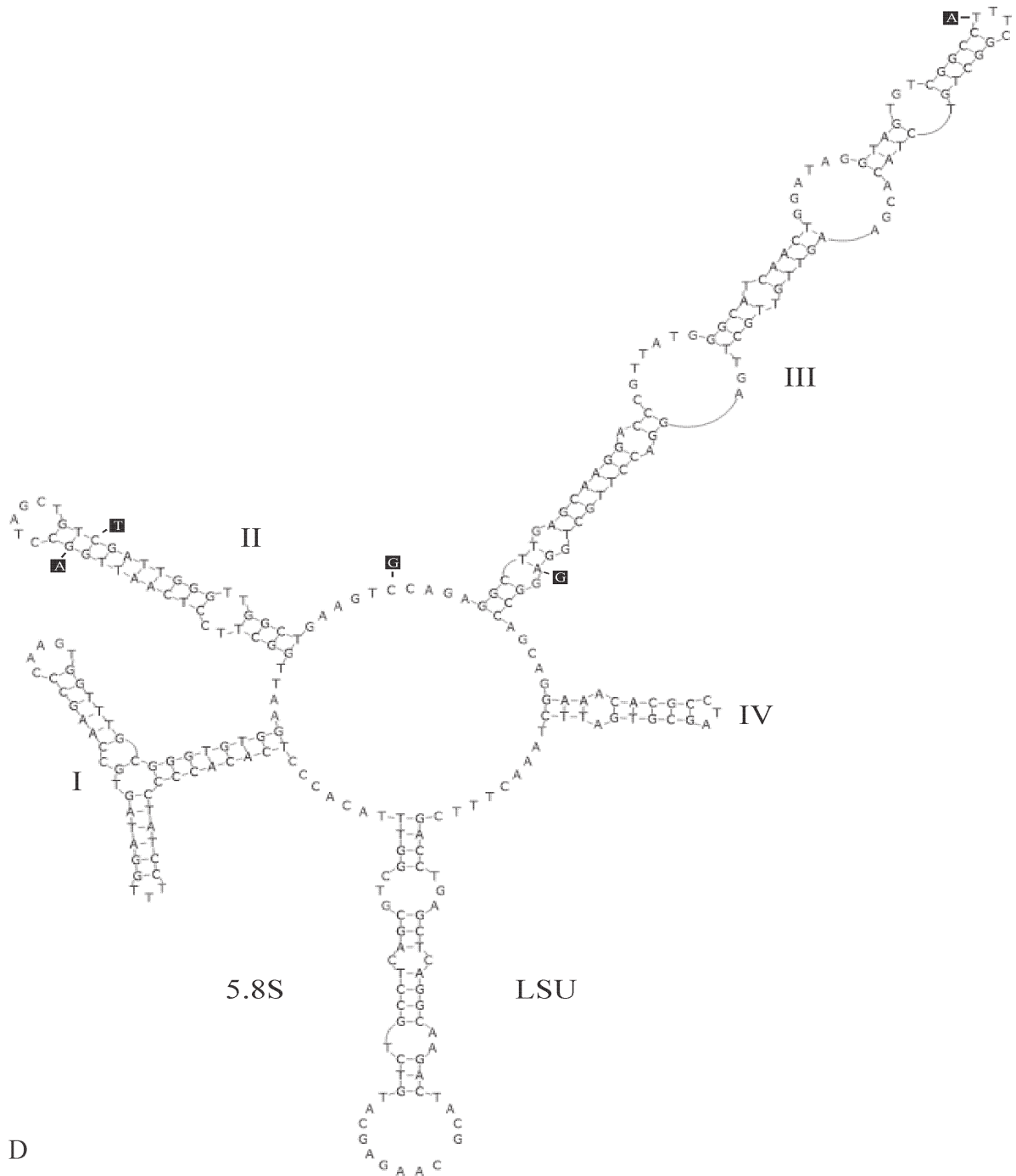


(A) ITS-2 model for the type strain of *Selenastrum bibraianum* (CCMA-UFSCar 125). In black boxes are the different bases compared to strain *Messastrum gracile* (CCMA-UFSCar 622).

(B) ITS-2 model for the type strain of *Selenastrum bibraianum* (CCMA-UFSCar 125). In gray boxes are the different bases compared to strain *Selenastrum bibraianum* (CCMA-UFSCar 47) and black boxes compared to *Selenastrum bibraianum* (CB 2012/47).

