

***New Phytologist* Supporting Information**

Article title: How to know the fungi: combining field inventories and DNA-barcoding to document fungal diversity

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Methods S1 The full methods for specimen collection, DNA extraction and sequencing, and data analysis

Fungal fruiting bodies were collected in *Nothofagus* forest sites in Patagonia (Argentina and Chile) during spring 2015 and 2016 (Southern Hemisphere autumn). Two shorter exploratory expeditions by Smith, Pfister, and Nouhra were conducted in 2008 and 2011. A small number of specimens from these earlier expeditions were sequenced and included in the final sequence database. Specimens were photographed in the field and fresh tissues were preserved in Extract-N-Amp (Sigma-Aldrich, St Louis, MO, USA) and CTAB (Gardes & Bruns, 1993) buffer for subsequent DNA extraction. Each collection was photographed and rapidly identified under a stereomicroscope. Spores, basidia, and other microscopic features were observed by light microscopy when necessary to refine identification. Specimens were preserved on a forced-air dryer at 37°C and stored in plastic bags with silica gel. Specimens were subsequently deposited at the Museo Botánico of Córdoba (CORD), the Museo Nacional de Historia Natural of Santiago (SGO), the University of Tennessee Herbarium (TENN), and the Florida Museum of Natural History (FLAS).

We extracted the DNA of specimens using the Extract-N-Amp Plant kit (Sigma-Aldrich, St Louis, MO, USA) for rapid DNA extraction and amplification. DNA of c. 25% of our collections were also extracted using a standard CTAB procedure (Gardes & Bruns, 1993). The rDNA internal transcribed spacer (ITS1-5.8S-ITS2) was amplified by PCR with primers ITS1F (Gardes & Bruns, 1993) and ITS4 (White *et al.*, 1990). PCR reactions of Extract-N-Amp DNA samples were performed with 0.5 µl of undiluted DNA in a total volume of 25 µl using Taq Polymerase with Standard Taq Buffer (New England Biolabs, Ipswich MA, USA) following manufacturer protocols. DNA samples extracted using the CTAB protocol were amplified by PCR using 1 µl of genomic DNA diluted 1:10 in a total volume of 25 µl using Taq Polymerase with Standard Taq Buffer following manufacturer protocols. Thermal cycling parameters were: initial denaturation at 95°C for 5 min; 35 cycles at 95°C for 30 s, 52°C for 30 s, 72°C for 2 min; final extension at 72°C for 10 min. For specimens MES-1534 (*Endogone*-like), MES-1074 and MES-1670 (*Tremellodendropsis* spp.), the nuclear 18S and 28S rDNA were also amplified by PCR. The 18S rDNA region was amplified using the primers NS1 (White *et al.*, 1990) and SSU-1196 (Borneman & Hartin, 2000), and the 28S rDNA region using the primers LR0R (Bunyard *et al.*, 1994) and LR5 (Vilgalys & Hester, 1990). Thermal cycling parameters were: initial denaturation at 94°C for 2 min; 35 cycles at 94°C for 30 s, 52°C for 45 s, 72°C for 1 min; final extension at 72°C for 10 min. For products that failed to amplify using the previously listed PCR protocols, we attempted a second round of PCR amplification using Phusion Hot Start II Taq Polymerase (ThermoFisher Scientific, Waltham MA). Phusion Taq PCR reactions used 1 µl of undiluted DNA template in a 20 µl reaction volume mixed to manufacturer specifications and the following thermal cycling parameters: initial denaturation at 98°C for 30 s; 35 cycles at 98°C for 10 s, 50°C for 30 s, 72°C for 30 s; final extension at 72°C for 5 min.

PCR products were verified by electrophoresis on 1.5 % agarose gel stained with SYBR green dye (ThermoFisher Scientific, Waltham, MA), cleaned with EXO and SAP enzymes (Glenn & Schable, 2005), and sequenced with the same primer combination using the BigDye Terminator v. 3.1 Cycle Sequencing Kit on an ABI3700 DNA sequencer (Applied Biosystems) at University of Florida. Sequences were edited and quality-checked with Sequencher 5.1. A BLAST search was performed in GenBank to

ensure that sequences were not contaminated. A total of 957 sequences were generated (See in Table S2 for GenBank accession numbers).

Sequences were filtered with the ITSx extractor (Bengtsson-Palme *et al.*, 2013) to select the ITS1-5.8S-ITS2 region and eliminate nucleotides of 18S at the beginning and 28S at the end of each sequence. Sequences were subsequently clustered into operational taxonomic units (OTUs) using the `pick_open_reference_otus.py` command with the `usearch61` algorithm in QIIME (Caporaso *et al.*, 2010). In a first step, sequences were clustered using the dynamic UNITE ‘species hypothesis’ database (Koljalg *et al.*, 2005). This approach uses 97–99% similarity thresholds depending on the group of fungi. Sequences that did not correspond to an existing ‘species hypothesis’ in the UNITE reference database were subsequently clustered *de novo* at 97% similarity in three additional steps, where each cluster centroid is then chosen as new ‘reference sequence’ in the following step (Caporaso *et al.*, 2010). Automated taxonomic assignment was completed using BLAST searches at 90% similarity in QIIME. One representative sequence from each OTU in our dataset was subsequently compared to the UNITE+INSD database using megaBLAST on the PlutoF workbench (Abarenkov *et al.*, 2010). The taxonomic identification of OTUs was evaluated manually by examining the PlutoF and QIIME BLAST hits and comparing them with the morphological identification of specimens (see in Table S2 for information on voucher specimens and BLAST results). None of our OTUs corresponded to the ‘Top 50 most wanted fungi’ identified by Nilsson *et al.* (2016), probably because most of these fungi are from the Northern Hemisphere whereas our sampling was from the Southern Hemisphere.

The nuclear 18S and 28S rDNA sequences of specimens MES-1074 and MES-1670 (*Tremellodendropsis* spp.) were combined with published Agaricomycetes datasets (Tedersoo & Smith, 2013; Berbee *et al.*, 2016) and aligned automatically with MUSCLE 3.8.31 (Edgar, 2004). Alignments were corrected manually and ambiguously aligned regions were excluded in Mesquite 3.2 (Maddison & Maddison, 2017). Phylogenetic trees of individual and combined dataset were reconstructed using Maximum Likelihood (ML) with 1000 bootstrap pseudoreplicates and the GTRGAMMA model in RAxML 8.2.8 (Stamatakis, 2014) on the CIPRES Portal (Miller *et al.*, 2010). The concatenated dataset was analyzed using Bayesian inference (BI) in MrBayes 3.2.6 (Ronquist *et al.*,

2012) with the GTR+G+I model for 10 million generations, 3 runs, and 4 chains. Convergence of the BI runs was verified in Tracer 1.6 (Rambaut *et al.*, 2014) and the majority rule consensus tree was reconstructed by pooling sampled trees after discarding the first 25% as burn-in. The Tremellodendropsidales ITS rDNA phylogeny (/agaricomycetes1 in Tedersoo & Smith, 2013) was reconstructed using the same methods. The phylogenetic position of specimen MES-1534 (*Endogone*-like species) within Mucoromycotina based on nuclear 18S and 28S ribosomal DNA sequences combined with published datasets (Bidartondo *et al.*, 2011; Desiro *et al.*, 2013; Hirose *et al.*, 2014; Yamamoto *et al.*, 2015, 2016; Orchard *et al.*, 2016) was inferred using the same procedure. The complete list of specimens and sequences is available in Table S2. Alignments and trees are available in TreeBase (<http://purl.org/phylo/treebase/phyloids/study/TB2:S20415>).

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Table S1 Operational taxonomic units (OTUs) generated from ITS rDNA sequencing of our specimen collections. Taxonomy, voucher number, Genbank accession, trophic mode, ECM lineage and highest BLAST match information is shown for a representative specimen from each OTU. BLAST data were generated using the UNITE+INSD sequence database and include the most closely related UNITE species hypothesis or Genbank number, sample type, sample origin, blast score, E-value, % similarity and % query coverage for each OTU. Specimens are currently at FLAS and will be permanently deposited at CORD, FH, SGO, TENN, or FLAS after taxonomic studies are complete.

Taxonomy	Voucher Specimen	Genbank Accession	Trophic Mode	ECM Lineage	Highest BLAST Match						
					UNITE Species Hypothesis	Sample Type	Sample Origin	Blast Score	e-value	% sim.	% cover.
Agaricomycetes	MES-2135	KY462668	saprobe		AY542865 SH202616.07FU Omphalina foliacea	specimen	other	795	0	91	100
Agaricus	CT-4269	KY462315	saprobe		DQ232648 SH174681.07FU Agaricus subantarcticus	specimen	Australasia	1188	0	99	100
Agaricus	CT-4291	KY462327	saprobe		DQ232648 SH174681.07FU Agaricus subantarcticus	specimen	Australasia	1212	0	100	100
Agaricus	CT-4462	KY462379	saprobe		FJ596845 SH174672.07FU Agaricus pocillator	specimen	other	1186	0	99	100
Aleuria	CT-4252	KY462306	saprobe		UDB018072 SH215691.07FU Aleuria aurantia	specimen	other	900	0	98	100
Aleuria	CT-4274	KY462317	saprobe		KC832903 SH527332.07FU Aleuria amplissima	specimen	other	1007	0	99	100
Aleurina	DHP-CH-33	KY462390	ecm	/aleurina	UDB014387 SH214067.07FU Pezizales	specimen	America South	977	0	100	100
Aleurina	MES-1336	KY462463	ecm	/aleurina	UDB007185 SH187817.07FU Envir: Pyronemataceae	root	America South	1003	0	100	100
Aleurina	MES-1337	KY462464	ecm	/aleurina	UDB007133 SH214068.07FU Envir: Pyronemataceae	root	America South	996	0	100	100
Aleurina	MES-1711	KY462532	ecm	/aleurina	UDB014386 SH187816.07FU Aleurina argentina	specimen	America	998	0	100	100
Amanita	CT-4216	KY462291	ecm	/amanita	AY194981 SH461459.07FU Amanita umbrinella	specimen	Australasia	512	1.00E-143	85	96
Amanita	MES-1343	KY462465	ecm	/amanita	GQ981527 SH014758.07FU Amanita arenaria	specimen	Australasia	494	3.00E-138	86	92
Amanita	MES-1774	KY462557	ecm	/amanita	AY194981 SH461459.07FU Amanita umbrinella	specimen	Australasia	510	4.00E-143	84	96
Amanita	MES-994	KY462705	ecm	/amanita	GU222312 SH003290.07FU Amanita taiepa	specimen	Australasia	872	0	97	100
Amanita	MES-1647	No seq.	ecm	/amanita	(ID by morphology: <i>Amanita muscaria</i>)	n/a	Northern Hemisphere	n/a	n/a	n/a	n/a
Amylascus	MES-1264	KY462450	ecm	/pachyphloeus-amylascus	UDB007098 SH207854.07FU Pezizaceae	root	America South	1033	0	100	100
Amylascus	MES-1295	KY462456	ecm	/pachyphloeus-amylascus	KJ720815 SH490405.07FU Amylascus	specimen	America South	1040	0	100	99
Amylascus	MES-1328	KY462462	ecm	/pachyphloeus-amylascus	UDB007201 SH207855.07FU Pezizaceae	root	America South	883	0	95	100
Amylascus	MES-1770	KY462556	ecm	/pachyphloeus-amylascus	KJ720815 SH490405.07FU Amylascus	specimen	America South	832	0	95	90
Amylascus	MES-1824	KY462574	ecm	/pachyphloeus-amylascus	UDB007052 SH207853.07FU Pezizaceae	root	America South	883	0	94	99
Amylascus	MES-1975	KY462629	ecm	/pachyphloeus-amylascus	UDB007201 SH207855.07FU Pezizaceae	root	America South	1027	0	100	100
Annulohypoxylon	AM-AR15-019	KY462280	saprobe		JQ327866 SH216694.07FU Annulohypoxylon	leaves	America South	970	0	100	100
Armillaria	MES-1303	KY462458	plant pathogen		FJ660948 SH184009.07FU Armillaria	specimen	America	1489	0	100	100
Arrhenia	MES-2170	KY462678	saprobe		KP889745 SH188321.07FU Arrhenia acerosa	specimen	other	965	0	96	100
Artomyces	MES-1987	KY462631	saprobe		AF454418 Artomyces adrienneae	specimen	Australasia	1099	0	100	100
Artomyces	MES-559	KP025706	saprobe		KP025706 SH494721.07FU Artomyces	specimen	America	1096	0	100	100
Atheliales	MES-1750	KY462544	ecm?	(unknown Atheliales)	JX136113 SH490487.07FU Fungi	air	other	435	2.00E-120	87	100
Atheliales	MES-2102	KY462660	ecm	/piloderma	UDB014555 SH016378.07FU Atheliales	root	other	918	0	99	98
Auriculariales	MES-1902	KY462616	saprobe		KJ140733 SH476579.07FU Heterochaetella	specimen	other	809	0	96	100
Austrogautieria	MES-911	KY462688	ecm	/hysterangium	KP191963 SH525689.07FU Austrogautieria	specimen	Australasia	586	6.00E-166	86	100
Austropaxillus	CT-4432	KY462370	ecm	/austropaxillus	UDB007002 SH179248.07FU Austropaxillus squarrosus	root	America	1066	0	100	100

