

**Table S1.** Specimen information and GenBank accession numbers for sequences used in this study.

Taxon	Voucher Information	Genbank Accession Number				
		<i>nrSSU</i>	<i>nrLSU</i>	<i>tef1-α</i>	<i>rpb1</i>	<i>rpb2</i>
<i>Ophiocordyceps pseudocommunis</i>	NHJ 12581	EF468973	EF468831	EF468775		EF468930
<i>Hirsutella cryptosclerotium</i>	ARSEF 4517	KM652066	KM652109	KM651992	KM652032	
<i>Hirsutella fusiformis</i>	ARSEF 5474	KM652067	KM652110	KM651993	KM652033	
<i>Hirsutella guyana</i>	ARSEF 878	KM652068	KM652111	KM651994	KM652035	
<i>Hirsutella_haptospora</i>	ARSEF 2226			KM651995	KM652036	
<i>Hirsutella_liboensis</i>	ARSEF 9603	KM652072	KM652115			
<i>Hirsutella minnesotensis</i>	3608	JPUM01000376	JPUM01000376	JPUM01000211	JPUM01000139	JPUM01000138
<i>Hirsutella nodulosa</i>	ARSEF 5473	KM652074	KM652117	KM652000	KM652040	
<i>Hirsutella radiata</i>	ARSEF 1369	KM652076	KM652119	KM652002	KM652042	
<i>Ophiocordyceps unituberculata</i>	YHH HU1301	KY923214	KY923212	KY923216	KY923218	
<i>Hirsutella subulata</i>	ARSEF 2227	KM652086	KM652130	KM652013	KM652051	
<i>Hymenostilbe odonatae</i>	TNS F27117		KJ878878			
<i>Ophiocordyceps_acicularis</i>	OSC 110988	EF468951	EF468804	EF468745	EF468853	
<i>Ophiocordyceps agriotidis</i>	ARSEF 5692	DQ522540	DQ518754	DQ522322	DQ522368	DQ522418
<i>Ophiocordyceps albacongiuae</i>	RC20	KX713633		KX713670		
<i>Cordyceps aphodii</i>	ARSEF 5498	DQ522541	DQ518755	DQ522323		DQ522419
<i>Ophiocordyceps appendiculata</i>	NBRC 106960	JN941728	JN941413	AB968577	JN992462	AB968539
<i>Ophiocordyceps blakebarnesii</i>	MISSOU3	KX713643	KX713608	KX713687	KX713714	
<i>Cordyceps brunneipunctata</i>	OSC 128576	DQ522542	DQ518756	DQ522324	DQ522369	DQ522420
<i>Ophiocordyceps camponoti-femorati</i>	FEMO2	KX713663	KX713590	KX713678	KX713702	
<i>Ophiocordyceps camponoti-floridani</i>	Flo4	KX713662	KX713591			
<i>Ophiocordyceps camponoti-hippocrepidis</i>	HIPPOC	KX713655	KX713597	KX713673	KX713707	
<i>Ophiocordyceps_camponoti-nidulantis</i>	NIDUL2	KX713640	KX713611	KX713669	KX713717	
<i>Ophiocordyceps_camponoti-renggeri</i>	ORENG	KX713634	KX713617	KX713671		
<i>Ophiocordyceps_clavata</i>	CEM1762	KJ878916	KJ878882	KJ878963	KJ878996	
<i>Ophiocordyceps cochliidiicola</i>	HMAS 199612	KJ878917	KJ878884	KJ878965	KJ878998	

