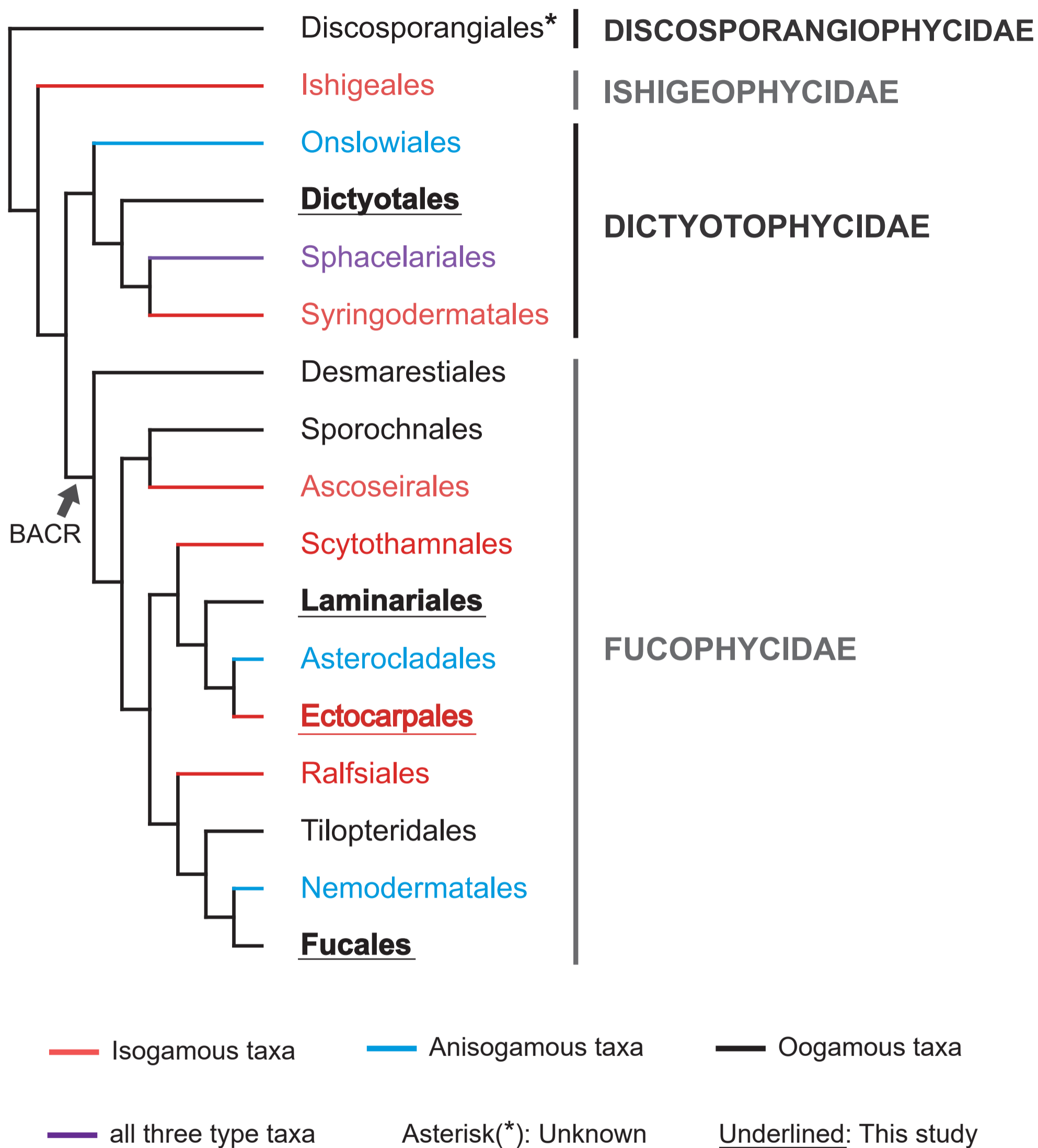


Fig. S1. Classification of four subclasses of Phaeophyceae and the type of fertilization at the order level. (BACR: Brown algal crown radiation)