(C) ITS-2 model for the type strain of *Messastrum gracile* (CCMA-UFSCar 622). In gray boxes are the different bases of *M. gracile* (CCMA-UFSCar 470) and black boxes *M. gracile* (CCMA-UFSCar 5).



(D) ITS-2 model for the type strain of *Curvastrum pantanale* (CCMA-UFSCar 350). In gray boxes are the different bases of *C. pantanale* (CCMA-UFSCar 608).

Table S1. Morphological characteristics of algal strains used in this study. For species marked with asterisk, see taxonomic references on Material and Methods [(ND) Not described].

Taxon	Cell shape (CSH)	Cell size (CSz) (µm)	Autospore Arrangement (AA)	Pyrenoid structure	Colony formation	Diacritical feature
<i>Ankistrodesmus arcuatus</i>	Crescent-shaped, circular or arcuate, isopolar	26–60 × 0.8–4.4	Parallel	Naked	Yes	CSz and CSh
<i>Ankistrodesmus fasciculatus</i>	Fusiform, isopolar	15–32 × 1.4–5	Parallel	Naked	Yes	Colony morphology, CSz size and CSh
<i>Ankistrodesmus fusiformis</i>	Fusiform, isopolar	19.2–57 × 1–5.8	Parallel	Naked	Yes	Colony morphology, CSz and CSh
* <i>Ankistrodesmus nanmoselene</i>	Crescent or halfmoon-shaped, isopolar	2.5–5.7 × 0.5–1.8	Parallel	Naked	No	Insertae sedis inside Selenastraceae
<i>Ankistrodesmus sigmoides</i>	Fusiform, isopolar	28 × 2–3	N	Naked	Yes	Colony morphology, CSz and CSh
<i>Ankistrodesmus spiralis</i>	Fusiform, isopolar	36–68 × 1–4.3	Parallel	Naked	Yes	Colony morphology, CSz and CSh
<i>Ankistrodesmus stipitatus</i>	Fusiform, isopolar	43–105 × 1.4–4.6	Parallel	Naked	Yes	Colony morphology, CSz and CSh
<i>Chlorolobion braunii</i>	Fusiform, isopolar to heteropolar	13–52 × 2.5–8	Parallel	Amyloid	No	Colony morphology, CSz and CSh
<i>Curvastrum pantanale</i>	Narrow, fusiform to semilunate, isopolar	7–21 × 1.95–3.5	Zigzag	Naked	Yes	Genus monospecific
<i>Kirchneriella aperta</i>	Crescent or halfmoon-shaped, isopolar	6–12 × 12	Parallel	Naked	Yes	CSz and CSh
<i>Kirchneriella contorta</i> var. <i>elegans</i>	Crescent or halfmoon-shaped, isopolar	6–8 × 2	Parallel	Naked	Yes	CSz and CSh
<i>Kirchneriella irregularis</i>	Fusiform, regularly semicircular	6–21 × 3–6	Parallel	Naked	Yes	CSz and CSh
<i>Kirchneriella lunaris</i>	Crescent-shaped or slightly circular, isopolar	4–15 × 1.2–3	Parallel	Naked	Yes	CSz and CSh
<i>Kirchneriella obesa</i>	Circular, isopolar	6–16 × 2–10	Parallel	Naked	Yes	CSz and CSh
<i>Kirchneriella pseudoaperta</i>	Crescent or halfmoon-shaped, isopolar	1.6–9.6 × 2.4 × 4.2	Zigzag	Naked	Yes	CSz and CSh, AA
<i>Messastrum gracile</i>	Narrow, fusiform to semilunate, isopolar	19–55 × 1–6	Zigzag	Naked	Yes	CSz and CSh
<i>Monoraphidium braunii</i>	Fusiform, isopolar to heteropolar	13–52 × 2.5–8	Parallel	Amyloid	No	Colony morphology, CSz and CSh
<i>Monoraphidium contortum</i>	Fusiform, crescent-shaped, circular, twisted, isopolar	7–40 × 1–5	Parallel	Naked	No	CSz and CSh
* <i>Monoraphidium convolutum</i>	Fusiform, semicircular, isopolar	5–16 × 1–6	Parallel	Naked	No	CSz and CSh

Table S1 Cont.