Austropaxillus	MES-1030	KY462404	ecm	/austropaxillus	UDB007002 SH179248.07FU Austropaxillus squarrosus	specimen	South America South	712	0	89	100
Austropaxillus	MES-1061	KY462413	ecm	/austropaxillus	UDB007002 SH179248.07FU Austropaxillus squarrosus	specimen	America South	809	0	92	100
Austropaxillus	MES-1621	KY462504	ecm	/austropaxillus	UDB007002 SH179248.07FU Austropaxillus squarrosus	root	America	558	2.00E-157	95	48
Austropaxillus	MES-1661	KY462514	ecm	/austropaxillus	KP191819 SH179251.07FU Austropaxillus squarrosus	specimen	Australasia South	667	0	88	97
Austropaxillus	MES-1776	KY462558	ecm	/austropaxillus	UDB007002 SH179248.07FU Austropaxillus squarrosus	specimen	America South	702	0	89	94
Austropaxillus	MES-1963	KY462625	ecm	/austropaxillus	UDB008410 SH179250.07FU Austropaxillus statuum	root	America South	1072	0	99	98
Austropaxillus	MES-2025	KY462641	ecm	/austropaxillus	UDB007002 SH179248.07FU Austropaxillus squarrosus	root	America South	558	2.00E-157	96	47
Austropaxillus	MES-2104	KY462661	ecm	/austropaxillus	UDB007002 SH179248.07FU Austropaxillus squarrosus	root	America	135	3.00E-030	84	25
Beauveria	MES-1872	KY462603	insect pathogen		LN808999 SH212413.07FU Beauveria bassiana	specimen	other	915	0	100	100
Boletus	MES-1021	KY462402	ecm	/boletus	EU837225 SH005625.07FU Truncocolumella rubra	specimen	other	754	0	89	94
Botryobasidium	MES-1018	KY462401	saprobe		UDB016306 SH189304.07FU Botryobasidium conspersum	specimen	other	1002	0	98	100
Botryobasidium	MES-1763	KY462551	saprobe		KP814561 Botryohypochnus	specimen	other	712	0	91	100
Camarophyllopsis cf.	MES-526	KY462680	saprobe		GU328580 SH004147.07FU Clavariaceae	soil	other	841	0	90	100
Ceratobasidium	MES-2154	KY462673	saprobe?		KJ188557 SH186408.07FU Ceratobasidiaceae	root	other	821	0	91	100
Ceratobasidium	MES-2155	KY462674	saprobe?		DQ068771 SH027403.07FU Ceratobasidium	specimen	other	752	0	91	104
Chlorociboria	MES-1149	KY462428	saprobe		EF520124 SH204303.07FU Chlorociboria argentinensis	specimen	South America	459	1.00E-127	88	93
Chlorociboria	MES-1889	KY462609	saprobe		EF520124 SH204303.07FU Chlorociboria argentinensis	specimen	South America	811	0	100	100
Clavariaceae	MES-1517	KY462472	saprobe		UDB014192 SH016155.07FU Clavulinopsis	specimen	other	725	0	91	100
Clavulinopsis	MES-1617	KY462502	saprobe		UDB019768 SH017003.07FU Clavulinopsis corniculata	specimen	other	616	7.00E-175	89	93
Clavulinopsis	MES-1672	KY462518	saprobe		KP257144 SH488603.07FU Clavulinopsis corallinorosea	unknown	other	817	0	93	100
Clavulinopsis	MES-1703	KY462526	saprobe		KM248913 SH197808.07FU Clavulinopsis laeticolor	specimen	other	889	0	97	100
Clitocybula	MES-2026	KY462642	saprobe		GQ924012 SH006020.07FU Gerronema	root	other	883	0	92	100
Coprinopsis	AM-AR15-006	KY462275	saprobe		KF897018 SH219007.07FU Coprinopsis atramentaria	specimen	other	1129	0	100	100
Corticaceae	MES-1066	KY462414	saprobe		JX857752 SH185881.07FU Corticaceae	specimen	other	996	0	99	96
Corticium	MES-2097	KY462657	saprobe		KU213579 SH197029.07FU Corticium	specimen	other	1066	0	100	100
Cortinarius	AM-AR15-008	KY462276	ecm	/cortinarius	UDB014285 SH222511.07FU Cortinarius	specimen	South America	1070	0	99	100
Cortinarius	CT-4213	KY462289	ecm	/cortinarius	UDB014309 SH222481.07FU Cortinarius holojanthinus	specimen	South America	1114	0	100	100
Cortinarius	CT-4215	KY462290	ecm	/cortinarius	KJ635229 SH222627.07FU Cortinarius xenosma	specimen	Australasia South	987	0	96	100
Cortinarius	CT-4221	KY462292	ecm	/cortinarius	UDB023828 SH532118.07FU Cortinarius semiamictus	specimen	America	1003	0	97	100
Cortinarius	CT-4226	KY462294	ecm	/cortinarius	JX178610 SH222599.07FU Cortinarius cycneus	specimen	Australasia	795	0	91	100
Cortinarius	CT-4228	KY462295	ecm	/cortinarius	JF960721 SH482403.07FU Cortinariaceae	specimen	Australasia South	1014	0	97	100
Cortinarius	CT-4229	KY462296	ecm	/cortinarius	UDB014312 SH222473.07FU Cortinarius	root	America	942	0	95	100
Cortinarius	CT-4233	KY462298	ecm	/cortinarius	GQ159901 SH191068.07FU Cortinarius renidens	specimen	other	800	0	91	99
Cortinarius	CT-4239	KY462300	ecm	/cortinarius	KT875181 SH223043.07FU Cortinarius elaiops	specimen	Australasia	905	0	94	100
Cortinarius	CT-4248	KY462305	ecm	/cortinarius	JF960662 SH033413.07FU Cortinariaceae	specimen	Australasia	845	0	91	100
Cortinarius	CT-4253	KY462307	ecm	/cortinarius	KU136439 SH218401.07FU Cortinarius iringa	specimen	Australasia South	887	0	94	100
Cortinarius	CT-4260	KY462310	ecm	/cortinarius	UDB014330 SH212108.07FU Cortinarius paradoxus	specimen	America South	1120	0	100	100
Cortinarius	CT-4261	KY462311	ecm	/cortinarius	UDB008459 SH222529.07FU Cortinarius	root	America South	992	0	96	100
Cortinarius	CT-4266	KY462313	ecm	/cortinarius	UDB014297 SH222584.07FU Cortinarius nothovenetus	specimen	America South	1033	0	98	100
Cortinarius	CT-4276	KY462318	ecm	/cortinarius	AF325599 Cortinarius	root	America South	1107	0	100	100
Cortinarius	CT-4283	KY462322	ecm	/cortinarius	UDB023896 SH223138.07FU Cortinarius austroduracinus	specimen	America South	1068	0	100	100
Cortinarius	CT-4285	KY462323	ecm	/cortinarius	JX679098 SH222420.07FU Cortinarius austrovenetus	specimen	Australasia South	1018	0	97	100
Cortinarius	CT-4287	KY462324	ecm	/cortinarius	UDB014316 SH222714.07FU Cortinariaceae	root	America	1040	0	98	100