<i>Ophiocordyceps coenomyia</i>	NBRC 106964	AB968385	AB968413	AB968571		AB968533
<i>Ophiocordyceps crinalis</i>	GDGM 17327	KF226253	KF226254	KF226256	KF226255	
<i>Ophiocordyceps curculionum</i>	OSC 151910	KJ878918	KJ878885		KJ878999	
<i>Ophiocordyceps cylindrospora</i>	MFLU 17-1961	MG553651	MG553652			MG647029
<i>Ophiocordyceps daceti</i>	MF01		KX713604	KX713667		
<i>Ophiocordyceps dipterigena</i>	OSC 151911	KJ878919	KJ878886	KJ878966	KJ879000	
<i>Ophiocordyceps elongata</i>	OSC 110989		EF468808	EF468748	EF468856	
<i>Ophiocordyceps entomorrhiza</i>	KEW 53484	EF468954	EF468809	EF468749	EF468857	EF468911
<i>Ophiocordyceps formicarum</i>	TNS F18565	KJ878921	KJ878888	KJ878968	KJ879002	KJ878946
<i>Ophiocordyceps formosana</i>	TNM F13893	KJ878908		KJ878956	KJ878988	KJ878943
<i>Ophiocordyceps forquignonii</i>	OSC 151902	KJ878912	KJ878876		KJ878991	KJ878945
<i>Ophiocordyceps forquignonii</i>	OSC 151908	KJ878922	KJ878889		KJ879003	KJ878947
<i>Ophiocordyceps globiceps</i>	MFLU 18-0661	MH725812	MH725830	MH727388		
<i>Ophiocordyceps gracilis</i>	EFCC 8572	EF468956	EF468811	EF468751	EF468859	EF468912
<i>Ophiocordyceps gracilis</i>	OSC 151906	KJ878923	KJ878890	KJ878969		
<i>Ophiocordyceps heteropoda</i>	EFCC 10125	EF468957	EF468812	EF468752	EF468860	EF468914
<i>Ophiocordyceps iranginensis</i>	BCC 82795			MH028186	MH028164	MH028174
<i>Ophiocordyceps megacuculla</i>	OSC 128578	DQ522556	DQ518770	DQ522345	DQ522391	DQ522445
<i>Ophiocordyceps_granospora</i>	OSC 128577	DQ522546	DQ518760	DQ522329	DQ522374	DQ522427
<i>Ophiocordyceps kimflemingiae</i>	SC09B	KX713631	KX713620	KX713698	KX713724	
<i>Ophiocordyceps kniphofioides</i>	HUA 186148	KC610790	KF658679	KC610739	KF658667	KC610717
<i>Ophiocordyceps konnoana_</i>	EFCC 7295	EF468958			EF468862	EF468915
<i>Ophiocordyceps lanpingensis</i>	YHOS0705	KC417458	KC417460	KC417462	KC417464	KC456333
<i>Ophiocordyceps lloydii_</i>	OSC 151913	KJ878924	KJ878891	KJ878970	KJ879004	KJ878948
<i>Ophiocordyceps longissima</i>	EFCC 6814		EF468817	EF468757	EF468865	
<i>Ophiocordyceps macroacicularis</i>	NBRC 105889	AB968390	AB968418	AB968576		AB968538
<i>Cordyceps melolonthae</i>	OSC 110993	DQ522548	DQ518762	DQ522331	DQ522376	
<i>Ophiocordyceps myrmecophila</i>	TNS 27120	KJ878929	KJ878895	KJ878975	KJ879009	
<i>Ophiocordyceps_khaoyaiensis</i>	HMAS 199620	KJ878927	KJ878893	KJ878973	KJ879007	

