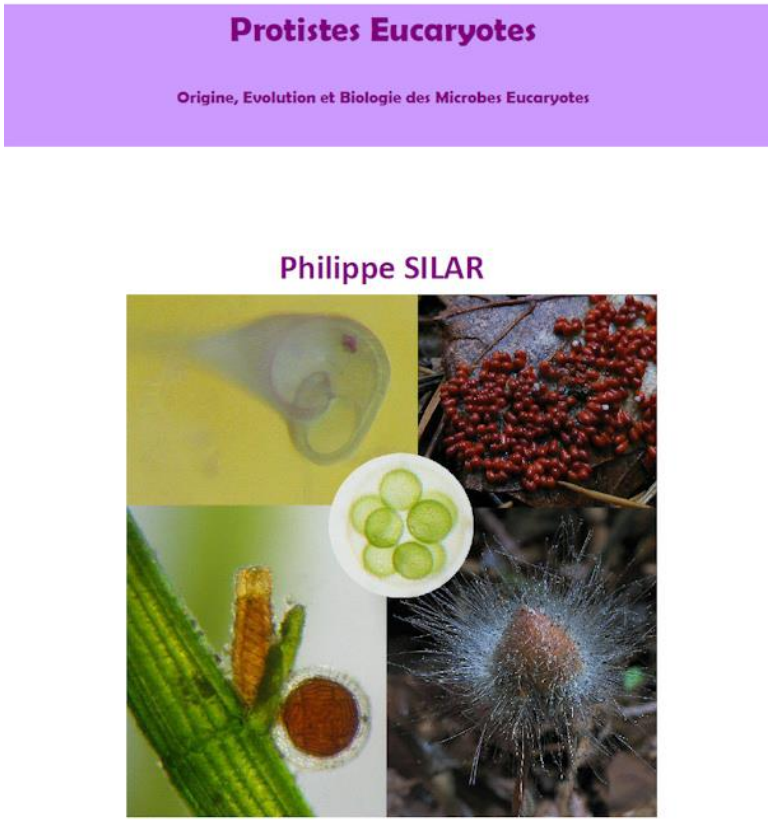
Mise en collection des champignons

Philippe silar: http://gec.sdv.univ-paris-diderot.fr/

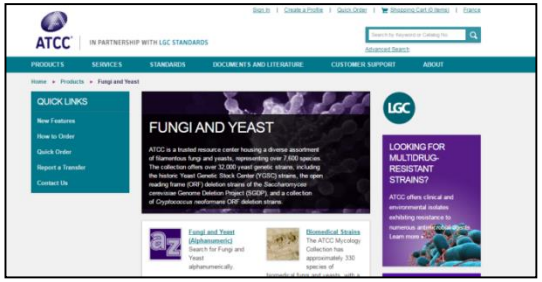


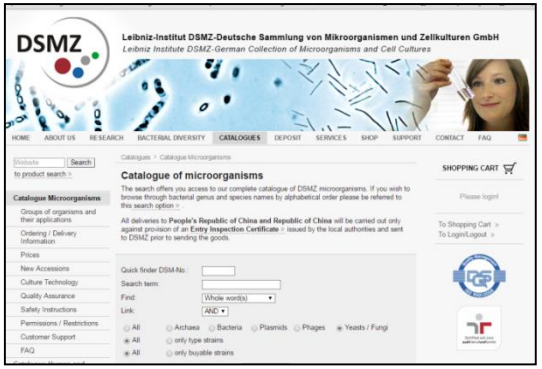
Qui fait des collections fongiques et pourquoi?

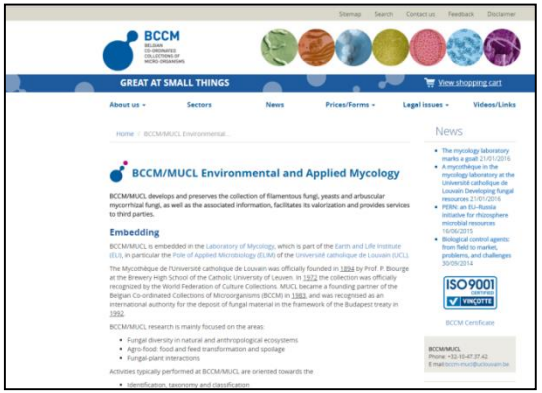
- Les collections institutionnelles publiques
- Les laboratoires de recherches
- Les industriels

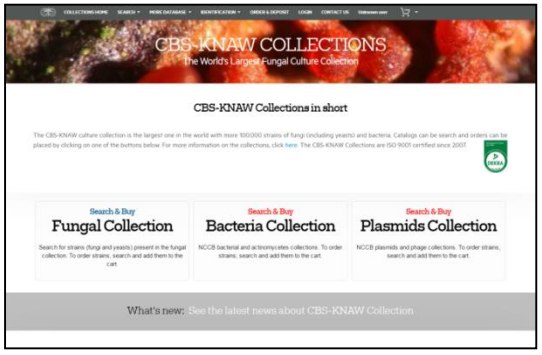
Des collections publiques

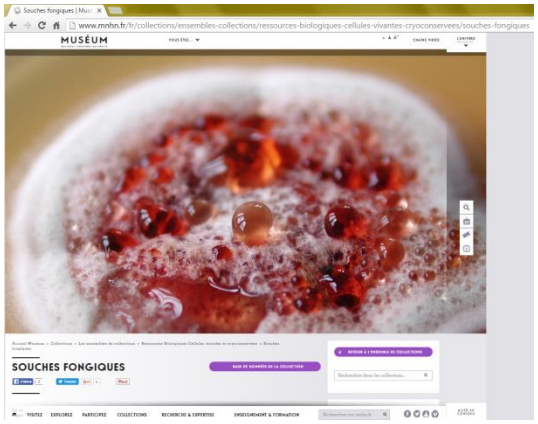
- à visée de préservation et pour servir de référence pour des études futures

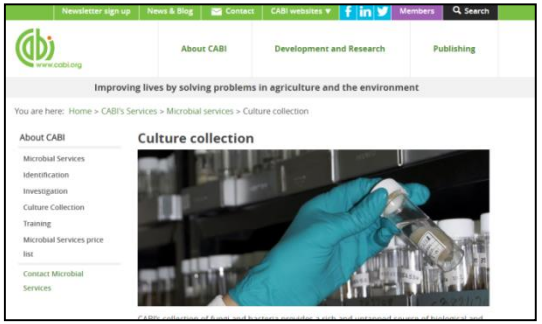




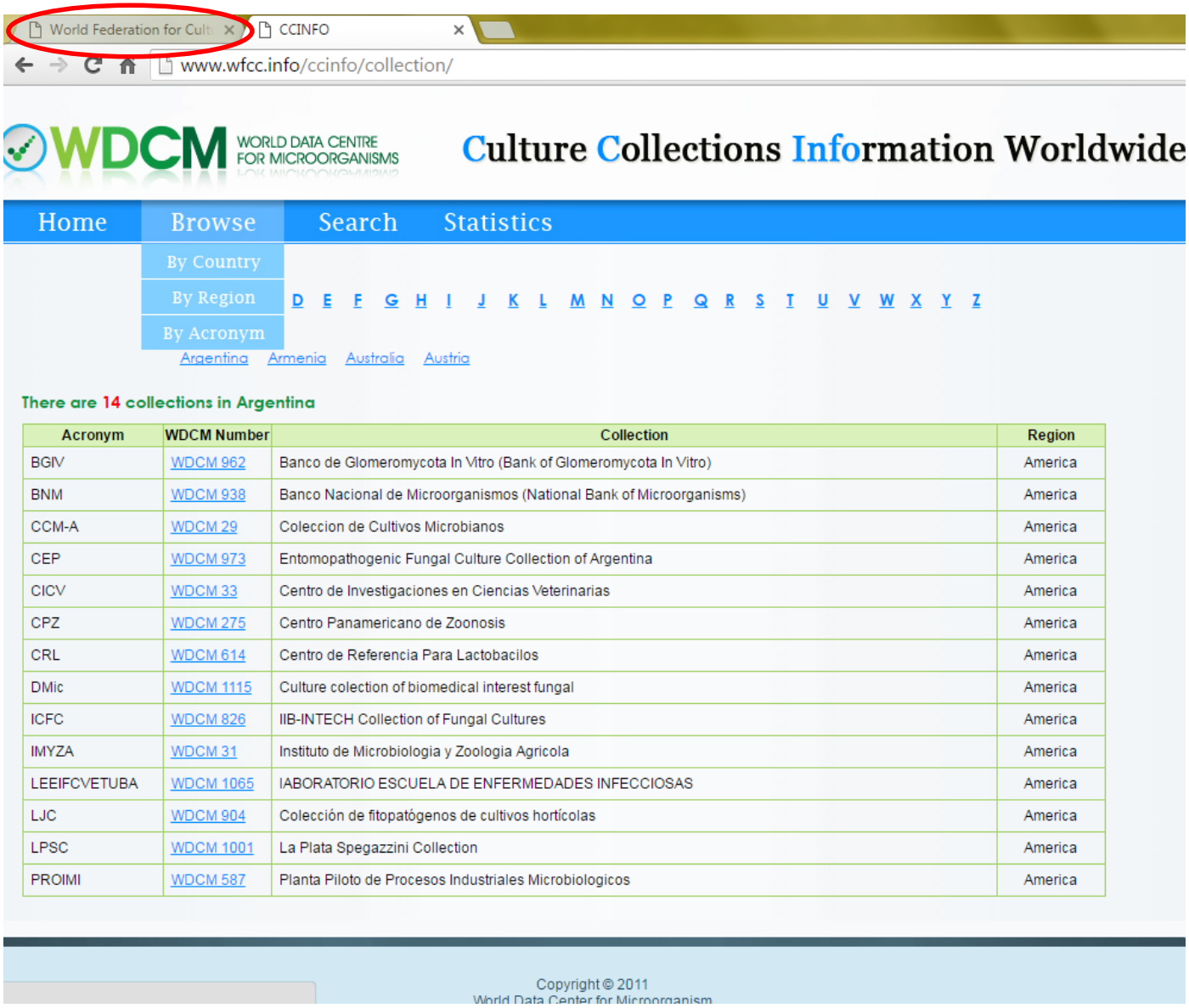








les collections publiques sont répertoriées dans le WFCC:



infrastructure dédiée à l'entretien des souches : collections pérennes

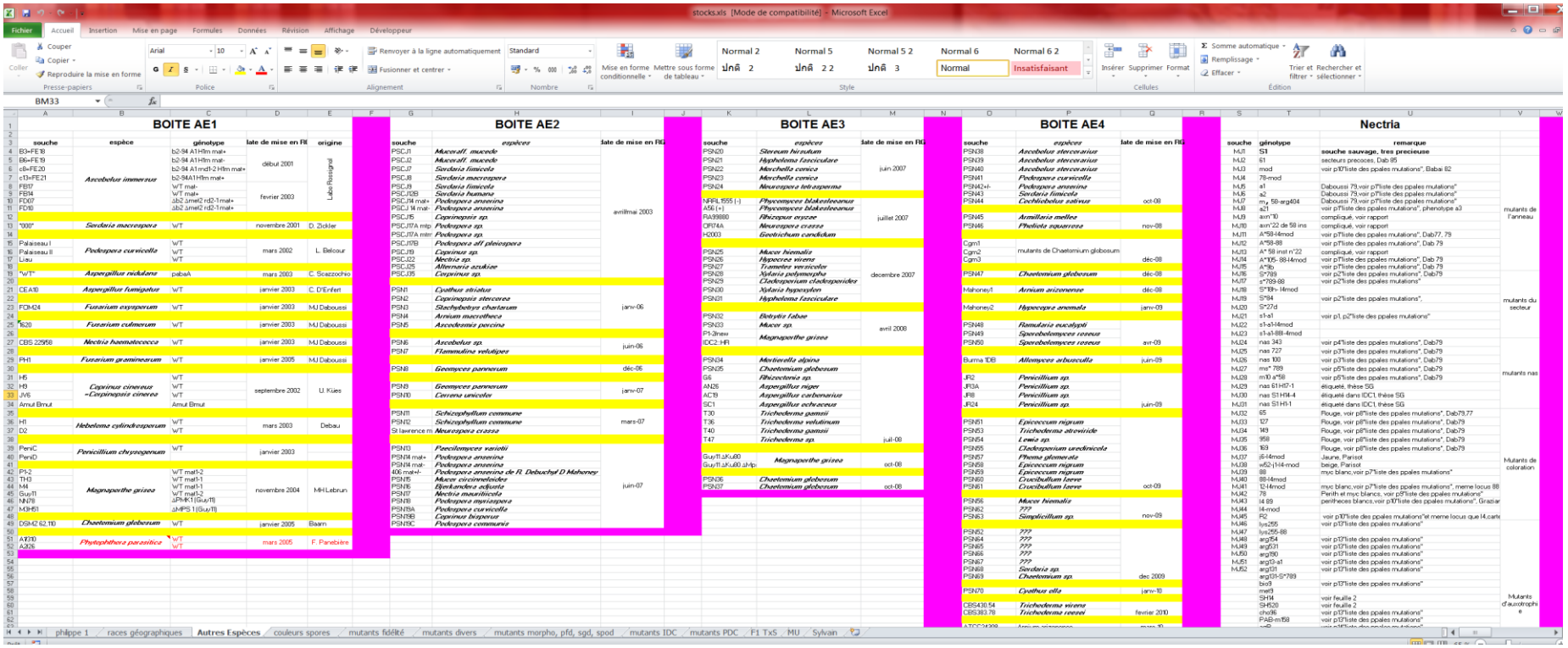
possèdent un site Web où il est possible d'acheter les souches

coût variable en fonction des collections (20-500€)

nécessité parfois de signer des « accords de transfert »

Des laboratoires comme par exemple le mien!

