

Table S2. Summary of algal pangenome studies.

Reference	Study system (# genomes)	Algal group	Geographical sources	Sequencing platforms	Species delimitation criteria (ANI, dDDH)	Pangenome construction structure
Rossoni et al., 2019	<i>Galdieria sulphuraria</i> (9), <i>Cyanidioschyzon merolae</i> (2), <i>Galdieria phlegrea</i> (2)	Rhodophyta	Europe (7), USA (4), Asia (2)	RSII (PacBio)	N/A	Pangenome: 9075 orthogroups
Cao et al., 2022	<i>Microcystis</i> (23)	Cyanobacteria	Japan(9), China(6), South Korea(1), USA(2), Netherlands(1), Unknown(4)	N/A	ANI > 0.95	Open pangenome: 22,009 genes Core: 7.5% Accessory: 39.4% Unique: 53.1%
Gann et al., 2022	<i>Aureococcus anophagefferens</i> (5)	Ochrophyta	USA (5)	NextSeq500 (Illumina), MinION Mk1B (ONT)	N/A	Pangenome: 4278 functional orthologs Core: 73.68% Accessory/unique: 26.32%
Cai et al., 2023	<i>Microcystis</i> (122)	Cyanobacteria	USA & Canada(69), East Asia(35), Brazil(8), Europe(6), Africa(3), Oceania(1)	N/A	within-cluster (ANI >= 0.970, dDDH > 0.750) between-cluster (ANI <0.970, dDDH<0.750)	Open pangenome: 21880 genes Core: 7.5% Accessory: 66.6% Unique: 25.9%
Wisecaver et al., 2023	<i>Prymnesium parvum</i> strains UTEX2797 and 12B1(USA), and 13 strains	Haptophyta	USA; different geographical regions	Novaseq 6000 (Illumina), HiSeq	N/A	Pangenome: 47,043 orthogroups Core: 34.9%

				(Illumina), MinION R9 (ONT)		Accessory: 44.2% Unique: 20.9%
Sibbald et al., 2025	<i>Aureococcus anophagefferens</i> (5), <i>Aureoumbra lagunensis</i> (1), <i>Pelagomonas calceolata</i> (1)	Ochrophyta	Canada	Novaseq 6000 (Illumina), HiSeq (Illumina), MinION (ONT)	ANI > 0.97	Pangenome: 23,356 orthogroups Core: 81.1% Accessory/unique: 18.9%

Abbreviations: N/A - not available for this study; ANI - average nucleotide identity; dDDH - digital DNA-DNA hybridization.

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