

Appendix I. Chromosome number and nuclear DNA content in Chlorophycean and Charophycean Algae

Entry number	Species ^(a)	2n ^(b)	Original ref. for 2n	DNA amount				Original ref. for C-value ^(e)	Standard species ^(f)	Method ^(g)
				1C (Mbp) ^(c)	1C (pg) ^(d)	2C (pg) ^(d)	4C (pg) ^(d)			
Charophycean Green Algae										
CHARALES										
Characeae										
1a	<i>Chara tomentosa</i> Linnaeus (male)	28	19	7252	7.4*	14.8	29.6	19	<i>Chara</i>	MI:EB
1b	<i>Chara tomentosa</i> Linnaeus (female)	28	19	6860	7.0*	14.0	28.0	19	<i>Chara</i>	MI:EB
COLEOCHAETALES										
Coleochaetaceae										
2	<i>Chaetosphaeridium globosum</i> (Nordstedt) Klebahn			588	0.6	1.2*	2.4	*	<i>Gallus</i>	MI:DAPI
3	<i>Coleochaete nitellarum</i> Jost	84	22	343	0.35	0.7	1.4*	*	<i>Gallus</i>	MI:DAPI
4	<i>Coleochaete orbicularis</i> Pringsheim	48	22	686	0.7	1.5	3.0*	*	<i>Gallus</i>	MI:DAPI
5	<i>Coleochaete scutata</i> Brébisson			1287	1.3	2.7	5.5*	*	<i>Gallus</i>	MI:DAPI
DESMIDIALES ¹										
Desmidiaceae										
6	<i>Cosmocladium perissum</i> Roy et Bisset			15288	15.6	31.2*	62.4	*	<i>Gallus</i>	MI:DAPI
7	<i>Euastrum pectinatum</i> (Brébisson) ex Brébisson			22932	23.4	46.8*	93.6	*	<i>Gallus</i>	MI:DAPI
Peniaceae										
8	<i>Gonatozygon monotaenium</i> de Bary	c.34	18	8624	8.8	17.6*	35.2	*	<i>Gallus</i>	MI:DAPI
KLEBSORMIDIALES										
9	<i>Entransia fimbriata</i> Hughes			539	0.55	1.1*	2.2	*	<i>Gallus</i>	MI:DAPI
10	<i>Klebsormidium flaccidum</i> (Kützing) P.C. Silva, K. Mattc et W. Blackwell	44	18	198	0.2	0.4*	0.8	*	<i>Gallus</i>	MI:DAPI
11	<i>Klebsormidium nitens</i> (Meneghini) Lokhorst	12	21	2695	0.28	0.55*	1.1	*	<i>Gallus</i>	MI:DAPI
MESOSTIGMATALES										
Mesostigmataceae										
12	<i>Mesostigma viride</i> Lauterborn			343	0.35	0.7*	1.4	*	<i>Gallus</i>	MI:DAPI
ZYGNEATALES										
Mesotaeniaceae										
13	<i>Mesotaenia kramstae</i> Lemmermann			539	0.55	1.1*	2.2	*	<i>Gallus</i>	MI:DAPI
14	<i>Roya anglica</i> G. S. West			784	0.8	1.6*	3.2	*	<i>Gallus</i>	MI:DAPI
Zygnemataceae										
15	<i>Mougeotia transeauii</i> Collins			3136	3.2	6.4*	12.8	*	<i>Gallus</i>	MI:DAPI

