

Supplementary Table S2. Sequence information of downloaded from GenBank

Clade / Species	Accession No.	Collection information	Reference	Published in GenBank
<i>Grateloupia subpectinata</i> clade (Fig. 3)				
" <i>G.</i> <i>subpectinata</i> "	AB114208	Seto, Shirahama, Wakayama, Japan; Mar 30, 2001	Faye et al. (2004)	-
	AB114209	Seto, Shirahama, Wakayama, Japan; Mar 30, 2001	Faye et al. (2004)	-
	AB114210	Koyurugi, Kamakura, Kanagawa, Japan; Apr 7, 2000	Faye et al. (2004)	-
	AB114211	Chojagasaki, Hayama, Kanagawa, Japan; Mar 23, 2003	Faye et al. (2004)	-
	AB114212	Chojagasaki, Hayama, Kanagawa, Japan; Mar 23, 2003	Faye et al. (2004)	-
	AB114213	Irago-misaki, Atsumi, Aichi, Japan; Jun 3, 2000	Faye et al. (2004)	-
	AM422898	Cottesloe, Western Australia, Australia; Dec 9, 1999	Figueroa et al. (2007)	-
	AJ868489	Williamstown, Victoria, Australia; May 9, 2003	De Clerck et al. (2005a)	-
	AJ868490	Perth, Western Australia; Oct 10, 2003	De Clerck et al. (2005a)	-
	AJ868491	Locmariaquer, Brittany, France; May 20, 2003	De Clerck et al. (2005a)	-
	AJ868492	Pontevedra, Tragove, Spain; May 4, 2000	De Clerck et al. (2005a)	-
	AP018129	Hakodate, Hokkaido, Japan; Feb 2015	Sumikawa et al. (2020)	" <i>G. asiatica</i> "
	AY775384	Thau Lagoon, France; May 1998	Verlaque et al. (2005)	-
	AY775391	Thau Lagoon, France; May 1998	Verlaque et al. (2005)	-
	AY775392	Thau Lagoon, France; May 1998	Verlaque et al. (2005)	-
	GU168549	Yeonggeumjeong, Sokcho, Korea; Apr 12, 2008	Lee et al. (2009)	-
	KJ648566	Jongdal, Jeju, Korea; Mar 25, 2012	Yang and Kim (2015)	-
	KJ648567	Pyeongdae, Jeju, Korea; Jun 1, 2012	Yang and Kim (2015)	-
	KF156715	Tauranga, New Zealand; Aug 24, 2012	Nelson et al. (2013)	-
	KF156716	Gangneung, Korea; Feb 19, 2011	Nelson et al. (2013)	-
	KF156717	Oki island, Japan; May 5, 2003	Nelson et al. (2013)	-
	KF156718	Yura, Japan; Mar 29, 2007	Nelson et al. (2013)	-
	KF156719	Sungsan, Jeju, Korea; May 26, 2010	Nelson et al. (2013)	-
	KF156720	Gamchusa, Donghae, Korea; Mar 14, 2010	Nelson et al. (2013)	-
	KF156721	Dodu, Jeju, Korea; Jun 4, 2009	Nelson et al. (2013)	-
	KF156722	Geojae, Korea; May 1, 2003	Nelson et al. (2013)	-
	KF156723	Kimnyeong, Jeju, Korea; May 6, 2008	Nelson et al. (2013)	-
	KF156724	Donghae, Korea; Oct 27, 2012	Nelson et al. (2013)	-
	KF156725	Yangyang, Korea; Oct 27, 2012	Nelson et al. (2013)	-
	KF156726	Gangneung, Korea; Oct 27, 2012	Nelson et al. (2013)	-
	KF156727	Yangyang, Korea; Oct 27, 2012	Nelson et al. (2013)	-
	KF156742	Dalian, China; Oct 14, 2008	Kim et al. (2013)	-
	KF156743	Gamchusa, Donghae, Korea; Mar 14, 2010	Kim et al. (2013)	-
	KF543070	Jeju, Korea	Yang and Kim (unpublished)	-
	KU726708	Williamstown, Victoria, Australia; Feb 18, 1993	Filloramo and Saunders (2016)	-
	KU772699	Snug Park, Tasmania, Australia; Jan 20, 2010	Filloramo and Saunders (2016)	-
	KY047357	Dalei, Wenzhou, China; Feb 15, 2014	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047358	Zhongxinyu, Wenzhou, China; Feb 15, 2014	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047359	Longchuanjiao, Wenzhou, China; Feb 16, 2014	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047360	Zhuyu, Wenzhou, China; Apr 18, 2014	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047361	Chaoanhaimen, Shantou, China; Apr 19, 2014	Liu et al. (2017)	as <i>G. didymecladia</i>

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Clade / Species	Accession No.	Collection information	Reference	Published in GenBank
	KY047362	Chaoanhaimen, Shantou, China; Apr 20, 2014	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047363	Heishijiao, Dalian, China; Mar 20, 2013	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047364	Jinshitan, Dalian, China; Feb 21, 2014	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047365	Houjishan, Wenzhou, China; Jun 5, 2016	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047366	Houjishan, Wenzhou, China; Jun 5, 2016	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY047367	Dalei, Wenzhou, China; Jun 5, 2016	Liu et al. (2017)	as <i>G. didymecladia</i>
