

A checklist of coprophilous fungi and other fungi recorded on dung from Brazil

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ABSTRACT — A review of the literature published between 1919 (the earliest known record) and 2013 has made it possible to confirm the occurrence of 209 species of coprophilous fungi (*sensu lato*) in Brazil, which are distributed in 259 records in 12 states of the Federation, with Pernambuco being the State most represented. The phylum most found was *Ascomycota* (117 species), followed by *Zygomycota* (54), *Basidiomycota* (25), *Myxomycota* (11), *Oomycota* (1) and *Proteobacteria* (1).

KEY WORDS — Brazilian fungi, fimicolous fungi, diversity

Introduction

Coprophilous fungi are an important group of organisms from the *Zygomycota*, *Ascomycota* and *Basidiomycota* and also some myxomycetes, oomycetes and myxobacteria. They use feces of various animals, especially herbivores, as a substrate (Lundqvist 1972; Bell 1983; Melo, Bezerra & Cavalcanti 2012). These fungi are an ecologically highly adapted group, capable of assimilating nutrients that are not used when food passes through the digestive tract of the animal, thus participating in decomposition processes and helping to recycle these nutrients in the environment (Harrower & Nagy 1979; Ávila, Chávez & García 2001; Krug, Benny & Keller 2004; Masunga et al. 2006; Richardson 2001a; Richardson 2003).

The earliest documented record of coprophilous fungi in Brazil dates from 1919, when the mycologist and botanist Carlos Spegazzini (1858-1926) announced the occurrence of *Psilocybe merdaria* (Fr.) Ricken on Brazilian territory (specific substrate and location not given) (Spegazzini 1919; Katinas, Gutiérrez & Robles 2000). In the 1950s and 1960s, more coprophilous fungi were recorded in Brazil, especially due to the contributions of the mycologist Augusto Chaves Batista and his co-workers (Batista, Vital & Silva-Maia 1955; Batista et al. 1961a, b, c). Some more recent studies of Brazilian coprophilous fungi (*sensu lato*) are those of Trufem (1984); Viriato & Trufem (1985a, b); Richardson (2001b); Alves, Trufem & Milanez (2002); Wartchow et al. (2007); Viriato (2008); Santiago, Cavalcanti & Trufem (2008); Bezerra, Silva & Cavalcanti (2008); Melo, Santiago & Cavalcanti (2011); Melo, Bezerra & Cavalcanti (2012); Calaça & Xavier-Santos (2012); Calaça et al. (2013), as well as studies that mention occasional findings.

The aim of this work was to contribute to the knowledge on the diversity and distribution of coprophilous fungi (*sensu lato*) and other fungi occurring in feces in Brazil, and to update the nomenclature of published records.

Materials & Methods

The present checklist was drawn up from a thorough review of the literature with records of fungi occurring on feces in Brazil, considering only articles published in indexed journals from 1900 to 2013. The records were compiled and the nomenclature updated in accordance with the Index Fungorum (IFP) (<http://www.indexfungorum.org/>).

The occurrence and distribution of the species in Brazilian states were recorded, and the states have been abbreviated thus: Federal District (DF), Espírito Santo (ES), Goiás (GO), Mato Grosso do Sul (MS), Minas Gerais (MG), Paraná (PR), Pernambuco (PE), Rio de Janeiro (RJ), Rio Grande do Sul (RS), Santa Catarina (SC), São Paulo (SP) and Sergipe (SE).

The checklist is organized in alphabetical order of species, in families within their respective phylum, and divided into four groups: Fungi, including only fungi *sensu stricto*; Slime Molds, including Myxomycetes; and one species each of Chromista and Proteobacteria. When a taxon is not clearly established in terms of its taxonomic position, it is marked as *incertae sedis*. The distribution map of records indicates the location of the records. If the locality was not recorded, the state capital is marked as the record.

