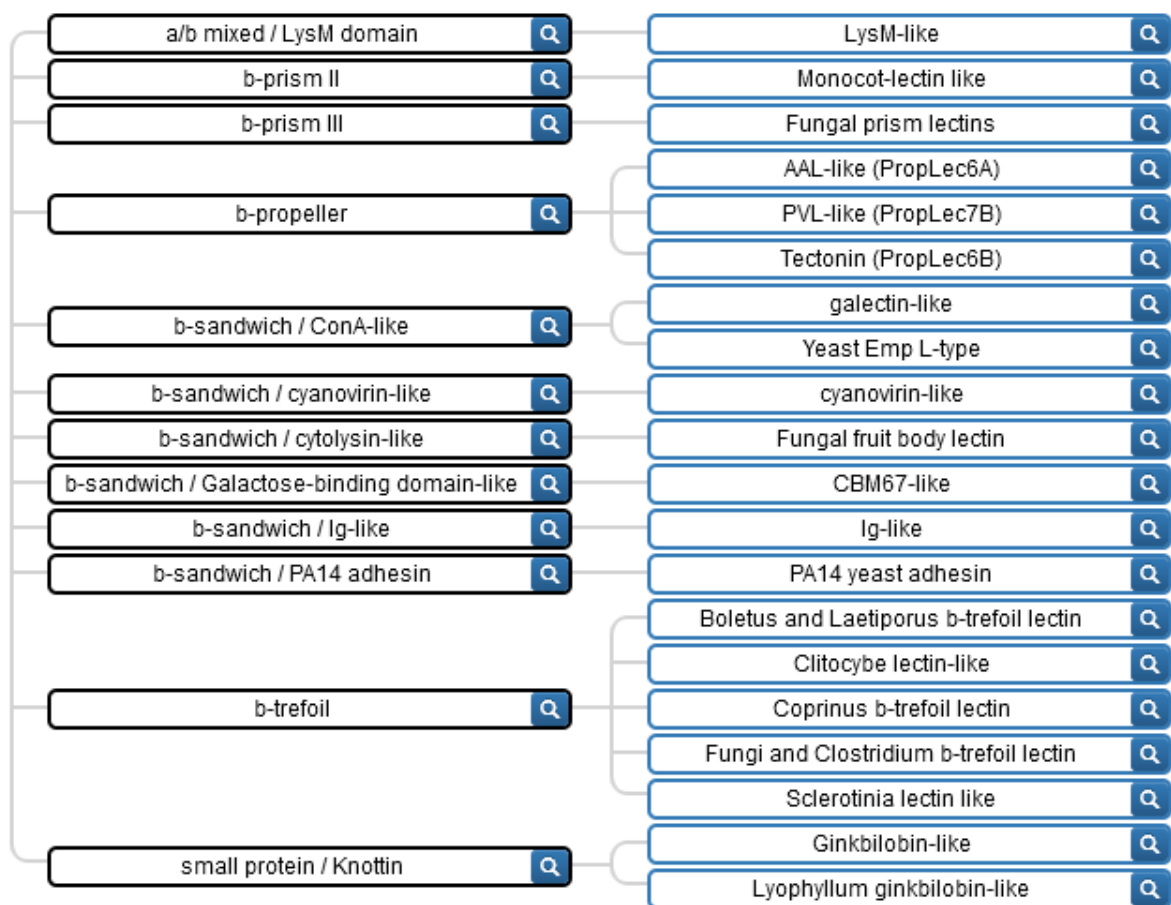


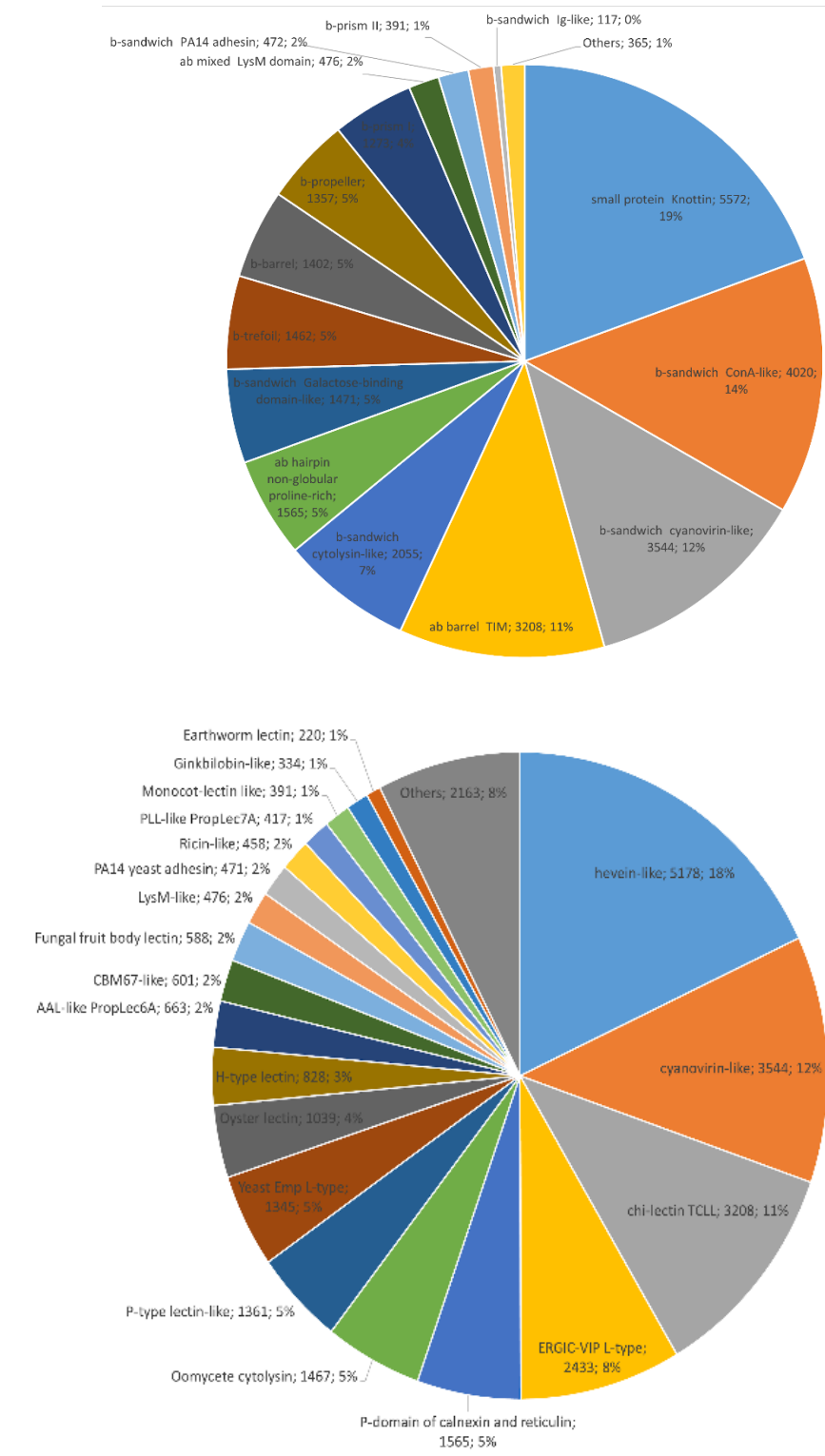
## Supplementary data

### A