Pour préserver nos souches sauvages et mutantes



stocks.xls [Mode de compatibilité] - Microsoft Excel

BOITE AE1

souche	espèce	génotype	date de mise en FR	origine
B3+FE18		b2-94 A1+Hm mat+		
B6+FE19		b2-94 A1+Hm mat-	début 2001	
c8+FE20		b2-94 A1 mat1-2 Hm mat+		
c13+FE21	*Ascobolus immersus*	b2-94A1Hm mat+		Labo Rossignol
FB17		WT mat-	février 2003	
FB14		WT mat+		
FD07		Δb2.1mel2 rd2-1 mat+		
FD10		Δb2.1mel2 rd2-1 mat+		
"000"	*Sordaria macrospora*	WT	novembre 2001	D. Zickler
Palaiseau I		WT		
Palaiseau II	*Podospora curvicolla*	WT	mars 2002	L. Belcour
Lieu		WT		
"WT"	*Aspergillus nidulans*	pabaA	mars 2003	C. Scazzocchio
CEA10	*Aspergillus fumigatus*	WT	janvier 2003	C. D'Enfert
FOM24	*Fusarium oxysporum*	WT	janvier 2003	MJ Daboussi
1620	*Fusarium culmorum*	WT	janvier 2003	MJ Daboussi
CBS 22958	*Nectria haematococca*	WT	janvier 2003	MJ Daboussi
PH1	*Fusarium graminearum*	WT	janvier 2005	MJ Daboussi
H5		WT		
H9	*Coprinus cinereus*	WT		
JV6	*=Coprinopsis cinerea*	WT	septembre 2002	U. Kües
Amut Bmut		Amut Bmut		
H1	*Hebeloma cylindrosporum*	WT	mars 2003	Debau
D2		WT		
PeniC	*Penicillium chrysogenum*	WT	janvier 2003	
PeniD				
P1-2		WT mat1-2		
TH3		WT mat1-1		
M4	*Magnaporthe grisea*	WT mat1-1	novembre 2004	MH Lebrun
Guy11		WT mat1-2		
NN78		ΔPMK1 (Guy11)		
M3H51		ΔMPS 1 (Guy11)		
DSMZ 62,110	*Cheletonium globosum*	WT	janvier 2005	Baam
A9310		WT		
A206	*Phytophthora parasitica*	WT	mars 2005	F. Panebière

BOITE AE2

souche	espèces	date de mise en FR
PSCJ1	*Mucor aff. mucedo*	
PSCJ2	*Mucor aff. mucedo*	
PSCJ7	*Sordaria limicola*	
PSCJ8	*Sordaria macrospora*	
PSCJ9	*Sordaria limicola*	
PSCJ10B	*Sordaria humana*	
PSCJ14 mat+	*Podospora anserina*	avril/mai 2003
PSCJ 14 mat-	*Podospora anserina*	
PSCJ15	*Coprinopsis sp.*	
PSCJ17A mitp	*Podospora sp.*	
PSCJ17A mitm	*Podospora sp.*	
PSCJ17B	*Podospora aff pleiospora*	
PSCJ19	*Coprinus sp.*	
PSCJ22	*Nectria sp.*	
PSCJ25	*Alternaria azukiae*	
PSCJ35	*Coprinus sp.*	
PSN1	*Cyathus striatus*	
PSN2	*Coprinopsis stercorea*	janv-06
PSN3	*Stochybotrys chartarum*	
PSN4	*Arnium macrotheca*	
PSN5	*Ascodesmis porcina*	
PSN6	*Ascobolus sp.*	juin-06
PSN7	*Flammulina velutipes*	
PSN8	*Geomyces pannorum*	déc-06
PSN9	*Geomyces pannorum*	janv-07
PSN10	*Cerrena unicolor*	
PSN11	*Schizophyllum commune*	
PSN12	*Schizophyllum commune*	mars-07
St lawrence m	*Neurospora crassa*	
PSN13	*Paecilomyces variotii*	
PSN14 mat+	*Podospora anserina*	
PSN14 mat-	*Podospora anserina*	
406 mat+/-	*Podospora anserina de R. Debuchy/ D Maheney*	
PSN15	*Mucor circinneloides*	juin-07
PSN16	*Sordaria adiasta*	
PSN17	*Nectria mariticola*	
PSN18	*Podospora myriospora*	
PSN19A	*Podospora curvicolla*	
PSN19B	*Coprinus bisporus*	
PSN19C	*Podospora comnunis*	

BOITE AE3

souche	espèces	date de mise en FR
PSN20	*Stereum hirsutum*	
PSN21	*Hyphoderma fasciculare*	
PSN22	*Merchella conica*	juin 2007
PSN23	*Merchella conica*	
PSN24	*Neurospora tetrasperma*	
NRRL 1555 (-)	*Phycomyces blakesleeanus*	
A56 (+)	*Phycomyces blakesleeanus*	
RA39880	*Rhizopus oryzae*	juillet 2007
DP74A	*Neurospora crassa*	
H2003	*Geotrichum candidum*	
PSN25	*Mucor hiemalis*	
PSN26	*Hypocrea virens*	
PSN27	*Trametes versicolor*	
PSN28	*Xylaria polymorpha*	decembre 2007
PSN29	*Cladosporium cladosperides*	
PSN30	*Xylaria hypoxylon*	
PSN31	*Hyphoderma fasciculare*	
PSN32	*Botrytis fabae*	
PSN33	*Mucor sp.*	avril 2008
P1-2mau	*Magnaporthe grisea*	
IDC2::HR		
PSN34	*Metrierella alpina*	
PSN35	*Cheetomium globosum*	
G6	*Rhizoctonia sp.*	
AN26	*Aspergillus niger*	
AC19	*Aspergillus carbonarius*	
SC1	*Aspergillus ochraceus*	
T30	*Trichoderma gamsii*	
T36	*Trichoderma velutinum*	
T40	*Trichoderma gamsii*	
T47	*Trichoderma sp.*	juil-08
Guy11.LKu90	*Magnaporthe grisea*	oct-08
Guy11.pKu90 .pVp		
PSN36	*Cheetomium globosum*	oct-08
PSN37	*Cheetomium globosum*	

BOITE AE4

souche	espèces	date de mise en FR
PSN38	*Ascobolus stercorarius*	
PSN39	*Ascobolus stercorarius*	
PSN40	*Ascobolus stercorarius*	
PSN41	*Podospora curvicolla*	
PSN42+/-	*Podospora anserina*	
PSN43	*Sordaria fimicola*	
PSN44	*Cochliobolus sativus*	oct-08
PSN45	*Armillaria mellea*	
PSN46	*Pholiota squarrosa*	nov-08
Cgm1		
Cgm2	mutants de Chaetomium globosum	
Cgm3		déc-08
PSN47	*Cheetomium globosum*	déc-08
Mahoney1	*Arnium arizonense*	déc-08
Mahoney2	*Hypocrea anomala*	janv-09
PSN48	*Ramularia eucalypti*	
PSN49	*Sporobolomyces roseus*	
PSN50	*Sporobolomyces roseus*	avr-09
Burma 1D8	*Allomyces arbusculla*	juin-09
JR2	*Penicillium sp.*	
JR3A	*Penicillium sp.*	
JR8	*Penicillium sp.*	
JR24	*Penicillium sp.*	juin-09
PSN51	*Epicoccum nigrum*	
PSN53	*Trichoderma atroviride*	
PSN54	*Lenea sp.*	
PSN55	*Cladosporium uredinicola*	
PSN57	*Phoma glomerata*	
PSN58	*Epicoccum nigrum*	
PSN59	*Epicoccum nigrum*	
PSN60	*Cruciibulum laeve*	
PSN61	*Cruciibulum laeve*	oct-09
PSN56	*Mucor hiemalis*	
PSN62	*???*	
PSN63	*Simplicillium sp.*	nov-09
PSN52	*???*	
PSN64	*???*	
PSN65	*???*	
PSN66	*???*	
PSN67	*???*	
PSN68	*Sordaria sp.*	
PSN69	*Cheetomium sp.*	dec 2009
PSN70	*Cyathus olla*	janv-10
CBS430.54	*Trichoderma virens*	
CBS383.78	*Trichoderma reesei*	février 2010

Nectria

souche	génotype	remarque	
MJ1	S1	souche sauvage, tres precieuse	
MJ2	61	secteurs precoces, Dab 05	
MJ3	mod	voir p1°liste des ppales mutations", Babai 82	
MJ4	78-mod		
MJ5	a1	Daboussi 73,voir p1°liste des ppales mutations"	
MJ6	a2	Daboussi 73,voir p1°liste des ppales mutations"	
MJ7	m_4 58-arg404	Daboussi 73,voir p1°liste des ppales mutations"	
MJ8	a21	voir p1°liste des ppales mutations", phenotype a3	mutants de
MJ9	asm°10	compliqué, voir rapport	l'anneau
MJ10	asm°22 de 58 ins	compliqué, voir rapport	
MJ11	A°58-14mod	voir p1°liste des ppales mutations", Dab77, 79	
MJ12	A°58-88	voir p1°liste des ppales mutations", Dab 79	
MJ13	A° 58 mat n°22	compliqué, voir rapport	
MJ14	A°105- 88-14mod	voir p1°liste des ppales mutations", Dab 79	
MJ15	A°8b	voir p1°liste des ppales mutations", Dab 79	
MJ16	S°789	voir p2°liste des ppales mutations", Dab79	
MJ17	s°789-88	voir p2°liste des ppales mutations"	
MJ18	S°18> 14mod		
MJ19	S°84	voir p2°liste des ppales mutations",	mutants du
MJ20	S°27d		secteur
MJ21	s1-a1	voir p1, p2°liste des ppales mutations"	
MJ22	s1-a14mod		
MJ23	s1-a1-88-4mod		
MJ24	nas 343	voir p4°liste des ppales mutations", Dab79	
MJ25	nas 727	voir p3°liste des ppales mutations", Dab79	
MJ26	nas 100	voir p3°liste des ppales mutations", Dab79	
MJ27	ms° 788	voir p3°liste des ppales mutations", Dab79	
MJ28	m10 a°58	voir p5°liste des ppales mutations", Dab79	mutants nas
MJ29	nas 61 H17-1	étiqueté, thèse SG	
MJ30	nas S1 H14-4	étiqueté dans IDC1, thèse SG	
MJ31	nas S1 H1-1	étiqueté dans IDC1, thèse SG	
MJ32	65	Rouge, voir p8°liste des ppales mutations", Dab79,77	
MJ33	127	Rouge, voir p8°liste des ppales mutations", Dab79	
MJ34	143	Rouge, voir p8°liste des ppales mutations", Dab79	
MJ35	958	Rouge, voir p8°liste des ppales mutations", Dab79	
MJ36	169	Rouge, voir p8°liste des ppales mutations", Dab79	
MJ37	j6-14mod	Jaune, Parisot	Mutants de
MJ38	a52-j1H-mod	beige, Parisot	coloration
MJ39	88	myc blanc,voir p7°liste des ppales mutations"	
MJ40	88-14mod		
MJ41	t2-14mod	myc blanc,voir p7°liste des ppales mutations", meme locus 88	
MJ42	78	Perith et myc blancs, voir p5°liste des ppales mutations"	
MJ43	t4 89	peritheces blancs,voir p10°liste des ppales mutations", Graziar	
MJ44	t4-mod		
MJ45	F2	voir p10°liste des ppales mutations"et meme locus que t4,carte	
MJ46	lys255	voir p7°liste des ppales mutations"	
MJ47	lys255-88		
MJ48	arg354	voir p12°liste des ppales mutations"	
MJ49	arg571	voir p12°liste des ppales mutations"	
MJ50	arg180	voir p12°liste des ppales mutations"	
MJ51	arg10-a1	voir p12°liste des ppales mutations"	
MJ52	arg121	voir p12°liste des ppales mutations"	
	arg131-S°789		
	bio3	voir p13°liste des ppales mutations"	
	met9		
	SH4	voir feuille 2	Mutants
	SH520	voir feuille 2	d'auxotrophi
	cho96	voir p13°liste des ppales mutations"	e
	P48-m158	voir p13°liste des ppales mutations"	

philippe 1 / races géographiques / **Autres Espèces** / couleurs spores / mutants fidélité / mutants divers / mutants morpho, pfd, sgd, spod / mutants IDC / mutants PDC / F1 TxS / MU / Sylvan

pas de site web: bouche à oreille

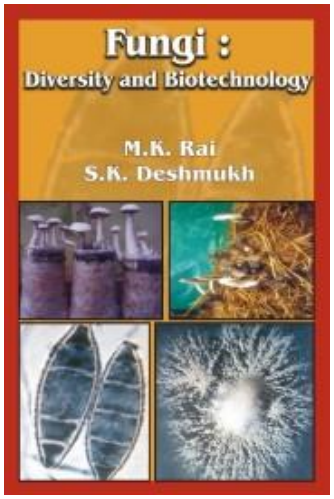
envoi gratuit des souches

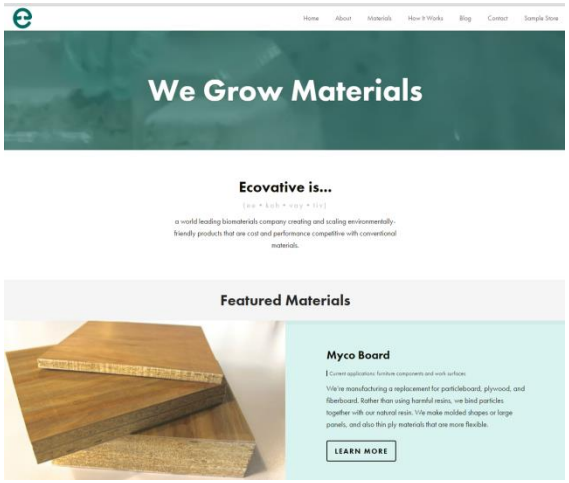
souvent la collection disparaît à la cessation d'activité…

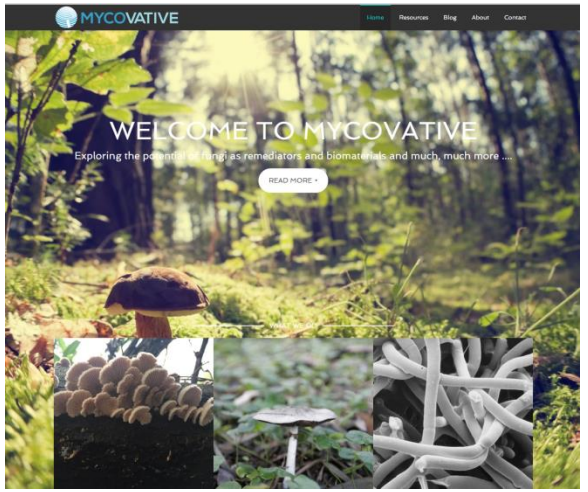
Dans notre collection, 3 donations issues de cessation d'activité

Les industriels :

- **Intérêts technologiques et financiers**
- **Pas accessibles au grand public**







Qu’est-ce qui est mis en collection?

