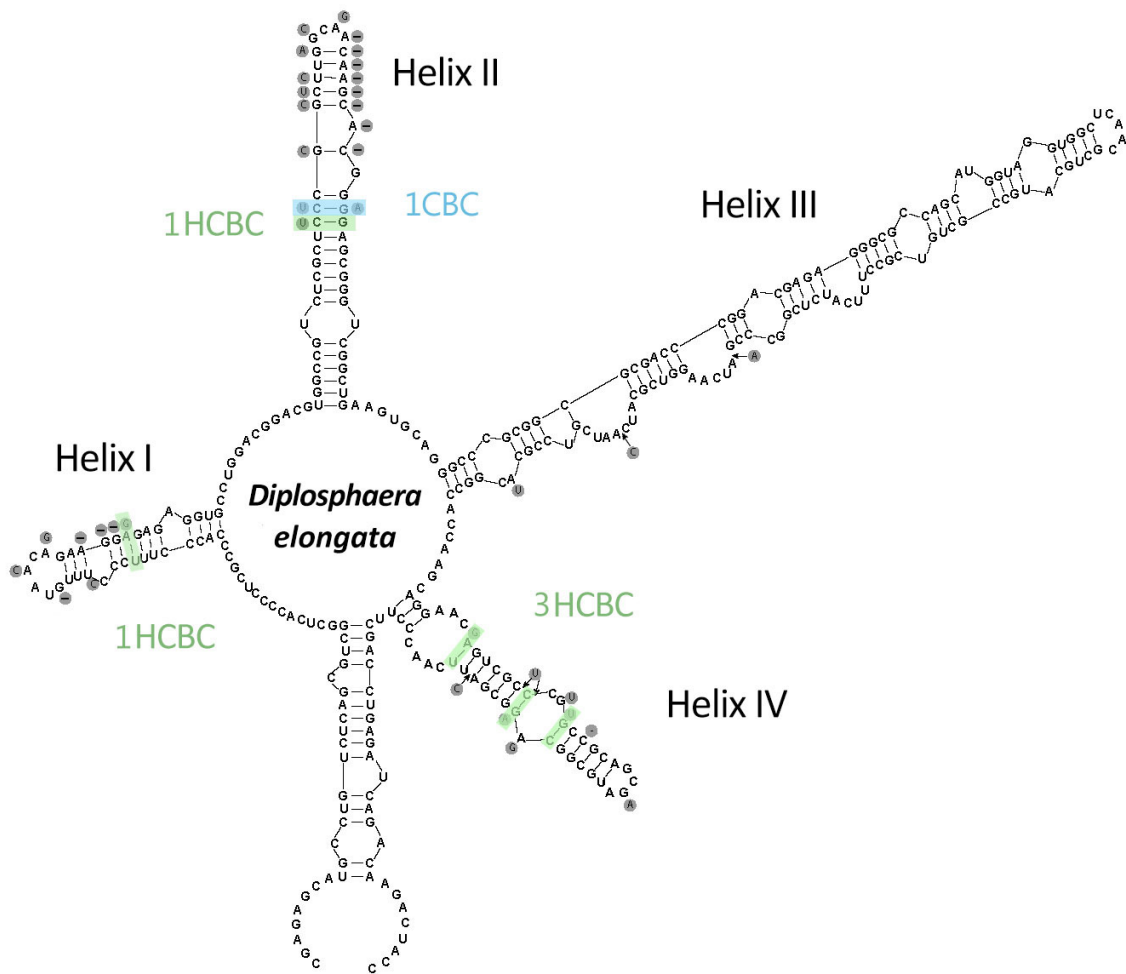
