

Table S1. Collection information for specimens in this study including location, collector, date, herbarium, stream data (specific conductance, pH, and water temperature) and GenBank accession number. GDA = University of Granada Herbarium. Sequences in bold were used in the phylogenetic analysis (Fig. 2).

Stream Number	Taxon	Collection site, collector(s), date; herbarium voucher	Specific Cond. $\mu\text{S.cm}^{-1}$	pH	Temp. $^{\circ}\text{C}$	rbcL COI-5P
1	<i>Batrachospermum gelatinosum</i>	Barranco del Nacimiento, Granada, Spain, 36.853743, -3.680597. P. Sánchez, 17 September 2013; GDA-A 8417	500	7.8	17	KM593845
2	<i>B. gelatinosum</i>	Torrente de Mallorca, Islas Baleares, Spain, 39.904277, 3.002083. I.S. Chapuis & G. Moya, 30 May 2013; GDAC-A 7816	1013	7.8	16	KM593827 KM592957
3	<i>B. gelatinosum</i>	Río Bullaque, Ciudad Real, Spain, 39.457923, -4.450660. I.S. Chapuis & G. Muñoz, 06 June 2011; GDA-A 5611	82	7.1	19	KM593806
4	<i>B. gelatinosum</i>	Río Aliste, Zamora, Spain, 41.842886, -6.323498. I.S. Chapuis & A. Negro, 21 June 2011; GDA-A 8128	106	8.4	23	KM593830
5	<i>B. gelatinosum</i>	Arroyo de la Miel, Cádiz, Spain, 36.110433, -5.509637. I.S. Chapuis & P. González, 11 May 2012; GDA-A 6817	—	—	—	KM593814
6	<i>B. gelatinosum</i>	Fuente de la Teja, Granada, Spain, 37.262761, -3.508170. P. Sánchez & V. Díaz, 15 May 2012; GDA-A 6822	629	7.7	13	KM593815
7	<i>B. gelatinosum</i>	La Fuentona, Soria, Spain, 41.734448, -2.863627. I.S. Chapuis & P. Sánchez, 20 July 2012; GDA-A 7088	505	7.5	17	KM593822
8	<i>B. gelatinosum</i>	Río Valladolid, Zamora, Spain, 41.431769, -2.58307. A. Negro, 12 June 2013, GDA-A 7869	515	8.2	20	KM593829 KM592958
9	<i>B. gelatinosum</i>	Laguna de Sobrado dos Monxes, Coruña, Spain, 43.036891, -8.009058. R. Carvalleira & M.C. López, 21 February 2013; GDA-A 8136	54	7.6	9	KM593834 KM592955
10	<i>B. gelatinosum</i>	Arroyo del Ejido, Madrid, Spain, 41.09708, -3.464820. P. Sánchez, 31 March 2013; GDA-A 8155	78	7.2	19	KM593838 KM592956
11	<i>B. gelatinosum</i>	Laguna de Somolinos, Guadalajara, Spain, 41.250648, -3.063606. P. Sánchez, 01 August 2013; GDA-A 8160	421	8.1	18	KM593839
12	<i>B. gelatinosum</i>	Río Viaña, Álava, Spain, 42.851283, -2.336110. P. Sánchez, 29 August 2013; GDA-A 8265	740	7.6	20	KM593840

Table S1 Cont.