Results and Discussion

This work reveals the occurrence of 210 species of coprophilous or occurring in feces fungi in Brazil [251 records in 12 states of the Federation (DF, ES, GO, MG, MS, PE, PR, RJ, RS, SC, SE and SP)], and 15 from unknown locations. These records constitute of strictly coprophilous species, like *Podospora* spp., *Ascobolus* spp., *Sporormiella* spp., as well as species considered fimicolous, occurring in dung of animals or other material contaminated with feces, like *Chaetomium* spp., *Candida* spp., *Aspergillus* spp., and other ‘anamorphic’ forms. Ascomycota, with 119 species, were the most frequent, followed by Zygomycota (54) Basidiomycota (24), Myxomycota (11), Oomycota (1) and Proteobacteria (1).

Of the 251 confirmed occurrences the majority (130; 51,7%) were from Pernambuco. The state of Mato Grosso do Sul had the next highest number of occurrences, with 30 (11,9%), followed by São Paulo (26; 10,3%), Goiás (23; 9,1%), Rio Grande do Sul (16; 6,3%), Sergipe (9; 3,5%) and Minas Gerais (8; 3,1%). Together, the other states represent 13 occurrences (4,8%).

These data show that despite the scarcity of studies, the diversity of coprophilous fungi in Brazil is high, even disregarding the fimicolous species (coprophilous *sensu lato*), when seen in the context of data presented by Richardson (2001a), who found 282 species when studying fecal substrates from locations in various countries worldwide. Furthermore, many of the species cited by him were also recorded in Brazil. However, considering the great diversity worldwide that is estimated for fungi, and noting that only 44% of Brazilian states were mentioned in records of coprophilous fungi (Figure 1), there is still much investigation to be done and doubtless many occurrences to be added to this richness.

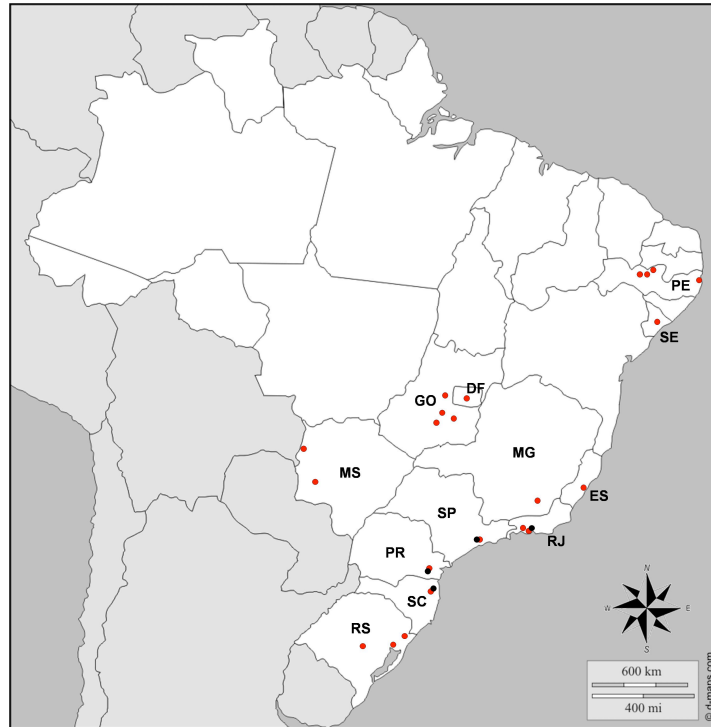


Figure 1. Distribution of the records of coprophilous fungi in Brazil [Based at D-Maps.com (www.d-maps.com)]. Redpoints mark known locations. Black points indicate that there are unknown locations in the state].

Species recorded in Brazil are listed below, with the state in which they were recorded and reference.

Coprophilous and other fungi recorded on dung in Brazil – a checklist

Fungi

Zygomycota

Backusellaceae K. Voigt & P.M. Kirk

Backusella lamprospora (Lendn.) Benny & R.K. Benj.

BASIONYM: *Mucor lamprosporus* Lendn.

LOCALITY: PE (Santiago et al. 2011).

Choanephoraceae J. Schröt.

Gilbertella persicaria (E.D. Eddy) Hesselt.

BASIONYM: *Choanephora persicaria* E.D. Eddy

LOCALITY: PE (Santiago et al. 2011).