Comprehensive Phylogenetic and Bioinformatics Survey of Lectins in the Fungal kingdom

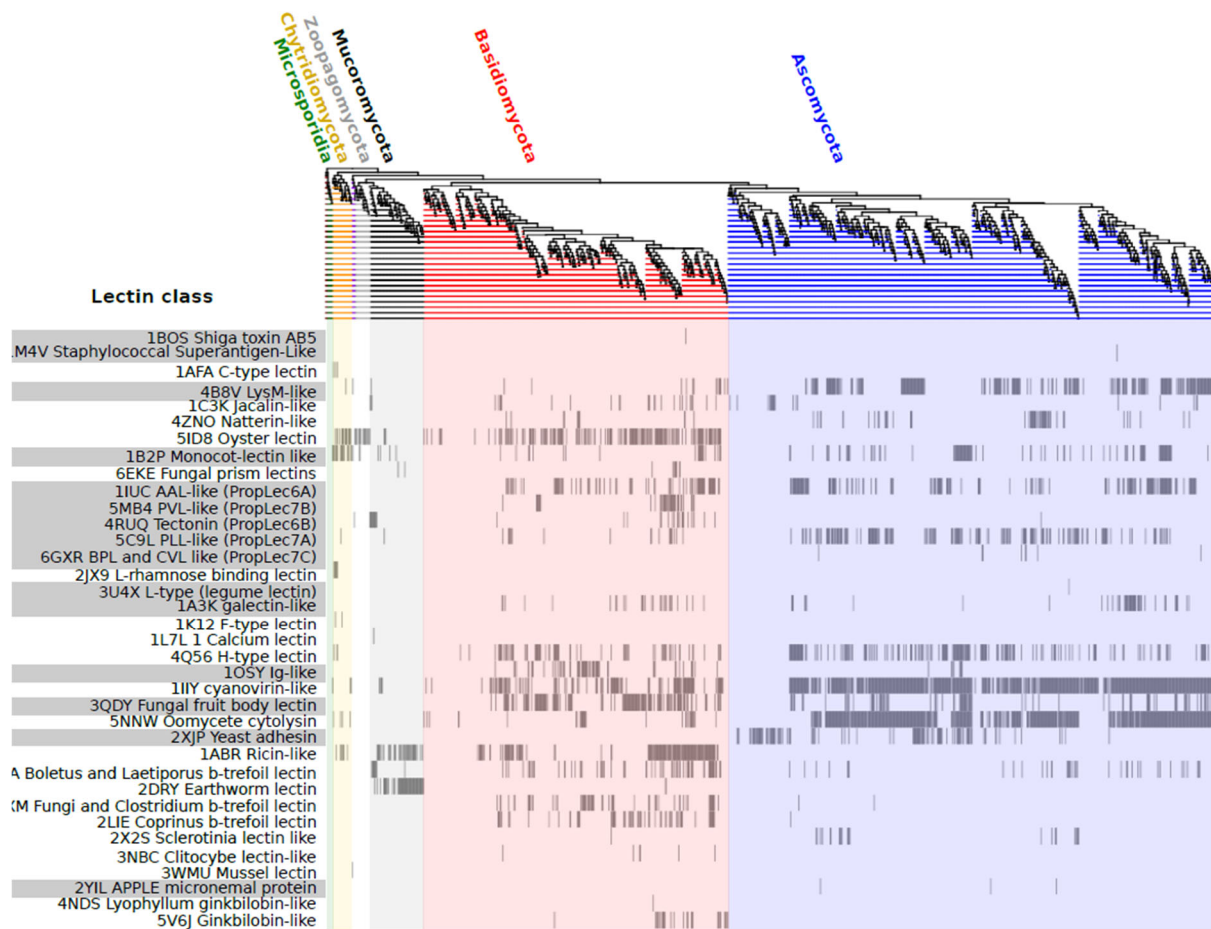
Annie Lebreton, François Bonnardel, Yu-Cheng Dai, Anne Imberty, Francis M. Martin, Frédérique Lisacek