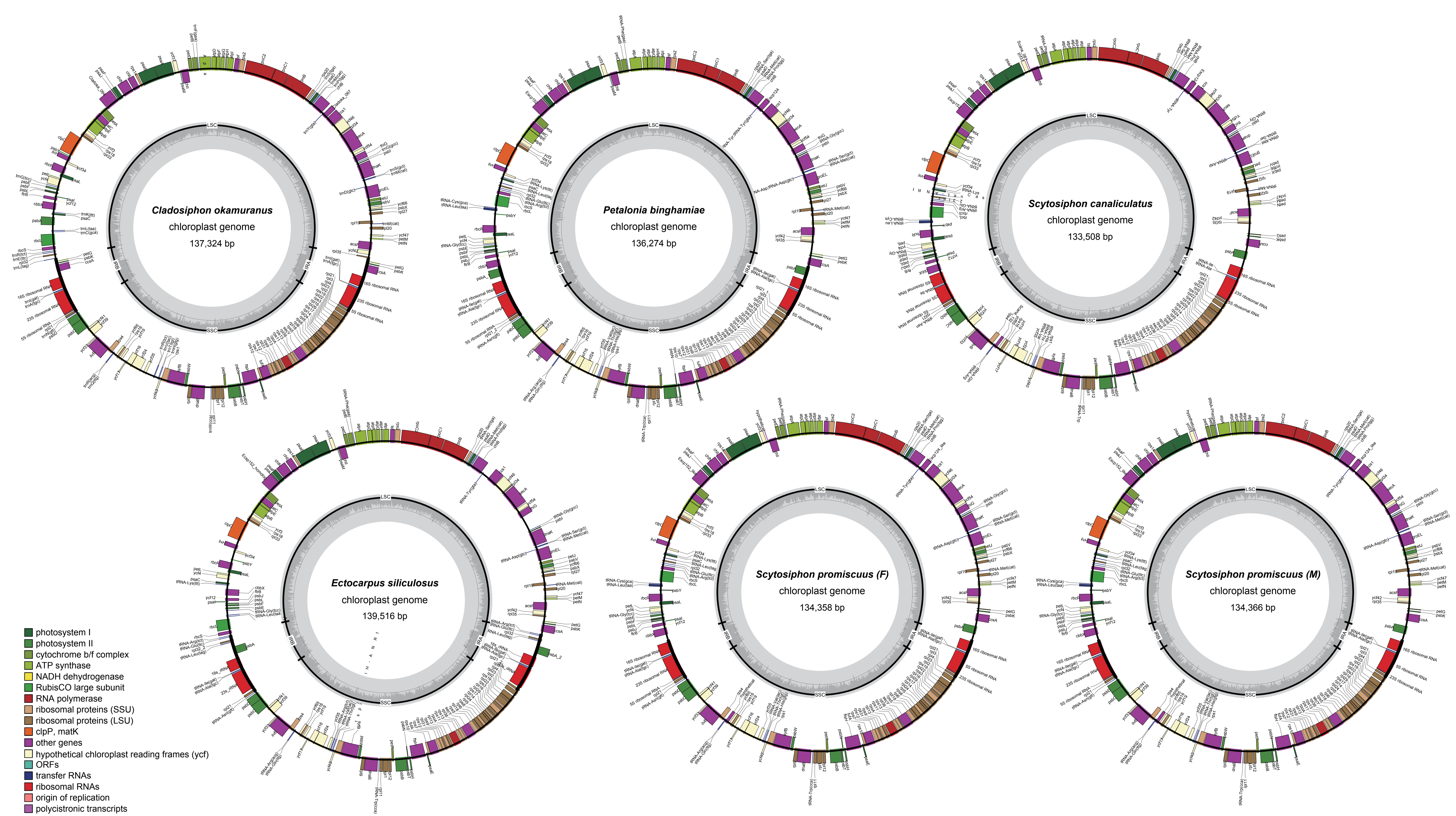


Fig. S2. Circular maps of the plastid genomes of four Ectocarpales species.

