



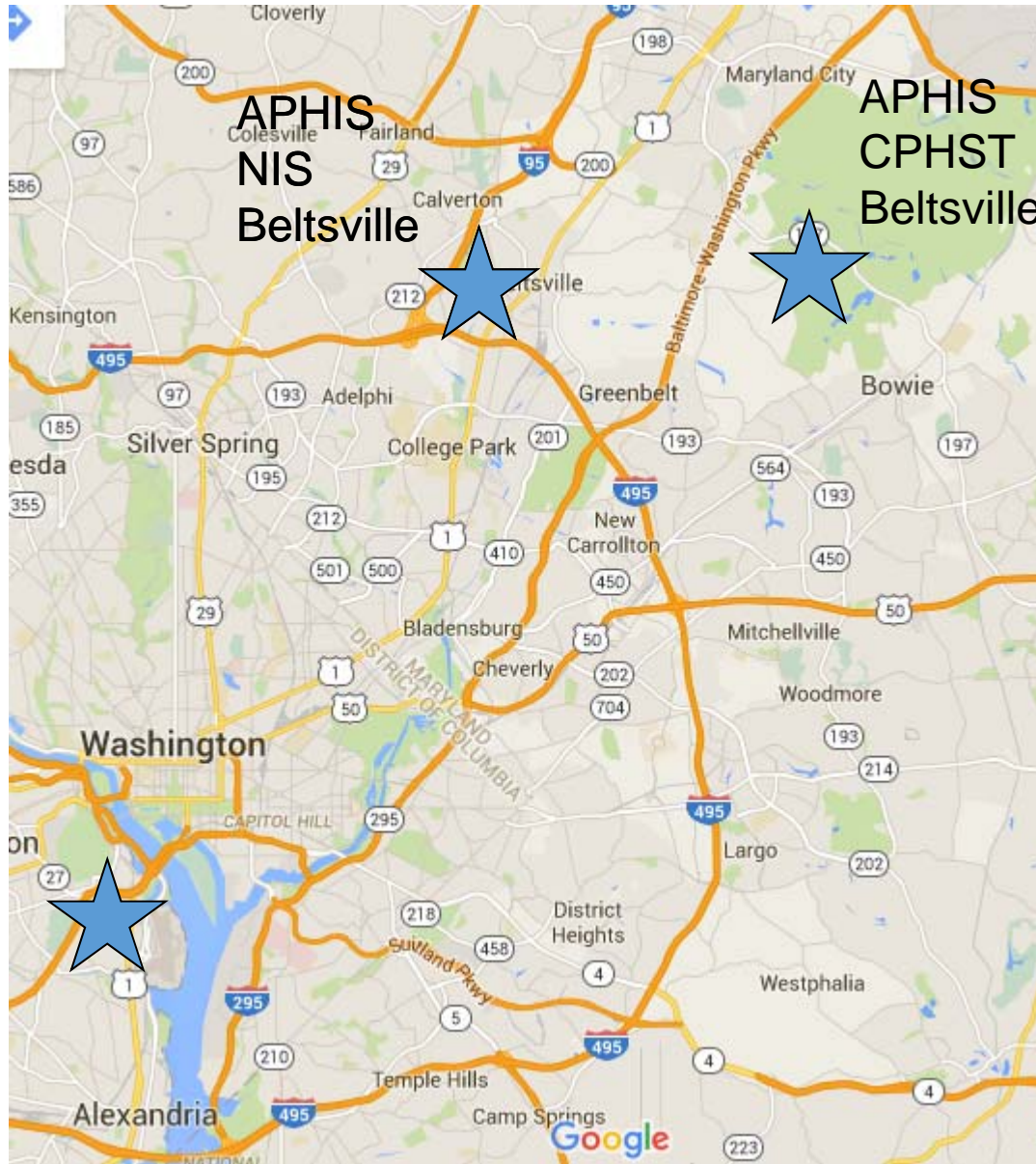
United States Department of Agriculture

Managing Mycological Mysteries

(Systematics and the
Identification of Fungi)

NPDN meeting March 2016

Megan Romberg USDA APHIS PPQ PHP NIS



APHIS NIS (Mycology) Beltsville

- Fungal Identification
- Samples received from ports– Urgents = same day turnaround
- Samples received from states -> Final confirmation of new to US (or new to state) fungi (morphology and sequence supported identifications)

APHIS CPHST Beltsville (580)

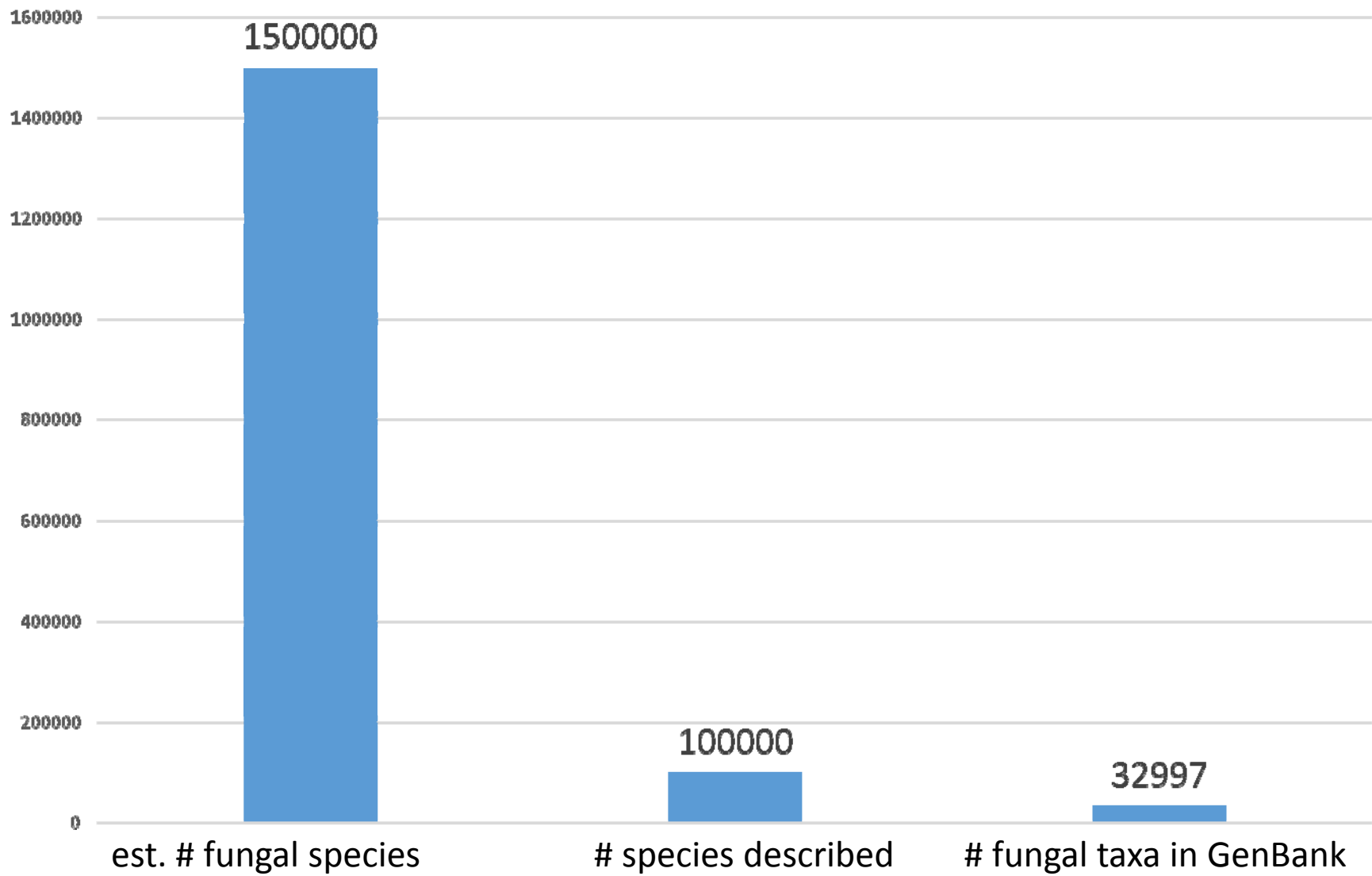
- Diagnostic assay development
- Samples received from states
- Final confirmation of new to US (or state) pathogens for which specific diagnostic assays exist and *Phytophthora* spp.



tricorder



United States Department of Agriculture



Detection

Question answered:

Is a specific organism present or absent?

Involves using a diagnostic test like a PCR assay, ELISA, LAMP, CANARY, etc.

Identification

Question answered:

What organism is this?

Involves comparison of characters observed to the those reported from the universe of possible organisms.