- des mycéliums vivants ou des spores dormantes de souches sauvages récoltés par les mycologues

Podospora setosa

General information

Summary:	Podospora setosa (G. Winter) Niessl, Hedwigia 22: 156 (1883) [MB#100959]
Synonymy:	≡Sordaria setosa G. Winter: 33 (1873) [MB#197053] ≡Philocopra setosa (G. Winter) Sacc., Rabenhorst's Kryptogamen-Flora, Pilze - Schizomyceten, Saccharomyceten und Basidiomyceten 1(1): 249 (1881) [MB#202838] ≡Pleurage setosa (G. Winter) Kuntze (1898) [MB#433729] ≡Cladochaete setosa (G. Winter) Sacc., Annales Mycologici 10 (3): 318 (1912) [MB#160211]
MycoBank #:	100959
Epithet:	setosa
Rank:	sp.
Authors:	(G. Winter) Niessl
Authors (abbreviated):	(G. Winter) Niessl
Literature:	Niessl, G. von. 1883. Über die Theilung der Gattung Sordaria. Hedwigia. 22:153-156
Page #:	156
Year of publication:	1883
Name type:	Combination
Gender:	Feminine
Type specimen or ex type:	1. Specimen record #102960 2. Specimen record #102961 3. Specimen record #102962 4. Specimen record #102963 5. Specimen record #102964
More specimens:	1. Specimen record #102960 2. Specimen record #102961 3. Specimen record #102962 4. Specimen record #102963 5. Specimen record #102964

Classification and associated taxa

Current name:	Podospora setosa (G. Winter) Niessl, Hedwigia 22: 156 (1883) [MB#100959]
Classification:	Fungi, Ascomycota, Pezizomycotina, Sordariomycetes, Sordariomycetidae, Sordariales, Lasiosphaeriaceae, Podospora
Associated records:	None
Basionym:	Sordaria setosa G. Winter: 33 (1873) [MB#197053]
Obligate or homotypic synonyms:	1. Cladochaete setosa (G. Winter) Sacc., Annales Mycologici 10 (3): 318 (1912) [MB#160211] 2. Philocopra setosa (G. Winter) Sacc., Rabenhorst's Kryptogamen-Flora, Pilze - Schizomyceten, Saccharomyceten und Basidiomyceten 1(1): 249 (1881) [MB#202838] 3. Pleurage setosa (G. Winter) Kuntze (1898) [MB#433729] 4. Sordaria setosa G. Winter: 33 (1873) [MB#197053]

Specimen record #102960

MycoBank Typification #(MBT):	102960
Identified as:	Podospora setosa
Taxon name:	Podospora setosa
Herbarium records:	CBS H-17284
Collected by:	R.F. Cain
Location details:	Tamsel
Country (state):	Germany
Substrate details:	dung of dog

Specimen record #102964

MycoBank Typification #(MBT):	102964
Identified as:	Podospora setosa
Identified by:	G.S. de Hoog
Taxon name:	Podospora setosa
Herbarium records:	CBS H-17288
Collected by:	G.S. de Hoog
Collectors number:	76
Collection date:	04/11/1968
Location details:	Baarn, Groeneveld
Country (state):	The Netherlands
Substrate details:	rabbit dung

Descriptions

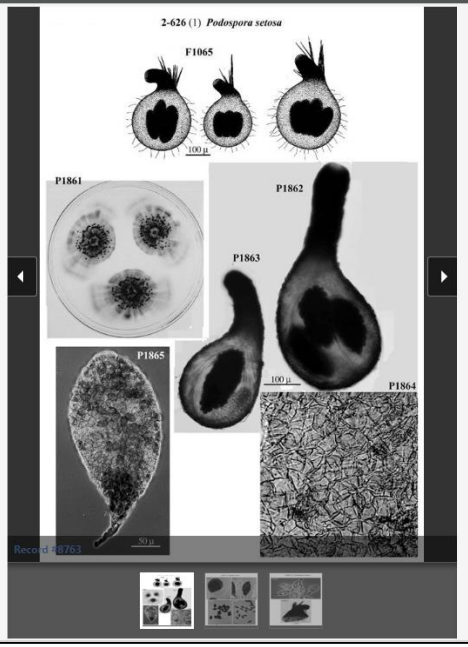
Description:	Podospora setosa (Winter) Niessl, 1883; Hedwigia, 22: 156. / in Matsushima (1975), p. 181.

Link out to external resources

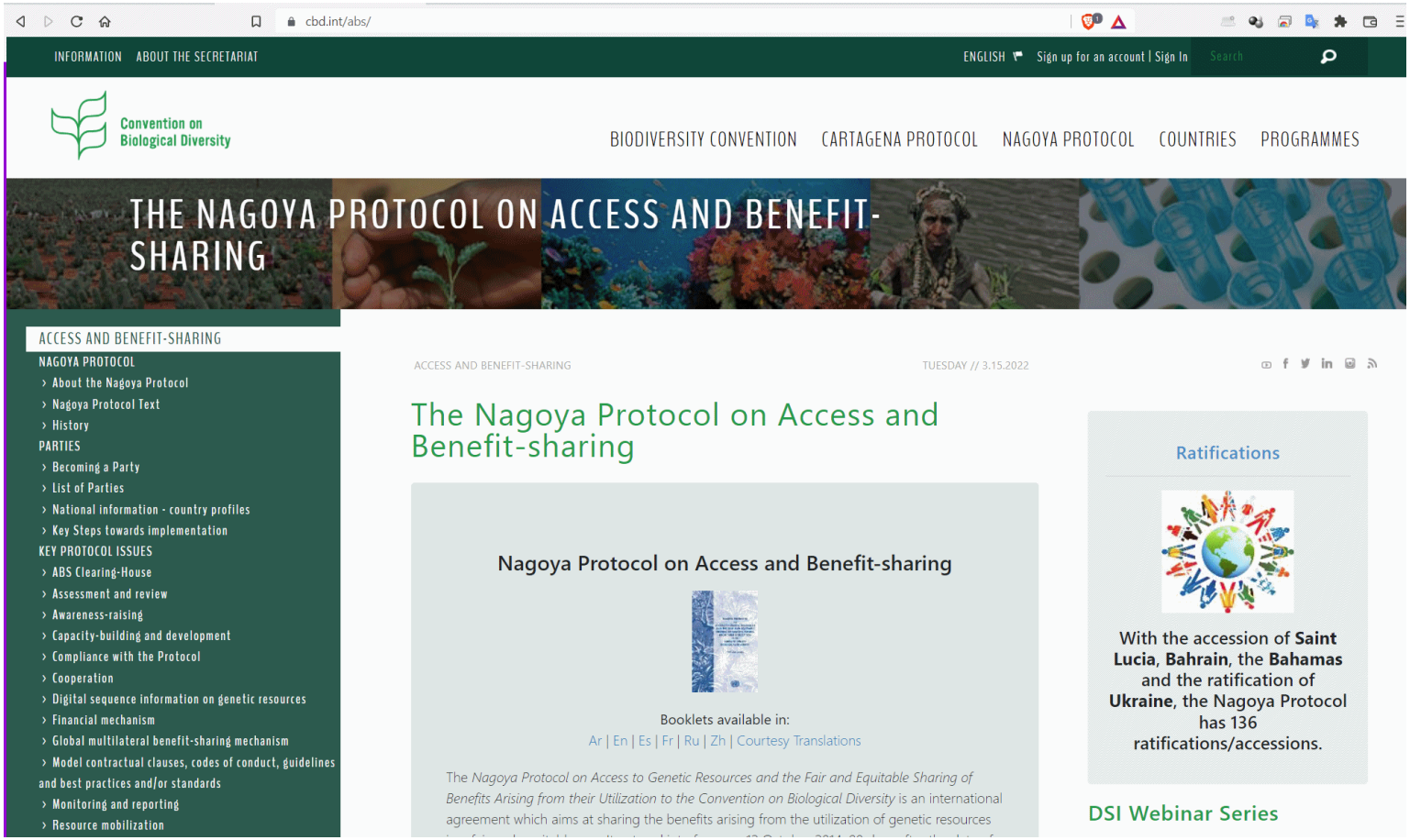
Other fungal links:	Catalogue of Life (CoL) Encyclopedia of Life (EOL) Global Biodiversity Information Facility (GBIF) Index Fungorum (IF) Integrated Taxonomic Information System (ITIS)
Bibliography links:	Google Scholar PubMed
General links:	Google Wikimedia Wikipedia Wikispecies
Molecular links:	BOLD Systems EMBL NCBI
Specimens and strains links:	All Russian Collection of Microorganisms (VKM) CBS collection StrainInfo

Files

Associated files:

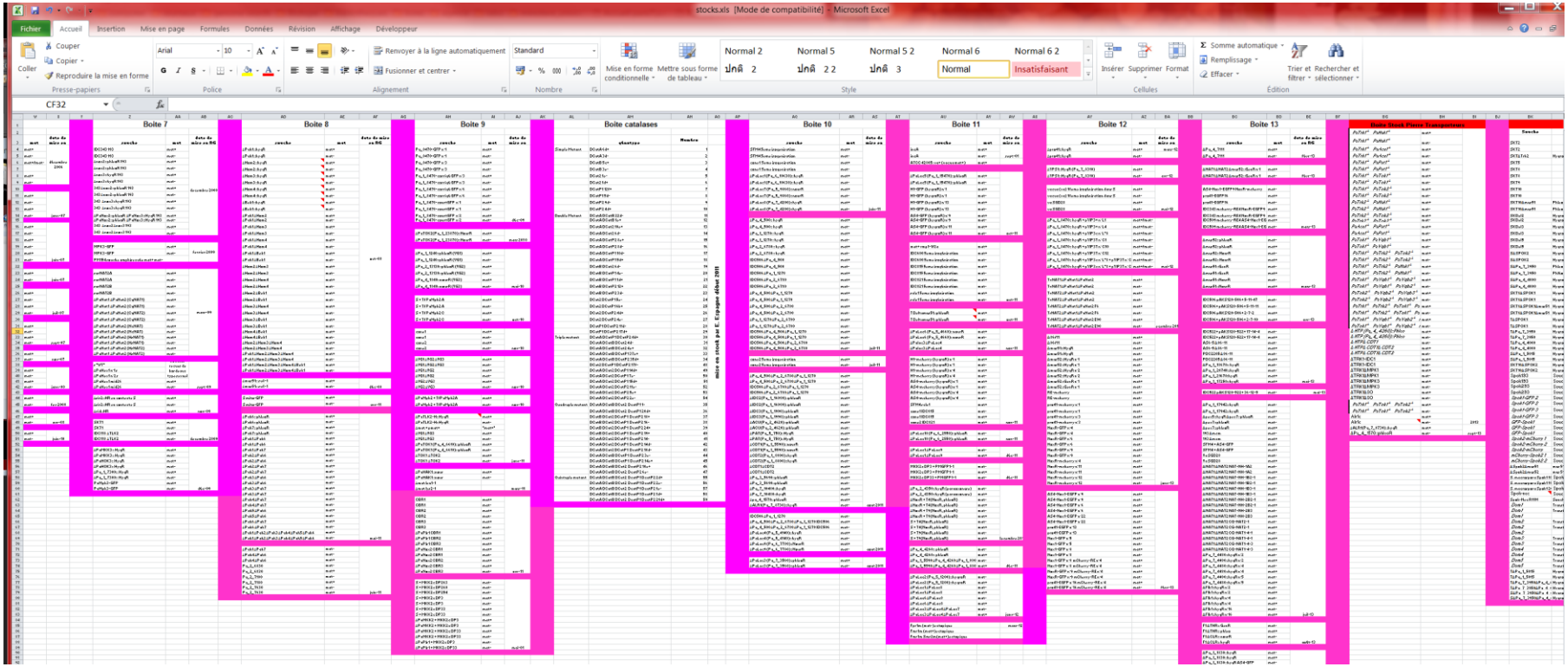


Attention : protocole de Nagoya!



Il devient très difficile de mettre en collection des souches obtenues à partir d'échantillons non-nationaux!

- des souches <u>mutantes ou améliorées</u> pour des applications biotechnologiques

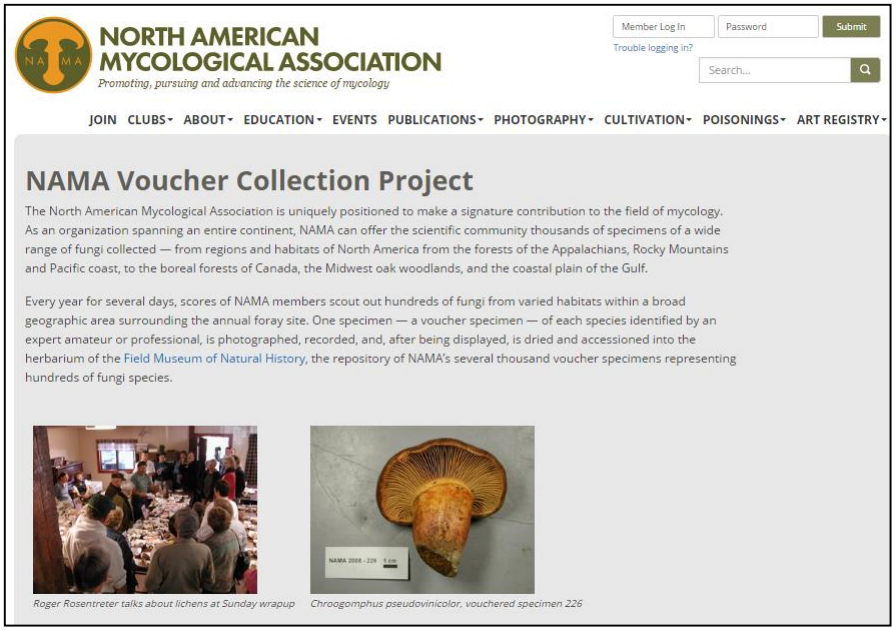


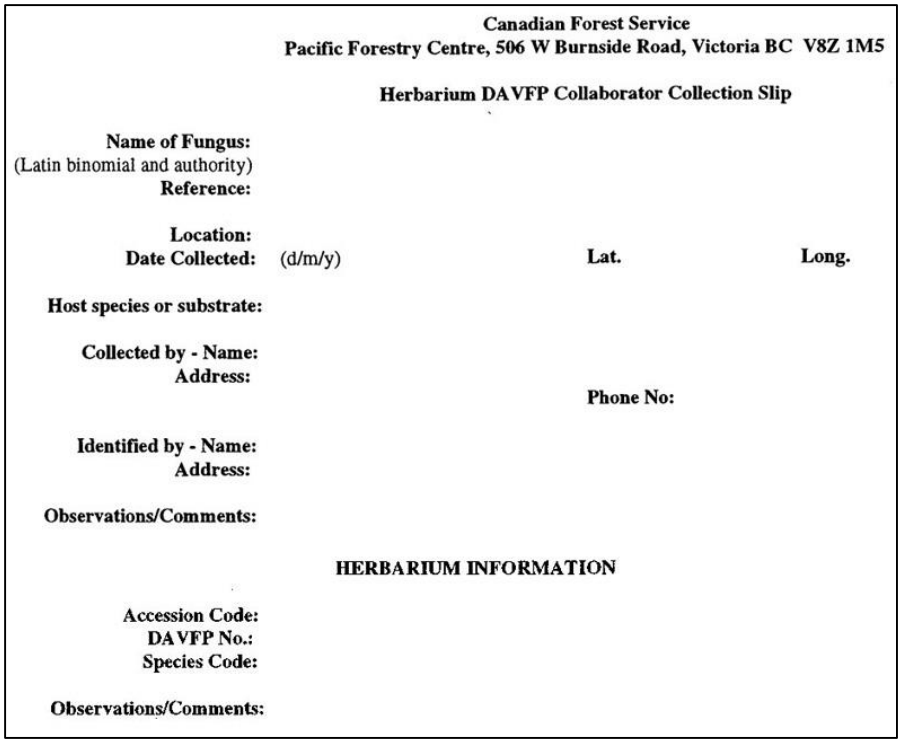
souches mutantes de Podospora anserina

dans notre collection plus de 1 000 mutants

Et les sporophores?