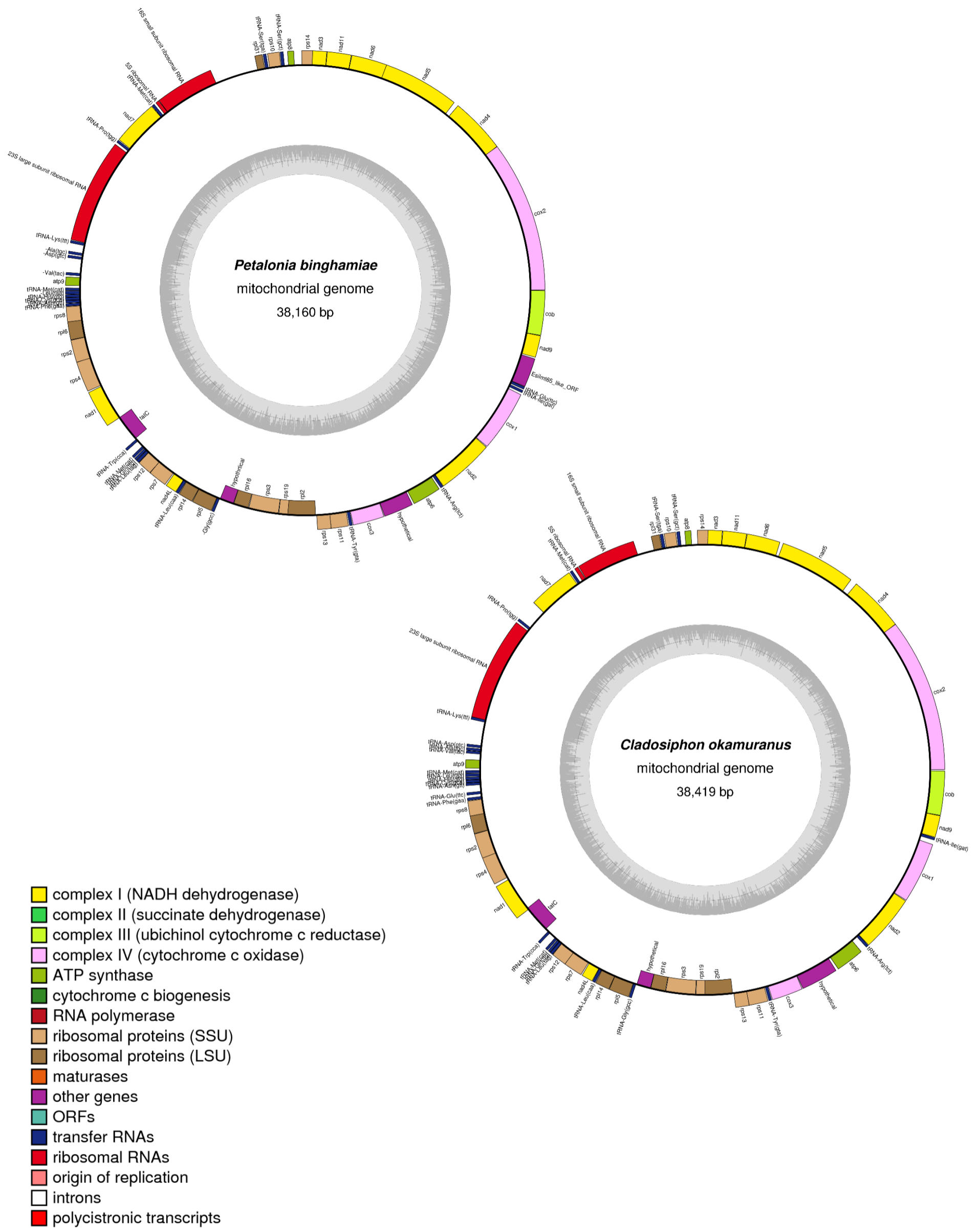


Fig. S3. Circular maps of the mitochondrial genomes of two Ectocarpales species.

