

Table S1. Specimens used for DNA extraction and GenBank accession number of all samples used in this study

Species	Voucher information	GenBank Accession numbers	
		ITS	nu LSU
<i>Acantholichen campestris</i>	DIC595b	KT429798	KT429810
<i>Acantholichen variabilis</i>	MDF679	KT429796	KT429808
<i>Arrhenia discorosea</i>	G1072	—	MK278416
<i>Arrhenia epichysium</i> 1	WU_21938	MW113695	—
<i>Arrhenia epichysium</i> 2	Redhead 5223	U66442	—
<i>Arrhenia epichysium</i> 3	G1952	—	MK277599
<i>Arrhenia fusconigra</i> 1	GB-0065942	MH198228	—
<i>Arrhenia fusconigra</i> 2	GB-0065958	MH198229	—
<i>Arrhenia peltigerina</i>	Diederich 16735 (LUX)	—	MW882126
<i>Arrhenia rustica</i>	G1220	—	MK278422
<i>Arrhenia sphagnicola</i>	G1957	—	MK277602
<i>Chrysomphalina aurantiaca</i> 1	UBC:F34015	ON738529	—
<i>Chrysomphalina aurantiaca</i> 2	iNAT:9391403	ON212944	—
<i>Chrysomphalina aurantiaca</i> 3	UBC:F33453	MN954723	—
<i>Chrysomphalina chrysophylla</i> 1	K(M):233320	MZ159640	—
<i>Chrysomphalina chrysophylla</i> 2	iNAT:9986321	MH256117	—
<i>Chrysomphalina grossularia</i> 1	OSC 113683	EU644704	EU652373
<i>Chrysomphalina grossularia</i> 2	OSC 113667	—	EU652372
<i>Chrysomphalina grossularia</i> 3	iNat100045557	ON856371	—
<i>Contumyces rosellus</i>	MGW1462	—	MF318912
<i>Cora byssoides</i>	DIC151	KF443234	KF443258
<i>Cora inversa</i>	DIC149	KF443236	KF443260
<i>Cyphellostereum imperfectum</i>	DIC115a	KF443218	KF443243
<i>Cyphellostereum phyllogenum</i>	DIC158	KF443219	KF443244
<i>Dictyonema hernandezii</i>	DIC122	KF443221	KF443246
<i>Dictyonema obscuratum</i>	DIC126	KF443223	KF443249
<i>Gerronema indigoticum</i> 1	HMJAU47636	MK693727	—
<i>Gerronema indigoticum</i> 2	HMJAU47942	MK693728	—
<i>Gerronema indigoticum</i> 3	HMJAU47636	NR166278	NG067873
<i>Gerronema keralense</i>	CAL1666	NR159832	NG064531
<i>Gerronema kuruvense</i> 1	CAL1665	—	NG064530
<i>Gerronema kuruvense</i> 2	BKF10266	MZ452090	MZ452669
<i>Gerronema nemorale</i> 1	FA236	MN744687	—
<i>Gerronema nemorale</i> 2	FA239	MN744688	—
<i>Haasiella splendidissima</i> 1	JVG1071013-1	JN944395	JN944396
<i>Haasiella splendidissima</i> 2	Herbarium Roux n. 3666	JN944398	JN944399
<i>Haasiella splendidissima</i> 3	Herbarium Roux n. 4044	JN944400	JN944401
<i>Haasiella venustissima</i> 1	A. Gminder 971488 (STU)	KF291092	KF291093
<i>Haasiella venustissima</i> 2	E.C. 08191	JN944393	JN944394
<i>Infundibulicybe alkaliolascens</i> 1	HMJU509	MW880700	MW880706
<i>Infundibulicybe alkaliolascens</i> 2	KUN-HKAS 115933 (Zhao2801)	MZ855883	MZ853569