<i>*Monoraphidium dybowskai</i>	Cylindrical, fusiform, isopolar	4–15.5 × 1.2–8	Parallel	Naked	No	CSz and CSz
<i>Monoraphidium indicum</i>	Fusiform, circular, isopolar	120–260 × 3–5	Parallel	Naked	No	CSz and CSz
<i>Monoraphidium komarkovae</i>	Needle-shaped, isopolar	25–182 × 1.4–3.5	Parallel	Naked	No	CSz and CSz
<i>*Monoraphidium neglectum</i>	Fusiform	15–37 × 2–6.5	Serial	Naked	No	CSz and CSz
<i>Monoraphidium pseudobraunii</i>	Fusiform to sigmoid, isopolar or heteropolar	8–25 × 1–2.5	Parallel	Naked	No	CSz and CSz
<i>*Monoraphidium terrestre</i>	Fusiform, cylindrical	14–30 × 2–8	Serial	Naked	No	CSz and CSz
<i>*Nephrochlamys subsolitaria</i>	Semilunate, isopolar	3.5–9.6–12	Serial	Naked	Yes	Proximity of cell ends
<i>*Podothriella falcata</i>	Needle-shaped, heteropolar	35–50 × 1.5–2.5	Serial	Naked	No	CSz and CSz
<i>*Quadrigula closterioides</i>	Cylindrical with rounded ends, isopolar	12–30 × 1–4	Parallel	Naked	Yes	Cell end and CSz
<i>Raphidocelis microscopica</i>	Conical, capitata, isopolar	3–5 × 1–2	Serial	Naked	Yes	CSz and CSz
<i>*Raphidocelis subcapitata</i>	Cylindrical, circular or sigmoid, isopolar	7–23 × 1–3	Serial	Naked	Yes	CSz and CSz
<i>*Rhombocystis complanata</i>	Rhomboidal, isopolar to heteropolar	9.5–14.5 × 2.4–3.6	Parallel	Naked	Occasionally	CSz and CSz
<i>Selenastrum bibrainum</i>	Narrow, fusiform to semilunate, isopolar	16–40 × 2.5–4.5	Zigzag	Naked	Yes	CSz and CSz
<i>*Tetranephris brasiliensis</i>	Bean-shaped	6–7.6 × 4–5.8	Serial	Naked	Yes	CSz and CSz

Table S2. List of studied strains with origin information and GenBank accession numbers for 18S rDNA and *rbcL* genes and ITS-2 secondary structure. Sequences in bold letter acquired from GenBank. [(CCMA)– UFS-Car, Coleção de culturas de Microalgas de Água Doce – Universidade Federal de São Carlos; (SAG) Sammlung der Algenkulturen der Universität Göttingen, Germany; (UTEX) The Culture Collection of Algae at the University of Texas at Austin. For own isolates or culture collections the initials were given: (CB) Christina Bock; (KR) Lothar Krienitz; Comas, Augusto Abilio Comas González; (KF) Alena Lukešová. The strain AN7–8 belongs to FAWLEY et al. 2004].

