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Supplementary material

Dating the emergence of truffle-like fungi in Australia, by using an augmented meta-analysis

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Table S1. Table of all included taxa, with GenBank numbers and identification of Australian and sequestrate taxa

See Table 2 for the sources of the sequences. ITS, internal transcribed spacer of nuclear rDNA; LSU, nuclear large subunit; rpb2, RNA polymerase beta subunit; tef1a, translation elongation factor-1α

Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Amanitaceae	*Amanita clelandii*		HQ539680			1	0
Amanitaceae	*Amanita conicobulbosa*		HQ539683			1	0
Amanitaceae	*Amanita effusa*		HQ539689			1	0
Amanitaceae	*Amanita egregia*		HQ539690			1	0
Amanitaceae	*Amanita farinacea*		HQ539692			1	0
Amanitaceae	*Amanita luteolovelata*		HQ539706			1	0
Amanitaceae	*Amanita murinoflammeum*		HQ539711			1	0
Amanitaceae	*Amanita ochrophylla*		HQ539717			1	0
Amanitaceae	*Amanita* sp. BEW 2011d		HQ539732			1	0
Amanitaceae	*Amanita subalbida*		HQ539745			1	0
Amanitaceae	*Amanita sublutea*		HQ539749			1	0
Amanitaceae	*Amanita umbrinella*		HQ539753			1	0
Amanitaceae	*Amanita* aff. *citrina*		AY436489			0	0
Amanitaceae	*Amanita* aff. *fulva*		AF024456			0	0
Amanitaceae	*Amanita* aff. *lanei*		GQ250416			0	0
Amanitaceae	*Amanita* aff. *pantherin*		GQ250421			0	0
Amanitaceae	*Amanita* aff. *vaginata*		EU522724			0	0
Amanitaceae	*Amanita* aff. *volvata*		AF024487			0	0
Amanitaceae	*Amanita altipes*		AY436487			0	0
Amanitaceae	*Amanita angustilamellata*		AF024440			0	0
Amanitaceae	*Amanita armillariiformis*		AF261436			0	0
Amanitaceae	*Amanita arocheae*		AY325879			0	0
Amanitaceae	*Amanita avellaneosquamosa*		AF024441			0	0
Amanitaceae	*Amanita bisporigera*		AF097384			0	0
Amanitaceae	*Amanita brunneofuliginea*		AF024442			0	0
Amanitaceae	*Amanita brunnescens*		AY631902			0	0
Amanitaceae	*Amanita ceciliae*		AF024444			0	0
Amanitaceae	*Amanita cf crocea*		AY436490			0	0
Amanitaceae	*Amanita cf virosa*		AF024486			0	0
Amanitaceae	*Amanita chepangiana*		AF024445			0	0
Amanitaceae	*Amanita citrina*		AF097378			0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Amanitaceae	*Amanita citrina var grisea*		AF024447			0	0
Amanitaceae	*Amanita clarisquamosa*		AF024448			0	0
Amanitaceae	*Amanita coacta*		FJ236807			0	0
Amanitaceae	*Amanita conicoverrucosa*		AY194983			0	0
Amanitaceae	*Amanita constricta*		AY228351			0	0
Amanitaceae	*Amanita curtipes*		EF653960			0	0
Amanitaceae	*Amanita cylindrispora*		AY325867			0	0
Amanitaceae	*Amanita excelsa*		AY436491			0	0
Amanitaceae	*Amanita exitialis*		AY436492			0	0
Amanitaceae	*Amanita farinose*		AF097370			0	0
Amanitaceae	*Amanita flavorubescens*		AF097380			0	0
Amanitaceae	*Amanita franchetii*		AF097381			0	0
Amanitaceae	*Amanita fritillaria*		AF024452			0	0
Amanitaceae	*Amanita frostiana*		AF024453			0	0
Amanitaceae	*Amanita fuliginea*		AF024454			0	0
Amanitaceae	*Amanita fulva*		AF024455			0	0
Amanitaceae	*Amanita gemmata*		AF024457			0	0
Amanitaceae	*Amanita griseopantherina*		AY436494			0	0
Amanitaceae	*Amanita griseoverrucosa*		AY436495			0	0
Amanitaceae	*Amanita hemibapha var ochracea*		AF024458			0	0
Amanitaceae	*Amanita humboldtii*		FJ890045			0	0
Amanitaceae	*Amanita ibotengutake*		AB088767			0	0
Amanitaceae	*Amanita incarnatifolia*		AF024459			0	0
Amanitaceae	*Amanita jacksonii*		AF097376			0	0
Amanitaceae	*Amanita japonica*		AF024460			0	0
Amanitaceae	*Amanita kotohiraensis*		FJ011682			0	0
Amanitaceae	*Amanita lignitincta*		AF024461			0	0
Amanitaceae	*Amanita liquii*		AY436493			0	0
Amanitaceae	*Amanita longistriata*		AF024462			0	0
Amanitaceae	*Amanita manginiana*		AF024463			0	0
Amanitaceae	*Amanita mira*		AF024464			0	0
Amanitaceae	*Amanita muscaria*		EU072012			0	0
Amanitaceae	*Amanita nauseosa*		AY194984			0	0
Amanitaceae	*Amanita nivalis*		AF024466			0	0
Amanitaceae	*Amanita oberwinkleran*		FJ011683			0	0
Amanitaceae	*Amanita ocreata*		AY325880			0	0
Amanitaceae	*Amanita orientifulva*		AY436496			0	0
Amanitaceae	*Amanita orientigemmata*		AY436497			0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Amanitaceae	*Amanita pantherina*		AB088768			0	0
Amanitaceae	*Amanita pantherina va*		AF024468			0	0
Amanitaceae	*Amanita parvipantherina*		AY436499			0	0
Amanitaceae	*Amanita peckiana*		AF097387			0	0
Amanitaceae	*Amanita phalloides*		DQ071721			0	0
Amanitaceae	*Amanita pilosella*		AF024470			0	0
Amanitaceae	*Amanita ponderosa*		EF653957			0	0
Amanitaceae	*Amanita porphyria*		AY436500			0	0
Amanitaceae	*Amanita pseudoporphyria*		AF024471			0	0
Amanitaceae	*Amanita pseudovaginata*		AF024472			0	0
Amanitaceae	*Amanita rhoadsii*		AF097391			0	0
Amanitaceae	*Amanita roseo tincta*		AF097369			0	0
Amanitaceae	*Amanita rubescens*		AF097383			0	0
Amanitaceae	*Amanita rubrovolvata*		AF024473			0	0
Amanitaceae	*Amanita sepiacea*		AY436501			0	0
Amanitaceae	*Amanita silvicola*		GQ250423			0	0
Amanitaceae	*Amanita sinensis*		AF024474			0	0
Amanitaceae	*Amanita solitaria*		AF024475			0	0
Amanitaceae	*Amanita solitariiform*		AF097389			0	0
Amanitaceae	*Amanita strobiliformis*		AF024476			0	0
Amanitaceae	*Amanita subfrostiana*		AF024477			0	0
Amanitaceae	*Amanita subjunquillea*		AF024479			0	0
Amanitaceae	*Amanita submembranace*		FJ705276			0	0
Amanitaceae	*Amanita sychnopyramis*		AF024480			0	0
Amanitaceae	*Amanita umbrinolutea*		AF024481			0	0
Amanitaceae	*Amanita vaginata*		AF024482			0	0
Amanitaceae	*Amanita velosa*		GQ250424			0	0
Amanitaceae	*Amanita verrucosivolva*		AF024483			0	0
Amanitaceae	*Amanita virgineoides*		AF024484			0	0
Amanitaceae	*Amanita virosa*		AF159086			0	0
Amanitaceae	*Amanita volvata*		AF097388			0	0
Amanitaceae	*Amanita xylinivolva*		FJ890035			0	0
Amanitaceae	*Amanita yuaniana*		AF024488			0	0
Amanitaceae	*Amarrendia grandispora* H0792		GQ925385			1	1
Amanitaceae	*Amarrendia oleosa* H7627		GQ925377			1	1
Amanitaceae	*Amarrendia* sp.		GQ925378			1	1
Amanitaceae	*Limacella glischra*		AY612843			0	0
Amanitaceae	*Limacella illinita*		AF261439			0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Amanitaceae	*Torrendia arenaria* 363		GQ925384			1	1
Amanitaceae	*Torrendia arenaria* 412		GQ925383			1	1
Amanitaceae	*Torrendia arenaria* 555		GQ925375			1	1
Amanitaceae	*Torrendia grandis* H7353		GQ925376			1	1
Amanitaceae	*Torrendia inculta* H7335		GQ925371			1	1
Amanitaceae	*Torrendia pulchella* AF261566		AF261566			0	1
Amanitaceae	*Cortinarius aurilicis*		AY684152			0	0
Amanitaceae	*Cortinarius iodes*		AY702013			0	0
Amanitaceae	*Pluteus romellii* AFT625		AY634279			0	0
Boletaceae	*Austroboletus gracilis*		DQ534624			0	0
Boletaceae	*Austroboletus mucosus*		AY612798			0	0
Boletaceae	*Austroboletus niveus*		DQ534622			0	0
Boletaceae	*Austroboletus novaezelandiae*		DQ534623			0	0
Boletaceae	*Boletus erythropus*	AJ419188				0	0
Boletaceae	*Chamonixia caespitosa* 92 83	DQ534565				0	1
Boletaceae	*Chamonixia caespitosa* AF336245		AF336245			0	1
Boletaceae	*Chamonixia caespitosa* OSC118291	EU834197				0	1
Boletaceae	*Chamonixia caespitosa* p693i	EU669385	EU669427			0	1
Boletaceae	*Leccinellum albellum*		AY612811			0	0
Boletaceae	*Leccinellum carpini* AF454588	AF454588				0	0
Boletaceae	*Leccinellum corsicum*		AF139693			0	0
Boletaceae	*Leccinellum crocipodium* Netherlands	AF454590				0	0
Boletaceae	*Leccinellum lepidum* AF139698		AF139698			0	0
Boletaceae	*Leccinellum lepidum* SU70	DQ131631				0	0
Boletaceae	*Leccinum aurantiacum*	AF454569	AF454569			0	0
Boletaceae	*Leccinum holopus*	AF454563	AF139697			0	0
Boletaceae	*Leccinum palustre*	AF454587				0	0
Boletaceae	*Leccinum quercinum* AF454591		AF454591			0	0
Boletaceae	*Leccinum rigidipes*	AF454584	AF454584			0	0
Boletaceae	*Leccinum roseotinctum*	AF454575				0	0
Boletaceae	*Leccinum rugosiceps*		AY612813			0	0
Boletaceae	*Leccinum scabrum* Sweden	AF454583	AY612814			0	0
Boletaceae	*Leccinum snellii*	AY538845				0	0
Boletaceae	*Leccinum subglabripes*		AF139688			0	0
Boletaceae	*Leccinum talamancae*	AY544779				0	0
Boletaceae	*Leccinum variicolor*	AF454570	AF139706			0	0
Boletaceae	*Octaviania asterosperma* DQ534619		DQ534619			0	1
Boletaceae	*Octaviania asterosperma* KM81259	EU784379				0	1

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Boletaceae	*Octaviania* sp. A Aichi	EU414289	EU414290			0	1
Boletaceae	*Octaviania tasmanica* PDD89058	GU222293				1	1
Boletaceae	*Octaviania tasmanica* TL2329	HQ647144	HQ647147			1	1
Boletaceae	*Pulveroboletus curtis*		AY612820			0	0
Boletaceae	*Retiboletus flavoniger*		AF456829			0	0
Boletaceae	*Retiboletus griseus*		AF456834			0	0
Boletaceae	*Retiboletus retipes* AF456811		AF456811			0	0
Boletaceae	*Retiboletus retipes* AF456831		AF456831			0	0
Boletaceae	*Rossbeevera eucyanea* Ouchida 159					0	1
Boletaceae	*Rossbeevera griseovelvetina* 173					0	1
Boletaceae	*Rossbeevera pachyderma* DQ534620		DQ534620			0	1
Boletaceae	*Rossbeevera westraliensis* MEL2231712	HQ647140	HQ647162			1	1
Boletaceae	*Xerocomus badius*	AJ889926				0	0
Boletaceae	*Xerocomus ferrugineus*	DQ066404				0	0
Boletaceae	*Xerocomus pruinatus*	EU350582				0	0
Boletaceae	*Xerocomus zelleri*	DQ822794				0	0
Boletaceae	*Calostoma cinnabarinum* AFTOL439	AY854064	AY645054			0	0
Boletaceae	*Cortinarius aurilicis*		AY684152	DQ083880	DQ061278	0	0
Boletaceae	*Cortinarius iodes*		AY702013	AY536285	AY881027	0	0
Boletaceae	*Suillus pictus* AFTOL717		AY684154	AY786066	AY883429	0	0
Entolomataceae	*Alboleptonia sericella* aff. MCA1978			GU384632		0	0
Entolomataceae	*Alboleptonia stylophora* AST84			GU384633		0	0
Entolomataceae	*Clitopilopsis hirneola* CBS577 87			GU384645		0	0
Entolomataceae	*Clitopilopsis hirneola* TB8490			GU384646		0	0
Entolomataceae	*Clitopilus caelatus* TB6995			GU384652		0	0
Entolomataceae	*Clitopilus cystidiatus* 26			GQ289220		0	0
Entolomataceae	*Clitopilus fallax* 37			GQ289276		0	0
Entolomataceae	*Clitopilus hirneolus* 263			GQ289278		0	0
Entolomataceae	*Clitopilus nitellinus* 265			GQ289281		0	0
Entolomataceae	*Clitopilus nitellinus* 400			GQ289282		0	0
Entolomataceae	*Clitopilus pallidogriseus* 118			GQ289283		1	0
Entolomataceae	*Clitopilus popinalis* 260			GQ289280		0	0
Entolomataceae	*Clitopilus prunulus* 2			GQ289221		0	0
Entolomataceae	*Clitopilus prunulus* TB8229			GU384650		0	0
Entolomataceae	*Clitopilus prunulus* TB9663			GU384586		0	0
Entolomataceae	*Clitopilus pseudopiperitus* 162			GQ289284		1	0
Entolomataceae	*Clitopilus* sp 211			GQ289279		0	0
Entolomataceae	*Clitopilus* sp CoDavid 266			HM164416		0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Entolomataceae	*Clitopilus* sp. TB8024			GU384647		0	0
Entolomataceae	*Clitopilus* sp. TB8067			GU384649		0	0
Entolomataceae	*Clitopilus* sp. VHAs07 02			DQ825408		0	0
Entolomataceae	*Clitopilus stanglianus* 503			GQ289285		0	0
Entolomataceae	*Entoloma abortivum* TB6693			GU384642		0	0
Entolomataceae	*Entoloma albidoquadratum* i4			GQ289223		0	0
Entolomataceae	*Entoloma alcedicolor* 210			GQ289224		0	0
Entolomataceae	*Entoloma araneosum* 14			GQ289225		0	0
Entolomataceae	*Entoloma bloxamii* 219			GQ289226		0	0
Entolomataceae	*Entoloma caccabus* 17			GQ289227		0	0
Entolomataceae	*Entoloma cephalotrichum* 253			GQ289229		0	0
Entolomataceae	*Entoloma cocles* 244			GQ289230		0	0
Entolomataceae	*Entoloma conferendum* 6			GQ289231		0	0
Entolomataceae	*Entoloma costatum* 49			GQ289232		0	0
Entolomataceae	*Entoloma cretaceum* 213			GQ289233		1	0
Entolomataceae	*Entoloma excentricum* 184			GQ289234		0	0
Entolomataceae	*Entoloma flavifolium* TB6215			GU384644		0	0
Entolomataceae	*Entoloma gasteromycetoides* 180			GQ289235		1	1
Entolomataceae	*Entoloma gelatinosum* 212			GQ289236		1	0
Entolomataceae	*Entoloma griseolazulinum* i11			GQ289237		0	0
Entolomataceae	*Entoloma haastii* 126			GQ289238		1	0
Entolomataceae	*Entoloma haastii* 216			GQ289239		1	0
Entolomataceae	*Entoloma haastii* 217			GQ289240		1	0
Entolomataceae	*Entoloma hebes* 46			GQ289241		0	0
Entolomataceae	*Entoloma indigoticoumbrinum* 83			GQ289242		1	0
Entolomataceae	*Entoloma indoviolaceum* i13			GQ289243		0	0
Entolomataceae	*Entoloma kermandii* 222			GQ289244		1	0
Entolomataceae	*Entoloma myrmecophilum* 231			GQ289245		0	0
Entolomataceae	*Entoloma nidorosum* TB9971			GU384643		0	0
Entolomataceae	*Entoloma pallideradicatum* 255			GQ289247		0	0
Entolomataceae	*Entoloma parasiticum* 20			GQ289248		0	0
Entolomataceae	*Entoloma perbloxamii* 71			GQ289249		1	0
Entolomataceae	*Entoloma phaeomarginatum* 127			GQ289250		1	0
Entolomataceae	*Entoloma pluteisimilis* 200			GQ289251		0	0
Entolomataceae	*Entoloma politum* 15			GQ289252		0	0
Entolomataceae	*Entoloma porphyrescens* 113			GQ289253		1	0
Entolomataceae	*Entoloma procerum* 70			GQ289254		1	0
Entolomataceae	*Entoloma prunuloides* 40			GQ289255		0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Entolomataceae	*Entoloma prunuloides* TJB4765			DQ385883		0	0
Entolomataceae	*Entoloma pygmaeopapillatum* 32			GQ289256		0	0
Entolomataceae	*Entoloma readiae* 102			GQ289257		1	0
Entolomataceae	*Entoloma rhodopolium* 8			GQ289258		0	0
Entolomataceae	*Entoloma sarcitum* 235			GQ289259		0	0
Entolomataceae	*Entoloma sericatum* 28			GQ289260		0	0
Entolomataceae	*Entoloma sericellum* 10			GQ289261		0	0
Entolomataceae	*Entoloma sericeonitidum* TB7144			EF421016		0	0
Entolomataceae	*Entoloma serrulatum* 163			GQ289263		1	0
Entolomataceae	*Entoloma sinuatum* 50			GQ289264		0	0
Entolomataceae	*Entoloma sordidulum* 1			GQ289265		0	0
Entolomataceae	*Entoloma* sp. 292			GQ289228		0	0
Entolomataceae	*Entoloma strictius* v. *isabellinus* TB7710			GU384641		0	0
Entolomataceae	*Entoloma tectonicola* i15			GQ289266		0	0
Entolomataceae	*Entoloma tjallingiorum* 243			GQ289267		0	0
Entolomataceae	*Entoloma transmutans* 155			GQ289268		1	0
Entolomataceae	*Entoloma turbidum* TB6949			GU384656		0	0
Entolomataceae	*Entoloma undatum* 18			GQ289270		0	0
Entolomataceae	*Entoloma valdeumbonatum* 189			GQ289271		0	0
Entolomataceae	*Entoloma vezzenaense* 241			GQ289272		0	0
Entolomataceae	*Entoloma vinaceum* TB8870			GU384651		0	0
Entolomataceae	*Entoloma violaceovillosum* i2			GQ289273		0	0
Entolomataceae	*Inocephalus murrayi* VHAs02 02			GU384637		0	0
Entolomataceae	*Inocephalus* sp. GD b			DQ472728		0	0
Entolomataceae	*Inocephalus* sp. MCA1475			GU384636		0	0
Entolomataceae	*Inocephalus* sp. MCA1585			GU384639		0	0
Entolomataceae	*Inocephalus* sp. MCA1867			GU384638		0	0
Entolomataceae	*Inocephalus* sp. MCA2479			GU384640		0	0
Entolomataceae	*Leptonia serrulata* VHAs0102			GU384634		0	0
Entolomataceae	*Leptonia* sp. MCA1486			GU384635		0	0
Entolomataceae	*Nolanea sericea* 29			GQ289262		0	0
Entolomataceae	*Nolanea sericea* VHAs03 *02*			DQ367435		0	0
Entolomataceae	*Nolanea strictior* DUKE JM96 10			EF421017		0	0
Entolomataceae	*Rhodocybe aureicystidiata* PBM1902			AY337412		0	0
Entolomataceae	*Rhodocybe fallax* CBS129 63			EF421018		0	0
Entolomataceae	*Rhodocybe mundula* TJB7599			DQ474128		0	0
Entolomataceae	*Rhodocybe popinalis* TB6378			GU384654		0	0
Entolomataceae	*Rhodocybe pruinosostipitata* MCA1492			GU384653		0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Entolomataceae	*Rhodocybe spongiosa* MCA2129			GU384657		0	0
Entolomataceae	*Rhodocybe trachyspora* TB5856			GU384658		0	0
Entolomataceae	*Rhodocybe truncata* CBS482 50			EF421019		0	0
Entolomataceae	*Richoniella asterospora* PBM3268			JF706311		0	1
Entolomataceae	*Trichopilus porphyrophaeus* VHAs09 02			EF421020		0	0
Entolomataceae	*Clitocybe dealbata* HC95cp3			DQ825407		0	0
Entolomataceae	*Lepista ovispora* 442			GQ289274		0	0
Entolomataceae	*Tricholoma vaccinum* 446			GQ289286		0	0
Entolomataceae	*Tricholoma viridiolivaceum* PBM3093			JF706319		0	0
Hydnangiaceae	*Hydnangium sublamellatum* KS1494	JX270750				1	1
Hydnangiaceae	*Hydnangium carneum* 2 TL2359	JX270733				1	1
Hydnangiaceae	*Hydnangium carneum* 1 TL2361	JX270705				1	1
Hydnangiaceae	FJ168595 *Hydnangium* sp. KHNZ06123	FJ168595				0	1
Hydnangiaceae	AM113953 *Laccaria amethystina*	AM113953				0	0
Hydnangiaceae	EF530940 *Laccaria amethystina*	EF530940				0	0
Hydnangiaceae	EU819476 *Laccaria amethystina*	EU819476				0	0
Hydnangiaceae	EU597085 *Laccaria bicolor*	EU597085				0	0
Hydnangiaceae	*Laccaria canaliculata1* TM1811	JX270720				1	0
Hydnangiaceae	DQ974699 *Laccaria* cf. *laccata* src671	DQ974699				0	0
Hydnangiaceae	AB211273 *Laccaria laccata*	AB211273				0	0
Hydnangiaceae	AJ699074 *Laccaria laccata*	AJ699074				0	0
Hydnangiaceae	EF644110 *Laccaria laccata*	EF644110				0	0
Hydnangiaceae	EU819478 *Laccaria laccata* var. *pallidifolia*	EU819478				0	0
Hydnangiaceae	*Laccaria lateritia1* ES101Y	JX270719				1	0
Hydnangiaceae	*Laccaria canaliculata2 ES093*	JX270714				1	0
Hydnangiaceae	*Laccaria masoniae1 ES285*	JX270741				1	0
Hydnangiaceae	*Laccaria masoniae2 ES279*	JX270728				1	0
Hydnangiaceae	DQ149865 *Laccaria montana*	DQ149865				0	0
Hydnangiaceae	EU486434 *Laccaria montana*	EU486434				0	0
Hydnangiaceae	AB211271 *Laccaria murina*	AB211271				0	0
Hydnangiaceae	DQ149861 *Laccaria nobilis*	DQ149861				0	0
Hydnangiaceae	FJ168600 *Laccaria ochropurpurea*	FJ168600				0	0
Hydnangiaceae	GQ267477 *Laccaria proxima*	GQ267477				0	0
Hydnangiaceae	DQ149871 *Laccaria pseudomontana*	DQ149871				0	0
Hydnangiaceae	DQ149864 *Laccaria pumila*	DQ149864				0	0
Hydnangiaceae	*Laccaria* sp. E2 ES154	JX270701				1	0
Hydnangiaceae	*Laccaria* cf. *lateritia* 2 ES172	JX270737				1	0
Hydnangiaceae	*Laccaria* cf. *canaliculata* 3 ES187	JX270697				1	0