13	<i>B. gelatinosum</i>	Rego de Braña Rubia, Coruña, Spain, 43.120097, –8.741437. R. Carvalleira & M.C. López, 23 June 2013. GDA–A 8306	89	7.4	17	KM593843
14	<i>B. gelatinosum</i>	Font de Sant Cristòfor, Gerona, Spain, 41.910278, 2.875277. A. Vergés, 05 May 2012; GDA–A 8129	–	–	–	KM593831
15	<i>B. gelatinosum</i>	Rego de Chaos, Lugo, Spain, 43.451666, –7.836111. R. Carvalleira. 17 May 2014; GDA–A 8578	–	–	–	KM593848
16	<i>B. gelatinosum</i>	Lagoa de Pantín, Coruña, Spain, 43.635277, –8.114722. R. Carvalleira, 23 July 2014; GDA–A 8577	–	–	–	KM593849
17	<i>B. pozoazulense</i>	Pozo Azul, Burgos, Spain, 42.735833, –3.795833. B. Esteban, 05 October 2013; GDA–A 8362	470	7.2	11	KM593863 KM593867
18	<i>B. pozoazulense</i>	Pozo de San Vicente, Burgos, Spain, 42.800555, –3.712222. B. Esteban, 05 October 2013; GDA–A 8405	436	7.9	15	KM593862
19	<i>B. pozoazulense</i>	Fuente de la Coveta, Teruel, Spain, 40.407382, –1.701201. G. Muñoz & P. González, 20 May 2012; GDA–A 6927	530	8.4	13	KM593858
20	<i>B. pozoazulense</i>	Río Guadalaviar, Teruel, Spain, 40.320766, –1.697566. G. Muñoz & P. González. 20 May 2012; GDA–A 6940	598	7.7	12	KM593859
21	<i>Paludicola keratophyta</i>	Fuente dos Vidrieros, Gerres, Portugal, 40.245236, –5.852677. I.S. Chapuis & P. Sánchez, 04 July 2012; GDA–A 6972	16	7.5	13	KM593821 KM592949
22	<i>P. keratophyta</i>	Rego da Silvosa, Lugo, Spain, 43.541435, –7.506205. R. Carvalleira & M.C. López, 12 August 2013; GDA–A 8133	78	4.7	20	KM593832 KM592948
23	<i>P. keratophyta</i>	Rego das Toxeiras, Lugo, Spain, 43.447026, –7.571695. R. Carvalleira & M.C. López, 14 July 2012; GDA–A 8305, 8304	32	4.6	16	KM593842 KM592953/ KM592952
24	<i>P. keratophyta</i>	Rego do Pedidro, Lugo, Spain, 43.449849, –7.5238336. R. Carvalleira & M.C. López, 14 July 2012; GDA–A 8135, 8134	35	7.1	15	KM593833 KM592951/ KM592950

Table S1 Cont.

25	<i>Sheathia arcuata</i> , <i>Torulania atra</i>	Manantial de los Chopos, Málaga, Spain, 36.838765, –4.265961. I.S. Chapuis & G. Muñoz, 18 April 2012; GDA–A 6432 GDA–A 6433	750	7.9	13	KM593812 KM592947 KM593813 / KT183025
26	<i>S. arcuata</i>	Río Palancia, Castellón, Spain, 39.939609, –0.488803. I.S. Chapuis & G. Muñoz, 15 May 2011; GDA–A 5199	408	7.3	15	KM593804
27	<i>S. arcuata</i>	Manantial de Fuencaliente, Granada, Spain, 37.471666, –2.778532. I.S. Chapuis & G. Muñoz, 12 April 2012. GDA–A 6414	1237	7.4	21	KM593810 KM592945
28	<i>S. arcuata</i>	Río Cerezo, Málaga, Spain, 37.015889, –4.303333. I.S. Chapuis & G. Muñoz. 18 April 2012; GDA–A 6428	484	7.3	8	KM593811 KM592946
29	<i>S. arcuata</i>	Fuente del Molino, Teruel, Spain, 40.395582, –1.728918. G. Muñoz & P. González. 20 May 2012; GDA–A 6933	634	8	16	KM593818
30	<i>S. arcuata</i>	Río Torrestío, León, Spain, 42.949156, –6.001836. I.S. Chapuis & P. Sánchez, 06 Sep- tember 2012; GDA–A 7618	375	8.3	12	KM593824
31	<i>S. boryana</i>	Río Turia, Valencia, Spain, 39.677783, –0.881248. I.S. Chapuis & G. Muñoz. 16 May 2011; GDA–A 5232	847	7.4	15	KM593805
32	<i>S. boryana</i>	Río Cebollón, Granada, Spain, 36.911016, –3.866755. I.S. Chapuis & G. Muñoz, 27 Mar- ch 2012; GDA–A 6381	504	8.2	12	KM593808
33	<i>S. boryana</i>	Siete Fuentes, Granada, Spain, 37.464235, –2.776519. I.S. Chapuis & G. Muñoz. 12 April 2012; GDA–A 6409	474	7.9	14	KM593809
34	<i>S. boryana</i>	Río Cabriel, Cuenca, Spain, 40.103791, –1.514924. G. Muñoz & P. González, 19 May 2012; GDA–A 6915	594	7.8	14	KM593816
35	<i>S. boryana</i>	Río Guadalaviar, Teruel, Spain, 40.401437, –1.450497. G. Muñoz & P. González, 20 May 2012; GDA–A 6925	764	8.3	17	KM593817
36	<i>S. boryana</i>	Fuente Hoz del Veteta, Cuenca, Spain, 40.428086, –1.890836. G. Muñoz & P. González, 20 May 2012; GDA–A 6949	651	7.8	11	KM593819