Taxon	Strain	18S	GenBank Accession Numbers		Origin
			<i>rbcL</i>	ITS-2	
Selenastraceae					
<i>Ankistrodesmus arcuatus</i>	CCMA–UFSCar 24		KT355740		Brazil – 22°12'20.6"S 47°52'37.6"W
<i>Ankistrodesmus fusiformis</i>	CCMA–UFSCar 423		KT833565		Brazil – 22°09'57.8"S 48°17'25.0"W
<i>Ankistrodesmus bibratianus</i>	SAG 278–1	Y16938			UK – 52°12'08.4"N 0°07'42.0"E
<i>Ankistrodesmus fasciculatus</i>	CB 2012/3		KT355769		Sweden – 56°40'10.4"N 14°10'03.4"E
<i>Ankistrodesmus fusiformis</i>	CB2012/6		KT833576		Sweden – 59°20'00.0"N 12°13'00.0"E
<i>Ankistrodesmus fusiformis</i>	CCMA–UFSCar 593		KT355761		Brazil – 20°25'05.6"S 47°25'41.0"W
<i>Ankistrodesmus fusiformis</i>	CCMA–UFSCar 611		KT833570		Brazil – 23°36'29.1"S 47°13'59.4"W
<i>Ankistrodesmus fusiformis</i>	KR 1988/9	X97352			Germany – 53°12'31.6"N 13°00'25.5"E
<i>Ankistrodesmus gracilis</i>	KR 1981/231	HM565930			Germany – 51°52'55.7"N 12°00'11.6"E
<i>Ankistrodesmus gracilis</i>	SAG 278–2	Y16937			UK – 51°57'54.3"N 1°09'39.9"E
<i>Ankistrodesmus nanmoselene</i>	SAG 202–6	KF673373			Sweden – 59°57'46.0"N 17°07'43.9"E
<i>Ankistrodesmus sigmoides</i>	CB2009/9	KT833600			Kenya – 53°10'06.3"N 13°07'50.9"E
<i>Ankistrodesmus spiralis</i>	CB2012/29		KT833573		Sweden – 55°32'46.4"N 13°15'05.3"E
<i>Ankistrodesmus stiptatus</i>	CCMA–UFSCar 277	KT833580			Brazil – 20°32'01.0"S 46°31'32.9"W
<i>Ankistrodesmus stiptatus</i>	CCMA–UFSCar 278	KT833581	KT355749		Brazil – 20°32'01.0"S 46°31'32.9"W
<i>Ankistrodesmus stiptatus</i>	SAG 202–5	X56100	EF113406		Czech Republic – 50°04'23.2"N 14°26'09.9"E
<i>Chlorolobion braunii</i>	CCMA–UFSCar 137	KT833579	KT355742		Brazil – 21°36'28.5"S 47°46'13.1"W
<i>Chlorolobion braunii</i>	CCMA–UFSCar 455	KT833587	KT355756		Brazil – 22°05'05.3"S 47°44'47.0"W
<i>Chlorolobion braunii</i>	CCMA–UFSCar 462	KT833588	KT355763		Brazil – 22°12'59.2"S 47°37'29.6"W
<i>Chlorolobion braunii</i>	CCMA–UFSCar 476	KT833591	KT355760		Brazil – 21°53'46.9"S 47°20'03.3"W
<i>Curvastrum pantanale</i>	CCMA–UFSCar 350	KT833584	KT355754	KU180822	Brazil – 19°17'59.0"S 55°47'45.0"W
<i>Curvastrum pantanale</i>	CCMA–UFSCar 608		KT833569	KU180824	Brazil – 23°15'25.7"S 47°18'18.6"W
<i>Kirchneriella aperta</i>	CCMA–UFSCar 482	KT833592			Brazil – 22°33'09.2"S 48°57'47.5"W
<i>Kirchneriella aperta</i>	SAG 2004	AJ271859	KC145514		Germany – 53°08'51.7"N 13°01'41.9"E

Table S2. Cont.

