

ANNEXES

Annex 1. Database of the 41 cultivated fungi from this study with information from GenBank, UNITE and FungalTraits databases (for this appendix you have the editable version to download the document in excel format and the version of the data view).

Mushroom Information Database

<https://docs.google.com/spreadsheets/d/e/2PACX-1vQBbUqbAaDsnw8p1cxM1deMV58JmrmlCkyugl473SpXhgkxmxD7i-OELsSL7UPYi6WXUXZ9xjzqMYTNO/pubhtml>

Annex 2. Database with the microscopic information of the 26 cultures used for the analysis of functional traits.

	UNIT: µm																			
Sample	Hypha 1	Hypha 2	Hypha 3	Hypha 4	Hypha 5	Hypha 6	Hypha 7	Hypha 8	Hypha 9	Hypha 10	Hypha 11	Hypha 12	Hypha 13	Hypha 14	Hypha 15	Average (µm)	Standard deviation	Color	Contexture	Description
QH1B	2	1	2	1	0.5	1	1	1	2	2	1	2	1	1	1	1.36	0.50	Dark brown	Thin	Without fibula, without spores
QH3	1	0.5	1	1	0.4	2	1	0.5	1	1	1	2	1	2	0.5	1.27	0.47	Hyaline	Very thin	With asexual spores, non-septate, no fibulae
QH4A	3	1	2	1	2	1	3	2	1	1	2	2	2	1	1	1.67	0.72	Light brown	Medium thick	With fibulae, without spores, septate hyphae
QH4C	1	2	2	1	1	1	1	0.5	1	1	1	2	0.5	1	1	1.23	0.44	Dark brown	Thin	Without fibulae, with spores
Ba1	1	1	1	2	1	0.5	1	2	2	1	1	2	0.5	1	1	1.31	0.48	Hyaline	Thin	With spores, non-septate, non-fibulae

Ba2	1	3	2	3	2	1	2	1	3	2	1	3	2	2	1	1.93	0.80	Hyaline	Medium thin	Gutulate (dark contents), septate, no fibulae
Ba3	3	3	4	4	3	3.5	2	3	4	3	4	3	2.5	2	3	3.15	0.69	Hyaline	Thick	Septate, asci and ascospores, asexual spores, guttulated
Ba4	1	2	1	1	2	0.5	1	1	0.5	2	1	2	1	2	1	1.38	0.51	Hyaline	Very thin	Spore-bearing, guttulate/nucleate, septate (thin)
Ba6	1	0.5	2	1	0.5	0.5	1	0.5	1	1	1	2	0.5	1	1	1.20	0.42	Hyaline	Very thin	Not septate, no spores
Ba9	4	3	4	3.5	4	3	2	3	4	3	4.5	3	2	4	3	3.23	0.73	Light yellow/purple	Thick	With spores, without fibulae, not septate
Ba10	1	0.5	0.4	2	1	1	2	0.5	1	0.4	1	1	2	1	0.5	1.30	0.48	Hyalines	Very thin	With spores, without fibulae, non-septate
Ba11	1	1	2	0.5	1	1	2	1	0.4	0.5	1	1	2	1	1	1.25	0.45	Dark green	Very thin	With spores (many spores), without fibula, non-septate
AR2M6A	1	2	1	0.5	1	1	1	0.5	2	1	1	1	1	0.5	2	1.25	0.45	Light green	Very thin	With spores, not septate, no fibulae
AR2M6B	1	3	2	1	2	1	2	1	2	3	2	1	1	2	3	1.80	0.77	Dark green	Medium thin	Without fibulae, with spores, septate, guttate/cores
AR2M8	1	0.5	1	1	1	1	2	1	0.5	0.4	1	1	2	1	0.5	1.18	0.40	Hyaline	Very thin	With spores, septate, no fibulae

C1M7B	3	4	5	3	2	4	4	4	3	5	4	5	4	3	3	3.73	0.88	Light green	Thick	Without fibula, septate, spore-forming (asexual)
C3M1	1	1	2	0.5	0.4	1	2	1	1	0.5	2	1	1	2	1	1.33	0.49	Hyaline	Very thin	With spores, not septate, not fibulae, not guttulated
C3M3	1	2	1	0.5	0.5	1	2	1.5	1	2	1	0.5	1	2	0.4	1.40	0.52	Dark green	Very thin	Many spores, septate, guttulated
C4M1	1	0.5	2	1	1	1	2	1	0.5	2	2	1	1	1	2	1.38	0.51	Hyaline	Very thin	septate, spore-bearing, fibulate
C4M3	4	3	3	4	3	4	2	3	4	3	3	4	2	3	3	3.20	0.68	Hyaline	Thick	Septate, with spores, with fibulae
C4M5	1	2	0.5	1	2	1	2	1	2	2	1	3	2	2	1	1.64	0.63	Light brown	Very thin	With spores, not septate, not fibulae
C4M8	2	1.5	2	1	0.5	1	2	2	1	1.5	1	2	1	0.4	2	1.55	0.52	Light green	Very thin	With spores, guttulate (balls in heaps), septate
C4M10	5	4	3	3	5	4	3	4	3	5	3	4	5	3	4	3.87	0.83	Dark green	Thick	With spores, not septate, not fibulae
C5M2	2	3	3	2	1	2	3	1	2	3	1	2	3	2	1	2.07	0.80	Very hyaline	Thin	With spores, guttulate, septate
C6M4	3	4	5	4	3	2	3	2.5	4	2	3.5	4	2	3	4	3.31	0.95	Verde oscuro	Thick	Spore-bearing, septate, with fibula, guttulate

C6M10	1	2	1	0.5	1.5	2	0.4	1	2	2	1	1	0.5	1	1	1.36	0.50	Muy hialinas	Very thin	Spores small, septate (thin)
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Annex 3. Information sheets for each of the species of root endophytic fungi used for functional trait analysis.

Taxonomy

Class: *Leotiomycetes*
 Order: *Helotiales*
 Family: *Hyaloscyphaceae*
 Genus or species: *Hyaloscyphaceae*

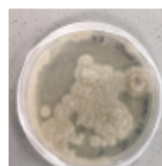
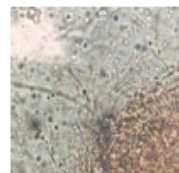


Image culture



Microscope image
(10 µm)

Host:

Quercus humboldtii
 Host UNITE database:
Fagus sylvatica-Pinus ponderosa-Pyrola

Geographic distribution (UNITE database):

North America and Europe

Functional traits

Hyphal diameter (average): 1,27
 Hyphal coloration and build: Highly hyaline, very thin
 Hyphal cytoplasmic contents: With asexual spores, non-septate hyphae, non-fibulae hyphae

Ecology and information

It is characterized by minute, sessile to subsessile apothecia, with hyaline, lageniform to conical hairs, prismatic-textured ectal excipient and filiform paraphyses.

Species in this family have a cosmopolitan distribution, and are saprobic, growing on dead wood or other plant debris (Quijada et al., 2017).

Quijada, L., Huhtinen, S., Negrin, R., & Beltrán-Tejera, E. (2017). Studies in *Hyaloscyphaceae* associated with major vegetation types in the Canary Islands II: a revision of *Hyaloscypha*. *Willdenowia*, 47(1), 31-42.

Taxonomy

Class: *Sordariomycetes*
 Order: *Diaporthales*
 Family: *Diaporthaceae*
 Genus or species: *Diaporthe nothofagi*

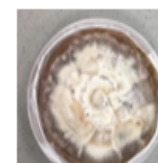


Image culture



Microscope image =
(10 µm)

Host:

Quercus humboldtii
 Host UNITE database:
Nothofagus menziesii-Nothofagus cunninghamii-Pinus sylvestris

Geographic distribution:

Europe and Australia

Functional traits

Hyphal diameter (average): 1,67
 Hyphal coloration and build: Dark brown, medium thick
 Hyphal cytoplasmic contents: With fibulae, no spores, septate hyphae

Ecology and information

Named after the host genus from which it was collected. *Nothofagus*.

Hyphae on PDA after 4 weeks septate, smooth, mostly hyaline 1–3µm wide, scarcely brown 3–8µm wide. Perithecia and pycnidia not produced on PDA, OMA or wheat straw pieces on WA after 4 weeks, it is not known whether *D. nothofagi* is a pathogen, saprobe or endophyte (Tan et al., 2013).

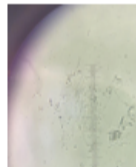
Tan, Y. P., Edwards, J., Grice, K. R. E., & Shivas, R. G. (2013). Molecular phylogenetic analysis reveals six new species of *Diaporthe* from Australia. *Fungal Diversity*, 61(1), 251-260.

Taxonomy

Class: *Sordariomycetes*
 Order: *Hypocreales*
 Family: *Clavicipitaceae*
 Genus or species: *Metapochonia bulbilosa*



Image culture



Microscope image
(10 µm)

Host:

Quercus humboldtii
 Host UNITE database:
Cabera pucaria-Gaultheria posnigii-Pinus sylvestris

Geographic distribution:

North America, South America, Europe and Asia

Functional traits

Hyphal diameter (average): 1,23
 Hyphal coloration and build: Hyaline, thin
 Hyphal cytoplasmic contents: Without fibulae, with spores

Ecology and information

The genus is characterized by rather fast-growing colonies. Conidiophores are prostrate or erect and bear solitary as well as verticillate phialides. The phialoconidia may be subglobose, ellipsoidal, rod-shaped to falcate (Zare & Gams, 2007).

Zare, R., & Gams, W. (2007). *Pochonia globispora* sp. nov. Nova Hedwigia, 84(3-4), 421-428.

Taxonomy

Class: *Eurotiomycetes*
 Order: *Eurotiales*
 Family: *Aspergillaceae*
 Genus or species: *Penicillium christensenii*



Image culture



Microscope image
(10 µm)

Host:

Bambusoideae
 Host UNITE database:
Calluna vulgaris-Quercus petraea-Fungi

Geographic distribution:

North America, South America, Europe, Asia and Africa

Functional traits

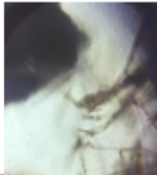
Hyphal diameter (average): 1,31
 Hyphal coloration and build: Light brown, thin
 Hyphal cytoplasmic contents: With spores, not septate, not fibulae

Ecology and information

This species is characterized by short stipes (compared to related species) and compact conidiophores, velvety colonies in MEA, moderate growth in CREA, and no growth in CYA incubated at 30 °C. It is named after Martha Christensen, who collected and isolated the type culture of this species.