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Hydnangiaceae	FJ168603 *Laccaria* sp. GMM1080	FJ168603				0	0
Hydnangiaceae	FJ168602 *Laccaria* sp. JCS071005C	FJ168602				0	0
Hydnangiaceae	FJ168598 *Laccaria* sp. SK05030	FJ168598				0	0
Hydnangiaceae	*Laccaria* sp. A ES295	JX270693				1	0
Hydnangiaceae	*Laccaria* sp. B1 TM999	JX270749				1	0
Hydnangiaceae	*Laccaria* sp. B4 TM956	JX270710				1	0
Hydnangiaceae	*Laccaria* sp. B3 TM944	JX270713				1	0
Hydnangiaceae	*Laccaria* sp. D ES189	JX270725				1	0
Hydnangiaceae	*Laccaria* sp. E1 ES277	JX270709				1	0
Hydnangiaceae	*Podohydnangium australe* TM1026	KY073249				1	1
Hydnangiaceae	AB459516 *Laccaria vinaceoavellanea*	AB459516				0	0
Hydnangiaceae	GQ981532 *Podohydnangium australe KM162959*	GQ981532				1	1
Hydnangiaceae	AM161523 uncultured ectomycorrhiza *Laccaria*	AM161523				0	0
Hydnangiaceae	AY880933 uncultured ectomycorrhiza *Laccaria*	AY880933				0	0
Hydnangiaceae	EF218783 uncultured ectomycorrhiza *Laccaria*	EF218783				0	0
Hydnangiaceae	EF634114 uncultured ectomycorrhiza *Laccaria* NZ	EF634114				0	0
Hydnangiaceae	AY825516 uncultured ectomycorrhiza *Laccaria* REVERSED	AY825516				0	0
Hydnangiaceae	AY702728 uncultured fungus from ectomycorrhizal root	AY702728				0	0
Hydnangiaceae	GQ205354 uncultured fungus	GQ205354				0	0
Hydnangiaceae	GQ205355 uncultured fungus	GQ205355				0	0
Hydnangiaceae	FN393140 uncultured *Laccaria*	FN393140				0	0
Hydnangiaceae	GQ240912 uncultured *Laccaria*	GQ240912				0	0
Hydnangiaceae	GQ240913 uncultured *Laccaria*	GQ240913				0	0
Hydnangiaceae	AB211143 uncultured mycorrhizal basidiomycete	AB211143				0	0
Hydnangiaceae	DQ421089 uncultured soil fungus	DQ421089				0	0
Hydnangiaceae	AF389133 *Cortinarius iodes*	AF389133				0	0
Hydnangiaceae	DQ404393 *Mythicomyces corneipes*	DQ404393				0	0
Phallomycetidae	*Geastrum fimbriatum*		DQ218600	DQ219048	DQ219226	0	0
Phallomycetidae	*Geastrum floriforme*		DQ218485	DQ219049	DQ219227	0	0
Phallomycetidae	*Geastrum fornicatum*		DQ218601	DQ219050	DQ219228	0	0
Phallomycetidae	*Geastrum pectinatum*		DQ218602	DQ219051	DQ219229	0	0
Phallomycetidae	*Geastrum recolligens*		DQ218486	DQ219052	DQ219230	0	0
Phallomycetidae	*Geastrum rufescens*		DQ218603	DQ219053	-	0	0
Phallomycetidae	*Geastrum smardae*		DQ218604	DQ219054	-	0	0
Phallomycetidae	*Geastrum* sp. T26588		DQ218605	-	-	0	0
Phallomycetidae	*Myriostoma coliforme*		DQ218606	DQ219055	DQ219231	0	0
Phallomycetidae	*Pyrenogaster pityophilus*		DQ218519	DQ219057	DQ219232	0	1
Phallomycetidae	*Radiigera bushnellii*		DQ218608	DQ219058	DQ219233	0	1

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Phallomycetidae	*Radiigera fuscogleba* OSC58979		DQ218609	DQ219059	DQ219234	0	1
Phallomycetidae	*Radiigera fuscogleba* OSC59749		DQ218610	-	-	0	1
Phallomycetidae	*Radiigera taylorii*		DQ218520	DQ219060	DQ219235	0	1
Phallomycetidae	*Schenella simplex*		DQ218607	DQ219056		0	1
Phallomycetidae	*Sclerogaster xerophilus*		DQ218611	DQ219061	DQ219236	0	1
Phallomycetidae	*Beenakia fricta*		AY574693	-	DQ219238	0	0
Phallomycetidae	*Clavariadelphus ligula*		AY574650	DQ219063	DQ219239	0	0
Phallomycetidae	*Clavariadelphus* sp. OSC122861		DQ218612	DQ219065	DQ219241	0	0
Phallomycetidae	*Clavariadelphus truncatus*		AY574649	DQ219064	DQ219240	0	0
Phallomycetidae	*Gautieria caudata*		DQ218483	DQ219066	DQ219242	0	1
Phallomycetidae	*Gautieria crispa*		DQ218484	DQ219068	DQ219244	0	1
Phallomycetidae	*Gautieria otthii*		AF393058	AY218486	AY883434	0	1
Phallomycetidae	*Gautieria parksiana*		AY574652	-	DQ219245	0	1
Phallomycetidae	*Gautieria pterosperma*		DQ218614	DQ219069	DQ219246	0	1
Phallomycetidae	*Gautieria* sp. OSC122685		DQ218616	DQ219071	DQ219248	0	1
Phallomycetidae	*Gautieria* sp. OSC48137		DQ218615	DQ219070	DQ219247	0	1
Phallomycetidae	*Gautieria* sp. OSC61517		DQ218613	DQ219067	DQ219243	0	1
Phallomycetidae	*Gloeocantharellus* sp. OSC122875		DQ218617	DQ219072	DQ219249	0	0
Phallomycetidae	*Gomphus clavatus*		DQ218487	-	-	0	0
Phallomycetidae	*Kavinia alboviridis*		AY574692	DQ219073	DQ219250	0	0
Phallomycetidae	*Lentaria pinicola*		AY574688	-	DQ219251	0	0
Phallomycetidae	*Phaeoclavulina grandis* OSC122773		DQ218618	DQ219074	DQ219252	0	0
Phallomycetidae	*Phaeoclavulina* sp. OSC122874		-	DQ219075	DQ219253	0	0
Phallomycetidae	*Ramaria araiospora*		AF213068	DQ219076	DQ219254	0	0
Phallomycetidae	*Ramaria celerivirescens*		AF213073	DQ219077	DQ219255	0	0
Phallomycetidae	*Ramaria flavobrunnescens*		AF213082	DQ219045	DQ219223	0	0
Phallomycetidae	*Ramaria moelleriana*		DQ218619	-	-	0	0
Phallomycetidae	*Ramaria rubella*		AY645057	AY786064	AY883435	0	0
Phallomycetidae	*Ramaria* sp. OSC122865		DQ218620	-	-	0	0
Phallomycetidae	*Ramaria* sp. OSC122871		DQ218621	-	-	0	0
Phallomycetidae	*Ramaria* sp. OSC122872		DQ218623	-	DQ219258	0	0
Phallomycetidae	*Ramaria* sp. OSC122873		DQ218622	DQ219080	-	0	0
Phallomycetidae	*Ramaria stricta*		AF213117	DQ219078	DQ219256	0	0
Phallomycetidae	*Ramaria stuntzii*		AF213102	DQ219079	DQ219257	0	0
Phallomycetidae	*Turbinellus floccosus*		AY574656	-	DQ219259	0	0
Phallomycetidae	*Andebbia pachythrix*		DQ218523	DQ218940	DQ219117	1	1
Phallomycetidae	*Aroramyces gelatinosporus*		DQ218524	DQ218941	DQ219118	1	1
Phallomycetidae	*Aroramyces radiates*		DQ218525	DQ218942	DQ219119	0	1

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Phallomycetidae	*Aroramyces* sp. OSC122590		DQ218529	DQ218946	DQ219123	0	1
Phallomycetidae	*Aroramyces* sp. OSC122858		DQ218528	DQ218945	DQ219122	0	1
Phallomycetidae	*Aroramyces* sp. SM10030		DQ218530	DQ218947	DQ219124	0	1
Phallomycetidae	*Aroramyces* sp. T15013		DQ218526	DQ218943	DQ219120	0	1
Phallomycetidae	*Aroramyces* sp. T9930		DQ218527	DQ218944	DQ219121	0	1
Phallomycetidae	*Austrogautieria chlorospora*		DQ218477	DQ218948	DQ219125	1	1
Phallomycetidae	*Austrogautieria clelandii*		DQ218531	DQ218949	DQ219126	1	1
Phallomycetidae	*Austrogautieria manjimupana*		DQ218533	DQ218951	DQ219128	1	1
Phallomycetidae	*Austrogautieria* sp. Beaton66		DQ218535	-	DQ219133	1	1
Phallomycetidae	*Austrogautieria* sp. OSC122637		DQ218534	DQ218955	DQ219132	0	1
Phallomycetidae	*Austrogautieria* sp. OSC80139		DQ218479	DQ218953	DQ219130	1	1
Phallomycetidae	*Austrogautieria* sp. OSC80140		DQ218480	DQ218954	DQ219131	1	1
Phallomycetidae	*Castoreum* sp. OSC122814		DQ218536	DQ218956	DQ219134	1	1
Phallomycetidae	*Chondrogaster angustisporus*		DQ218537	DQ218957	DQ219135	1	1
Phallomycetidae	*Chondrogaster pachysporus*		DQ218538	DQ218958	DQ219136	1	1
Phallomycetidae	*Gallacea dingleyae*		DQ218539	DQ218959	DQ219137	0	1
Phallomycetidae	*Gallacea eburnea*		DQ218482	DQ218960	DQ219138	0	1
Phallomycetidae	*Gallacea scleroderma*		AY574645	DQ218961	DQ219139	0	1
Phallomycetidae	*Gallacea* sp. OSC122728		DQ218542	DQ218965	DQ219143	0	1
Phallomycetidae	*Gallacea* sp. OSC122813		DQ218543	DQ218966	DQ219144	1	1
Phallomycetidae	*Gallacea* sp. OSC80855		-	DQ218964	DQ219142	1	1
Phallomycetidae	*Gallacea* sp. REB2364		DQ218540	DQ218962	DQ219140	0	1
Phallomycetidae	*Gallacea* sp. T25038		DQ218541	DQ218963	DQ219141	0	1
Phallomycetidae	*Gummiglobus agglutinosporus*		DQ218544	DQ218967	-	1	1
Phallomycetidae	*Gummiglobus joyceae*		DQ218488	DQ218968	-	1	1
Phallomycetidae	*Hallingea purpurea*		DQ218545	DQ218969	DQ219145	0	1
Phallomycetidae	*Hysterangium affine*		DQ218546	DQ218970	-	1	1
Phallomycetidae	*Hysterangium aggregatum*		DQ218489	DQ218971	DQ219146	1	1
Phallomycetidae	*Hysterangium album*		DQ218490	DQ218972	DQ219147	0	1
Phallomycetidae	*Hysterangium aureum*		DQ218491	DQ218973	DQ219148	0	1
Phallomycetidae	*Hysterangium calcareum*		DQ218492	DQ218974	DQ219149	0	1
Phallomycetidae	*Hysterangium cistophilum*		DQ218493	DQ218975	DQ219150	0	1
Phallomycetidae	*Hysterangium clathroides*		DQ218547	DQ218976	DQ219151	0	1
Phallomycetidae	*Hysterangium coriaceum*		AY574686	DQ218977	DQ219152	0	1
Phallomycetidae	*Hysterangium crassirhachis*		DQ218494	DQ218978	DQ219153	0	1
Phallomycetidae	*Hysterangium crassum*		AY574687	DQ218979	DQ219154	0	1
Phallomycetidae	*Hysterangium epiroticum*		DQ218495	DQ218980	DQ219155	0	1
Phallomycetidae	*Hysterangium fragile*		DQ218496	DQ218981	DQ219156	0	1

