

1 **Supplementary Table S1** Information of taxa used in phylogenetic analysis. Newly sequenced collections are in bold.

Taxa	Collection number (Herbarium)	Locality	Host/Habitat	GenBank accession number		
				ITS	LSU	RPB2
<i>Pseudosperma aestivum</i>	BK18089706 (UTC, holotype)	USA: Utah	<i>Populus, Abies, Pinus</i> , mid-elev	EU600847	EU600846	—
<i>Pseudosperma albobrunneum</i>	LAH35047 (holotype)	Pakistan	<i>Cedrus deodara</i>	MG495392	—	—
<i>Pseudosperma amabile</i>	BAN3010	Austria		MW010036	—	—
<i>Pseudosperma amabile</i>	BAN369 (holotype)	Germany		MW010031	—	—
<b><i>Pseudosperma arenarium</i> sp. nov.</b>	<b>NXYC20201005-01 (holotype)</b>	<b>China</b>	<b><i>Populus</i> plantations</b>	<b>OM304278</b>	<b>OM304287</b>	<b>OM421667</b>
<b><i>Pseudosperma arenarium</i> sp. nov.</b>	<b>NX20210922-57</b>	<b>China</b>	<b><i>Populus</i> plantations</b>	<b>OM304279</b>	<b>OM304288</b>	<b>OM421668</b>
<b><i>Pseudosperma arenarium</i> sp. nov.</b>	<b>SX20210930-65</b>	<b>China</b>	<b><i>Populus</i> plantations</b>	<b>OM304280</b>	<b>OM304289</b>	<b>OM421669</b>
<i>Pseudosperma arenicola</i>	RC-GB99-014	France	<i>Pinus, Salix</i> , sand dune	FJ904134	FJ904134	—
<i>Pseudosperma arenicola</i> var. <i>mediterraneum</i>	JV14920F (WTU)	Italy	<i>Pinus</i> , sandy seashore	JQ408748	JQ408748	—
<i>Pseudosperma aureocitrinum</i>	BAN2903 (isotype)	Spain		MW010047	—	—
<i>Pseudosperma breviterincarnatum</i>	BK28080407	USA: Utah		EU555451	EU555451	—
<i>Pseudosperma breviterincarnatum</i>	PBM1914	USA: Washington	sandy soil under <i>Abies, Picea, Pinus</i>	JQ408750	JQ319677	JQ846465
<i>Pseudosperma brunneicothurnata</i>	PBM1889 (TENN)	USA: Texas	<i>Fagus, Quercus, Pinus</i>	JQ408787	JQ319707	JQ846493
<i>Pseudosperma brunneoumbonatum</i>	MSM0053 (holotype)	Pakistan	<i>Pinus roxburghii</i>	MG742419	MG742420	—
<i>Pseudosperma brunneoumbonatum</i>	MSM00545	Pakistan	<i>Pinus roxburghii</i>	MG742421	MG742422	—
<i>Pseudosperma bulbosissimum</i>	EL6605	Norway	<i>Salix</i> , alpine	AM882765	AM882765	—
<i>Pseudosperma bulbosissimum</i>	EL75-07	Sweden		FJ904160	FJ904160	—
<i>Pseudosperma cercocarpi</i>	BK20069806 (UTC)	USA: Utah	<i>Cercocarpus-Pinus</i> , woodland	—	EU600890	EU600889
<i>Pseudosperma citrinostipes</i>	FYG2903	China		MT072897	MT071202	—
<i>Pseudosperma citrinostipes</i>	FYG2909 (holotype)	China		MT072898	MT071203	—

<i>Pseudosperma conviviale</i>	19793 (holotype)	Italy	<i>Quercus ilex</i>	MT095091	MT095115	—
<i>Pseudosperma dulcamaroides</i>	EL29-08	USA	<i>Salix</i> , alpine	FJ904127	—	—
<i>Pseudosperma emberizanum</i>	STU:SMNS-STU-F-0901461	Germany		MW647630	—	—
<i>Pseudosperma fissuratum</i>	PBM2195 (PERTH) (E7042)	Western Australia	<i>Eucalyptus</i> , tall wet forest	JQ408771	EU555466	EU555465