Native forest soil and leaf litter of *Manilkara bidentata* or *Guarea guidonia*; Costa Rica and Puerto Rico, USA. Good sporulation on CYA, velvety, dull green conidia, white mycelium, exudate produced in clear droplets, soluble pigments absent, entire margin, light brown reverse with orange grooves in the center. (Houbraken et al., 2011).

Houbraken, J., Frisvad, J. C., & Samson, R. A. (2011). Taxonomy of *penicillium* section *citrina*. Studies in mycology, 70, 53-138.

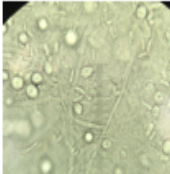
Taxonomy Class: <i>Sordariomycetes</i> Order: <i>Diaporthales</i> Family: <i>Diaporthaceae</i> Genus or species: <i>Diaportha columnaris</i>		
Host: <i>Bambusoideae</i> Host UNITE database: <i>Microthlaspi perfoliatum</i>-<i>Populus trichocarpa</i>-<i>Ammophila arenaria</i>	Image culture	Microscope image (10 µm)
Geographic distribution: North America, South America, Europe, Asia, Africa and Australia		
Functional traits Hyphal diameter (average): 1,93 Hyphal coloration and build: Dark brown, medium thin Hyphal cytoplasmic contents: <i>Gutulate</i> (dark contents), septate, not fibulae		

Ecology and information

Comprises *phytopathologically* important *microfungi* with *diverse* host associations and a worldwide distribution.

This taxon is distinguished from other species of *Phomopsis* by the distinctive conidiophores that consist of vertically aligned cells lining the base and sides of the conidiomata. [Two other species have been associated with dieback of *Vaccinium* spp. in the USA, Canada and Europe namely *P. vaccinii* Shear from blueberry and cranberry and *P. myrtilli* Petrak from bilberry and whortleberry in Austria and the Czech Republic (Udayanga et al., 2011).

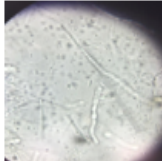
Udayanga, D., Liu, X., McKenzie, E. H., Chukeatirote, E., Bahkali, A. H., & Hyde, K. D. (2011). The genus *Phomopsis*: biology, applications, species concepts and names of common phytopathogens. *Fungal diversity*, 50(1), 189-225.

Taxonomy Class: <i>Sordariomycetes</i> Order: Hypocreales Family: <i>Nectriaceae</i> Genus or species: <i>Gibberella fujikuroi</i>		
Host: <i>Bambusoideae</i> Host UNITE database: <i>Cicer arietinum</i>-<i>Phaseolus</i>-<i>Homo sapiens</i>	Image culture Microscope image (10 µm)	
Geographic distribution: North America, South America, Europe and Asia		
Functional traits Hyphal diameter (average): 3,15 Hyphal coloration and build: Hyaline, coarse Hyphal cytoplasmic contents: Septate, asci and ascospores, asexual spores, <i>gutulate</i>		

Ecology and information

Is a monophyletic taxon that includes an assemblage of *Fusarium* species with similar and overlapping morphological traits that complicates their *differentiation*. Most of the species in this complex are associated with devastating diseases of many economically important plants. They also produce a remarkably wide range of secondary metabolites or mycotoxins that contaminate food/feed worldwide and can subsequently cause a variety of diseases in humans and animals (Kvas et al., 2009).

Kvas, M., Marasas, W. F. O., Wingfield, B. D., Wingfield, M. J., & Steenkamp, E. T. (2009). Diversity and evolution of *Fusarium* species in the *Gibberella fujikuroi* complex.

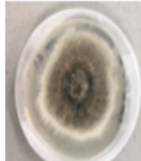
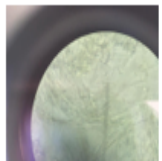
Taxonomy Class: <i>Eurotiomycetes</i> Order: <i>Eurotiales</i> Family: <i>Aspergillaceae</i> Genus or species: <i>Penicillium christensenii</i>	
Host: <i>Bambusoideae</i> Host UNITE database: <i>Calluna vulgaris-Quercus petraea-Fungi</i>	  Image culture Microscope image (10 um) Geographic distribution: North America, South America, Europe, Asia and Africa
Functional traits Hyphal diameter (average): 1,38 Hyphal coloration and build: Hyaline, very thin Hyphal cytoplasmic contents: With spores, guttulate/nucleate, septate (thin)	

Ecology and information

This species is characterized by short stipes (compared to related species) and compact conidiophores, velvety colonies in MEA, moderate growth in CREA, and no growth in CYA incubated at 30 °C. It is named after Martha Christensen, who collected and isolated the type culture of this species.

Native forest soil and leaf litter of *Manilkara bidentata* or *Guarea guidonia*; Costa Rica and Puerto Rico, USA. Good sporulation on CYA, velvety, dull green conidia, white mycelium, exudate produced in clear droplets, soluble pigments absent, entire margin, light brown reverse with orange grooves in the center. (Houbraken et al., 2011).

Houbraken, J., Eriyad, J. C., & Samson, R. A. (2011). Taxonomy of *penicillium* section *citrina*. *Studies in mycology*, 70, 53-138.

Taxonomy Class: <i>Sordariomycetes</i> Order: Family: Genus or species: <i>Dictyochoaeta</i>	
Host: <i>Bambusoideae</i> Host UNITE database: <i>Populus deltoides-Malus pumila-Nicotiana benthamiana</i>	  Image culture Microscope image (10 um) Geographic distribution: North America, South America, Europe and Asia
Functional traits Hyphal diameter (average): 1,20 Hyphal coloration and build: Hyaline, very thin Hyphal cytoplasmic contents: Not septate, no spores	

Ecology and information

Dictyochoaeta is characterized by macronematous, mononematous (rarely synnematos), septate, pale brown to dark brown conidiophores, producing monophylactic or polyphylactic conidiophores, with sympodial proliferation of conidiogenous cells that often have conspicuous, bell-shaped collarettes. Frequently, sterile or fertile fertile setae are associated with the conidiophores and together they may form small clusters originating from a superficial hyphal node. The conidia are hyaline and smooth (Whitton et al., 2000).

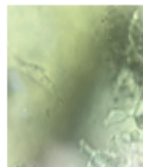
Whitton, S. R., McKenzie, E. H. C., & Hyde, K. D. (2000). *Dictyochoaeta* and *Dictyochoaetopsis* species from the Pandanaceae. *Fungal Diversity*, 4, 133-158.

Taxonomy

Class: *Leotiomycetes*
 Order: *Helotiales*
 Family: *Sclerotiniaceae*
 Genus or species: *Botrytis caroliniana*



Image culture



Microscope image
(10 µm)

Host:

Bambusoideae

Host UNITE database:

Vitis vinifera, *Persea caroliniana*, *Malus domestica*

Geographic distribution:

North America, South America, Europe, Asia and Australia

Functional traits

Hyphal diameter (average): 3,23

Hyphal coloration and build: Hyaline, very thin

Hyphal cytoplasmic contents: Not septate, no spores

Ecology and information

This species is pathogenic on blackberry fruits and broad bean leaves, which distinguishes it further from *B. galanthina*. The new species formed white to pale gray colonies with short, tufted aerial mycelium and produced black sclerotia on PDA at 20 °C (Li et al., 2012).

Li, X., Kerrigan, J., Chai, W., & Schnabel, G. (2012). *Botrytis caroliniana*, a new species isolated from blackberry in South Carolina. *Mycologia*, 104(3), 650-658.

Taxonomy

Class: *Sordariomycetes*
 Order: *Hypocreales*
 Family: *Nectriaceae*
 Genus or species: *Gibberella zeae*

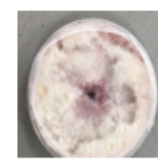
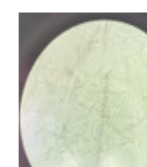


Image culture



Microscope image
(10 µm)

Host:

Bambusoideae

Host UNITE database:

Zea mays, *Triticum aestivum*, *Homo sapiens*

Geographic distribution:

North America, South America, Europe, Africa, Australia and Asia

Functional traits

Hyphal diameter (average): 1,30

Hyphal coloration and build: Hyaline, very thin

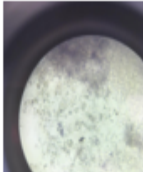
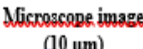
Hyphal cytoplasmic contents: With spores, without *fibulae*, not septate

Ecology and information

Also known by the name of its anamorph *Fusarium graminearum*, is a fungal plant pathogen which causes fusarium head blight, a devastating disease on wheat and barley (Bai & Shaner, 2004). The pathogen is responsible for billions of dollars in economic losses worldwide each year. The fungus causes fusarium head blight on wheat, barley, and other grass species, as well as ear rot on corn (Beyer & Verret, 2005).

Bai, G., & Shaner, G. (2004). Management and resistance in wheat and barley to Fusarium head blight. *Annu. Rev. Phytopathol.*, 42, 135-161.

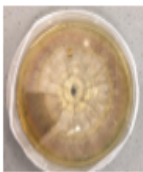
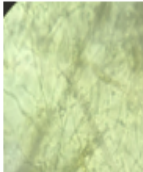
Beyer, M., & Verret, J. A. (2005). Germination of *Gibberella zeae* ascospores as affected by age of spores after discharge and environmental factors. *European journal of plant pathology*, 111(4), 381-389.

Taxonomy Class: <i>Sordariomycetes</i> Order: Hypocreales Family: Genus or species: <i>Fusarium oxysporum</i>	
Host: <i>Bambusoideae</i> Host UNITE database: <i>Glycine max-Solanum lycopersicum-Populus trichocarpa</i>	Image culture  Microscope image (10 µm) 
Geographic distribution: North America, Europe and Asia	
Functional traits Hyphal diameter (average): 1,25 Hyphal coloration and build: Light yellow/purple, very thin Hyphal cytoplasmic contents: With spores (many spores), without fibulae, not septate	

Ecology and information

This species is also considered a normal constituent of the fungal communities in the rhizosphere of plants. All strains of *F. oxysporum* are saprophytic and able to grow and survive for long periods on organic matter in soil and in the rhizosphere of many plant species. Moreover, some strains of *F. oxysporum* are pathogenic to different plant species; they penetrate into the roots inducing either root-rots or *tracheomycosis*, when they invade the vascular system. Many other strains can penetrate roots, but do not invade the vascular system or cause disease (Fravel et al., 2003).