Chlorophycean Green Algae										
SPHAEROPLEALES										
Scenedesmaceae										
17	<i>Scenedesmus obliquus</i> (Turpin) Kuetzing	12	22	196	0.2	0.40*	0.8	6		MFA
VOLVOCALES ²										
Chlamydomonaceae										
18	<i>Brachiomonas</i> sp.			4.9	0.005	0.01*	0.02	26		FC
19	<i>Chlamydomonas reinhardtii</i> P. A. Dangeard	16	3	88	0.09	0.19*	0.38	4		
20a	<i>Dunaliella tertiolecta</i> Butcher			294	0.3	0.6*	1.2	13		
20b	<i>Dunaliella tertiolecta</i>									
Volvocaceae										
21	<i>Pleodorina californica</i> Shaw (as <i>Eudorina californica</i>)	28	5	78	0.08	0.17*	0.34	25		
Prasinophycean Green Algae										
CHLORODENDRALES										
Chlorodendraceae										
22	<i>Tetraselmis suecica</i> (Kyllin) Butcher			343	0.35	0.7*	1.4	*	<i>Gallus</i>	MI:DAPI
Halosphaeraceae										
23a	<i>Micromonas pusilla</i> (Butcher) Manton et Parke			15	0.015	0.03*	0.06	23		FC
23b	<i>Micromonas pusilla</i>			13	0.0135	0.027*	0.05	26		FC
MAMIELLALES										
Mamiellaceae										
24	<i>Bathycoccus prasinus</i> Eikrem et Throndsen			10	0.01	0.02	0.04	23		FC
25a	<i>Ostreococcus tauri</i> Courties et Chretiennot-Dinet	28	10	10.2 [†]	0.005	0.01	0.02	9		PFGE
25b	<i>Ostreococcus tauri</i>			9.7 [†]	0.005	0.01	0.02	10		PFGE
PYRAMIMONADALES										
Pyramimonadaceae										
26	<i>Pyramimonas parkeae</i> Norris et Pearson			67	0.07	0.15*	0.3	*	<i>Gallus</i>	MI:DAPI
Trebouxiophycean Green Algae										
CHLORELLALES ³										
Chlorellaceae										
27	* <i>Chlorella ellipsoidea</i> Gerneck	18	12	400 [†]	0.41	0.82	1.64	12		PFGE
28	<i>Chlorella fusca</i> var. <i>vacuolata</i> Shihira et Krauss			521 [†]	0.53	1.06	1.12	11		RK
29	<i>Chlorella homosphaera</i> Skuja			418 [†]	0.2	0.4	0.8	11		RK
30a	<i>Chlorella kessleri</i> Fott et Nováková			196 [†]	0.2	0.4	0.8	11		RK
30b	<i>Chlorella kessleri</i>			48 [†]	0.05	0.1	0.2	28		FC
31	<i>Chlorella lobophora</i> Andreeva			426 [†]	0.43	0.86	1.72	11		RK