Table S1 Cont.

37	<i>S. boryana</i>	Laguna del Marquesado, Cuenca, Spain, 40.194301, –1.668634. G. Muñoz & P. González. 20 May 2012; GDA–A 6957	499	8.3	12	KM593820
38	<i>S. boryana</i>	Ríos de Bubia, Asturias, Spain, 43.097644, –6.206965. I.S. Chapuis & P. Sánchez, 05 September 2012; GDA–A 7609	298	8.6	11	KM593823
39	<i>S. boryana</i>	Río Alcontar, Almería, Spain, 37.335553 –2.596010. I.S. Chapuis & P. Sánchez, 21 March 2013; GDA–A 7676	1400	7.3	10	KM593825
40	<i>S. boryana</i>	Río de las Puenteillas, Albacete, Spain, 38.666695, –2.260378. P. Victoria Gómez & G. Muñoz, 17 September 2013; GDA–A 7760	500	8.1	14	KM593826
41	<i>S. boryana</i>	Río Piedra, Zaragoza, Spain, 41.100376, –1.776572. A. Negro, 10 June 2013; GDA–A 7832	664	8	20	KM593828
42	<i>S. confusa</i>	Río Horcajo, Extremadura, Spain, 40.363896, –6.364305. F. Urbano, 01 May 2014; GDA–A 8570	–	–	–	KM593846
43	<i>S. confusa</i>	Río do Batán, Coruña, Spain, 43.015072, –8.080229. R. Carvalleira & M.C. López, 21 February 2013; GDA–A 8138	102	7	11	KM593836
44	<i>S. confusa</i>	Rego Seixeda, Coruña, Spain, 43.350838, –8.281075. R. Carvalleira & M.C. López. 11 February 2013; GDA–A 8139	277	6.8	14	KM593837
45	<i>S. confusa</i>	Rego das Lamas, Coruña, Spain, 43.034748, –7.998708. R. Carvalleira & M.C. López, 02 August 2013; GDA–A 8137B	45	7.2	11	KM593835
46	<i>S. confusa</i>	Rego de Brandelos, Coruña, Spain, 42.818611, –8.335833. R. Carvalleira, 01 June 2014; GDA–A 8576	–	–	–	KM593847
47	<i>S. confusa</i>	Rego Riomaio, Coruña, Spain, 43.451666, –7.836111. R. Carvalleira & M.C. López, 17 April 2014; GDA–A 8579	–	–	–	– KM592954
48	<i>Virescentia helminthosa</i>	Termas de Nisa, Portoalegre, Portugal, 39.449058, –7.694633, I.S. Chapuis & P. Sanchez, 13 June 2011; GDA–A 5813	180	7.2	23	KM593807

Table S1 Cont.