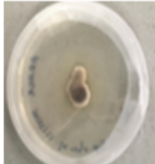
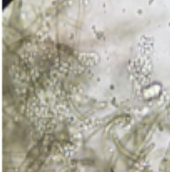
Fravel D., Olivain C., & Alabouvette C. (2003). *Fusarium oxysporum* and its biocontrol. New phytologist, 157(3), 493-502.

Taxonomy Class: <i>Sordariomycetes</i> Order: Hypocreales Family: <i>Nectriaceae</i> Genus or species: <i>Dothylonectria anthracicola</i>	
Host: <i>Araliaceae</i> Host UNITE database: <i>Populus deltoides-Populus trichocarpa-Quercus alba</i>	Image culture  Microscope image (10 µm) 
Geographic distribution: North America, South America, Europe, Africa, Asia and Australia	
Functional traits Hyphal diameter (average): 1,25 Hyphal coloration and build: Hyaline, very thin Hyphal cytoplasmic contents: With spores, not septate, not fibulae	

Ecology and information

Characteristic symptoms of black foot disease include a reduction in root biomass and root hairs with sunken and necrotic lesions. Severe necrosis of the root system results in stunting, wilting, leaf chlorosis, browning and leaf drop prior to death. Produce *cylindrocarpum*-like asexual morphs (Parkinson et al., 2017).

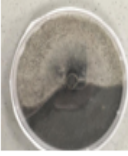
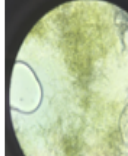
Parkinson, L. E., Shivas, R. G., & Dann, E. K. (2017). Pathogenicity of *nectriaceous* fungi on avocado in Australia. *Phytopathology*, 107(12), 1479-1485.

Taxonomy Class: <i>Lectiomycetes</i> Order: <i>Helotiales</i> Family: Genus or species: <i>Cadophora</i>	
Host: <i>Araliaceae</i> Host UNITE database: No host	  Image culture Microscope image (10 µm)
Functional traits Hyphal diameter (average): 1,80 Hyphal coloration and build: Dark green, medium thin Hyphal cytoplasmic contents: Without fibulae, with spores, septate, guttate/nuclei	
Geographic distribution: Africa and Asia	

Ecology and information

Fungi of this genus are found in many habitats, being isolated mainly from soil and plants, either interacting as plant pathogens, root or trunk colonizers, or saprophytes, causing blue stain on wood (Harrington & McNew, 2003).

Harrington, T. C., & McNew, D. L. (2003). Phylogenetic analysis places the *Phialophora*-like anamorph genus *Cadophora* in the *Helotiales*. *Mycotaxon*, 87(141), e151.

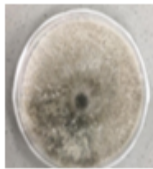
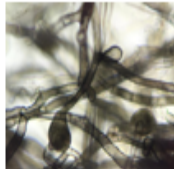
Taxonomy Class: <i>Sordariomycetes</i> Order: <i>Magnaporthales</i> Family: <i>Magnaporthaceae</i> Genus or species: <i>Mycocleptodiscus cuttonii</i>	
Host: <i>Araliaceae</i> Host UNITE database: <i>Dalbergia retusa</i> - <i>Synyzium longipes</i> - <i>Paullinia cupana</i>	  Image culture Microscope image (10 µm)
Geographic distribution: South America and Asia	
Functional traits Hyphal diameter (average): 1,18 Hyphal coloration and build: Light green, very thin Hyphal cytoplasmic contents: With spores, septate, no fibulae	

Ecology and information

Named after the British mycologist, Brian C. Sutton, who described several species related to *Mycocleptodiscus*.

Includes plant pathogens, animal opportunists, saprobic and endophytic fungi. Colonies on OA attaining 80–90 mm diam after 2 wk at 25 °C, aerial mycelium, cottony to hispid, white, pale olivaceous grey to olivaceous black in the centre buff to the periphery, margin effuse; reverse olivaceous buff, to olivaceous grey in the centre paler to the periphery (Hernández et al., 2019).

Hernández-Restrepo, M., Bezerra, J. D. P., Tan, Y. P., Wiederhold, N., Crous, P. W., Guarro, J., & Gené, J. (2019). Re-evaluation of *Mycocleptodiscus* species and morphologically similar fungi. *Persoonia: Molecular Phylogeny and Evolution of Fungi*, 42, 205.

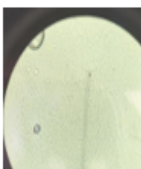
Taxonomy Class: <i>Sordariomycetes</i> Order: <i>Trichosphaeriales</i> Family: <i>Trichosphaeriaceae</i> Genus or species: <i>Nigrospora musae</i>	
Host: <i>Cecropia</i> sp. Host UNITE database: <i>Platycladus orientalis-Caulerpa racemosa-Rohdea chinensis</i>	  Image culture Microscope image (10 µm)
Geographic distribution: North America, Australia, Europe and Asia	
Functional traits Hyphal diameter (average): 3,73 Hyphal coloration and build: Dark green, coarse Hyphal cytoplasmic contents: Without fibula, septate, spore-forming (asexual)	

Ecology and information

Hyphae pale brown, smooth, branched, septate, 2–6 µm diam. Conidiophores aggregated in black sporodochia, micronematous or semi-macronematous, flexuous or straight, pale brown, smooth, much branched, 3.5–8 µm diam, some conidiophores reduced to conidiogenous cells.

On PDA, colonies woolly, margin circular. Colonies initially white, becoming dark grey with age, most mycelia immersed, and the reverse were olive-citrine, reaching 9 cm diam in 7 d at 25 °C. On SNA, colonies flat, the aerial mycelia growing sparsely, most mycelia immersed, reverse olivaceous grey with black patches, with abundantly sporulation (Wang et al., 2017).

Wang, M., Liu, F., Crous, P. W., & Cai, L. (2017). Phylogenetic reassessment of *Nigrospora*: ubiquitous endophytes, plant and human pathogens. *Persoonia: Molecular Phylogeny and Evolution of Fungi*, 39, 118.

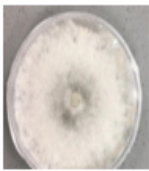
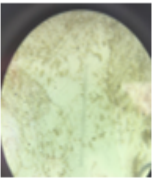
Taxonomy Class: <i>Sordariomycetes</i> Order: <i>Hypocreales</i> Family: Genus or species: <i>Trichoderma</i> sp.	
Host: <i>Cecropia</i> sp. Host UNITE database: <i>Schinus molle-Glycine max-Andropogon gerardii</i>	  Image culture Microscope image (10 µm)
Geographic distribution: South America, Europe and Asia	
Functional traits Hyphal diameter (average): 1,33 Hyphal coloration and build: Hyaline, very thin Hyphal cytoplasmic contents: With spores, not septate, not fibulae, not guttulate	

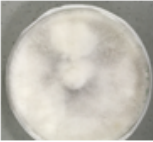
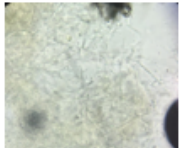
Ecology and information

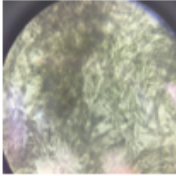
It is a saprophytic fungus, an antagonist of plant pathogens that is present in most soils. It activates plant root growth, is able to colonize and grow on roots as they develop and increases crop resistance to attack by potential pathogens.

The ability to produce diverse metabolites and to adapt to diverse environmental conditions and substrates, confers to *Trichoderma* the possibility of being used in the biotechnological industry (Martínez et al., 2013).

Martínez, B., Infante, D., & Reyes, Y. (2013). *Trichoderma* spp. and their role in crop pest control. *Revista de Protección Vegetal*, 28(1), 1-11.

Taxonomy Class: <i>Sordariomycetes</i> Order: Family: Genus or species: <i>Fungi</i> <i>sp.</i>	 
Host: <i>Cecropia</i> <i>sp.</i> Host UNITE database: <i>Coffea arabica</i>-<i>Sesuvium repens</i>	Image culture Microscope image (10 µm) Geographic distribution: Asia
Functional traits Hyphal diameter (average): 1,40 Hyphal coloration and build: Light green, very thin Hyphal cytoplasmic contents: Many spores, septate, guttulated	

Taxonomy Class: <i>Sordariomycetes</i> Order: <i>Xylariales</i> Family: <i>Xylariaceae</i> Genus or species: <i>Xylaria</i>	 
Host: <i>Cecropia</i> <i>sp.</i> Host UNITE database: <i>Sesuvium repens</i>-<i>Hevea brasiliensis</i>-<i>Citrus</i>	Image culture Microscope image (10 µm) Geographic distribution: South America and Africa
Functional traits Hyphal diameter (average): 1,38 Hyphal coloration and build: Hyaline, very thin Hyphal cytoplasmic contents: Septate, with spores, with fibulae	
Ecology and information <i>Xylaria</i> is distinguished by having a cylindrical and stipitate stroma, or peltate or pulvinate. The peltate or pulvinate forms manifest their generic identity only after producing the anamorph in culture, which is characterized by the production of an erect conidial stroma. Ascospores are subhyaline to almost black; they usually have a straight, sigmoid or spiral germ line, which may be short or run the entire length of the propagule, and can be grouped on the basis of their macro- and microscopic characteristics and the type of host with which they evolve (Sn Martin & Rogers, 1995). San Martin, F., & Rogers, J. D. (1995). Notes on the history, host relationships and distribution of the genus <i>Xylaria</i> (<i>Pyrenomycetes</i>, <i>Sphaeriales</i>) in Mexico. <i>Acta Botanica Mexicana</i>, (30), 21-40.	

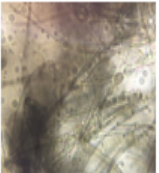
Taxonomy Class: <i>Sordariomycetes</i> Order: <i>Glomerellales</i> Family: <i>Glomerellaceae</i> Genus or species: <i>Colletotrichum gigasporum</i>		
Host: <i>Cecropia</i> sp. Host UNITE database: <i>No host</i>	Image culture 	Microscope image (10 µm) Geographic distribution: North America, Europe and Asia
Functional traits Hyphal diameter (average): 3,20 Hyphal coloration and build: Dark green, coarse Hyphal cytoplasmic contents: Septate, spore-bearing, with fibulae		

Ecology and information

Was originally reported from healthy leaves of *Centella asiatica* in Madagascar and *Stylosanthes guianensis* in Mexico, as well as from *Coffea arabica* in Colombia. It has an endophytic growth habit and could be isolated from various host plants occurring in geographically distant areas.