Les « vouchers » sont séchés, numérotés et stockés dans des « herbariums »





Il est possible d'extraire de l'ADN, mais les tissus sont généralement morts…

Malgré tout, le nombre de souches présentes dans les collections est restreint

1000 Fungal Genomes

This project aims to provide genomic information for every family of fungi. The list below includes sequenced fungal genomes, those in progress, and selected nominations. You can log in and nominate new species for genome sequencing in the families with no (green) or only one (yellow) reference genome if you can provide DNA/RNA samples for their sequencing (see JGI User Guidelines). If you know additional fungal species being sequenced somewhere but not reflected on this list, please register these projects in GOLD (use Add to GOLD link) or let us know.

Phylum: all | Subphylum: all | Class: all | Order: all | Family: all | Search | Reset

Found 713 families, 1251 genome project(s), 501 nomination(s). Show families with ☑ No genomes ☑ Single genome ☑ Many genomes

The species that have been nominated for sequencing by community are marked with asterisk.

Phylum name	Subphylum name	Class name	Order name	Family name	Genome Projects		
Ascomycota	Incertae sedis	Incertae sedis	Incertae sedis	Incertae sedis	Ascomycete sp.	GOLD: Whole Genome Sequencing	
					Calcarisporiella thermophila	GOLD: Whole Genome Sequencing	
					Cerataphis brasiliensis yeast-like symbiont	GOLD: Whole Genome Sequencing	
					Helminthosporium solani	GOLD: Whole Genome Sequencing	
					Nilaparvata lugens yeast-like symbiont	GOLD: Whole Genome Sequencing	
					Stanjemonium griseum	GOLD: Whole Genome Sequencing	
					Symbiotaphrina kochii	GOLD: Whole Genome Sequencing	
					Taxomyces andreanae	GOLD: Whole Genome Sequencing	
							Add to GOLD
Ascomycota	Pezizomycotina	Arthoniomycetes	Arthoniales	Arthoniaceae	Arthonia rubrocincta	GOLD: Whole Genome Sequencing	
							Nominate Add to GOLD
Ascomycota	Pezizomycotina	Arthoniomycetes	Arthoniales	Chrysothricaceae	None sequenced		Nominate Add to GOLD
Ascomycota	Pezizomycotina	Arthoniomycetes	Arthoniales	Roccellaceae	None sequenced		Nominate Add to GOLD
Ascomycota	Pezizomycotina	Arthoniomycetes	Incertae sedis	Melaspileaceae	None sequenced		Nominate Add to GOLD
Ascomycota	Pezizomycotina	Dothideomycetes	Acrospermales	Acrospermaceae	Acrospermum compressum	GOLD: Whole Genome Sequencing	Jon Magnuson, Pacific Northwest National Laboratory
					* Oomyces carneoalbus	nominated	Manfred Binder, CBS KNAW
							Add to GOLD
Ascomycota	Pezizomycotina	Dothideomycetes	Botryosphaeriales	Bagnisiellaceae	None sequenced		Nominate Add to GOLD
Ascomycota	Pezizomycotina	Dothideomycetes	Botryosphaeriales	Botryosphaeriaceae	Aplosporella prunicola	GOLD: Whole Genome Sequencing	
					Botryosphaeria dothidea	GOLD: Whole Genome Sequencing	
					Diplodia pinea	GOLD: Whole Genome Sequencing	
					Lasiodiplodia theobromae	GOLD: Genome fragments	
					Macrophomina phaseolina	GOLD: Whole Genome Sequencing	
					Microdiplodia sp. AK1800	nominated	Jana URen, University of Arizona
					Neofusicoccum parvum	GOLD: Whole Genome Sequencing	

le projet de séquence de 1000 génomes fongiques a du mal à trouver les souches à séquencer car les collections ne possèdent pas de cultures pour de nombreuses familles…

… la raison en est qu'il n'existe souvent plus de mycologues qui les étudient actuellement!
et que…

… la diversité des champignons est immense !

estimations du nombre des espèces:

la plus basse : 100 000 espèces décrites
la plus fréquente: 1 500 000 espèces
la plus optimiste: >10 000 000 d'espèces

Au sein d'une même espèce, il existe une grande diversité génétique…

Comment sont conservées les souches ?

- repiquage en tube

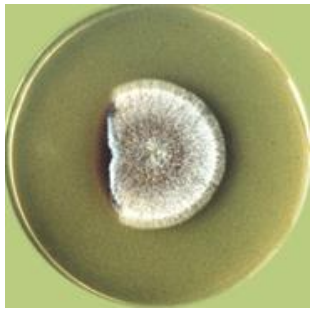
problème de stabilité des souches

haute mortalité

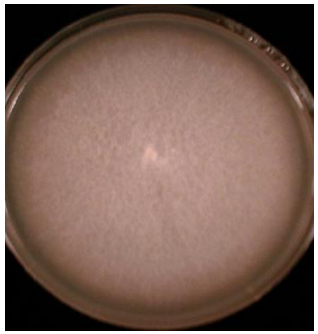
problème d'infection et de remplacement d'une espèce par une autre

nécessite de main d'œuvre compétente

exemple:



souche sauvage originale CBS225/58 de *Nectria haematococca* présente une instabilité naturelle

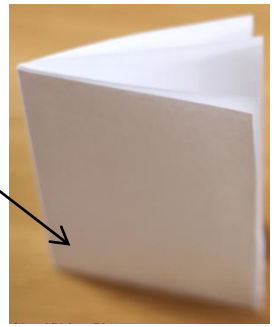


quelques années plus tard, l'instabilité a disparu: évènement mutationnel…

-sous huile

-spores ou mycéliums lyophilisés

spores ou mycélium



-spores ou mycéliums dans de l'eau pure

ne nécessite pas d'équipements complexes

souches plus stables

préservation plus longue

mortalité réduite

espace de stockage réduit

mais la durabilité est limitée et il faut repiquer régulièrement les souches

les dérives génétiques sont toujours possibles

les pertes sont toujours importantes

la cryopréservation dans l'azote liquide

souches stables

préservation plus longue

mortalité quasi-inexistante

mais nécessite

- des équipements complexes et onéreux

- un approvisionnement continu en azote liquide

- un grand espace pour le stockage des containers

Au laboratoire, nous utilisons la conservation à -70°C dans un milieu riche en saccharose

ressemble au système « cryoinstant »

en moins cher…

équipements moins complexes (congélateur à -80°C)

pannes de courant pas catastrophiques sauf si elles durent: les tubes peuvent être décongelés et recongelés plusieurs fois

souches très stables

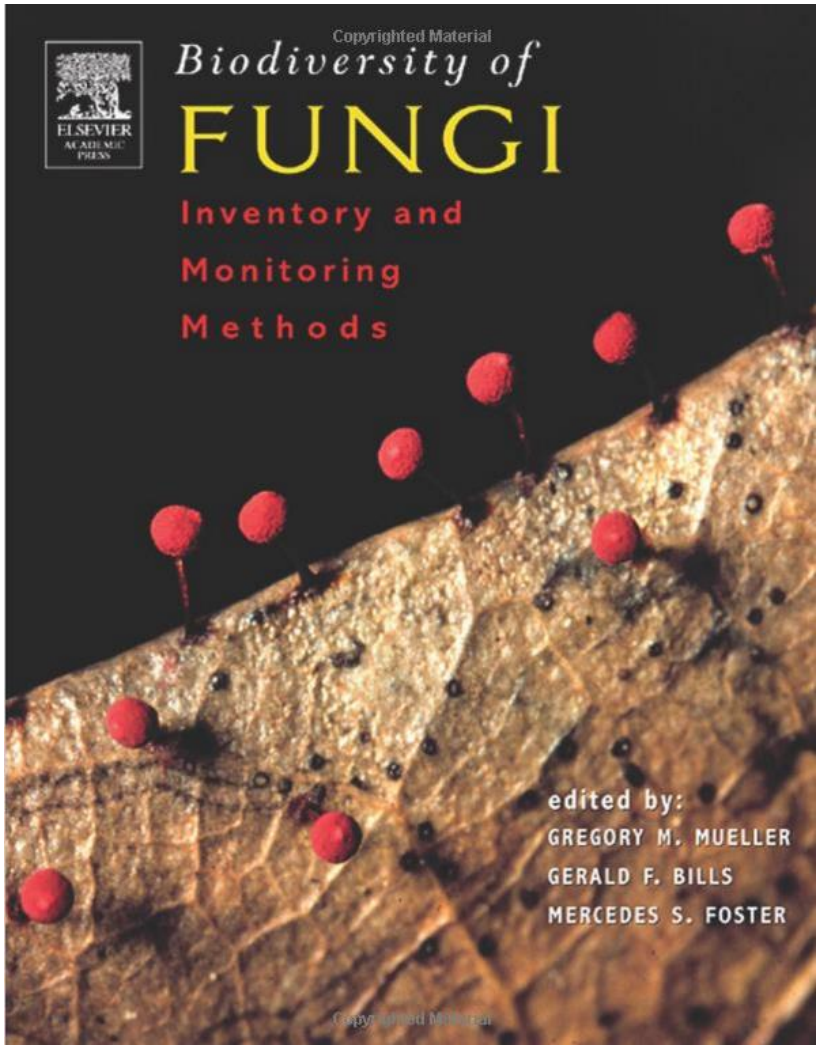
préservation longue

mortalité inexistante

espace de stockage réduit

fonctionne sur tout les *Eumycota* mais pas sur les *Oomycota*

Est-il difficile de démarrer une collection?



Non!

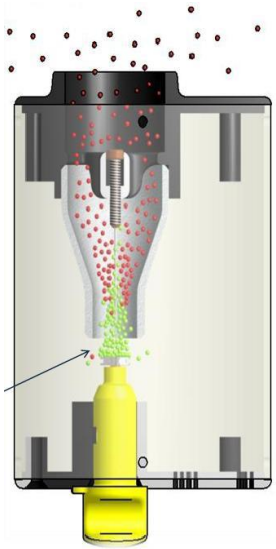
il existe des livres qui expliquent comment isoler des champignons en donnant les meilleurs recettes pour récupérer les différents types de champignons

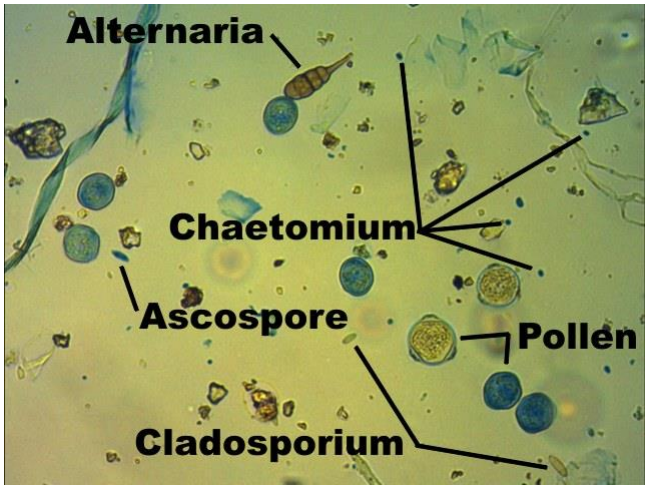
Il est possible de partir de :

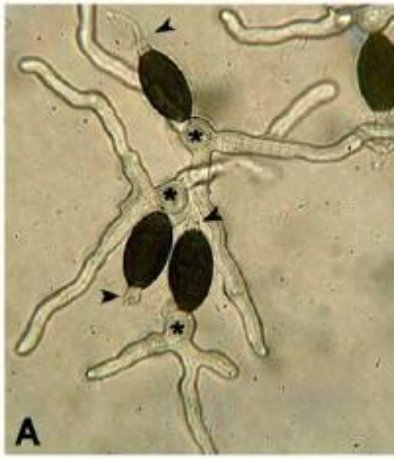
- **Sporophores car quasiment toutes les cellules fongiques sont totipotentes**
  - **Permet des savoir quel champignon est mis en culture**

→ Mais les sporophores sont souvent contaminés par d'autres champignons…

- **Spores récoltées dans l'environnement (dans l'atmosphère ou sur un carpophore par exemple)**







→ **Mais de nombreuses spores, en particulier les spores sexuelles (basidiospores et ascospores) germent difficilement…**

- **D’échantillons pris dans l’environnement avec mise en culture directe ou utilisation d’appâts pour privilégier certaines espèce**

→ Problèmes des contaminations (bactéries, nématodes et acariens, champignons à croissance rapide (*Mucor*): seule une fraction des espèces est récupérée

Mais, tous les champignons ne sont pas faciles à isoler et cultiver:

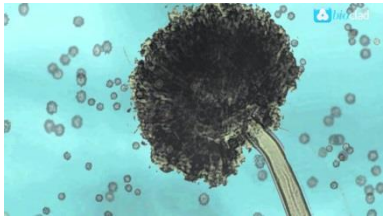
- **rouilles: pathogènes obligatoires incultivables *in vitro***

- endomycorhiziens : mutualistes obligatoires incultivables *in vitro* sauf quelques espèces à culture extrêmement difficile

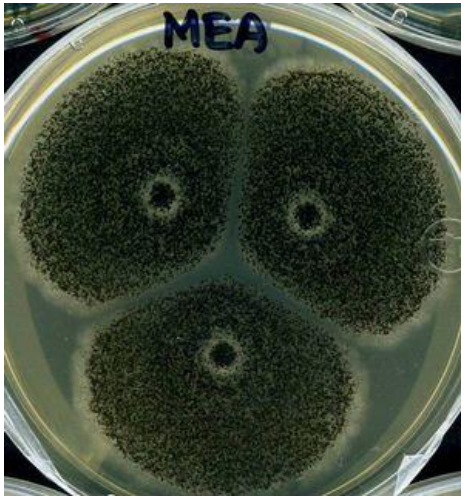
- les champignons ectomycorhiziens et les lichens ont des vitesses de croissance de quelques mm/mois

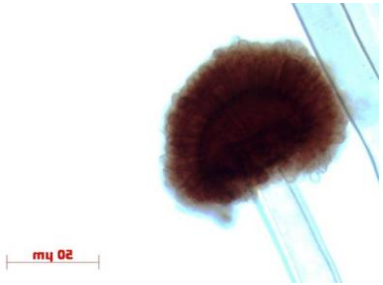
etc.