Cunninghamellaceae Naumov ex R.K. Benj.

Cunninghamella blakesleeana Lendn.

LOCALITY: PE (Santiago et al. 2011).

Cunninghamella echinulata (Thaxt.) Thaxt. ex Blakeslee
BASIONYM: *Oedocephalum echinulatum* Thaxt.
LOCALITY: PE (Santiago et al. 2011).

Cunninghamella phaeospora Boedijn
LOCALITY: PE (Santiago et al. 2011).

Dimargaritaceae R.K. Benj.

Dimargaris bacillispora R. K. Benj.
LOCALITY: PE (Santiago, Cavalcanti & Trufem 2009, Santiago et al. 2011).

Dispira cornuta Tiegh.
LOCALITY: PE (Viriato & Trufem 1985b).

Lichtheimiaceae Kerst. Hoffm., Walther & K. Voigt

Lichtheimia hyalospora (Saito) Kerst. Hoffm., Walther & K. Voigt
BASIONYM: *Tieghemella hyalospora* Saito
LOCALITY: PE [Santiago et al. 2011, as *Lichtheimia blakesleeana* (Lendn.) Kerst. Hoffm.].

Lichtheimia ramosa (Zopf) Vuill.
BASIONYM: *Mucor ramosus* Lindt
LOCALITY: SP [Trufem & Viriato 1985, as *Absidia ramosa* (Zopf) Lendn.].

Mucoraceae Dumort.

Mucor circinelloides Tiegh.
LOCALITY: SP (Trufem & Viriato 1985).
PE [Santiago et al. 2011, Alves, Trufem & Milanez 2002, as *Mucor circinelloides* f. *griseocyanus* (Hagem) Schipper, *Mucor circinelloides* f. *janssenii* (Lendn.) Schipper and *Mucor circinelloides* f. *lusitanicus* (Bruderl.) Schipper].

Mucor fuscus (Berk. & M.A. Curtis) Berl. & De Toni
BASIONYM: *Ascophora fusca* Berk. & M.A. Curtis
LOCALITY: PE (Trufem & Viriato 1985, Santiago et al. 2011).

Mucor genevensis Lendn.
LOCALITY: PE (Alves, Trufem & Milanez 2002).

Mucor guilliermondii Nadson & Filippov
LOCALITY: PE (Santiago, Trufem & Cavalcanti 2008, Santiago et al. 2011).

Mucor hiemalis Wehmer
LOCALITY: PE (Alves, Trufem & Milanez 2002 and Santiago et al. 2011, both as *M. hiemalis* f. *hiemalis* Wehmer).

Mucor luteus Linnem. ex Wrzosek
LOCALITY: PE [Alves, Trufem & Milanez 2002, as *Mucor hiemalis* f. *luteus* (Linnem.) Schipper].

Mucor mousanensis Bajjal & B.S. Mehrotra
LOCALITY: SP (Trufem & Viriato 1985) and PE (Santiago et al. 2011).

Mucor mucedo Fresen.
LOCALITY: PE (Santiago et al. 2011);
SP (Trufem 1984; Trufem & Viriato 1985).

Mucor piriformis A. Fisch.

LOCALITY: SP (Trufem 1984).

Mucor piriformis f. *nanus* M.H. Alves & Trufem

LOCALITY: PE (Alves, Trufem & Milanez 2002).

Mucor plumbeus Bonord.

LOCALITY: SP (Trufem 1984).

Mucor pyriformis f. *pyriformis* Scop.

LOCALITY: PE (Alves, Trufem & Milanez 2002).

Mucor racemosus Fresen.

LOCALITY: PE (Batista et al. 1961c).

Nomenclatural comment: *Nomen illegitimum*.

Mucor racemosus f. *chibinensis* (Neophyt.) Schipper

BASIONYM: *Mucor chibinensis* Neophyt.

LOCALITY: PE (Alves, Trufem & Milanez 2002, Santiago et al. 2011).

Mucor ramosissimus Samouts.

LOCALITY: PE (Santiago et al. 2011).

Mucor speciosus Oudem.