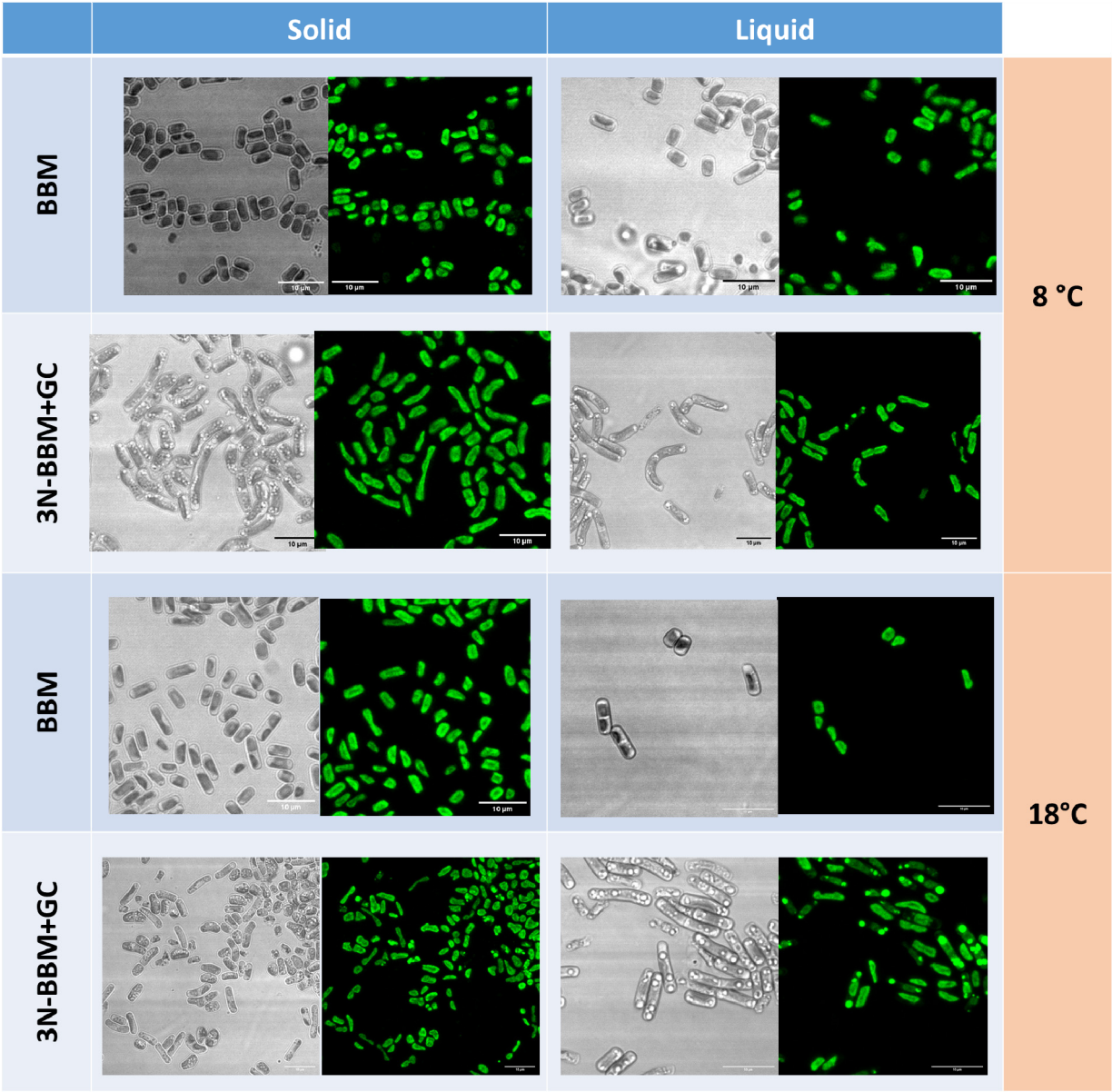