<i>Kirchneriella contorta</i> var. <i>elegans</i>	CCMA–UFSCar 447	KT833586			Brazil – 22°19'01.0"S 48°03'05.4"W
<i>Kirchneriella irregularis</i>	CCMA–UFSCar 348	KT833583	KT355752		Brazil – 19°17'59.0"S 55°47'45.0"W
<i>Kirchneriella lunaris</i>	CCMA–UFSCar 443		KT833566		Brazil – 22°19'01.0"S 48°03'05.4"W
<i>Kirchneriella obesa</i>	CCMA–UFSCar 345		KT833564		Brazil – 19°17'59.0"S 55°47'45.0"W
<i>Kirchneriella pseudoaperta</i>	CCMA–UFSCar 346	KT833582			Brazil – 19°17'59.0"S 55°47'45.0"W
<i>Messastrum gracile</i>	CB 2009/3	KT833596			Germany – 53°00'50.8"N 13°10'00.5"E
<i>Messastrum gracile</i>	CB 2009/35	KT861784			Germany – 52°31'32.1"N 13°17'15.5"E
<i>Messastrum gracile</i>	CCMA–UFSCar 470	KT833589	KT355759	KU180823	Brazil – 21°48'38.0"S 47°16'26.0"W
<i>Messastrum gracile</i>	CCMA–UFSCar 5	KT833577	KT355739	KU180819	Brazil – 22°12'20.6"S 47°52'37.6"W
<i>Messastrum gracile</i>	CCMA–UFSCar 622	KT833593	KT355762	KU180825	Brazil – 23°02'28.8"S 48°03'15.9"W
<i>Monoraphidium braunii</i>	KR 1986/28	AJ300527			Germany – 53°08'37.9"N 13°01'07.3"E
<i>Monoraphidium contortum</i>	CB2009/10		KT833571		Kenya – 53°10'06.3"N 13°07'50.9"E
<i>Monoraphidium contortum</i>	CCMA–UFSCar 306		KT355750		Brazil – 23°44'04.3"S 46°45'44.4"W
<i>Monoraphidium contortum</i>	CCMA–UFSCar 329		KT833563		Brazil – 8°35'17.9"S 63°37'12.3"W
<i>Monoraphidium contortum</i>	CCMA–UFSCar 349		KT355753		Brazil – 19°17'59.0"S 55°47'45.0"W
<i>Monoraphidium convolutum</i>	AS7–3	AY846377			USA – 47°17'26.8"N 98°50'07.0"W
<i>Monoraphidium convolutum</i>	KR 1981/262	HM565926			Germany – 51°49'37.8"N 11°59'41.7"E
<i>Monoraphidium dybowskii</i>	SAG 202–7e	Y16939			France – 43°06'26.3"N 0°05'10.4"W
<i>Monoraphidium indicum</i>	CCMA–UFSCar 549		KT833568		Brazil – 22°04'56.2"S 48°29'20.0"W
<i>Monoraphidium komarkovae</i>	CCMA–UFSCar 353	KT833585	KT355755		Brazil – 19°20'29.0"S 55°43'40.0"W
<i>Monoraphidium komarkovae</i>	CCMA–UFSCar 632	KT833595	KT355763		Brazil – 24°0'19.44"S 48°20'33.41"W
<i>Monoraphidium neglectum</i>	SAG 48.87	AJ300526			Germany – 51°44'43.9"N 11°58'48.6"E
<i>Monoraphidium pseudoabraunii</i>	CCMA–UFSCar 325		KT355751		Brazil – 8°35'17.9"S 63°37'12.3"W
<i>Monoraphidium terrestre</i>	SAG 49.87	Y17817			Germany – 51°47'22.9"N 12°03'53.6"E
<i>Nephrochlamys subsolitaria</i>	SAG 243–2a	HM560960			UK – 54°55'25.5"N 2°18'02.7"W
<i>Podohedriella falcata</i>	SAG 202–2	X91263			Switzerland – 47°10'37.2"N 8°12'35.0"E
<i>Quadrigula closterioides</i>	SAG 12.94	Y17924			USA – 47°11'43.2"N 95°10'00.9"W
<i>Raphidoceelis microscopica</i>	CB 2009/6		KT355768		Sweden – 0°21'20.1"S 36°03'20.5"E
<i>Raphidoceelis microscopica</i>	CB2012/39		KT833574		Sweden – 58°25'11.5"N 14°30'30.6"E

Table S2. Cont.

<i>Raphidoceles microscopica</i>	CB 2009/18		KT355764	Kenya – 0°25'49.0"S 36°13'54.6"E
<i>Raphidoceles subcapitata</i>	KR 1991/19	HM483520		Germany – 53°08'49.3"N 13°01'53.9"E
<i>Rhombocystis complanata</i>	KR 1998/2	HM483518		Dominica – 15°23'29.9"N 61°15'19.6"W
<i>Selenastrum bibratium</i>	CB2009/41	HM483514		Germany – 51°00'47.8"N 9°52'58.2"E
<i>Selenastrum bibratium</i>	CB 2009/43	KT833599		Germany – 52°27'10.4"N 13°18'25.3"E
<i>Selenastrum bibratium</i>	CB 2012/47		KT833575	Sweden – 55°52'01.4"N 13°33'21.5"E
<i>Selenastrum bibratium</i>	CB2009/39	KT833597		Sweden – 55°52'01.4"N 13°33'21.5"E
<i>Selenastrum bibratium</i>	CCMA–UFSCar 125	KT833578	KT355741	Brazil – 21°36'28.5"S 47°46'13.1"W
<i>Selenastrum bibratium</i>	CCMA–UFSCar 47		KT833561	Brazil – 21°59'08.5"S 47°52'50.6"W
<i>Selenastrum bibratium</i>	CCMA–UFSCar 630	KT833594		Brazil – 23°49'17.5"S 48°36'02.9"W
<i>Tetranephris brasiliensis</i>	KR 1989/26	HM565927		Germany – 53°32'48.5"N 13°15'10.6"E
<i>Tetranephris brasiliensis</i>	Comas 1991/6	HM565929		Cuba – 22°17'05.4"N 80°33'32.2"W
Bracteococcaceae				
<i>Bracteococcus aerius</i>	KF26		JQ259861	Sweden – 68°21'03.5"N 18°49'45.2"E
<i>Bracteococcus bullatus</i>	KF22		JQ259877	Czech Republic – 50°04'26.8"N 14°27'02.0"E
<i>Bracteococcus cohaerens</i>	SAG 2369	HQ246325	HQ246363	South Africa – 30°07'11.2"S 17°35'26.8"E
<i>Bracteococcus grandis</i>	UTEX 1246		GQ985396	USA – 30°39'27.5"N 97°36'19.1"W
Hydrodictyaceae				
<i>Pediastrum duplex</i>	SAG 28.83	AY780662		Germany – 49°17'21.8"N 7°50'59.5"E

