

557 **Table S6:** The full dataset, with corresponding references, for all of the data used in our analyses.

Species	Obligate or facultative	Number of cell types	Total number of cells	Group formation	Current environment	Ancestral environment	Reference(s)
<i>Acrasis rosea</i>	facultative	2	707.9457844	non-clonal	terrestrial	terrestrial	Raper 1984, Bonner 2003, Brown <i>et al.</i> 2011
<i>Acytostelium</i>	facultative	1	NA	non-clonal	terrestrial	terrestrial	Bonner 2003, Bourke 2011
<i>Aelosoma tenebrarum</i>	obligate	12	50118.72	clonal	NA	aquatic	Brace 1901
<i>Alaria marginata</i>	obligate	14	1.00E+12	clonal	aquatic	aquatic	Kain 1979, Charrier <i>et al.</i> 2007
<i>Anthoceros himalayensis</i>	obligate	12	39810.71706	clonal	terrestrial	aquatic	Henra & Handoo 1953, Nishiyama 2007
<i>Arabidopsis thaliana</i>	obligate	30		clonal	terrestrial	aquatic	Carroll 2001, Lin <i>et al.</i> 1999
<i>Ascophyllum nodosum</i>	obligate	6	6.31E+11	clonal	aquatic	aquatic	Rawlence 1978, Charrier <i>et al.</i> 2007
<i>Asperococcus fistulosus</i>	obligate	5	10000000000	clonal	aquatic	aquatic	Bold & Wynne 1978, Charrier <i>et al.</i> 2007
<i>Astrephomene gubernaculifera</i>	obligate	2	64	clonal	aquatic	aquatic	Stein 1958, Herron & Michod 2008, Hallmann 2011
<i>Astrephomene perforata</i>	obligate	2	64	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011
<i>Basichlamys sacculifera</i>	obligate	1	4	clonal	aquatic	aquatic	Nozaki <i>et al.</i> 1996, Hallmann 2011
<i>Beckerlla scalaramosa</i>	obligate	12	31622776600	clonal	aquatic	aquatic	Kraft 1976, Graham 1985
<i>Botryocladia wynnei</i>	obligate	6	3981071.706	clonal	aquatic	aquatic	Ballantine 1985, Graham 1985
<i>Callinectes sapidus</i>	obligate	69	3.16E+11	clonal	NA	aquatic	Johnson 1980
<i>Candida albicans</i>	facultative	3	NA	clonal	NA	terrestrial	Engelberg <i>et al.</i> 1998, Whiteway & Bachewich 2007
<i>Canis familiaris</i>	obligate	99	5.01E+13	clonal	terrestrial	aquatic	Adam <i>et al.</i> 1983
<i>Carpomitra cabrecae</i>	obligate	7	2511886432	clonal	aquatic	aquatic	Motomura <i>et al.</i> 1985, Charrier <i>et al.</i> 2007
<i>Chlamydomonas reinhardtii</i>	facultative	1	71	clonal	aquatic	aquatic	Bold & Wynne 1985, Kirk 1998, Lurling <i>et al.</i> 2006, Becks <i>et al.</i> 2010
<i>Chordaria flagelliformis</i>	obligate	6	3981071706	clonal	aquatic	aquatic	Kornmann 1962, Charrier

							<i>et al. 2007</i>
<i>Chordaria linearis</i>	obligate	6	10000000000	clonal	aquatic	aquatic	Searles 1980, Charrier <i>et al. 2007</i>
<i>Cladostephus verticillatus</i>	obligate	8	125892541.2	clonal	aquatic	aquatic	Sauvageau 1907, Charrier <i>et al. 2007</i>
<i>Colpomenia sinuosa</i>	obligate	5	1995262315	clonal	aquatic	aquatic	Wynne 1972, Charrier <i>et al. 2007</i>
<i>Conocephalum conicum</i>	obligate	15	3162277.66	clonal	terrestrial	aquatic	Maybrook 1914, Nishiyama 2007
<i>Croomia pauciflora</i>	obligate	42	25118864320	clonal	terrestrial	aquatic	Tomlinson & Ayensu 1968