<i>Infundibulicybe catinus</i>	—	HM631720	—
<i>Infundibulicybe costata</i>	G0484	—	MK278217
<i>Infundibulicybe geotropa</i>	ALV4344	KT122792	KT122793
<i>Infundibulicybe gibba</i> 1	KUN-HKAS 92032 (Cai 1412)	MZ675563	MZ675574
<i>Infundibulicybe gibba</i> 2	KUN-HKAS 73336 (Qin350)	MZ718998	MZ719010
<i>Infundibulicybe hongyinpan</i> 1	KUN-HKAS 105573 (JSP 248)	MZ718999	MZ719011
<i>Infundibulicybe hongyinpan</i> 2	HBAU15234	MW862268	—
<i>Infundibulicybe kotonensis</i>	LAH35902	MN017278	—
<i>Infundibulicybe mediterranea</i>	—	HM631724	—
<i>Infundibulicybe rufa</i> 1	KUN-HKAS 57811 (Yang 5268)	MZ719001	MZ719013
<i>Infundibulicybe rufa</i> 2	KUN-HKAS 77865 (Qin 464)	MZ719000	MZ719012
<i>Lichenomphalia altoandina</i> 1	SGO:160478	KT371534	KT371535
<i>Lichenomphalia altoandina</i> 2	SGO:160478	NR158477	—
<i>Lichenomphalia alpina</i>	O-L-195732	KY266895	—
<i>Lichenomphalia grisella</i>	KH73	GU234100	—
<i>Lichenomphalia hudsoniana</i> 1	GAL18249	JQ065873	JQ065875
<i>Lichenomphalia hudsoniana</i> 2	Gulden247/86	JQ065874	—
<i>Lichenomphalia hudsoniana</i> 3	K(M):168207	MZ159424	—
<i>Lichenomphalia hudsoniana</i> 4	11-32112 (KUN-L)	KY435909	—
<i>Lichenomphalia lobata</i> 1	Palice 2327	AY542866	—
<i>Lichenomphalia lobata</i> 2	Palice 3275	AY542867	—
<i>Lichenomphalia luteovitellina</i> (<i>Omphalina luteovitellina</i>)	—	AY293962	—
<i>Lichenomphalia meridionalis</i> 1	S-270-FB1	LC428308	LC428307
<i>Lichenomphalia meridionalis</i> 2	A1368	MT035854	MT032349
<i>Lichenomphalia umbellifera</i> 1	GAL15152	GU810926	GU811011
<i>Lichenomphalia umbellifera</i> 2	—	AY293959	—
<i>Lichenomphalia umbellifera</i> 3	—	AY293961	—
<i>Lichenomphalia umbellifera</i> 4	12-36882 (KUN-L)	KY435923	—
<i>Lichenomphalia umbellifera</i> 5	12-34741 (KUN-L)	KY435917	—
<i>Loreleia marchantiae</i> 1	Y. Makinen 87-190	MF319070	—
<i>Loreleia marchantiae</i> 2	M. Lahti 24/14	—	MF318926
<i>Omphalina chionophile</i> 1	GG106_88	GU234144	—
<i>Omphalina chionophile</i> 2	CBS 553.91	MH862276	MH873957
<i>Omphalina rivulicola</i> 1	CBS 558.87	MH862099	MH873788
<i>Omphalina rivulicola</i> 2	CBS 560.87	MH862101	—
<i>Omphalina pyxidata</i> 1	R. Saarenoksa 48384	MF319071	MF318927
<i>Omphalina pyxidata</i> 2	TO AV98	JN944402	JN944403
<i>Omphalina pyxidata</i> 3	GT99398	JQ671000	—
<i>Omphalina pyxidata</i> 4	EM0434-05	JQ671001	—
<i>Omphalina licheniformis</i> sp. nov. 1	JX001 (HMAS-L 154705)	ON723778	ON723776
<i>Omphalina licheniformis</i> sp. nov. 2	ZRL20220005 (HMAS 281952)	ON723779	ON723777
<i>Rickenella mellea</i> 1	—	U66438	—
<i>Rickenella mellea</i> 2	CBS 581.87	MH862107	MH873796
<i>Trogia benghalensis</i>	CUH:AM031	KU647630	—

<i>Trogia infundibuliformis</i> 1	N.K.Zeng2233	MT822925	MT829108
<i>Trogia infundibuliformis</i> 2	KUN_HKAS56709	JQ031776	JQ031781
<i>Trogia venenata</i> 1	KUN_HKAS56679	JQ031773	JQ031779
<i>Trogia venenata</i> 2	KUN_HKAS54710	JQ031772	JQ031778
<i>Multiclavula petricola</i> (outgroup)	H. Masumoto 356 ex-type	LC516464	LC516465
<i>Multiclavula caput-serpentis</i> (outgroup)	KaiR699	MW386064	MW369074
<i>Multiclavula corynoides</i> (outgroup)	Lutzoni 930804-2, DUKE	U66440	—
<i>Multiclavula vernalis</i> (outgroup)	Lutzoni 930806-1, DUKE	U66439	—

Notes: Newly generated sequences are in bold font. '—' indicates that the corresponding information or sequence is absent.