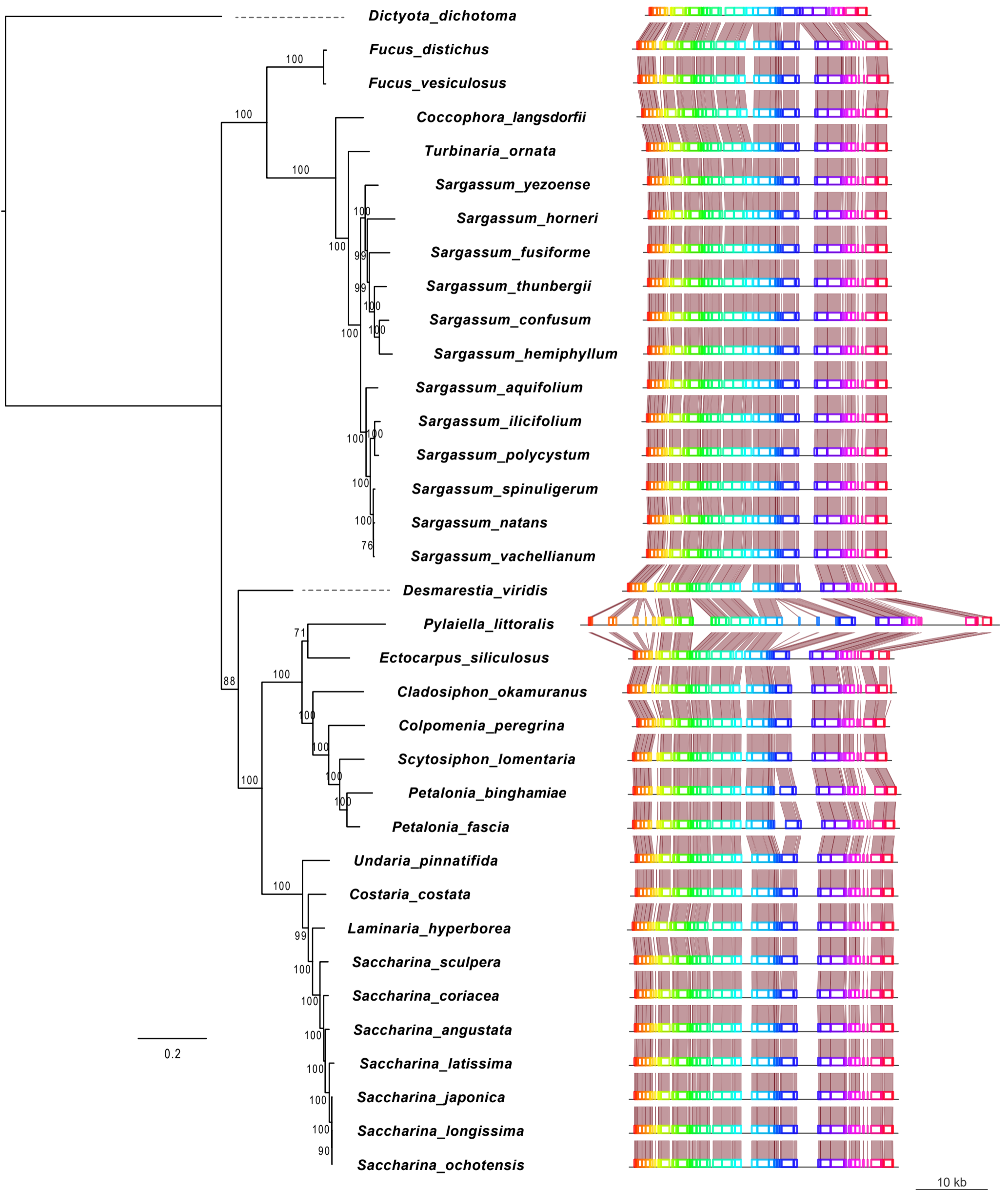


Fig. S4. Co-linear alignment and phylogeny-based clustering of mtDNAs of 32 brown algal species

**Table. S1. Plastid genome sequencing statistics**

	<i>Scytosiphon canaliculatus</i>	<i>Scytosiphon promiscuus</i> (♂)	<i>Scytosiphon promiscuus</i> (♀)	<i>Petalonia binghamiae</i>	<i>Ectocarpus siliculosus</i> (♂)	<i>Cladosiphon okamuranus</i> <sup>1</sup>
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) <sup>2</sup>	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

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

<sup>2</sup>The N50 value was calculated from the merged all assemblies



Table S2. continued

Functional Categories	Protein Coding Gene	Count	Phaeophyceae													
			Fucales				Laminariales			Ectocarpales				Dictyotales		
			<i>Coccophora.langsdorffii</i>	<i>Sargassum.horneri</i>	<i>Sargassum.thunbergii</i>	<i>Fucus.vesiculosus</i>	<i>Costaria.costata</i>	<i>Saccharina.japonica</i>	<i>Undaria.pinnatifida</i>	<i>Pleurocladia.lacustris</i>	<i>Ectocarpus.siliculosus</i>	<i>Cladophoron.okamuranus</i>	<i>Scytosiphon.canaliculatus</i>	<i>Scytosiphon.lomentaria</i>	<i>Petalonia.binghamiae</i>	<i>Dictyopteris.divaricata</i>
Photosystem II	psbA	14														
	psbB	14														
	psbC	14														
	psbD	14														
	psbE	14														
	psbF	14														
	psbH	14														
	psbI	14														
	psbJ	13														
	psbK	14														
	psbL	14														
	psbN	14														
	psbT	14														
	psbV	14														
	psbW	14														
	psbX	14														
psbY	14															
Cytochrome complex	petA	14														
	petB	14														
	petD	14														
	petF	14														
	petG	14														
	petJ	14														
	petL	11														
	petM	14														
	petN	14														
	ccs1	14														
ccsA	14															
Metabolism	chlI	14														
	chlB	14														
	chlL	14														
	chlN	14														
	rbcL	14														
	rbcS	14														
	thiG	14														
	thiS (ycf40)	14														
Cellular process	clpC	14														
	dnaE	14														
	dnaK	14														
	ftsH	14														
	groEL	14														
	secA	14														
	secG (ycf47)	14														
	secY	14														
	sufB (ycf24)	14														
	sufC (ycf16)	14														
	tatC	14														
	acsF	14														
	ftrB	14														
	ilvB	14														
	ilvH	14														
Conserved proteins	ycf3	14														
	ycf4	14														
	ycf12	14														
	ycf17	10														
	ycf19	14														
	ycf33	14														
	ycf34	14														
	ycf35	14														
	ycf37	14														
	ycf39	14														
	ycf41	14														
	ycf42	14														
	ycf46	14														
	ycf54	10														
	ycf65	14														
	ycf66	14														
	Escp124_like	14														
Escp152_like	14															
Total	72		139	139	139	139	139	139	139	141	144	144	143	143	144	139