	KY486723	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
	KY486726	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
	KY486727	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
	MG598531	Xiangshan Harbor, Zhejiang, China	Zhang et al. (2018)	" <i>G. filicina</i> "
	MK125385	Mallacoota, Vic, Australia	Verbruggen and Costa (unpublished)	-
	MT656298	China	Unpublished	" <i>G. corymbcladia</i> "
	MT656299	China	Unpublished	" <i>G. corymbcladia</i> "
	MT656300	China	Unpublished	" <i>G. corymbcladia</i> "
	MT656301	China	Unpublished	" <i>G. corymbcladia</i> "
	MT656302	China	Unpublished	" <i>G. corymbcladia</i> "
	MT656303	China	Unpublished	" <i>G. corymbcladia</i> "
	MZ509529	Wenzhou, Zhejiang, China	Duan et al. (2022)	" <i>G. oligoclora</i> "
	MZ509530	Wenzhou, Zhejiang, China	Duan et al. (2022)	" <i>G. oligoclora</i> "
	MZ509531	Wenzhou, Zhejiang, China	Duan et al. (2022)	" <i>G. oligoclora</i> "
	MZ509532	Wenzhou, Zhejiang, China	Duan et al. (2022)	" <i>G. oligoclora</i> "
	MZ509533	Wenzhou, Zhejiang, China	Duan et al. (2022)	" <i>G. oligoclora</i> "
" <i>Grateloupia</i> " sp.	AY435175	NSW, Australia	Wilkes et al. (unpublished)	" <i>G. luxurians</i> "
	AY435176	Portsmouth, United Kingdom	Wilkes et al. (unpublished)	" <i>G. luxurians</i> "
" <i>G. turuturu</i> "	AB055475	Onahama, Iwaki, Fukushima, Japan; Sep 16, 1999	Kawaguchi et al. (2001)	-
	KF156744	Sodol, Gangneung, Korea; Mar 14, 2010	Kim et al. (2013)	-
	MN853877	Qinhuangdao, China	Han and Li (2020)	-
" <i>G. sparsa</i> "	AB055473	Oohara, Chiba, Japan; Apr 9, 2000	Kawaguchi et al. (2001)	-
	AB055474	Onahama, Iwaki, Fukushima, Japan; Sep 16, 1999	Kawaguchi et al. (2001)	-
" <i>G. phuquocensis</i> "	AY772022	Kaalawai, Oahu, Hawaiian Islands	De Clerck et al. (2005a)	-
" <i>G. huangiae</i> "	HM590408	Longdong, Taiwan, China; Apr 20, 2003	Lin and Liang (2011)	-
	HM590409	Liping, Taiwan, China; Jan 17 2005	Lin and Liang (2011)	-
	HM590410	Makang, Taiwan, China; Apr 30, 2002	Lin and Liang (2011)	-
" <i>G. taiwanensis</i> "	KC894740	Orange Beach, AL, USA; Apr 6, 2011	De Priest et al. (2013)	-
	MK167364	Da Nang, Vietnam; Feb 2017	Nguyen et al. (2019)	-
<i>Mariaramirezia lapathifolia</i>	KF363929	La Punta, Callao, Lima, Peru	Calderon et al. (2014)	as <i>Cryptonemia lapathifolia</i>
<i>M. osornoensis</i>	MG191653	Los Chonos, Chiloe I., Chile; Dec 15, 1998	Schneider et al. (2018)	-
Prionitis clade (Fig. 4)				
" <i>Grateloupia</i> " asiatica	AB055484	Shimiao, Dalian, Liaoning, China; Mar 18, 1999	Kawaguchi et al. (2001)	-
	AB055485	Shicao, Dalian, Liaoning, China; Feb 17, 1999	Kawaguchi et al. (2001)	-
	AB055486	Iwakuni, Yamaguchi, Japan; Feb 20, 2000	Kawaguchi et al. (2001)	-

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Clade / Species	Accession No.	Collection information	Reference	Published in GenBank
	AB055487	Tsuyazaki, Fukuoka, Japan; Apr 11, 1998	Kawaguchi et al. (2001)	-
	AB055488	Qingdao, Shandong, China; Mar 11, 1999	Kawaguchi et al. (2001)	-
	AB055489	Nokoshima, Fukuoka, Japan; Apr 17, 2000	Kawaguchi et al. (2001)	-
	AB055490	Nokoshima, Fukuoka, Japan; Apr 17, 2000	Kawaguchi et al. (2001)	-
	AB055491	Myoken-misaki, Hakata Bay, Fukuoka, Japan; May 18, 2000	Kawaguchi et al. (2001)	-
	AB055492	Minatoura, Sukumo, Kochi, Japan; May 5, 2000	Kawaguchi et al. (2001)	-
	AY178762	Qingdao, Shandong, China; Jun 29, 1994	Mateo-Cid et al. (2005)	-
	AY178763	Qingdao, Shandong, China; Jun 29, 1994	Mateo-Cid et al. (2005)	-
	AY775393	Thau Lagoon, France; May 1998	Verlaque et al. (2005)	-