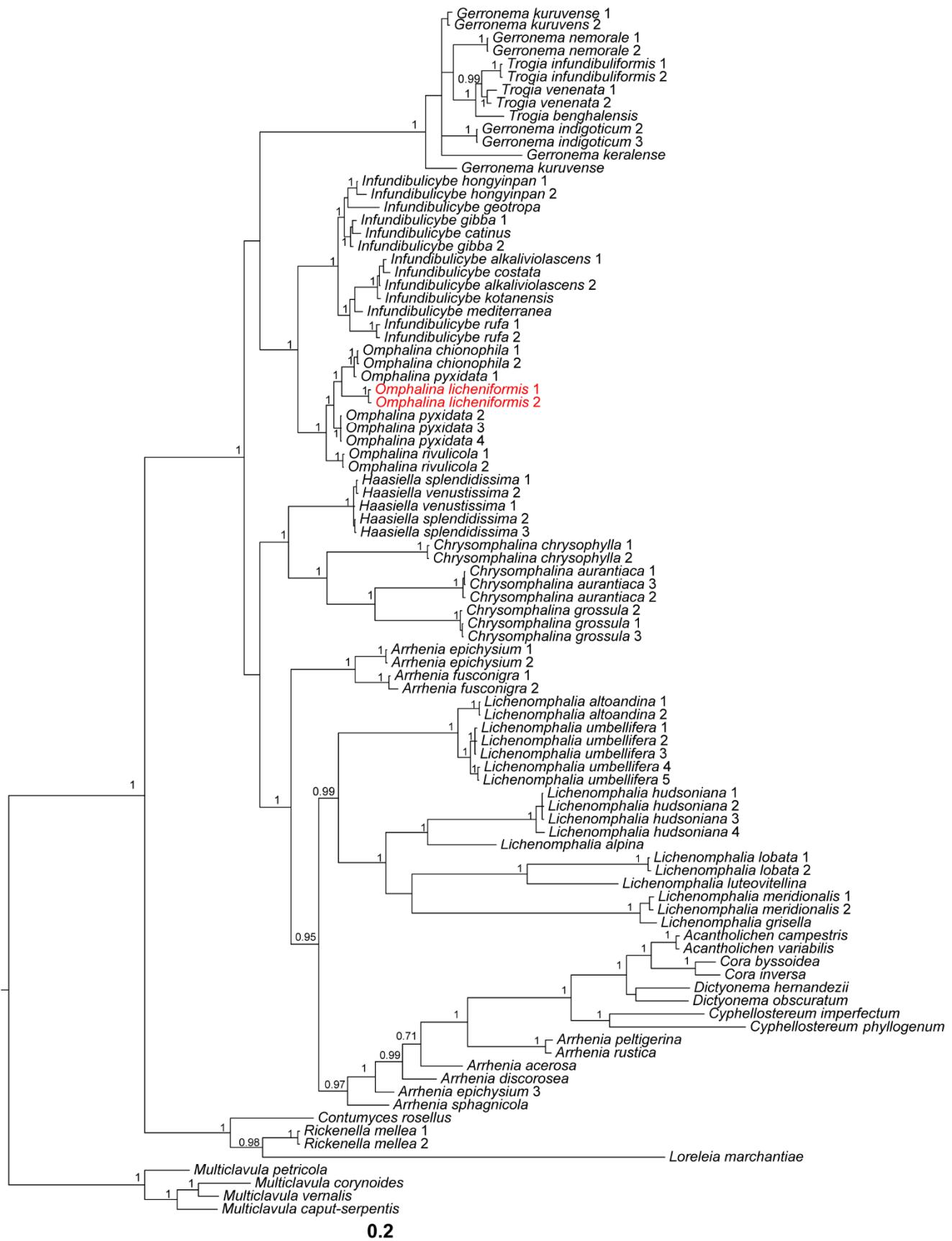


Figure S1. The Bayesian tree based on the concatenated ITS + nuLSU data sets. The numbers in each node represent posterior probability (PP) values. PP values ≥ 0.95 were plotted on the branches of the tree. The samples in red color indicate that these sequences were newly generated for this study. Scale in 0.2 substitution per site.