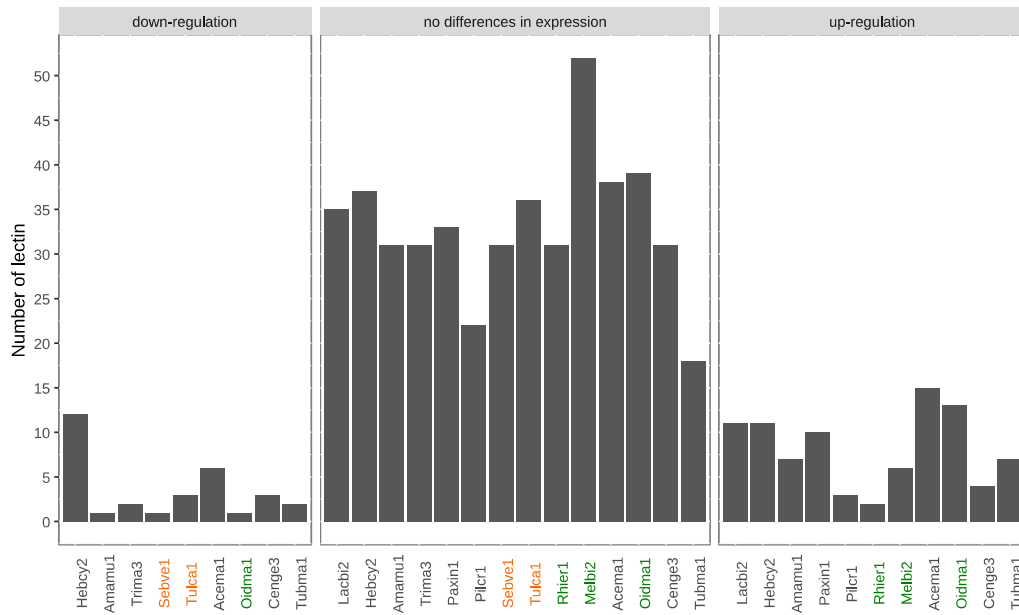
**Figure S1:** Distribution of lectin folds and classes of fungal lectin with 3D structures in Unilectin3D database.



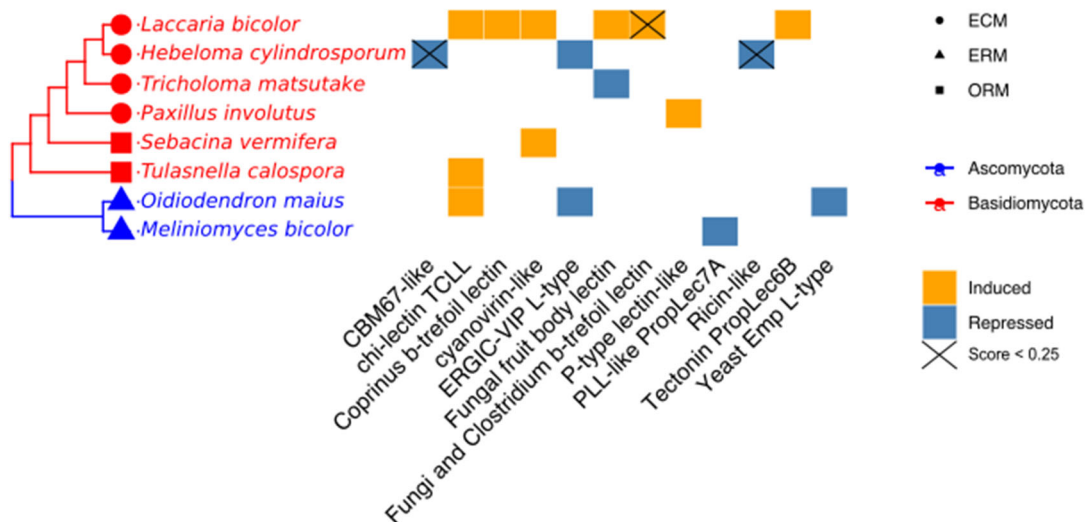
**Figure S2:** Distribution of folds (left) and classes (right) of predicted lectin sequences in MycoLec. Only lectin sequences with a similarity score > 25% were used.