<i>Ophiocordyceps naomipierceae</i>	DAWKSANT	KX713664	KX713589		KX713701	
<i>Ophiocordyceps neovolkiana</i>	OSC 151903	KJ878930	KJ878896	KJ878976	KJ879010	
<i>Ophiocordyceps nigrella</i>	EFCC 9247	EF468963	EF468818	EF468758	EF468866	EF468920
<i>Ophiocordyceps_oecophyllae</i>	OECO1	KX713635				
<b><i>Ophiocordyceps pingbianensis</i></b>	<b>YFCC 8075</b>		<b>MT270099</b>	<b>MT270097</b>	<b>MT270098</b>	<b>MT273117</b>
<i>Ophiocordyceps pruinosa</i>	NHJ 12994	EU369106	EU369041	EU369024	EU369063	EU369084
<i>Ophiocordyceps pulvinata_</i>	TNS F 30044	GU904208		GU904209	GU904210	
<i>Ophiocordyceps purpureostromata</i>	TNS F18430	KJ878931	KJ878897	KJ878977	KJ879011	
<i>Ophiocordyceps ramosissimum_</i>	GZUHHN8	KJ028012		KJ028014	KJ028017	
<i>Ophiocordyceps ravenelii</i>	OSC 151914	KJ878932		KJ878978	KJ879012	KJ878950
<i>Ophiocordyceps pseudorhizoidea</i>	NHJ 12522	EF468970	EF468825	EF468764	EF468873	EF468923
<i>Ophiocordyceps rubiginosiperitheciata</i>	NBRC 106966	JN941704	JN941437	AB968582	JN992438	AB968544
<i>Ophiocordyceps satoi</i>	J7	KX713653	KX713599	KX713683	KX713711	
<i>Ophiocordyceps sinensis_</i>	EFCC 7287	EF468971	EF468827	EF468767	EF468874	EF468924
<i>Ophiocordyceps sinensis</i>	YN07-8	JX968027	JX968032	JX968017	JX968007	JX968012
<i>Ophiocordyceps sobolifera</i>	TNS F18521	KJ878933	KJ878898	KJ878979	KJ879013	
<i>Ophiocordyceps sphecocephala</i>	OSC 110998	DQ522551	DQ518765	DQ522336	DQ522381	DQ522432
<i>Ophiocordyceps sporangifera_</i>	MFLU 18-0658		EF468817	EF468757	EF468865	
<i>Ophiocordyceps stylophora</i>	OSC 110999	MH725813	MH725831	MH727389	MH727391	
<i>Ophiocordyceps superficialis</i>	MICH 36253	EF468982	EF468837	EF468777	EF468882	EF468931
<i>Ophiocordyceps variabilis</i>	ARSEF 5365	EF468983			EF468883	
<i>Ophiocordyceps xuefengensis</i>	GZUH 2012HN14	KC631789		KC631793	KC631798	
<i>Ophiocordyceps yakusimensis</i>	HMAS 199604	KJ878938	KJ878902		KJ879018	KJ878953
<i>Ophiocordyceps_entomorrhiza</i>	TNS 16252	KJ878941	KJ878906	KJ878986		
<i>Paraisaria myrmicarum</i>	IMI 393961		EU797600	EU797597		
<i>Ophiocordyceps_citrina</i>	TNS F18537		KJ878903	KJ878983		KJ878954
<i>Ophiocordyceps_buquetii</i>	HMAS 199617	KJ878940	KJ878905	KJ878985	KJ879020	
<i>Tolypocladium inflatum</i>	OSC 71235	EF469124	EF469077	EF469061	EF469090	EF469108
<i>Tolypocladium ophioglossoides_</i>	CBS 100239	KJ878910	KJ878874	KJ878958	KJ878990	KJ878944

<i>Hirsutella thompsonii</i>	ARSEF 414	KM652093	KM652139	KM652021	KM652056	
<i>Hirsutella thompsonii</i>	ARSEF 5412	KM652100	KM652148			
<i>Ophiocordyceps unilateralis_</i>	VIC 44303	KX713628	KX713626	KX713675	KX713730	
<i>Hirsutella satumaensis</i>	ARSEF 996	KM652082	KM652125	KM652008	KM652047	
<i>Ophiocordyceps unituberculata.</i>	YFCC HU1301	KY923214	KY923218	KY923216		KY923220
<i>Ophiocordyceps robertsii</i>	KEW 27083		EF468826	EF468766		
<i>Hirsutella illustris</i>	ARSEF 5539	KM652069	KM652112	KM651996	KM652037	
<i>Hirsutella lecaniicola_</i>	ARSEF 8888	KM652069	KM652112	KM651996	KM652037	
<i>Hirsutella rhossiliensis</i>	ARSEF 2931	KM652078	KM652121	KM652004	KM652043	
<i>Hirsutella rhossiliensis</i>	ARSEF 3747	KM652080	KM652123	KM652006	KM652045	
<i>Hirsutella cf. haptospora</i>	ARSEF 2228	KM652075	KM652118	KM652001	KM652041	
<i>Hirsutella strigosa</i>	ARSEF 2197	KM652085	KM652129	KM652012	KM652050	
<i>Ophiocordyceps sinensis</i>	ARSEF 6282	KM652083	KM652126	HM140637	HM140640	