Cortinarius	CT-4288	KY462325	ecm	/cortinarius	KF727390 SH033557.07FU Cortinarius	specimen	Australasia	922	0	94	100
Cortinarius	CT-4290	KY462326	ecm	/cortinarius	UDB023910 SH490329.07FU Cortinarius	specimen	South America	990	0	96	100
Cortinarius	CT-4313	KY462329	ecm	/cortinarius	absinthiacus KJ635229 SH222627.07FU Cortinarius	specimen	Australasia	989	0	96	100
Cortinarius	CT-4317	KY462330	ecm	/cortinarius	xenosma	specimen	South America	1011	0	97	100
Cortinarius	CT-4319	KY462331	ecm	/cortinarius	UDB014298 SH222601.07FU Cortinarius	root	South America	1011	0	97	100
Cortinarius	CT-4336	KY462338	ecm	/cortinarius	UDB014297 SH222584.07FU Cortinarius	specimen	South America	976	0	96	100
Cortinarius	CT-4349	KY462340	ecm	/cortinarius	nothovenetus UDB023931 SH494865.07FU Cortinarius	specimen	South America	1009	0	96	100
Cortinarius	CT-4352	KY462341	ecm	/cortinarius	maulensis UDB014322 SH222584.07FU Cortinarius	specimen	South America	1009	0	96	100
Cortinarius	CT-4366	KY462346	ecm	/cortinarius	nothovenetus KJ635229 SH222627.07FU Cortinarius	specimen	America	966	0	96	100
Cortinarius	CT-4369	KY462347	ecm	/cortinarius	xenosma	specimen	Australasia	1027	0	97	100
Cortinarius	CT-4371	KY462349	ecm	/cortinarius	JF960721 SH482403.07FU Cortinariaceae	specimen	Australasia	983	0	96	100
Cortinarius	CT-4372	KY462350	ecm	/cortinarius	KJ421019 SH491529.07FU Cortinarius	specimen	Australasia	616	6.00E-175	90	95
Cortinarius	CT-4379	KY462354	ecm	/cortinarius	controversus KJ635222 SH222735.07FU Cortinarius	specimen	Australasia	931	0	95	100
Cortinarius	CT-4380	KY462355	ecm	/cortinarius	carbonellus KF727383 SH033573.07FU Cortinarius	specimen	Australasia	957	0	95	100
Cortinarius	CT-4381	KY462356	ecm	/cortinarius	bellus	specimen	Australasia	957	0	95	100
Cortinarius	CT-4394	KY462358	ecm	/cortinarius	UDB023856 Cortinarius pallidolamellatus	specimen	Australasia	1101	0	100	100
Cortinarius	CT-4401	KY462362	ecm	/cortinarius	UDB014328 SH222584.07FU Cortinarius	specimen	South America	952	0	95	100
Cortinarius	CT-4405	KY462363	ecm	/cortinarius	nothovenetus AY669600 SH033607.07FU Cortinarius	specimen	South America	1059	0	99	99
Cortinarius	CT-4422	KY462366	ecm	/cortinarius	pseudotriumphans UDB000677 SH200758.07FU Cortinarius	specimen	America	1059	0	99	99
Cortinarius	CT-4425	KY462367	ecm	/cortinarius	variegatus UDB023841 SH494791.07FU Cortinarius	specimen	other South	568	2.00E-160	87	97
Cortinarius	CT-4428	KY462368	ecm	/cortinarius	pugionipes UDB023852 SH525555.07FU Cortinarius	specimen	South America	1064	0	99	99
Cortinarius	CT-4443	KY462374	ecm	/cortinarius	brunneovirescens UDB023911 SH526258.07FU Cortinarius	specimen	South America	987	0	96	100
Cortinarius	CT-4461	KY462378	ecm	/cortinarius	chrysophaeus UDB014322 SH222584.07FU Cortinarius	specimen	South America	917	0	94	100
Cortinarius	CT-4473	KY462381	ecm	/cortinarius	nothovenetus JX648597 SH222716.07FU Cortinarius	specimen	America	1003	0	97	100
Cortinarius	MES-1107	KY462421	ecm	/cortinarius	paraoniti UDB023894 SH526258.07FU Cortinarius	specimen	Australasia	922	0	95	100
Cortinarius	MES-1209	KY462437	ecm	/cortinarius	bulbosomustellinus UDB023850 SH529788.07FU Cortinarius	specimen	South America	1094	0	100	100
Cortinarius	MES-1247	KY462446	ecm	/cortinarius	australimoniis AF389125 SH033526.07FU Cortinarius	specimen	South America	876	0	100	99
Cortinarius	MES-1285	KY462455	ecm	/cortinarius	magellanicus	root	South America	1085	0	99	100
Cortinarius	MES-1498	KY462470	ecm	/cortinarius	UDB014300 SH222446.07FU Cortinarius	root	South America	1088	0	99	100
Cortinarius	MES-1527	KY462473	ecm	/cortinarius	DQ328216 SH222338.07FU Cortinarius	specimen	Australasia	922	0	94	100
Cortinarius	MES-1536	KY462476	ecm	/cortinarius	argyrionus JX000357 SH222605.07FU Cortinarius	specimen	other South	826	0	98	100
Cortinarius	MES-1539	KY462477	ecm	/cortinarius	cretax UDB014305 SH222429.07FU Cortinarius	specimen	South America	1007	0	97	100
Cortinarius	MES-1553	KY462480	ecm	/cortinarius	atroacutus GU222274 SH222742.07FU Cortinarius	specimen	Australasia	750	0	91	100
Cortinarius	MES-1554	KY462481	ecm	/cortinarius	perareus	specimen	Australasia	750	0	91	100
Cortinarius	MES-1557	KY462483	ecm	/cortinarius	GQ159901 SH191068.07FU Cortinarius	specimen	other	824	0	92	99
Cortinarius	MES-1597	KY462487	ecm	/cortinarius	GU222274 SH222742.07FU Cortinarius	specimen	Australasia	800	0	92	99
Cortinarius	MES-1600	KY462490	ecm	/cortinarius	perareus UDB023841 SH494791.07FU Cortinarius	specimen	South America	920	0	94	100
Cortinarius	MES-1601	KY462491	ecm	/cortinarius	pugionipes UDB023841 SH494791.07FU Cortinarius	specimen	South America	931	0	95	99
Cortinarius	MES-1602	KY462492	ecm	/cortinarius	UDB004066 SH033474.07FU Envir:	root	Australasia	904	0	94	99
Cortinarius	MES-1603	KY462493	ecm	/cortinarius	Cortinarius JX178610 SH222599.07FU Cortinarius	specimen	Australasia	998	0	97	100
Cortinarius	MES-157	KY462483	ecm	/cortinarius	cycneus JX648597 SH222716.07FU Cortinarius	specimen	Australasia	815	0	93	95
Cortinarius	MES-1597	KY462487	ecm	/cortinarius	paraoniti	specimen	South America	902	0	97	100
Cortinarius	MES-1599	KY462488	ecm	/cortinarius	UDB007142 SH222473.07FU Cortinarius	root	South America	902	0	97	100
Cortinarius	MES-1601	KY462491	ecm	/cortinarius	UDB007083 SH222664.07FU Cortinariaceae	root	South America	1016	0	98	100
Cortinarius	MES-1602	KY462492	ecm	/cortinarius	e	root	South America	1016	0	98	100
Cortinarius	MES-1603	KY462493	ecm	/cortinarius	UDB007192 SH222525.07FU Cortinarius	root	South America	1142	0	100	100
Cortinarius	MES-1604	KY462494	ecm	/cortinarius	UDB004082 Cortinarius	specimen	South America	979	0	97	100
Cortinarius	MES-1605	KY462495	ecm	/cortinarius	UDB023869 SH493252.07FU Cortinarius	specimen	South America	891	0	93	100
Cortinarius	MES-1606	KY462496	ecm	/cortinarius	macilentus	specimen	South America	891	0	93	100
Cortinarius	MES-1607	KY462497	ecm	/cortinarius	UDB007142 SH222473.07FU Cortinarius	root	South America	1094	0	100	100
Cortinarius	MES-1608	KY462498	ecm	/cortinarius	UDB023911 SH526258.07FU Cortinarius	specimen	South America	979	0	96	100
Cortinarius	MES-1609	KY462499	ecm	/cortinarius	chrysophaeus	specimen	America	979	0	96	100

Cortinarius	MES-1604	KY462494	ecm	/cortinarius	UDB014292 SH222482.07FU Cortinarius	root	South America	789	0	87	99
Cortinarius	MES-1605	KY462495	ecm	/cortinarius	KJ635229 SH222627.07FU Cortinarius	specimen	Australasia South	970	0	96	100
Cortinarius	MES-1607	KY462496	ecm	/cortinarius	UDB014320 SH222500.07FU Cortinarius	specimen	America South	1116	0	100	100
Cortinarius	MES-1608	KY462497	ecm	/cortinarius	vaginatus KJ421096 SH222820.07FU Cortinarius	specimen	America South	721	0	96	99
Cortinarius	MES-1611	KY462499	ecm	/cortinarius	chlorophanus UDB014297 SH222584.07FU Cortinarius	specimen	America South	1064	0	99	100
Cortinarius	MES-1618	KY462503	ecm	/cortinarius	nothovenetus KT875181 SH223043.07FU Cortinarius	specimen	Australasia South	917	0	94	100
Cortinarius	MES-1637	KY462508	ecm	/cortinarius	elaiops UDB014329 SH191071.07FU Cortinarius	specimen	America South	1090	0	100	100
Cortinarius	MES-1638	KY462509	ecm	/cortinarius	coleopus JQ287679 SH222731.07FU Cortinarius	specimen	Australasia South	1013	0	97	100
Cortinarius	MES-1644	KY462511	ecm	/cortinarius	verniciorum UDB007206 SH222421.07FU Cortinarius	root	America South	1062	0	99	100
Cortinarius	MES-1733	KY462535	ecm	/cortinarius	UDB023911 SH526258.07FU Cortinarius	specimen	America South	926	0	95	99
Cortinarius	MES-1735	KY462536	ecm	/cortinarius	chrysophaeus UDB023852 SH525555.07FU Cortinarius	specimen	America South	1098	0	100	100
Cortinarius	MES-1737	KY462537	ecm	/cortinarius	brunneovirescens UDB023845 SH489797.07FU Cortinarius	specimen	America South	931	0	95	99
Cortinarius	MES-1738	KY462538	ecm	/cortinarius	austroturmalis UDB023911 SH526258.07FU Cortinarius	specimen	America South	968	0	96	100
Cortinarius	MES-1740	KY462539	ecm	/cortinarius	chrysophaeus AY033115 SH033527.07FU Cortinarius	specimen	America South	911	0	93	100
Cortinarius	MES-1742	KY462540	ecm	/cortinarius	collariatus UDB023911 SH526258.07FU Cortinarius	specimen	America South	955	0	96	100
Cortinarius	MES-1743	KY462541	ecm	/cortinarius	chrysophaeus UDB023844 SH494790.07FU Cortinarius	specimen	America South	1046	0	100	97
Cortinarius	MES-1746	KY462542	ecm	/cortinarius	sulphureomyceliatus KJ635227 SH215615.07FU Cortinarius	specimen	Australasia	750	0	97	100
Cortinarius	MES-1751	KY462545	ecm	/cortinarius	melimyxa KJ635229 SH222627.07FU Cortinarius	specimen	Australasia South	968	0	95	100
Cortinarius	MES-1752	KY462546	ecm	/cortinarius	xenosma UDB008475 SH222608.07FU Cortinarius	root	America South	983	0	97	100
Cortinarius	MES-1753	KY462547	ecm	/cortinarius	paraoniti JX648597 SH222716.07FU Cortinarius	specimen	Australasia South	719	0	89	100
Cortinarius	MES-1756	KY462548	ecm	/cortinarius	UDB023847 SH495816.07FU Cortinarius	specimen	America South	983	0	100	88
Cortinarius	MES-1758	KY462549	ecm	/cortinarius	discophaeus UDB023828 SH532118.07FU Cortinarius	specimen	America South	1094	0	100	100
Cortinarius	MES-1759	KY462550	ecm	/cortinarius	semiamictus UDB023833 SH525555.07FU Cortinarius	specimen	America South	972	0	96	100
Cortinarius	MES-1768	KY462554	ecm	/cortinarius	nitellinus KJ635229 SH222627.07FU Cortinarius	specimen	Australasia	1046	0	97	100
Cortinarius	MES-1790	KY462563	ecm	/cortinarius	xenosma JF960691 SH033459.07FU Cortinarius	specimen	Australasia South	776	0	92	100
Cortinarius	MES-1793	KY462564	ecm	/cortinarius	UDB023845 SH489797.07FU Cortinarius	specimen	America South	939	0	95	99
Cortinarius	MES-1794	KY462565	ecm	/cortinarius	austroturmalis JX648599 SH218401.07FU Cortinarius	specimen	Australasia	981	0	99	100
Cortinarius	MES-1797	KY462566	ecm	/cortinarius	iringa JF960721 SH482403.07FU Cortinariaceae	specimen	Australasia South	915	0	95	100
Cortinarius	MES-1801	KY462567	ecm	/cortinarius	UDB007083 SH222664.07FU Cortinariaceae	root	America South	1086	0	98	98
Cortinarius	MES-1803	KY462568	ecm	/cortinarius	e KJ701303 SH033566.07FU Cortinariaceae	root	America South	924	0	95	100
Cortinarius	MES-1810	KY462570	ecm	/cortinarius	UDB014297 SH222584.07FU Cortinarius	specimen	America South	1098	0	99	100
Cortinarius	MES-1815	KY462571	ecm	/cortinarius	nothovenetus UDB014294 SH222429.07FU Cortinarius	specimen	America South	1103	0	100	98
Cortinarius	MES-1817	KY462573	ecm	/cortinarius	atroacutus KJ421094 SH494020.07FU Cortinarius	specimen	other South	1086	0	100	100
Cortinarius	MES-1830	KY462578	ecm	/cortinarius	olivaceobubalinus UDB014316 SH222714.07FU Cortinariaceae	root	America South	1003	0	97	98
Cortinarius	MES-1832	KY462579	ecm	/cortinarius	e UDB014298 SH222601.07FU Cortinarius	root	America South	1092	0	100	100
Cortinarius	MES-1833	KY462580	ecm	/cortinarius	AY669648 SH033560.07FU Cortinarius	specimen	America South	1122	0	100	97
Cortinarius	MES-1835	KY462582	ecm	/cortinarius	tristis UDB014324 SH222491.07FU Cortinariaceae	root	America South	963	0	96	98
Cortinarius	MES-1836	KY462583	ecm	/cortinarius	e KF732479 SH222693.07FU Cortinarius	specimen	other South	911	0	94	100
Cortinarius	MES-1837	KY462584	ecm	/cortinarius	wiebeae KJ421096 SH222820.07FU Cortinarius	specimen	America South	1092	0	99	100
Cortinarius	MES-1842	KY462587	ecm	/cortinarius	chlorophanus UDB007167 SH222646.07FU Cortinarius	root	America South	1107	0	99	99
Cortinarius	MES-1846	KY462589	ecm	/cortinarius	KU136439 SH218401.07FU Cortinarius	specimen	Australasia South	885	0	95	100
Cortinarius	MES-1855	KY462594	ecm	/cortinarius	iringa UDB014304 SH222473.07FU Cortinarius	root	America South	795	0	92	98
Cortinarius	MES-1856	KY462595	ecm	/cortinarius	UDB014304 SH222473.07FU Cortinarius	specimen	Australasia	525	1.00E-147	89	98