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Phallomycetidae	*Hysterangium gardneri*		DQ218548	DQ218982	DQ219157	1	1
Phallomycetidae	*Hysterangium hallingii*		DQ218497	DQ218983	DQ219158	0	1
Phallomycetidae	*Hysterangium inflatum*		DQ218549	DQ218984	DQ219159	1	1
Phallomycetidae	*Hysterangium membranaceum*		DQ218498	DQ218985	DQ219160	0	1
Phallomycetidae	*Hysterangium neotunicatum*		DQ218550	DQ218986	DQ219161	0	1
Phallomycetidae	*Hysterangium occidentale*		AY574685	DQ218987	DQ219162	0	1
Phallomycetidae	*Hysterangium pompholyx*		DQ218499	-	DQ219163	0	1
Phallomycetidae	*Hysterangium rugisporum*		DQ218500	DQ218988	DQ219164	0	1
Phallomycetidae	*Hysterangium rupticutis*		DQ218551	-	-	0	1
Phallomycetidae	*Hysterangium salmonaceum*		DQ218501	DQ218989	DQ219165	1	1
Phallomycetidae	*Hysterangium separabile*		DQ218502	DQ218990	DQ219166	0	1
Phallomycetidae	*Hysterangium setchellii*		DQ218552	DQ218991	DQ219167	0	1
Phallomycetidae	*Hysterangium* sp. AHF602		DQ218566	DQ219008	DQ219185	0	1
Phallomycetidae	*Hysterangium* sp. Garcia3779		DQ218559	DQ219001	DQ219178	0	1
Phallomycetidae	*Hysterangium* sp. H2022		DQ218568	DQ219010	DQ219187	1	1
Phallomycetidae	*Hysterangium* sp. H4123		DQ218557	DQ218999	DQ219176	1	1
Phallomycetidae	*Hysterangium* sp. H4749		DQ218573	DQ219015	DQ219192	1	1
Phallomycetidae	*Hysterangium* sp. H5057		DQ218574	DQ219016	DQ219193	1	1
Phallomycetidae	*Hysterangium* sp. H5573		DQ218575	DQ219017	DQ219194	0	1
Phallomycetidae	*Hysterangium* sp. H6105		DQ218576	DQ219018	DQ219195	1	1
Phallomycetidae	*Hysterangium* sp. K		DQ218506	DQ218997	DQ219174	1	1
Phallomycetidae	*Hysterangium* sp. MEL2049882		DQ218556	DQ218998	DQ219175	1	1
Phallomycetidae	*Hysterangium* sp. MEL2057692		DQ218560	DQ219002	DQ219179	1	1
Phallomycetidae	*Hysterangium* sp. MEL2078287		DQ218555	DQ218996	DQ219173	1	1
Phallomycetidae	*Hysterangium* sp. OSC122483		DQ218579	DQ219021	DQ219198	0	1
Phallomycetidae	*Hysterangium* sp. OSC122721		DQ218578	DQ219020	DQ219197	0	1
Phallomycetidae	*Hysterangium* sp. OSC122836		DQ218577	DQ219019	DQ219196	1	1
Phallomycetidae	*Hysterangium* sp. OSC122857		DQ218563	DQ219005	DQ219182	0	1
Phallomycetidae	*Hysterangium* sp. OSC122859		DQ218571	DQ219013	DQ219190	0	1
Phallomycetidae	*Hysterangium* sp. OSC122860		DQ218572	DQ219014	DQ219191	0	1
Phallomycetidae	*Hysterangium* sp. OSC59629		DQ218565	DQ219007	DQ219184	0	1
Phallomycetidae	*Hysterangium* sp. PDD82853		DQ218580	DQ219022	DQ219199	0	1
Phallomycetidae	*Hysterangium* sp. SM10007		DQ218581	DQ219023	DQ219200	0	1
Phallomycetidae	*Hysterangium* sp. SM10100		DQ218582	DQ219024	DQ219201	0	1
Phallomycetidae	*Hysterangium* sp. SM10166		DQ218583	DQ219025	DQ219202	0	1
Phallomycetidae	*Hysterangium* sp. T13345		DQ218584	DQ219026	DQ219203	0	1
Phallomycetidae	*Hysterangium* sp. T17501		DQ218553	-	DQ219171	0	1
Phallomycetidae	*Hysterangium* sp. T17856		DQ218569	DQ219011	DQ219188	0	1

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Phallomycetidae	*Hysterangium* sp. T19263		DQ218561	DQ219003	DQ219180	0	1
Phallomycetidae	*Hysterangium* sp. T22832		DQ218562	DQ219004	DQ219181	0	1
Phallomycetidae	*Hysterangium* sp. T26347		DQ218585	DQ219027	DQ219204	0	1
Phallomycetidae	*Hysterangium* sp. T26367		DQ218586	DQ219028	DQ219205	0	1
Phallomycetidae	*Hysterangium* sp. T27921		DQ218587	DQ219029	DQ219206	0	1
Phallomycetidae	*Hysterangium* sp. T3296		DQ218554	DQ218995	DQ219172	0	1
Phallomycetidae	*Hysterangium* sp. T3328		DQ218564	DQ219006	DQ219183	0	1
Phallomycetidae	*Hysterangium* sp. T4794		DQ218558	DQ219000	DQ219177	0	1
Phallomycetidae	*Hysterangium* sp. T591		-	DQ218994	DQ219170	0	1
Phallomycetidae	*Hysterangium* sp. T6889		DQ218570	DQ219012	DQ219189	1	1
Phallomycetidae	*Hysterangium* sp. T6923		DQ218567	DQ219009	DQ219186	1	1
Phallomycetidae	*Hysterangium* sp. T8997		DQ218588	-	DQ219207	0	1
Phallomycetidae	*Hysterangium spegazzinii*		DQ218503			0	1
Phallomycetidae	*Hysterangium strobilus*		DQ218504	DQ218992	DQ219168	0	1
Phallomycetidae	*Hysterangium youngii*		DQ218505	DQ218993	DQ219169	0	1
Phallomycetidae	*Malajczukia amicorum*		DQ218508	DQ219030	DQ219208	1	1
Phallomycetidae	*Malajczukia ingratissima*		DQ218509	DQ219031	DQ219209	1	1
Phallomycetidae	*Malajczukia viridigleba*		DQ218510			1	1
Phallomycetidae	*Mesophellia arenaria*		DQ218589	DQ219032	DQ219210	1	1
Phallomycetidae	*Mesophellia clelandii*		DQ218511	DQ219033	DQ219211	1	1
Phallomycetidae	*Mesophellia glauca*		DQ218590	DQ219034	DQ219212	1	1
Phallomycetidae	*Mesophellia oleifera*		DQ218512			1	1
Phallomycetidae	*Mesophellia sabulosa*		DQ218591	DQ219035	DQ219213	1	1
Phallomycetidae	*Mesophellia trabalis*		DQ218592	DQ219036	DQ219214	1	1
Phallomycetidae	*Nothocastoreum cretaceum* OSC79832		DQ218593	-	DQ219215	1	1
Phallomycetidae	*Nothocastoreum cretaceum* OSC79925		DQ218594	DQ219037	DQ219216	1	1
Phallomycetidae	*Phallogaster saccatus*		DQ218595	DQ219038	DQ219217	0	1
Phallomycetidae	*Protubera hautuensis*		DQ218517	DQ219039	DQ219218	0	1
Phallomycetidae	*Protubera nothofagi*		AY574644	DQ219040	DQ219219	0	1
Phallomycetidae	*Protubera* sp. T20068		DQ218596	DQ219041	DQ219220	1	1
Phallomycetidae	*Trappea phillipsii*		DQ218522	DQ219042	-	0	1
Phallomycetidae	*Trappea pinyonensis*		DQ218597	DQ219043	DQ219221	0	1
Phallomycetidae	*Auricularia polytricha*		AF261554			0	0
Phallomycetidae	*Auricularia* sp. PBM2295		AY634277	DQ366278	DQ408144	0	0
Phallomycetidae	*Boletellus projectellus*		AY684158	AY787218	AY879116	0	0
Phallomycetidae	*Calocera cornea*		AY701526	AY536286	AY881019	0	0
Phallomycetidae	*Chamonixia* sp. Muroi361		DQ218598	DQ219046	DQ219224	0	1
Phallomycetidae	*Cortinarius aurilicis*		AY684152	DQ083880	DQ061278	0	0

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Phallomycetidae	*Cortinarius iodes*		AY702013	AY536285	AY881027	0	0
Phallomycetidae	*Dacrymyces chrysospermus*		AF287855	AY218480	-	0	0
Phallomycetidae	*Rhopalogaster transversarium*		DQ218599	DQ219047	DQ219225	0	0
Phallomycetidae	*Russula compacta*		AF287888	AY218514	-	0	0
Phallomycetidae	*Sarcodon imbricatus*		AY586711	AY218528	-	0	0
Phallomycetidae	*Suillus pictus*		AY684154	AY786066	AY883429	0	0
Phallomycetidae	*Anthurus archeri*		DQ218624	DQ219081	DQ219260	1	0
Phallomycetidae	*Aseroe rubra*		DQ218625	DQ219082	DQ219261	1	0
Phallomycetidae	*Clathrus chrysomycelinus*		DQ218626	DQ219083	DQ219262	0	0
Phallomycetidae	*Clathrus ruber*		-	DQ219084	-	0	0
Phallomycetidae	*Claustula fischeri* OSC122661		-	DQ219085	DQ219263	0	1
Phallomycetidae	*Claustula fischeri* REB2326		-	DQ219086	DQ219264	0	1
Phallomycetidae	*Dictyophora duplicata*		DQ218481	DQ219087	DQ219265	0	0
Phallomycetidae	*Dictyophora indusiata*		DQ218627	DQ219088	DQ219088	0	0
Phallomycetidae	*Dictyophora multicolor*		DQ218628	DQ219089	DQ219267	1	0
Phallomycetidae	*Gelopellis macrospora*		DQ218629	-	DQ219268	0	1
Phallomycetidae	*Gelopellis* sp. H4397		DQ218630	DQ219090	DQ219269	0	1
Phallomycetidae	*Gelopellis* sp. H4571		DQ218631	DQ219091	DQ219270	0	1
Phallomycetidae	*Gelopellis* sp. MEL2063389		DQ218632	DQ219092	-	1	1
Phallomycetidae	*Ileodictyon cibarium*		DQ218633	DQ219093	-	0	0
Phallomycetidae	*Ileodictyon gracile* MEL2024221		DQ218634	DQ219094	DQ219271	1	0
Phallomycetidae	*Ileodictyon gracile* MEL2037639		DQ218635	DQ219095	DQ219272	1	0
Phallomycetidae	*Ileodictyon gracile* MEL2054561		DQ218636	DQ219096	DQ219273	1	0
Phallomycetidae	*Kjeldsenia aureispora*		DQ218637	DQ219097	DQ219274	0	1
Phallomycetidae	*Kobayasia nipponica* OSC122862		DQ218638	DQ219098	-	0	1
Phallomycetidae	*Kobayasia nipponica* OSC122863		DQ218639	-	-	0	1
Phallomycetidae	*Laternea triscapa*		DQ218640	DQ219099	DQ219275	0	0
Phallomycetidae	*Lysurus borealis*		DQ218641	DQ219100	DQ219276	0	0
Phallomycetidae	*Lysurus mokusin*		DQ218507	DQ219101	DQ219277	0	0
Phallomycetidae	*Mutinus elegans*		AY574643	DQ219102	-	0	0
Phallomycetidae	*Phallus costatus*		DQ218513	DQ219104	DQ219279	0	0
Phallomycetidae	*Phallus hadriani*		DQ218514	DQ219044	DQ219222	0	0
Phallomycetidae	*Phallus ravenelii*		DQ218515	DQ219105	DQ219280	0	0
Phallomycetidae	*Protubera borealis*		DQ218516	DQ219106	DQ219282	0	1
Phallomycetidae	*Protubera canescens* MEL2063471		DQ218644	DQ219107	DQ219283	1	0
Phallomycetidae	*Protubera canescens* MEL2105035		DQ218645	DQ219108	DQ219284	1	0
Phallomycetidae	*Protubera clathroidea*		DQ218646	DQ219109	DQ219285	0	1
Phallomycetidae	*Protubera jamaicensis*		DQ218647	DQ219110	DQ219286	0	1

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Phallomycetidae	*Protubera maracuja*		DQ218518	DQ219111	DQ219287	0	1
Phallomycetidae	*Protubera parvispora*		DQ218648	DQ219112	DQ219288	0	1
Phallomycetidae	*Protubera sabulonensis*		DQ218649	DQ219113	DQ219289	0	1
Phallomycetidae	*Protubera* sp. JM98		AF261555	-	DQ219291	0	1
Phallomycetidae	*Protubera* sp. SM10143		DQ218650	DQ219114	DQ219290	0	1
Phallomycetidae	*Simblum sphaerocephalum*		DQ218521	DQ219115	-	0	0
Physalacriaceae	*Cribbea gloriosa* H4603	FJ178107				1	1
Physalacriaceae	*Cribbea gloriosa MEL21710*	FJ178110				1	1
Physalacriaceae	*Cribbea gloriosa* MEL2313432	FJ178108				1	1
Physalacriaceae	*Cribbea* sp. H4424	DQ328156				1	1
Physalacriaceae	*Cribbea turbinispora* PSC1590	FJ178109				1	1
Physalacriaceae	*Flammulina velutipes*	AY854073				0	0
Physalacriaceae	*Gloiocephala aquatica*	DQ097356				0	0
Physalacriaceae	*Physalacria bambusae*	DQ097367				0	0
Physalacriaceae	*Rhizomarasmius pyrrocephalus*	DQ097369				0	0
Physalacriaceae	*Strobilurus trullisatus*	DQ097370				0	0
Physalacriaceae	*Xerula gigaspora* MD8	FJ178104				1	0
Physalacriaceae	*Xerula mundroola*	FJ178106				1	0
Physalacriaceae	*Dactylosporina macracantha* TFB10789	HM005076				0	0
Physalacriaceae	*Dactylosporina* sp. MCA1775	HM005074				0	0
Physalacriaceae	*Hymenopellis chiangmaiae* LFZ238 s6 HKAS42521	GU980132				0	0
Physalacriaceae	*Hymenopellis furfuracea* TENN59889 c14	GQ913369				0	0
Physalacriaceae	*Hymenopellis furfuracea* TENN61678	GQ913364				0	0
Physalacriaceae	*Hymenopellis gigaspora* NYBG REH8671 c1	GQ913355				1	0
Physalacriaceae	*Hymenopellis gigaspora* TENN50050	GQ913359				1	0
Physalacriaceae	*Hymenopellis incognita* TENN59437	GQ913421				0	0
Physalacriaceae	*Hymenopellis limonispora* TENN61131 c1	GQ913408				0	0
Physalacriaceae	*Hymenopellis limonispora* TENN61401	GQ913401				0	0
Physalacriaceae	*Hymenopellis megalospora* TENN51257 c2	GQ913412				0	0
Physalacriaceae	*Hymenopellis megalospora* TENN51257 c4	GQ913414				0	0
Physalacriaceae	*Hymenopellis orientalis* TMI 2IX2002 c1	GQ913397				0	0
Physalacriaceae	*Hymenopellis orientalis* TMI 2IX2002 c3	GQ913398				0	0
Physalacriaceae	*Hymenopellis orientalis* TMI 2IX2002 c4	GQ913396				0	0
Physalacriaceae	*Hymenopellis radicata* LE1003	GQ913382				0	0
Physalacriaceae	*Hymenopellis radicata* LEBIN130	GQ913381				0	0
Physalacriaceae	*Hymenopellis radicata* TENN59235	GQ913383				0	0
Physalacriaceae	*Hymenopellis radicata* TENN59301	GQ913374				0	0
Physalacriaceae	*Hymenopellis radicata* TENN60126 c1	GQ913384				0	0