Systematics

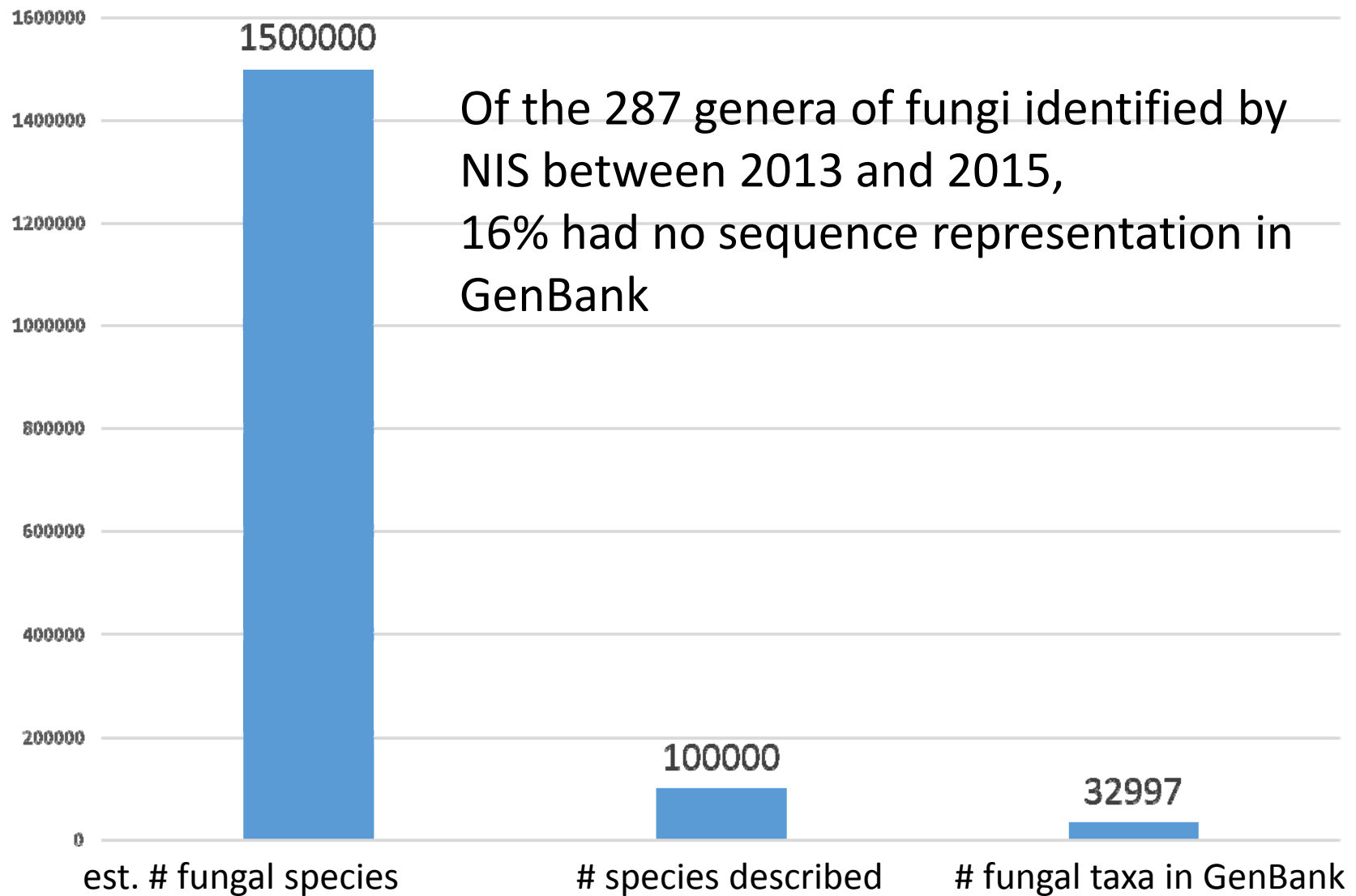
- Names organisms
- describes them
- provides classifications for the organisms
- investigates their evolutionary histories (phylogeny)
- considers their environmental adaptations

Taxonomy

Nomenclature involves the rules about which names should be used for a given organism.







Systematics provides a framework to which an unknown can be compared.

1. Good sequences exist, good systematic framework exists, species ID possible both morphologically and molecularly.

(*Puccinia spp. on Alcea*)

2. No sequences exist or very few/poor coverage, good taxonomic framework exists, species ID possible via morphology, (but phylogenetic placement unknown, may be a species complex) (*Phyllachora maydis*)

3. No sequence exists, no taxonomic framework, species (and possibly genus) ID not possible, likely new to science.

(Coelomycete on Arecaceae)



Example of framework in place: morphological and sequence ID possible

doi:10.5598/imafungus.2015.06.02.11

IMA FUNGUS · 6(2): 477–482 (2015)

Microcyclic rusts of hollyhock (*Alcea rosea*)

Jill E. Demers¹, Megan K. Romberg², and Lisa A. Castlebury^{1*}

¹USDA-ARS, Systematic Mycology and Microbiology Laboratory, Beltsville, MD 20705, USA; corresponding author e-mail: Jill.Demers@ARS.USDA.GOV

²USDA-APHIS-PPQ-National Identification Services, Beltsville, MD 20705, USA

Puccinia malvacearum and *P. heterogena*. These two species can be difficult to distinguish confused with other, less common species of microcyclic rust fungi infecting hollyhock: *P. ata*, *P. platyspora*, and *P. sherardiana*. Molecular phylogenetic analysis revealed that *P. heterogena* are closely related, along with *P. sherardiana* and *P. platyspora*. A key to the *Puccinia* species infecting hollyhock is presented.

Key words:
Pucciniales
Puccinia
pathogen interceptions
identification
taxonomy

ARTICLE

Six species of
Puccinia produce
telia on *Alcea rosea*
(hollyhock).



TAXONOMY

Key to the microcyclic rusts of hollyhock

- 1 Teliospores predominately one-celled 2
 Teliospores predominately two-celled 4

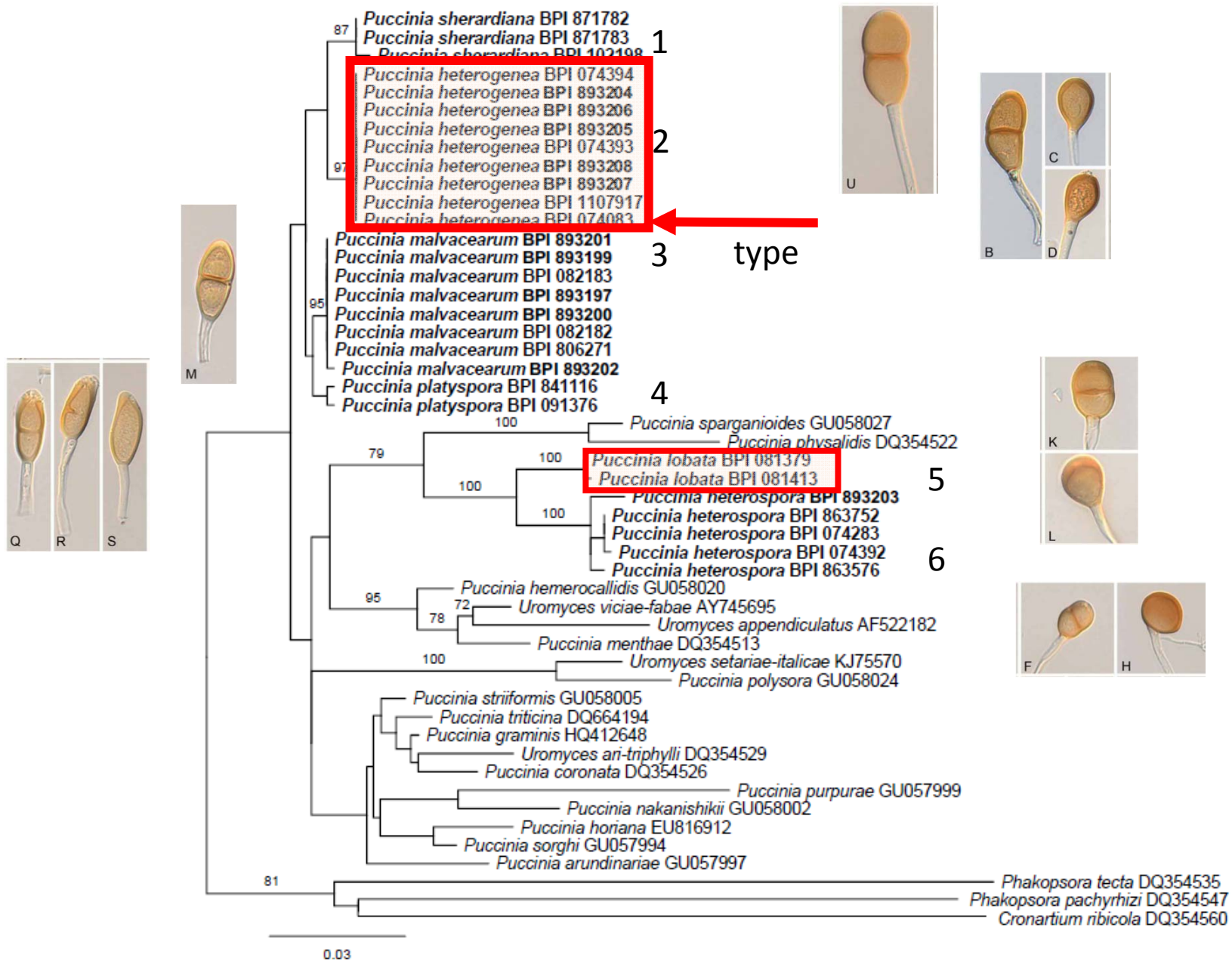
- 2 (1) One-celled teliospores mostly < 25 μm in length, globose **Puccinia heterospora**
 One-celled teliospores mostly > 25 μm in length, ovoid to oblong 3

- 3 (2) Teliospores with apical walls to 13 μm thick **Puccinia platyspora**
 Teliospores with apical walls to 5 μm thick **Puccinia heterogenea**

- 4 (1) Telia light reddish brown, scattered **Puccinia malvacearum**
 Telia dark brown, in clusters 5

- 5 (4) Two-celled teliospores with no or little central constriction **Puccinia lobata**
 Two-celled teliospores with a central constriction **Puccinia sherardiana**





Puccinia gansensis DAOM 240065 ITS region; from TYPE material

NCBI Reference Sequence: NR_111525.1

[FASTA](#) [Graphics](#)[Go to:](#)

LOCUS NR_111525 472 bp DNA linear PLN 25-FEB-2015
DEFINITION Puccinia gansensis DAOM 240065 ITS region; from TYPE material.
ACCESSION NR_111525
VERSION NR_111525.1 GI:597900860
DBLINK BioProject: [PRJNA177353](#)
KEYWORDS RefSeq.
SOURCE Puccinia gansensis
ORGANISM [Puccinia gansensis](#)
Eukaryota; Fungi; Dikarya; Basidiomycota; Pucciniomycotina;
Pucciniomycetes; Pucciniales; Pucciniaceae; Puccinia.
REFERENCE 1 (bases 1 to 472)
AUTHORS Liu, M. and Hambleton, S.
TITLE Taxonomic study of stripe rust, Puccinia striiformis sensu lato,
based on molecular and morphological evidence
JOURNAL Fungal Biol 114 (10), 881-899 (2010)
NUMBER 20042100