Cortinarius	MES-1857	KY462596	ecm	/cortinarius	UDB014317 SH222671.07FU Cortinariaceae	root	South America	1103	0	100	98
Cortinarius	MES-1858	KY462597	ecm	/cortinarius	KP191910 SH529440.07FU Hymenogaster	specimen	Australasia South	736	0	89	99
Cortinarius	MES-1859	KY462598	ecm	/cortinarius	UDB014303 Cortinarius	specimen	America South	1059	0	99	99
Cortinarius	MES-1860	KY462599	ecm	/cortinarius	UDB014318 SH222608.07FU Cortinarius	root	America South	1005	0	97	100
Cortinarius	MES-1864	KY462600	ecm	/cortinarius	UDB014297 SH222584.07FU Cortinarius nothovenetus	specimen	America South	1033	0	98	100
Cortinarius	MES-1877	KY462604	ecm	/cortinarius	UDB014290 Cortinariaceae	root	America South	1005	0	97	100
Cortinarius	MES-1881	KY462605	ecm	/cortinarius	UDB014313 SH222405.07FU Cortinarius	root	America South	981	0	96	100
Cortinarius	MES-1884	KY462606	ecm	/cortinarius	UDB023841 SH494791.07FU Cortinarius pugnionipes	specimen	America South	850	0	93	100
Cortinarius	MES-1887	KY462607	ecm	/cortinarius	UDB023832 SH493254.07FU Cortinarius choloides	specimen	America South	1098	0	100	100
Cortinarius	MES-1888	KY462608	ecm	/cortinarius	KJ421051 SH490130.07FU Cortinarius rhodophyllus	specimen	America	959	0	96	100
Cortinarius	MES-1903	KY462617	ecm	/cortinarius	KF732605 SH222609.07FU Cortinarius myrtillophilus	specimen	other South	959	0	95	99
Cortinarius	MES-1925	KY462620	ecm	/cortinarius	UDB023858 SH490813.07FU Cortinarius mitis	specimen	America South	931	0	95	100
Cortinarius	MES-1928	KY462621	ecm	/cortinarius	AF389151 SH025893.07FU Cortinarius teratargus	specimen	America South	1022	0	98	100
Cortinarius	MES-1948	KY462623	ecm	/cortinarius	UDB023910 SH490329.07FU Cortinarius absinthiacus	specimen	America South	1098	0	99	100
Cortinarius	MES-1991	KY462632	ecm	/cortinarius	UDB014290 Cortinarius	specimen	America	979	0	95	100
Cortinarius	MES-1993	KY462633	ecm	/cortinarius	JX648599 SH218401.07FU Cortinarius iringa	specimen	Australasia South	941	0	95	100
Cortinarius	MES-1994	KY462634	ecm	/cortinarius	UDB014331 SH033480.07FU Cortinariaceae	root	America	1079	0	99	100
Cortinarius	MES-1996	KY462635	ecm	/cortinarius	JX000355 SH218401.07FU Cortinarius iringa	specimen	Australasia	944	0	94	99
Cortinarius	MES-1999	KY462636	ecm	/cortinarius	EU660950 SH222535.07FU Cortinarius alboaggregatus	specimen	Australasia South	950	0	96	99
Cortinarius	MES-2004	KY462637	ecm	/cortinarius	UDB023858 SH490813.07FU Cortinarius mitis	specimen	America South	837	0	92	100
Cortinarius	MES-2010	KY462638	ecm	/cortinarius	UDB014310 SH025898.07FU Cortinariaceae	root	America	1055	0	100	100
Cortinarius	MES-2019	KY462639	ecm	/cortinarius	KF732518 SH222536.07FU Cortinarius argutus	specimen	other South	915	0	94	100
Cortinarius	MES-2022	KY462640	ecm	/cortinarius	UDB014311 SH222512.07FU Cortinariaceae	root	America South	1027	0	98	100
Cortinarius	MES-2028	KY462644	ecm	/cortinarius	UDB008440 SH222712.07FU Cortinarius	root	America South	1088	0	100	100
Cortinarius	MES-2031	KY462645	ecm	/cortinarius	UDB007038 SH222635.07FU Cortinarius	root	America South	1120	0	98	100
Cortinarius	MES-2041	KY462646	ecm	/cortinarius	AF325599 Cortinarius	root	America South	966	0	96	100
Cortinarius	MES-2042	KY462647	ecm	/cortinarius	UDB023896 SH223138.07FU Cortinarius austroduracinus	specimen	America South	937	0	97	97
Cortinarius	MES-2047	KY462648	ecm	/cortinarius	UDB014322 SH222584.07FU Cortinarius nothovenetus	specimen	America South	1046	0	98	100
Cortinarius	MES-2053	KY462649	ecm	/cortinarius	UDB023887 Cortinarius luteostriatulus	specimen	America South	1061	0	99	100
Cortinarius	MES-2068	KY462651	ecm	/cortinarius	UDB023833 SH525555.07FU Cortinarius nitellinus	specimen	America South	985	0	97	100
Cortinarius	MES-2074	KY462652	ecm	/cortinarius	UDB014313 SH222405.07FU Cortinarius	root	America South	959	0	96	100
Cortinarius	MES-2117b	KY462663	ecm	/cortinarius	UDB014314 SH222405.07FU Cortinarius	root	America South	1090	0	100	100
Cortinarius	MES-2120	KY462664	ecm	/cortinarius	UDB023865 Cortinarius myxoclaricolor	specimen	America South	1009	0	98	94
Cortinarius	MES-2150	KY462670	ecm	/cortinarius	KJ421095 SH222500.07FU Cortinarius vaginatus	specimen	America	929	0	94	100
Cortinarius	MES-525	KY462679	ecm	/cortinarius	JX679130 SH033536.07FU Cortinarius	specimen	Australasia	998	0	97	100
Cortinarius	MES-527	KY462498	ecm	/cortinarius	AY033111 SH222495.07FU Cortinarius subcastaneus	specimen	Australasia	832	0	95	100
Cortinarius	MES-952	KY462693	ecm	/cortinarius	JX648602 SH017731.07FU Cortinarius	specimen	Australasia	453	3.00E-126	95	100
Cortinarius	MES-956	KY462694	ecm	/cortinarius	KF727353 SH222628.07FU Cortinarius	specimen	Australasia South	612	6.00E-174	96	99
Cortinarius	MES-974	KY462697	ecm	/cortinarius	AF389160 SH222598.07FU Cortinarius amoenus	specimen	America South	1085	0	100	100
Cortinarius	MES-976	KY462698	ecm	/cortinarius	UDB023832 SH493254.07FU Cortinarius choloides	specimen	America South	952	0	95	100
Cortinarius	MES-977	KY462699	ecm	/cortinarius	UDB023888 SH496901.07FU Cortinarius carneocrassus	specimen	America	965	0	100	86
Cortinarius	MES-988	KY462703	ecm	/cortinarius	JQ287679 SH222731.07FU Cortinarius verniciorum	specimen	Australasia South	1009	0	97	100
Cortinarius	MES-993	KY462704	ecm	/cortinarius	UDB023841 SH494791.07FU Cortinarius pugnionipes	specimen	America	693	0	94	99