LOCALITY: PE (Batista et al. 1961c).

Mucor subtilissimus Oudem.

LOCALITY: PE (Santiago et al. 2011).

Nomenclatural comment: *Nomen illegitimum*.

Mucor variosporus Schipper

LOCALITY: PE (Alves, Trufem & Milanez 2002).

Pilaira anomala (Ces.) J. Schröt.

BASIONYM: *Pilobolus anomalus* Ces.

LOCALITY: SP (Viriato & Trufem 1985a, Trufem 1984);

PE (Santiago et al. 2011).

Pilobolaceae Corda

Pilobolus crystallinus (F.H. Wigg.) Tode

BASIONYM: *Hydrogera crystalline* F.H. Wigg.

LOCALITY: SP (Trufem 1984, Viriato & Trufem 1985a, Viriato 2008);

GO (Calaça & Xavier-Santos 2012);

MS (Richardson 2001b);

PE [Santiago, Cavalcanti & Trufem 2008, Santiago et al. 2011, as *Pilobolus crystallinus* var. *crystallinus* (F.H. Wigg) Tode and as *P. crystallinus* var. *hyalosporus* (Boedijn) F.M. Hu & R.Y. Zheng].

Pilobolus kleinii Tiegh.

LOCALITY: GO (Calaça & Xavier-Santos 2012);

SP [Trufem 1984 and Viriato & Trufem 1985a, b, (as *Pilobolus heterosporus* Palla), Viriato 2008];

PE [Santiago, Cavalcanti & Trufem 2008, Santiago et al. 2011 both as *Pilobolus crystallinus* var. *kleinii* (Tiegh.) R.Y. Zheng & G.Q. Chen.).

Pilobolus lentiger Corda

LOCALITY: PE (Santiago, Cavalcanti & Trufem 2008, Santiago et al. 2011, both as *Pilobolus lentiger* var. *lentiger* Corda);
SP (Viriato & Trufem 1985a, Viriato 2008, both as *Pilobolus borzianus* Morini);
MS [Richardson 2001b, as *Pilobolus sphaerosporus* (Grove) Palla].

Pilobolus longipes Tiegh.

LOCALITY: SP (Trufem 1984, Viriato & Trufem 1985a, Viriato 2008);
PE (Santiago et al. 2011).

Pilobolus minutus Speg.

LOCALITY: PE [Santiago, Cavalcanti & Trufem 2008, Santiago et al. 2011, as *Pilobolus lentiger* var. *minutus* (Speg.) R.Y. Zheng & G.Q. Chen];
SP (Viriato & Trufem 1985a, Viriato 2008, as *Pilobolus morinii* Sacc.).

Pilobolus nanus Tiegh.

LOCALITY: SP (Viriato 2008).

Pilobolus oedipus Mont.

LOCALITY: SP (Viriato 2008, Viriato & Trufem 1985a).

Pilobolus pullus Masee

LOCALITY: SP (Viriato & Trufem 1985a, Viriato 2008).

Pilobolus roridus (Bolton) Pers.

BASIONYM: *Mucor roridus* Bolton

LOCALITY: PE [Santiago, Cavalcanti & Trufem 2008, Santiago et al. 2011, both as *Pilobolus roridus* var. *roridus* (Bolton) Pers.].

Pilobolus umbonatus Buller

LOCALITY: PE [Santiago, Cavalcanti & Trufem 2008, Santiago et al. 2011, both as *Pilobolus roridus* var. *umbonatus* (Buller) F.M. Hu & R.Y. Zheng].

Phycomycetaceae Arx

Phycomyces blakesleeanus Burgeff

LOCALITY: SP (Trufem & Viriato 1985).

Piptocephalidaceae J. Schröt

Piptocephalis freseniana de Bary

LOCALITY: SP (Trufem 1984, Viriato & Trufem 1985b, as *Piptocephalis repens* Tiegh. & G. Le Monn.).

Piptocephalis lemonnieriana Vuill.

LOCALITY: PE (Santiago et al. 2011).

Piptocephalis lepidula (Marchal) P. Syd.

LOCALITY: PE (Santiago et al. 2011).