**RefSeq ITS TYPE sequences
in GenBank: 3448**



The importance of types

INTERNATIONAL ASSOCIATION
FOR PLANT TAXONOMY



International Code of Nomenclature
for
algae, fungi, and plants
(Melbourne Code)

adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July
2011

<http://www.iapt-taxon.org/nomen/main.php>



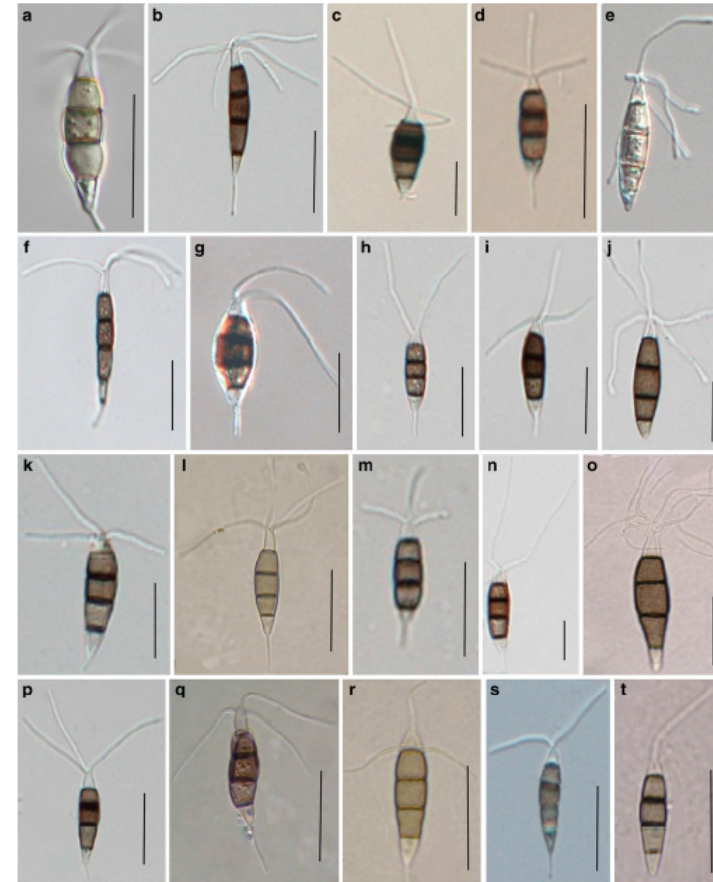
United States Department of Agriculture

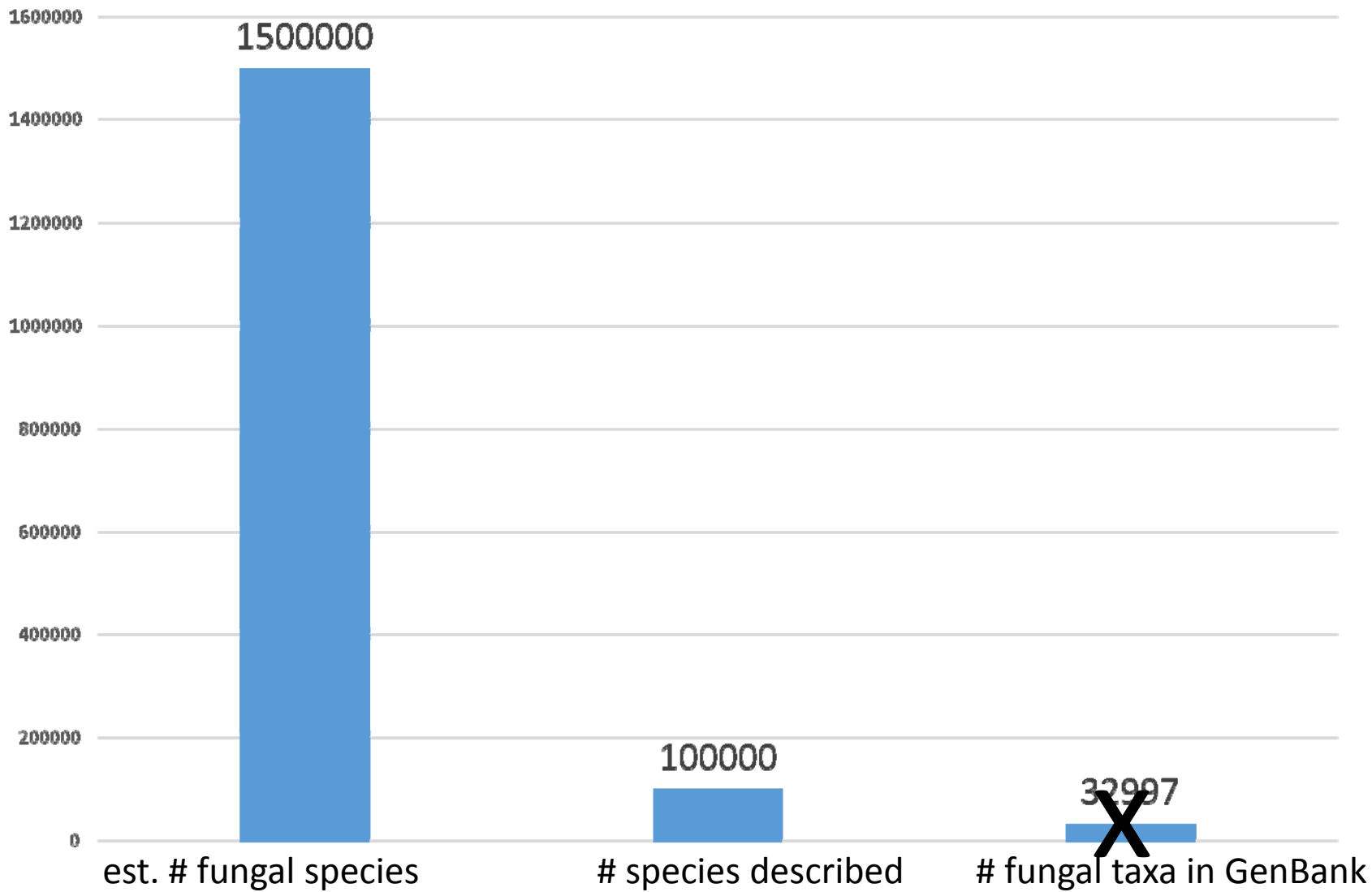
The importance of types

9.1. A (holo)type of a name of a species is the one specimen designated by the author as the nomenclatural **type**. As long as the holotype is extant, it fixes the application of the name concerned.

8B.2. In cases where the type of a name is a culture permanently preserved in a metabolically inactive state (see Art. [8.4](#)), any living isolates obtained from it should be referred to as “ex-type” (ex typo), “ex-holotype” (ex holotypo), “ex-isotype” (ex isotypo), etc., in order to make it clear they are derived from the type but are not themselves the nomenclatural type.