Crepidotus	MES-987	KY462702	saprobe		UDB023702 SH210131.07FU Crepidotus epibryus	specimen	other South America	1048	0	100	100
Cuphophyllus	MES-1642	KY462510	saprobe		KF291035 SH467409.07FU Cuphophyllus adonis	specimen	other South America	1147	0	99	100
Cyphellostereum	MES-1038	KY462408	saprobe		KC581335 SH186251.07FU Cyphellostereum laeve	specimen	other South America	1027	0	98	99
Descolea	MES-1132	KY462427	ecm	/descolea	UDB007127 SH220020.07FU Agaricales	root	other South America	915	0	93	100
Descolea	MES-160	KY462489	ecm	/descolea	UDB007003 SH220018.07FU Agaricales	root	other South America	1013	0	100	100
Descolea	MES-917	KY462689	ecm	/descolea	UDB008449 SH220020.07FU Agaricales	specimen	other	1194	0	100	100
Descomyces	MES-1786 DHP-CH-99	KY462562	ecm	/descolea	KP191862 SH493021.07FU Descomyces	specimen	Australasia	867	0	93	100
Discinella	MES-1068	KY462393	ecm	/helotiales	GU222294 Discinella terrestris	root	Australasia	713	0	94	100
Discinella	MES-2134	KY462667	ecm	/helotiales	UDB004169 SH203289.07FU Envir: Helotiales	root	Australasia	252	6.00E-066	94	99
Diversispora	MES-1697	KY462524	amf		KC412001 SH006772.07FU Discinella boudieri	soil	other	839	0	99	97
Elaphomyces	MES-1843	KY462588	ecm nonvascular symbiont?	/elaphomyces	KJ850197 SH196902.07FU Diversispora insculpta	unknown	other	183	1.00E-045	96	100
Endogone-like	MES-1534	KY462475			UDB004022 SH471098.07FU Envir: Elaphomyces	root	Australasia	798	0	94	92
Entoloma	CT-4335	KY462337	saprobe		JF414168 SH463013.07FU Mucoromycotina	specimen	Australasia	966	0	97	100
Entoloma	CT-4360	KY462344	saprobe		KC710079 Entoloma gracilior	specimen	Australasia	1029	0	98	100
Entoloma	MES-1784	KY462561	ecm?	/entoloma?	UDB014376 Envir: Entoloma	specimen	other	935	0	95	100
Entoloma	MES-534	KY462681	saprobe?		JF960760 Entolomataceae	specimen	other	1044	0	99	98
Favolaschia	MES-1036	KY462406	endophyte?		JQ281488 Entoloma incanum	specimen	other	891	0	92	100
Filoboletus	CT-4378	KY462353	saprobe		GQ924066 SH006420.07FU Cruentomyces na	specimen	other	974	0	92	100
Fistulina	CT-4420	KY462365	saprobe		KF746997 SH183920.07FU Filoboletus manipularis	specimen	other	534	2.00E-150	90	63
Flammulina	MES-1650	KY462512	saprobe		HM583822 SH006131.07FU Fistulina	specimen	Australasia	1153	0	94	100
Galactinia	MES-1325	KY462461	ecm	/galactinia	FJ889518 SH221682.07FU Flammulina velutipes	specimen	other South America	1277	0	99	100
Galerina	MES-1700	KY462525	saprobe		UDB007097 SH216242.07FU Pezizaceae	root	other South America	1066	0	100	100
Galerina	MES-1709	KY462530	saprobe		JQ272382 SH176957.07FU Galerina	specimen	other	894	0	93	100
Gamundia	MES-924	KY462691	saprobe		GQ890490 SH001895.07FU Fungi	unknown	Australasia	904	0	94	100
Gautieria	MES-1039	KY462409	ecm	/ramaria-gautieria	UDB024644 SH201120.07FU Gamundia striatula	specimen	other South America	891	0	94	100
Gautieria	MES-1868	KY462601	ecm	/ramaria-gautieria	AF377069 SH008275.07FU Gautieria chilensis	specimen	other South America	845	0	92	100
Gautieria	MES-1977 AM-AR15-003	KY462630	ecm	/ramaria-gautieria	UDB014388 SH486057.07FU Gomphales	root	other South America	1061	0	100	98
Geastrum	DHP-CH-170	KY462273	saprobe		AF377069 SH008275.07FU Gautieria chilensis	specimen	other	1112	0	99	100
Geoglossum	MES-190	KY462614	amf		JN845197 SH025439.07FU Geastrum	specimen	other	780	0	96	94
Glomeraceae	MES-577	KY462684	ecm	/tuber-helvella	JQ347005 Geoglossum	specimen	other	599	6.00E-170	90	100
Gymnohydnotrya	MES-1076	KY462417	ecm	/austropaxillus	AF480159 Glomeraceae	specimen	other South America	558	9.00E-158	91	100
Gymnopaxillus	MES-1129	KY462426	ecm	/austropaxillus	UDB008465 SH177035.07FU Tuber	root	other South America	1197	0	100	100
Gymnopaxillus	MES-1500	KY462471	ecm	/tuber-helvella	UDB007002 SH179248.07FU Austropaxillus squarrosus	root	other South America	765	0	92	95
Gymnopaxillus	MES-1949	KY462624	ecm	/austropaxillus	UDB007002 SH179248.07FU Austropaxillus squarrosus	specimen	other South America	756	0	92	91
Gymnopaxillus	MES-564	KP242140	ecm	/austropaxillus	KP242139 SH489081.07FU Gymnopaxillus morchelliformis	specimen	other South America	874	0	96	89
Gymnopaxillus	CT-4234	KY462299	saprobe		KP242139 SH489081.07FU Gymnopaxillus morchelliformis	specimen	other South America	902	0	97	86
Gymnopaxillus	CT-4281 AM-AR15-004	KY462321	saprobe		KP242140 Gymnopaxillus morchelliformis	specimen	other South America	819	0	100	100
Gyromitra	MES-171	KY462531	ecm	/hysterangium	KC248400 SH183804.07FU Gymnopus ceraceicola	specimen	Australasia	870	0	90	99
Hallingea	MES-1358 AM-AR15-020	KY462468	ecm	/hebeloma-panicola	AF505784 SH183809.07FU Gymnopus spongiosus	specimen	other	732	0	92	80
Hebeloma	MES-1358 AM-AR15-020	KY462281	saprobe		UDB011770 SH221813.07FU Gyromitra longipes	specimen	other South America	1199	0	99	100
Helotiales					JN845098 SH220563.07FU Geastrum indicum	specimen	other	503	6.00E-141	90	73
					KC966085 SH218845.07FU Hebeloma	specimen	other	809	0	100	100
					AY789355 SH469320.07FU Ionomidotis	unknown	other	704	0	94	99

Helotiales	CT-4376 DHP-CH-11B	KY462352	saprobe		KC411992 SH464609.07FU Phaeohelotium geogenum	specimen	other	497	2.00E-139	94	75
Helotiales	CT-4376 DHP-CH-85	KY462387	saprobe?		UDB031210 Helotiales JN225947 SH016043.07FU Torrendiella cannibalensis	specimen	other	651	0	94	91
Helotiales	MES-1004	KY462392	saprobe		KR673723 SH492364.07FU Lanzia luteovirens	leaves	Australasia	599	5.00E-170	94	100
Helotiales	MES-1022	KY462395	saprobe		FJ005112 SH198390.07FU Glarea lozoyensis	specimen	other	169	7.00E-041	85	100
Helotiales	MES-1128	KY462403	saprobe		JN225947 SH016043.07FU Torrendiella cannibalensis	litter, soil	other	359	1.00E-097	85	83
Helotiales	MES-1566	KY462425	saprobe		KC164651 SH201651.07FU Hymenoscyphus ohakune	leaves	Australasia	542	7.00E-153	97	100
Helotiales	MES-1708	KY462482	saprobe		KT923227 SH203625.07FU Dimorphospora	specimen	Australasia	562	6.00E-159	96	99
Helotiales	MES-1708	KY462529	saprobe			specimen	other	747	0	94	98
Helotiales	MES-2087	KY462654	saprobe		JN225950 SH016047.07FU Crocicreas EU833660 SH175911.07FU Holocotylon brandegeeanum	specimen	Australasia	569	5.00E-161	89	97
Holocotylon	CT-4245	KY462303	saprobe		EU833660 SH175911.07FU Holocotylon brandegeeanum	specimen	other	1151	0	98	100
Holocotylon	CT-4412	KY462364	saprobe		KF291054 SH015319.07FU Chromosera lilacina	specimen	other	1162	0	99	100
Hygrophoraceae	CT-4374	KY462351	saprobe		KF617572 SH200330.07FU Hygrophorus persicolor	specimen	other	481	3.00E-134	85	91
Hygrophoraceae	MES-1058	KY462412	saprobe		UDB025030 SH216861.07FU Hygrophoropsis rufa	specimen	other	401	2.00E-110	89	78
Hygrophoropsis	MES-1300	KY462457	saprobe			specimen	other	684	0	94	60
Hypholoma	CT-4324	KY462333	saprobe		UDB022175 Hypholoma myosotis	specimen	other	1120	0	100	100
Hypholoma	CT-4356	KY462342	saprobe		HQ211857 SH177501.07FU Hypholoma KM975406 SH201444.07FU Hypholoma brunneum	specimen	other	1013	0	98	100
Hypholoma	CT-4460	KY462377	saprobe		UDB022181 SH177500.07FU Hypholoma radicosum	specimen	Australasia	1099	0	99	100
Hypholoma	CT-4464	KY462380	saprobe		HQ832446 SH031316.07FU Hypholoma australe	specimen	other	1053	0	98	100
Hypholoma	MES-1777	KY462559	saprobe			specimen	Australasia	1075	0	97	100
Hypochnicium	MES-1116	KY462424	saprobe		EF029226 SH015246.07FU Hypochnicium Y17091 SH184937.07FU Hypomyces rosellus	unknown	other	1029	0	100	100
Hypomyces	MES-1254	KY462447	saprobe	mycoparasite	JN845098 SH220563.07FU Geastrum indicum	specimen	other	939	0	100	98
Hysterangium	MES-1013	KY462400	ecm	/hysterangium	UDB008463 SH220563.07FU Agaricomycetes	specimen	South America	496	9.00E-139	90	75
Hysterangium	MES-1851	KY462592	ecm	/hysterangium	JN845098 SH220563.07FU Geastrum indicum	specimen	South America	965	0	100	98
Hysterangium	MES-986	KY462701	ecm	/hysterangium		specimen	South America	534	2.00E-150	90	82
Inocybe	CT-4231	KY462297	ecm	/inocybe	UDB014350 SH190769.07FU Inocybaceae	root	America	835	0	92	95
Inocybe	CT-4258	KY462309	ecm	/inocybe	KJ778853 SH010849.07FU Inocybe	specimen	Australasia	673	0	87	96
Inocybe	CT-4320	KY462332	ecm	/inocybe	KP636879 Inocybe subfibrosoides	specimen	South America	900	0	93	100
Inocybe	CT-4333	KY462336	ecm	/inocybe	UDB014367 SH190770.07FU Inocybaceae	root	South America	1133	0	100	100
Inocybe	CT-4357	KY462343	ecm	/inocybe	UDB004096 SH011025.07FU Inocybaceae	root	Australasia	822	0	90	100
Inocybe	CT-4455	KY462376	ecm	/inocybe	KF977201 SH208374.07FU Inocybe	specimen	South America	1099	0	100	100
Inocybe	MES-1037	KY462407	ecm	/inocybe	UDB007173 SH177022.07FU Inocybaceae	root	South America	754	0	90	98
Inocybe	MES-1043	KY462410	ecm	/inocybe	KP636879 Inocybe subfibrosoides	specimen	South America	1142	0	100	100
Inocybe	MES-1056	KY462411	ecm	/inocybe	UDB007182 SH177026.07FU Agaricales	root	South America	793	0	90	100
Inocybe	MES-1158	KY462430	ecm	/inocybe	KP171111 SH524892.07FU Inocybe	specimen	South America	1157	0	100	100
Inocybe	MES-1172	KY462433	ecm	/inocybe	UDB014368 SH222156.07FU Inocybaceae	root	South America	628	8.00E-179	91	100
Inocybe	MES-1192	KY462436	ecm	/inocybe	UDB007173 SH177022.07FU Inocybaceae	root	South America	808	0	91	95
Inocybe	MES-1233	KY462440	ecm	/inocybe	UDB007187 SH177022.07FU Inocybaceae	root	South America	1151	0	100	100
Inocybe	MES-1234	KY462441	ecm	/inocybe	UDB007182 SH177026.07FU Agaricales	root	South America	737	0	95	100
Inocybe	MES-1236	KY462442	ecm	/inocybe	GQ469526 SH220490.07FU Inocybe ochroalba	specimen	other	1098	0	100	100
Inocybe	MES-1309	KY462459	ecm	/inocybe	KP171120 SH523240.07FU Inocybe fuscata	specimen	South America	1112	0	100	100
Inocybe	MES-1573	KY462484	ecm	/inocybe	UDB007182 SH177026.07FU Agaricales	root	South America	743	0	90	98
Inocybe	MES-1596	KY462486	ecm	/inocybe	UDB007196 SH190774.07FU Inocybaceae	root	South America	1098	0	100	100
Inocybe	MES-1628	KY462507	ecm	/inocybe	KP308798 SH494443.07FU Inocybe	specimen	Australasia	710	0	88	98