	AY775394	Thau Lagoon, France; Oct 2000	Verlaque et al. (2005)	-
	AY775395	Thau Lagoon, France; Oct 2000	Verlaque et al. (2005)	-
	GU168533	Yeonggeumjeong, Sokcho, Korea; Apr 12, 2008	Lee et al. (2009)	-
	GU168534	Kimnyeong, Jeju, Korea; May 6, 2008	Lee et al. (2009)	-
	JX307635	Coronado Island, San Diego, CA, USA; Jun 25, 2012	Hughey (unpublished)	-
	KF156733	Dadae, Geogje, Korea; Aug 24, 2009	Kim et al. (2013)	-
	KF156732	Gijang, Busan, Korea; Feb 5, 2011	Kim et al. (2013)	-
	KF475728	Noguri, Namhaedo, Korea; May 20, 2012	Yang and Kim (2015)	-
	KP676387	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KP676388	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KP676389	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KP676390	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KR905588	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KR905589	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KR905590	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KR905591	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KR905592	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KR905593	China	Li et al. (2016) (in Chinese)	as <i>G. fastigiata</i>
	KU365972	Dalian, Liaoning, China	Wang et al. (2016) (in Chinese)	-
	KU365973	Dalian, Liaoning, China	Wang et al. (2016) (in Chinese)	-
	KU365974	Dalian, Liaoning, China	Wang et al. (2016) (in Chinese)	-
	KU365975	Dalian, Liaoning, China	Wang et al. (2016) (in Chinese)	-
	KU365976	Dalian, Liaoning, China	Wang et al. (2016) (in Chinese)	-
	KU365977	Dalian, Liaoning, China	Wang et al. (2016) (in Chinese)	-
	KU365978	Dalian, Liaoning, China	Wang et al. (2016) (in Chinese)	-
	KU365979	Dalian, Liaoning, China	Wang et al. (2016) (in Chinese)	-
	KY486737	Qingdao, Shandong, China	Peng et al. (2018)	-
	KY486738	Qingdao, Shandong, China	Peng et al. (2018)	-
	KY486747	Qingdao, Shandong, China	Peng et al. (2018)	-
	MK342606	The First Swimming Beach, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MK342607	The First Swimming Beach, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MK342608	The First Swimming Beach, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>

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Clade / Species	Accession No.	Collection information	Reference	Published in GenBank
	MK342609	Luxun Park, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MK342610	Luxun Park, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MK342611	Luxun Park, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MK342612	Luxun Park, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MK342613	Maidao, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MK342614	Maidao, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MK342615	Maidao, Qingdao, China	Liu et al. (2020)	as <i>G. qingdaoensis</i>
	MN412709	China	Wang et al. (unpublished)	" <i>G. constricta</i> "
	MN412710	China	Wang et al. (unpublished)	" <i>G. constricta</i> "
	MN412711	China	Wang et al. (unpublished)	" <i>G. constricta</i> "
	MN412712	China	Wang et al. (unpublished)	" <i>G. constricta</i> "
	MN412713	China	Wang et al. (unpublished)	" <i>G. constricta</i> "
	MN412714	China	Wang et al. (unpublished)	" <i>G. constricta</i> "
	MN412715	China	Wang et al. (unpublished)	" <i>G. constricta</i> "
	MN412716	China	Wang et al. (unpublished)	" <i>G. constricta</i> "
	MN809604	China	Wen et al. (unpublished)	" <i>G. sorocarpus</i> "
	MN809605	China	Wen et al. (unpublished)	" <i>G. sorocarpus</i> "
	MN809606	China	Wen et al. (unpublished)	" <i>G. sorocarpus</i> "
	MN809607	China	Wen et al. (unpublished)	" <i>G. sorocarpus</i> "
	MN809608	China	Wen et al. (unpublished)	" <i>G. sorocarpus</i> "
	MN809609	China	Wen et al. (unpublished)	" <i>G. sorocarpus</i> "