The most distinctive morphological feature of *C. gigasporum* is the long straight conidia (up to 32 µm long, av. length 26 µm) (Liu et al., 2014).

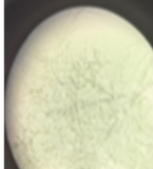
Liu, F., Cai, L., Crous, P. W., & Damm, U. (2014). The *Colletotrichum gigasporum* species complex. *Persoonia: Molecular Phylogeny and Evolution of Fungi*, 33, 83

Taxonomy Class: <i>Sordariomycetes</i> Order: <i>Magnaporthales</i> Family: <i>Magnaporthaceae</i> Genus or species: <i>Micolenporthus</i>			
Host: <i>Cecropia</i> sp. Host UNITE database: <i>Magnolia kabus-Cephalanthea rubra-Agathis australis</i>	Image culture 	Microscope image (10 µm) Geographic distribution: South America and Asia	
Functional traits Hyphal diameter (average): 1,64 Hyphal coloration and build: Hyaline, very thin Hyphal cytoplasmic contents: With spores, not septate, no fibulae			

Ecology and information

Is a genus of fungi in the family *Magnaporthaceae*. These fungi are endophytic, meaning that they do not harm the host plant and are probably in a mutualistic relationship with it (Tibpromma et al., 2018).

Tibpromma, S., Hyde, K. D., Bhat, J. D., Mortimer, P. E., Xu, J., Promrutha, L., ... & Kanwarathna, S. C. (2018). Identification of endophytic fungi from leaves of *Pandanus* based on their morphotypes and DNA sequence data from southern Thailand. *MycKeys*, (33), 25.

Taxonomy Class: Laotiomycetes Order: Helotiales Family: Genus or species: Helotiales fam Incertae sedis	
Host: <i>Cecropia sp.</i> Host UNITE database: Schinachyrium scoparium-Glycine max-Andropogon gerardii	  Image culture Microscope image (10 µm) Geographic distribution: South America and Europe
Functional traits Hyphal diameter (average): 1,55 Hyphal coloration and build: Hyaline, very thin Hyphal cytoplasmic contents: With spores, guttulate (balls in clusters), septate	

Taxonomy Class: Sordariomycetes Order: Hypocreales Family: Nectriaceae Genus or species: Ilyonectria	
Host: <i>Cecropia sp.</i> Host UNITE database: Vitis vinifera-Cambidium-Desmodium camptocladus	 Image culture Microscope image (10 µm) Geographic distribution: North America, South America, Europe and Asia
Functional traits Hyphal diameter (average): 3,87 Hyphal coloration and build: Light brown, coarse Hyphal cytoplasmic contents: With spores, not septate, not fibulae	

Taxonomy

Class: *Sordariomycetes*
 Order: Hypocreales
 Family:
 Genus or species: *Clonostachys*

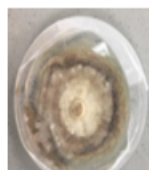
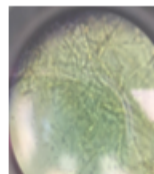


Image culture



Microscope image
(10 µm)

Host:

Cecropia sp.

Host UNITE database:

Cecropia insignis-*Ammonia spraguei*-*Ficus insipida*

Geographic distribution:

North America, South America, Europe, Asia and Australia

Functional traits

Hyphal diameter (average): 2,07

Hyphal coloration and build: Light green, thin

Hyphal cytoplasmic contents: With spores, guttulate, septate

Ecology and information

Clonostachys is a promising saprophytic filamentous genus fungus that belongs to phylum Ascomycota. *Clonostachys* is widespread around the world and exists in many kinds of habitats, with the highest frequency in soil. As an excellent mycoparasite, exhibits strong biological control ability against numerous fungal plant pathogens, nematodes and insects (Sun et al., 2020).

Sun, Z. B., Li, S. D., Ren, Q., Xu, J. L., Lu, X., & Sun, M. H. (2020). Biology and applications of *Clonostachys rosea*. Journal of applied microbiology, 129(3), 486-495.

Taxonomy

Class: *Dothideomycetes*
 Order: *Botryosphaeriales*
 Family: *Botryosphaeriaceae*
 Genus or species: *Neodeightonia subglobosa*

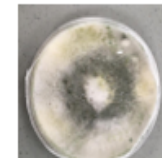
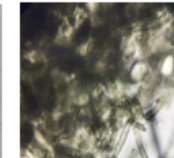


Image culture



Microscope image
(10 µm)

Host:

Cecropia sp.

Host UNITE database:

Fragaria x ananassa

Geographic distribution:

Europe and Asia

Functional traits

Hyphal diameter (average): 3,31

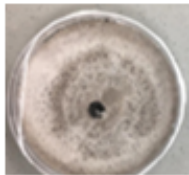
Hyphal coloration and build: Dark green, coarse