SUPPORTING INFORMATION

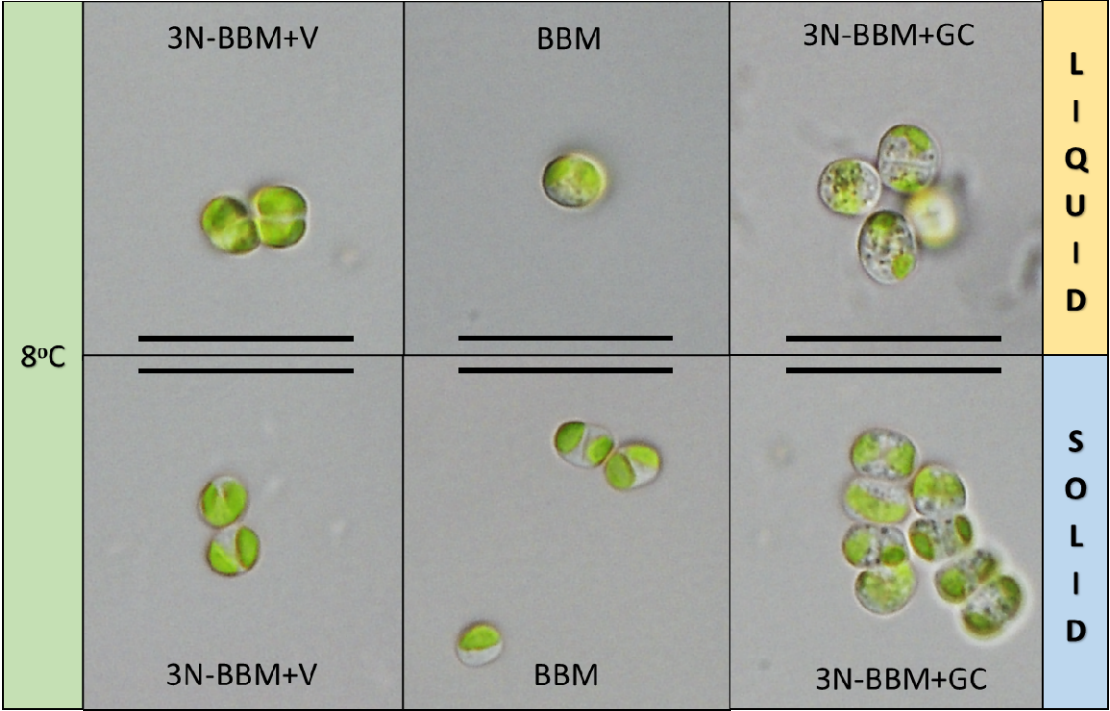
Supplementary Figure S1. Predicted secondary structure of the ITS2 transcript of *Diplosphaera elongata* (strain ASUV 135, GenBank accession number OK636219) compared with *D. chodatii* (SAG 49.86) as *Diplosphaera* genus epitype. Compensatory base changes (CBC) and hemi-compensatory base changes (hCBC) are indicated in a green box; single base changes are marked in grey circles.



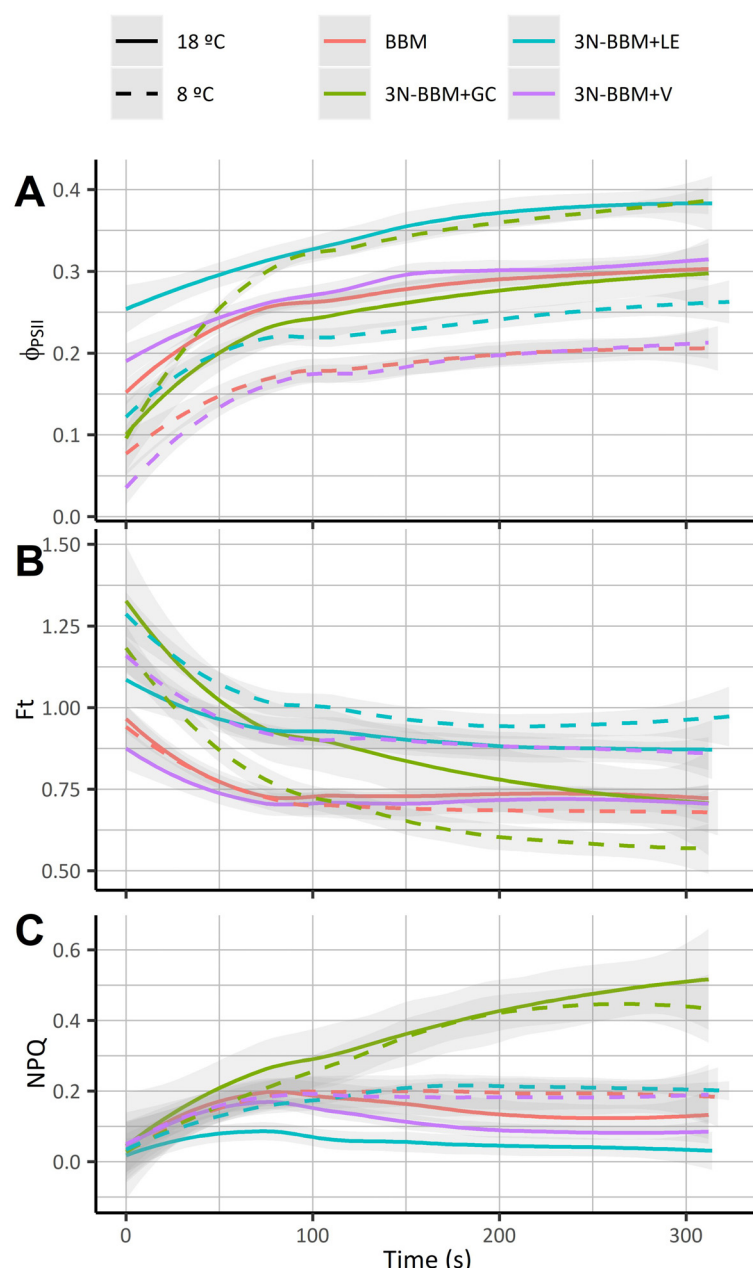
Supplementary Figure S2. Confocal reconstructions using CSML and transmitted light imaging of *D. elongata*.