	MN809610	China	Wen et al. (unpublished)	" <i>G. sorocarpus</i> "
	MN809611	China	Wen et al. (unpublished)	" <i>G. sorocarpus</i> "
	MZ753748	Korea & Qingdao and Dalian, China & Oshoro, Japan	Yang et al. (2021)	-
	MZ753749	Gemoondo, Yeosu, Korea	Yang et al. (2021)	-
	MZ753750	Seogwipo, Jeju, Korea	Yang et al. (2021)	-
	MZ753751	Yeongdeok, Korea & Shimoda, Misaki, Japan	Yang et al. (2021)	-
	MZ753752	Pohang, Korea	Yang et al. (2021)	-
	MZ753753	Busan, Korea	Yang et al. (2021)	-
	MZ753754	Seogwipo, Jeju, Korea	Yang et al. (2021)	-
	MZ753755	Seogwipo, Jeju, Korea	Yang et al. (2021)	-
	MZ753756	Seogwipo, Jeju, Korea	Yang et al. (2021)	-
	MZ753757	Seogwipo, Jeju, Korea	Yang et al. (2021)	-
" <i>G. variata</i> "	KC869679	Luxun Park, Qingdao, Shandong, China; May 3, 2011	Cao et al. (2016a)	as <i>Grateloupia</i> sp. / <i>G. intermedia</i>
	KC869680	Luxun Park, Qingdao, Shandong, China; May 3, 2011	Cao et al. (2016a)	as <i>Grateloupia</i> sp. / <i>G. intermedia</i>
	KC869681	Luxun Park, Qingdao, Shandong, China; May 3, 2011	Cao et al. (2016a)	as <i>Grateloupia</i> sp. / <i>G. intermedia</i>
	KC869682	Luxun Park, Qingdao, Shandong, China; May 3, 2011	Cao et al. (2016a)	as <i>Grateloupia</i> sp. / <i>G. intermedia</i>
" <i>G. serra</i> "	KP195734	Luxun Park, Qingdao, Shandong, China; May 25, 2013	Lou et al. (2019)	as <i>Grateloupia</i> sp. / <i>G. serra</i>
	KP195735	Luxun Park, Qingdao, Shandong, China; May 25, 2013	Lou et al. (2019)	as <i>Grateloupia</i> sp. / <i>G. serra</i>
	KP195736	Luxun Park, Qingdao, Shandong, China; May 25, 2013	Lou et al. (2019)	as <i>Grateloupia</i> sp. / <i>G. serra</i>
	KP195737	Luxun Park, Qingdao, Shandong, China; May 25, 2013	Lou et al. (2019)	as <i>Grateloupia</i> sp. / <i>G. serra</i>

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" <i>G.</i> <i>acuminata</i>	AB055480	Katase, Fujisawa, Kanagawa, Japan; Apr 7, 2000	Kawaguchi et al. (2001)	-
" <i>G.</i> <i>livida</i>	AB038610	Miyake Island, Tokyo, Japan; Jul 13, 1998	Wang et al. (2000)	-
	AB055481	Hakodate, Hokkaido, Japan; 1988	Kawaguchi et al. (2001)	-
	AB055482	Muroto-misaki, Kochi Prefecture, Japan; May 7, 2000	Kawaguchi et al. (2001)	-
	AB055483	Irago-misaki, Aichi, Japan; Jun 3, 2000	Kawaguchi et al. (2001)	-
	AB809602	Ilwaco, WA, USA (Thnami debris); Jun 15, 2012	Hanyuda et al. (2018)	-
	AF488815	Muroran, Hokkaido, Japan; Sep 6, 1993	Gavio and Fredericq (2002)	-
	KY486731	Weihai, Shandong, China	Peng et al. (2018)	-
	KY486732	Weihai, Shandong, China	Peng et al. (2018)	-
	KY486733	Weihai, Shandong, China	Peng et al. (2018)	-
	KY486734	Weihai, Shandong, China	Peng et al. (2018)	-
	KY486735	Weihai, Shandong, China	Peng et al. (2018)	-
	KY486746	Weihai, Shandong, China	Peng et al. (2018)	-
" <i>G.</i> <i>elata</i>	AB061388	Oohara, Chiba, Japan; Sep 15, 1999	Wang et al. (2001)	as <i>Prionitis elata</i>
	AB061389	Oohara, Chiba, Japan; Apr 9, 2000	Wang et al. (2001)	as <i>Prionitis elata</i>
" <i>G.</i> <i>patens</i>	AB061390	Shinori, Hakodate, Hokkaido, Japan; Sep 11, 1999	Wang et al. (2001)	as <i>Prionitis patens</i>
	AB061391	Kamakura, Kanakawa, Japan; Apr 7, 2000	Wang et al. (2001)	as <i>Prionitis patens</i>
	AB061392	Oohara, Chiba, Japan; Apr 9, 2000	Wang et al. (2001)	as <i>Prionitis patens</i>
" <i>G.</i> <i>schmitziana</i>	AB061394	Oohara, Chiba, Japan; Apr 9, 2000	Wang et al. (2001)	as <i>Prionitis schmitziana</i>
	AB061398	Kamakura, Kanakawa, Japan; Aug 8, 1998	Wang et al. (2001)	as <i>Prionitis schmitziana</i>
	AB061399	Kamakura, Kanakawa, Japan	Wang et al. (2001)	as <i>Prionitis schmitziana</i>
" <i>G.</i> <i>jejuensis</i>	KF156729	Gijang, East coast, Korea; Feb 28, 2010	Kim et al. (2013)	as <i>Grateloupia</i> sp.
	KJ648563	Shinchon, Jeju, Korea; May 16, 2012	Yang and Kim (2015)	as <i>Grateloupia</i> sp.