Hyphal cytoplasmic contents: With spores, septate, with fibula, guttulate

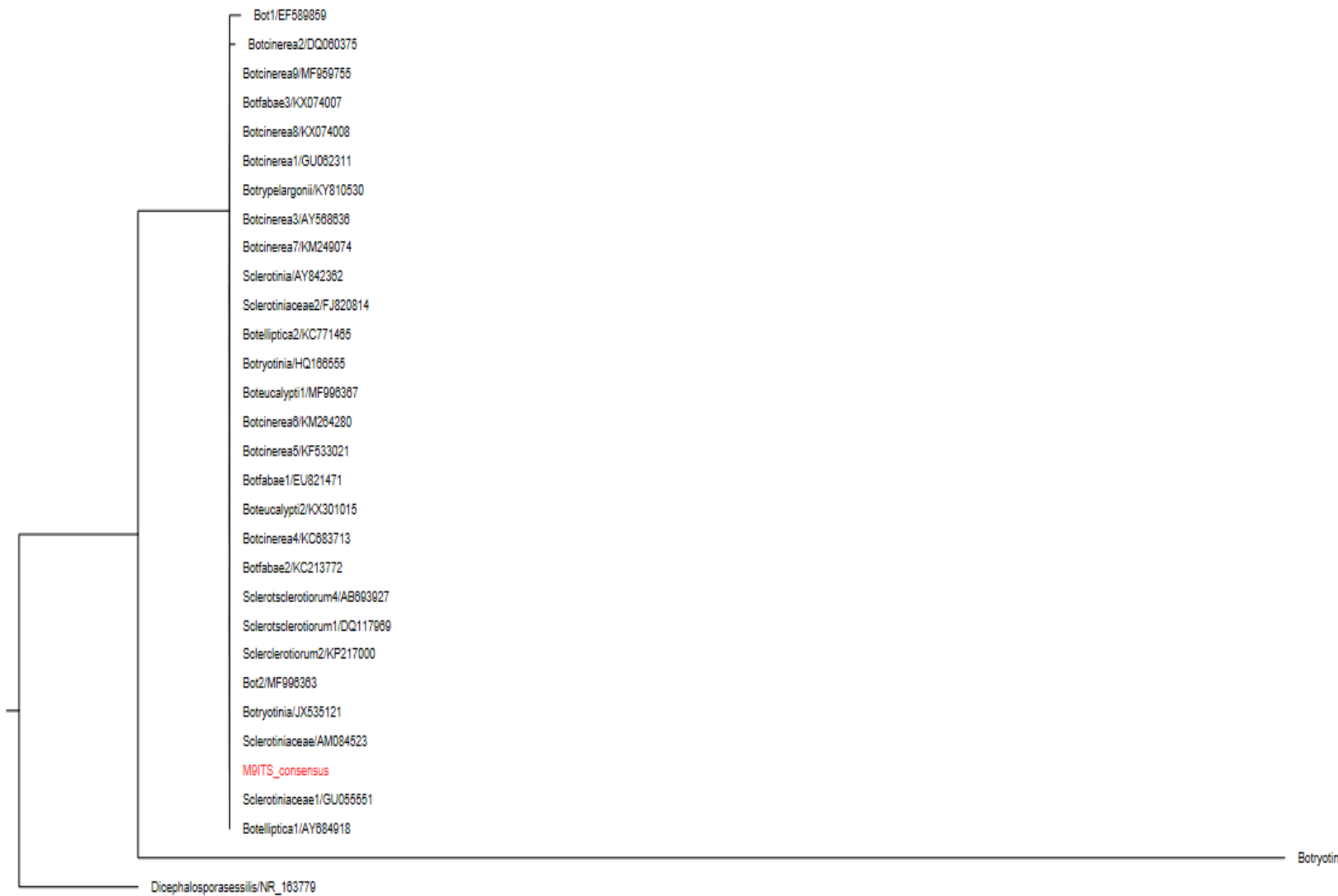
Ecology and information

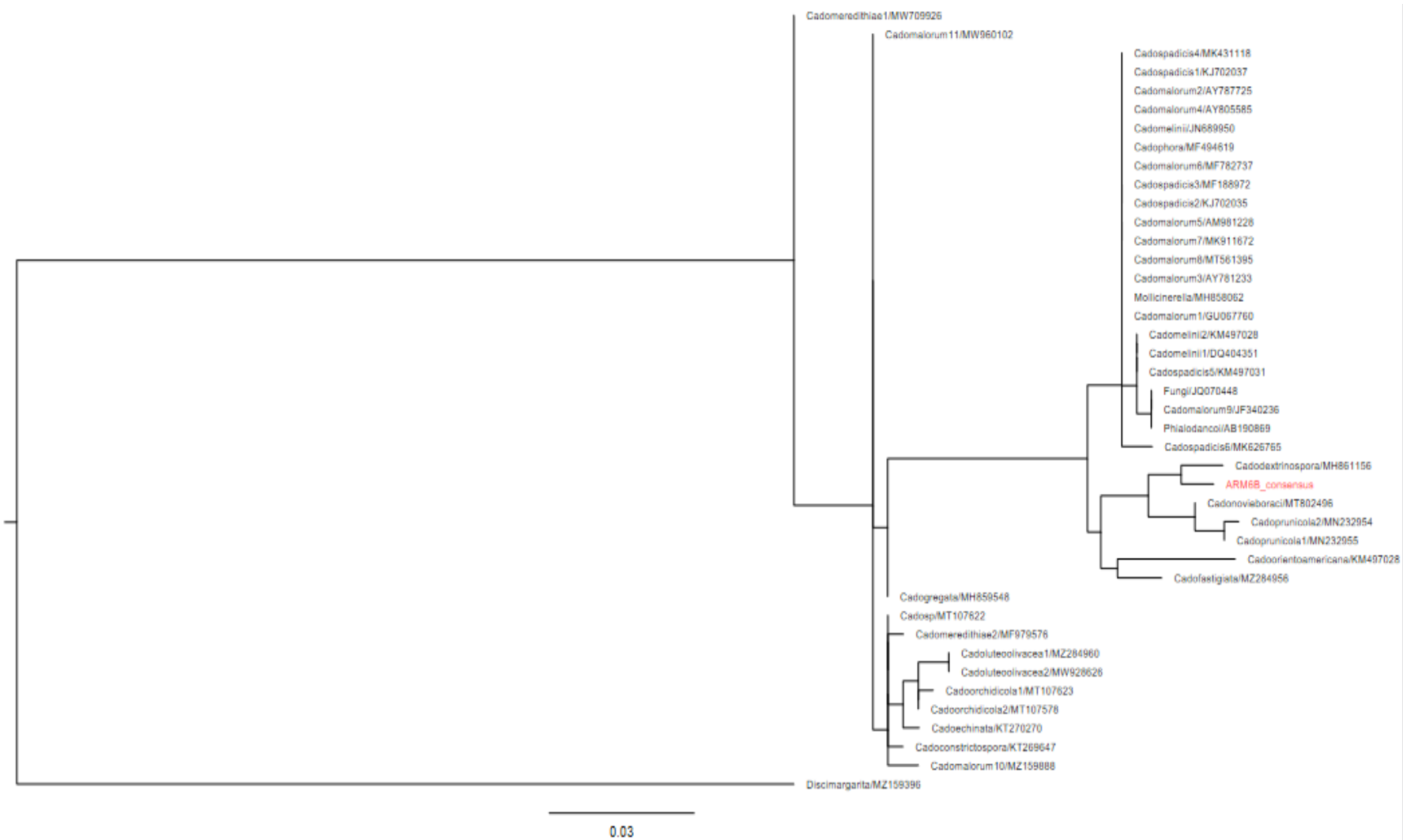
Ascomata immersed, up to 300 µm wide, dark brown to black with a single locule, paraphysate, locule filled with disintegrating sterile thin-walled tissue, amongst which the asci develop, neck narrow, cone-shaped, opening by an apical ostiole. Asci bitunicate, clavate, with well-developed apical chamber, 110-140 × 16-20 µm, 8-spored. Ascospores hyaline, aseptate, becoming brown and 1-septate, ovoid to broadly ellipsoidal, smooth or with a finely roughened surface, 20-26 × 7-10 µm (Phillips et al., 2013).

Phillips, A. J. L., Alves, A., Abdollahzadeh, J., Slippers, B., Wingfield, M. J., Groenewald, J. Z., & Crous, P. W. (2013). The Botryosphaeriaceae: genera and species known from culture. Studies in mycology, 76, 51-167.

Taxonomy Class: <u>Sordariomycetes</u> Order: <u>Dianorthales</u> Family: Genus or species: <u>Dianorthales</u>			
Host: <i>Cecropia</i> <u>sp</u> Host UNITE database: <i>Quercus ilex</i>-<i>Pinus halepensis</i>-<i>Rosmarinus officinalis</i>		Image culture Microscope image (10 µm) Geographic distribution: North America, South America, Europe and Asia	
Functional traits Hyphal diameter (average): 1,36 Hyphal coloration and build: Very hyaline, very thin Hyphal cytoplasmic contents: Small, septate (thin), spores			

Annex 4. Phylogenetic trees of each of the genera identified in the study where the red underlines are each of our samples.