<i>Cutleria</i>	obligate	7	3162277660	clonal	aquatic	aquatic	Bold & Wynne 1978, Charrier <i>et al. 2007</i>
<i>Cyanea cyanea</i>	obligate	22	1.00E+13	clonal	aquatic	aquatic	Hyman 1940
<i>Cyathodium barodae</i>	obligate	13	50118723.36	clonal	terrestrial	aquatic	Chavran 1937, Nishiyama 2007
<i>Dasybranchus caducus</i>	obligate	10	31622.7766	clonal	NA	aquatic	Bookhaut 1957
<i>Desmarestia antarctica</i>	obligate	7	6.31E+11	clonal	aquatic	aquatic	Moe & Silva 1989, Charrier <i>et al. 2007</i>
<i>Dictyosiphon hirsutus</i>	obligate	6	39810717060	clonal	aquatic	aquatic	Peters 1992, Charrier <i>et al. 2007</i>
<i>Dictyostelium discoideum</i>	facultative	3	100000	non-clonal	terrestrial	terrestrial	Kaiser 1986, Raper 1940, Rokas 2008
<i>Dictyostelium fasciculatum</i>	facultative	2	NA	non-clonal	terrestrial	terrestrial	
<i>Dictyostelium minutum</i>	facultative	2	3162.27766	non-clonal	terrestrial	terrestrial	Kaiser 198
<i>Dictyostelium purpureum</i>	facultative	2	NA	non-clonal	terrestrial	terrestrial	Mehdiabadi <i>et al.</i> (2009)
<i>Dictyota binghamiae</i>	obligate	4	2.51E+11	clonal	aquatic	aquatic	Foster <i>et al.</i> 1972, Charrier <i>et al. 2007</i>
<i>Diurodrilus westheidi</i>	obligate	14	3548.134	clonal	NA	aquatic	Kristensen & Niilon 1982
<i>Ducellieria chodati</i>	obligate	1	40	clonal	aquatic	aquatic	Hesse <i>et al.</i> 1989
<i>Durvillaea antarctica</i>	obligate	6	1.00E+12	clonal	aquatic	aquatic	Naylor 1949, Charrier <i>et al. 2007</i>
<i>Ectocarpus siliculosus</i>	obligate	4	316227.766	clonal	aquatic	aquatic	Knight 1931, Charrier <i>et al. 2007</i>
<i>Elachista fucicola</i>	obligate	5	15848931.92	clonal	aquatic	aquatic	Koeman & Cortel-Breeman 1976, Charrier <i>et al. 2007</i>
<i>Eudorina cylindrica</i>	obligate	2	16	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011

<i>Eudorina elegans</i>	obligate	1	32	clonal	aquatic	aquatic	Hallmann 2011
<i>Eudorina minodii</i>	obligate	1	32	clonal	aquatic	aquatic	Hallmann 2011
<i>Eudorina unicocca</i>	obligate	1	32	clonal	aquatic	aquatic	Yamada <i>et al.</i> 2008, Hallmann 2011
<i>Farlowia mollis</i>	obligate	7	3162277660	clonal	aquatic	aquatic	Abbott 1962, Graham 1985
<i>Fonticula alba</i>	facultative	2		non-clonal	terrestrial	terrestrial	Brown <i>et al.</i> 2009
<i>Fucus vesiculosus</i>	obligate	7	3.16E+12	clonal	aquatic	aquatic	McCully 1966, Charrier <i>et al.</i> 2007
<i>Fuirena ciliaris</i>	obligate	44	25118864320	clonal	terrestrial	aquatic	Govindarajalu 1969, Graham 1985
<i>Funaria hygrometrica</i>	obligate	20	251188643.2	clonal	terrestrial	aquatic	Puri 1981, Nishiyama 2007
<i>Gloeophycus koreanum</i>	obligate	12	63095734450	clonal	aquatic	aquatic	Lee & Yoo 1979, Graham 1985
<i>Gonium multicocum</i>	obligate	1	32	clonal	aquatic	aquatic	Hallmann 2011
<i>Gonium octonarium</i>	obligate	1	32	clonal	aquatic	aquatic	Hallmann 2011
<i>Gonium pectorale</i>	obligate	1	16	clonal	aquatic	aquatic	Hallmann 2011, Herron & Michod 2008, Stein 1959
<i>Gonium quadratum</i>	obligate	1	16	clonal	aquatic	aquatic	Hallmann 2011