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Physalacriaceae	*Hymenopellis rubrobrunnescens* TENN51262	GQ913373				0	0
Physalacriaceae	*Hymenopellis rubrobrunnescens* TENN52479	GQ913371				0	0
Physalacriaceae	*Hymenopellis rubrobrunnescens* TENN52654	GQ913372				0	0
Physalacriaceae	*Hymenopellis rugosoceps* TENN60604	GQ913394				0	0
Physalacriaceae	*Hymenopellis sinapicolor* TENN56566 c1	GQ913350				0	0
Physalacriaceae	*Hymenopellis* sp. TENN59292	GQ913399				0	0
Physalacriaceae	*Hymenopellis superbiens* MEL2291946 c1	GQ913360				1	0
Physalacriaceae	*Hymenopellis superbiens* MEL2291946 c2	GQ913361				1	0
Physalacriaceae	*Hymenopellis vinocontusa* TMI7669	GQ913370				0	0
Physalacriaceae	*Mucidula brunneomarginata* TFB6597 TENN53020	HM005123				0	0
Physalacriaceae	*Mucidula mucida* var. *asiatica* TFB2362 TENN48240	GQ844231				0	0
Physalacriaceae	*Mucidula mucida* var. *mucida* TFB4157 TENN50637	GQ844232				0	0
Physalacriaceae	*Oudemansiella australis* RV95 274	AF321474				1	0
Physalacriaceae	*Oudemansiella australis* RV95 416	AF321473				1	0
Physalacriaceae	*Oudemansiella australis* RV95 852	AF321475				0	0
Physalacriaceae	*Oudemansiella canarii* JM98 221	AF321476				0	0
Physalacriaceae	*Oudemansiella canarii* RVPR33	AF321478				0	0
Physalacriaceae	*Oudemansiella canarii* TL	AY216473				0	0
Physalacriaceae	*Oudemansiella mucida* MKACC 50056	AY534118				0	0
Physalacriaceae	*Oudemansiella* sp. TENN60767 TFB11886 s12	HM005145				0	0
Physalacriaceae	*Paraxerula americana* CLO4744	HM005141				0	0
Physalacriaceae	*Paraxerula hongoi* C60612	HM005144				0	0
Physalacriaceae	*Xerula australis* RV95 413	AF321480				1	0
Physalacriaceae	*Xerula flavo olivacea* c1	HM005149				1	0
Physalacriaceae	*Xerula flavo olivacea* REH8781 s3	HM005148				1	0
Physalacriaceae	*Xerula furfuracea* JM98 155	AF321484				0	0
Physalacriaceae	*Xerula furfuracea* QXW2430	AF321481				0	0
Physalacriaceae	*Xerula furfuracea* QXW2446	AF321482				0	0
Physalacriaceae	*Xerula furfuracea* QXW2570	AF321483				0	0
Physalacriaceae	*Xerula hispida* TFB10881	HM005164				0	0
Physalacriaceae	*Xerula hispida* GMM4696	AF321486				0	0
Physalacriaceae	*Xerula hispida* GMM6177	AF321485				0	0
Physalacriaceae	*Xerula melanotricha* TFB11917	HM005160				0	0
Physalacriaceae	*Xerula pudens* 179640	AF321492				0	0
Physalacriaceae	*Xerula pudens* RV95 904	AF321490				0	0
Physalacriaceae	*Xerula pudens* W1983 2424	AF321487				0	0
Physalacriaceae	*Xerula radicata* JMCR120	AF321494				0	0
Physalacriaceae	*Cortinarius aurilicis*	DQ083772				0	0

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Physalacriaceae	*Cortinarius iodes*	AF389133				0	0
Russulaceae	*Arcangeliella borziana*	AF373599				0	1
Russulaceae	*Arcangeliella parva*	-	AF265531			0	1
Russulaceae	*Arcangeliella variegata*	-	AF265532			0	1
Russulaceae	*Cystangium seminudum*	EU019947	-			1	1
Russulaceae	*Cystangium sessile* H5038	EU019948	AF265533			1	1
Russulaceae	*Cystangium theodouri* H6145	-	AF265534			1	1
Russulaceae	*Gymnomyces glarea* T14439	-	AF265537			1	1
Russulaceae	*Gymnomyces megasporum*	-	AF265535			1	1
Russulaceae	*Lactarius clarkeae* JET980	EU019924	EU019924			1	0
Russulaceae	*Lactarius deceptivus* AFTOL 682	AY854089	AY631899			0	0
Russulaceae	*Lactarius deliciosus*	AF230892	-			0	0
Russulaceae	*Lactarius eucalypti* JET978	EU019923	EU019923			1	0
Russulaceae	*Lactarius lignyotus* AFTOL 681	DQ221107	AY631898			0	0
Russulaceae	*Lactarius panuoides*	-	AF218561			0	0
Russulaceae	*Lactarius sepiaceus* JET1000	EU019926	EU019926			1	0
Russulaceae	*Lactarius stephensii*	AY331012	AF336274			0	1
Russulaceae	*Lactarius torminosus*	AY336959	AF325292			0	0
Russulaceae	*Macowanites* aff. *pilosella* 3313	EU019932	EU019932			1	1
Russulaceae	*Macowanites albobrunnea* 6109	EU019939	EU019939			1	1
Russulaceae	*Macowanites albobrunnea* TL2136	EU019933	EU019933			1	1
Russulaceae	*Macowanites Americana*		AF265540			0	1
Russulaceae	*Macowanites ammophilus*	AJ438038	-			0	1
Russulaceae	*Macowanites brunneonigra*	EU019945	-			1	1
Russulaceae	*Macowanites galbana* 13425	-	EU019937			1	1
Russulaceae	*Macowanites galbana* 4667	EU019936	EU019936			1	1
Russulaceae	*Macowanites luteirosea*	EU019946	-			1	1
Russulaceae	*Macowanites pilosella* 686	EU019941				1	1
Russulaceae	*Macowanites pumicoides*	EU019931	EU019931			1	1
Russulaceae	*Macowanites reddellii*	EU019944	-			1	1
Russulaceae	*Macowanites rostraticystidia*	EU019938	EU019938			1	1
Russulaceae	*Macowanites rubrolutea*	EU019940	EU019940			0	1
Russulaceae	*Macowanites sinuata*	EU019943	-			1	1
Russulaceae	*Macowanites tapawera* 12611	EU019935	EU019935			0	1
Russulaceae	*Macowanites variispora*	EU019934	EU019934			1	1
Russulaceae	*Macowanites vinaceodorus* 1	AJ438035	-			0	1
Russulaceae	*Russsula sanguinea*	AY061718	-			0	0
Russulaceae	*Russula adulterine*	AY061651	-			0	0

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Russulaceae	*Russula adusta*	AY061652	AF218544			0	0
Russulaceae	*Russula* aff. *adusta* JET871	EU019918	EU019918			1	0
Russulaceae	*Russula archaea*	AY061737	-			0	0
Russulaceae	*Russula brevipes*	AF349714	-			0	0
Russulaceae	*Russula brevipes* var. *acrior*	-	AF218545			0	0
Russulaceae	*Russula brunneola*	-	AF218548			0	0
Russulaceae	*Russula caerulea*	AY061661	AF325297			0	0
Russulaceae	*Russula camarophylla*	AY061662	-			0	0
Russulaceae	*Russula cheelii JET99*1	-	EU019925			1	0
Russulaceae	*Russula chloroides*	AY061663	AF325300			0	0
Russulaceae	*Russula compacta*	-	AB154701			0	0
Russulaceae	*Russula cyanoxantha*	AY061669	AF325301			0	0
Russulaceae	*Russula decolorans*	AY061670	AF325302			0	0
Russulaceae	*Russula delica*	AY061671	AF325303			0	0
Russulaceae	*Russula emetica*	AY061673	AF325305			0	0
Russulaceae	*Russula exalbicans*	AF418622	AF325306			0	0
Russulaceae	*Russula farinipes*	AY061675	-			0	0
Russulaceae	*Russula fellea*	AY061676	AF325307			0	0
Russulaceae	*Russula foetens*	AY061677	AF325299			0	0
Russulaceae	*Russula fragilis*	AF230897	-			0	0
Russulaceae	*Russula grisea*	AY061679	-			0	0
Russulaceae	*Russula ingwa* JET874	EU019919	EU019919			1	0
Russulaceae	*Russula iterika* JET1130	EU019929	EU019929			1	0
Russulaceae	*Russula kalimna* JET1012	EU019927	EU019927			1	0
Russulaceae	*Russula laricina*	AY061685	-			0	0
Russulaceae	*Russula maculate*	AY061688	-			0	0
Russulaceae	*Russula mairei*	AF418620	AF325311			0	0
Russulaceae	*Russula marangania* JET1151	EU019930	EU019930			1	0
Russulaceae	*Russula messapica*	AY061692	-			0	0
Russulaceae	*Russula neerimea* JET795	EU019915	EU019915			1	0
Russulaceae	*Russula nigricans*	AY061695	AF325312			0	0
Russulaceae	*Russula odorata*	AY061698	-			0	0
Russulaceae	*Russula olivacea*	AY061699	AF325314			0	0
Russulaceae	*Russula paludosa*	AY061703	-			0	0
Russulaceae	*Russula pascua*	AY061705	-			0	0
Russulaceae	*Russula pectinata*	AY061706	-			0	0
Russulaceae	*Russula persanguinea* JET818	EU019916	EU019916			1	0
Russulaceae	*Russula postiana*	AF230898	-			0	0

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Russulaceae	*Russula purpuroflava* JET785	EU019914	EU019914			1	0
Russulaceae	*Russula purpuroflava* JET836	EU019917	EU019917			1	0
Russulaceae	*Russula queletii*	AY061711	AF325316			0	0
Russulaceae	*Russula roseipes*	AY061716	-			0	0
Russulaceae	*Russula* sp. blueishgrey JET969	EU019922	EU019922			1	0
Russulaceae	*Russula* sp. mottledbrown JET906	EU019920	EU019920			1	0
Russulaceae	*Russula* sp. stickywhite *JET1098*	EU019928	EU019928			1	0
Russulaceae	*Russula sphagnophila*	-	AY061719			0	0
Russulaceae	*Russula violacea*	AY061725	AF218559			0	0
Russulaceae	*Russula virescens*	AY061727	AF041548			0	0
Russulaceae	*Russula wollumbina* JET933	EU019921	EU019921			1	0
Russulaceae	*Russula xerampelina*	AY061734	AF218542			0	0
Russulaceae	*Zelleromyces daucinus*	-	AF265543			1	1
Russulaceae	*Zelleromyces giennensis*	AF230900	-			0	1
Russulaceae	*Zelleromyces hispanicus* 2	AF231913	-			0	1
Russulaceae	*Albatrellus ovinus*	AY293165				0	0
Russulaceae	*Hericium americanum*	DQ206987	DQ411538			0	0
Russulaceae	*Cortinarius iodes*	AF389133	AY702013			0	0
Sclerodermataceae	*Astraeus hygrometricus* MB05029	EU718087	DQ682996			0	0
Sclerodermataceae	*Astraeus hygrometricus* MEL2238785		EU718157			0	0
Sclerodermataceae	*Astraeus* sp. Arora0017		DQ517425			0	0
Sclerodermataceae	*Boletinellus merulioides* AFTOL575	DQ200922	AY684153			0	0
Sclerodermataceae	*Boletinellus rompelii* No1192		EU718159			0	0
Sclerodermataceae	*Calostoma* aff. *cinnabarinum* F1120877		EU718160			0	0
Sclerodermataceae	*Calostoma berkeleyi* AWW268	EU718090	EU718128			0	0
Sclerodermataceae	*Calostoma cinnabarinum* AFTOL439	AY854064	AY645054			0	0
Sclerodermataceae	*Calostoma fuscum* OKM23918	EU718091	EU718129			1	0
Sclerodermataceae	*Calostoma fuscum* PDD70777		EU718161			0	0
Sclerodermataceae	*Calostoma insignis* Arora9831	EU718092	EU718130			0	0
Sclerodermataceae	*Calostoma japonicum* OKM22412		EU718162			0	0
Sclerodermataceae	*Calostoma junghuhnii* VC1151		EU718163			0	0
Sclerodermataceae	*Calostoma lutescens* 1329		EU718164			0	0
Sclerodermataceae	*Calostoma oriruber* HKAS32119		EU718165			0	0
Sclerodermataceae	*Calostoma ravenelii* 510	EU718094	EU718132			0	0
Sclerodermataceae	*Calostoma rodwayi*	EU718095	EU718133			0	0
Sclerodermataceae	*Calostoma sarasini* AWW244		FJ710206			0	0
Sclerodermataceae	*Calostoma* sp. HKAS38139	EU718098	EU718136			0	0
Sclerodermataceae	*Diplocystis wrightii* PR4718		DQ644135			0	0

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Sclerodermataceae	*Gyroporus* aff. *castaneus* E4600		EU718169			1	0
Sclerodermataceae	*Gyroporus* aff. *castaneus* E843c		EU718170			1	0
Sclerodermataceae	*Gyroporus* aff. *cyanescens* OKM23719	EU718104	EU718140			1	0
Sclerodermataceae	*Gyroporus* aff. *cyanescens* REH8819		EU718172			1	0
Sclerodermataceae	*Gyroporus castanaeus* REH8804	EU718101	EU718137			0	0
Sclerodermataceae	*Gyroporus castaneus* 239 97	EU718100	AF336253			0	0
Sclerodermataceae	*Gyroporus castaneus* Arora 01512		FJ710209			0	0
Sclerodermataceae	*Gyroporus castaneus* F1086418		EU718167			0	0
Sclerodermataceae	*Gyroporus castaneus* Gc1	EU718099	AF336252			0	0
Sclerodermataceae	*Gyroporus castaneus* Gc2		EU718168			0	0
Sclerodermataceae	*Gyroporus cyanescens*		AF336254			0	0
Sclerodermataceae	*Gyroporus cyanescens* MB05	EU718102	EU718138			0	0
Sclerodermataceae	*Gyroporus cyanescens* REH8758		EU718171			1	0
Sclerodermataceae	*Gyroporus purpurinus* PRL3737	EU718105	EU718141			0	0
Sclerodermataceae	*Gyroporus* sp. E8155		EF561627			1	0
Sclerodermataceae	*Gyroporus* sp. REH8799	EU718106	EU718142			0	0
Sclerodermataceae	*Gyroporus subalbellus* OKM25477	EU718108	EU718144			0	0
Sclerodermataceae	*Phlebopus beniensis*		AY612822			0	0
Sclerodermataceae	*Phlebopus marginatus* MEL2145841		FJ600322			1	0
Sclerodermataceae	*Phlebopus portentosus*	EU718110	AF336260			0	0
Sclerodermataceae	*Phlebopus* sp. REH8795	EU718111	FJ153623			0	0
Sclerodermataceae	*Phlebopus sudanicus*		AF336261			0	0
Sclerodermataceae	*Pisolithus arhizus*		AF336262			0	0
Sclerodermataceae	*Pisolithus marmoratus*	AY318745				0	0
Sclerodermataceae	*Pisolithus* sp. ECV3205	EU718113	EU718147			0	0
Sclerodermataceae	*Pisolithus* sp. LJ30	AF270774				1	0
Sclerodermataceae	*Pisolithus* sp. MURU	AY179746				1	1
Sclerodermataceae	*Pisolithus* sp. PERTH4888		EU718177			1	0
Sclerodermataceae	*Pisolithus tinctorius* AWW219	EU718114	EU718148			0	0
Sclerodermataceae	*Scleroderma areolatum* AWW211	EU718115	EU718149			0	0
Sclerodermataceae	*Scleroderma areolatum* PBM2208	EU718116	EU718150			1	0
Sclerodermataceae	*Scleroderma bermudense* BZ3961	EU718118	DQ644137			0	0
Sclerodermataceae	*Scleroderma bovista*		AF336264			0	0
Sclerodermataceae	*Scleroderma cepa*		AF336265			1	0
Sclerodermataceae	*Scleroderma citrinum*		AF336266			0	0
Sclerodermataceae	*Scleroderma columnare*		AF261533			0	0
Sclerodermataceae	*Scleroderma dictyospora*		AF336267			0	0
Sclerodermataceae	*Scleroderma echinatum*		AF336268			0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Sclerodermataceae	*Scleroderma fuscum* Trappe26575		EU718178			0	0
Sclerodermataceae	*Scleroderma laeve* 27936	EU718120	DQ683003			0	0
Sclerodermataceae	*Scleroderma macalpinei* OSC24605	EU718122	DQ682999			1	1
Sclerodermataceae	*Scleroderma meridionale* AWW218	EU718121	EU718152			0	0
Sclerodermataceae	*Scleroderma polyrhizum* 594		DQ683000			0	0
Sclerodermataceae	*Scleroderma polyrhizum* AWW216	EU718123	EU718153			0	0
Sclerodermataceae	*Scleroderma* sp. Arora9917		EU718179			0	0
Sclerodermataceae	*Scleroderma* sp. Arora99193		DQ644136			0	0
Sclerodermataceae	*Scleroderma* sp. AWW260	EU718125	EU718155			0	0
Sclerodermataceae	*Scleroderma* sp. MCA2168		EU718180			0	0
Sclerodermataceae	*Scleroderma verrucosum*		AF336271			0	0
Sclerodermataceae	*Scleroderma xanthochroum* AWW254	EU718124	EU718154			0	0
Sclerodermataceae	*Tremellogaster surinamensis* MCA1985	EU718127	DQ534664			0	0
Sclerodermataceae	*Veligaster columnaris;*		AF336273			0	0
Cortinariaceae	AF389133 *Cortinarius iodes*	AF389133				0	0
Cortinariaceae	*Cortinarius acidophilus* O125826	AY669524				0	0
Cortinariaceae	*Cortinarius acutovelatus* TUB011513	AY669655				0	0
Cortinariaceae	*Cortinarius acutus* IB19980137	AF325578				0	0
Cortinariaceae	*Cortinarius alboserrulatus* CO1318	AY669620				0	0
Cortinariaceae	*Cortinarius alboviolaceus* IB19740181	AF325596				0	0
Cortinariaceae	*Cortinarius alboviolaceus* TUB011882	AY669657				0	0
Cortinariaceae	*Cortinarius aleuriosmus* TUB011840	AY669537				0	0
Cortinariaceae	*Cortinarius allutus* IB19940224	AF325585				0	0
Cortinariaceae	*Cortinarius allutus* TUB011841	AY669531				0	0
Cortinariaceae	*Cortinarius alnetorum* TUB01192	AY669695				0	0
Cortinariaceae	*Cortinarius amazonicus* IB12139	AF389129				0	0
Cortinariaceae	*Cortinarius amoenus* IB19930118	AF389160				0	0
Cortinariaceae	*Cortinarius amoenus* TUB011467	AF5397211				0	0
Cortinariaceae	*Cortinarius anomalus* IB19950138	AF325581				0	0
Cortinariaceae	*Cortinarius anomalus* TUB011883	AY669645				0	0
Cortinariaceae	*Cortinarius anserinus* TUB011459	AY174805				0	0
Cortinariaceae	*Cortinarius anthracinus* TUB01190	AY669670				0	0
Cortinariaceae	*Cortinarius aprinus* TUB01191	AY669663				0	0
Cortinariaceae	*Cortinarius archeri* PERTH05506395	AY669610				1	0
Cortinariaceae	*Cortinarius arcuatorum* TUB011421	AY174822				0	0
Cortinariaceae	*Cortinarius ardesiacus* HO 970419A0	AY669650				1	0
Cortinariaceae	*Cortinarius argutus* O60164	AY669535				0	0
Cortinariaceae	*Cortinarius argyronius* MD162	GQ890313				1	1