<i>Pseudosperma fissuratum</i>	PBM2206 PERTH (E7054) (holotype)	Western Australia	<i>Eucalyptus</i> , lawn	JQ408770	AY732213	JQ421069
<i>Pseudosperma flavellum</i>	EL13705	Sweden		AM882776	—	—
<i>Pseudosperma cf. flavellum</i>	EL 2010a / PAM05062502	France		FJ904128	FJ904128	—
<i>Pseudosperma flavorimosum</i>	LAH35042 (holotype)	Pakistan	<i>Pinus wallichiana</i> A.B	MG495391	—	—
<i>Pseudosperma friabile</i>	TENN068384 (type)	USA	In lawn under planted <i>Quercus phellos</i>	MH216095	NG_067823	—
<i>Pseudosperma griseorubidum</i>	CAL 1253	India: Kerala	<i>Vateria indica</i>	KT180326	KT180327	KT180328
<i>Pseudosperma huginii</i>	STU:SMNS-STU-F-0901564 (holotype)	Austria		NR_173974	MW647628	—
<i>Pseudosperma hygrophorus</i>	EL97-06	Sweden	<i>Betula</i> , <i>Salix</i> , subalpine meadow	FJ904137	FJ904137	—
<i>Pseudosperma illudens</i>	65726	Australia	natural bush under <i>Eucalyptus</i>	NR_153126	NG_057200	JQ421068
<i>Pseudosperma keralense</i>	KM 191712	India: Kerala	<i>Vateria indica</i> , <i>Hopea ponga</i>	KM924523	KM924518	KY553243
<i>Pseudosperma lepidotellum</i>	MCA1881 (BRG, holotype)	Guyana	In humus layer, on trunk of <i>Dicymbe</i> , rainforest	JN642233	JN642235	—
<i>Pseudosperma melleum</i>	MCVE 30145 (holotype)	Italy	<i>Quercus ilex</i> and <i>Quercus suber</i>	MT095090	MT095114	—
<i>Pseudosperma melliolens</i>	EL224-06	France	<i>Salix</i> , <i>Quercus</i>	FJ904149	FJ904149	—
<i>Pseudosperma melliolens</i>	PAM05052303	France	<i>Tilia</i> , calcareous soil	FJ904148	FJ904148	—
<i>Pseudosperma melliolens</i>	17130 (type)	France		MN901256	MN901256	—
<i>Pseudosperma melliolens</i>	MCVE30344	Italy	<i>Quercus ilex</i> & <i>Arbutus unedo</i>	MT095095	—	—
<i>Pseudosperma cf. microfastigiatum</i>	EL113-06	Sweden	<i>Dryas</i>	FJ904156	FJ904156	—
<i>Pseudosperma cf. microfastigiatum</i>	FO46800	Germany		DQ071697	DQ071697	—

<i>Pseudosperma napae anum</i>	BAN2947 (holotype)	Germany		MW010040	—	—
<i>Pseudosperma napae anum</i>	BAN2948	Germany		MW010044	—	—
<i>Pseudosperma neglectum</i>	ZT13022_DED8063 (SFSU)	Thailand	Lithocarpus and Castanopsis	EU600829	EU600829	—
<i>Pseudosperma neoumbrinellum</i>	HMJAU25742 (holotype)	China	<i>Populus, Salix</i>	MH047249	MG844977	—
<i>Pseudosperma niveivelatum</i>	PBM2337 (WTU)	USA: Washington	<i>Abies, Pinus</i> , sandy soil, montane	JQ313566	JQ313566	AY333776
<i>Pseudosperma niveivelatum</i>	BK21089714	USA	montane conifer-aspen forest (Pinaceae, <i>Populus</i> )	JQ319695	JQ319695	—
<i>Pseudosperma obsoletum</i>	EL1704	Sweden	<i>Picea, Corylus</i>	AM882769	AM882769	—
<i>Pseudosperma obsoletum</i>	PBM2332 (WTU)	USA	<i>Alnus, Corylus</i>	JQ408766	JQ408766	—