" <i>G.</i> <i>divaricata</i>	GU168536	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	GU168537	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	GU168538	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	GU168539	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	GU168540	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	GU168541	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	GU168542	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	GU168543	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	GU168544	Sacheonjin, Gangneung, Korea; Aug 9, 2008	Lee et al. (2009)	-
	KF156734	Jeoncheon, Donghae, Korea; Feb 7, 2010	Kim et al. (2013)	-
	KF475729	Jumunjin, Gangneung, Korea	Yang and Kim (unpublished)	-
	KJ648559	Gyungpodae, Gangneung, Korea; Aug 21, 2011	Yang and Kim (2015)	-
	KJ648560	Anin, Gangneung, Korea; May 19, 2012	Yang and Kim (2015)	-
	AY178764	Oshoro, Hokkaido, Japan; Sep 5, 1995	Mateo-Cid et al. (2005)	-
	AB038609	Oshoro, Hokkaido, Japan; Apr 7, 1998	Wang et al. (2000)	-
<i>Prionitis filiformis</i>	KF156746	A sunset at pescadero state beach, CA, USA; May 28, 2010	Kim et al. (2013)	-
<i>P. lanceolata</i>	AY772037	Pigion Point, CA, USA; Dec 21, 1992	De Clerck et al. (2005b)	as <i>Grateloupia americana</i>
<i>P. simplex</i>	MG191648	San Juan Island, WA, USA	Schneider et al. (2018)	-

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Clade / Species	Accession No.	Collection information	Reference	Published in GenBank
<i>P. sternbergii</i>	AY772033	San Luis, CA, USA	De Clerck et al. (2005a)	" <i>Prionitis lyalii</i> "
<i>Pachymeniopsis elliptica</i>	KF156737	Gamchusa, Donghae, Korea; Mar 14, 2010	Kim et al. (2013)	-
<i>Pachymeniopsis imbricata</i>	KF156739	Gimnyoung, Jeju, Korea; Aug 24, 2006	Kim et al. (2013)	-
<i>Grateloupia sensu stricto</i> (Fig.5)				
<i>G. catenata</i>	KJ648558	Sehaw, Jeju, Korea; Jan 6, 2012	Yang and Kim (2015)	-
	KF475737	Gimnyeong, Jeju, Korea; May 18, 2012	Yang and Kim (2015)	-
	GU168535	Hakampo, Taean, Korea; Nov 11, 2001	Lee et al. (2009)	-
	KF156735	Hupohang, Uljin, Korea; Jan 11, 2002	Kim et al. (2013)	-
	DQ787590	Hakampo, Taean, Korea; Nov 11, 2001	Yang et al. (2016)	" <i>G. divaricata</i> "
	JF803876	Qinhuangdao, Hebei, China	Sheng et al. (2012)	as <i>Sinotubimorpha claviformis</i>
	JF803877	Qinhuangdao, Hebei, China	Sheng et al. (2012)	as <i>S. claviformis</i>
	JF803878	Qinhuangdao, Hebei, China	Sheng et al. (2012)	as <i>S. claviformis</i>
	JF803879	Qingdao, Shandong, China	Sheng et al. (2012)	as <i>S. catenata</i>
	JF803880	Qingdao, Shandong, China	Sheng et al. (2012)	as <i>S. catenata</i>
	JF803881	Shanwei, Guangdong, China	Sheng et al. (2012)	as <i>S. guangdongensis</i>
	JF803882	Shanwei, Guangdong, China	Sheng et al. (2012)	as <i>S. guangdongensis</i>
	JF803883	Qingdao, Shandong, China	Sheng et al. (2012)	as <i>S. qingdaoensis</i>
	JF803884	Qingdao, Shandong, China	Sheng et al. (2012)	as <i>S. qingdaoensis</i>
	JF803885	Fuzhou, Fujian, China	Sheng et al. (2012)	as <i>S. ramosissima</i>
	AB038613	Hakodate, Hokkaido, Japan; Sep 11, 1999	Wang et al. (2000)	-
	AB038614	Mikuni, Fukui, Japan; Sep 6, 1998	Wang et al. (2000)	-
	AB038615	Kamaya, Hokkaido, Japan; Sep 11, 1999	Wang et al. (2000)	-
	AB038616	Motoujina, Hiroshima, Japan; Jun 23, 1998	Wang et al. (2000)	-
	AB038617	Dalian, Liaoning, China; Aug 12, 1999	Wang et al. (2000)	-
	AB038618	Dalian, Liaoning, China; Aug 11, 1999	Wang et al. (2000)	-
	KY486720	Guangdong, China	Peng et al. (2018)	-
	KY486721	Guangdong, China	Peng et al. (2018)	-
	KY486722	Guangdong, China	Peng et al. (2018)	-
	KY486744	Guangdong, China	Peng et al. (2018)	-
	KY486745	Guangdong, China	Peng et al. (2018)	-
	KY486728	Weihai, Shandong, China	Peng et al. (2018)	-
	KY486729	Weihai, Shandong, China	Peng et al. (2018)	-
	KY486730	Weihai, Shandong, China	Peng et al. (2018)	-
<i>G. ramosissima</i>	AB061393	Ootsuki, Kochi, Japan; Mar 23, 2000	Wang et al. (2001)	as <i>Prionitis ramosissima</i>
	AB061396	Kamakura, Kanagawa, Japan; Aug 8, 1998	Wang et al. (2001)	as <i>Prionitis ramosissima</i>