La détermination des espèces peut être difficile…



Aspergillus niger





Aspergillus carbonarius

Détermination morphologique ou moléculaire ?

La détermination morphologique ne nécessite en général pas d'équipements onéreux

Key to *Podospora* with 4-spored asci

1) Perithecia with swollen, articulated and agglutinated hairs (often forming a collar at the neck base), or sometimes with only swollen (non-agglutinated) hairs or single inflated and rounded peridial cells. Spores early septate, with a plasma-filled and hardly collapsing primary appendage. Filiform paraphyses absent, replaced by jacket-paraphyses.
(***Schizothecium*** Corda ***emend.*** N. Lundq., ***s.*** Lundqvist, 1972). **2**

1*) Perithecia with filiform, rigid hairs, but lacking swollen, articulated hairs. Outer peridial layer of polygonal cells. Spores usually late septate, with an easily collapsing, not plasma-filled primary appendage. True paraphyses present. 4

2) Spores lacking a gelatinous equipment, with a decidedly inequilateral apical portion, 17-22 × 10-13 µm. *P. inaequalis*

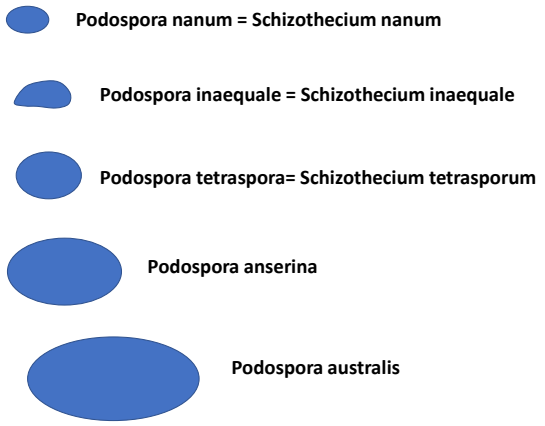
2*) Spores symmetrical, with a gelatinous equipment. 3

3) Spore head 12-14.5 × 7-9 µm. *Schizothecium* (= *Podospora*) *nanum*

3*) Spore head 19-24 × 12-14.5 µm. *P. tetraspora*

4) Spores 35-40 × 18-19 µm, with a well developed pedicel. Neck hairs agglutinated. *P. anserina*

4*) Spores 50-65 × 27-36 µm, with a hardly developed or sometimes absent pedicel. Neck hairs dense but non-agglutinated. *P. australis*



Mais des compétences souvent atteintes qu'après plusieurs années de pratiques…

La détermination moléculaire nécessite des équipements sophistiqués…

Au minimum:

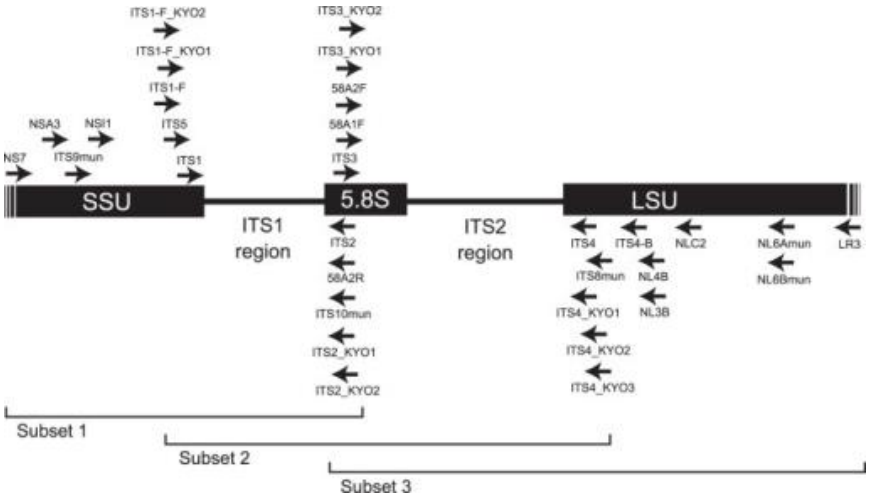
+

+

→ **Le séquençage peut se faire chez un prestataire de service**

Mais moins de compétences en mycologie !

détermination de la séquence code barre: région ITS chez les champignons et comparaison avec des banques



- Extraction d'ADN du champignon à identifier
- Amplification avec amorces (le plus souvent ITS1 + ITS4)
- Envoi à la séquence
- Interrogation banques de données:

  GenBank (https://www.ncbi.nlm.nih.gov/genbank/)

  UNITE (https://unite.ut.ee)

les erreurs sont nombreuses car les espèces sont mal déterminées (y compris dans les mycothèques!)

Un exemple: souligné en rouge, des myxomycètes et non des eumycètes !!!!!!!!!

Edit and Resubmit | Save Search Strategies | ▹Formatting options | ▹Download | How to read this page | Blast report description

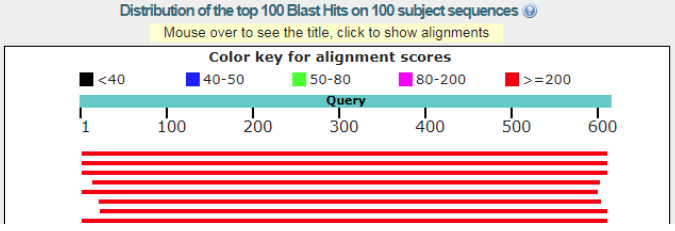
Job title: Nucleotide Sequence (612 letters)

RID 37GUS5MU015 (Expires on 12-16 19:43 pm)
Query ID lcl|Query_22391
Description None
Molecule type nucleic acid
Query Length 612

Database Name nr
Description Nucleotide collection (nt)
Program BLASTN 2.7.1+ ▹Citation

Other reports: ▹Search Summary [Taxonomy reports] [Distance tree of results] [MSA viewer]

Graphic Summary



Sequences producing significant alignments:

Select: All None Selected:0

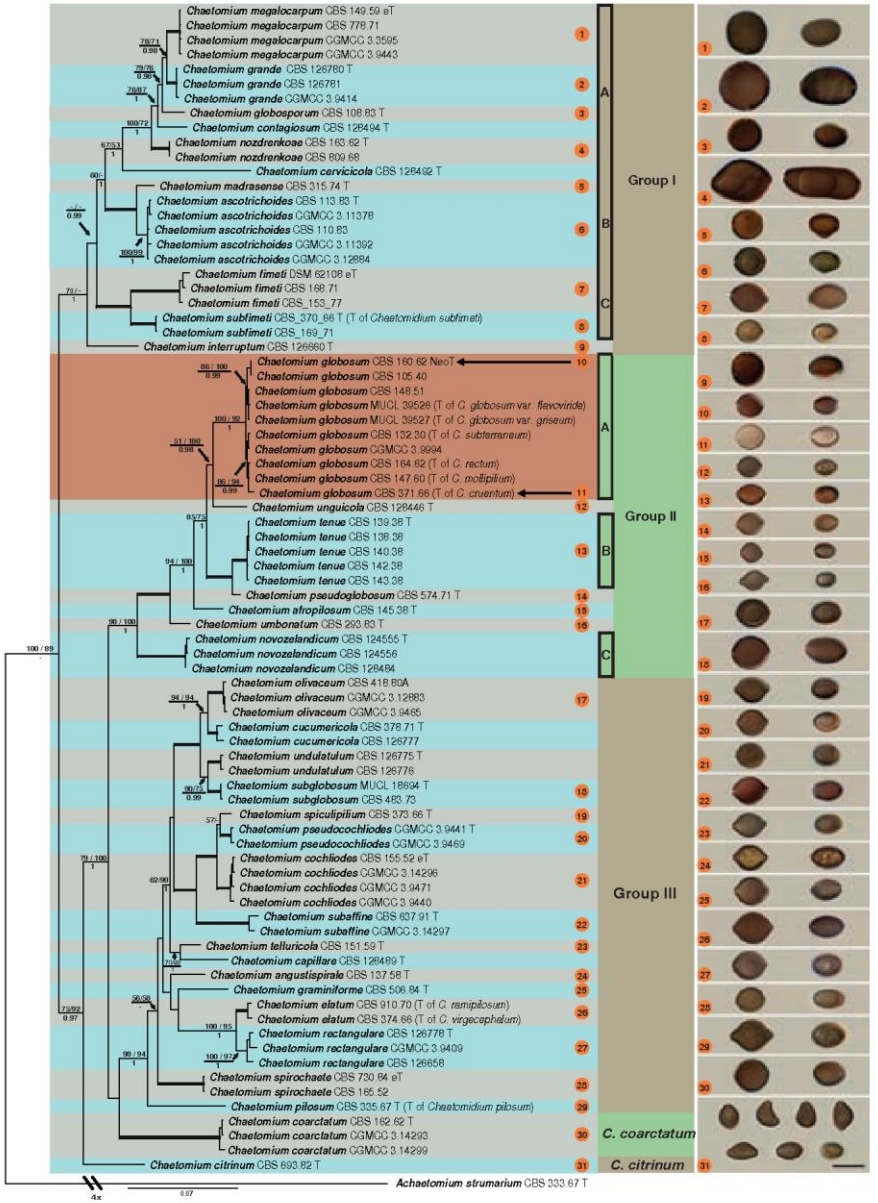
Alignments | Download | GenBank Graphics Distance tree of results

Description	Max score	Total score	Query cover	E value	Ident	Accession
Fungal sp. d3 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	1077	1077	98%	0.0	99%	GQ922553.1
Uncultured fungus clone FA1-O17 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	983	983	98%	0.0	96%	JX984744.1
Uncultured eukaryote clone CMH501 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	983	983	98%	0.0	96%	KF800592.1
Pezizales sp. strain SA233 internal transcribed spacer 1, partial sequence; 5.8S ribosomal RNA gene and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence	979	979	95%	0.0	97%	KX953549.1
Pezizales sp. P10 18S rRNA gene (partial), ITS1, 5.8S rRNA gene, ITS2 and 25S rRNA gene (partial), isolate P10	963	963	96%	0.0	96%	AJ969618.1
Iodophanus testaceus strain YG-C24 internal transcribed spacer 1, partial sequence; 5.8S ribosomal RNA gene and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	924	924	94%	0.0	95%	KX683422.1
Physarum loratum 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	911	911	95%	0.0	95%	HM101141.1
Uncultured eukaryote clone S12T_01 small subunit ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequen	726	726	98%	0.0	89%	KX114864.1
Uncultured fungus 18S rRNA, ITS1, 5.8S rRNA, ITS2 and 28S rRNA, clone 1B5	726	726	98%	0.0	88%	FN689670.1
Ascomycota sp. UNEX FECRGA 2012E703 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	699	699	97%	0.0	88%	KP698372.1
Uncultured fungus clone IIN1-21 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	699	699	96%	0.0	89%	EU516958.1
Uncultured soil fungus clone C065 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	688	688	98%	0.0	88%	JX489826.1
Uncultured eukaryote gene for fungal ITS1, 5.8S rRNA and ITS2, partial and complete sequence, clone: ITS_C03	688	688	96%	0.0	88%	AB572266.1
Arcyria sp. OT2-141 internal transcribed spacer 1, partial sequence; 5.8S ribosomal RNA gene and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	656	656	74%	0.0	93%	KT804074.1
Oedocephalum adhaerens 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 25S ribosomal RNA gene, partial sequence	656	656	98%	0.0	87%	FJ695215.1
Uncultured compost fungus partial 18S rRNA gene, ITS1, 5.8S rRNA gene, ITS2 partial 28S rRNA gene, clone AP38	616	616	75%	3e-172	91%	AM711392.1
Arcyria sp. 23332 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1 and 5.8S ribosomal RNA gene, complete sequence; and internal transcribed spacer 2, partial sequence	593	593	87%	2e-165	87%	KF574866.1
Fungal sp. Px2_2_4 genomic DNA containing ITS1, 5.8S rRNA gene and ITS2, isolate Px2_2_4	593	593	85%	2e-165	88%	FR648382.1
Arcyria nigella 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	577	577	93%	2e-160	86%	HM101140.1
Oedocephalum sp. AEH3_2 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1 and 5.8S ribosomal RNA gene, complete sequence; and internal transcribed spacer 2, partial sequence	545	545	80%	4e-151	87%	KF227802.1
Fungal sp. Px2_3_3 genomic DNA containing ITS1, 5.8S rRNA gene and ITS2, isolate Px2_3_3	544	544	74%	2e-150	89%	FR648385.1
Uncultured Pezizaceae clone OTU_1282-phylogroup Pez_6 5.8S ribosomal RNA gene and internal transcribed spacer 2, partial sequence	538	538	54%	7e-149	96%	KX115604.1
Uncultured eukaryote clone CMH398 18S ribosomal RNA gene, partial sequence; internal transcribed spacer 1, 5.8S ribosomal RNA gene, and internal transcribed spacer 2, complete sequence; and 28S ribosomal RNA gene, partial sequence	508	508	71%	6e-140	88%	KF800489.1

arbres phylogénétiques

- Extraction d'ADN
- Amplification par PCR de plusieurs gènes
- Séquences
- Arbre phylogénétique en incluant des espèces connues

Plus robuste que les séquences ITS mais beaucoup moins de données dans les banques de séquences…



g. 1 Consensus phylogram resulting from a Bayesian analysis of the concatenated *mb2*, *tub2*, *tef1*, *rpb1*, ITS and LSU gene region alignment, with th

La solution?