Supplementary Figure S3. The morphology of the strain *D. chodatii* CCAP 416/1 subjected to 3N-BBM+V, BBM and 3N-BBM+GC media at 8°C (solid and liquid) by differential interference contrast microscopy. Scale bars: 1 µm.



Supplementary Figure S4. Induction curves of chlorophyll a fluorescence of *D. elongata* grown under different mediums and at different temperatures. The parameters represent: A) ϕ_{PSII} , effective quantum yield; B) F_t , steady-state measured fluorescence yield registered briefly before the pulse; and C) NPQ, non-photochemical quenching.



Supplementary Table S1. GenBank accession numbers for the species included in the phylogenetic analyses.

Species	Accession number SSU	Accession number ITS	Accession number RcbI
<i>Desmococcus olivaceus</i> SAG 63.90	MT078160	MT078160	-
<i>D. olivaceus</i> SAG 1.94	MT078159	MT078159	-
<i>D. olivaceus</i> SAG 1.92	MT078158	MT078158	-
<i>D. olivaceus</i> SAG 25.92	MT078157	MT078157	-
<i>Deuterostichococcus allas</i> FiSo15/03fVI	-	-	MH672671
<i>D.allas</i> ASIB37	-	-	MH672681
<i>D. allas</i> FiSo15/03cVI	-	-	MH672679
<i>D. allas</i> Dec15/07cII	-	-	MH672653
<i>D. allas</i> ASIB37	-	MH670394	-
<i>D. allas</i> PC AB15	-	MH670339	-
<i>D. allas</i> PA DI-NE	-	MH670395	-
<i>D. allas</i> Dec15/07aIV	-	-	MH672649
<i>Deuterostichococcus deasonii</i> SAG 2139	MT078164	MT078164	-
<i>Deuterostichococcus lewinii</i> SAG 108.80	MT078163	MT078163	-
<i>D. lewinii</i> SAG 107.80	MT078162	MT078162	-
<i>Deuterostichococcus epilithicus</i> SAG 2060	MT078165	MT078165	-
<i>D. epilithicus</i> ST-3	MT078167	MT078167	-
<i>D. epilithicus</i> ST-4	MT078168	MT078168	-
<i>D. epilithicus</i> SAG 2119	MT078166	MT078166	-