**Figure S3: Distribution of predicted lectins by species in MycoLec.** Each vertical line corresponds to a fungal strain organized according to their phylogenetic relationship as displayed by the tree. Left, Clustering of lectin classes. Lectins with a similarity score > 25% were used to detect the presence of the different lectin classes found in the MycoCosm genomes.



**Figure S4: Impact of mycorrhization of 14 fungal strains with their corresponding host plant on lectin expression.** Each bar corresponds to a strain annotated by a tag used in the MycoCosm database to refer to the specific strain and genomic assembly. Tags are colored according to the mycorrhizae type: grey ectomycorrhizae, green ericoid mycorrhizae, orange orchid mycorrhizae.



**Figure S5: Differential expression of lectins within mycorrhizal fungi upon plants interaction.** Lectins with invariable expression are not represented. Three species are ericoid mycorrhizae (ERM), two are orchids mycorrhizae (ORM) and the other are ectomycorrhizae (ECM).

**Table S1: Fungal species investigated in the exploration of the lectins induced and repressed during their mycorrhization with a compatible plant host.** ECM: ectomycorrhizae, ORM: orchids mycorrhizae, ERM: ericoid mycorrhizae

JGI ID	Fungal species	Plant host	Analysis Method	Mycorrhizae type	Ref
Amamu1	<i>Amanita muscaria</i>	<i>Populus tremula tremoloides</i>	CLC	ECM	1
Hebcy2	<i>Hebeloma cylindrosporum</i>	<i>Pinus pinaster</i>	CLC	ECM	1
Paxin1	<i>Paxillus involutus</i>	<i>Fagus sylvatica</i>	CLC	ECM	1
Pilcr1	<i>Piloderma croeus</i>	<i>Quercus robur</i>	CLC	ECM	1
Oidma1	<i>Oidiodendron maius</i>	<i>Vaccinium myrtillus</i>	CLC	ERM	1
Sebve1	<i>Sebacina vermifera</i>	<i>Arabidopsis thaliana</i>	CLC	ORM	1
Tulca1	<i>Tulasnella calosporra</i>	<i>Serapias vomeracea</i>	CLC	ORM	1
Melbi2	<i>Meliniomyces bicolor</i>	<i>Vaccinium myrtillus</i>	CLC	ERM	2
Rhier1	<i>Rhizoscyphus ericaceae</i>	<i>Vaccinium myrtillus</i>	CLC	ERM	2
Tubma1	<i>Tuber magnatum</i>	<i>Quercus robur</i>	CLC	ECM	3
Cenge3	<i>Cenococcum geophilum</i>	<i>Pinus sylvestris</i>	CLC	ECM	4
Acema1	<i>Acephala macrosclerotiorum</i>	<i>Pinus sylvestris</i>	HISAT/ DESeq2	ECM	5
Lacbi2	<i>Laccaria bicolor</i>	<i>Populus tremula x alba</i>	HISAT/DESeq2	ECM	6
Trima3	<i>Tricholoma matsutake</i>	<i>Pinus sylvestris</i>	CLC	ECM	5