FACES OF FUNGI
Fungal Phyla

Home | Ascomycota | Basidiomycota | Basal Fungi | Other fungal-like organisms

Citation for webpage

Jayasiri SC, Hyde KD, Ariyawansa HA, Bhat J, Buyck B, Cai L, Dai YC, Abd-Elsalam KA, Ertz D, Hidayat I, Jeewon R, Jones EBG, Bahkali AH, Karunarathna SC, Liu JK, Luangsa-ard JJ, Lumbsch HT, Maharachchikumbura SSN, McKenzie EHC, Moncalvo, JM, Ghobad-Nejhad M, Nilsson H, Pang KA, Pereira OL, Phillips AJL, Raspé O, Rollins AW, Romero AI, Etayo J, Selçuk F, Stephenson SL, Suetrong S, Taylor JE, Tsui CKM, Vizzini A, Abdel-Wahab MA, Wen TC, Boonmee S, Dai DQ, Daranagama DA, Dissanayake AJ, Ekanayaka AH, Fryar SC, Hongsanan S, Jayawardena RS, Li WJ, Perera RH, Phookamsak R, de Silva NI, Thambugala KM, Tian Q, Wijayawardene NN, Zhao RL, Zhao Q, Kang JC, Promputtha I. 2015 – The Faces of Fungi database: fungal names linked with morphology, phylogeny and human impacts. Fungal Diversity 74(1):3-18 (DOI 10.1007/s13225-015-0351-8)

Curators of web page

Why we need to put faces to fungi

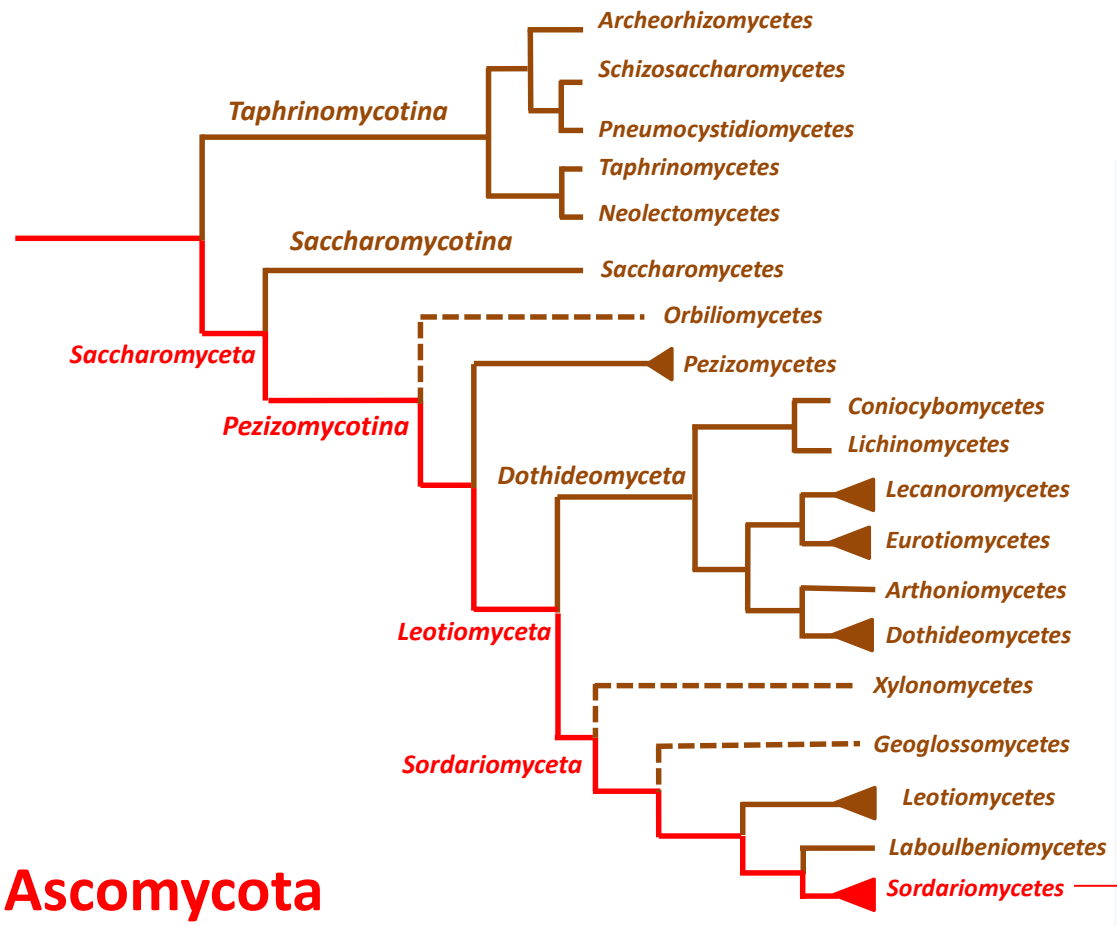
Several fungal taxonomic databases (Index Fungorum and MycoBank) can be sourced to find taxonomic details of the fungi, while sequence data for the fungi can be sourced from GenBank and UNITE. The latter nucleotide databases in particularly have very little quality control and thus blast searches for matches in GenBank are often meaningless. Although sequence data may be linked to names, the data has been lodged by literally anyone and the names are not generally linked to images, descriptions or fungarium material. There is generally no way to establish if the names are accurate or guesses. Even the AFTOL and recent higher phylogenetic studies, which have used strains from international fungaria (e.g. CBS) have rarely been linked to more than a culture number. Usually it is impossible to verify what the characters of the taxon from which the strain were isolated. Thus most fungi in public databases, whether taxonomic or gene based are faceless and much of the time we work in a vacuum, hoping that the names are correct. In April 2014 the Mushroom Research Foundation will launch a webpage for the fungi with the aim of putting faces on fungi. Not only will names have characteristics linked to sequence data, but they will also be given human attributes. Thus roles, industrial relevance, quarantine and chemistry will be included in fungal profiles. Each genus will be profiled in separate publications in relevant journals where the fungi will be illustrated, isolates from the illustrated fungi will be detailed and sequenced, and details on role, industrial relevance, biosecurity issues, importance and chemistry will be added. The relevant details will be extracted to the "*faces of fungi*", web site. We hope that all mycologists will contribute to this web page over time and it will provide a comprehensive one stop shop where details of fungal genera and species, molecular data as well as their roles, biosecurity issues and industrial relevance can be sourced. The present paper is written and published in order to kick start the data entry and introduce the web page to the scientific community. Thus, the aim of the web page is to show how fungi are relevant to humans and thus put a human face on the fungal world.

Mushroom RESEARCH FOUNDATION

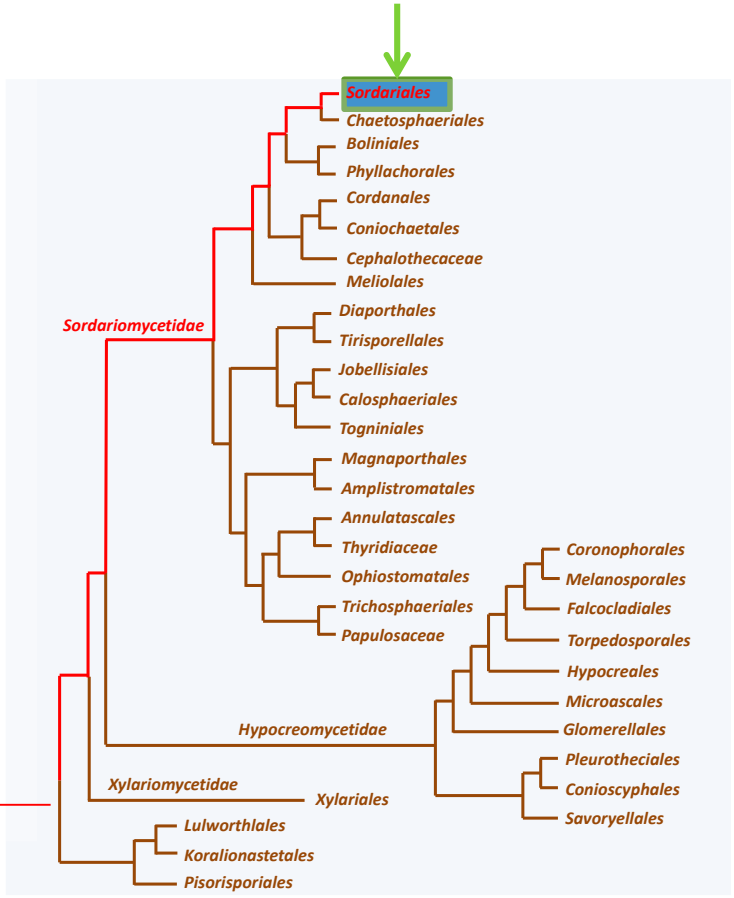
School of Science
Mae Fah Luang University

This website is under construction
Please visit again.

Un exemple de ce que je fais actuellement dans mon laboratoire - Les *Sordariales* : diversité génétique et biologique extraordinaire



Ordre des *Sordariales*
Plus divers que les vertébrés!



wGladieux CSP19 sordariales - D

https://jgi.doe.gov/preparing-for-sequence-data-deluge/wgladieux-csp19-sordariales/

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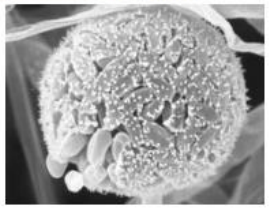
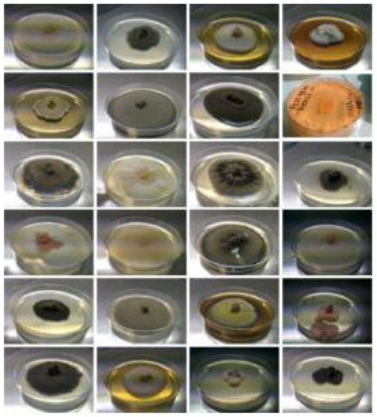