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Cortinariaceae	*Cortinarius armeniacus* IB19960124	AF325595				0	0
Cortinariaceae	*Cortinarius armillatus* TUB01193	AY669671				0	0
Cortinariaceae	*Cortinarius atrolazulinus* NZ8517	AF389131				0	0
Cortinariaceae	*Cortinarius aurantiorufus* TUB011291	AF539710				0	0
Cortinariaceae	*Cortinarius aureocalceolatus* TUB011842	AY669569				0	0
Cortinariaceae	*Cortinarius aureofulvus* TUB011831	AY669571				0	0
Cortinariaceae	*Cortinarius aureopulverulentus* TUB011843	AY669568				0	0
Cortinariaceae	*Cortinarius australiensis* AUS ACT72 567	AF389126				1	0
Cortinariaceae	*Cortinarius australis* HO A20420A0	AY669515				1	0
Cortinariaceae	*Cortinarius austrocinnabarinus* MEL2089674	GQ890321				1	0
Cortinariaceae	*Cortinarius austrocyanites* CO1034	AY669626				0	0
Cortinariaceae	*Cortinarius austroduracinus* TUB011522	AY669653				0	0
Cortinariaceae	*Cortinarius austrolimonius* var. *ochrovelatus* TUB011468	AF539706				0	0
Cortinariaceae	*Cortinarius austrosaginus* HO 980509A0	AY669619				1	0
Cortinariaceae	*Cortinarius austroturmalis* TUB011469	AF539730				0	0
Cortinariaceae	*Cortinarius austrovaginatus* HO 990125A1	AY669635				1	0
Cortinariaceae	*Cortinarius austrovenetus* MEL2089666	GQ890318				1	0
Cortinariaceae	*Cortinarius badiovinaceus* IB19950278	AF389152				0	0
Cortinariaceae	*Cortinarius balaustinus* IB20000143	AF389153				0	0
Cortinariaceae	*Cortinarius balaustinus* TUB011894	AY669693				0	0
Cortinariaceae	*Cortinarius balteatoalbus* O63269	AY669517				0	0
Cortinariaceae	*Cortinarius balteatoalbus* var. *areni silvis* O125960	AY669533				0	0
Cortinariaceae	*Cortinarius balteatocumatilis* TUB011440	AY174801				0	0
Cortinariaceae	*Cortinarius balteatus* TUB011844	AY669526				0	0
Cortinariaceae	*Cortinarius basipurpureus* PERTH04259629	AY669607				1	1
Cortinariaceae	*Cortinarius basirubescens* MEL2089702	GQ890319				1	0
Cortinariaceae	*Cortinarius basorapulus* KV621	GQ890309				1	1
Cortinariaceae	*Cortinarius belleri* TUB011895	AY669685				0	0
Cortinariaceae	*Cortinarius biformis* TUB011896	AY669688				0	0
Cortinariaceae	*Cortinarius bigelowii* Trappe4618	AF325617				0	1
Cortinariaceae	*Cortinarius bivelus* TUB011897	AY669682				0	0
Cortinariaceae	*Cortinarius bolaris* IB19990199	AF389169				0	0
Cortinariaceae	*Cortinarius bolaris* TUB0118524	AY669596				0	0
Cortinariaceae	*Cortinarius borgsjoeensis* O65492	AY669567				0	0
Cortinariaceae	*Cortinarius boudieri* TUB011402	AY174860				0	0
Cortinariaceae	*Cortinarius bovinus* TUB011898	AY669691				0	0
Cortinariaceae	*Cortinarius brunneus* IB19950084	AF325590				0	0
Cortinariaceae	*Cortinarius bulliardi* TUB011899	AY669659				0	0

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Cortinariaceae	*Cortinarius bulliardii* IB19920363	AF389154				0	0
Cortinariaceae	*Cortinarius caelicolor* TUB011470	AF539715				0	0
Cortinariaceae	*Cortinarius caeruleoburneus* HO 990311A4	AY669634				1	0
Cortinariaceae	*Cortinarius caerulescens* UL98 88	AY174863				0	0
Cortinariaceae	*Cortinarius caesibulga* KV660	GQ890310				1	1
Cortinariaceae	*Cortinarius caesiocanescens* TUB011847	AY669546				0	0
Cortinariaceae	*Cortinarius caesiocortinatus* TUB011400	AY174809				0	0
Cortinariaceae	*Cortinarius caesiostramineus* TUB011845	AY669519				0	0
Cortinariaceae	*Cortinarius cagei* TUB011514	AY669676				0	0
Cortinariaceae	*Cortinarius caligatus* TEB153 84	AY669553				0	0
Cortinariaceae	*Cortinarius callisteus* TUB011827	AY669594				0	0
Cortinariaceae	*Cortinarius calochrous* 19960143	AF325619				0	0
Cortinariaceae	*Cortinarius calochrous* TUB011398	AY174838				0	0
Cortinariaceae	*Cortinarius calochrous* var. *coniferarum* TUB011385	AY174842				0	0
Cortinariaceae	*Cortinarius candelaris* TUB011518	AY669675				0	0
Cortinariaceae	*Cortinarius caninus* TUB011884	AY669646				0	0
Cortinariaceae	*Cortinarius caperatus* TUB011913	AY669575				0	0
Cortinariaceae	*Cortinarius carneolus* TUB011471	AF539712				0	0
Cortinariaceae	*Cortinarius caroviolaceus* TUB011849	AY669559				0	0
Cortinariaceae	*Cortinarius catharinae* TUB011850	AY669560				0	0
Cortinariaceae	*Cortinarius cedretorum* TUB011851	AY669564				0	0
Cortinariaceae	*Cortinarius cephalixus* TUB011391	AY174786				0	0
Cortinariaceae	*Cortinarius cereifolius* TUB011426	AY174847				0	0
Cortinariaceae	*Cortinarius cervinus* TUB011472	AF539711				0	0
Cortinariaceae	*Cortinarius* cf. *submeleagris* HO990411A1	AY669638				1	0
Cortinariaceae	*Cortinarius chalybaeus* CO1342	AY669613				0	0
Cortinariaceae	*Cortinarius cinereobrunneus* IB19630258	AF325600				0	0
Cortinariaceae	*Cortinarius cinereoroseolus* KV610	GQ890314				1	1
Cortinariaceae	*Cortinarius cinnabarinus* TUB011508	AY669662				0	0
Cortinariaceae	*Cortinarius citrinus* TUB011449	AY174820				0	0
Cortinariaceae	*Cortinarius citriolens* IB19970154	AF325607				0	0
Cortinariaceae	*Cortinarius claricolor* TUB011852	AY669522				0	0
Cortinariaceae	*Cortinarius claroflavus* TUB011427	AY174852				0	0
Cortinariaceae	*Cortinarius clelandii* MEL2089677	GQ890322				1	0
Cortinariaceae	*Cortinarius coalescens* O125961	AY669552				0	0
Cortinariaceae	*Cortinarius coelopus HO* 990504A3	AY669640				1	0
Cortinariaceae	*Cortinarius collinitus* IB19960061	AF325565				0	0
Cortinariaceae	*Cortinarius collinitus* TUB011832	AY669588				0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Cortinariaceae	*Cortinarius columbinus* TUB011473	AF539735				0	0
Cortinariaceae	*Cortinarius corrosus* IB19880210	AF325618				0	0
Cortinariaceae	*Cortinarius corrosus* TUB011588	AY669562				0	0
Cortinariaceae	*Cortinarius corrugatus* IB2000544	AF325611				0	0
Cortinariaceae	*Cortinarius cotoneus* IB19860257	AF389168				0	0
Cortinariaceae	*Cortinarius cotoneus* TUB011826	AY669597				0	0
Cortinariaceae	*Cortinarius crassus* TUB011589	AY669544				0	0
Cortinariaceae	*Cortinarius cretax* CO1180	AY669622				0	0
Cortinariaceae	*Cortinarius croceocaeruleus* IB19930275	AF389143				0	0
Cortinariaceae	*Cortinarius croceocaeruleus* TUB011833	AY669590				0	0
Cortinariaceae	*Cortinarius cumatilis* TUB011417	AY174812				0	0
Cortinariaceae	*Cortinarius cupreorufus* TUB011418	AY174831				0	0
Cortinariaceae	*Cortinarius cyanites* TUB011885	AY669647				0	0
Cortinariaceae	*Cortinarius cycneus* NZ8644	AF389123				0	0
Cortinariaceae	*Cortinarius cystidiocatenatus* HO A20518A6	AY669651				1	0
Cortinariaceae	*Cortinarius delaportei* TUB011853	AY669534				0	0
Cortinariaceae	*Cortinarius delibutus* IB19860263	AF325580				0	0
Cortinariaceae	*Cortinarius delibutus* TUB011834	AY669587				0	0
Cortinariaceae	*Cortinarius dibaphus* TUB011437	AY174819				0	0
Cortinariaceae	*Cortinarius dionysae* TUB011450	AY174813				0	0
Cortinariaceae	*Cortinarius diosmus* TUB011886	AY669661				0	0
Cortinariaceae	*Cortinarius dulciolens* Horak NZ8635	AF325610				0	0
Cortinariaceae	*Cortinarius duracinus* IB19960695	AF389157				0	0
Cortinariaceae	*Cortinarius duracinus* TUB011517	AY669674				0	0
Cortinariaceae	*Cortinarius effundens* TUB011854	AY669601				0	0
Cortinariaceae	*Cortinarius elaiochrous* CO1335	AY669627				0	0
Cortinariaceae	*Cortinarius elaphinus* TUB011474	AF539725				0	0
Cortinariaceae	*Cortinarius elegantior* IB19980248	AF325622				0	0
Cortinariaceae	*Cortinarius elegantior* TUB011394	AY174851				0	0
Cortinariaceae	*Cortinarius elegantissimus* TUB011855	AY669565				0	0
Cortinariaceae	*Cortinarius emodensis* HKAS365 41	AY669576				0	0
Cortinariaceae	*Cortinarius erythraeus* PERTH05506727	AY669605				1	0
Cortinariaceae	*Cortinarius erythrinus* TUB011900	AY669690				0	0
Cortinariaceae	*Cortinarius erythrocephalus* MEL2089681	GQ890323				1	0
Cortinariaceae	*Cortinarius evernius* TUB011901	AY669686				0	0
Cortinariaceae	*Cortinarius favrei* IB19990627	AF325575				0	0
Cortinariaceae	*Cortinarius firmus* IB19990084	AF389163				0	0
Cortinariaceae	*Cortinarius flammuloides* TUB011475	AF539716				0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Cortinariaceae	*Cortinarius flavifolius* MTS4789	AF389166				0	0
Cortinariaceae	*Cortinarius flavofucatus* TUB011476	AF539709				0	0
Cortinariaceae	*Cortinarius flavovirens* TUB011454	AY174841				0	0
Cortinariaceae	*Cortinarius flexipes* TUB011903	AY669683				0	0
Cortinariaceae	*Cortinarius flexipes* var. *flabellus* TUB011902	AY669678				0	0
Cortinariaceae	*Cortinarius fraudulosus* IB19960696	AF325605				0	0
Cortinariaceae	*Cortinarius fraudulosus* TUB011870	AY669551				0	0
Cortinariaceae	*Cortinarius fulvo ochrascens* IB19970218	AF389139				0	0
Cortinariaceae	*Cortinarius fulvocitrinus* IB20000136	AF389141				0	0
Cortinariaceae	*Cortinarius fulvocitrinus* TUB011434	AY174828				0	0
Cortinariaceae	*Cortinarius fulvoconicus* TUB011525	AY669677				0	0
Cortinariaceae	*Cortinarius fulvoiubatus* HO 990427A5	AY669649				1	0
Cortinariaceae	*Cortinarius gentilis* IB19960825	AF325589				0	0
Cortinariaceae	*Cortinarius glaucopus* IB19990668	AF325604				0	0
Cortinariaceae	*Cortinarius glaucopus* TUB011397	AY174785				0	0
Cortinariaceae	*Cortinarius glaucopus* TUB011414	AY174787				0	0
Cortinariaceae	*Cortinarius glaucopus* var. *olivaceus* TUB011856	AY669523				0	0
Cortinariaceae	*Cortinarius globuliformis* Claridge2351	AF325582				1	1
Cortinariaceae	*Cortinarius globuliformis* PERTH05506719	AY669602				1	1
Cortinariaceae	*Cortinarius gracilior* TUB011857	AY669525				0	0
Cortinariaceae	*Cortinarius gymnopiloides* NZ68501	AF389147				0	0
Cortinariaceae	*Cortinarius haasii* TUB011858	AY669561				0	0
Cortinariaceae	*Cortinarius helvelloides* TUB011904	AY669684				0	0
Cortinariaceae	*Cortinarius helveolus* TUB011905	AY669667				0	0
Cortinariaceae	*Cortinarius hemitrichus* TUB011509	AY669680				0	0
Cortinariaceae	*Cortinarius hinnuleus* TUB011512	AY669665				0	0
Cortinariaceae	*Cortinarius humidicola* IB19970396	AF325594				0	0
Cortinariaceae	*Cortinarius icterinus* TUB011477	AF539720				0	0
Cortinariaceae	*Cortinarius illitus* IB1963414	AF389128				0	0
Cortinariaceae	*Cortinarius incisus* TUB011906	AY669656				0	0
Cortinariaceae	*Cortinarius infractus* IB19990669	AF389148				0	0
Cortinariaceae	*Cortinarius infractus* TUB011393	AY174782				0	0
Cortinariaceae	*Cortinarius infractus* TUB011396	AY174780				0	0
Cortinariaceae	*Cortinarius infractus* TUB011441	AY174781				0	0
Cortinariaceae	*Cortinarius infractus* var. *obscurocyaneus* TUB0118859	AY669536				0	0
Cortinariaceae	*Cortinarius ionochlorus* TUB011430	AY174834				0	0
Cortinariaceae	*Cortinarius iringa* CO1255	AY669624				0	0
Cortinariaceae	*Cortinarius junghuhnii* TUB011907	AY669660				0	0

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Cortinariaceae	*Cortinarius kaputarensis* KV603	GQ890308				1	1
Cortinariaceae	*Cortinarius kula* HO 980515A0	AY669643				1	0
Cortinariaceae	*Cortinarius lacteus* HO A20504A2	AY669642				1	0
Cortinariaceae	*Cortinarius laetus* IB19990518	AF389170				0	0
Cortinariaceae	*Cortinarius langei* TUB011860	AY669558				0	0
Cortinariaceae	*Cortinarius langei* TUB011861	AY669527				0	0
Cortinariaceae	*Cortinarius laniger* IB19990511	AF325592				0	0
Cortinariaceae	*Cortinarius laniger* TUB011521	AY669666				0	0
Cortinariaceae	*Cortinarius largus* TUB011455	AY669542				0	0
Cortinariaceae	*Cortinarius latobalteatus* TUB011862	AY669550				0	0
Cortinariaceae	*Cortinarius lavendulensis* PERTH05506735	AY669617				1	0
Cortinariaceae	*Cortinarius leucopus* IB19630078	AF325593				0	0
Cortinariaceae	*Cortinarius lignyotus* TUB011478	AF539718				0	0
Cortinariaceae	*Cortinarius limonius* IB19740328	AF325588				0	0
Cortinariaceae	*Cortinarius lividoochrascens* IB19960258	AF325565				0	0
Cortinariaceae	*Cortinarius lividus* TUB011479	AF539734				0	0
Cortinariaceae	*Cortinarius lustrabilis* TUB011835	AY669586				0	0
Cortinariaceae	*Cortinarius lustratus* UL98 92	AY174853				0	0
Cortinariaceae	*Cortinarius maculobulga* KV532	GQ890306				1	1
Cortinariaceae	*Cortinarius magellanicus* IB19630347	AF389125				0	0
Cortinariaceae	*Cortinarius magellanicus* TUB011480	AF539719				0	0
Cortinariaceae	*Cortinarius magnivelatus* Trappe20666	AF325615				0	1
Cortinariaceae	*Cortinarius maire* IB93 619	AY669548				0	0
Cortinariaceae	*Cortinarius malachius* TUB011887	AY669681				0	0
Cortinariaceae	*Cortinarius malicorius* TUB011819	AY669583				0	0
Cortinariaceae	*Cortinarius malvaceus* TUB011836	AY669611				0	0
Cortinariaceae	*Cortinarius meinhardii* TUB011443	AY174840				0	0
Cortinariaceae	*Cortinarius minoscaurus* CO1013	AY669628				0	0
Cortinariaceae	*Cortinarius mucosus* IB19910694	AF325574				0	0
Cortinariaceae	*Cortinarius multiformis* IB19800618	AF389135				0	0
Cortinariaceae	*Cortinarius multiformis* TUB011458	AY174844				0	0
Cortinariaceae	*Cortinarius multiformis* TUB011841	AY669531				0	0
Cortinariaceae	*Cortinarius mussivus* TUB011412	AY174814				0	0
Cortinariaceae	*Cortinarius myxoclaricolor* TUB011481	AF539733				0	0
Cortinariaceae	*Cortinarius nanceiensis* TUB011389	AY174855				0	0
Cortinariaceae	*Cortinarius nanceiensis* var. *bulbopodius* TUB011865	AY669520				0	0
Cortinariaceae	*Cortinarius nebulobrunneus* KV588	GQ890307				1	1
Cortinariaceae	*Cortinarius nymphicolor* TUB011866	AY669566				0	0