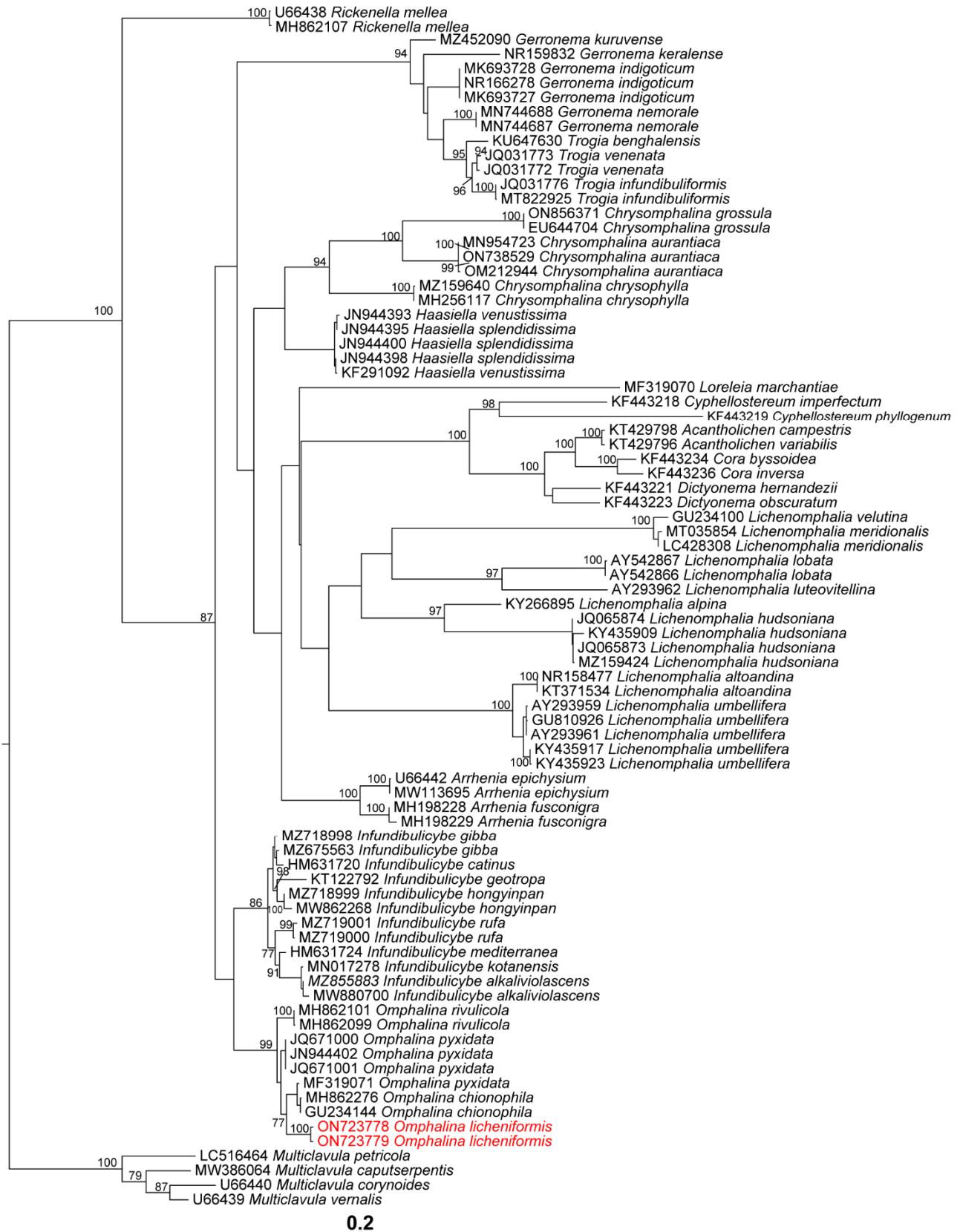


Figure S2. The maximum likelihood tree based on the ITS data set. The numbers in each node represent bootstrap support (BS) values. BS values $\geq 75\%$ were plotted on the branches of the tree. The samples in red color indicate that these sequences were newly generated for this study. Scale in 0.2 substitution per site.