Inocybe	MES-1691	KY462523	ecm	/inocybe	UDB007182 SH177026.07FU Agaricales	root	South America South	1129	0	100	100
Inocybe	MES-1717	KY462533	ecm	/inocybe	UDB008430 SH190772.07FU Inocybaceae	root	South America South	1166	0	100	100
Inocybe	MES-1778	KY462560	ecm	/inocybe	UDB007173 SH177022.07FU Inocybaceae	root	South America South	741	0	89	98
Inocybe	MES-1870	KY462602	ecm	/inocybe	UDB007183 SH177022.07FU Inocybaceae	root	South America South	723	0	89	96
Inocybe	MES-1971	KY462627	ecm	/inocybe	KJ701301 SH177024.07FU Cortinariaceae	root	South America South	1157	0	100	100
Inocybe	MES-2099	KY462658	ecm	/inocybe	UDB007143 SH213445.07FU Agaricales	root	South America South	787	0	96	98
Inocybe	MES-959	KY462695	ecm	/inocybe	KP171120 SH523240.07FU Inocybe fuscata	specimen	South America South	992	0	97	100
Laccaria	CT-4325	KY462334	ecm	/laccaria	UDB014374 SH220971.07FU Agaricales	specimen	South America South	1018	0	97	100
Laccaria	MES-1109	KY462422	ecm	/laccaria	UDB014374 SH220971.07FU Agaricales	specimen	South America South	1118	0	100	100
Laccaria	MES-2093	KY462656	ecm	/laccaria	KJ701314 SH220971.07FU Tricholomataceae	specimen	South America	1125	0	100	100
Lactarius	MES-185	KY462591	ecm	/lactarius	UDB005888 SH176406.07FU Lactarius necator	specimen	other	942	0	93	100
Lactarius	MES-582	KY462685	ecm	/russula-lactarius	UDB019741 SH176426.07FU Lactarius zonarioides	specimen	other	1037	0	95	100
Lepiota	MES-2090	KY462655	saprobe		UDB015444 SH215891.07FU Echinoderma asperum	specimen	other	979	0	93	100
Lepista	MES-1615	KY462501	saprobe		KM406961 SH218328.07FU Lepista tarda	specimen	other	1109	0	100	100
Leucogloea	MES-907	KY462686	saprobe		KP191965 SH495592.07FU Leucogloea EU833659 SH175878.07FU Lycoperdon	specimen	Australasia	963	0	100	100
Lycoperdon	AM-AR15-029	KY462285	saprobe		utriforme KU507387 SH175893.07FU Lycoperdon	unknown	other	1219	0	100	100
Lycoperdon	CT-4265	KY462312	saprobe		nigrescens KJ461909 SH175408.07FU Lyophyllum	specimen	other	1208	0	100	100
Lyophyllum	MES-1219	KY462438	ecm	/paralyophyllum	decastes	unknown	other	1110	0	100	100
Melanogaster	MES-1003	KY462394	ecm	/paxillus-gyrodon	KC152159 SH182662.07FU Melanogaster	specimen	other	1262	0	99	100
Melanoleuca	CT-4241	KY462301	saprobe		UDB011384 SH215881.07FU Melanoleuca melaleuca	specimen	other	1107	0	98	100
Meruliaceae	MES-1580	KY462485	saprobe		KP135356 SH212877.07FU Scopuloides	specimen	other	861	0	95	100
Morchella	AM-AR15-013	KY462277	saprobe		KJ439678 SH223423.07FU Morchella KM587970 SH223426.07FU Morchella	specimen	other	1201	0	100	99
Morchella	MES-1225	KY462439	saprobe		eximia KM587965 SH209936.07FU Morchella	specimen	other	1160	0	100	100
Morchella	MES-1849	KY462590	saprobe		tridentina	specimen	other	1596	0	99	100
Mucronella	MES-1274	KY462452	saprobe		KJ713995 SH497258.07FU Mucronella FM997942 SH186350.07FU Mycena	specimen	other	575	1.00E-162	86	100
Mycena	CT-4280	KY462320	saprobe		pearsoniana	specimen	other	1061	0	98	100
Mycena	MES-1655	KY462513	saprobe		GQ268688 SH019004.07FU Mycena	root	other South America	728	0	90	100
Mycena	MES-1839	KY462585	saprobe		FN394620 Mycena HG531386 SH220721.07FU Mycena	specimen	other	1027	0	98	96
Mycena	MES-1893	KY462612	saprobe		galericulata U57812 SH014721.07FU Neodasyscypha	specimen	other	1158	0	100	100
Neodasyscypha	MES-1115	KY462423	saprobe		cerina	unknown	other	846	0	99	100
Paecilomyces	MES-1622	KY462505	insect parasite		KX523678 Paecilomyces hepiali	specimen	other	918	0	100	100
Panaeolus	CT-4279	KY462319	saprobe		UDB023535 SH178703.07FU Panaeolus acuminatus	specimen	other	1053	0	100	100
Parasola	CT-4272	KY462316	saprobe		UDB024639 SH196203.07FU Parasola plicatilis	specimen	other	776	0	89	100
Peziza	CT-4247	KY462304	saprobe		JQ654492 SH210379.07FU Peziza fimeti	specimen	other	907	0	98	100
Peziza	MES-1283	KY462454	saprobe?		KJ728717 SH523882.07FU Peziza howsei	specimen	other	809	0	93	77
Peziza	MES-1674	KY462519	saprobe?		UDB028415 SH188463.07FU Envir: Peziza varia	specimen	other South America	977	0	100	100
Peziza	MES-1816	KY462572	ecm	/terfezia-peziza depressa	UDB007172 SH207802.07FU Pezizaceae	root	South America	771	0	94	98
Peziza	MES-2133	KY462666	saprobe?		FJ788754 SH191892.07FU Pezizaceae JF908532 SH194174.07FU Peziza	root	other	811	0	91	100
Pezizaceae	MES-1765	KY462552	saprobe?		phylogena	specimen	other South America	689	0	90	100
Pezizaceae	MES-1825	KY462575	ecm	/pachyphloeus-amylascus	UDB014382 SH221555.07FU Pezizaceae	specimen	South America	819	0	93	100
Pezizaceae	MES-1852	KY462593	saprobe?		JF908528 SH194174.07FU Peziza howsei	specimen	other South America	689	0	89	100
Pezizaceae	MES-1908	KY462619	ecm	/terfezia-peziza depressa	JX414201 SH221555.07FU Pezizaceae	specimen	South America	1037	0	99	100
Phaeogalera	CT-4326	KY462335	saprobe		KC842390 Phaeogalera stagnina	specimen	other	1040	0	97	99

Phlebia	MES-1704	KY462527	saprobe		AY618675 SH193446.07FU Phlebia KC122893 SH176910.07FU Pholiota alnicola	specimen	other	1007	0	99	100
Pholiota	CT-4342	KY462339	saprobe			specimen	other	1038	0	97	100
Pholiota	CT-4396	KY462359	saprobe		KC589022 SH219756.07FU Pholiota	specimen	other	1109	0	100	100
Pholiota	CT-4400	KY462361	saprobe		KC514905 SH219763.07FU Pholiota UDB023564 SH219740.07FU Pholiota mixta	specimen	other	1118	0	100	100
Pholiota	MES-1612	KY462500	saprobe		KR153192 SH176910.07FU Pholiota alnicola	specimen	other	1007	0	96	100
Pholiota	MES-978 AM-AR16-023	KY462700	saprobe mycoparasite		KU582193 SH190975.07FU Plectosphaerella oratosquillae	specimen	other	992	0	98	100
Plectosphaerella		KY462287				specimen	other	761	0	99	100
Pleurocollybia	MES-920	KY462690	saprobe		KP311477 Pleurocollybia KC581353 SH213611.07FU Pleurotopsis longinqua	specimen	Australasia	1057	0	99	100
Pleurotopsis	MES-541	KY462682	saprobe			specimen	other	1062	0	100	100
Pluteus	CT-4244	KY462302	saprobe		HM562194 Pluteus spegazzianus	specimen	other	1096	0	100	100
Pluteus	MES-523	KJ009776	saprobe		KJ009776 Pluteus KP191968 SH495877.07FU Podoserpula pusio	specimen	other	1116	0	100	100
Podoserpula	MES-1008	KY462398	saprobe		KJ417299 SH497043.07FU Porpoloma portentosum	specimen	Australasia South America	881	0	92	100
Porpoloma	CT-4385	KY462357	ecm	/porpoloma	UDB007123 SH217862.07FU Tricholomataceae	specimen	South America	1031	0	98	98
Porpoloma	MES-1347	KY462466	ecm	/porpoloma		specimen	South America	1109	0	100	100
Porpoloma	MES-531	KJ417298	ecm	/porpoloma/hebeloma- alnicola	KJ417298 Porpoloma portentosum	specimen	America	1109	0	100	100
Psathyroma	MES-1549	KY462478	ecm		UDB014346 SH218872.07FU Agaricales KC965829 SH220405.07FU Psathyrella dunensis	root	other	1120	0	100	100
Psathyrella	MES-1256	KY462449	saprobe		KR063502 SH220363.07FU Psathyrellaceae	specimen	other	726	0	97	99
Psathyrella	MES-1490	KY462469	saprobe		KC992907 SH220357.07FU Psathyrella seminuda	specimen	other	1042	0	98	100
Psathyrella	MES-1532	KY462474	saprobe		AB481288 SH196512.07FU Trichopezizella otanii	specimen	other	1050	0	98	100
Pseudomitula	MES-1097	KY462418	saprobe		AB481288 SH196512.07FU Trichopezizella otanii	specimen	other	556	4.00E-157	88	100
Pseudomitula	MES-1807	KY462569	saprobe			unknown	other	634	2.00E-180	92	100
Pseudomitula	MES-2129	KY462665	saprobe		AB481289 SH196513.07FU Trichopezizella	unknown	other	612	8.00E-174	91	100
Pseudotracharina	MES-2152	KY462671	saprobe		FJ788783 SH210633.07FU Pezizaceae	root	other	926	0	98	100
Psilocybe	MES-1627	KY462506	saprobe		KU640171 Psilocybe semilanceata	specimen	other	1125	0	100	100
Pulvinula	MES-1034	KY462405	ecm	/pulvinula	FJ210748 SH204543.07FU Pulvinula HG936753 SH215683.07FU Pyronemataceae	root	other	387	6.00E-106	83	89
Pyronemataceae	MES-1245	KY462445	saprobe			specimen	other	953	0	100	100
Pyronemataceae	MES-2100 AM-AR15-023	KY462659	saprobe		KU556557 SH215678.07FU Scutellinia KC582006 SH199933.07FU Geastrum schmidelii	specimen	other	754	0	92	99
Radiigera		KY462282	saprobe		JN845204 SH030507.07FU Radiigera taylorii	specimen	other	571	1.00E-161	88	100
Radiigera	MES-1151	KY462429	saprobe			specimen	other	676	0	91	100
Ramaria	CT-4255	KY462308	ecm	/ramaria-gautieria	UDB017000 SH462047.07FU Ramaria	specimen	South America	976	0	99	100
Ramaria	CT-4312	KY462328	ecm	/ramaria-gautieria	UDB017000 SH462047.07FU Ramaria	specimen	South America	785	0	94	96
Ramaria	CT-4438	KY462371	ecm	/ramaria-gautieria	AJ408364 SH003580.07FU Ramaria flava	specimen	other	418	2.00E-115	82	87
Ramaria	CT-4446	KY462375	ecm	/ramaria-gautieria	UDB024973 SH494861.07FU Ramaria conjunctipes	specimen	other	593	3.00E-168	90	82
Ramaria	MES-1006	KY462396	ecm	/ramaria-gautieria	UDB017000 SH462047.07FU Ramaria EU669369 SH010425.07FU Ramaria rainierensis	specimen	South America	344	3.00E-093	83	79
Ramaria	MES-1668	KY462516	saprobe?		JX310379 SH017600.07FU Phaeoclavulina abietina	specimen	other	514	3.00E-144	85	92
Ramaria	MES-1706	KY462528	ecm	/ramaria-gautieria		specimen	other	713	0	89	99
Ramaria	MES-2066	KY462650	ecm	/ramaria-gautieria	KT697953 SH522152.07FU Ramaria KP967538 SH470934.07FU Ramaria flavescens	specimen	other	933	0	95	100
Ramaria	MES-2078	KY462653	ecm	/ramaria-gautieria		specimen	other	449	7.00E-125	84	97
Ramaria	MES-558	KY462683	ecm	/ramaria-gautieria	UDB017000 SH462047.07FU Ramaria JF908719 SH028390.07FU Ramsbottomia asperior	specimen	South America	749	0	93	96
Ramsbottomia	MES-2027 AM-AR15-025	KY462643	saprobe		KP276329 SH221080.07FU Rhizopogonaceae	specimen	other	870	0	96	98
Rhizopogon		KY462283	ecm	/suillus-rhizopogon	KM596895 SH221086.07FU Rhizopogon villosulus	specimen	other	1181	0	100	100
Rhizopogon	MES-1898	KY462613	ecm	/suillus-rhizopogon		specimen	other	1105	0	100	100
Rhodocollybia	MES-1901	KY462615	saprobe		KT205400 Rhodocollybia olivaceogrisea	specimen	other	1267	0	98	99