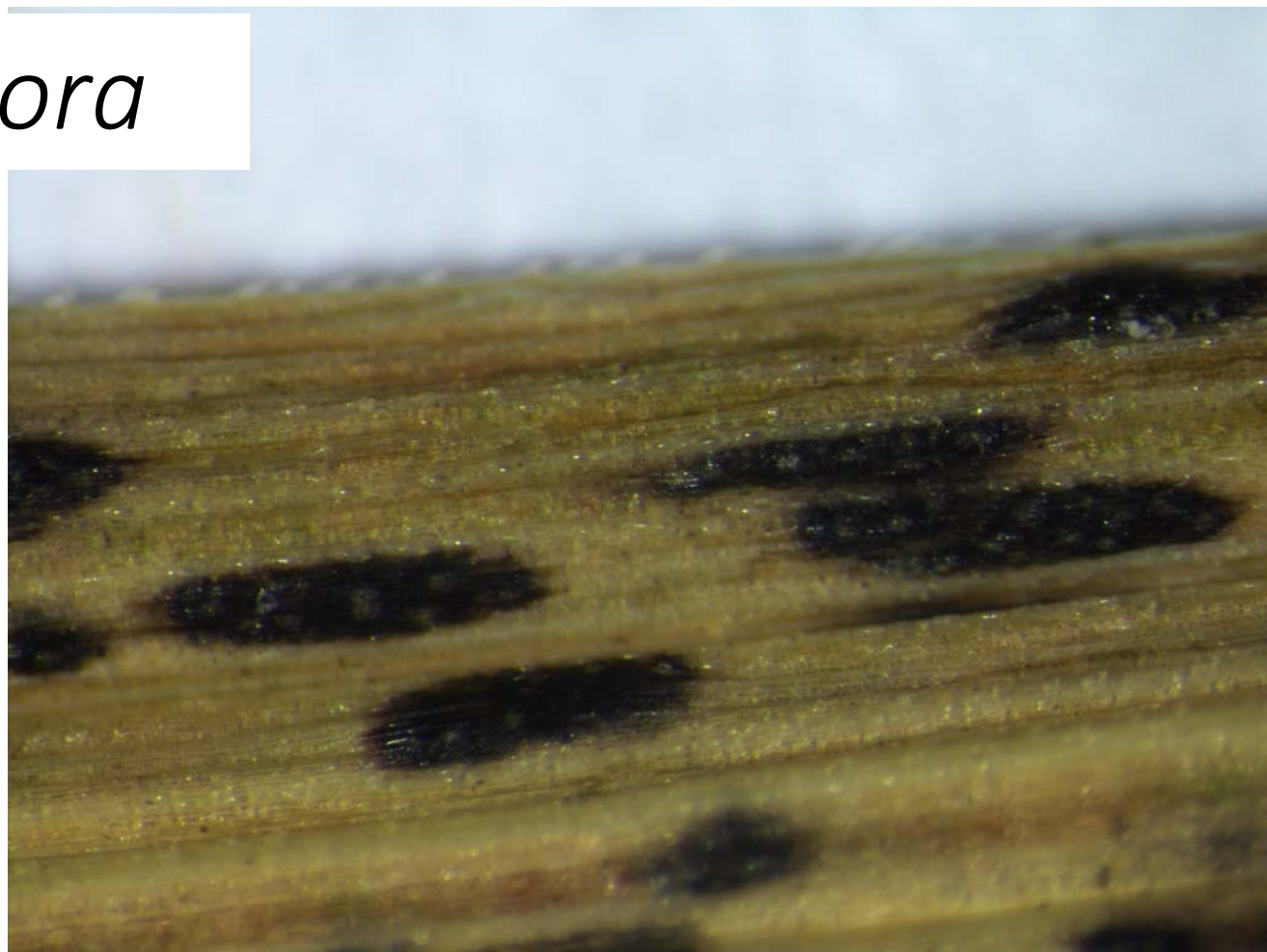


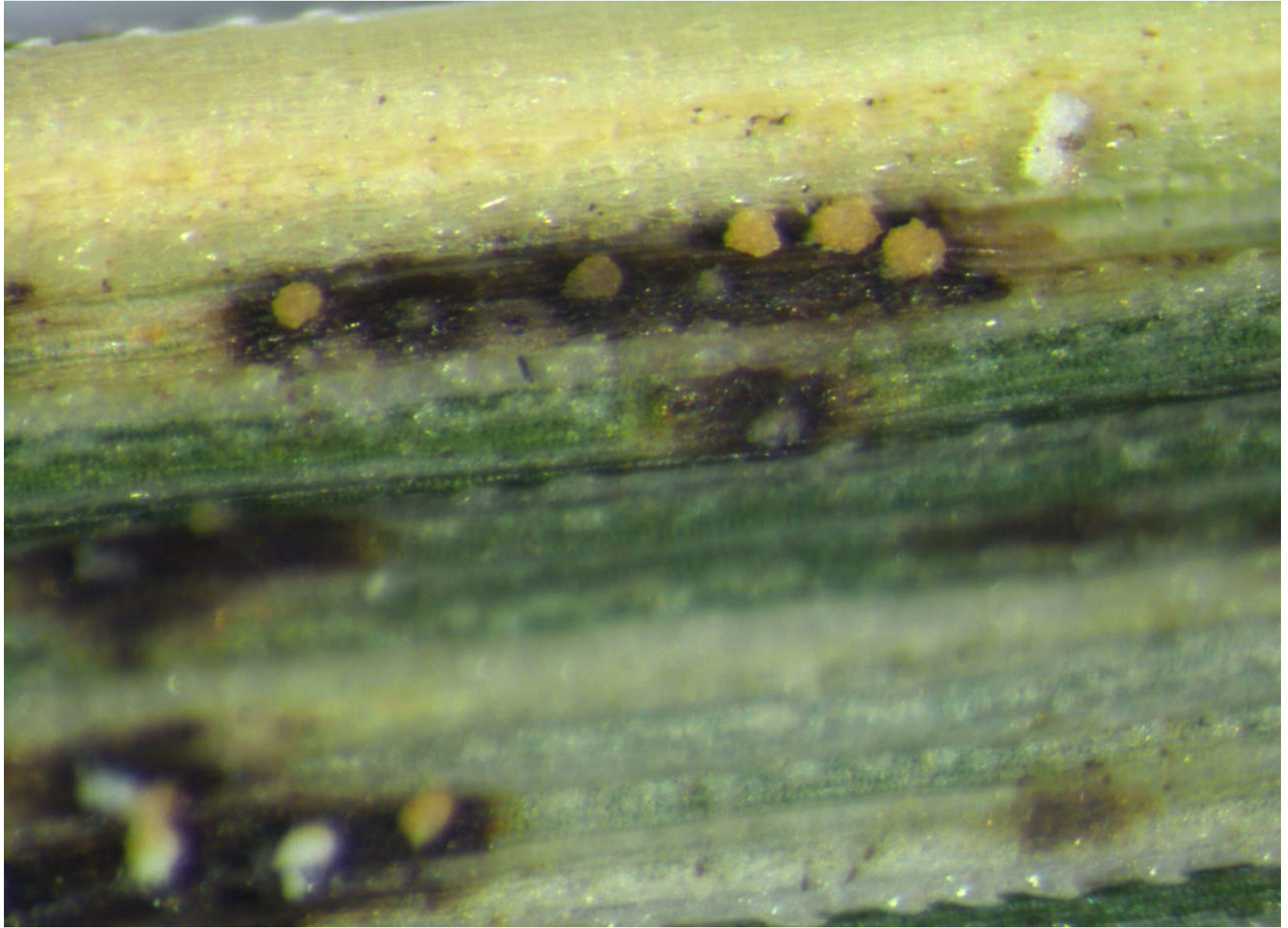


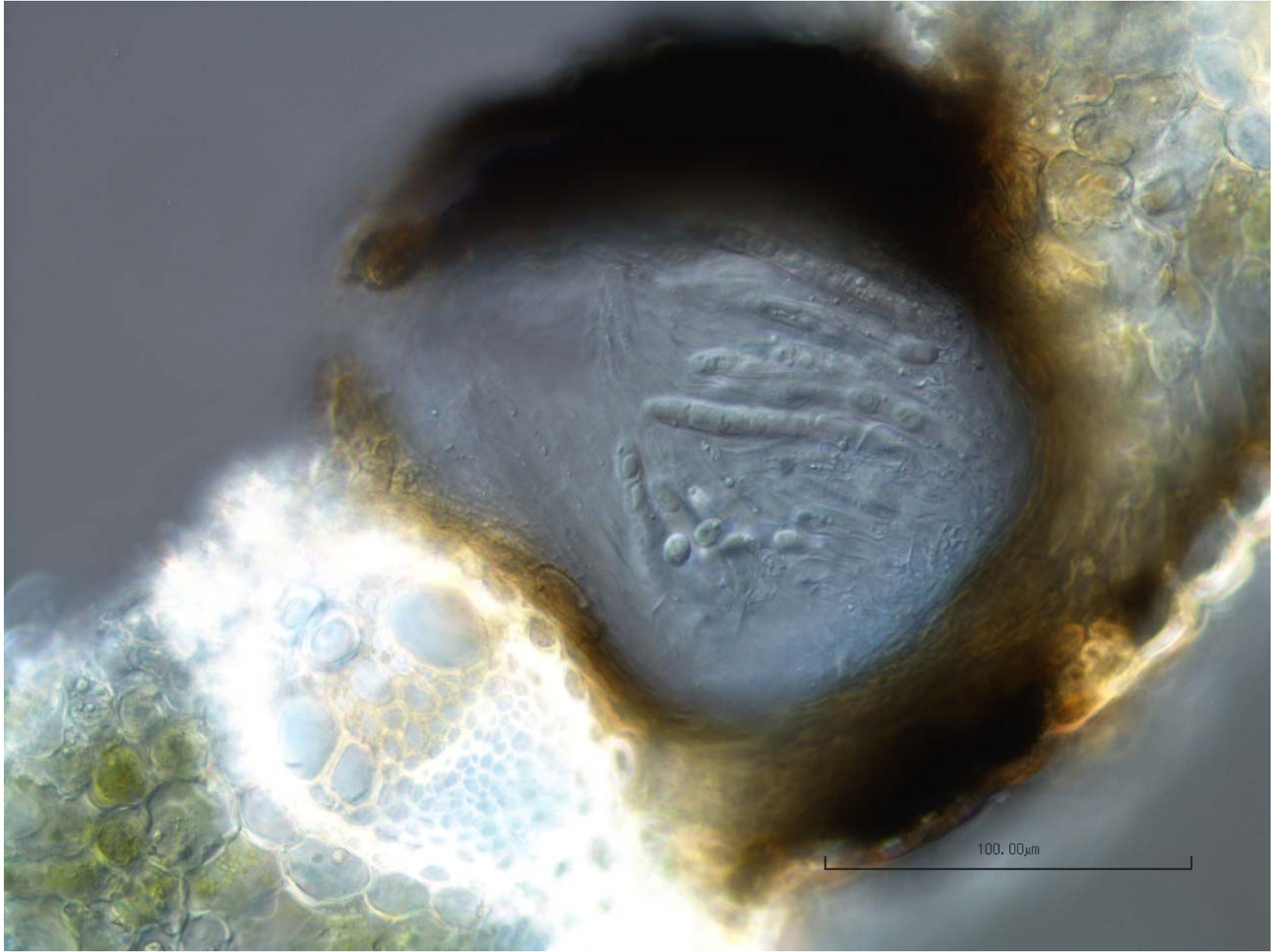


Example of framework in place:
only morphological ID possible

Phyllachora







Phyllachora

Orton 1944 Graminicolous spp. of *Phyllachora* in N. America
Mycologia 36 (1): 18-53

- 45 species of *Phyllachora* on graminicolous spp. in N. America. Descriptions based on herbarium collections and samples submitted by a number of collectors.

Parbery 1967 (amended Parbery 1971) Studies on Graminicolous species of *Phyllachora* Nke. in Fckl. *Aust. J. Bot.* 1967 (15): 271-375

- 95 species of *Phyllachora* from the 278 names in literature. Descriptions based on herbarium collections of type specimens and other specimens.



Phyllachora maydis

See Ruhl et al. 2016 Pl. Dis. (online 1/25/2016)



Maublanc, A. 1904. Espèces nouvelles de champignons inférieurs. Bulletin de la Société Mycologique de France. 20(2):70-74

[Start page](#) [Standard search](#) [Cross browser](#)

Virtuella Herbariet: Specimen list

Specimens giving hits for: Fungi except Lichens / Svampar utom Lavar, Ascomycota / Sporsäcksvampar, *Phyllachora maydis*
2 records found.

[List](#) [Map](#) [Record](#) [Export](#)

Click on blue numbers to reach specimen records. Click on green headlines to sort columns.

Inst.	Catalogue No.	Taxon	Country	Province	District	Year	Collector
S	F9049	<i>Phyllachora maydis</i>	^{TYPE} Mexico				Bonansea
S	F114789	<i>Phyllachora maydis</i>	Dominican Republic			1930	R. Ciferri

Phyllachora maydis

9

accession	taxon	region	no. sequences	host	specimen	ID to P. maydis	notes
AF257112	<i>Phyllachora vulgata</i>	ITS2	1	Poaceae?	unknown	75%	unpublished
HQ317550	<i>Phyllachora graminis</i>	ITS1 and 2 plus RNA genes	1	"grass"	DAOM 240981	83%	unpublished
AF064051	<i>Phyllachora graminis</i>	18S	1?	?	UME31349	n/a	unpublished, possibly not a <i>Phyllachora</i>
AF257111	<i>Phyllachora graminis</i>	ITS2	1?	?	unknown	84%	unpublished
KC685630	<i>Phyllachora phyllostachydis</i>	ITS1 and 2 plus RNA genes	1	Bambusa	unknown	nd	Possibly not a <i>Phyllachora</i>
KR020502	<i>Phyllachora</i> sp. ML-2015	ITS1 and 2 plus RNA genes	1	Triarrhena	unknown	nd	Really an <i>Acremonium</i>
PSU78542	<i>Phyllachora</i> sp. 'R.T. Hanlin BF96-9'	ITS1 and 2 plus RNA genes	1	Bauhinia	unknown	nd	Possibly not a <i>Phyllachora</i>
KM108581	Phyllachorales sp. L0002	ITS1 and 2 plus RNA genes	1	unknown	unknown	85%	unpublished
KM108580	Phyllachorales sp. L001	ITS1 and 2 plus RNA genes	1	unknown	unknown	85%	unpublished
AJ877102	Uncultured Phyllachoraceae	ITS1 and 2 plus RNA genes	1				really a <i>Colletotrichum</i>
EF619667	uncultured Phyllachoraceae	ITS1 and 2 plus RNA genes	1				really a <i>Colletotrichum</i>
EU754975	uncultured Phyllachoraceae	ITS1 and 2 plus RNA genes	1				probably a <i>Plectosphaerella</i>
EF635769	uncultured Phyllachoraceae	ITS1 and 2 plus RNA genes	1				hard to tell, <i>Sordariomycetes</i>
AJ877101	uncultured Phyllachoraceae	ITS1 and 2 plus RNA genes	1				really a <i>Colletotrichum</i>
	multiple <i>Phyllachora</i> sp. clone	18S		30 Myrtaceae	UB collection	nd	APS abstract, no paper
	multiple <i>Phyllachora</i> sp. clone	ssRNA		44 Myrtaceae	UB collection	nd	APS abstract, no paper
	multiple <i>Phyllachora</i> sp. clone	ITS1 and 2 plus RNA genes		51 Myrtaceae	UB collection	nd	APS abstract, no paper