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
Cortinariaceae	*Cortinarius obsoletus* TUB011912	AY669549				0	0
Cortinariaceae	*Cortinarius odoratus* TUB011438	AY174836				0	0
Cortinariaceae	*Cortinarius odorifer* IB19920577	AF325620				0	0
Cortinariaceae	*Cortinarius odorifer* TUB011383	AY174817				0	0
Cortinariaceae	*Cortinarius olivaceobubalinus* TUB011483	AF539736				0	0
Cortinariaceae	*Cortinarius olivaceofuscus* TUB011820	AY669585				0	0
Cortinariaceae	*Cortinarius olivaceopictus* MEL2120743	GQ890316				1	0
Cortinariaceae	*Cortinarius ombrophilus* IB19630228	AF389149				0	0
Cortinariaceae	*Cortinarius orellanoides* IB19980157	AF389165				0	0
Cortinariaceae	*Cortinarius orellanus* IB19980580	AF389164				0	0
Cortinariaceae	*Cortinarius osmophorus* TUB011399	AY174815				0	0
Cortinariaceae	*Cortinarius pachynemeus* AH13475	AF539727				0	0
Cortinariaceae	*Cortinarius paleaceus* IB19980139	AF389156				0	0
Cortinariaceae	*Cortinarius palustris* var. *sphagneti* TUB011821	AY669581				0	0
Cortinariaceae	*Cortinarius papulosus* TUB011867	AY669555				0	0
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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
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Cortinariaceae	*Rozites caperatus* IB19990888	AF325614				0	0
Cortinariaceae	*Thaxterogaster albocanus* Halling5832	AF325599				0	1

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Lineage	Taxon	ITS	LSU	rpb2	tef1a	Australian	Sequestrate
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Cortinariaceae	*Thaxterogaster violaceum* DAOM198883	AF325556				0	1

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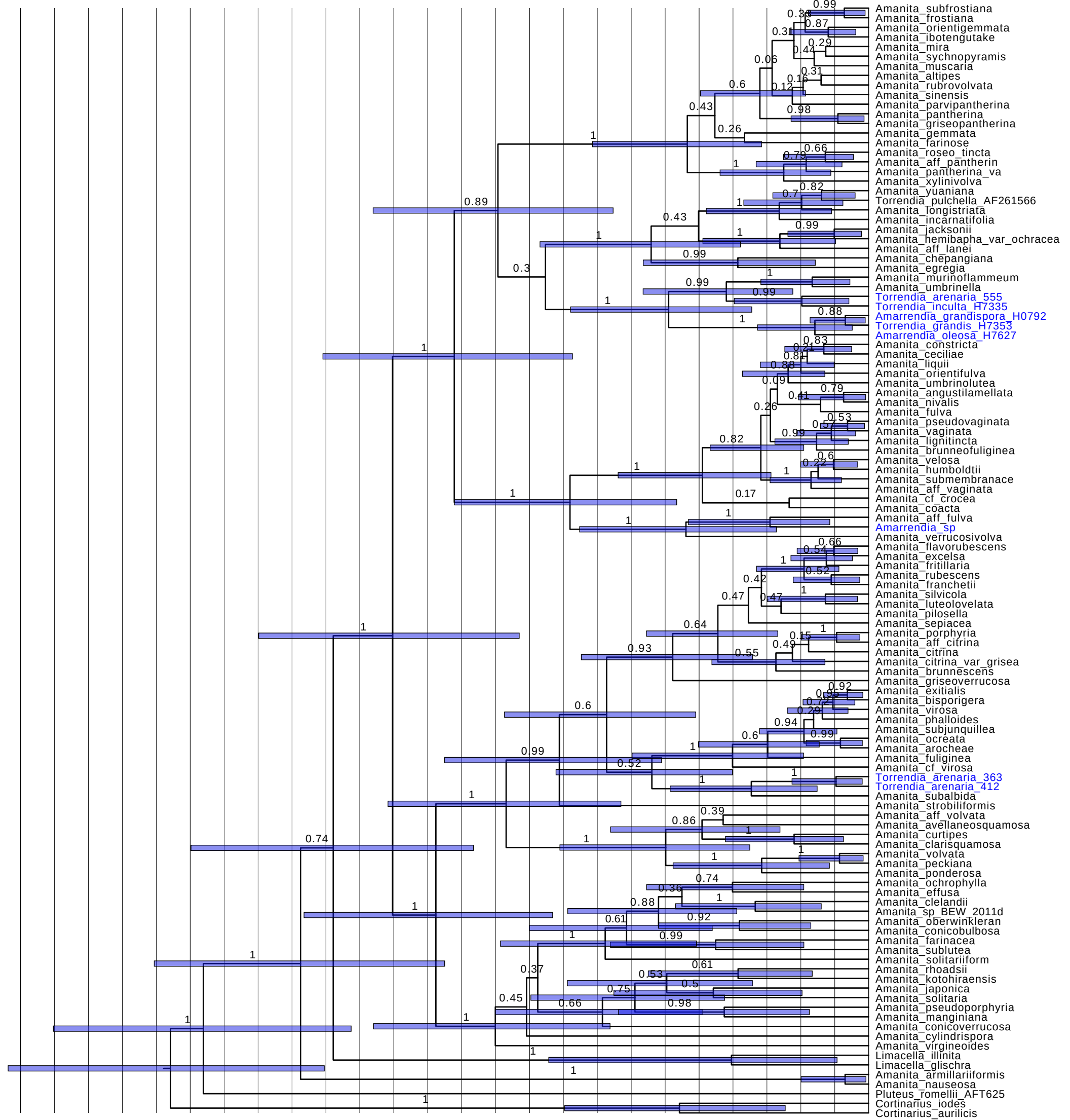
doi:10.1071/SB16025_AC

Fig. S1. Dated phylogenies reconstructed for nine lineages (includes 95% highest posterior densities around node ages and posterior probabilities; coloured labels indicate Australian sequestrate taxa)

.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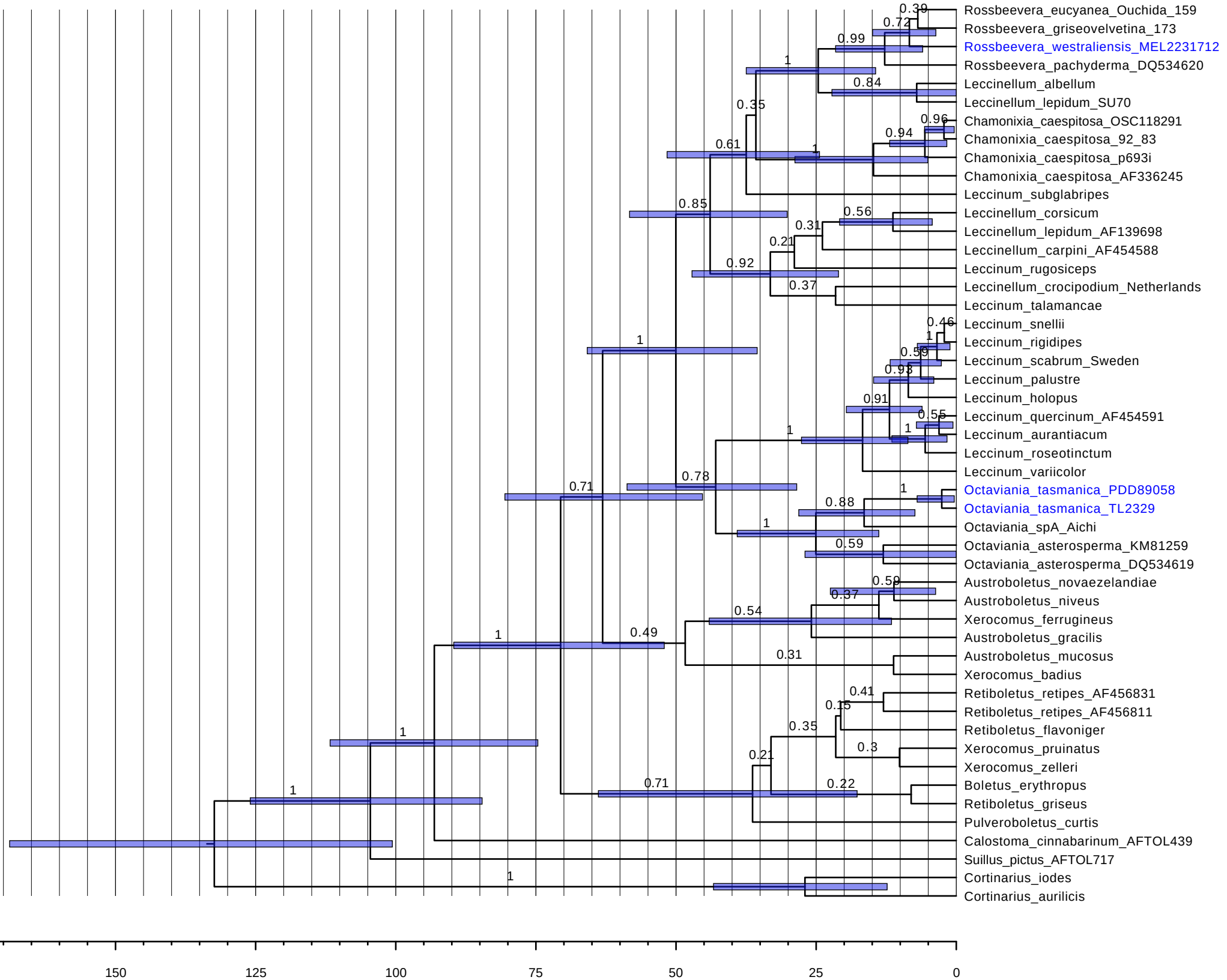
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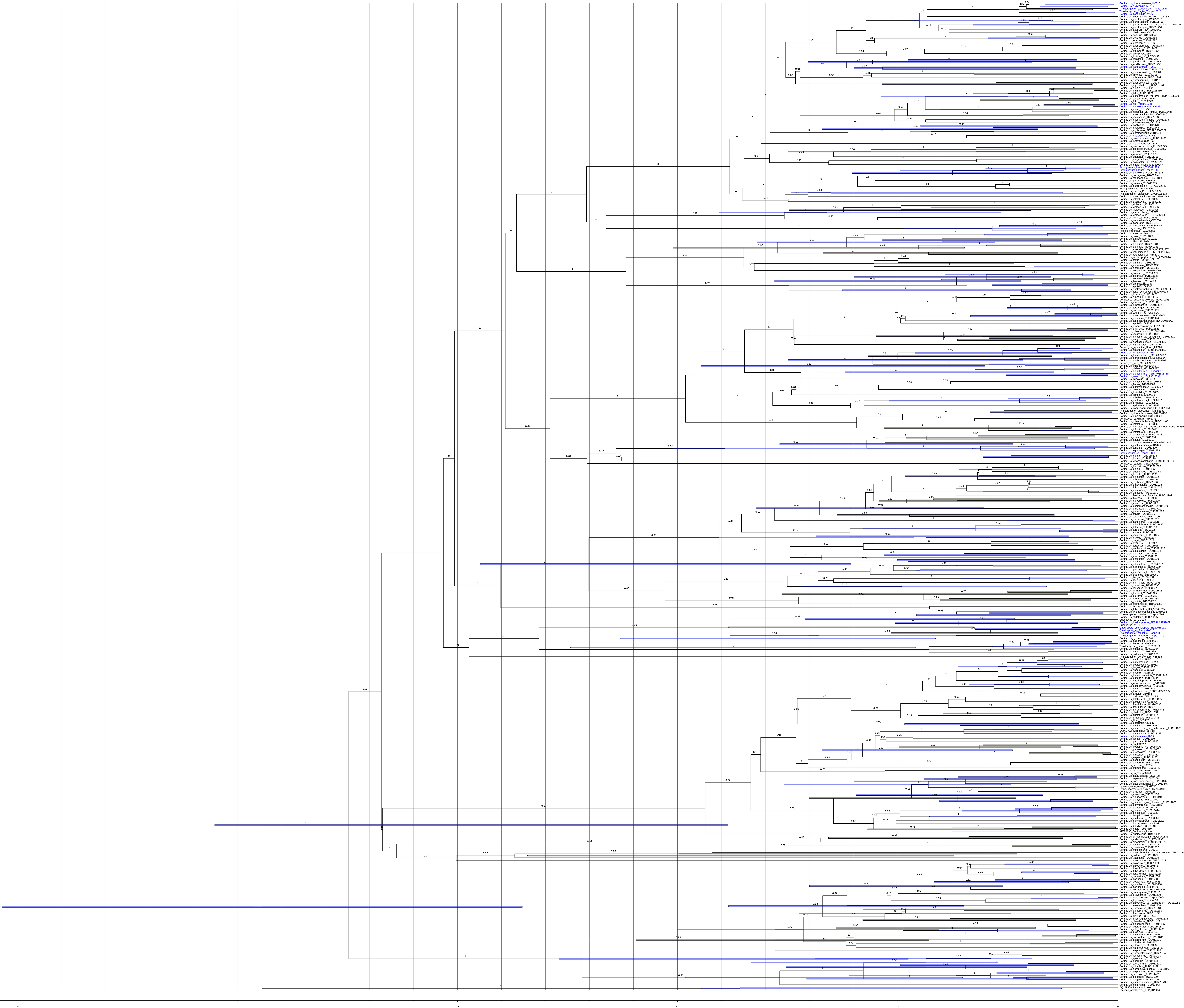