	AB061395	Con, Nha Trang, Vietnam; May 2, 1999	Wang et al. (2001)	as <i>Prionitis ramosissima</i>
	AF488810	Keelung, Taiwan, China; Aug 12, 1993	Gavio and Fredericq (2002)	-
	AF488811	Keelung, Taiwan, China; Jul 5, 1994	Gavio and Fredericq (2002)	-
	EU292741	Linping, Taiwan, China; Jan 17, 2005	Lin et al. (2008)	-
<i>G. tenuis</i>	KC918541	Lingshui, Hainan, China; Feb 5, 2009	Yu et al. (2013)	as <i>Grateloupia</i> sp. / <i>G. tenuis</i>
	KC918542	Lingshui, Hainan, China; Feb 5, 2009	Yu et al. (2013)	as <i>Grateloupia</i> sp. / <i>G. tenuis</i>

Supplementary Table S2. Continued

Clade / Species	Accession No.	Collection information	Reference	Published in GenBank
<i>G. huanghaiensis</i>	KC918543	Lingshui, Hainan, China; Feb 5, 2009	Yu et al. (2013)	as <i>Grateloupia</i> sp. / <i>G. tenuis</i>
	KC918544	Lingshui, Hainan, China; Feb 5, 2009	Yu et al. (2013)	as <i>Grateloupia</i> sp. / <i>G. tenuis</i>
	JN704571	Luxun Park, Qingdao, Shandong, China; Jun 22, 2010	Wang et al. (2015)	as <i>Grateloupia</i> sp. / <i>G. huanghaiensis</i>
	JN704572	Luxun Park, Qingdao, Shandong, China; Jun 22, 2010	Wang et al. (2015)	as <i>Grateloupia</i> sp. / <i>G. huanghaiensis</i>
<i>G. ramosa</i>	KC869931	China; Jun 22, 2010	Wang et al. (unpublished)	as <i>Grateloupia</i> sp. / <i>G. huanghaiensis</i>
	KC869932	China; Jun 22, 2010	Wang et al. (unpublished)	as <i>Grateloupia</i> sp. / <i>G. huanghaiensis</i>
	JF810596	Wenchang, Hainan, China	Cao et al. (2016b)	as <i>Grateloupia</i> sp. / <i>G. ramosa</i>
	JF810597	Lingshui, Hainan, China	Cao et al. (2016b)	as <i>Grateloupia</i> sp. / <i>G. ramosa</i>
	JF810598	Lingshui, Hainan, China	Cao et al. (2016b)	as <i>Grateloupia</i> sp. / <i>G. ramosa</i>
	JX974606	Wenchang, Hainan, China	Cao et al. (2016b)	as <i>Grateloupia</i> sp. / <i>G. ramosa</i>
<i>G. filicina</i>	JX974607	Wenchang, Hainan, China	Cao et al. (2016b)	as <i>Grateloupia</i> sp. / <i>G. ramosa</i>
	JX974608	Lingshui, Hainan, China	Cao et al. (2016b)	as <i>Grateloupia</i> sp. / <i>G. ramosa</i>
	AB055470	Quercianella, Italy; Apr 14, 2000	Kawagichi et al. (2001)	-
	AB055471	Quercianella, Italy; Apr 14, 2000	Kawagichi et al. (2001)	-
	AB055472	Livorno, Italy; May 26, 2000	Kawagichi et al. (2001)	-
	AY775389	Marseille, France; Oct 2001	Verlaque et al. (2005)	-
	AY775390	Marseille, France; Oct 2001	Verlaque et al. (2005)	-
	AY772028	Pontellieria, Sicily, Italy; Apr 3, 2003	De Clerck et al. (2005a)	-
	AJ868473	Banyuls, France; Jul 25, 1976	De Clerck et al. (2005b)	-
	AJ868474	Cala Aguafreida, Begur, Girona, Spain; May 1, 2002	De Clerck et al. (2005b)	-
	AJ868475	Roques Planes, Palamo´s, Spain; May 4, 2004	De Clerck et al. (2005b)	-
	AJ868476	Pontellieria, Sicily, Italy; Apr 3, 2003	De Clerck et al. (2005b)	-
	KP281328	Port of Asturias, Spain; Sep 30, 1996	Montes et al. (unpublished)	-
	MH670459	Port of Chebba, Tunisia; Apr 27, 2014	Manghisi et al. (2019)	-
	JX070629	Livorno, Italy; Jul 1, 2002	Gargiulo et al. (2013)	-
	<i>G. orientalis</i>	AM422893	Corsica, Calvi, France; Jul 6, 1981	Figuerola et al. (2007)
HG794422		Venice Lagoon, Italy	Wolf et al. (2014)	-
EU292744		Linyuan, Taiwan, China; Feb 12, 2003	Lin et al. (2008)	as <i>Grateloupia</i> sp. / <i>G. orientalis</i>
AJ868477		Sebastian Inlet, Hutchinson Island, FL, USA; Feb 14, 1999	De Clerck et al. (2005b)	" <i>G. filicina</i> "
AJ868478		Coquina rocks, Marineland, FL, USA; Apr 8, 2001	De Clerck et al. (2005b)	" <i>G. filicina</i> "
AJ868479		Moorea, French Polynesia; May 13, 2002	De Clerck et al. (2005b)	" <i>G. filicina</i> "
AJ868483		Port Aransas, TX, USA; Feb 1, 2000	De Clerck et al. (2005b)	" <i>G. filicina</i> "
AJ868484		Galveston, TX, USA; Jun 1, 2001	De Clerck et al. (2005b)	" <i>G. filicina</i> "
HQ829966		Lingshui, Hainan, China	Zhang et al. (2012) (in Chinese)	-
HQ848573		Lingshui, Hainan, China	Zhang et al. (2012) (in Chinese)	-
JF803828		Lingshui, Hainan, China; Feb 6, 2009	Zhang et al. (2012) (in Chinese)	-
JF803829		Lingshui, Hainan, China; Feb 6, 2009	Zhang et al. (2012) (in Chinese)	-
<i>G. yangjiangensis</i> or <i>G. hawaiiensis</i>	MK919016	Sao Paulo, Brazil	Azevedo and Oliveira (unpublished)	" <i>Grateloupia</i> sp."