Species	Accession number SSU	Accession number ITS	Accession number RcbI
<i>D. epilithicus</i> SAG 10.97	MT078169	MT078169	-
<i>D. epilithicus</i> SAG 2482	MT078170	MT078170	-
<i>Deuterostichococcus</i> sp. 1 MT27.1	-	OK636223	-
<i>Diplosphaera</i> sp. A07020	-	HM237336	-
<i>Diplosphaera</i> sp. A07020	-	HM237335	-
<i>Diplosphaera</i> sp. Ru-6-16	MH703748	MH703748	-
<i>Diplosphaera</i> sp. L515	-	-	JN573848
<i>Diplosphaera</i> sp. L623	-	-	JN573859
<i>Diplosphaera</i> sp. CG671	-	-	JN573832
<i>Diplosphaera</i> sp. CG574	-	-	JN573831
<i>Diplosphaera</i> sp. L620	-	-	JN573858
<i>Diplosphaera</i> sp. CG458	-	-	JN573820
<i>Diplosphaera</i> sp. CG578	-	-	JN573827
<i>Diplosphaera</i> sp. L530	-	-	JN573849
<i>Diplosphaera</i> sp. L596	-	-	JN573854
<i>Diplosphaera</i> sp. L514	-	-	JN573846
<i>Diplosphaera</i> sp. CG586	-	-	JN573823
<i>Diplosphaera</i> sp. CG475	-	-	JN573815
<i>Diplosphaera</i> sp. CG115	-	-	JN573814
<i>Diplosphaera</i> sp. CG567	-	-	JN573817
<i>Diplosphaera</i> sp. L619	-	-	JN573857
<i>Diplosphaera</i> sp. L618	-	-	JN573856
<i>Diplosphaera</i> sp. J4028B	-	-	JN573845
<i>Diplosphaera</i> sp. CG585a	-	-	JN573818
<i>Diplosphaera</i> sp. L531	-	-	JN573850
<i>Diplosphaera</i> sp. L616	-	-	JN573855
<i>Diplosphaera</i> sp. CG608	-	-	JN573834
<i>Diplosphaera</i> sp. Llsn	-	-	JN573819
<i>Diplosphaera</i> sp. L594	-	-	JN573851

Species	Accession number SSU	Accession number ITS	Accession number RcbI
<i>Diplosphaera</i> sp. MPN177	-	-	MN562635
<i>Diplosphaera</i> sp. L540	-	-	JN573853
<i>Diplosphaera</i> sp. MPN505	-	-	MN562636
<i>Diplosphaera</i> sp. MPN178	-	-	JN573842
<i>Diplosphaera</i> sp. L624	-	-	JN573860
<i>Diplosphaera</i> sp. L469	-	-	JN573847
<i>Diplosphaera</i> sp. CG470	-	-	JN573833
<i>Diplosphaera</i> sp. AA53935	-	-	JN573824
<i>Diplosphaera</i> sp. CG378	-	-	JN573822
<i>Diplosphaera</i> sp. CG831	-	-	JN573835
<i>Diplosphaera</i> sp. CG601	-	-	JN573825
<i>Diplosphaera</i> sp. cort13	-	-	HG793070
<i>Diplosphaera</i> sp. L532	-	-	JN573852
<i>Diplosphaera</i> sp. cort12	-	-	HG793069
<i>Diplosphaera</i> sp. CG27	-	-	JN573830
<i>Diplosphaera chodatii</i> CCAP 416/1	OP901443	OP901443	OP924018
<i>D. chodatii</i> SAG 2049	MT078180	MT078180	-
<i>D. chodatii</i> SAG 9.82	MT078181	MT078181	JF502540
<i>D. chodatii</i> SAG 2.82	MT078179	MT078179	-
<i>D. chodatii</i> KZ-26-5	MK201746	MK231275	-
<i>D. chodatii</i> JX645020	-	JX645020	-
<i>D. chodatii</i> var. <i>mucosa</i> SAG 48.86	MT078178	MT078178	AM260444
<i>D. chodatii</i> SAG 11.88	MT078177	MT078177	-
<i>D. chodatii</i> SAG 49.86	MT078182	MT078182	AM260445
<i>D. chodatii</i> JX645018	-	JX645018	-
<i>D. chodatii</i> JX645019	-	JX645019	-
<i>D. chodatii</i> TE3.C		OK636222	
<i>D. chodatii</i> JX645021	-	JX645021	-
<i>D. chodatii</i> JX645013	-	JX645013	-