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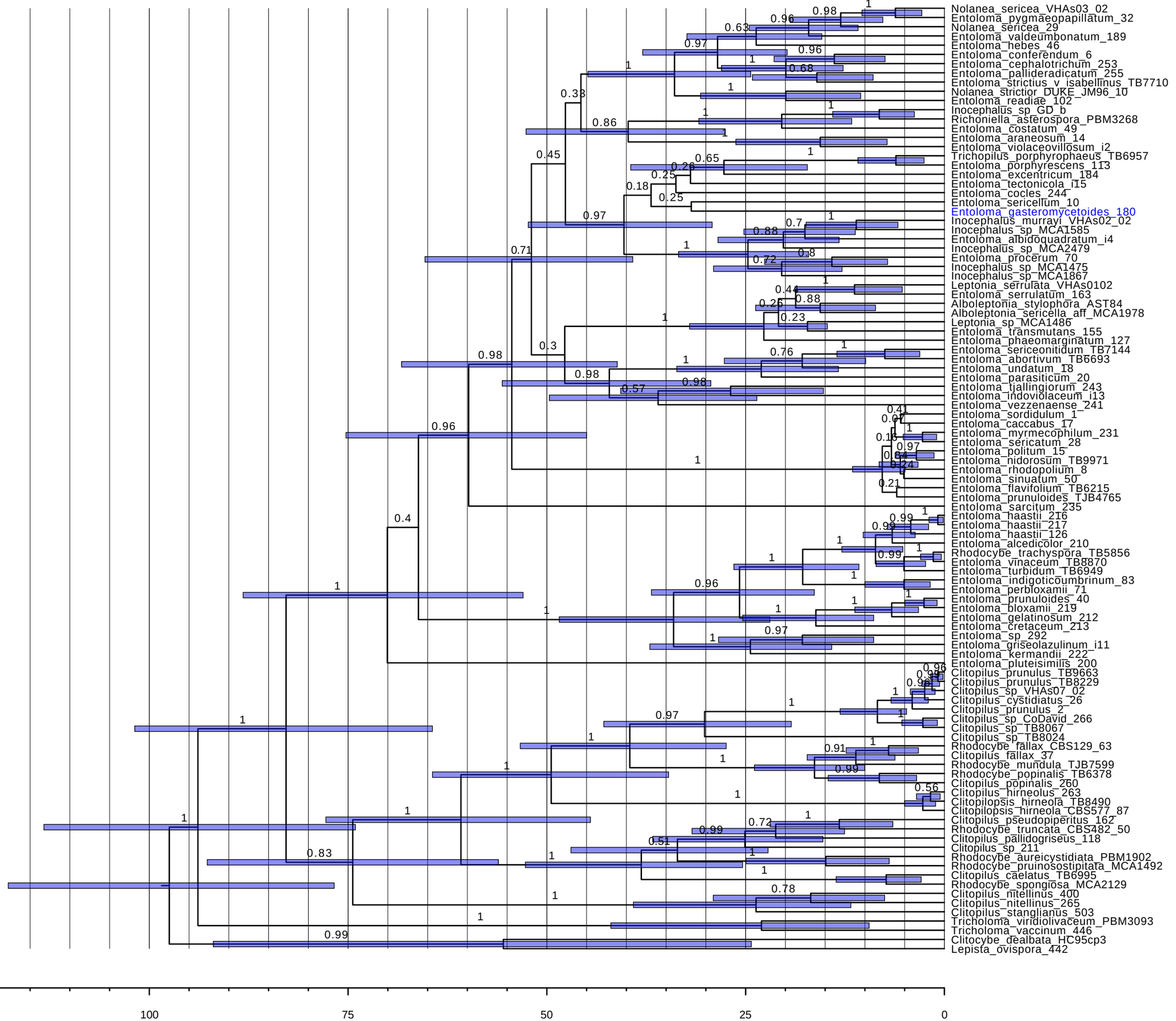
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Clitopilus_sp_TB8067
Clitopilus_sp_TB8024
Rhodocybe_fallax_CBS129_63
Clitopilus_fallax_37
Rhodocybe_mundula_TJB7599
Rhodocybe_popinalis_TB6378
Clitopilus_popinalis_260
Clitopilus_hirneolus_263
Clitopilopsis_hirneola_TB8490
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Clitopilus_pseudopiperitus_162
Rhodocybe_truncata_CBS482_50
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Clitopilus_sp_211
Rhodocybe_aureicystidiata_PBM1902
Rhodocybe_pruinosostipitata_MCA1492
Clitopilus_caelatus_TB6995
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Clitopilus_stanglianus_503
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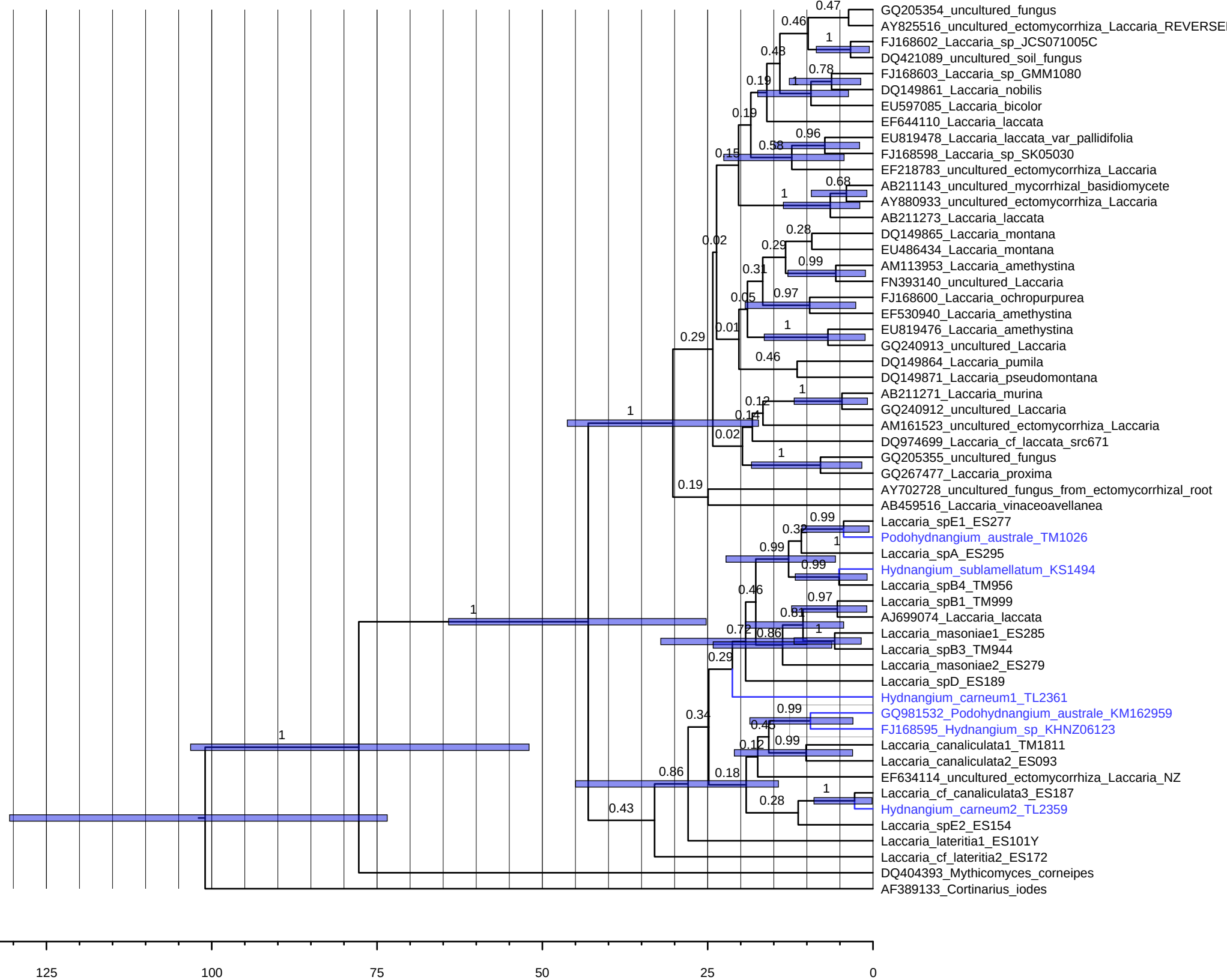
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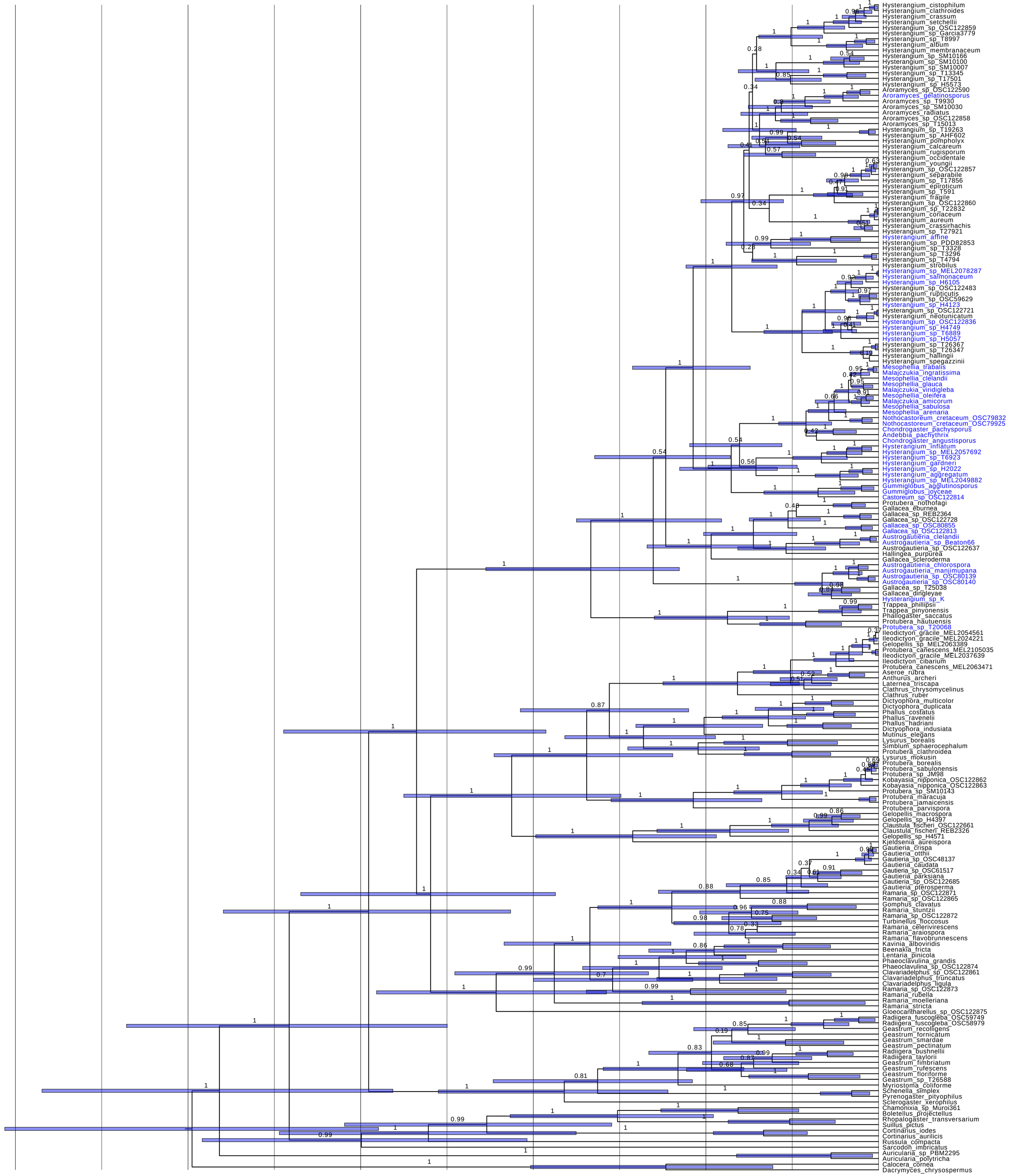
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Phallus_hadriani
Dictyophora_indusiata
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Rhopalogaster_transversarium
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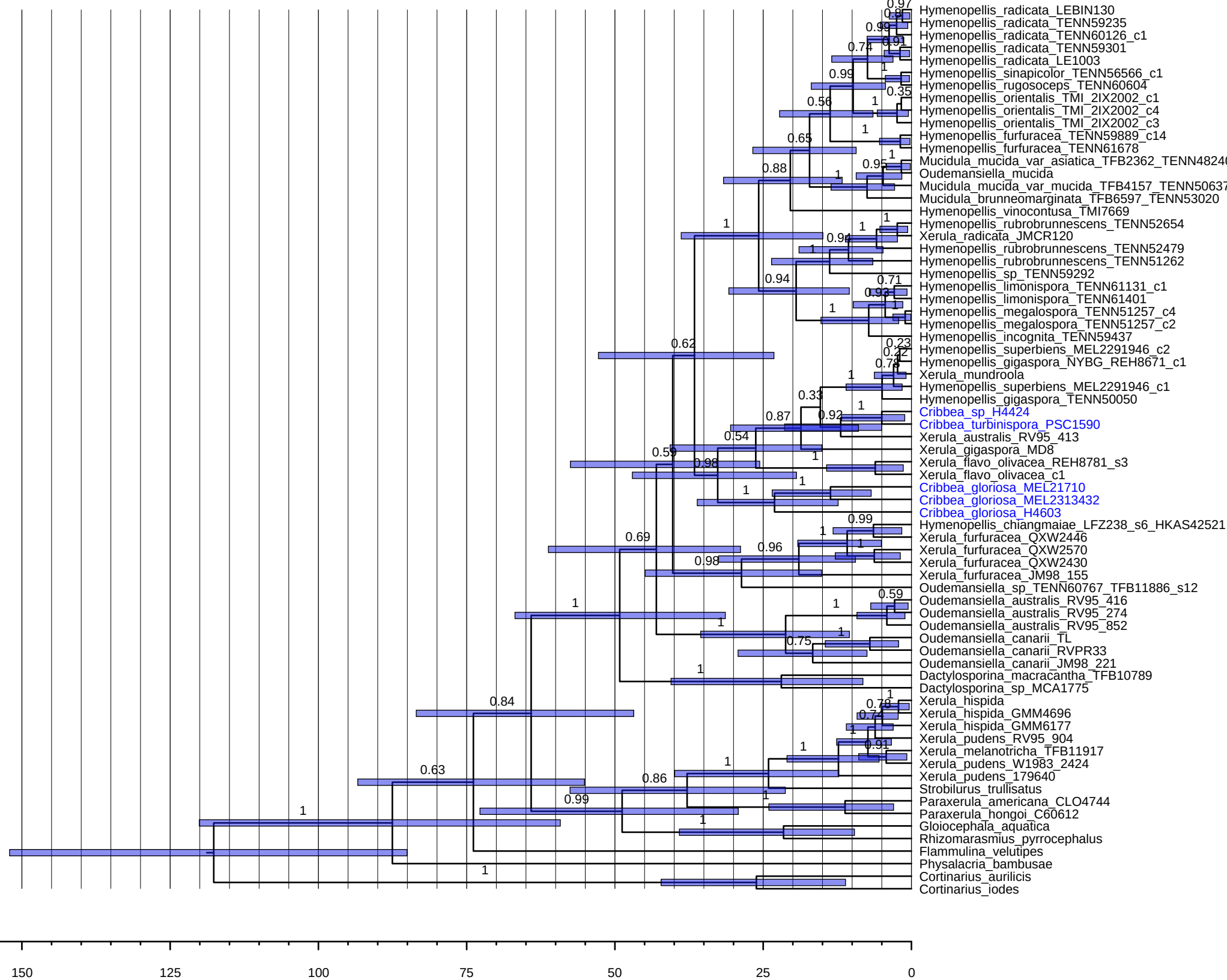
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Hymenopellis_sp_TENN59292
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Hymenopellis_megalospora_TENN51257_c2
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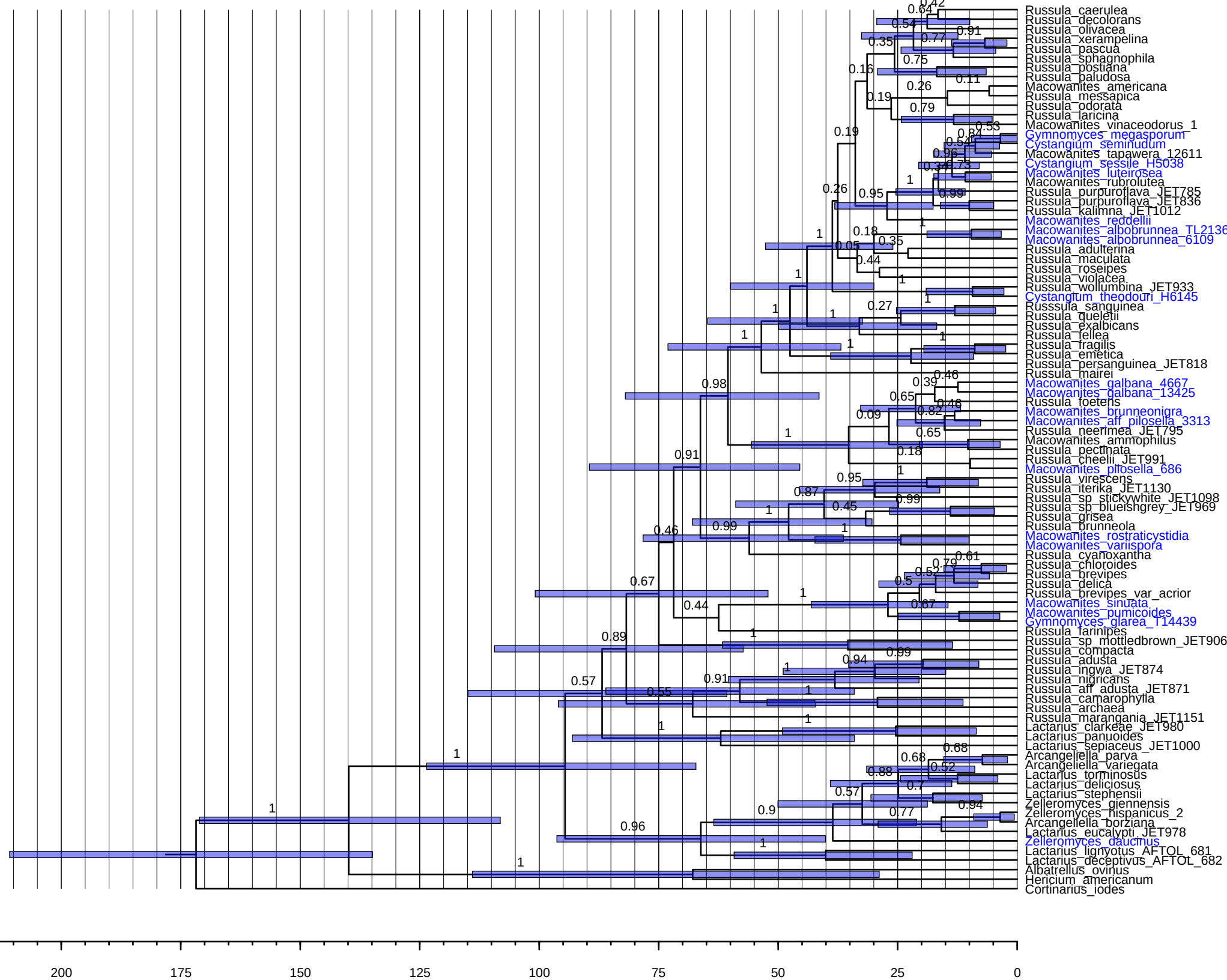
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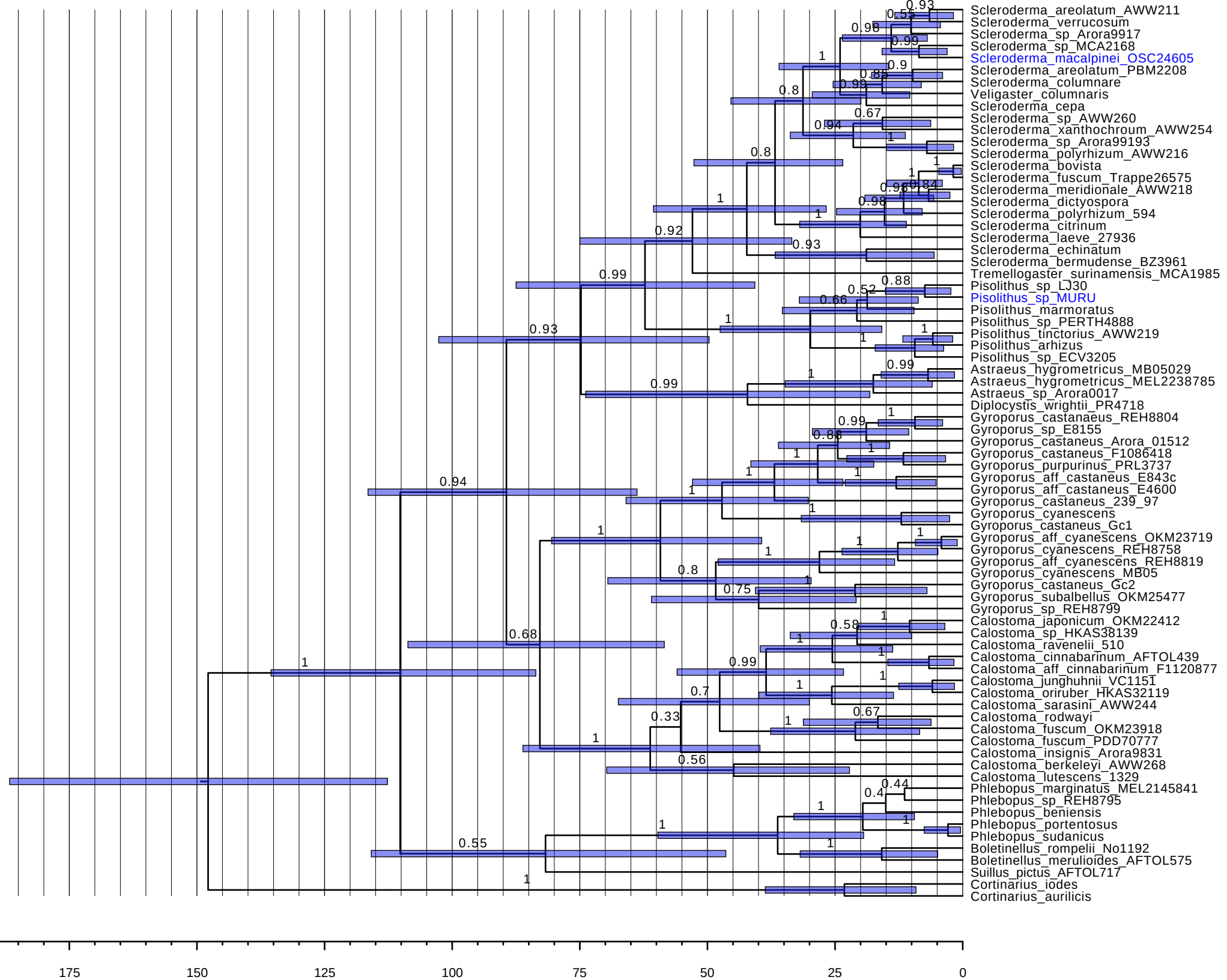
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Cortinarius_iodes
Cortinarius_aurilicis
175
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Box S1. Text of the custom R function used to read the data

```
#library(ape)

#library(laser)

### Function to read data ###
read_files<-function(treeFiles,dataFiles) {
   TreesData <- list()
   i<-1

   for (k in 1:length(treeFiles)) {
         cat ('#######\nReading tree from "',treeFiles[k],'".\n')
         TreesData[[i]] <- list()

         TreesData[[i]][[1]] <- read.nexus(treeFiles[k])

         cat ('Reading data from "',dataFiles[k],'".\n')

         names(TreesData[[i]])[1] <- 'tree'

         temp <- read.csv(dataFiles[k],header=T,row.names=1)

         temp_ordered <- c()
         austral_ordered <- c()

         for (l in 1:length(TreesData[[i]][[1]]$tip.label)) {
            printed <- FALSE
            for(j in 1:length(row.names(temp))) {
                  if (TreesData[[i]][[1]]$tip.label[l] == row.names(temp)[j]) {
                     #print(temp[j,])
                     temp_ordered[l]<-temp[j,1]
                     austral_ordered[l]<-temp[j,2]
                     printed <- TRUE
                  }
            }
            if (!printed) cat('Found no match for ',TreesData[[i]][[1]]$tip.label[l],' in the data!\n')
         }
         TreesData[[i]][[2]] <- temp_ordered

         names(TreesData[[i]])[2] <- 'data'

         ### Make star tree
         temp<-TreesData[[i]][[1]]
         x<-0
         j<-1
         while(1) {
            x<-x+temp$edge.length[j]
            if (temp$edge[j,2] <= length(temp$tip.label)) break
            j<-j+1
         }
         j<-0
         for (j in 1:length(temp$edge.length)) {
            if ( temp$edge[j,2] <= length(temp$tip.label) ) {
                  temp$edge.length[j] <- x
            }
            else {
                  temp$edge.length[j] <- 0.0001
            }
         }
```