Rhodogaster	MES-1012	KY462399	saprobe		FJ973679 SH458379.07FU Calliderma rimosum	specimen	South America South	405	2.00E-111	88	68
Rickenella	MES-1891	KY462611	saprobe		UDB014381 SH178586.07FU Rickenella	root	America South	959	0	95	98
Rickenella	MES-1965	KY462626	saprobe		UDB014381 SH178586.07FU Rickenella	root	America South	1107	0	100	98
Ruhlandiella	MES-1187	KY462435	ecm	/terfezia-peziza depressa	JX414210 SH207800.07FU Ruhlandiella	specimen	America South	994	0	99	99
Ruhlandiella	MES-1255	KY462448	ecm	/terfezia-peziza depressa	UDB007147 SH207800.07FU Ruhlandiella	specimen	America South	741	0	91	99
Ruhlandiella	MES-1273	KY462451	ecm	/terfezia-peziza depressa	UDB014393 SH207800.07FU Ruhlandiella	specimen	America South	1027	0	100	100
Ruhlandiella	MES-1353	KY462467	ecm	/terfezia-peziza depressa	UDB007147 SH207800.07FU Ruhlandiella	specimen	America South	667	0	100	100
Russula	CT-4225	KY462293	ecm	/russula-lactarius	UDB007174 SH186548.07FU Russulaceae	root	America South	1096	0	100	100
Russula	CT-4361	KY462345	ecm	/russula-lactarius	UDB008438 SH180379.07FU Cystangium nothofagi	specimen	America South	1070	0	99	93
Russula	MES-1106	KY462420	ecm	/russula-lactarius	KF819809 SH180379.07FU Cystangium nothofagi	specimen	America South	1125	0	99	99
Russula	MES-1324	KY462460	ecm	/russula-lactarius	GU222258 SH032037.07FU Russula vinaceocuticulata	specimen	Australasia South	1064	0	98	100
Russula	MES-1664	KY462515	ecm	/russula-lactarius	UDB007174 SH186548.07FU Russulaceae	root	America South	686	0	90	96
Russula	MES-908	KY462687	ecm	/russula-lactarius	UDB014389 SH180379.07FU Cystangium nothofagi	specimen	America South	610	4.00E-173	98	58
Russula	MES-964	KY462696	ecm	/russula-lactarius	KF819809 SH180379.07FU Cystangium nothofagi	specimen	America South	902	0	100	78
Russulales	MES-1166 AM-AR16-025	KY462432	saprobe		KJ010078 SH485392.07FU Dichostereum granulolum	specimen	other	582	1.00E-164	91	56
Sarcosomataceae		KY462288	saprobe		KP335342 SH189289.07FU Ascomycota	specimen	other South	821	0	93	100
Scleroderma	MES-1278	KY462453	ecm	/pisolithus-scleroderma	HQ688789 SH186880.07FU Scleroderma AJ875384 SH197887.07FU Scutellinia patagonica	specimen	America South	1099	0	100	100
Scutellinia	MES-1826	KY462576	saprobe		DQ241450 SH029157.07FU Septobasidium ramorum	specimen	other	848	0	95	100
Septobasidium	MES-2169 DHP-AR-18	KY462677	insect parasite		KP191969 SH206658.07FU Sowerbyella rhenana	specimen	other	627	2.00E-178	94	100
Sowerbyella		KY462383	ecm	/sowerbyella	KM086863 SH525048.07FU Stephanospora flava	specimen	other	955	0	99	100
Stephanospora	MES-169	KY462522	saprobe		AB846965 SH215973.07FU Stephanosporaceae	specimen	Australasia South	942	0	95	89
Stephanosporaceae	MES-1177	KY462434	endophyte?		UDB028299 SH525516.07FU Lindtneria flava	root	other	948	0	93	100
Stephanosporaceae	MES-1686 DHP-CH-108	KY462520	saprobe		KT876977 SH492821.07FU Strossmayeria basitricha	specimen	other	802	0	89	100
Strossmayeria		KY462386	saprobe			specimen	other	547	2.00E-154	94	99
Suillus	AM-AR15-018	KY462279	ecm	/suillus-rhizopogon	EU557325 SH214587.07FU Suillus lakei	specimen	other	1107	0	100	100
Suillus	AM-AR15-026	KY462284	ecm	/suillus-rhizopogon	EU562607 SH176742.07FU Suillus pseudobrevipes	specimen	other	1138	0	100	100
Suillus	CT-4397	KY462360	ecm	/suillus-rhizopogon	UDB008611 SH176742.07FU Suillus pseudobrevipes	specimen	other	1122	0	100	100
Tarzetta	MES-2162	KY462675	ecm	/tarzetta	UDB014391 SH205430.07FU Tarzetta	root	South America	904	0	100	98
Tomentella	MES-1100	KY462419	ecm	/tomentella-thelephora	UDB007180 SH177836.07FU Tomentella	root	South America	765	0	100	100
Tomentella	MES-1159	KY462431	ecm	/tomentella-thelephora	UDB014216 Tomentella	root	other	856	0	95	93
Tomentella	MES-1749	KY462543	ecm	/tomentella-thelephora	UDB014404 SH189408.07FU Tomentella galzinii	specimen	South America	989	0	97	98
Tomentella	MES-2106	KY462662	ecm	/tomentella-thelephora	JF960840 SH002602.07FU Thelephoraceae	root	Australasia South	846	0	93	99
Tomentella	MES-2144	KY462669	ecm	/tomentella-thelephora	UDB008418 SH184540.07FU Thelephoraceae	root	South America	1068	0	100	100
Tomentella	MES-2166	KY462676	ecm	/tomentella-thelephora	UDB014402 SH189408.07FU Tomentella galzinii	specimen	South America	1090	0	100	99
Trechispora	MES-1840	KY462586	saprobe		JF300723 SH199562.07FU Trechispora	root, soil	other	959	0	98	100
Tremellodendropsis sp. 1	MES-1074	KY462416	ecm?	/agaricomycete s1	KC966326 SH178758.07FU Fungi	root	South America	396	1.00E-108	82	89
Tremellodendropsis sp. 2	MES-1670	KY462517	ecm	/agaricomycete s2	UDB008469 SH178751.07FU Envir: Agaricomycetes	root	South America	355	2.00E-096	89	52
Trichoderma	MES-1904 DHP-CH-105	KY462618	saprobe		KT202858 SH181342.07FU Trichoderma viride	specimen	other	979	0	100	100
Trichoglossum		KY462385	saprobe		HQ222868 SH017434.07FU Trichoglossum KJ701317 SH219384.07FU Tricholomataceae	specimen	Australasia South	782	0	94	99
Tricholoma	CT-4370	KY462348	ecm	/tricholoma	JF960850 SH031085.07FU Tricholomataceae	root	America South	1037	0	97	100
Tricholoma	CT-4439	KY462372	ecm	/tricholoma		specimen	Australasia South	983	0	96	100
Tricholoma	CT-4441	KY462373	ecm	/tricholoma	UDB007100 SH219371.07FU Tricholoma KJ701317 SH219384.07FU Tricholomataceae	specimen	America South	959	0	95	100
Tricholoma	CT-4474	KY462382	ecm	/tricholoma		root	America South	977	0	95	100