FY20 Proposal Call for Community Science Program

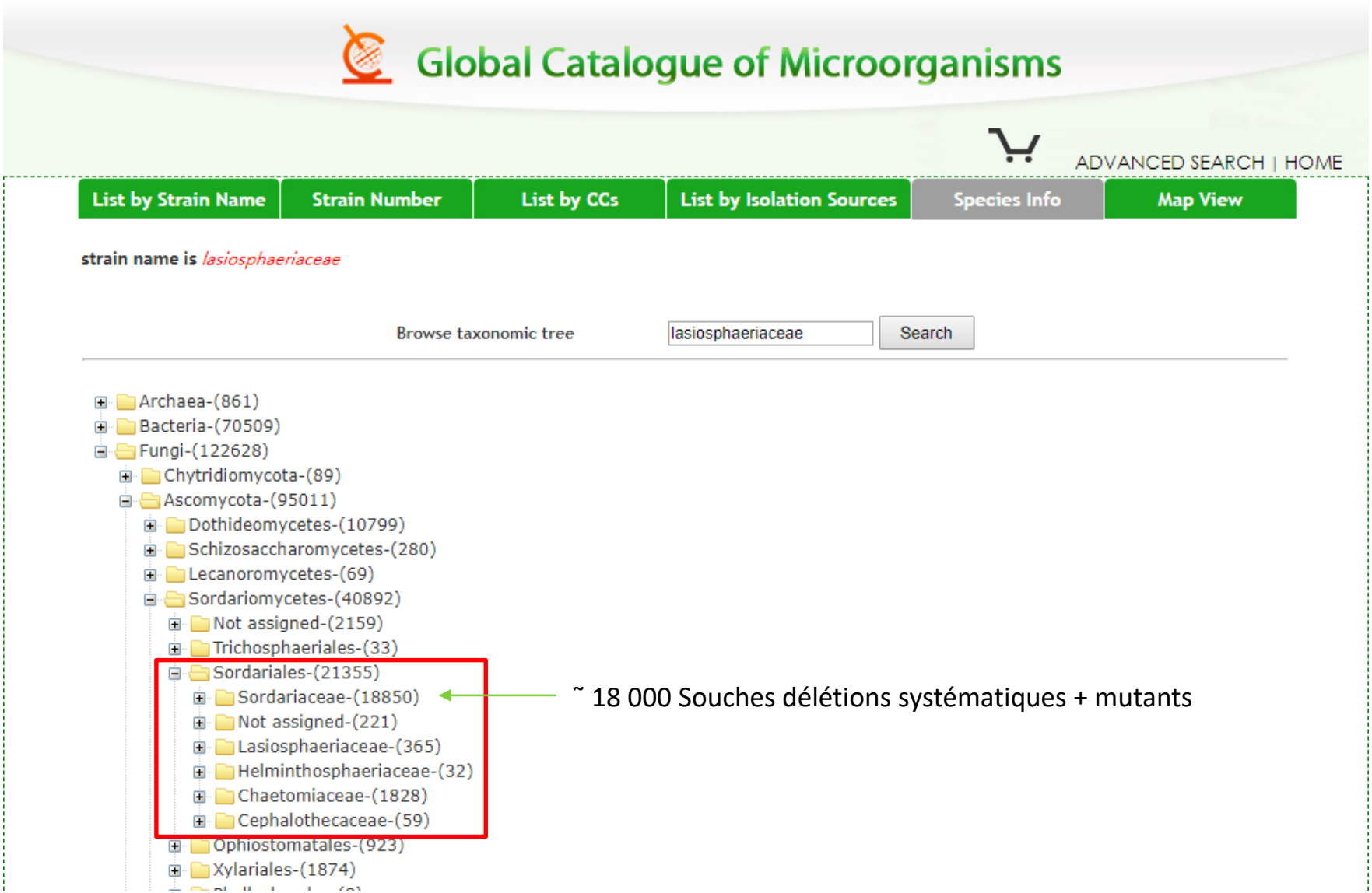
OCTOBER 2, 2018

wGladieux CSP19 sordariales



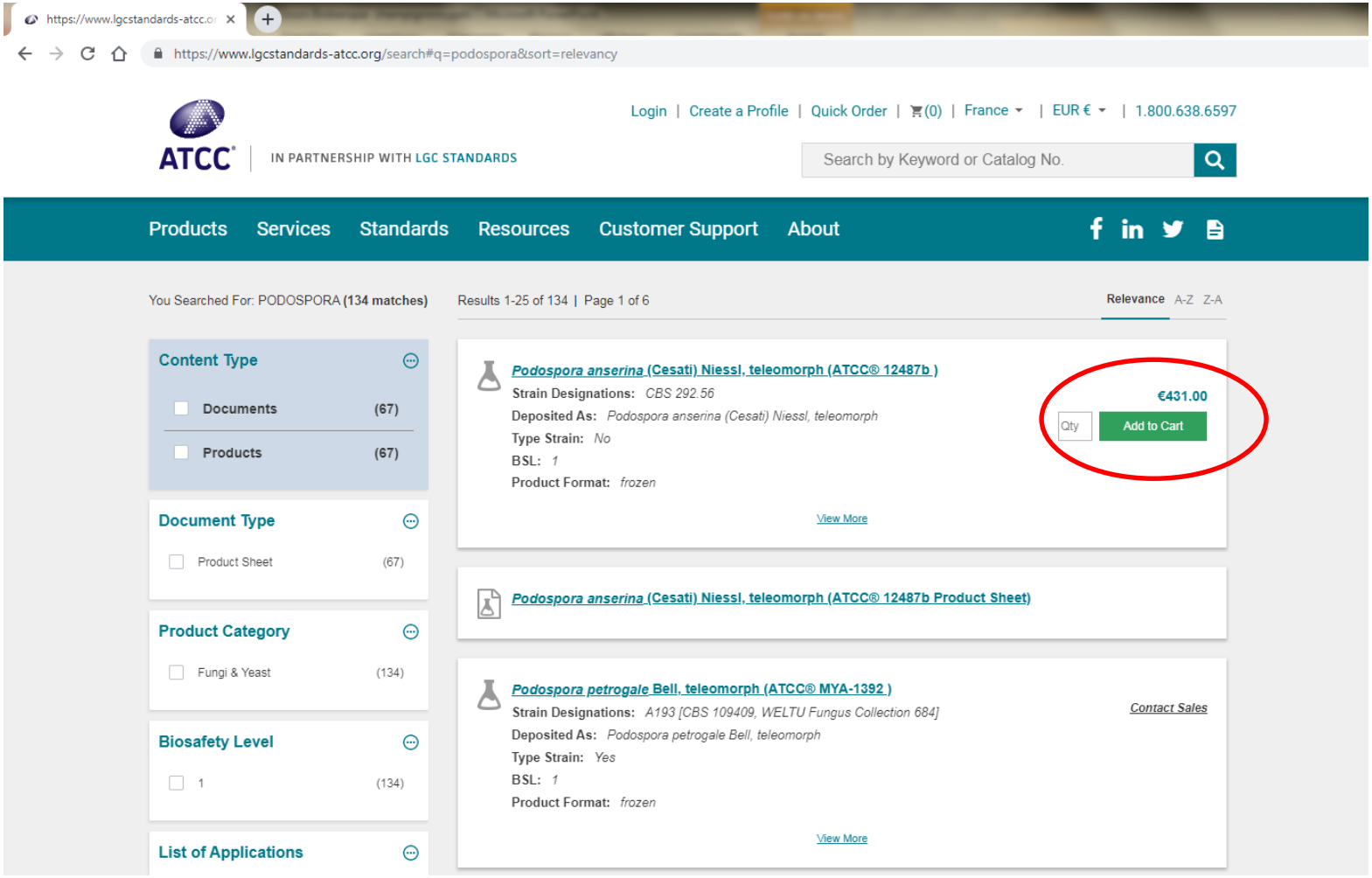
Morphological diversity of Sordariales growing in the lab. Pierre Gladieux's proposal explores functional diversity in Neurospora and its relatives. (Pierre Gladieux, INRA Montpellier)

Analyse des génomes par des collègues mais…



Peu de souches dans les collections pour la plupart des familles

Les souches coutent cher!



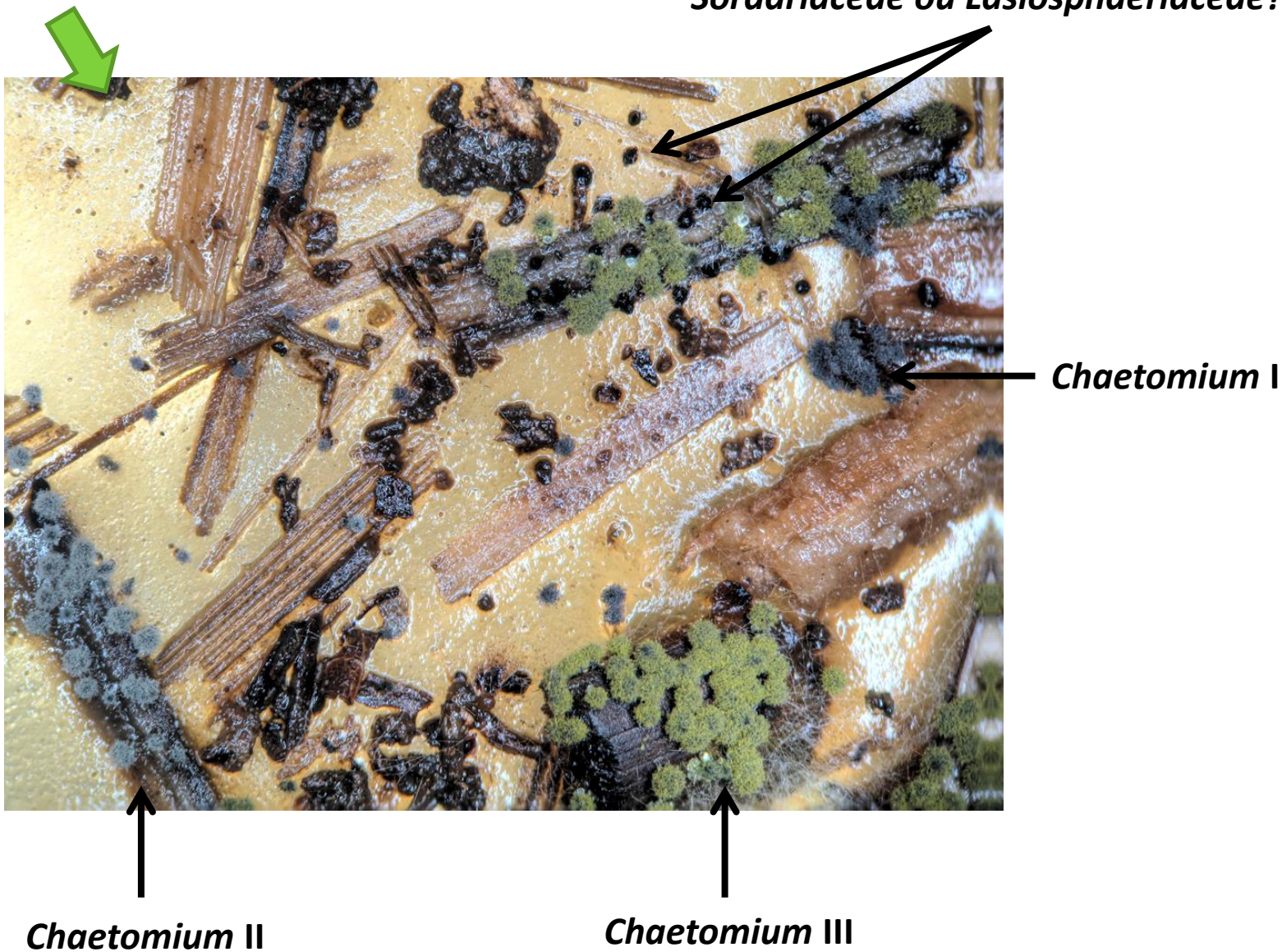
→Isolement de nouvelles souches et mise en collection!

Comment fait-on?

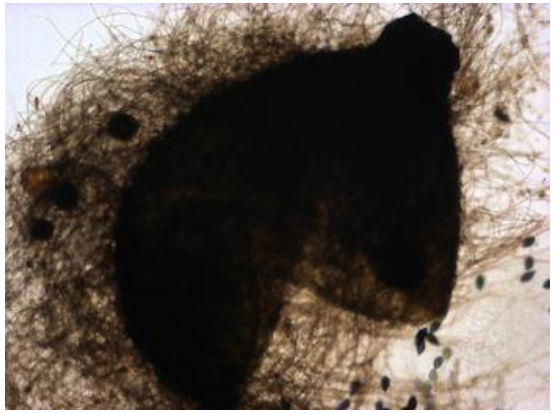
Chambres humides avec excréments d'herbivores pour les coprophiles ou des morceaux de bois pour les lignicoles

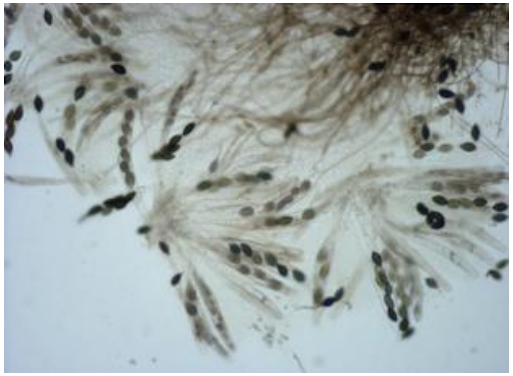
Inoculation sur milieu avec sources de carbone complexes pour les espèces du sol, de la litière et les endophytes

Mise en culture sur M0+miscanthus



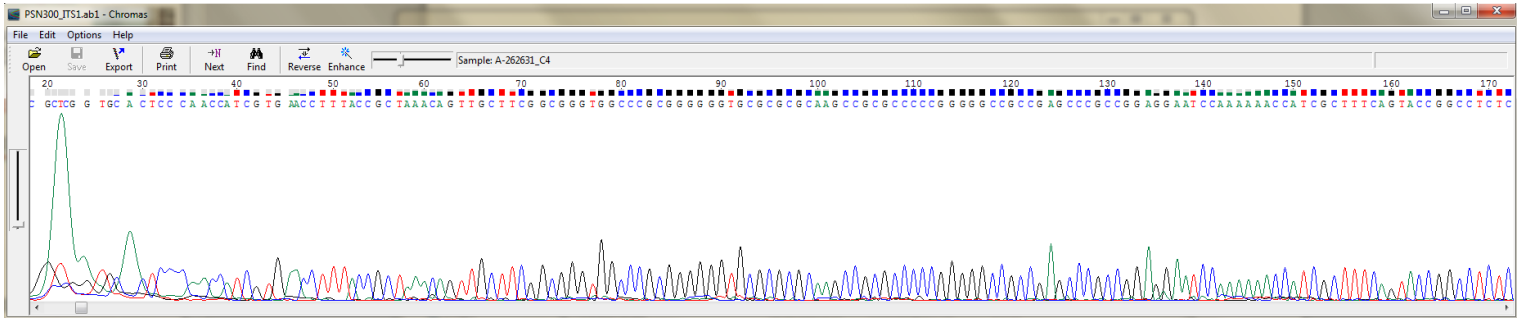
Identification rapide par la morphologie





Lasiosphaeriaceae: mise en culture

Séquence du code barre (ITS)



Analyse de notre fichier vérifié par BLAST

Une fois validée: chaque souche est mise en collection!

BOITE AE15

souche	*espèces*	date de mise en RG
T1(P.roq V3/pAN7.1::hygro^R)	*P. roqueforti*	
T4(P.roq V3/pAN7.1::hygro^R)	*P. roqueforti*	
T11(P.roq V3/pAN7.1-Ago::hygro^R)	*P. roqueforti*	
T14(P.roq V10/pAN7.1::hygro^R)	*P. roqueforti*	
T15(P.roq V10/pAN7.1-Ago::hygro^R)	*P. roqueforti*	
T17(P.roq V10/pAN7.1-Ago::hygro^R)	*P. roqueforti*	**juin-17**
CBS307.81 sp4 mat1-2 (=MT-)	*Cercophora samala*	
CBS307.81 sp5 mat1-1 (=MT+)	*Cercophora samala*	juil-17
CBS 390.84	*Apiocordaria longicaudata*	
CBS 315.58	*Apiocordaria verruculosa*	aout 2017
PSN237	*Dioratomycespurpureofiscens*	
PSN238	*Dioratomyces sp.*	
PSN239	*Podospora anserina*	
PSN240A		
PSN240B	*Podospora anserina*	
PSN240C		
PSN240D		
PSN241	*Podospora anserina*	
PSN242	*Podospora aff. Communis*	
PSN243	*Podospora aff. Communis*	
PSN244	*Schizothecium sp.*	
PSN245	*Schizothecium sp.*	
PSN246	*Schizothecium sp.*	
PSN247	*Sordaria macrospora*	
PSN248	*Fusarium equiseti*	
PSN249	*Sordaria aff. Macrospora*	
PSN250	*Pezizales sp.*	
PSN251	*Chaetomium sp.*	
PSN252	*Chaetomium sp.*	
PSN253	*Coprinellus bisporus*	
PSN254	*????*	
PSN255	*Sordaria aff. Fimicola*	
PSN256	*Gelaniscospora brevispora*	
PSN257	*Gelaniscospora cratophora*	
PSN258	*Podospora aff. curvulcoides*	
PSN259	*Cladorrhinum sp.*	
PSN260	*Gelaniscospora seminuda*	
PSN261	*Pelectosphaerella cucumerina*	

BOITE AE16

souche	*espèces*	date de mise en RG
PSN314	*Podospora australis*	
PSN315	*Podospora aff. araneosa*	mai-18
PSN316	*Cladorrhinumaff. Bulbillosum*	
PSN317	*Cladorrhinum samala*	
PSN318	*Neurospora tetrasperma*	
PSN319	*Trichoderma spirale*	
PSN320	*Neurspora tetrasperma*	
PSN321	*Chaetomium nigricolor*	
PSN322	*Podospora unicaudata*	
PSN323	*Botrytotrichum murorum*	
PSN324	*Cladorrhinum samala*	juin-18
PSN325	*Petriella sp.*	
PSN326	*Torula sp.*	
PSN327	*Chaetomium globosum*	
PSN328	*Cladorrhinum samala*	
PSN329	*Cladorrhinum sp.*	
PSN330	*Cladorrhinum sp.*	
PSN331	*Cladorrhinum sp.*	
PSN332	*Cladorrhinum sp.*	
PSN333	*Cladorrhinum sp.*	
PSN334	*Cladorrhinum sp.*	juil-18
PSN335		
PSN336		
PSN337		
PSQ1		
PSQ2		
PSQ3		
PSQ4		
PSQ5		
PSQ6		
PSQ7		
PSQ8		
PSQ9		
PSQ10		
PSQ11		
PSQ12		
PSQ13		
PSQ14		

En attente d'identification

JGI MycoCosm
THE FUNGAL GENOMICS RESOURCE

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TREE | SEARCH | BLAST | ANNOTATIONS | MCL CLUSTERS | DOWNLOAD | INFO | HELP!