<i>Pseudosperma occidentalis</i>	BK27089703 (UTC, holotype)	USA: Utah	<i>Picea, Abies</i> , montane	EU600893	EU600893	EU600892
<i>Pseudosperma occidentalis</i>	PBM525	USA, Washington		AY038321	AY038321	AY333775
<i>Pseudosperma perlatum</i>	EL7404	Sweden	<i>Corylus, Betula</i> , calcareous soil	AM882771	AM882771	—
<i>Pseudosperma perlatum</i>	JV10247 (WTU)	Finland	<i>Populus tremula</i> mixed with <i>Betula, Alnus, Picea, Prunus</i>	JQ408767	JQ319698	—
<i>Pseudosperma pinophilum</i>	MSM0046 (holotype)	Pakistan	<i>Pinus roxburghii</i>	MG742414	MG742418	—
<i>Pseudosperma pinophilum</i>	MSM0047	Pakistan	<i>Pinus wallichiana</i>	MG742417	MG742415	—
<i>Pseudosperma pomderosum</i>	19060 (holotype)	Italy	<i>Quercus rubra</i>	MT095092	MT095116	—
<i>Pseudosperma rimosum</i>	AO20080250	GB		FJ904147	FJ904147	—
<i>Pseudosperma rimosum</i>	EL118-08	Sweden		FJ904146	FJ904146	—
<i>Pseudosperma rimosum</i>	EL211-06	France		FJ904145	FJ904145	—
<i>Pseudosperma rimosum</i>	PAM06112703	France: Corsica		FJ904143	FJ904143	—
<i>Pseudosperma rimosum</i>	EL75-05	Sweden	<i>Fagus, Quercus</i> , park	AM882762	AM882762	—
<i>Pseudosperma rimosum</i>	PAM03110904	France	<i>Quercus</i>	FJ904144	FJ904144	—
<i>Pseudosperma rimosum</i>	PBM2958	USA	<i>Quercus, Carya, Tsuga, Pinus</i>	JQ408777	JQ421071	JQ421071
<i>Pseudosperma rimosum</i>	DJL_SJ14 (TENN)	Virgin Islands	<i>Coccoloba, Neea</i> , dry tropical forest	JQ408784	EU600851	—

<i>Pseudosperma rimosum</i>	BK28080513 (UTC)	USA: Utah	<i>Populus, Pinus</i>	EU600850	EU600848	EU600849
<i>Pseudosperma rimosum</i>	PBM2601 (TENN)	Tennessee	<i>Betula, Picea,</i>	EU600852	EU600852	—
<i>Pseudosperma</i> cf. <i>rimosum</i>	PC080925	GB	<i>Pinus, Quercus</i>	FJ904153	FJ904153	—
<i>Pseudosperma</i> cf. <i>rimosum</i>	PAM05061101	France	<i>Tilia</i> , calcareous soil	FJ904155	FJ904155	—
<i>Pseudosperma</i> cf. <i>rimosum</i>	PBM2574 (TENN)	USA: Massachusetts	<i>Quercus, Pinus</i>	JQ408776	EF561633	EU307858
<i>Pseudosperma</i> cf. <i>rimosum</i>	JV8125	Finland	<i>Picea, Tilia, Populus</i> , rich	FJ904152	FJ904152	—
<i>Pseudosperma</i> cf. <i>rimosum</i>	JV22619	Estonia	<i>Quercus, Corylus</i> , calcareous soil	FJ904157	FJ904157	—
<i>Pseudosperma</i> cf. <i>rimosum</i> .	EL-2010d/JV26578	Sweden		FJ904154	FJ904154	—
<i>Pseudosperma salentinum</i>	MCVE 30342	Italy	<i>Quercus ithaburensis</i> subsp. <i>macrolepis</i>	MT095093	MT095117	—
<i>Pseudosperma solare</i>	BAN3078 (holotype)	Germany		NR_173973	MW647627	—
<i>Pseudosperma sororium</i>	MCA859/PBM3901 (TENN) (type)	USA: Virginia	<i>Quercus</i>	JQ408772	JQ319700	MH249810
<i>Pseudosperma</i> aff. <i>sororium</i>	PBM2654 (TENN)	USA: Tennessee	<i>Tsuga, Quercus, Carya</i>	EU600853	EU600853	—