Tricholoma	MES-1766	KY462553	ecm	/tricholoma	KJ701317 SH219384.07FU Tricholomataceae	root	South America	893	0	93	99
Tricholoma	MES-1769	KY462555	ecm	/tricholoma	JX178630 SH219385.07FU Tricholoma viridiolivaceum	specimen	Australasia	979	0	95	100
Tricholoma	MES-1834	KY462581	ecm	/tricholoma	JF960846 SH031084.07FU Tricholoma	specimen	Australasia	959	0	95	100
Tricholoma	MES-1890	KY462610	ecm	/tricholoma	KJ417318 SH497041.07FU Tricholoma UDB028531 SH219351.07FU Tricholoma	specimen	Australasia	737	0	97	100
Tricholoma	MES-928	KY462692	ecm	/tricholoma	fulvum KJ701317 SH219384.07FU Tricholomataceae	specimen	other South America	634	1.00E-180	98	98
Tricholoma	MES-997 DHP-AR-19	KY462706	ecm	/tricholoma	ae	root	South America	854	0	92	100
Trichophaeopsis	DHP-CH-58	KY462384	saprobe		JX978247 Pezizomycetes	specimen	other	905	0	98	100
Trichophaeopsis		KY462391	saprobe		JX978247 Pezizomycetes UDB015634 SH186579.07FU Tubaria	unknown	other	752	0	93	99
Tubaria	MES-1238	KY462443	saprobe		furfuracea UDB015634 SH186579.07FU Tubaria	specimen	other	902	0	94	100
Tubaria	MES-1721	KY462534	saprobe		furfuracea UDB011741 SH186576.07FU Tubaria	specimen	other	941	0	95	100
Tubaria	MES-1973	KY462628	saprobe		furfuracea UDB014425 SH219526.07FU Tulasnellaceae	specimen	other South America	1146	0	100	100
Tulasnella	MES-2153	KY462672	ecm	/tulasnella	ae	root	South America	1123	0	100	100
Typhula	MES-1007	KY462397	saprobe		FR682177 SH028415.07FU Typhula	dust	other South America	477	4.00E-133	94	50
Underwoodia	CT-4268	KY462314	ecm	/tuber-helvella	UDB014407 SH481948.07FU Pezizales	root	South America	1251	0	100	100
Underwoodia	DHP-CH-126	KY462388	ecm	/tuber-helvella	JQ925630 SH006506.07FU Gymnohydnotrya echinulata	specimen	Australasia South America	377	4.00E-103	85	61
Underwoodia	MES-1239	KY462444	ecm	/tuber-helvella	UDB014415 SH177035.07FU Tuber	root	South America	586	7.00E-166	84	94
Underwoodia	MES-161	JQ925656	ecm	/tuber-helvella	JQ925656 SH477860.07FU Underwoodia KP814501 SH192727.07FU Xenasmataella	specimen	South America	1194	0	100	100
Xenasmataella	MES-1828 AM-AR15-014	KY462577	ecm?	/xenasmataella	vaga	specimen	other	787	0	92	100
Xylaria	AM-AR15-032	KY462278	saprobe		HG971767 SH195048.07FU Xylaria	specimen	Australasia	907	0	99	100
Xylaria		KY462286	saprobe		GU300089 Xylaria striata KF516952 SH195024.07FU Xylaria	bark	other	935	0	100	100
Xylaria	MES-1689	KY462521	saprobe		castorea	specimen	other	904	0	100	100
Xylaria	MES-1939	KY462622	saprobe		UDB013467 SH021193.07FU Xylaria	specimen	Australasia	896	0	99	100

Table S2 Species and samples included in the phylogenetic studies, with specimen/strain number and Genbank/UNITE accessions. In bold, new sequences generated for this study.

(a) Agaricomycetes

Species/Sample Type	18S Specimen/Strain	18S Accession	28S Specimen/Strain	28S Accession	ITS Specimen/Strain	ITS Accession
Antrrodia vaillantii	240	AM286436	240	AM286436	–	–
Auricularia auricula-judae	AU110	JN712676	AU110	JN712676	–	–
Boletellus projectellus	AFTOL 713	AY662660	AFTOL 713	AY684158	–	–
Botryobasidium subcoronatum	TUB 011733	EU909344	TUB 011733	EU909344	–	–
Calocera viscosa	AFTOL 1679	DQ520102	AFTOL 1679	DQ520102	–	–
Ceratobasidium sp.	AFTOL 1878	DQ520098	AFTOL 1878	DQ520098	–	–
Clavulicium macounii	Nordeen37145	KC203492	Nordeen37145	KC203492	–	–
Craterocolla cerasi	AFTOL 1677	DQ520103	AFTOL 1677	DQ520103	–	–
ECM of Angiospermae	–	–	–	–	–	HQ022288
ECM of Eucalyptus sp.	–	–	–	–	–	JF960849
ECM of Fagus crenata	–	–	–	–	–	AB218075
ECM of Lithocarpus densiflorus	–	–	C11	DQ273492	C11	DQ273361
ECM of Nothofagus pumilio	–	–	UDB008409	JX316510	UDB008409	JX316510
ECM of Nothofagus pumilio	–	–	UDB008467	JX316518	UDB008467	JX316518
ECM of Nothofagus pumilio	–	–	–	–	UDB008445	JX316515
ECM of Nothofagus pumilio	–	–	–	–	UDB008469	JX316519
ECM of Populus tremula	–	–	–	–	–	EF644168
ECM of Quercus suber	–	–	–	–	–	GU256215
Exidia uvapassa	AFTOL 461	AY654890	AFTOL 461	AY645056	–	–
Fomes fomentarius	DAOM 129034	AF026574	IUM00144	DQ208418	–	–
Fungal mycelium	–	–	–	–	–	EF619876
Guepinopsis buccina	AFTOL 888	DQ667157	AFTOL 888	AY745711	–	–
Hericium americanum	AFTOL 469	AY665778	AFTOL 469	DQ411538	–	–
Hydnellum geogonium	AFTOL 680	AY752971	AFTOL 680	AY631900	–	–
Hymenochaete dupontii	AFTOL 666	AY662669	AFTOL 666	AY635770	–	–
Lactifluus deceptivus	AFTOL 682	AY707093	AFTOL 682	AY631899	–	–
Multiclavula mucida	TUB 011734	EU909345	TUB 011734	EU909345	–	–
Polyozellus multiplex	AFTOL 677	AY771600	AFTOL 677	AY634275	–	–
Ramaria stricta	TUB 019104	FJ641900	TUB 019104	FJ644512	–	–
Root of Oryza sativa	–	–	–	–	–	FJ524308
Sebacina incrustans	AFTOL 1876	DQ521407	AFTOL 1626	DQ521406	–	–
Serendipita vermifera	AFTOL 1877	DQ520096	AFTOL 1877	DQ520096	–	–
Serpula himantoides	P19	AM946630	P19	AM946630	–	–
Soil sample	–	–	–	–	–	JQ247534
Soil sample	–	–	–	–	–	JQ247539
Soil sample	–	–	–	–	–	DQ421269
Soil sample	–	–	–	–	–	JQ247538
Tomentella sp.	AFTOL 1016	DQ092920	AFTOL 1016	DQ835997	–	–
Trechispora alnicola	AFTOL 665	AY657012	AFTOL 665	AY635768	–	–

Tremellodendropsis sp. 1	MES-1074	KY487059	MES-1074	KY487062	MES-1074	KY462416
Tremellodendropsis sp. 2	MES-1670	KY487060	MES-1670	KY487063	MES-1670	KY462517
Tremellodendropsis tuberosa	UBCF26414	KU900853	UBCF26414	KU900858	UBCF26414	KU900858
Tremellodendropsis tuberosa	UBCF26415	KU900852	UBCF26415	KU900857	UBCF26415	KU900857
Tremellodendropsis tuberosa	UBCF26416	KU900854	UBCF26416	KU900860	UBCF26416	KU900859
Tremellodendropsis tuberosa	UBCF31377	KU900855	UBCF31377	KU900861	UBCF31377	KU900861
Tricholoma matsutake	–	U62538	–	U62964	–	–

(b) Mucoromycotina

Species/Sample Type	Specimen/Strain	18S Accession	28S Accession
Densospora solitaria	DAR74956	UDB018861	UDB018860
ECM of Eucalyptus regnans	–	UDB002714	UDB002714
ECM of Nothofagus cunninghamii	–	UDB004033	UDB004033
ECM of Quercus acutissima	EME12001	LC159474	LC159476
ECM of Quercus crispula	EME15001	LC159475	LC159477
Endogone aggregata	DAR74991	UDB018868	UDB018867
Endogone flammicorona	NC0024738	LC107332	LC107360
Endogone incrassata	NC0024213	LC107337	LC002620
Endogone lactiflua	AFTOL45	DQ536471	DQ273811
Endogone oregonensis	OSC130614	JF414196	–
Endogone pisiformis	AFTOL539	DQ322628	DQ273811
Endogone sp.	T14506.4	KC708390	–
'Endogone-like'	MES-1534	KY487058	KY487061
Glomus mosseae	AFTOL139	AY635833	DQ273793
Root of Trifolium subterraneum	OTU0	KX434773	–
Root of Trifolium subterraneum	OTU10	KX434782	–
Root of Trifolium subterraneum	OTU4	KX434777	–
Scutellospora heterogama	AFTOL138	AY635832	DQ273792
Sphaeroceas pubescens	Kayeku	AB752288	–
Sphaeroceas pubescens	GP120607	AB755410	–
with Allisonia cockaynii	MIB 8372	JF414210	–
with Allisonia cockaynii	MIB 8388	JF414221	–
with Anthoceros laminiferus	8443.5	KC708394	–
with Anthoceros laminiferus	8443.6	KC708395	–
with Anthoceros laminiferus	8802.4	KC708417	–
with Anthoceros sp.	8553.2.1x	KC708400	–
with Haplomitrium gibbsiae	MIB 8357	JF414212	–
with Haplomitrium gibbsiae	MIB 8360	JF414208	–
with Haplomitrium gibbsiae	MIB 8352	JF414222	–
with Paraphymatoceros sp.	MIB 8478	JF414207	–
with Phaeoceros carolinianus	8792.1	KC708412	–
with Phaeoceros carolinianus	8827.Ax	KC708419	–
with Phaeoceros carolinianus	AD15.4	KC708430	–

with <i>Phaeoceros carolinianus</i>	AD2.1x	KC708431	—
with <i>Phaeoceros dendroceroides</i>	8841.1	KC708420	—
with <i>Phaeoceros dendroceroides</i>	8842.Cx	KC708422	—
with <i>Phaeoceros laevis</i>	8550.2	KC708399	—
with <i>Phaeoceros laevis</i>	8533.2x	KC708398	—
with <i>Phaeomegaceros coriaceus</i>	8783.4	KC708411	—
with <i>Phaeomegaceros coriaceus</i>	AD25.3	KC708432	—
with <i>Treubia lacunosa</i>	MIB 8353.1	JF414226	JF414167
with <i>Treubia lacunosa</i>	MIB 8355.1	JF414217	JF414170
with <i>Treubia lacunosa</i>	MIB 8364	JF414227	—
with <i>Treubia lacunosa</i>	MIB 8365	JF414228	—
with <i>Treubia pygmaea</i>	MIB 8362	JF414232	—
with <i>Treubia tasmanica</i>	MIB 8349	JF414234	—

Fig. S1 Maximum likelihood phylogeny of Tremellodendropsidales fungi (/agaricomycetes1 in Tedersoo & Smith, 2013) based on ITS rDNA. Thick bars indicate bootstrap support (BS) ≥ 70 and corresponding posterior probabilities (PP) ≥ 0.95 from the Bayesian analysis (in black); BS ≥ 60 and PP ≥ 0.90 (in grey). The order Tremellodendropsidales is subdivided into three highly supported lineages (black circles) from across a wide geographic range (Northern Hemisphere, Southern Hemisphere, New World). Taxa in this lineage are ECM symbionts with a large diversity of angiosperms, including *Fagus*, *Eucalyptus*, *Lithocarpus*, and *Nothofagaceae*.