	HQ324236	Yangjiang, Guangdong China	Wang et al. (2014)	" <i>G. yangjiangensis</i> "
	HQ324237	Yangjiang, Guangdong, China	Wang et al. (2014)	" <i>G. yangjiangensis</i> "
	HQ324238	Lingshui, Hainan, China	Wang et al. (2014)	" <i>G. yangjiangensis</i> "

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<i>G. yinggenhaiensis</i>	HQ324239	Yinggehai, Hainan, China	Wang et al. (2014)	" <i>G. yangjiangensis</i> "
	AY772030	Maui, Hawaii; Jul 27, 2003	De Clerck et al. (2005a)	" <i>G. hawaiiiana</i> "
	AJ868480	Puppuka, Hawaii, Hawaiian Islands; May 12, 2003	De Clerck et al. (2005b)	" <i>G. filicina</i> "
	AJ868481	Punta Ceiba, Gulf of Mexico, Mexico; Feb 14, 1999	De Clerck et al. (2005b)	" <i>G. filicina</i> "
	AB038612	Pulau Bai, Sandakan, Sabah, Malaysia; May 19, 1998	Wang et al. (2000)	" <i>G. filicina</i> "
	HQ332513	Yinggehai, Hainan, China; Feb 24, 2009	Zhao et al. (2012)	as <i>Grateloupia</i> sp. / <i>G. yinggenhaiensis</i>
	HQ332514	Lingshui, Hainan, China; Feb 28, 2009	Zhao et al. (2012)	as <i>Grateloupia</i> sp. / <i>G. yinggenhaiensis</i>
	AY772029	Dikwella, Sri Lanka; Aug 17, 2003	De Clerck et al. (2005a)	" <i>G. filicina</i> "
	AJ868488	Tuler, Madagascar; Sep 1, 2002	De Clerck et al. (2005b)	" <i>G. filicina</i> "
	KY486715	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
	KY486716	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
	KY486717	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
	KY486718	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
	KY486719	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
	KY486742	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "
KY486743	Guangdong, China	Peng et al. (2018)	" <i>G. filicina</i> "	
<i>G. boaoensis</i>	HG794419	Venice Lagoon, Italy; 2008	Wolf et al. (2014)	as <i>Grateloupia</i> sp. / <i>G. yinggenhaiensis</i>
	HG794420	Venice Lagoon, Italy; 2013	Wolf et al. (2014)	as <i>Grateloupia</i> sp. / <i>G. yinggenhaiensis</i>
	HG794421	Venice Lagoon, Italy; 2013	Wolf et al. (2014)	as <i>Grateloupia</i> sp. / <i>G. yinggenhaiensis</i>
	KC904938	Longlou, Haianan, China; Jan 8, 2009	Liu et al. (2014)	as <i>Grateloupia</i> sp. / <i>G. boaoensis</i>
	KC904939	Longlou, Haianan, China; Jan 8, 2009	Liu et al. (2014)	as <i>Grateloupia</i> sp. / <i>G. boaoensis</i>
<i>G. irregularis</i>	KC904940	Longlou, Haianan, China; Jan 8, 2009	Liu et al. (2014)	as <i>Grateloupia</i> sp. / <i>G. boaoensis</i>
	KC904941	Longlou, Haianan, China; Jan 8, 2009	Liu et al. (2014)	as <i>Grateloupia</i> sp. / <i>G. boaoensis</i>
	KY573971	Punta Burica, Panama; Jan 8, 2011	Freshwater et al. (2017)	as <i>Grateloupia</i> sp.
	KY573981	Punta Burica, Panama; Jan 8, 2011	Freshwater et al. (2017)	as <i>Grateloupia</i> sp.
<i>G. filiformis</i>	KY573991	Punta Burica, Panama; Jan 8, 2011	Freshwater et al. (2017)	as <i>Grateloupia</i> sp.
	AF488822	Espiritu Santu, Marataizes, Brazil; Sep 15, 2001	Gavio and Fredericq (2002)	-
	MK919020	Espiritu Santu, Marataizes, Brazil	Azevedo and Oliveira (unpublished)	" <i>Grateloupia</i> sp."
<i>G. dichotoma</i>	MK919021	Bahia, Brazil	Azevedo and Oliveira (unpublished)	" <i>Grateloupia</i> sp."
	AF488823	Espiritu Santu, Marataizes, Brazil; Sep 15, 2001	Gavio and Fredericq (2002)	-
<i>Grateloupia</i> sp. 1	AF488824	Brava Beach, Ubatuba, Brazil; May 26, 2001	Gavio and Fredericq (2002)	-
	AJ868486	Dutch West Indies	De Clerck et al. (2005b)	" <i>G. filicina</i> "
<i>Grateloupia</i> sp. 2	AJ868487	Madrizavi Island, Los Roques, Venezuela; Jun 6, 1999	De Clerck et al. (2005b)	" <i>G. filicina</i> "
	MK919019	Bahia, Brazil	Azevedo and Oliveira (unpublished)	-
<i>Grateloupia</i> sp. 3 (maybe <i>G. lithophila</i>)	MK919023	Espiritu Santu, Marataizes, Brazil	Azevedo and Oliveira (unpublished)	-