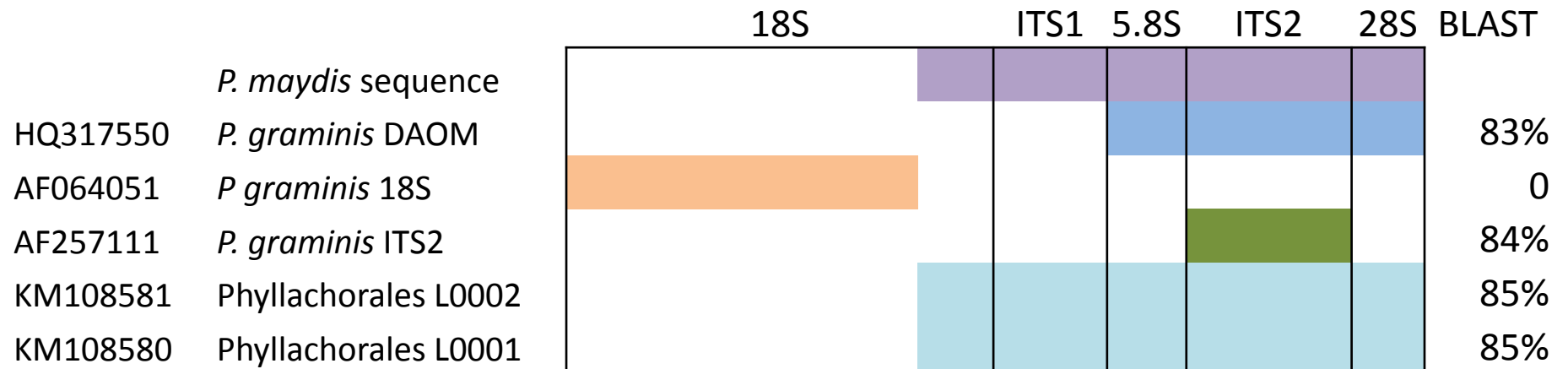
Phyllachora maydis

5

accession	taxon	region	no. sequences	host	specimen	ID to P. maydis	notes
HQ317550	<i>Phyllachora graminis</i>	ITS1 and 2 plus RNA genes	1	"grass"	DAOM 240981		83% unpublished
AF064051	<i>Phyllachora graminis</i>	18S	1?		UME31349	n/a	unpublished, possibly not a <i>Phyllachora</i>
AF257111	<i>Phyllachora graminis</i>	ITS2	1?		unknown		84% unpublished
KM108581	Phyllachorales sp. L0002	ITS1 and 2 plus RNA genes	1	unknown	unknown		85% unpublished
KM108580	Phyllachorales sp. L001	ITS1 and 2 plus RNA genes	1	unknown	unknown		85% unpublished



Phyllachora maydis



Phyllachora

- Molecular systematics based on type specimens (including epitypes) needed to elucidate possible species complexes (e.g. *Phyllachora graminis*) in this genus.
- Only morphological ID in this group is possible currently.
- Sequence of *P. maydis* in GenBank is now tied to a specimen in a curated collection (US National Fungus Collections-BPI), available for future work.





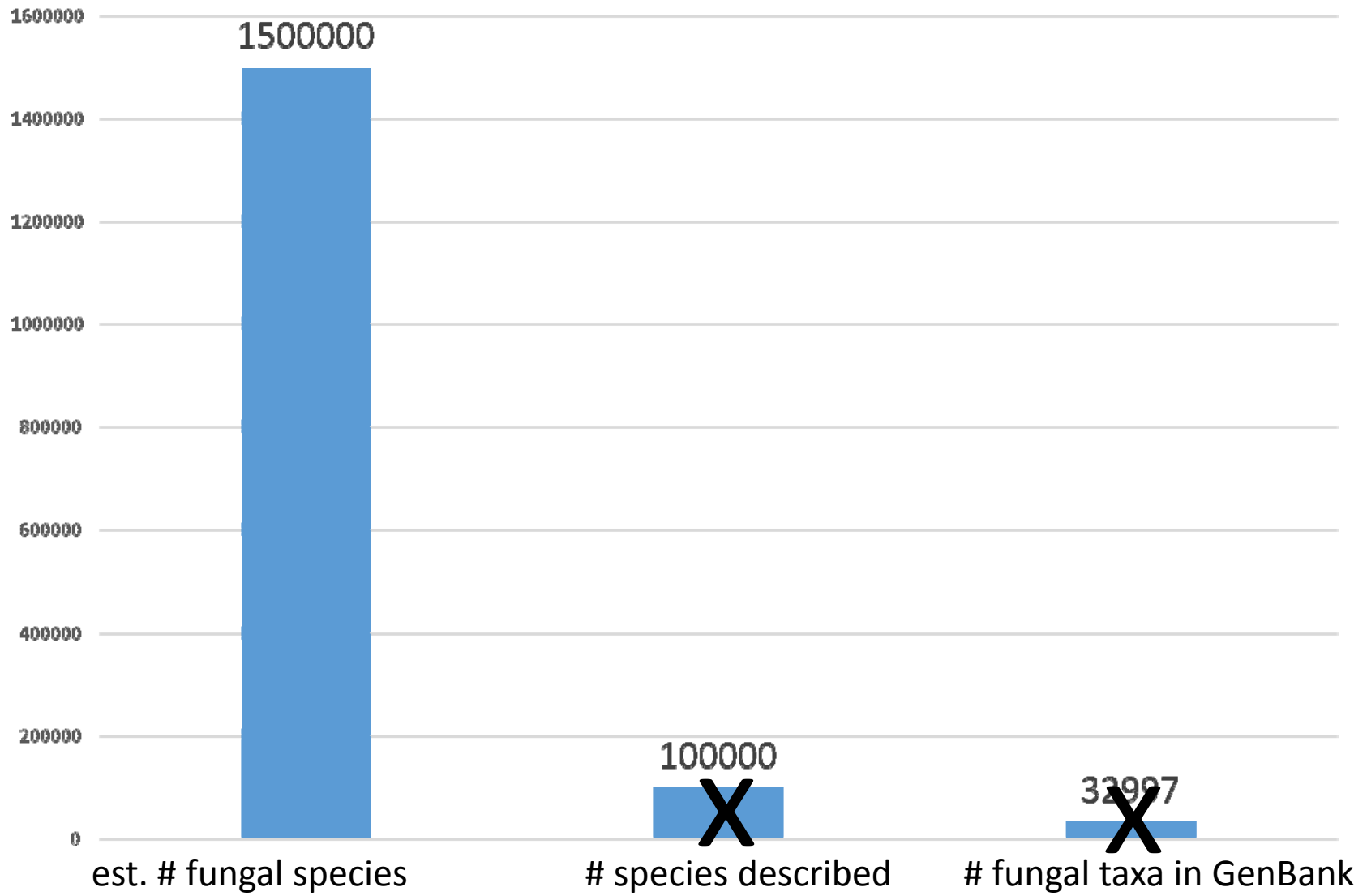
United States Department of Agriculture

1108143
National Fungus Collections U.S.D.A.
Thecaphora heliopsidis Duran
Heliopsis sp.
Mexico --, Intercepted Laredo Texas #028937
Coll. Troche A. on 1990 NOV 07
Detr. Palm Mary E.

1108143 National Fungus Collections U.S.D.A. 268
Thecaphora heliopsidis Duran
Heliopsis sp.
Mexico --, Intercepted Laredo Texas #028937
Coll. Troche A. on 1990 NOV 07
Detr. Palm Mary E.

Thecaphora heliopsidis Duran
in Heliopsis sp.





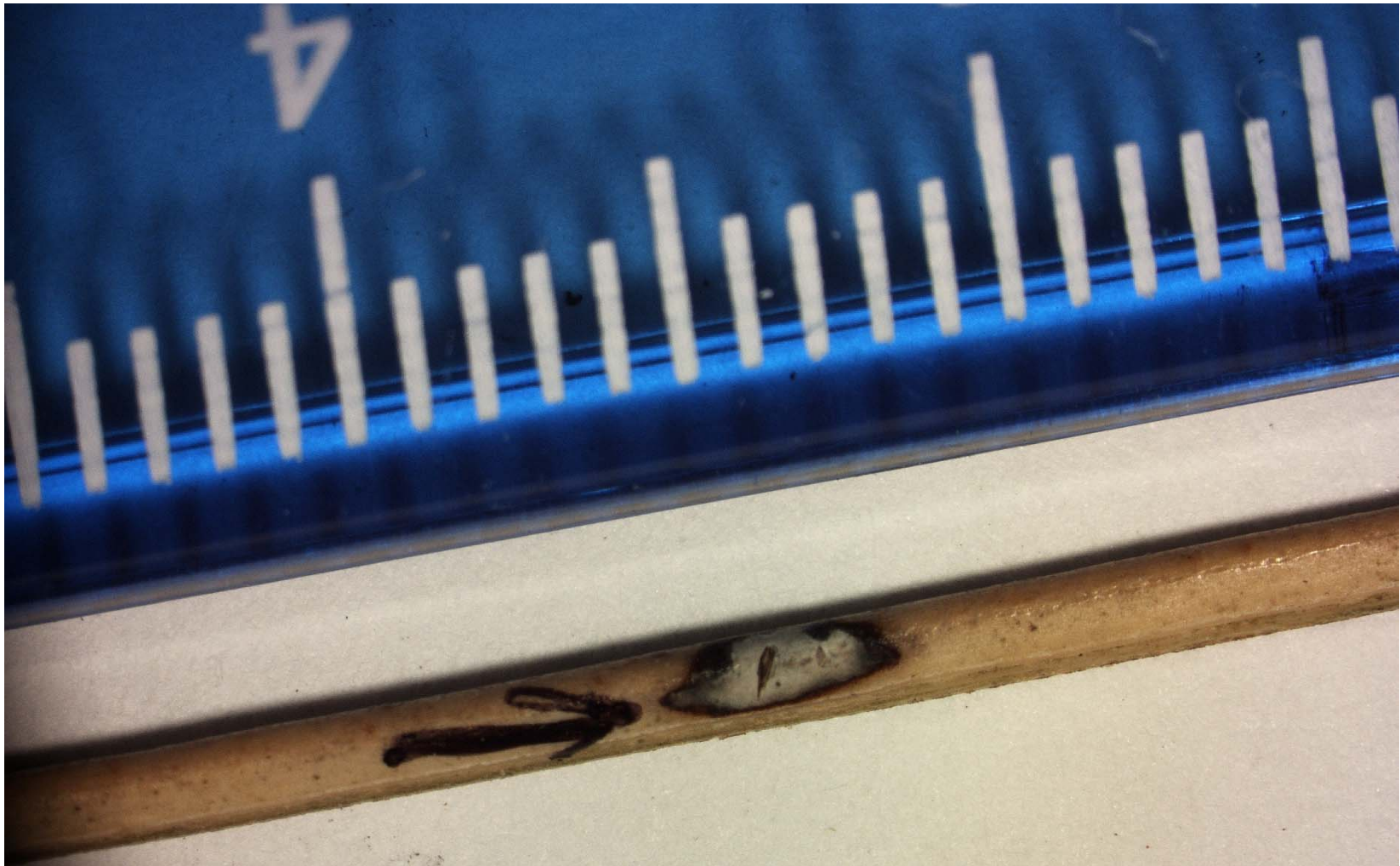


United States Department of Agriculture

No framework in place:
What's the ID?