<i>Gonium viridistellatum</i>	obligate	1	16	clonal	aquatic	aquatic	Hallmann 2011
<i>Gymnoascus reessii</i>	obligate	5	15848.93192	clonal	terrestrial	terrestrial	Gaetano 1986, Graham 1985
<i>Halymenia asymmetrica</i>	obligate	13	63095734450	clonal	aquatic	aquatic	Gaetano 1986, Graham 1985
<i>Haplospora globosa</i>	obligate	4	25118864320	clonal	aquatic	aquatic	Kuhlenkamp & Muller 1985, Charrier <i>et al.</i> 2007
<i>Helminthostachys zeylandica</i>	obligate	5	70794578.44	clonal	terrestrial	aquatic	Lang 1902, Graham 1985
<i>Heteroralsia saxicola</i>	obligate	9	794328234.7	clonal	aquatic	aquatic	Kawai 1989, Charrier <i>et al.</i> 2007
<i>Himantothallus grandifolius</i>	obligate	14	1.58E+12	clonal	aquatic	aquatic	Wiencke & Clayton 1990, Charrier <i>et al.</i> 2007
<i>Hirudo medicinalis</i>	obligate	26	19952623150	clonal	NA	aquatic	Mann 1962
<i>Homo sapiens</i>	obligate	200	1.00E+14	clonal	terrestrial	aquatic	Valentine <i>et al.</i> 1994
<i>Hummia onusta</i>	obligate	5	100000000	clonal	aquatic	aquatic	Fiore 1977, Charrier <i>et al.</i> 2007
<i>Hydra attenuata</i>	obligate	15	63095.73445	clonal	aquatic	aquatic	Campbell & Bode 1983, Glauber <i>et al.</i> 2010

<i>Hymenophyllum tunbridgensis</i>	obligate	15	7079457844	clonal	terrestrial	aquatic	Boodle 1900, Graham 1985
<i>Isthmoploea sphaerophora</i>	obligate	3	15848.932	clonal	aquatic	aquatic	Rueness 1974, Charrier <i>et al.</i> 2007
<i>Kurogiella saxatilis</i>	obligate	7	25118864320	clonal	aquatic	aquatic	Kawai 1993, Charrier <i>et al.</i> 2007
<i>Laminaria dentigera</i>	obligate	14	1.26E+11	clonal	aquatic	aquatic	Kain 1979, Charrier <i>et al.</i> 2007
<i>Leathesia difformis</i>	obligate	6	39810717060	clonal	aquatic	aquatic	Bold & Wynne 1978, Charrier <i>et al.</i> 2007
<i>Lemna minor</i>	obligate	18	794328.2347	clonal	terrestrial	aquatic	Daubs 1965, Graham 1985
<i>Lomandra hermaphroditicum</i>	obligate	36	35481338920	clonal	terrestrial	aquatic	Fahn 1954, Graham 1985
<i>Lumbricus terrestris</i>	obligate	57	10000000000	clonal	terrestrial	aquatic	Stephenson 1930
<i>Mamillaria elongata</i>	obligate	27	63095734450	clonal	terrestrial	aquatic	Darbishire 1904
<i>Membranoptera subtropica</i>	obligate	12	6309573.445	clonal	aquatic	aquatic	Schneider & Eisemann 1979, Graham 1985
<i>Monoclea forsteri</i>	obligate	13	3162277.66	clonal	terrestrial	aquatic	Shuster 1984, Nishiyama 2007
<i>Morone saxatilis</i>	obligate	122	2.51E+11	clonal	aquatic	aquatic	Groman 1982
<i>Mus musculus</i>	obligate	102	2.00E+11	clonal	terrestrial	aquatic	Gude <i>et al.</i> 1982
<i>Nais variabilis</i>	obligate	13	251188.6432	clonal	NA	aquatic	Stephenson 1908
<i>Neodilsea natashae</i>	obligate	12	19952623150	clonal	aquatic	aquatic	Linstrom 1984, Graham 1985
<i>Ophioglossum palmatum</i>	obligate	14	6309573445	clonal	terrestrial	aquatic	Chrysler 1941, Graham 1985
<i>Pandorina colemaniae</i>	obligate	1	16	clonal	aquatic	aquatic	Bold & Wynne 1985, Hallmann 2011