49	<i>V. helminthosa</i>	Brañas de Sada, A Coruña, Spain. 43.348568, –8.259633. R. Carvalleira & M.C. López, 21 May 2013. GDA A–8271.	289	7.7	16	KM593841
50	<i>V. helminthosa</i>	Río Belelle, A Coruña, Spain. 43.486687, –8.123498. R. Carvalleira & M.C. López, 2 August 2013. GDA A–8308.	68	6.1	18	KM593844
51	<i>V. vogesiaca</i>	Río Tera, Zamora, Spain, 42.120809, –6.698288. A. Negro, 06 September 2014; GDA–A 8721	12	7.4	20	KU754497
52	<i>Volatus carrionii</i>	Río Batuecas, Salamanca, Spain, 40.442978, –6.143373. I.S. Chapuis & P. Sanchez, 14 June 2011; GDA–A 5823	11	7.1	16	KM593860
53	<i>V. carrionii</i>	Río Negro, Zamora, Spain, 42.064061, –6.413191. A. Negro, 12 June 2013; GDA–A 8132	20	6.5	19	KM593861 KM593866
54	<i>V. carrionii</i>	Río Xares, Orense, Spain, 42.238823, –6.993089. R. Carvalleira & M.C. López, 05 July 2013; GDA–A 8310	20	6.7	14	KM593864

Table S2. Fifty-four additional sequence data from GenBank used for phylogenetic analyses.

Taxon	rbcL
<i>Acarposporophycos brasiliensis</i>	FJ386458
<i>Batrachospermum dapsile</i>	KM593855
<i>Batrachospermum gelatinosum</i>	AF029141
<i>Batrachospermum gelatinosum</i>	GU810834
<i>Batrachospermum gelatinosum</i>	KM077034
<i>Batrachospermum naidis</i>	KM593857
<i>Batrachospermum shanxiense</i>	KM593851
<i>Kumanoa ambigua</i>	AY423390
<i>Lemanea fucina</i>	KJ825959
<i>Montagnia australis</i>	EU106056
<i>Nemalionopsis shawii</i>	KM005141
<i>Nocturama antipodites</i>	FJ386456
<i>Nothocladus nodosus</i>	AF029152
<i>Paludicola communis</i>	AF029147
<i>Paludicola diamantinensis</i>	MN943927
<i>Paludicola groenbladii</i>	MN943929
<i>Paludicola johnhallii</i>	MN943931
<i>Paludicola keratophyta</i>	KJ825963
<i>Paludicola leafensis</i>	MN943934
<i>Paludicola orthosticha</i>	MN943935
<i>Paludicola periploca</i>	MN943944
<i>Paludicola phangiae</i>	KF557564
<i>Paludicola turfosa</i>	MN943940
<i>Paludicola turfosisiformis</i>	MN943946
<i>Paralemanea catenata</i>	KJ825957
<i>Petrohua bernabei</i>	AY960690
<i>Psilosiphon scoparius</i>	AF029155
<i>Sheathia arcuata</i>	DQ393131
<i>Sheathia arcuata</i>	JX669741
<i>Sheathia assamica</i>	MN481450
<i>Sheathia boryana</i>	KM077043
<i>Sheathia boryana</i>	JX669773
<i>Sheathia confusa</i>	JX669740
<i>Sheathia confusa</i>	DQ393133
<i>Sheathia dispersa</i>	MN487058
<i>Sheathia exigua</i>	JX669738
<i>Sheathia grandis</i>	JX669762
<i>Sheathia heterocortica</i>	JX669796
<i>Sheathia indonepalensis</i>	MN481449
<i>Sheathia involuta</i>	JX669771
<i>Sheathia longipedicellata</i>	JQ028696
<i>Sirodotia suecica</i>	JF344718
<i>Thorea okadae</i>	AB159654
<i>Torularia atra</i>	KM077029

Table S2 Cont.

<i>Torularia atro-brasiliensis</i>	KT183024
<i>Torularia puiggariana</i>	KT894752
<i>Tuomeya americana</i>	AF029159
<i>Virescentia helminthosa</i>	KJ825955
<i>Virescentia viride-americana</i>	AF029142
<i>Virescentia viride-brasiliense</i>	KM097031
<i>Virescentia vogesiaca</i>	KJ825954
<i>Visia cayennense</i>	AY423392
<i>Volatus personatus</i>	KM593856
<i>Volatus ulterior</i>	KM593853