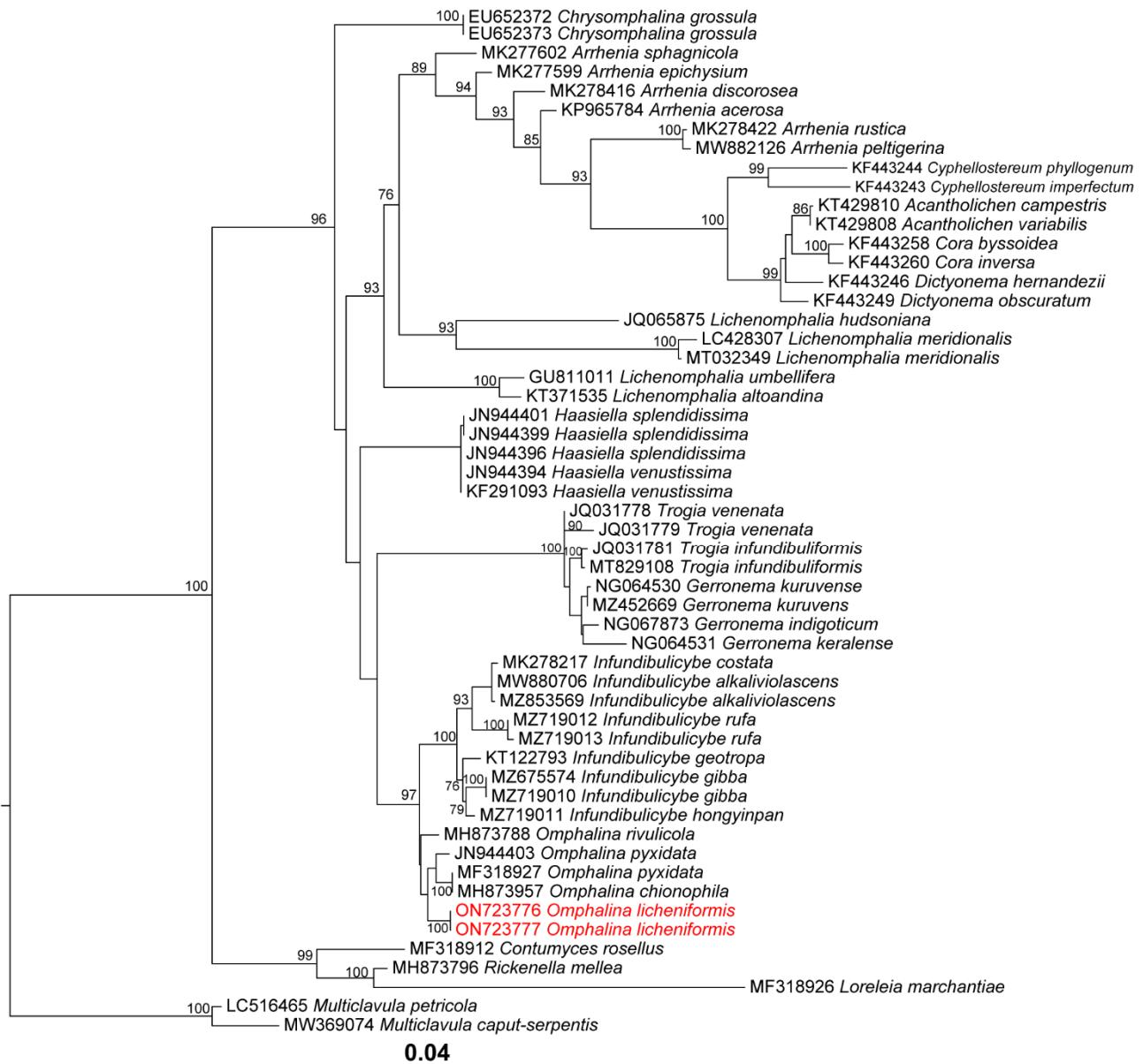


Figure S3. The maximum likelihood tree based on the LSU data set. The numbers in each node represent bootstrap support (BS) values. BS values $\geq 75\%$ were plotted on the branches of the tree. The samples in red color indicate that these sequences were newly generated for this study. Scale in 0.04 substitution per site.