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```
            TreesData[[i]][[3]] <- temp

            names(TreesData[[i]])[3] <- 'starTree'

            ### Nodes that are Austral with uncertain included, Austral should be coded as 1
            #print(austral_ordered)
            #print(nodes_with_trait_value(TreesData[[i]]$tree,austral_ordered))
            TreesData[[i]][[4]] <- nodes_with_trait_value(TreesData[[i]]$tree,austral_ordered) # clades to include for rate
change

            names(TreesData[[i]])[4] <- 'includeNodes'

            ### Nodes that are Austral with uncertain excluded
            TreesData[[i]][[5]] <- nodes_with_trait_value(TreesData[[i]]$tree,austral_ordered,max=F)

            names(TreesData[[i]])[5] <- 'includeNodesStrict'

            i <- i+1
    }
    return(TreesData)
}

### Function to calculate the likelihood when having a multiplier for branches at supplied nodes (the number gives the
end node of the branch to multiply the length for) ###
two_rates_full<- function ( multiplier, x, phy, model, height, included_clades = NA, excluded_nested_clades = NA,
included_nested_clades = NA, included_nodes = NA ) {
    if (multiplier < 0.00000001 ) return(-Inf) # lower values may give problems with zero length branches
    ### Get which branch lengths should be multiplied
    if (length(included_nodes)>1 || (length(included_nodes)==1 && !is.na(included_nodes))) included_clades <-
included_nodes
    else {
            if (is.null(included_clades)) cat("NULL value for provided clades!\n")
       if (length(included_clades)<2 && (is.null(included_clades) || is.na(included_clades))) included_clades[1] <-
phy$edge[1,1]
       for ( i in 1:length(phy$edge[,1])) {
          if (phy$edge[i,1] %in% included_clades) included_clades[length(included_clades)+1] <- phy$edge[i,2]
       }
       # This will exclude non-Austral clades nested in Austral clades
       if (length(excluded_nested_clades)<2 && !is.na(excluded_nested_clades)) { # No need to do this if no clades are
given
          for ( i in 1:length(phy$edge[,1])) { # Check for nested clades
             if (phy$edge[i,1] %in% excluded_nested_clades & !(phy$edge[i,2] %in% included_nested_clades))
excluded_nested_clades[length(excluded_nested_clades)+1] <- phy$edge[i,2]
          }
          # Exclude the clades by setting them to 0
          for (i in 1:length(included_clades)) for(j in 1:length(excluded_nested_clades)) if (included_clades[i] ==
excluded_nested_clades[j]) included_clades[i]<-0
       }
            #print(included_clades)
    }
    tree<-phy
    for (i in 1:length(phy$tip.label)) {
       tempb <- height
       target <- i
       while (tempb>0) {
          j<-1
          while (1) {
             if (target %in% included_clades) {
                if (tree$edge[j,2] == target) {
```

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```
                if (tree$edge.length[j]!=phy$edge.length[j]) {
                   tempb <- -1
                   break
                }
                tempb<-tempb-tree$edge.length[j]
                if (tempb>0) {
                   tree$edge.length[j]<-tree$edge.length[j]*multiplier
                   target <- tree$edge[j,1]
                   j<-1
                }
                else {
                   tree$edge.length[j] <- ((tree$edge.length[j]+tempb)*multiplier)-tempb
                   break
                }
             }
             else if (j < length(tree$edge[,1])) j<-j+1
             else {
                tempb <- -1
                break
             }
          }
          else {
             tempb <- -1
             break
          }
       }
    }
  }
  return_object<-list()
  return_object$tree<-tree
  scale_factor<-(100/max(tree$edge.length))
  tree$edge.length<-tree$edge.length*scale_factor #All branches are scaled to the longest branch length, which is set to
100

  ace(x,tree,type="discrete",model=model)->ace_result
  return_object$rate<-ace_result$rates*scale_factor
  return_object$loglik<-ace_result$loglik
  return (return_object)
}

### Function to use when optimizing only the multiplier at a given height ###
two_rates<- function ( multiplier, DataList, model, height, separateClades = FALSE, strict=FALSE ) {
  LogLik <- 0
  for (i in 1:length(DataList)) {
        if (separateClades) {
           if (strict) includeNodes<-DataList[[i]]$includeNodes else
                 includeNodes<-DataList[[i]]$includeNodesStrict
           LogLik <- LogLik + two_rates_full( multiplier, DataList[[i]]$data, DataList[[i]]$tree, model, height,
included_nodes=includeNodes)$loglik
        }
        else
           LogLik <- LogLik + two_rates_full( multiplier, DataList[[i]]$data, DataList[[i]]$tree, model, height)$loglik
  }
  return(LogLik)
}

### Function to use when optimizing both height and multiplier
two_rates_rate_height<- function ( a, DataList, model, separateClades = FALSE, strict=FALSE ) {
  LogLik <- 0
  for (i in 1:length(DataList)) {
```

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```
      if (separateClades) {
         if (strict) includeNodes<-DataList[[i]]$includeNodes else
            includeNodes<-DataList[[i]]$includeNodesStrict
         LogLik <- LogLik + two_rates_full( a[1], DataList[[i]]$data, DataList[[i]]$tree, model, a[2],
included_nodes=includeNodes)$loglik
          }
          else LogLik <- LogLik + two_rates_full(a[1], DataList[[i]]$data, DataList[[i]]$tree, model, a[2])$loglik
   }
   return(LogLik)
}

### Function to reconstruct ancestral state using parsimony and return the number for the nodes that have a specific value
### If max set to true (default) uncertain nodes will be regarded as having the value, if false they will be regarded as not
having the value
nodes_with_trait_value<-function(tree,characters,value=1,max=TRUE){
   nodes<-list()
   for (i in 1:length(characters)) nodes[[i]]<-characters[i]
   nodes_with_both_ancestors<-1
   count<-0
   while (length(nodes_with_both_ancestors)>0 && !is.na(nodes_with_both_ancestors)) {
          count<-count+1
          nodes_with_trait<-is_not_null_in_list(nodes)
          nodes_with_both_ancestors<-tree$edge[tree$edge[,2] %in%
nodes_with_trait,1][duplicated(tree$edge[tree$edge[,2] %in% nodes_with_trait,1])]
          nodes_with_both_ancestors<-nodes_with_both_ancestors[!(nodes_with_both_ancestors %in%
nodes_with_trait)]
          if (length(nodes_with_both_ancestors)<1) break
          for(i in 1:length(nodes_with_both_ancestors)) {
             childs<-tree$edge[tree$edge[,1]==nodes_with_both_ancestors[i],2]
             if (length(childs)<2 || is.null(childs[1]) || is.null(childs[2]) || is.na(childs[1])) cat('Error no children at ',i,', ',
nodes_with_both_ancestors[i],'.\n')
             if (length(nodes)<1) cat('Error in length of nodes.\n')
             if (childs[1] > length(nodes)) {
                   cat ('Error child number too large at ',i,', ', nodes_with_both_ancestors[i],', ',childs[1], ', ', length(nodes),
', ', count,'.\n')
                   print (nodes)
             }
             if (childs[2] > length(nodes)) {
                   cat ('Error child number too large at ',i,', for node ', nodes_with_both_ancestors[i],', with ',childs[2], ', ',
length(nodes), ', ', count, '.\n')
                   print (nodes)
             }
             nodes[[nodes_with_both_ancestors[i]]]<-vector()
             if (length(intersect(nodes[[childs[1]]],nodes[[childs[2]]]))>0) {
                   nodes[[nodes_with_both_ancestors[i]]]<-intersect(nodes[[childs[1]]],nodes[[childs[2]]])} else {
                      nodes[[nodes_with_both_ancestors[i]]]<-union(nodes[[childs[1]]],nodes[[childs[2]]]) }
                   #cat('Data ',nodes[[childs[1]]],' | ',nodes[[childs[2]]],' | ',nodes_with_both_ancestors[i],'\n')
          }
   }
   fitch_second_pass(tree,tree$edge[1,1],nodes)
   if(max) return(is_value_in_list(nodes,value))
   else return(is_value_unique_in_list(nodes,value))
}

### Assign the value of the ancestor if it is a possible value
fitch_second_pass<-function(tree,node,character_list) {
   if (node <= (tree$Nnode+length(tree$tip.lable))) {
          ancestor<-tree$edge[tree$edge[,2]==nodes_with_both_ancestors[i],2]
          if (ancestor && length(character_list[[node]])>1) {
```

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```
            if (intersect(character_list[[node]],character_list[[ancestor]])) character_list[[node]]<-
intersect(character_list[[node]],character_list[[ancestor]])
        }
        childs<-tree$edge[tree$edge[,1]==nodes_with_both_ancestors[i],2]
        if (childs){
            fitch_second_pass(tree,child[1],character_list)
            fitch_second_pass(tree,child[2],character_list)
        }
    }
    return(character_list)
}

### Returns which elements (index) in a list that are not null
is_not_null_in_list<-function(a_list){
    x<-c()
    for(i in 1:length(a_list)) if(!is.null(a_list[[i]])) x[length(x)+1]<-i
    return(x)
}

### Returns which elements in a list that have a vector containing the value
is_value_in_list<-function(a_list,value){
    x<-c()
    for(i in 1:length(a_list)) if (value %in% a_list[[i]]) x[length(x)+1]<-i
    return(x)
}

### Returns which elements in a list for which the vector only have the value
is_value_unique_in_list<-function(a_list,value){
    x<-c()
    for(i in 1:length(a_list)) if (setequal(value,a_list[[i]])) x[length(x)+1]<-i
    return(x)
}

########################################
```

Box S2. Text of the custom R script used for the analyses

```
library(ape)

library(laser)

### Read the functions
source("R_functions.txt")

### Read the trees and data
### Give the names of the tree files in a vector
treeFiles <- c("Amanitaceae.trees","Entolomataceae.trees","Rossbeevera.trees")
### Give the name of the data files. They should be comma separated with species name as it appear in the tree in the
first column, the sequestrate/non-sequestrate character in the second column, and Austral/non-Austral in the third column.
It only cares about data for the tips in the tree, so all data can be placed in the same file, but the file name needs to be
repeated and in the same position as in the vector for tree files. There should be headers for the columns.
dataFiles <- c("data.csv","data.csv","data.csv")

### Read the data
TreesData <- read_files(treeFiles,dataFiles)

### Check data by plotting each tree
x<-1 # change this to check the different trees
plot(TreesData[[x]]$tree,no.margin=T)
nodelabels()
### Check if the reconstruction of the Austral clades is correct
```

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```
### The tips
TreesData[[x]]$tree$tip.label[TreesData[[x]]$includeNodes[TreesData[[x]]$includeNodes <
length(TreesData[[x]]$tree$tip.label)]]
### Uncertain nodes reconstructed as Austral
TreesData[[x]]$includeNodes[TreesData[[x]]$includeNodes > length(TreesData[[x]]$tree$tip.label)]
### Uncertain nodes reconstructed as not Austral
TreesData[[x]]$includeNodesStrict[TreesData[[x]]$includeNodesStrict > length(TreesData[[x]]$tree$tip.label)]

### 1. Uniform rate ###
MLuniform <- 0
for (i in 1:length(TreesData)) {
   TreesData[[i]]$uniform <- ace(TreesData[[i]]$data,TreesData[[i]]$tree,type="discrete",model=matrix(c(0,0,1,0),2,2))
   MLuniform <- MLuniform + (TreesData[[i]]$uniform)$loglik
}
print(MLuniform) # This should be the same as the sum when running each separately

### 2. Without evolution (star tree) ###
MLstar <- 0
for (i in 1:length(TreesData)) {
   TreesData[[i]]$star <- ace(TreesData[[i]]$data,TreesData[[i]]$starTree,type="discrete",model=matrix(c(0,0,1,0),2,2))
   MLstar <- MLstar + (TreesData[[i]]$star)$loglik
}
print(MLstar) # This should be the same as the sum when running each separately

### 3a. Rate change 32Myr ago in Australia, uncertain nodes as Austral ###
OptimAt32Ma <- optimize(two_rates,c(0,500),DataList=TreesData,model=matrix(c(0, 0, 1,
0),2),height=32,separateClades = T,maximum=T)
print(OptimAt32Ma)

### 3b. Rate change 32Myr ago in Australia, uncertain nodes as non-Austral ###
OptimAt32MaMin <- optimize(two_rates,c(0,500),DataList=TreesData,model=matrix(c(0, 0, 1,
0),2),height=32,separateClades = T,strict=T,maximum=T)
print(OptimAt32MaMin)

### 4a. Rate change at some time in Australia, uncertain nodes as Austral ###
OptimVarAge <- optim(c(1,32),two_rates_rate_height,DataList=TreesData,model=matrix(c(0, 0, 1,
0),2),separateClades=T,control=list(fnscale=-1))
print(OptimVarAge)

### Check if the right branches are extended for different clades
x<-1 # change this to check the different trees
two_rates_full(OptimVarAge$par[1],TreesData[[x]]$data,TreesData[[x]]$tree,matrix(c(0, 0, 1,
0),2),OptimVarAge$par[2],included_nodes=TreesData[[x]]$includeNodes)->temp
plot(temp$tree,no.margin=T)

### 4b. Rate change at some time in Australia, uncertain nodes as non-Austral ###
OptimVarAgeMin <- optim(c(1,32),two_rates_rate_height,DataList=TreesData,model=matrix(c(0, 0, 1,
0),2),separateClades=T,strict=T,control=list(fnscale=-1))
print(OptimVarAgeMin)

### Check if the right branches are extended for different clades
x<-1 # change this to check the different trees
two_rates_full(OptimVarAgeMin$par[1],TreesData[[x]]$data,TreesData[[x]]$tree,matrix(c(0, 0, 1,
0),2),OptimVarAgeMin$par[2],included_nodes=TreesData[[x]]$includeNodes)->temp
plot(temp$tree,no.margin=T)

### 5. Rate change at some time globally ###
OptimVarAgeGlobal <- optim(c(1,32),two_rates_rate_height,DataList=TreesData,model=matrix(c(0, 0, 1,
0),2),separateClades=F,control=list(fnscale=-1))
print(OptimVarAgeGlobal)
```

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```
### 6. Likelihood gradient from 1 to 64Myr ago ###
LogLikGrad <- c()
MaxAge<-64 # You may want to increase this

for(i in 1:MaxAge) {
   LogLikGrad[i]<-optimize(two_rates,c(0,500),DataList=TreesData,model=matrix(c(0, 0, 1,
0),2),height=i,separateClades = T,maximum=T)$objective
}
### Look at the result in a graph with the ML marked with a solid red vertical line, and two log-likelihood units below
this marked with a dashed horizontal line
plot(1:MaxAge,LogLikGrad,type='l',no.margin=F,xlab='Myr',ylab='Log Likelihood')
abline(v=OptimVarAge$par[2],col='red')
abline(h=(OptimVarAge$value-2),col='red',lty=3)
```