<i>Pandorina morum</i>	obligate	1	16	clonal	aquatic	aquatic	Bold & Wynne 1985, Hallmann 2011
<i>Periplaneta americana</i>	obligate	50	3162277660	clonal	terrestrial	aquatic	Smith 1968
<i>Petermannia cirrhosa</i>	obligate	39	25118864320	clonal	terrestrial	aquatic	Tomlinson & Ayensu 1968, Graham 1985
<i>Physarum polycephalum</i>	facultative	2	300	clonal	terrestrial	terrestrial	Stephenson & Stempen 1994, Baldauf & Doolittle 1996, Everhart <i>et al.</i> 2008
<i>Pinus monophylla</i>	obligate	30	10000000000	clonal	terrestrial	aquatic	Foster & Gifford 1974

<i>Pisone remota</i>	obligate	11	44668.35922	clonal	NA	aquatic	Akesson 1961
<i>Platydorina caudata</i>	obligate	1	32	clonal	aquatic	aquatic	Hallmann 2011
<i>Pleodorina californica</i>	obligate	2	128	clonal	aquatic	aquatic	Hallmann 2011
<i>Pleodorina illinoisensis</i>	obligate	2	32	clonal	aquatic	aquatic	Bonner 2004, Hallmann 2011
<i>Pleodorina indica</i>	obligate	2	128	clonal	aquatic	aquatic	Bonner 2004, Hallmann 2011
<i>Pleodorina japonica</i>	obligate	2	128	clonal	aquatic	aquatic	Hallmann 2011
<i>Pleurobrachia</i>	obligate	13	10000	clonal	aquatic	aquatic	Hyman 1940
<i>Pocheina flagellata</i>	facultative	2	NA	non-clonal	terrestrial	terrestrial	Bell & Mooers 1997, Brown <i>et al.</i> 2011
<i>Pocheina rosea</i>	facultative	2	NA	non-clonal	terrestrial	terrestrial	Bell & Mooers 1997, Brown <i>et al.</i> 2011
<i>Pogonatum stevensii</i>	obligate	21	707945784.4	clonal	terrestrial	aquatic	Chopra & Sharna 1958, Nishiyama 2007
<i>Polysphondylium pallidum</i>	facultative	2	NA	non-clonal	terrestrial	terrestrial	Stenhouse & Williams 1980
<i>Polysphondylium violaceum</i>	facultative	2	NA	non-clonal	terrestrial	terrestrial	Bonner 1959
<i>Polytrichum commune</i>	obligate	26	1000000000	clonal	terrestrial	aquatic	Puri 1981, Nishiyama 2007
<i>Pomatoceros triqueter</i>	obligate	12	70794.578	clonal	NA	aquatic	Segrove 1941
<i>Ralfsia verrucosa</i>	obligate	8	630957344.5	clonal	aquatic	aquatic	Loiseaux 1968, Charrier <i>et al.</i> 2007
<i>Saccharomyces cerevisiae</i>	facultative	3	NA	clonal	NA	terrestrial	Ratcliff <i>et al.</i> 2011, Koschwanez <i>et al.</i> 2011
<i>Sagittaria lancifolia</i>	obligate	42	1.00E+11	clonal	terrestrial	aquatic	Stant 1964, Graham 1985
<i>Salmo gairdneri</i>	obligate	116	2.51E+11	clonal	aquatic	aquatic	Yasutake 1983
<i>Salpingoeca rosetta</i>	facultative	NA	29	clonal	aquatic	aquatic	Fairclough <i>et al.</i> 2010, Dayel <i>et al.</i> 2011
<i>Sarconema scinaoides</i>	obligate	13	2511886432	clonal	aquatic	aquatic	Papenfuss & Edelstein 1974, Graham 1985
<i>Schimitzia hiscockiana</i>	obligate	14	2.00E+11	clonal	aquatic	aquatic	Maggs & Guiry 1985, Graham 1985
<i>Schimmelmanna dawsonii</i>	obligate	11	2.51E+11	clonal	aquatic	aquatic	Acleto 1972, Graham 1985

<i>Scytosiphon lomentria</i>	obligate	4	794328234.7	clonal	aquatic	aquatic	Clayton 1976, Charrier <i>et al.</i> 2007
<i>Selenipedium palmifolium</i>	obligate	35	12589254120	clonal	terrestrial	aquatic	Rosso 1966, Graham 1985