	AJ868485	Lae, Papua New Guinea; Aug 7, 1980	De Clerck et al. (2005b)	" <i>G. filicina</i> "
	MT247858	Tuticorin, Tamil Nadu; Dec 4, 2017	Chellamanimegalai et al. (2020)	" <i>G. catenata</i> "
	MT247859	Tuticorin, Tamil Nadu; Dec 4, 2017	Chellamanimegalai et al. (2020)	" <i>G. catenata</i> "
	MT247860	Tuticorin, Tamil Nadu; Dec 4, 2017	Chellamanimegalai et al. (2020)	" <i>G. catenata</i> "
	MT247861	Tuticorin, Tamil Nadu; Dec 4, 2017	Chellamanimegalai et al. (2020)	" <i>G. catenata</i> "
	MT247765	Visakhapatnam, Andhra Pradesh, India; Mar 5, 2018	Chellamanimegalai et al. (2020)	" <i>G. orientalis</i> "

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Clade / Species	Accession No.	Collection information	Reference	Published in GenBank
	MT247766	Visakhapatnam, Andhra Pradesh, India; Mar 5, 2018	Chellamanimegalai et al. (2020)	" <i>G. orientalis</i> "
	MT247767	Visakhapatnam, Andhra Pradesh, India; Mar 5, 2018	Chellamanimegalai et al. (2020)	" <i>G. orientalis</i> "
	MT247872	India	Chellamanimegalai et al. (2020)	" <i>G. lithophila</i> "
	MT247873	India	Chellamanimegalai et al. (2020)	" <i>G. lithophila</i> "
	MT247874	India	Chellamanimegalai et al. (2020)	" <i>G. lithophila</i> "
	MT247875	India	Chellamanimegalai et al. (2020)	" <i>G. lithophila</i> "
	MT247876	India	Chellamanimegalai et al. (2020)	" <i>G. lithophila</i> "
	MT247862	India	Chellamanimegalai et al. (2020)	" <i>G. filicina</i> "
	MT247863	India	Chellamanimegalai et al. (2020)	" <i>G. filicina</i> "
	MT247864	India	Chellamanimegalai et al. (2020)	" <i>G. filicina</i> "
	KY009958	India	Babitha and Vasuki (unpublished)	" <i>G. filicina</i> "
	KY009959	India	Babitha and Vasuki (unpublished)	" <i>G. filicina</i> "
	KX791434	India	Babitha and Vasuki (unpublished)	" <i>G. filicina</i> "
<i>Yonagunia zollingeri</i>	JX627436	Malang, Indonesia; Jun 9, 2012	Boo et al. (2013)	-
<i>Y. mailardii</i>	MT501473	Thalaraba, Sri Lanka; Jan 5, 1996	Lin et al. (2020)	-

Supplementary Table S3. Genetic distance of several species within each clade using *rbcl* gene

		1	2	3	4	5	6	7	8	9
<i>Prionitis</i> clade	1. <i>G. asiatica</i>	0–1.3%	15–21 bp	13–22 bp	26–36 bp	79–89 bp	29–34 bp	65–71 bp		
	2. <i>G. serra</i>	1.2–1.9%	0%	20–24 bp	34 bp	92 bp	33–36 bp	66–67 bp		
	3. <i>G. livida</i>	1.2–2.0%	1.8–2.1%	0–0.5%	35–40 bp	89–93 bp	29–33 bp	61–65 bp		
	4. <i>G. variata</i>	2.3–3.2%	3%	3.1–3.6%	0%	91 bp	42–44 bp	69–70 bp		
	5. <i>G. dalianensis</i>	7.3–7.9%	8.2%	7.9–8.3%	8.10%	0%	98–101 bp	114–117 bp		
	6. <i>G. acuminata</i>	2.7–3.5%	2.9–3.2%	2.8–2.9%	3.7–3.9%	8.7–9.0%	0–0.27%	66–67 bp		
	7. <i>G. divaricata</i>	5.8–6.3%	5.9–6.0%	5.4–5.8%	6.1–6.2%	10.2–10.4%	5.9–6.0%	0–0.27%		
<i>Grateloupia sensu stricto</i> clade	1. <i>G. catenata</i>	0–1.0%	43–49 bp	30–37 bp	66–76 bp	47–52 bp	43–49 bp	55–75 bp	56–62 bp	59–64 bp
	2. <i>G. ramosissima</i>	1.9–2.4%	0–0.8%	37–41 bp	66–75 bp	51–54 bp	49–54 bp	60–73 bp	56–62 bp	53–60 bp
	3. <i>G. tenuis</i>	2.7–3.3%	3.4–3.7%	0%	40–46 bp	29 bp	29 bp	44–50 bp	44–45 bp	58–62 bp
	4. <i>G. orientalis</i>	5.9–6.8%	5.9–6.7%	3.6–4.1%	0–1.9%	31–37 bp	43–46 bp	35–44 bp	49–54 bp	59–70 bp
	5. <i>G. huanghaiensis</i>	4.2–4.6%	4.5–4.8%	2.60%	2.8–3.3%	0%	23–24 bp	22–33 bp	43–45 bp	51–55 bp
	6. <i>G. ramosa</i>	3.8–4.3%	4.3–4.8%	2.9–3.0%	3.8–4.1%	2.0–2.1%	0%	23–33 bp	42–44 bp	54–59 bp
	7. <i>G. yinggenhaiensis</i>	4.9–6.7%	5.3–6.6%	3.9–4.4%	4.3–6.0%	3.1–3.9%	2.0–2.9%	0–1.4%	36–40 bp	63–73 bp
	8. <i>G. yangjiangensis</i> & <i>G. hawaiiiana</i>	4.8–5.6%	5.0–5.6%	3.9–4.1%	4.4–4.9%	3.8–4.0%	3.7–4.0%	3.2–3.8%	0.2–0.3%	62–64 bp
	9. <i>G. filicina</i>	4.8–5.7%	4.6–5.3%	4.8–5.4%	5.1–6.2%	4.1–4.9%	4.4–5.3%	5.1–6.5%	5.0–5.9%	0–1.0%