**Table S2: Lectin content in the predicted proteomes of the Agaricomycetes fungal class sorted by ecological niche.**



<i>Gymnopus androsaceus</i>	1		2			5	1	1	3			1	6	20	8			
<i>Gymnopus luxurians</i>		7				1	10	3	6			1	1	4	33	8		
<i>Leucoagaricus</i>																		
<i>gongylophorus</i>													1	1	1			
<i>Marasmius fiardii</i>		2	3	5		1						4	3	18	6			
<i>Mycena galopus</i>	5		5	2		19	1	16	2	1	1	2	1	3	8	5	71	14
<i>Polyporus arcularius</i>								1		2			1	1	5	4		
<i>Psilocybe serbica</i>		2	2	2		4	4	2	1	1	1	3	1	4	1	28	13	
<i>Pterula gracilis</i>			1			1	2	1	1		1				7	6		
<i>Sphaerobolus stellatus</i>			2	7		9	4	1		1	8	3	1	3	1	40	11	
<b>Generalist decayer</b>																		<b>0</b>
<i>Pleurotus ostreatus</i>	2					3	2	4				1	1	1	14	7		
<i>Rhodospodium toruloides</i>						1									1	1		
<i>Serpula lacrymans</i>			1			2						1	3	7	4			
<b>Wood decayer</b>																		<b>0</b>
<i>Auricularia subglabra</i>						17	4	5	1	1	1			1	30	7		
<i>Auriculariopsis ampla</i>			1			1							3	5	3			
<i>Bjerkandera adusta</i>			6			1	1	7	2	1		1		19	7			
<i>Clavulina sp./Sistotrema</i>						1	1				1	2		5	4			
<i>Coniophora olivacea</i>						1	2	2			1			6	4			
<i>Coniophora puteana</i>						1	1				1			3	3			
<i>Crucibulum laeve</i>			1			1	3	3		1			2	9	20	7		
<i>Cylindrobasidium torrendii</i>	1						1							2	2			
<i>Dentipellis sp.</i>						1	3	3		1				8	4			
<i>Dichomitus squalens</i>	3					1	1		3	4	1			13	6			
<i>Exidia glandulosa</i>						20	2	1	1	1			3	3	31	7		
<i>Fibroporia radiculosa</i>						1				1			1	3	3			
<i>Fistulina hepatica</i>						1								1	1			
<i>Fomitopsis pinicola</i>						1				1	2			4	3			
<i>Galerina marginata</i>			2	2	1	6	1	7		1			1	6	1	28	10	
<i>Ganoderma sp.</i>						1		1	1					3	3			
<i>Gloeophyllum trabeum</i>						2								2	1			
<i>Heliocybe sulcata</i>						1	1							2	2			
<i>Hypholoma sublateritium</i>		1	1			5	1	3	1	1			1	14	8			
<i>Lentinellus vulpinus</i>		1				1			1	1		3		7	5			
<i>Lentinula edodes</i>	1												1	2	2			
<i>Lentinus tigrinus</i>							1	2			1			4	3			
<i>Neolentinus lepideus</i>						1								1	1			
<i>Obba rivulosa</i>	4	1				1			2					8	4			
<i>Omphalotus olearius</i>								1	1					2	2			
<i>Peniophora sp.</i>		1				2				2		5	2	12	5			
<i>Phanerochaete carnosa</i>			2				2	6						10	3			
<i>Phanerochaete</i>																		
<i>chrysosporium</i>			6			1	2	1						10	4			
<i>Phlebia brevispora</i>			1			1	1	2	2	1		2	7	2	19	9		
<i>Phlebia centrifuga</i>						3	1	6						10	3			
<i>Phlebia radiata</i>			3	1		1	8	1				7	9	2	32	8		
<i>Phlebiopsis gigantea</i>			4			1	1	2		1				9	5			
<i>Plicaturopsis crispa</i>						1						1		2	2			
<i>Pluteus cervinus</i>	1		38	1		1	1	1	1			3	2	48	8			
<i>Polyporus brumalis</i>								1	1			1	1	4	4			
<i>Postia placenta</i>	1					1	3	4	2	2	7	3		23	8			
<i>Punctularia strigosozonata</i>							3	1						4	2			
<i>Pycnoporus cinnabarinus</i>						1						1		2	2			
<i>Ramaria rubella</i>	1		1	3									2	7	4			