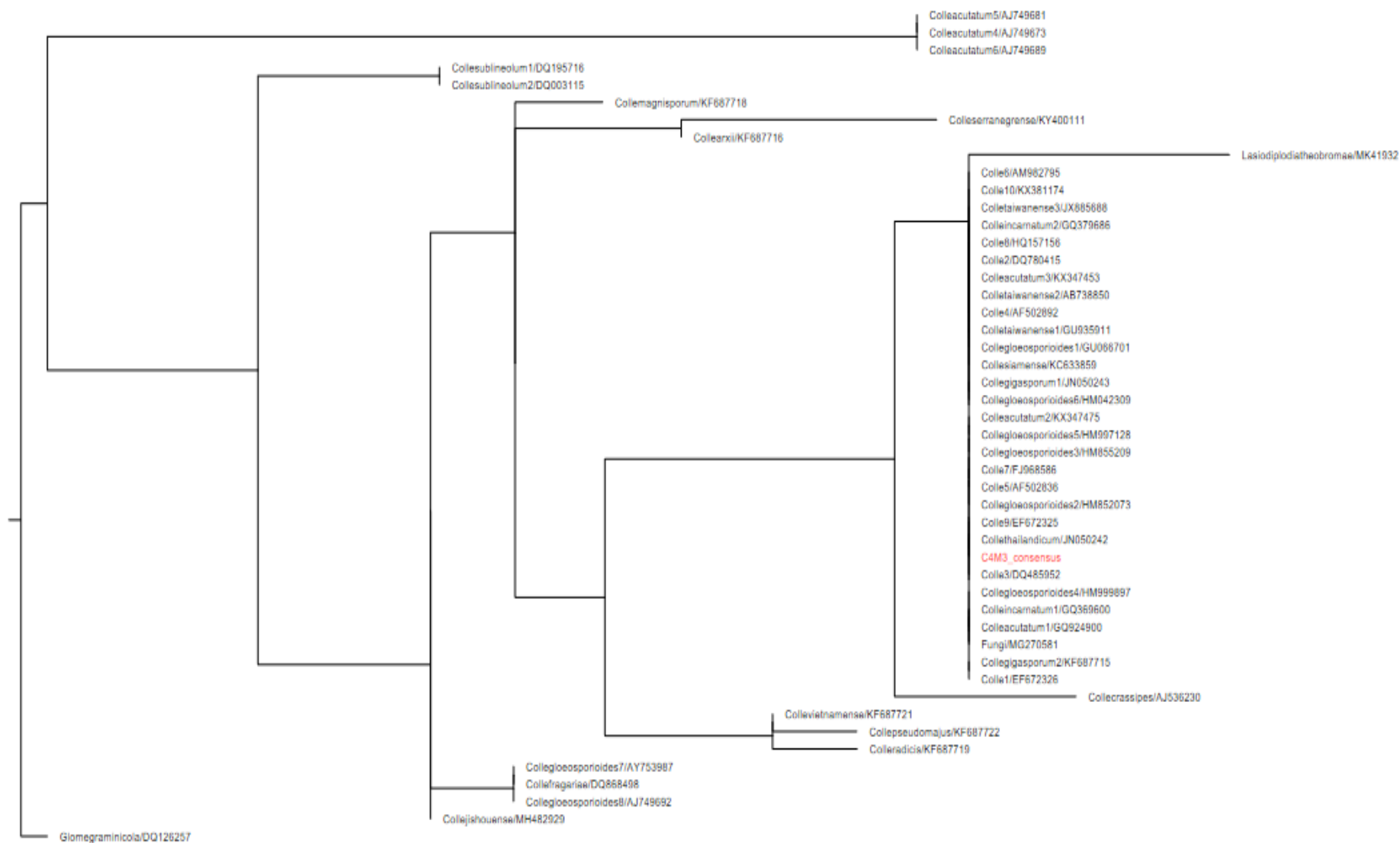


C5M2_consensus

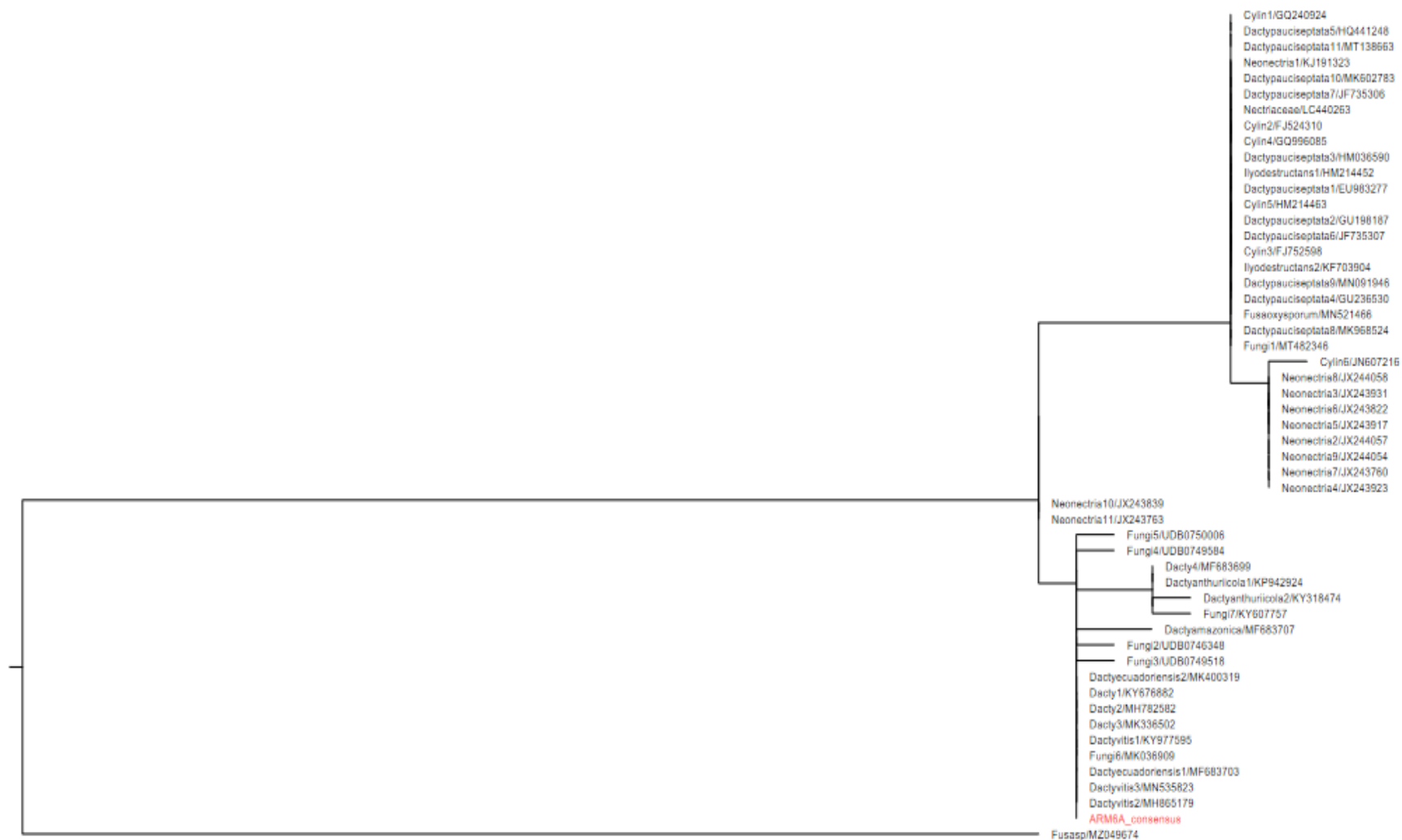
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 Clonosrosea14/KT377485
 Clonostachys10/EF031114
 Clonostachys11/AJ279488
 Clonosrosea5i/AY876924
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 Fungi/MF962949
 Clonosrosea17/KU377277
 Clonostachys5/EU754945
 Clonosrosea7/AF106532
 Clonosrosea3/FJ426388
 Clonostachys4/FJ999643
 Clonosrosea16/KU377279
 Clonosrosea9/HM037983
 Clonostachys2/FJ999649
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 Clonostachys7/EF601597
 Clonostachys9/EF152541
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 Clonosrosea27/HM751081
 Clonostachys19/MH260837
 Clonosspseudochroleuca2/KC806265
 Clonostachys17/JQ905684
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 Colligloosporioides/MH790242
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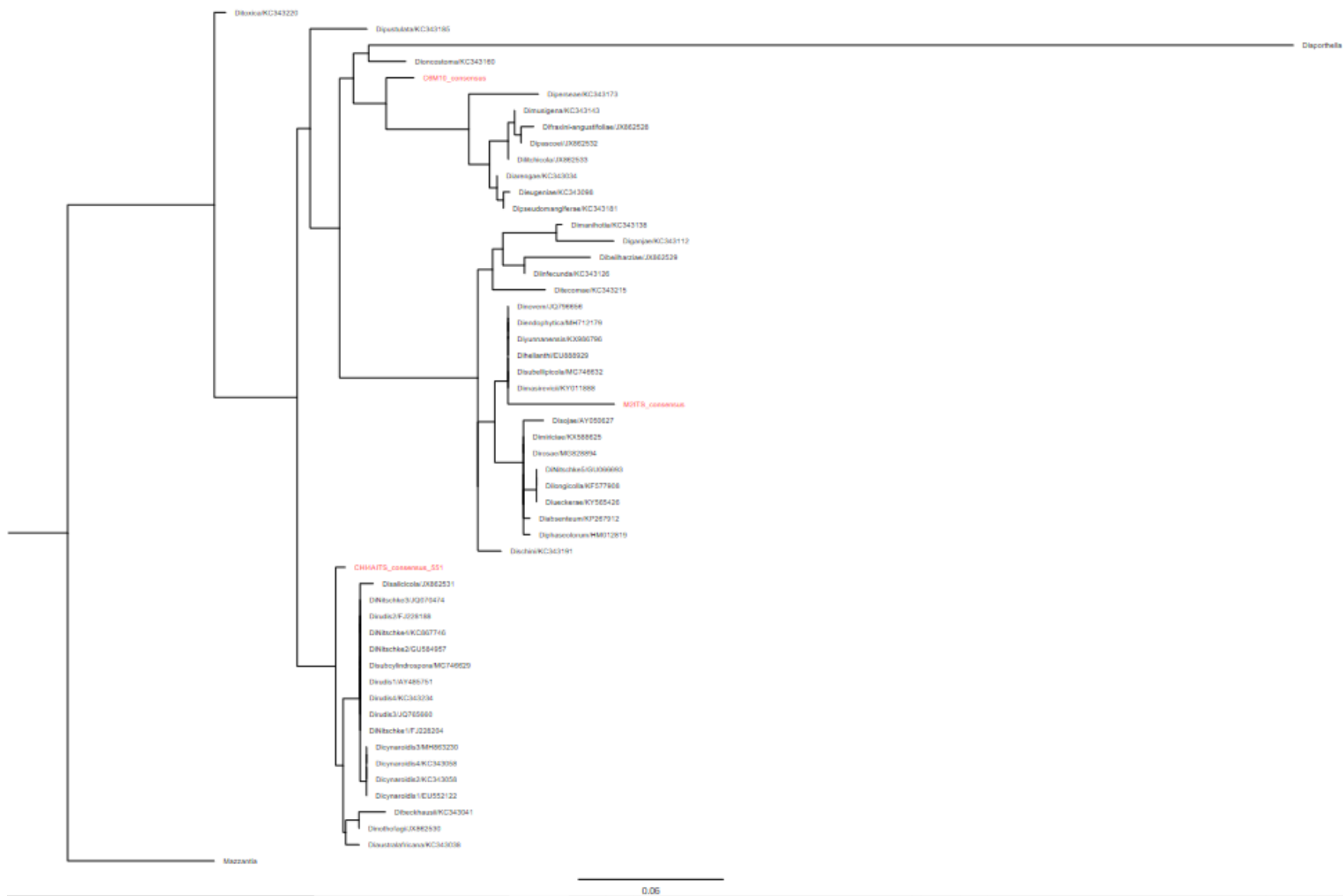
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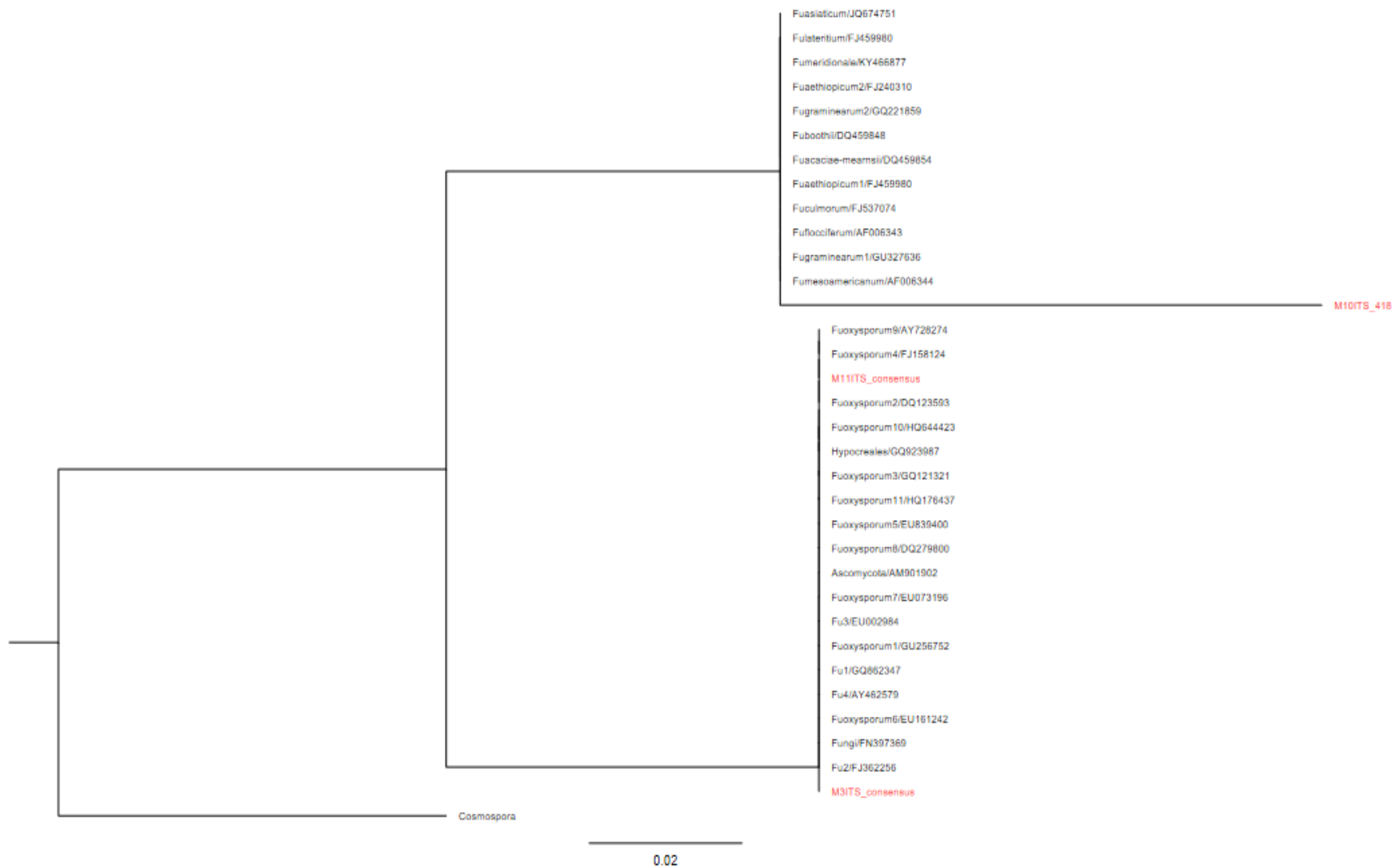