Unknown on Arecaceae





United States Department of Agriculture



Fungal databases - Fungus-Host Distributions

[Report Errors](#)

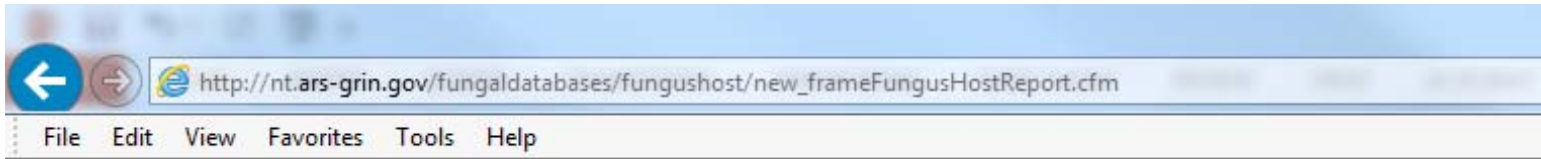
[About this database](#)

Fungus Name	<input type="text"/>	<input type="text"/>	
Or Fungus Group	<input type="text" value="Anamorphic fungi - Coelomycetes"/> ▼		<input type="checkbox"/> Include vars <input type="checkbox"/>
Or Fungus Order	<input type="text"/> ▼		<input type="checkbox"/>
Host Name	<input type="text" value="Phoenix"/>	<input type="text"/>	<input type="checkbox"/>
Or Host Family	<input type="text"/>	A-B C-E F-L M-P Q-Z	<input type="checkbox"/>
Locality	<input type="text"/>	Available Localities	<input type="checkbox"/>
Regions	<input type="text"/> ▼		
Use Synonyms	Fungus <input type="checkbox"/>	Host (slower search) <input type="checkbox"/>	<input type="checkbox"/>
Display	<input type="text" value="Fungus-Host"/> ▼		<input type="checkbox"/>
Email	<input type="text"/>		<input type="checkbox"/>
Email format	txt <input type="radio"/> rtf <input type="radio"/> comma <input type="radio"/>		
	<input type="button" value="Search"/>	<input type="button" value="Clear Fields"/>	

English
 Español

A new option, Locality, has been added to the Display options. This will sort the results by geographic location.

Special searches: [Fungi not in the U.S.](#) [List of host families/genera](#)



[Return to search page](#)

[Printer Friendly Output](#)

145 records were found using the criteria Host Genus = Phoenix, Fungus Group = Anamorphic fungi - Coelomyces

[Tell us why you value the fungal databases](#)

Botryodiplodia palmarum:

Phoenix dactylifera: Pakistan - [6232](#), [42528](#),

Botryodiplodia phoenicum:

Phoenix canariensis: Florida - [1](#),

Botryodiplodia theobromae - (Lasiodiplodia theobromae):

Phoenix dactylifera: India - [6558](#),

Colletotrichum derridis:

Phoenix roebelenii (Leaf spot.): Florida - [1](#),

Colletotrichum gloeosporioides:

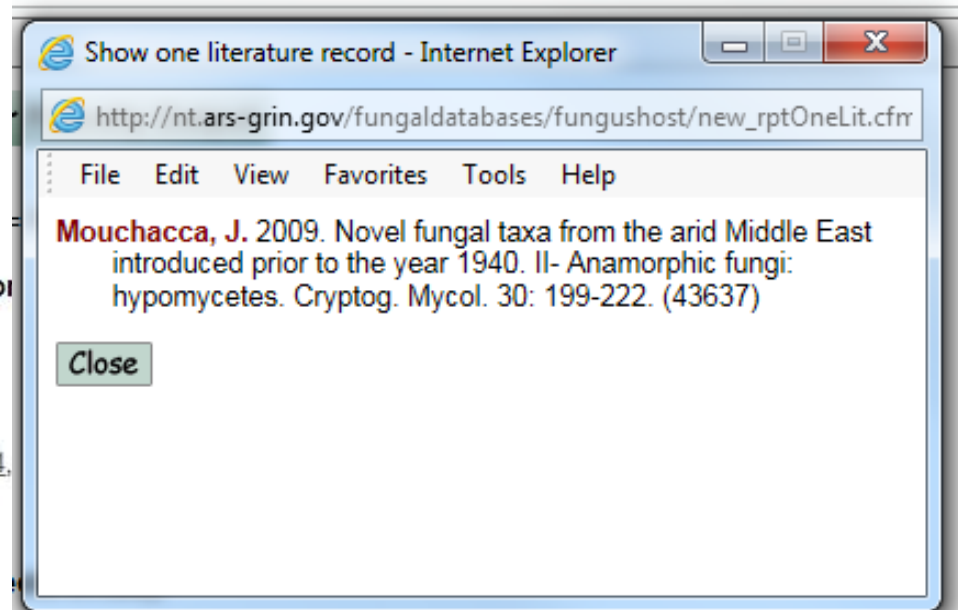
Phoenix dactylifera (On leaves.): Mexico - [7848](#), Texas - [94](#),
Phoenix roebelenii (Anthracnose.) Florida - [1](#),
Phoenix sp. South Africa - [6959](#),

Coniothecium heterosporum:

Phoenix dactylifera: Egypt - [43637](#),

Coniothyrium palmarum:

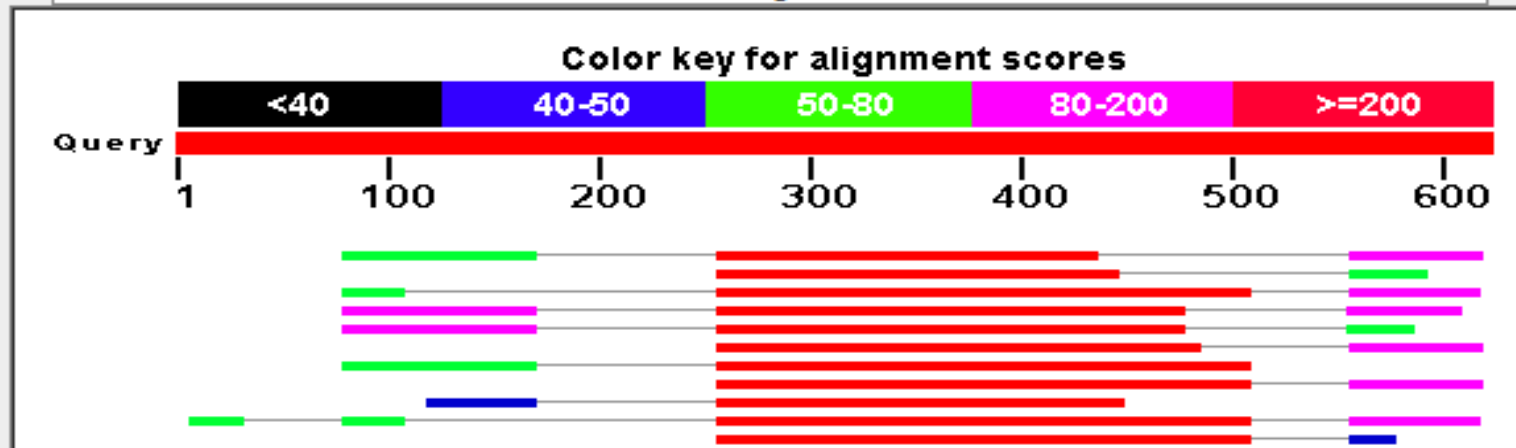
Phoenix dactylifera: Cyprus - [8322](#), India - [7077](#), Israel - [44452](#), Italy, Sicily - [45968](#), Libya - [7991](#),





Distribution of 262 Blast Hits on the Query Sequence

Mouse over to see the define, click to show alignments



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
<input type="checkbox"/>	Eurotiomycetes sp. genotype 400 isolate FL0854 internal transcribed spacer 1, p	332	503	54%	5e-87	98%	gi 387353354 JQ760492.1
<input type="checkbox"/>	Phaeomoniella sp. OT1-107 internal transcribed spacer 1, partial sequence; 5.8S	328	400	36%	7e-86	96%	gi 942678458 KT804064.1
<input type="checkbox"/>	Neophaeomoniella zymoides isolate KD 18S ribosomal RNA gene, partial seque	326	488	55%	3e-85	91%	gi 983947148 KR909194.1
<input type="checkbox"/>	Chaetothyriomycetidae sp. isolate AM200-P4T8R 18S ribosomal RNA gene, parti	326	515	59%	3e-85	93%	gi 961554420 KT264493.1
<input type="checkbox"/>	Chaetothyriomycetidae sp. isolate AM157-P11T6R 18S ribosomal RNA gene, par	326	472	55%	3e-85	93%	gi 961554397 KT264470.1
<input type="checkbox"/>	Eurotiomycetes sp. voucher ARIZ:DF0057 18S ribosomal RNA gene, internal tran	326	437	47%	3e-85	92%	gi 929998963 KP991579.1
<input type="checkbox"/>	Fungal sp. JB2-2 18S ribosomal RNA gene, partial sequence; internal transcribe	326	395	55%	3e-85	91%	gi 902549619 KP726315.1





How NPDN labs can help fill in the fungal puzzle

Deposit voucher specimens (!!) (and/or cultures)

Voucher specimens should be required for
Disease Notes

A specimen without a published report is better
than a published report without a specimen.