Species	Accession number SSU	Accession number ITS	Accession number RcbI
<i>D. chodatii</i> JX645014	-	JX645014	-
<i>D. chodatii</i> JX645011	-	JX645011	-
<i>D. chodatii</i> JX645012	-	JX645012	-
<i>D. chodatii</i> JX645045	-	JX645045	-
<i>D. chodatii</i> JX645015	-	JX645015	-
<i>D. chodatii</i> JX645009	-	JX645009	-
<i>D. chodatii</i> JX645008	-	JX645008	-
<i>D. chodatii</i> JX645010	-	JX645010	-
<i>D. chodatii</i> UTEX 1177	-	HQ129931	-
<i>Diplosphaera elongata</i> ASUV135 (TE1.D)	OK636219	OK636219	OP882615
<i>D. elongata</i> PPS2.B	-	OK636234	-
<i>D. elongata</i> PPS2.D	-	OK636235	-
<i>D. elongata</i> RF5B.2	-	OK636220	-
<i>D. elongata</i> RF5B.3	-	OK636221	-
<i>Prasiolales</i> sp. S2MWC-09	-	MK005079	-
<i>Protostichococcus edaphicus</i> SAG 2481	MT078161	MT078161	-
<i>Pseudostichococcus monallantoides</i> SAG 380-1	KM020066	KM020066	-
<i>P. monallantoides</i> SAG 379-4	MT078184	MT078184	-
<i>P. monallantoides</i> SAG 2067	MT078185	MT078185	-
<i>P. monallantoides</i> UTEX 2249	MT078186	MT078186	-
<i>Stichococcus</i> sp. FontaineG1 from <i>Dermatocarpon rivulorum</i>	-	JX645022	-
<i>Stichococcus</i> sp. S2F4-03	-	MK005073	-
<i>Stichococcus</i> sp. S2RA-21	-	MK005085	-
<i>Stichococcus</i> sp. BCP-ZNP2-VF4	-	-	KC207724
<i>Stichococcus</i> sp. CU358a	-	-	EF589147
<i>Stichococcus</i> sp. cort05	-	-	HG793062
<i>Stichococcus</i> sp. cort02	-	-	HG793061

Species	Accession number SSU	Accession number ITS	Accession number Rcb1
<i>Stichococcus bacillaris</i> isolate FG2/4.2	-	KM020048	-
<i>S. bacillaris</i> SAG 249.80	MT078156	MT078156	-
<i>S. bacillaris</i> SAG 335-8	MT078154	MT078154	-
<i>S. bacillaris</i> SAG 56.91	MT078155	MT078155	-
<i>S. bacillaris</i> SAG 397-1b	AJ416107	AJ431678	-
<i>S. bacillaris</i> SAG 379-2	HE610125	HE610125	-
<i>S. bacillaris</i> SAG 379-1b	-	-	AM260442
<i>Tetratostichococcus jenerensis</i> SAG 2138	MT078183	MT078183	-
<i>T. jenerensis</i> CAUP J 1302	-	-	KM438447
<i>Tritostichococcus coniocybes</i> RF5A.1	-	OK636233	-
<i>Tritostichococcus coniocybes</i> ST-9	MT078172	MT078172	-
<i>T. coniocybes</i> ST-7	MT078173	MT078173	-
<i>T. coniocybes</i> ST-6	MT078174	MT078174	-
<i>T. coniocybes</i> ST-8	MT078175	MT078175	-
<i>Tritostichococcus corticulus</i> ST-2	MT078176	MT078176	-
<i>Tritostichococcus solitus</i> SAG 2406	MT078171	MT078171	-
Uncultured fungus clone OTU 2309	-	KX221524	-
Uncultured Chaetophorales isolate soil 300	-	MF481512	-
Uncultured Chlorophyta	-	JX435329	-
Uncultured eukaryote clone ITS1A H8	-	HM490288	-
Uncultured Chlorophyta clone ALCH11	-	JX435395	-

Supplementary Table S2. Aspect Ratio (AR= With/Height) expressed as the Mean of each treatment. Between parentheses MIN; MAX of AR.

	Solid		Liquid	
	8°C	18°C	8°C	18°C
Standard conditions: 3N-BBM+V	1.4 (1.0; 2.6)	1.4 (1.0; 2.3)	1.6 (1.4; 2.4)	1.5 (1.0; 3.1)
Poor conditions: BBM	1.5 (1.0; 3.2)	1.6 (1.0; 3.8)	1.6 (1.0; 2.6)	1.7 (1.0; 3.7)
Rich conditions: 3N-BBM+GC	2.3 (1.1; 5.1)	1.7 (1.0; 4.5)	2.34 (1.0; 5.9)	2.4 (1.1; 4.7)
Lichen conditions: 3N-BBM+LE	1.6 (1.0; 3.0)	1.4 (1.0; 2.6)	1.9 (1.0; 3.6)	1.7 (1.0; 3.1)