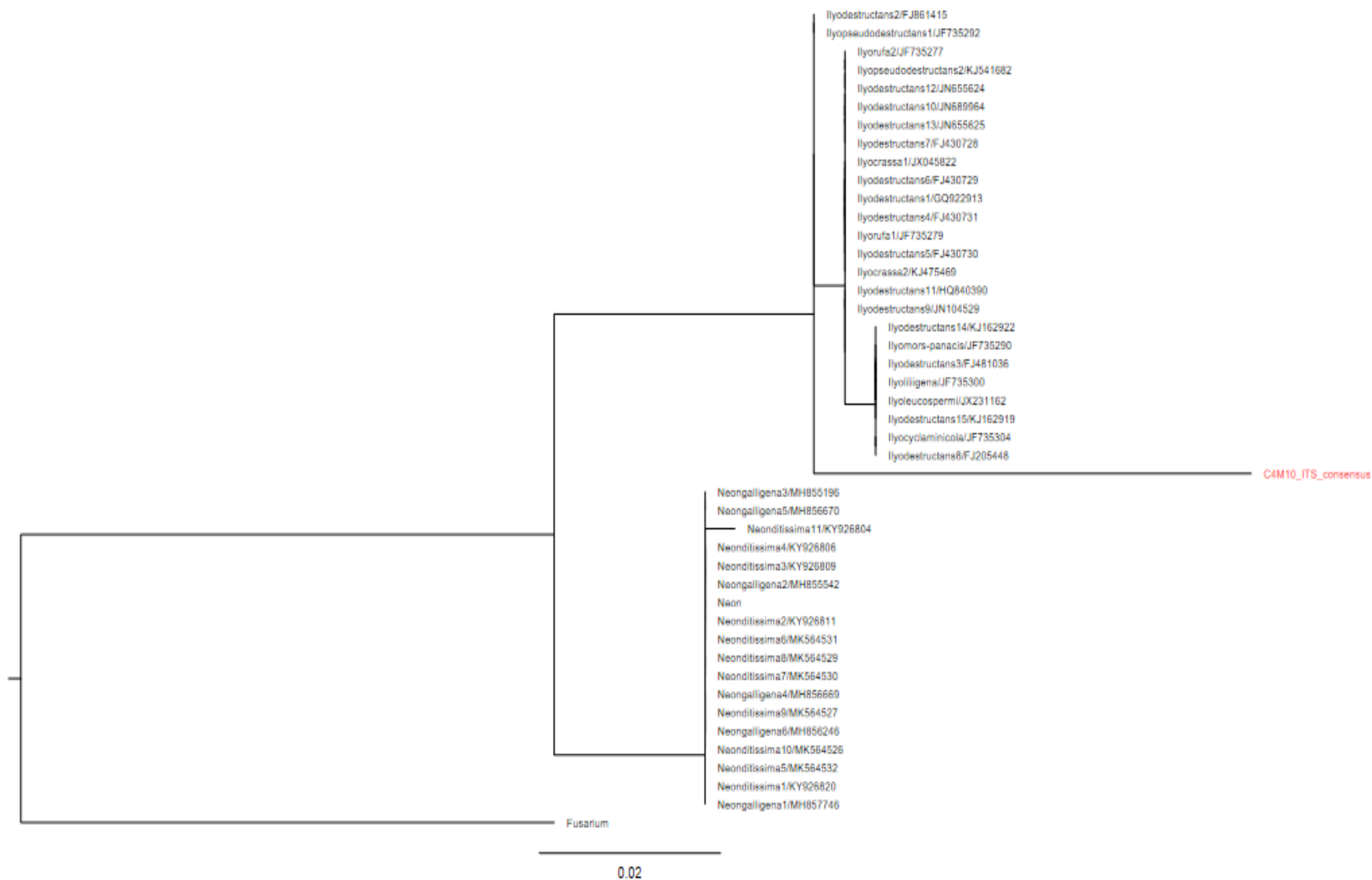
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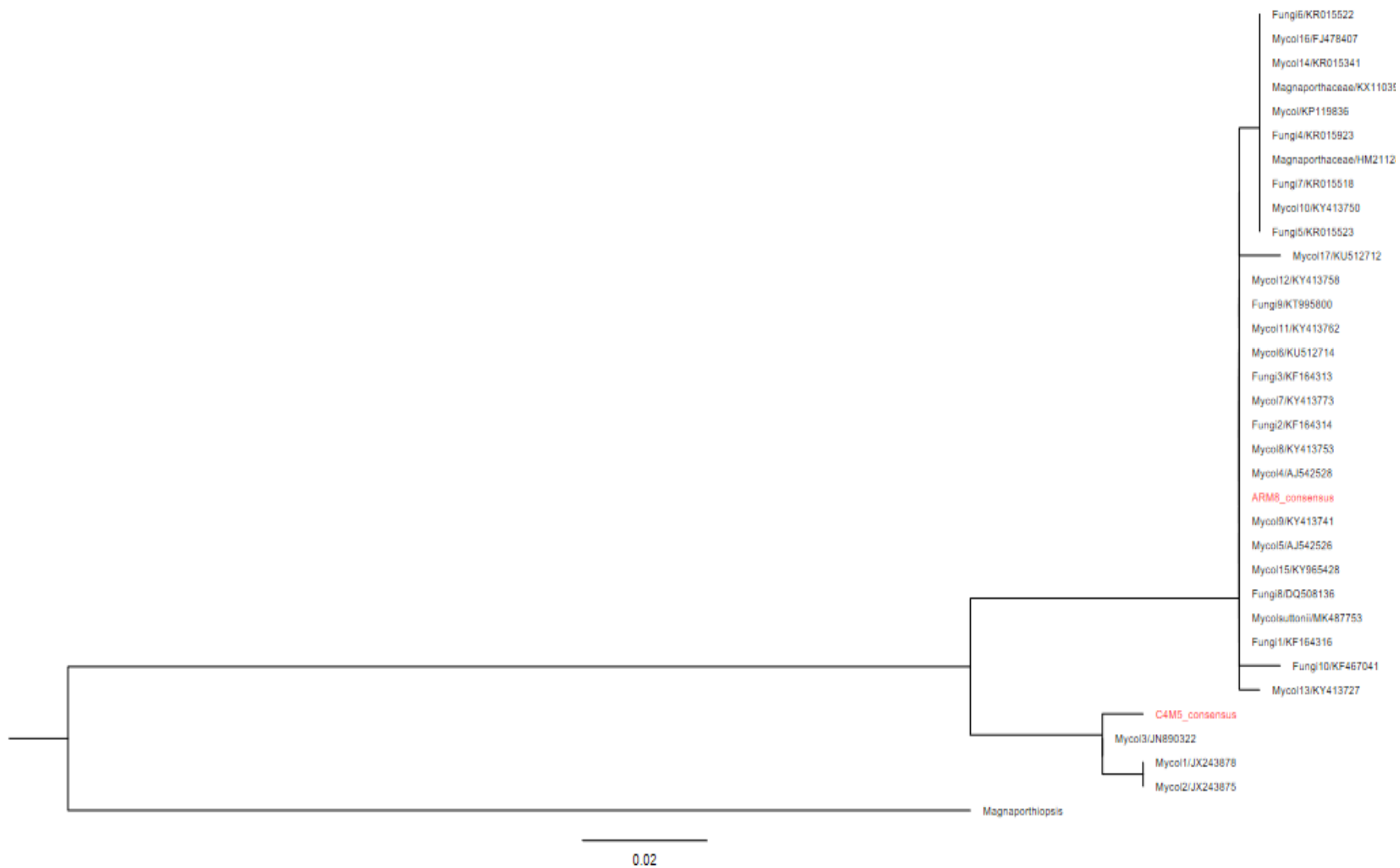
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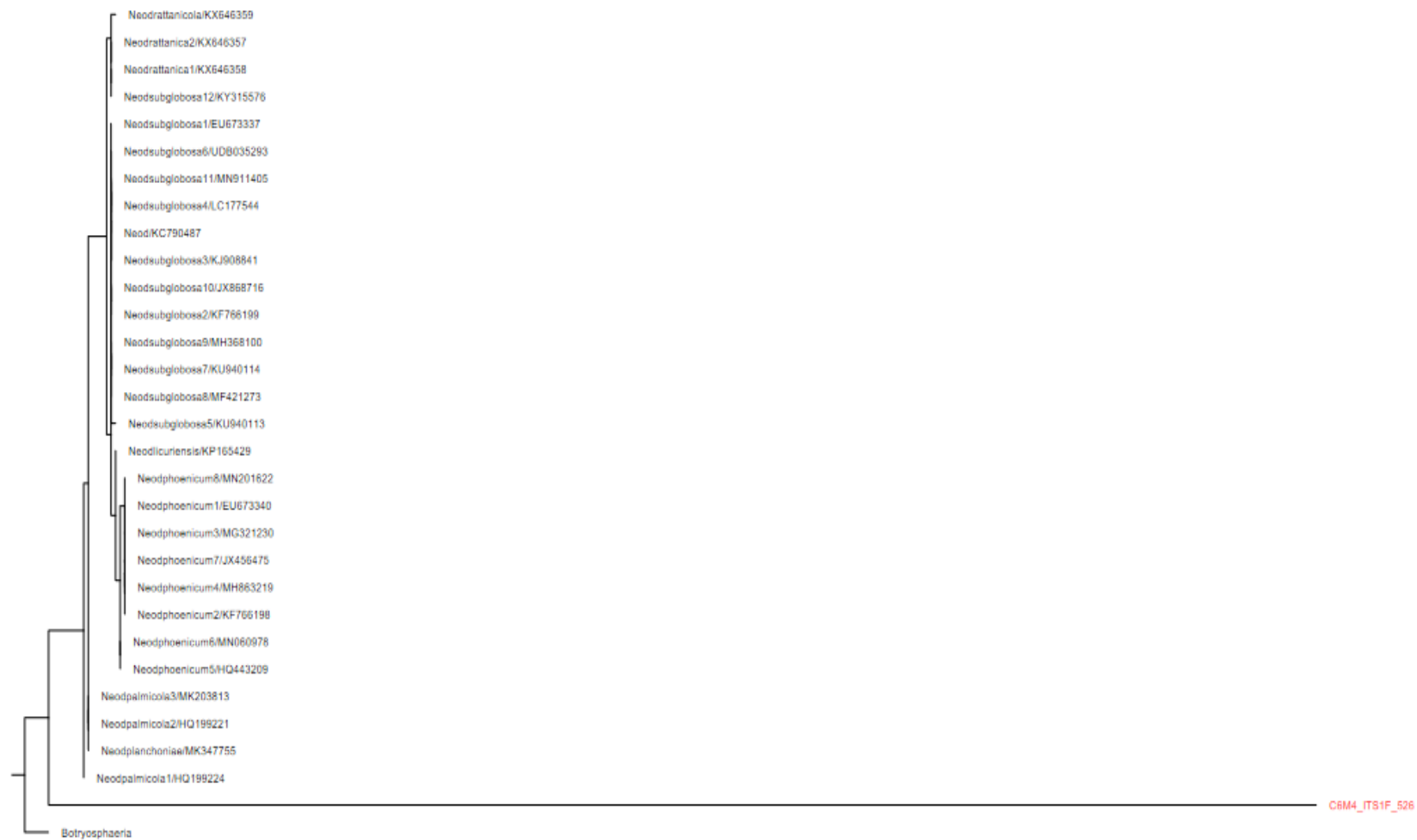