In 2015 there were:

37 Disease Notes from USA in Plant Disease

5 with vouchers

5 first reports in US/Americas

(2 with vouchers)

28 with deposited sequences in GenBank

DNA sequences deposited in GenBank associated with first reports of a fungus on a host or in a new location (whether published or not), should always be tied to a specimen or culture in a curated collection.





Notice: The web keys to species of *Trichoderma*, *Hypocrea*, *Hypomyces* and *Ravenelia* are not currently functional. We do not yet have an estimated time frame for restoration of these identification keys.

Fungal Databases - Quick Search

1. For advanced searches select one of the databases above
- OR
2. Quickly search all the databases using a SINGLE name

- English
- Español

[Report Errors](#)

[About this database](#)



Enter a complete name (no wildcards)

Examples: *Alternaria porri*, *Alternaria porri* f. sp. *solani*

OR

Enter the first four letters of the species epithet

Is this a fungus? or a host name?

Use synonyms

Notice: The web keys to species of *Trichoderma*, *Hymocrea*, *Hymomyces* and *Ravenelia* are not currently functional. We do not yet have an estimated time. [Close](#)

Fungal Data: *Coccostromopsis chamaedoreae*

- 1. For advanced searches see [View](#) the 1 Fungus-Host combinations in the Fungus-Host database
- OR [View](#) the 1 records in the Literature database
- 2. Quickly search all the data [View](#) the 10 records in the Specimen database
- [View](#) the 1 record in the Nomenclature database
- Enter a complete name (no spaces) [View](#) all of the datasets.
- Examples: *Alternaria porri*, *Alternaria porri*
-

OR
Enter the first four letters of the name

Is this a fungus? or a lichen?
Use synonyms

[Report Errors](#)

[About this database](#)



Fungal databases - Specimens

Report Errors

About this database

Genus Species Append * to epithet to include var/subsp

OR Fungus Group

OR Fungus Order

Host Append * to epithet to include var/subsp

OR Host Family

Select a host family [A-B](#) [C-E](#) [F-L](#) [M-P](#) [Q-Z](#)

Country State

OR Region

Collector Year

BPI Type

Options

- Format English Español
- List: ordered by fungus, host
- Use synonyms (must enter full scientific name)
- Fungus Host (slower search)
- Include other herbaria in search
- Build a loan request

Search Clear Fields

[Loan policy](#) | [How to deposit specimens](#)

JavaScript and cookies must be enabled for this site to work properly. Cookies are deleted when your browser session ends. See our [privacy policy](#) for more information on our use of cookies.

Systematic Mycology and Microbiology Laboratory Specimen Database. March 09, 2016
U.S. Department of Agriculture, Agricultural Research Service
Send comments or questions about the databases to HerbariumBPI@ars.usda.gov
Page last updated 15 September 2006

Suggested citation: Farr, D.F., & Rossman, A.Y. Fungal Databases, Systematic Mycology and Microbiology Laboratory, ARS, USDA.
Retrieved March 9, 2016 from <http://nt.ars-grin.gov/fungal-databases/>

[Return to search page](#)

[Printer Friendly Output](#)

10 records were found using the criteria Fungus Name = *Coccostromopsis chamaedoreae* and its synonyms

[Tell us why you value the fungal databases](#)

***Coccostromopsis chamaedoreae* (Syd.) K.D. Hyde & P.F. Cannon 1999 (Ascomycetes, Phyllachorales)**

≡ *Phoenicostroma chamaedoreae* Syd. 1925

≡ *Bagnisiopsis chamaedoreae* (Syd.) Petr. 1928

≡ *Cocodiella chamaedoreae* (Syd.) I. Hino & Katum. 1968 Note: Presumably I. Hino and not T. Hino.

≡ *Coccostroma chamaedoreae* (Syd.) Arx & E. Müll. 1954

Distribution: North America (Costa Rica).

Substrate: Living and dead leaves.

Disease Note: Lesions not clearly defined and stromata developing on leaf veins (Hyde and Cannon 1999).

Host: *Chamaedorea bifurcata* (Arecaceae).

Supporting Literature:

Hyde, K.D., and Cannon, P.F. 1999. Fungi causing tar spots on palms. *Mycol. Pap.* 175: 1-114.

Updated on Jun 29, 2009

Bagnisiopsis chamaedoreae

Chamaedorea sp. - [BPI 640792](#), [BPI 640793](#)

Coccostroma chamaedoreae

Chamaedorea sp. - [BPI 644301](#), [BPI 644303](#), [BPI 644307](#), [BPI 644309](#), [BPI 644331A](#), [BPI 644331B](#)

Phoenicostroma chamaedoreae

unknown, palm - [BPI 640894](#), [BPI 640895](#)

10 records were found using the criteria: Fungus Name = *Coccostromopsis chamaedoreae* and its synonyms

Systematic Mycology and Microbiology Laboratory Specimen Database. March 09, 2016

U.S. Department of Agriculture, Agricultural Research Service

Send comments or questions about the databases to HerbariumBPI@ars.usda.gov

Suggested citation: Farr, D.F., & Rossman, A.Y. Fungal Databases, Systematic Mycology and Microbiology Laboratory, ARS, USDA. R

[Return to search page](#)

[Printer Friendly Output](#)

10 records were found using the criteria Fungus Name = *Coccostromopsis chamaedoreae* and its synonyms

***[Tell us why you value the](#)

Coccostromopsis chamaedoreae

≡ *Phoenicostroma chamaedoreae*

≡ *Bagnisiopsis chamaedoreae*

≡ *Cocodiella chamaedoreae*

≡ *Coccostroma chamaedoreae*

Distribution: North America

Substrate: Living and dead

Disease Note: Lesions not described

Host: *Chamaedorea bifurcata*

Supporting Literature:

Hyde, K.D., and Cannon, P.

Updated on Jun 29, 2009

Bagnisiopsis chamaedoreae

Chamaedorea sp. - BPI 640

Coccostroma chamaedoreae

Chamaedorea sp. - BPI 644

Phoenicostroma chamaedoreae

unknown, palm - BPI 640894, BPI 640895

10 records were found using the criteria: Fungus Name = *Coccostromopsis chamaedoreae* and its synonyms

Systematic Mycology and Microbiology Laboratory Specimen Database. March 09, 2016

U.S. Department of Agriculture, Agricultural Research Service

Send comments or questions about the databases to HerbariumBPI@ars.usda.gov

Suggested citation: Farr, D.F., & Rossman, A.Y. Fungal Databases, Systematic Mycology and Microbiology Laboratory, ARS, USDA. Retrieved March 9, 2016, from

Specimen details - Google Chrome

nt.ars-grin.gov/fungaldatabases/specimens/new_rptSpecime

Close

Phoenicostroma chamaedoreae BPI 640894

unknown, palm

Mexico. Intercepted El Paso Texas #1776

Coll: Anderson B. R. on 1934 AUG 21

Detr: Cash Edith K.

Other info.: Includes slide

Fungal databases - Specimens

Genus Species Append * to epithet to include var/subsp

? Fungus

? OR Fungus Group

? OR Fungus Order

? Host Append * to epithet to include var/subsp

? OR Host Family

Select a host family [A-B](#) [C-E](#) [F-L](#) [M-P](#) [Q-Z](#)

? Country State

OR Region

? Collector ? Year

? BPI ? Type

[Loan policy](#) | [How to deposit specimens](#)

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Systematic Mycology and Microbiology Laboratory Specimen Database. March 07, 2016

U.S. Department of Agriculture, Agricultural Research Service

Send comments or questions about the databases to HerbariumBPI@ars.usda.gov

Page last updated 15 September 2006

Suggested citation: Farr, D.F., & Rossman, A.Y. Fungal Databases, Systematic Mycology and Microbiology Laboratory, ARS, USDA. Retrieved March 7, 2016, from <http://nt.ars-grin.gov/fungaldatabases/>

Report Errors

About this database

Options

- ? Format English Español
- List: ordered by fungus, host
- ? Use synonyms (must enter full scientific name)
- Fungus Host (slower search)
- ? Include other herbaria in search
-
- ? Build a loan request

Search

Clear Fields





Related Topics

- > Publications
- > ARS Manuscripts
- > Search for a publication
- > ARS Software
- > How to prepare specimens on substrate
- > How to prepare dried specimens of cultures

U.S. National Fungus Collections - Depositing Vouchers

To ensure scientific reliability of published reports about fungi, properly prepared voucher specimens and cultures should be deposited in recognized institutions and cited in the publication. When new taxa are described, such specimens are required and a living culture should be deposited in a recognized culture collection as well. This point has been recently reiterated by Agerer et al. (2000) in an open letter from numerous mycologists to the mycological scientific community which appeared in several scientific journals. The resources for depositing voucher specimens are available to all scientists. **Dried fungal specimens**, either of [pure cultures](#) or [on the substrate](#), can be deposited at any of the numerous fungal herbaria.

Living fungal cultures for which sequences have been entered in GenBank or any other sequence repository should be deposited at a recognized culture collection such as the [American Type Culture Collection \(ATCC\)](#) or the [Centraalbureau voor Schimmelcultures \(CBS\)](#). These institutions accept living cultures that are of interest to the scientific community, particularly a culture that has been the subject of a publication. These culture collections take great care to store their cultures in conditions that will allow as little alteration as possible during long-term storage. Depositing a culture is free. The deposition form to be completed is available at their respective Web sites.

All dried fungal specimens of interest to scientists, plant quarantine officials, extension agents, and others can be deposited at:

U.S. National Fungus Collections (BPI)
Systematic Mycology and Microbiology Laboratory
USDA-Agricultural Research Service
Room 229, Building 010A
10300 Baltimore Avenue
Beltsville, MD 20705-2350 USA
Phone: (301)504-6921
Fax: (301)504-5062
HerbariumBPI@ars.usda.gov

Use our [Printable herbarium deposition form](#) or clearly label specimens with the following information, if available:

- Scientific name of fungus, including authority
- Scientific name of host
- Substrate/plant part
- Collection location (country, state, county, town or city, and specific locality information)
- Latitude/Longitude/Elevation
- Habitat
- Collector(s) and/or person who isolated the fungus
- Collection date
- Collector's number
- Determiner
- Type status (Type specimens are not added to the publicly-accessible specimen database until publication)
- Accession numbers in other herbaria, culture collections, or GenBank
- Publications that refer to the specimen (please also send us a reprint)

Please DO NOT send specimens with naphthalene (moth balls).