Table S3. 18S rDNA, *rbcL* and ITS primers used for amplification and sequencing of Selenastraceae.

Primer Name	Sequence 5'-3'	Direction	Target gene	Reference
18S F1	AATCTGGTTGATCCTGCCAGT	FW	18S	Katana et al.2001
1 F	CTGGTTGATCCTGCCAG	FW	18S	Huss et al.1999
300 F	AGGGTTCGATTCGGGAG	FW	18S	Huss et al.1999
528 F	CGGTAATCCAGCTCC	FW	18S	Huss et al.1999
690 F	YAGAGGTGAAATTCT	FW	18S	Huss et al.1999
920F	GAAACTTAAAKGAATTG	FW	18S	Huss et al.1999
1055 F	GGTGGTGCAITGGCCG	FW	18S	Huss et al.1999
1400F	TGYACACACCCGCCCGTC	FW	18S	Huss et al.1999
920 R	ATTCTTTTRAGTTTC	RV	18S	Huss et al.1999
1200 R	GGGCATCACAGACCTIG	RV	18S	Huss et al.1999
1520 R	CYGCAGGTTTCACTTAC	RV	18S	Huss et al.1999
18SR1	TGATCCTTCTGCAGGTTTACCTA	RV	18S	Katana et al.2001 (modified)
<i>rbcL</i> 1	ATGGTTCCACAACAGAAAC	FW	<i>rbcL</i>	Nozaki et al. 1995
<i>rbcL</i> 320	TATTCGAAGAAAGGTTTCAGTAAC	FW	<i>rbcL</i>	Rindi et al. 2008
<i>rbcL</i> RH1	ATGTCACCACAAAACAGAACTAAAGC	FW	<i>rbcL</i>	Manhart, J.R. 1994
<i>rbcL</i> 320 mod	TATTYGAASAAGGTTTCWGTWAC	FW	<i>rbcL</i>	Proposed on this study
Selenastraceae <i>rbcL</i> F	CGYTACAAAAGDCGTTGYT	FW	<i>rbcL</i>	Proposed on this study
<i>rbcL</i> 1181	AAGATTTCAAACTAAAAGCTGGCA	RV	<i>rbcL</i>	Nozaki et al. 1995
<i>rbcL</i> 1385	GAAAAGAAAATTAATTTGAATT	RV	<i>rbcL</i>	McCourt et al.2000
<i>rbcL</i> 1421	TTGTCAATAGTATCAAAATTC	RV	<i>rbcL</i>	Nozaki et al. 1995
<i>rbcL</i> ORB	CTGGAGCAITACCCCAAGG	RV	<i>rbcL</i>	Pazoutova unpublished
<i>rbcL</i> Orb modified	CTGGNGCRTTACCCCAAGG	RV	<i>rbcL</i>	Proposed on this study
Selenastraceae <i>rbcL</i> R	RTTACCCCAWGGGTGHCCTA	RV	<i>rbcL</i>	Proposed on this study
1420F	CAGGTCTGTGATGCC	FW	ITS	Rogers et al. 2006

Table S3 Cont.

NS7m	GGCAATAAACAGGTCTGT	FW	ITS	An et al. 1999
ITS055R	CTCCTTGGTCCCGTGTTCAAAGACGGG	RV	ITS	Marin et al. 1998
LR1850	CCTCACGGTACTTGTTTC	RV	ITS	An et al. 1999