<i>Pseudosperma</i> aff. <i>sororium</i>	ADW0057/TENN063512	USA	<i>Abies, Picea</i>	JQ408778	—	—
<i>Pseudosperma</i> aff. <i>sororium</i>	PBM3055/TENN063504	USA	redwood forest under <i>Pseudotsuga, Lithocarpus</i>	JQ408781	—	—
<i>Pseudosperma</i> aff. <i>sororium</i>	JV15200	Sweden	<i>Salix</i> , alpine	FJ904151	FJ904151	—
<i>Pseudosperma</i> aff. <i>sororium</i>	REH8245 (NY)	Costa Rica	<i>Quercus, Comarostaphylis</i>	JQ408783	JN975004	JQ421076
<i>Pseudosperma squamatum</i>	PAM05052301	France		FJ904132	FJ904132	—
<i>Pseudosperma squamatum</i>	SJ08003	Sweden	<i>Betula, Pinus</i>	FJ904136	FJ904136	—
<i>Pseudosperma triaciculare</i>	MSM0039 (holotype)	Pakistan	<i>Pinus roxburghii</i>	MG742423	MG742424	—
<i>Pseudosperma triaciculare</i>	MSM0041	Pakistan	<i>Pinus roxburghii</i>	MG742429	MG742430	—
<i>Pseudosperma umbrinellum</i>	JV13699	Finland	<i>Pinus, Populus, Salix</i>	FJ904165	FJ904165	—
<i>Pseudosperma umbrinellum</i>	PAM01102912	France		—	FJ904162	—

<i>Pseudosperma umbrinellum</i>	F14488 (type)	Italy		HM209796	—	—
<i>Pseudosperma umbrinellum</i>	PBM3024	USA	<i>Tsuga, Pinus</i>	MH216105	JN975010	JQ846497
<i>Pseudosperma xanthocephala</i>	PAM00100606	France	<i>Salix</i>	FJ904130	FJ904130	—
<i>Pseudosperma yunnanense</i>	HMJAU25840 (holotype)	China	<i>Quercus, Pinus</i>	MH047250	MG844975	—
<i>Pseudosperma</i> sp.	TR104-05 (M)	Papua New Guinea	Mixed <i>Castanopsis</i> forest, tropical montane	JN975011	JN975011	—
<i>Pseudosperma</i> sp.	TR133-05 (M)	Papua New Guinea	Mixed <i>Castanopsis</i> forest, tropical montane	JQ408791	JQ319709	—
<i>Pseudosperma</i> sp.	TR183-05	Papua New Guinea	Mixed <i>Castanopsis</i> forest, tropical montane	JQ408773	JN975005	—
<i>Pseudosperma</i> sp.	TR75-05	Papua New Guinea	Mixed <i>Castanopsis</i> forest, tropical montane	JQ408774	JQ815425	—
<i>Pseudosperma</i> sp.	TR138-05 (M)	Papua New Guinea	Mixed <i>Castanopsis</i> forest, tropical montane	JQ408792	JN975009	—
<i>Pseudosperma</i> sp.	TR49-05 (M)	Papua New Guinea	Mixed <i>Castanopsis</i> forest, tropical montane	JQ408790	JN975014	JQ421079
<i>Pseudosperma</i> sp.	MTS2494 (UC)	USA: California	<i>Quercus agrifolia</i>	JQ408786	JN975008	—
<i>Pseudosperma</i> sp.	BAN2931	Germany		MW010038	—	—
<i>Pseudosperma</i> sp.	BAN3013	Germany		MW010037	—	—
<i>Pseudosperma</i> sp.	MCA704 (TENN)	Japan	<i>Pinus, Betula</i> , montane	JQ408765	JN975007	—
<i>Pseudosperma</i> sp.	TM02-130	Ontario	<i>Tsuga</i> dominant forest plot	EU522733	EU 522733	—
<i>Mallocybe terrigena</i>	JV16431	Finland	<i>Pinus, Picea</i> , calcareous soil	AM882864	AY380401	AY333309
<i>Nothocybe distincta</i>	CAL-1310 (holotype)	India: Kerala		KX171343	EU604546	KX171345