Syncephalis asymmetrica Tiegh. & G. Le Monn.

LOCALITY: SP (Viriato & Trufem 1985b).

Syncephalis clavata H.M. Ho & Benny

LOCALITY: PE (Melo, Santiago & Cavalcanti 2011).

Syncephalis cornu Tiegh. & G. Le Monn.

LOCALITY: PE (Santiago et al. 2011);
SP (Trufem 1984, Viriato & Trufem 1985b).

Syncephalis penicillata Indoh

LOCALITY: SP (Viriato & Trufem 1985b).

Syncephalis sphaerica Tiegh.

LOCALITY: SP (Viriato & Trufem 1985b).

Syncephalis tengi S. H. Ou

LOCALITY: SP (Trufem 1984, Viriato & Trufem 1985b).

Rhizopodaceae K. Schum.

Rhizopus arrhizus A. Fisch.

LOCALITY: PE (Santiago et al. 2011, as *Rhizopus arrhizus* var. *arrhizus* A. Fisch).

Syncephalastraceae Naumov ex R.K. Benj.

Circinella minor Lendn.

LOCALITY: SP (Trufem & Viriato 1985).

Circinella muscae (Sorokīn) Berl. & De Toni

BASIONYM: *Helicostylum muscae* Sorokīn
LOCALITY: PE (Trufem & Viriato 1985, Santiago et al. 2011).

Circinella umbellata Tiegh. & G. Le Monn

LOCALITY: PE (Trufem & Viriato 1985, Santiago et al. 2011).

Syncephalastrum racemosum Cohn ex J.Schröt.

LOCALITY: PE (Santiago et al. 2011) and SP (Viriato & Trufem 1985b, as *Syncephalastrum verruculosum* Misra).

Thamnostylum piriforme (Bainier) Arx & H.P. Upadhyay

BASIONYM: *Helicostylum piriforme* Bainier
LOCALITY: PE (Santiago et al. 2011, Melo, Santiago & Cavalcanti 2011).

Ascomycota

Ascobolaceae Boud. ex Sacc.

Ascobolus carletonii Boud.

LOCALITY: RJ (Brummelen 1990).

Ascobolus cuniculorum Bat. & Pontual

LOCALITY: PE (Brummelen 1967).

Ascobolus immersus Pers.

LOCALITY: GO (Calaça & Xavier-Santos 2012);
RJ (Jahn 2000);
MS (Richardson 2001b);
RS (Brummelen 1967).

Ascobolus laevisporus Speg.

LOCALITY: RS (Brummelen 1967).

Ascobolus moellerianus Henn.

LOCALITY: SC (Brummelen 1967).

Ascobolus notatus Bat. & A.F. Vital.

LOCALITY: PE (Batista, Vital & Silva-Maia 1955).

Ascobolus scatigenus (Berk. & M.A. Curtis) Brumm.

BASIONYM: *Peziza scatigena* Berk. & M. A. Curtis

LOCALITY: PE (Brummelen 1967).

Ascobolus stercorarius (Bull.) J. Schröt.

BASIONYM: *Peziza stercoraria* Bull.

LOCALITY: GO (Calaça & Xavier-Santos 2012, as *Ascobolus furfuraceus* Pers.).

Saccobolus beckii Heimerl

LOCALITY: GO (Calaça & Xavier-Santos 2012).

Saccobolus citrinus Boud. & Torrend

LOCALITY: GO (Calaça & Xavier-Santos 2012);

MG (Lundqvist 1972);

MS (Richardson 2001b);

PE (Melo, Bezerra & Cavalcanti 2012);

RS (Jahn 2000, Brummelen 1967).

Saccobolus depauperatus (Berk. & Broome) E.C. Hansen

BASIONYM: *Ascobolus depauperatus* Berk. & Broome

LOCALITY: MG (Jahn 2000);

MS (Richardson 2001b).

Saccobolus exiguus Bat. & Pontual

LOCALITY: PE (Brummelen 1967).

Saccobolus glaber (Pers.) Lambotte

BASIONYM: *Ascobolus glaber* Pers.