32	* <i>Chlorella luteoviridis</i> Chodat		593 [†]	0.6	1.2	2.4	11		RK
33	* <i>Chlorella minutissima</i> Fott et Novakova		126 [†]	0.13	0.26	0.52	11		RK
34	* <i>Chlorella mirabilis</i> Andreeva		98 [†]	0.1	0.2*	0.4	11		RK
35	<i>Chlorella protothecoides</i> Krüger		195 [†]	0.2	0.4	0.8	11		RK
36	* <i>Chlorella saccharophila</i> var. <i>ellipsoidea</i> (Gerneck) Fott et Nováková		808 [†]	0.8	1.6	3.2	11		RK
37	<i>Chlorella saccharophila</i> var. <i>saccharophila</i> (Krüger) Migula, Fott et Nováková		394 [†]	0.4	0.8	1.6	11		RK
38a	<i>Chlorella sorokiana</i> Shihira et Krauss		49	0.05	0.11*	0.22	4		MFA
38b	<i>Chlorella sorokiana</i>		597 [†]	0.61	1.2	2.4	11		RK
39a	<i>Chlorella vulgaris</i> M. Beijerinck	16	12	400 [†]	0.41	0.82	1.64	12	
39b	<i>Chlorella vulgaris</i>		140 [†]	0.14	0.28	0.56	11		RK
40	* <i>Chlorella zofingiensis</i> Dönz		413 [†]	0.4	0.8	1.6	11		RK
41	<i>Marvania coccooides</i> (Naumann) Henley et al. (= <i>Nannochloris coccooides</i> Naumann)		18 [†]	0.02	0.04	0.08	28	yeast	FC
42a	<i>Nannochloris bacillaris</i> Naumann	14	2	98	0.1	0.2*	0.4	12	PFGE
42b	<i>Nannochloris bacillaris</i>		20 [†]	0.02	0.04	0.08	28	yeast	FC
43	<i>Picochlorum atomus</i> (Butcher) Henley et al. (as <i>Nannochloris atomus</i> Butcher)		9.8	0.01	0.02*	0.04	26		FC
	(as <i>Nannochloris atomus</i>)		47 [†]	0.05	0.1	0.2	28	yeast	FC
44	<i>Picochlorum eucaryotum</i> (Wilhelm, Eisenbeis, Wild et Zahn) Henley et al. (as <i>Nannochlorum eucaryotum</i> (Wilhem, Eisenbeis, Wild et Zahn) Henley et al.)		59	0.06*	0.12	0.24	27		FC
	(as <i>Nannochlorum eucaryotum</i>)		23 [†]	0.02	0.04	0.08	28	yeast	FC
45	<i>Picochlorum maculatum</i> (Butcher) Henley et al. (as <i>Nannochloris maculatus</i> Butcher)		14 [†]	0.01	0.02	0.04	28	yeast	FC
PRASIOALES									
Prasiolaceae									
46	<i>Prasiola stipitata</i> Suhr in Jessen	16	8	221	0.23	0.45	0.9*	*	<i>Gallus</i> MI:DAPI
Ulvophycean Green Algae									
CAULERPALES									
Codiaceae									
47	<i>Codium fragile</i> subsp. <i>tomentosoides</i> (van Goor) P.C.	20	17	284	2.9	5.8	11.6*	*	<i>Gallus</i> MI:DAPI
48	<i>Codium lucasii</i> Setchell		882	0.9	1.8*	3.6	*	<i>Gallus</i> MI:DAPI	
49	<i>Codium prostratum</i> Levring		833	0.8	1.7*	3.4	*	<i>Gallus</i> MI:DAPI	
CLADOPHORALES/SIPHONOCLADALES COMPLEX ⁴									
50	<i>Cladophora coelothrix</i> Kützing		1421	1.45	2.9	5.8	*	<i>Gallus</i> MI:DAPI	

51	<i>Pithora</i> sp. (UTEX 787)			2009	2.05	4.1	8.2*	*	<i>Gallus</i>	MI:DAPI
52	<i>Pithophora</i> sp. (UTEX 1333)			882	0.9	1.9	3.8*	*	<i>Gallus</i>	MI:DAPI
DASYCLADALES ⁵										
Dasycladaceae										
53	<i>Neomeris dumetosa</i> Lamouroux			1862	1.9	3.8*	7.6	*	<i>Gallus</i>	MI:DAPI
54	<i>Parvocaulis exigua</i> (Solms-Laubach) S. Berger et al. (= <i>Polyphysa exigua</i> (Solms-Laubach) M. J. Wynne)			1568	1.6	3.2*	6.4	*	<i>Gallus</i>	MI:DAPI
TRENTEPOHLIALES										
Trentepohliaceae										
55	<i>Cephaleuros parasiticus</i> Karsten			1911	1.95	3.9*	7.2	20	<i>Gallus</i>	MI:DAPI
56	<i>Cephaleuros virescens</i> Kunze in Fries	36	14	980	1.0	2.0*	4.0	20	<i>Gallus</i>	MI:DAPI
57	<i>Physolinum monile</i> (De Wildeman) Printz	22	7	2009	2.05	4.1*	8.2	20	<i>Gallus</i>	MI:DAPI
58	<i>Trentepohlia arborum</i> (Agardh) Hariot			1470	1.5	3.0*	6.0	20	<i>Gallus</i>	MI:DAPI
59a	<i>Trentepohlia aurea</i> (Linnaeus) Martius	32,34	1, 24	588	0.6	1.2*	2.4	20	<i>Gallus</i>	MI:DAPI
59b	<i>Trentepohlia aurea</i>			701	0.71	1.43*	2.86	*	<i>Gallus</i>	MI:DAPI
60	<i>Trentepohlia iolithus</i> (Linnaeus) Wallroth			980	1.0	2.0*	4.0	*	<i>Gallus</i>	MI:DAPI
61	<i>Trentepohlia odorata</i> (Wiggers) Wittrock			539	0.55	1.1*	2.2	20	<i>Gallus</i>	MI:DAPI
62	<i>Trentepohlia umbrina</i> (Kützing) Bornet	24	22	657	0.67	1.34	2.68	*	<i>Gallus</i>	MI:DAPI
ULOTRICHALES ⁶										
<i>Incertae sedis</i>										
63	<i>Gleotilopsis sterilis</i> Deason			108	0.11	0.23*	0.46	*	<i>Gallus</i>	MI:DAPI
64	<i>Pseudendoclonium basilense</i> Vischer			167	0.17	0.34*	0.68	*	<i>Gallus</i>	MI:DAPI
Monostromaceae										
65	<i>Capsosiphon fulvescens</i> (C.Agardh) Setchell et N.L.Gardner			157	0.16	0.33*	0.6	*	<i>Gallus</i>	MI:DAPI
Ultrichaceae										
ULVALES ⁷										
<i>Incertae sedis</i>										
66	<i>Pseudendoclonium basilense</i> Vischer			196	0.17	0.34*	0.6	*	<i>Gallus</i>	MI:DAPI
Ulvaceae										
67	<i>Percursaria percursa</i> (C.Agardh) Rosenvinge			294	0.3	0.6*	1.2	*	<i>Gallus</i>	MI:DAPI
68	<i>Ulva compressa</i> Linnaeus (as <i>Enteromorpha compressa</i> (Linnaeus) Greville)	20	16	26.8*	0.07	0.14*	0.28	15	<i>abidopsis</i> /	FC
69	<i>Ulva rotundata</i> Bliding			294	0.3	0.6*	1.2	*	<i>Gallus</i>	MI:DAPI