<i>Schizophyllum commune</i>	1	2								1										3				7	4			
<i>Schizopora paradoxa</i>	2									1	6	1			1	1							1	13	7			
<i>Serpula himantioides</i>		1									3									3	1			8	4			
<i>Stereum hirsutum</i>										1	1			1										3	3			
<i>Trametes pubescens</i>															2								2	4	2			
<i>Trametes versicolor</i>															1								2	3	2			
<b>Plant pathogen/Wood decayer</b>	<b>0</b>																											
<i>Armillaria cepistipes</i>															16		1	4	2	1				26	6			
<i>Armillaria gallica</i>															16		1	3	3	1				27	6			
<i>Fomitiporia mediterranea</i>										1								2						3	2			
<i>Laetiporus sulphureus</i>																		2						5	4			
<b>Plant pathogen</b>	<b>0</b>																											
<i>Armillaria mellea</i>		1													1		3	5	2	1				14	7			
<i>Armillaria ostoyae</i>															16		2	3	2					25	5			
<i>Armillaria solidipes</i>		1													17		1	4	1					26	6			
<i>Heterobasidion annosum</i>										1					2									3	2			
<i>Moniliophthora perniciosa</i>		1																						4	2			
<i>Rhizoctonia solani</i>		1													8			3		4	3	3		22	6			
<i>Wolfiporia cocos</i>															1			1						2	2			
															10										13			
<b>Overall total</b>	12	8	13	16	3	9	18	34	42	33	9	32	8	1	10	0	7	29	32	56	85	7	38	51	71	25	12	31
<b>Number of species</b>	4	7	5	8	2	32	5	10	11	15	3	31	44	53	8	20	36	19	22	25	27	5	22	24	15	14	5	10
<b>% species</b>	4%	7%	5%	7%	2%	30%	5%	9%	10%	14%	3%	29%	41%	50%	7%	19%	34%	18%	21%	23%	25%	5%	21%	22%	14%	13%	100%	



**Table S3 : Details of lectins identified in the genome of *Laccaria bicolor***

Lectin class	#	Mycosm AC (score)	NCBI AC	Protein name
Tectonin PropLec6B	3	Lacbi2:399271 (0.73) Lacbi2:399270 (0.67) Lacbi2:322629 (0.27)	XP_001876432.1	tectonin 2
Coprinus $\beta$ -trefoil lectin	3	Lacbi2:330799 (0.48) Lacbi2:327918 (0.42) Lacbi2:691792 (0.25)	XP_001885184.1	predicted protein [ <i>Laccaria bicolor</i> S238N-H82]
Galectin like	2	Lacbi2:236913 (0.36) Lacbi2:312069 (0.35)	XP_001883510.1	galectin [ <i>Laccaria bicolor</i> S238N-H82]
Physarium lectin	2	Lacbi2:381649 (0.39) Lacbi2:322629 (0.39)	XP_001875654.1	ricin-containing lipase tectonin-like
Oyster lectin	2	Lacbi2:585014 (0.28) Lacbi2:448672 (0.27)	XP_001880964.1	predicted protein [ <i>Laccaria bicolor</i> S238N-H82]
Fungal fruit body lectin	1	Lacbi2:185716 (0.54)	XP_001885326.1	predicted protein, partial
Boletus and Laetiporus $\beta$ -trefoil lectin	1	Lacbi2:318163 (0.30)	XP_001879265.1	predicted protein [ <i>Laccaria bicolor</i> S238N-H82]
Cyanovirin like	1	Lacbi2:327824 (0.42)	XP_001881773.1	predicted protein [ <i>Laccaria bicolor</i> S238N-H82]
P domain of calnexin and reticulon	1	Lacbi2:399410 (0.50)	XP_001874124.1	calnexin [ <i>Laccaria bicolor</i> S238N-H82]
Ergic vip L type	1	Lacbi2:399414 (0.48)	XP_001888824.1	ERGIC53, mannose lectin
P-type lectin like	1	Lacbi2:642707 (0.29)	XP_001874815.1	predicted protein [ <i>Laccaria bicolor</i> S238N-H82]
PVL like PropLec7B	1	Lacbi2:692684 (0.67)	XP_001891161.1	predicted protein, partial

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