<i>Sorogena stoianovitchae</i>	facultative	1	500	non-clonal	aquatic	terrestrial	Sugimoto & Endoh 2006, Blanton & Olive 1982, Olive & Blanton 1980
<i>Sphacelaria bipinnata</i>	obligate	9	1258925412	clonal	aquatic	aquatic	Clint 1927, Charrier <i>et al.</i> 2007
<i>Sphaerobolus stellatus</i>	obligate	9	1258925.412	clonal	terrestrial	terrestrial	Buller 1933, Knoll 2011
<i>Sphagnum recurvum</i>	obligate	11	891250938.1	clonal	terrestrial	aquatic	Puri 1981, Nishiyama 2007
<i>Symphyogyna brogniarti</i>	obligate	13	446683.5922	clonal	terrestrial	aquatic	Puri 1981, Nishiyama 2007
<i>Syngoderma phinneyi</i>	obligate	6	199526.2315	clonal	aquatic	aquatic	Henry & Muller 1983, Charrier <i>et al.</i> 2007
<i>Tetrabaena socialis</i>	obligate	1	4	clonal	aquatic	aquatic	Stein 1959, Herron & Michod 2008, Hallmann 2011
<i>Volvox africanus</i>	obligate	2	8192	clonal	aquatic	aquatic	Herron & Michod 2008, Nozaki 2011, Hallmann 2011
<i>Volvox aureus</i>	obligate	2	2048	clonal	aquatic	aquatic	Hallmann 2011
<i>Volvox carteri</i>	obligate	2	2048	clonal	aquatic	aquatic	Nishii & Miller 2010, Bonner 1998, Kaiser 2001, Kirk 1999, Hallmann 2011
<i>Volvox dissipatrix</i>	obligate	2	16384	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron 2014
<i>Volvox gigas</i>	obligate	2	4096	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron 2014
<i>Volvox globator</i>	obligate	2	16384	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron 2014
<i>Volvox obversus</i>	obligate	2	2048	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron 2014
<i>Volvox rousseletii</i>	obligate	2	32768	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron

							2014
<i>Volvox tertius</i>	obligate	2	1024	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron 2014
<i>Volvulina boldii</i>	obligate	1	16	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron 2014
<i>Volvulina compacta</i>	obligate	1	16	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron 2014
<i>Volvulina pringsheimii</i>	obligate	1	16	clonal	aquatic	aquatic	Herron & Michod 2008, Hallmann 2011, Herron 2014
<i>Volvulina steinii</i>	obligate	1	16	clonal	aquatic	aquatic	Stein 1958, Hallmann 2011
<i>Wolffia arrhiza</i>	obligate	5	10000	clonal	terrestrial	aquatic	Luandolt 1986, Graham 1985
<i>Wolffia microscopica</i>	obligate	7	70794.57844	clonal	terrestrial	aquatic	Maheshwari 1954, Graham 1985
<i>Yamadaella cenomyce</i>	obligate	7	3981071706	clonal	aquatic	aquatic	Abbott 1970, Graham 1985
<i>Yamadaphycus carnosa</i>	obligate	11	1000000000	clonal	aquatic	aquatic	Mikami 1973, Graham 1985
<i>Yamagishiella unicocca</i>	obligate	1	32	clonal	aquatic	aquatic	Yamada <i>et al.</i> 2008, Herron & Michod 2008, Hallmann 2011
<i>Zeacarpa leiomorpha</i>	obligate	8	7943282347	clonal	aquatic	aquatic	Anderson <i>et al.</i> 1988, Charrier <i>et al.</i> 2007
<i>Zoothamnium alterans</i>	obligate	4	141.2537545	clonal	aquatic	aquatic	Summers 1938, Faure-Fremiet 1930