¹ Traditional taxonomic lists often grouped all conjugating green algae within one order, the Zygnematales (Conjugales) (Bold and Wynne, 1985). Results of recent molecular studies support recognition of two orders, the Desmidiiales and the Zygnematales (McCourt *et al.*, 2000; Denboh *et al.*, 2001).

² Molecular data demonstrate that *Chlamydomonas* is non-monophyletic (Nozaki *et al.* 2000; Nozaki and Krienitz, 2001) and that revision of the circumscription of these genera will be required (Larson *et al.*, 1992). *Dunalliella tertiolecta*, included here in the Chlamydomonaceae, is part of a polyphyletic complex that may warrant recognition as a separate order (Nakayama *et al.*, 1966).

³ Recent molecular studies have demonstrated that *Chlorella* taxa are dispersed over two classes: the Trebouxiophyceae and the Chlorophyceae (Krienitz *et al.*, 2004). Chlorellales included here are considered to be Trebouxiophycean algae (Huss *et al.*, 1999).

⁴ Molecular data clearly demonstrate that classifications of the genus *Cladophora* should be revised (Hanyuda *et al.*, 2002). Circumscription of families in this complex will require sequence data for additional cladophorean algae.

⁵ Recent molecular investigations indicate that genera of the Dasycladaceae are well delineated, but this does not hold true for genera of the Polyphysaceae (= Acetabulariaceae). 18S rDNA data support transfer of *Acicularia schenckii* and *Polyphysa peniculus* to the genus *Acetabularia* (Berger *et al.*, 2003). The familiar binomials are retained here for convenience until a complete taxonomic revision of the Dasycladales is available.

⁶ Recent phylogenetic investigations have redefined the boundary between the Ulotrichales and Ulvales (O'Kelly *et al.*, 2004). Species of *Monostroma* appear to be more closely related to the Ulotrichales than to the Ulvales (Hayden and Waaland, 2002). No contemporary characterization of families is available for this newly circumscribed order.

⁷ Characters used to separate the genera *Ulva* and *Enteromorpha* lack taxonomic significance (Tan *et al.*, 1999; Shimada *et al.*, 2003). The familiar binomials have been retained here in the absence of formal reassignment of species (Hayden and Waaland, 2003, 2004). Exact placement of *Blidingia* in the Ulvales remains uncertain (*Incertae sedis*) as no contemporary characterization of the emended family Monostromaceae is available.