BPI numbers for use in publications will be provided upon receipt of specimens. **Reprints of publications resulting from studies based on BPI specimens should be sent to the Herbarium Manager at the address above.**

Laredo 028937
Slits



Herbarium specimen label with fields for Date, Locality, Collector, and various checkboxes for processing options like 'Dried', 'Pressed', 'Flowers', etc.

Checklist for specimen processing with options: Archived, All required, For mounting, For analysis, Metals, For micro-GAL, Recommendation, Only for signature or return, Yes/No.

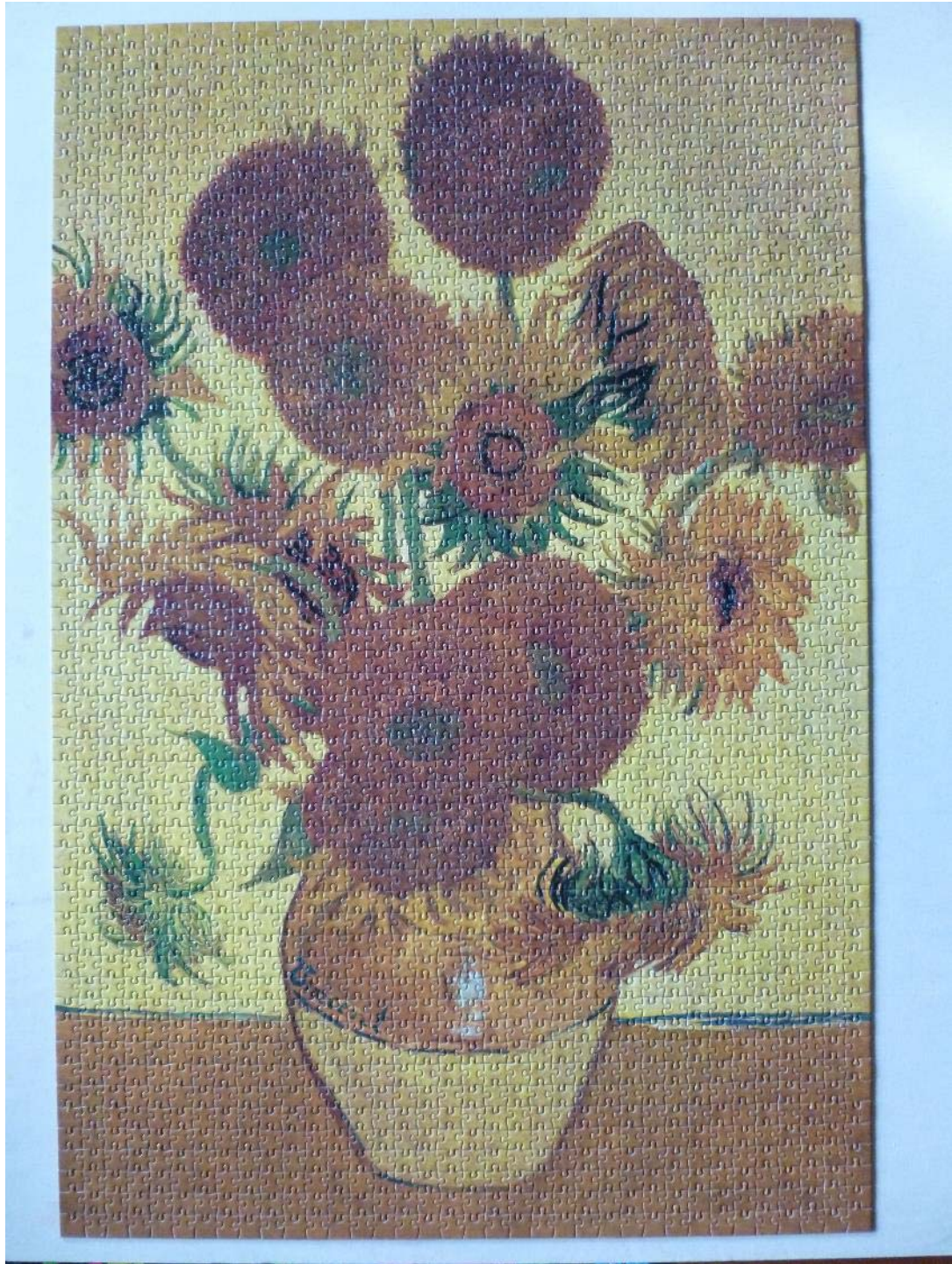
SMOTIED
FLOWER HEADS

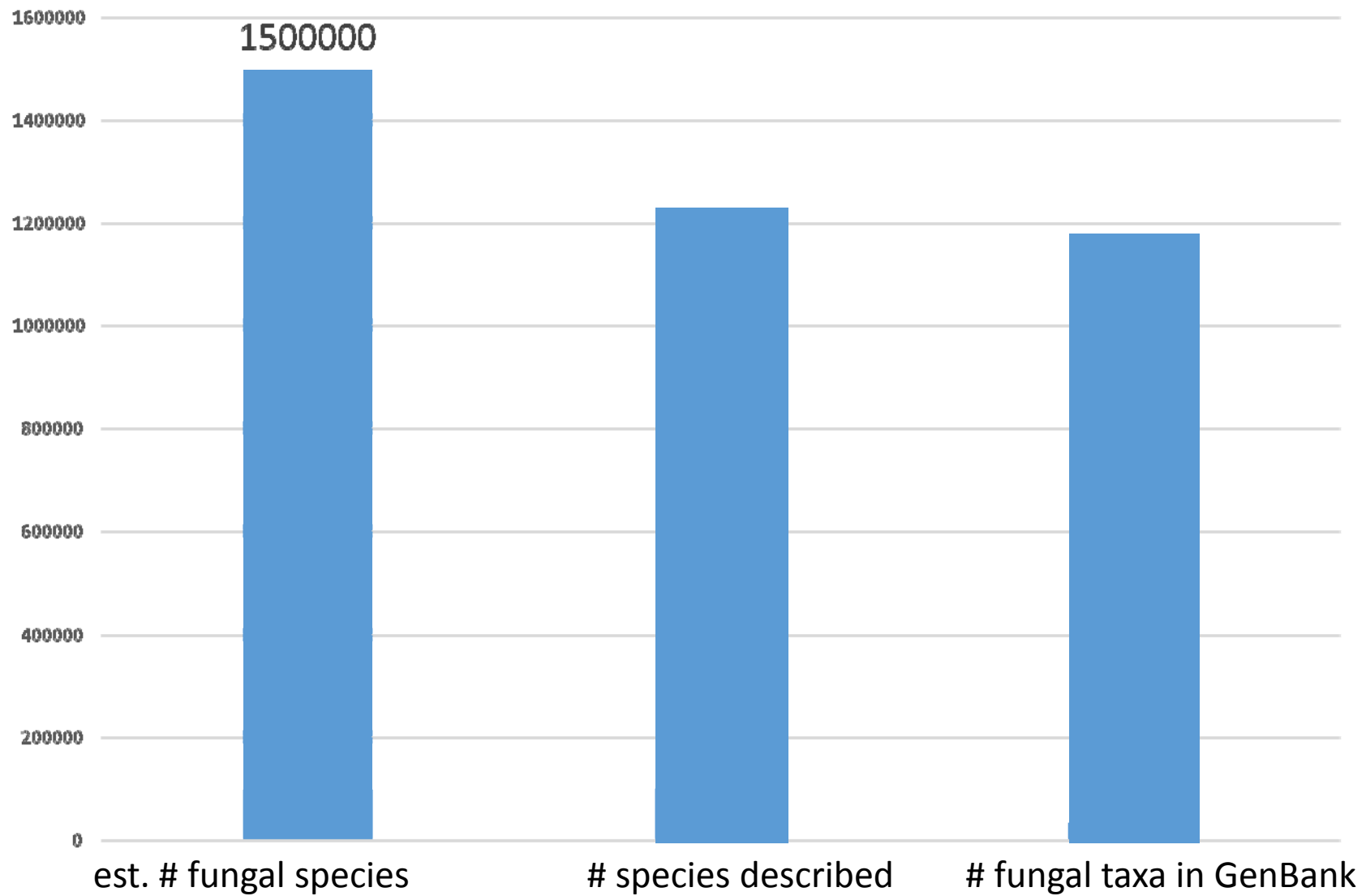


flower
LAR 028937
TX











United States Department of Agriculture

Thanks!



Japanese cherry trees flowering around the Tidal Basin with the Washington monument in the background, Washington, DC (Courtesy of David F. Farr)

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Plant Industry

Washington, January 19, 1910

Pathological
collections
Mycological exchange.
Inspection work.

Mr. David Fairchild,

Agricultural Explorer,

In charge of Seed and Plant Introduction.

Dear Mr. Fairchild:

The inspection of the large consignment of Japanese cherry trees presented by the Japanese Government has been completed.

Crown gall is present on 45% of the trees and the girdling of five trees apparently has resulted from the attack of a *Pestalozzia* sp. Crown gall is already widely distributed in this country and its importation in this case may not be of any considerable economic importance. It is impossible to decide with the limited time available for research if the *Pestalozzia* is of an indigenous species.

Fungous mycelium was pretty generally present on the roots—it appeared to be due to conditions of packing rather than a true root disease. Cultural experiments were started to substantiate this belief.

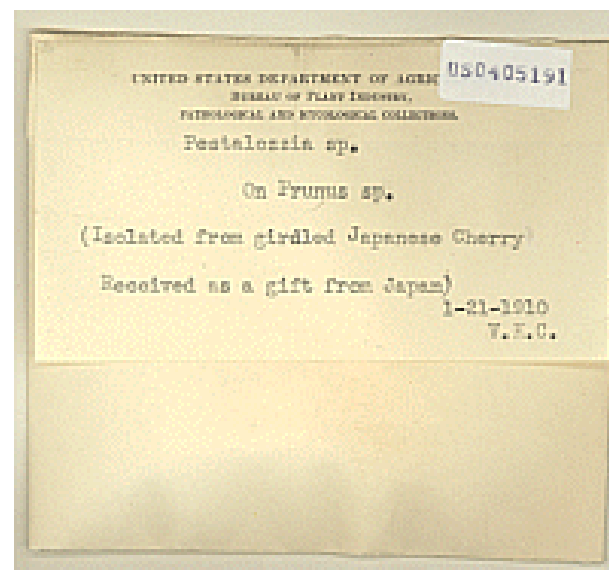
Yours very truly,

FLORA PATTERSON

Mycologist in Charge.

O.K.,

A=A.V.



2



**Flora Patterson, first
woman mycologist at
USDA
(1895-1923)**