##	Name	Assembly Length	# Genes	Published
1	Achaetomium strumarium CBS333.67 v1.0	32,422,668	10,185	
2	Apiosordaria backusii CBS 540.89 v1.0	40,188,346	12,368	
3	Apiosordaria verruculosa CBS 315.58 v1.0	37,862,799	11,838	
4	Apodospora peruviana CBS 118394 v1.0	42,017,045	13,445	
5	Bombardia bombarda SMH3391-2 v1.0	38,597,794	12,102	
6	Cercophora caudata CBS 606.72 v1.0	41,294,634	14,552	
7	Cercophora newfieldiana SMH2532-1 v1.0	39,838,444	14,520	
8	Cercophora samala CBS 307.81 v1.0	37,160,918	11,249	
9	Cercophora scortea SMH4131-1 v1.0	40,165,273	11,779	
10	Chaetomidium fimeti CBS 168.71 v1.0	35,321,551	11,448	
11	Chaetomium funicola MPI-SDFR-AT-0129 v1.0	33,300,809	10,414	Mesny F et al., 2021
12	Chaetomium globosum MPI-SDFR-AT-0079 v1.0	34,154,134	11,569	Mesny F et al., 2021
13	Chaetomium globosum v1.0	34,886,939	11,124	Cuomo CA et al., 2015
14	Chaetomium sp. 1176438 v1.0	33,837,664	9,520	
15	Chaetomium sp. MPI-CAGE-AT-0009 v1.0	33,768,356	11,326	Mesny F et al., 2021
16	Chaetomium thermophilum var thermophilum DSM 1495	28,322,806	7,165	Amlacher S et al., 2011
17	Cladorrhinum bulbillosum DJ3 v1.0	39,735,607	12,786	
18	Cladorrhinum microsclerotigenum CBS 290.75 v1.0	33,147,543	10,782	
19	Cladorrhinum samala PSN324 v1.0	36,213,901	10,895	
20	Cladorrhinum sp. PSN259 v1.0	37,965,256	11,972	
21	Cladorrhinum sp. PSN332 v1.0	37,948,236	12,024	
22	Copromyces sp. CBS 386.78 v1.0	50,044,663	10,890	
23	Diplogelasinospora grovesii CBS 340.73 v1.0	48,188,163	13,057	
24	Echria (Arnium) macrotheca PSN4 v1.0	37,830,185	12,289	
25	Gelasinospora tetrasperma v1.0	43,856,413	11,251	
26	Lasiosphaeria miniovina SMH2392-1A v1.0	49,418,628	14,970	
27	Lasiosphaeria ovina CBS 958.72 v1.0	51,771,160	14,921	
28	Lasiosphaeriaceae sp. AZ0830 v1.0	49,085,029	15,812	
29	Lasiosphaeris hirsuta SMH4607-1 v1.0	44,448,086	14,131	
30	Lasiosphaeris hispida CBS 955.72 v1.0	48,441,159	14,680	
31	Madurella mycetomatis mm55	36,704,944	10,707	Smit S et al., 2016
32	Myceliophthora heterothallica CBS 202.75 v1.0	35,441,645	9,222	
33	Myceliophthora heterothallica CBS 203.75 v1.0	35,358,904	10,061	
34	Myceliophthora similis CBS 632.67 v1.0	31,812,524	9,392	
35	Myceliophthora thermophila (Sporotrichum thermophile) v2.0	38,744,216	9,110	Berka RM et al., 2011
36	Neurospora crassa FGSC 73 trp-3 v1.0	40,416,174	11,978	Baker SE et al., 2015
37	Neurospora crassa FGSC4200 (ORS6a) v2.0	41,683,309	10,792	
38	Neurospora crassa OR74A v2.0	41,037,538	10,785	Galagan JE et al., 2003

des souches que j'ai isolées…

Podospora	fibrinocaudata	no	IMI346680	Bombardiaceae
Triangularia	batistae	no	CBS315.93(duclaeII/III)	Bombardiaceae
Zopfiella	pleuropora	no	IMI148365	Bombardiaceae
Phialemonium	atrogriseum		8032-3	Cephalothecales
Phialemonium	globosum		UM16-13	Cephalothecales
Boothiella	tetraspora	no	CBS334.67	Chaetomiaceae
Collariella	robusta	no	PSN660	Chaetomiaceae
Subramaniula	aff. cuniculorum	Chaetomium aff. cuniculorum	PSN656	Chaetomiaceae
Diplogelasinospor	grovesii		CBS340.73	Diplogelanisosporaceae
Diplogelasinospor	princeps	no	CBS135879	Diplogelanisosporaceae
Diplogelasinospor	inaequalis	no	CBS436.74	Diplogelanisosporaceae
Camptosphaeria	citronella	no	ANMAccl#895.1	Lasiosphaeriaceae
Lasiosphaeria	sp.	no	ANMAccl#1003	Lasiosphaeriaceae
Mammaria	echinobotryoides	no	IMI141550	Lasiosphaeriaceae
Cercophora	arenicola	Lasiosphaeris arenicola	ANMAccl#617.7	Lasiosphaeridaceae
Apodus	sp.	no	PSN540	Naviculisporaceae
Arnium	leporinum	no	CBS365.69	Naviculisporaceae
Naviculisporaceae	sp.	no	PSN637	Naviculisporaceae
Naviculisporaceae	sp.	no	PSN640	Naviculisporaceae
Podospora	decipiens		PSN293	Naviculisporaceae
Podospora	aff. araneosa	no	PSN308	Naviculisporaceae
Pseudorhypophila	mangenotii	Triangularia mangenotii	IMI229747	Naviculisporaceae
Pseudorhypophila	marina	Zopfiella marina	IMI229743	Naviculisporaceae
Rhypophila	pleiospora	Podospora pleiospora	PSN305	Naviculisporaceae
Rhypophila	decipiens	Podospora decipiens	CBS256.69	Naviculisporaceae
Rhypophila	aff. pleiospora	no	PSN658	Naviculisporaceae
Zopfiella	latipes	no	IMI350600	Naviculisporaceae
Apiosordaria	verruculosa		CBS315.58sp2	Podosporaceae
Apiosordaria	aff. backusii	no	PSN263	Podosporaceae
Apiosordaria	tenuilacunata	no	CBS629.82sp1	Podosporaceae
Apiosordaria	yaeyamensis	Triangularia yaeyamensis	NBRC31170	Podosporaceae
Cercophora	samala		CBS307.81F0.1	Podosporaceae
Cercophora	aff. grandiuscula	Cladorrhinum aff. grandiusculum	PSN269	Podosporaceae
Cercophora	grandiuscula	Cladorrhinum grandiusculum	CBS120013	Podosporaceae
Cercophora	squamulosa	no	CBS125293	Podosporaceae
Cercophora	coprophila	Cladorrhinum coprophilum	NBRC32091sp1	Podosporaceae
Cladorrhinum	samala		PSN324	Podosporaceae
Cladorrhinum	sp.		PSN332	Podosporaceae
Cladorrhinum	microsclerotigenum		CBS290.75	Podosporaceae
Cladorrhinum	sp.		PSN259	Podosporaceae
Cladorrhinum	aff. bulbillosum	no	PSN502	Podosporaceae
Cladorrhinum	aff. bulbillosum	no	PSN501	Podosporaceae
Cladorrhinum	phialophoroides	Triangularia phialophoroides	CBS300.91sp1	Podosporaceae
Cladorrhinum	sp.	no	PSN476	Podosporaceae
Cladorrhinum	sp.	no	PSN330	Podosporaceae
Cladorrhinum	foecundissimum	no	IMI352947	Podosporaceae
Cladorrhinum	hyalocarpum	no	CBS322.70sp1	Podosporaceae
Jugulospora	sp.	no	PSQ10	Podosporaceae
Podospora	unicaudata		PSN322	Podosporaceae
Podospora	australis		PSN309	Podosporaceae
Podospora	fimiseda		CBS990.96	Podosporaceae
Podospora	brasiliensis		CBS892.96	Podosporaceae
Podospora	inflatula	no	CBS413.82	Podosporaceae
Podospora	austroamericana	Podospora castorinospora	IMI104947	Podosporaceae
Podospora	horridula	Rosellinia horridula ; Triangularia horrid	IMI263268	Podosporaceae
Podospora	platensis	no	IMI331743	Podosporaceae
Podospora	bulbillosa	Cladorrhinum bulbillosum	CBS304.90	Podosporaceae
Triangularia	batistae	no	CBS381.68	Podosporaceae
Triangularia	angulispora	no	IMI229745	Podosporaceae
Triangularia	allahabadensis	no	CBS724.68sp1	Podosporaceae
Triangularia	striatispora	Podospora striatispora	CBS154.77sp1	Podosporaceae
Zopfiella	longicaudata	Triangularia longicaudata	CBS252.57	Podosporaceae
Zopfiella	leucotricha	no	PSQ3	Podosporaceae
Zopfiella	inermis	no	IMI192617	Podosporaceae
Zopfiella	macrospora	no	IMI300979	Podosporaceae
Zopfiella	tetraspora	Triangularia tetraspora	NBRC32904	Podosporaceae
Apodus	deciduus	no	CBS506.70	Schizothecaceae
Cercophora	aff. caudata		PSN171	Schizothecaceae
Cercophora	sp.	no	PSN556	Schizothecaceae
Echria	macrotheca		PSN4	Schizothecaceae
Jugulospora	carbonaria	Strattonia carbonaria	IMI210875	Schizothecaceae
Lundqvistomyces	tanzaniensis	Triangularia tanzaniensis	CBS453.91	Schizothecaceae
Lunqvistomyces	karachiensis	Zopfiella karachiensis	IMI340453	Schizothecaceae
Podospora	aff. communis		PSN243	Schizothecaceae
Podospora	tetraspora		CBS815.71sp3	Schizothecaceae
Podospora	inquinata	no	IMI300486	Schizothecaceae
Podospora	minicauda	no	IMI314719	Schizothecaceae
Podospora	aff. prethopodalis	no	PSN608	Schizothecaceae
Podospora	aff. vesticola	Schizothecium aff. vesticola	PSN591	Schizothecaceae
Podospora	cupiformis	no	CBS246.71sp3	Schizothecaceae
Podospora	aff. tetraspora	Schizothecium aff. tetrasporum	PSN518	Schizothecaceae
Schizothecia	sp.	no	PSN676	Schizothecaceae
Schizothecium	conicum		SC1-Ups	Schizothecaceae
Schizothecium	carpinicola	Podospora carpinicola	IMI314718	Schizothecaceae
Schizothecium	curvisporum	Neoschizothecium curvisporum	IMI175246	Schizothecaceae
Zygopleurage	sp.	no	PSN465	Schizothecaceae
Asordaria	arctica		CBS143.68	Sordariaceae
Copromyces	sp.		CBS386.78	Sordariaceae
Gelasinospora	amorphoporcata		CBS626.80	Sordariaceae
Neurospora	calospora	Gelasinospora calospora	FGSC958	Sordariaceae
Neurospora	reticulospora	Gelasinospora reticulospora	FGSC960	Sordariaceae
Neurospora	dodgei	no	FGSC1692	Sordariaceae
Neurospora	galapagosensis	no	FGSC1739	Sordariaceae
Neurospora	lineolata	no	FGSC1910	Sordariaceae
Neurospora	indica	Gelasinospora indica	FGSC7793	Sordariaceae
Neurospora	brevispora	Gelasinospora brevispora	FGSC7795	Sordariaceae
Neurospora	cratophora	Gelasinospora cratophora	FGSC7796	Sordariaceae
Neurospora	hapsidophora	Gelasinospora hapsidophora	FGSC7797	Sordariaceae
Neurospora	dictyophora	Gelasinospora dictyophora	FGSC7798	Sordariaceae
Neurospora	sp.	no	MNHN-RF-04747	Sordariaceae
Neurospora	kobi	Gelasinospora kobi	MNHN-RF-02382	Sordariaceae
Neurospora	stellata	Gelasinospora stellata	MNHN-RF-02395	Sordariaceae
Neurospora	santi-florii	Gelasinospora santi-florii	MNHN-RF-02390	Sordariaceae
Neurospora	foveaconica	Gelasinospora foveaconica	MNHN-RF-02366	Sordariaceae
Neurospora	fallaciosa	Gelasinospora fallaciosa	MNHN-RF-02373	Sordariaceae
Neurospora	heterospora	Gelasinospora heterospora	MNHN-RF-02378	Sordariaceae
Neurospora	inversa	Gelasinospora inversa	MNHN-RF-02380	Sordariaceae
Neurospora	macrospora	Gelasinospora macrospora	MNHN-RF-02386	Sordariaceae
Neurospora	multifloris	Gelasinospora multifloris	MNHN-RF-02387	Sordariaceae
Neurospora	seminuda	Gelasinospora seminuda	MNHN-RF-02393	Sordariaceae
Sordaria	sclerogenia	no	FGSC2741	Sordariaceae
Sordaria	goundaensis	Asordaria goundaensis	MNHN-RF-02343	Sordariaceae
Sordaria	tomentoalba	no	MNHN-RF-02357	Sordariaceae
Sordaria	fimicola	no	MNHN-RF-02568	Sordariaceae
Sordaria	mabokeensis	Asordaria mabokeensis	MNHN-RF-02349	Sordariaceae
Sordaria	prolifica	Asordaria prolifica	MNHN-RF-02352	Sordariaceae
Sordaria	superba	no	MNHN-RF-04840	Sordariaceae
Sordaria	conoidea	Asordaria conoidea	MNHN-RF-02340	Sordariaceae
Podospora	haustrohemisphaeric	no	FGSC8314	Sordariales IS
Podospora	petrogale	Strattonia petrogale	CBS109409	Strattoniaceae
Vermiculariopsiell	pediculata		CBS132484	Vermiculariopsiellales