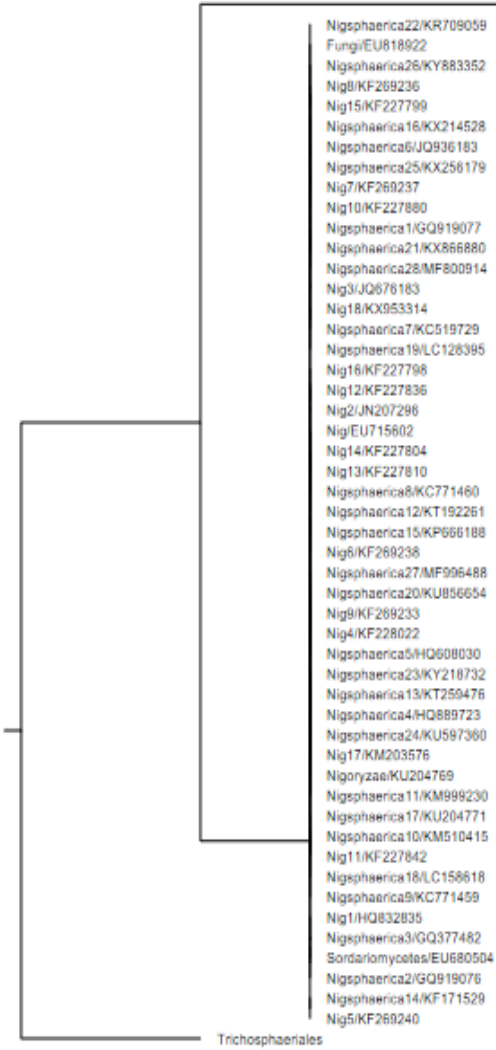




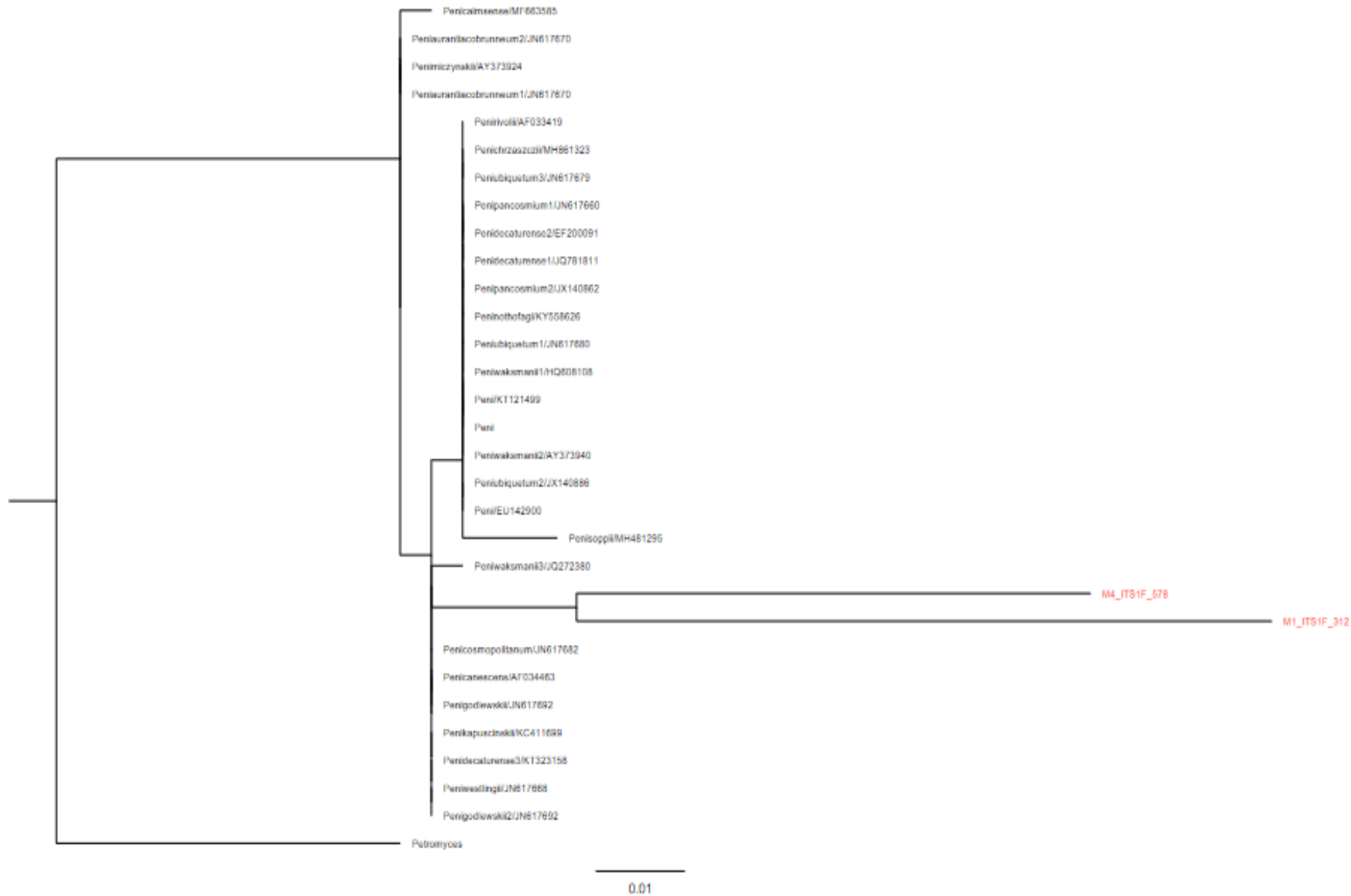








0.03



Trichoatroviride22/KC461527

C3M1_consensus

Trichoatroviride3/KR868365

Trichoatroviride28/KR868357

Trichoviride/GU134889

Trichoderma1/FJ008983

Trichoatroviride27/KR868359

Trichoatroviride17/EU816385

Trichoatroviride8/GQ203596

Trichoatroviride7/GQ376096

Trichoparatroviride2/KT153590

Trichoatroviride15/FJ426304

Trichoatroviride18/JQ745258

Trichoatroviride16/EU821797

Trichohamatum/FJ411985

Trichoatroviride9/GQ203594

Trichoatroviride14/FJ610284

Trichoatroviride/KR868360

Trichoatroviride24/KC469612

Tricholixii/JN039048

Trichoharzianum/EU553288

Trichoatroviride1/EU280133

Trichoatroviride21/KC569351

Trichoatroviride13/FJ610285

Trichoderma2/KF225851

Trichoatroviride19/JQ040326

Trichoatroviride12/FJ710066

Trichoatroviride23/KC460881

Trichoatroviride6/GU176469

Trichoatroviride5/FJ571486

Trichoatroviride10/GQ241294

Trichokoningii/FJ478089

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Trichoatroviride25/KR868362

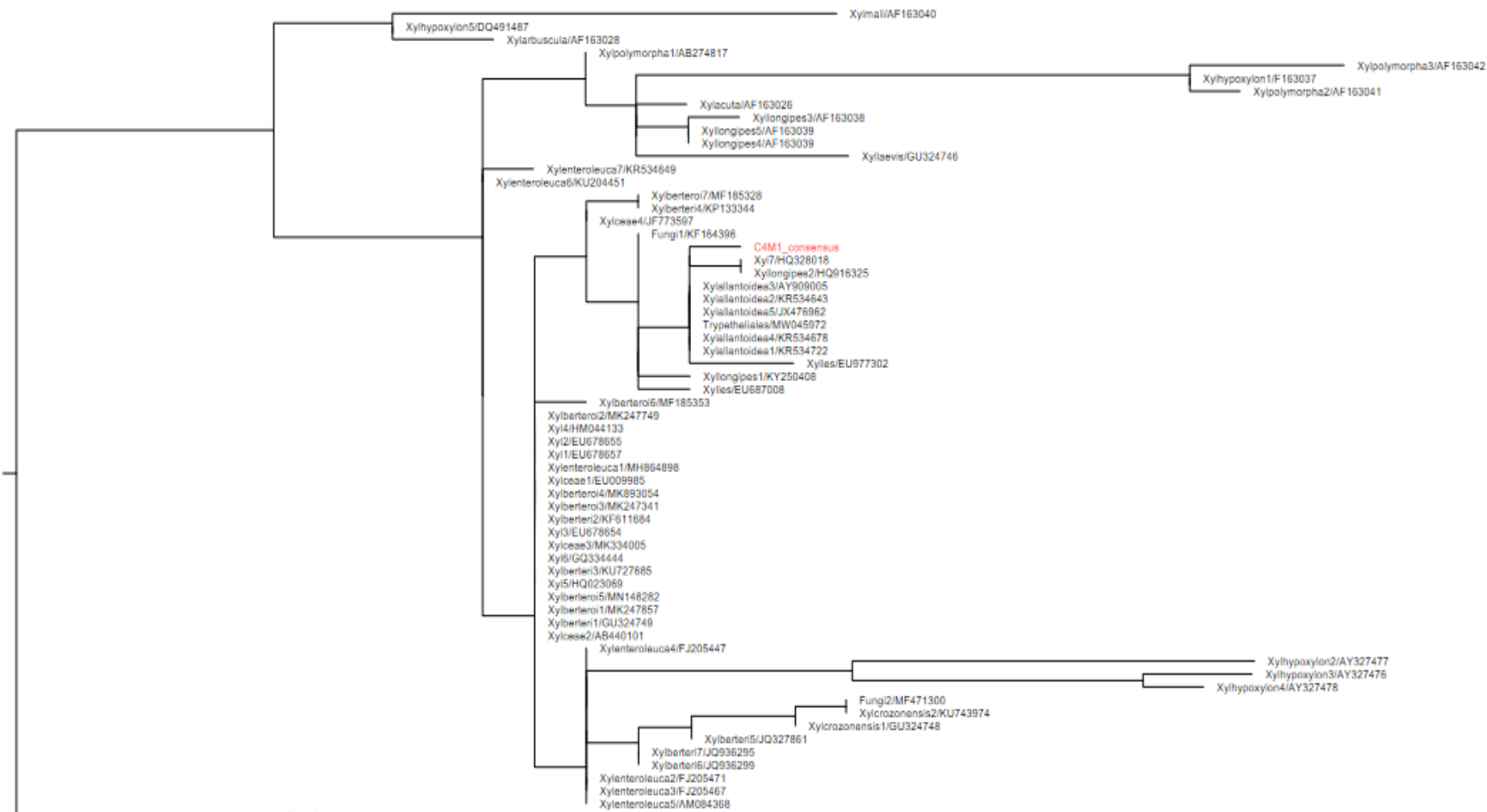
Trichoatroviride26/KR868361

Trichoatroviride2/DQ000297

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Protocrea

0.02



0.02