LOCALITY: MG (Brummelen 1967).

Saccobolus infestans (Bat. & Pontual) Brumm.

BASIONYM: *Ascobolus infestans* Bat. & Pontual

LOCALITY: No details (Brummelen 1967).

Saccobolus minimus Velen.

LOCALITY: GO (Calaça & Xavier-Santos 2012).

Saccobolus saccoboloides (Seaver) Brumm.

BASIONYM: *Ascobolus saccoboloides* Seaver

LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Saccobolus truncatus Velen.

LOCALITY: MS (Richardson 2001b).

Saccobolus verrucisporus Brumm.

LOCALITY: MS (Richardson 2001b).

Saccobolus versicolor (P. Karst.) P. Karst.
BASIONYM: *Ascobolus versicolor* P. Karst.
LOCALITY: MS (Richardson 2001b);
PE (Melo, Bezerra & Cavalcanti 2012).

Ascodesmidaceae J. Schröt.

Ascodesmis macrospora W. Obrist
LOCALITY: PE (Obrist 1961).

Ascodesmis nigricans Tiegh.
LOCALITY: PE (Obrist 1961).

Ascodesmis porcina Seaver
LOCALITY: PE (Obrist 1961, Melo, Bezerra & Cavalcanti 2012).

Ascodesmis sphaerospora W. Obrist
LOCALITY: PE (Obrist 1961).

Bionectriaceae Samuels & Rossman

Selinia africana R. S. Khan & J. C. Krug
LOCALITY: MS (Richardson 2001b).

Selinia pulchra (G. Winter) Sacc.
BASIONYM: *Hypocreopsis pulchra* G. Winter
LOCALITY: MS (Richardson 2001b).

Chaetomiaceae G. Winter

Chaetomium bostrychodes Zopf
LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Chaetomium cochliodes Palliser
LOCALITY: GO (Calaça & Xavier-Santos 2012).

Chaetomium funicola Cooke
LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Chaetomium globosum Kunze
LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Thielavia terrestris (Apinis) Malloch & Cain
BASIONYM: *Allescheria terrestris* Apinis
LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Davidiellaceae C.L. Schoch, Spatafora, Crous & Shoemaker

Cladosporium herbarum (Pers.) Link
BASIONYM: *Dematium herbarum* Pers.
LOCALITY: PE (Batista et al. 1961a).

Dipodascaceae Engl. & E. Gilg

Geotrichum candidum Link
LOCALITY: PE (Batista et al. 1961c).

Geotrichum membranogenes (C. Martins) C.W. Dodge
BASIONYM: *Zymonema pulmonalis-membranogenes* C. Martins
LOCALITY: PE (Batista et al. 1961c).

Dothioraceae Theiss. & Syd.

Aureobasidium pullulans (de Bary) G. Arnaud
BASIONYM: *Dematidium pullulans* de Bary & Löwenthal
LOCALITY: PE (Batista et al. 1961c).

Humariaceae Velen.

Cheilymenia granulata (Bull.) J. Moravec
BASIONYM: *Peziza granulata* Bull.
LOCALITY: GO (Calaça & Xavier-Santos 2012).

Incertae sedis

Acremonium recifei (Leão & Lôbo) W. Gams
BASIONYM: *Cephalosporium recifei* Leão & Lôbo
LOCALITY: PE [Batista et al. 1961c, as *Hyalopus recifei* (Leão & Lôbo) Leão & M.A.J. Barbosa].

Candida albicans (C.P. Robin) Berkhout
BASIONYM: *Oidium albicans* C.P. Robin
LOCALITY: PE [Batista et al. 1961c, cited as *Candida clausenii* Lodder & Kreger-van Rij, as *Candida genitalis* Bat. & J.S. Silveira, as *Candida intestinalis* Bat. & J.S. Silveira and as *Candida stellatoidea* (C.P. Jones & D.S. Martin) Langeron & Guerra].

Candida catenulata Diddens & Lodder
LOCALITY: PE [Batista et al. 1961c, as *Candida brumptii* (Langeron & Guerra) Langeron & Guerra].

Candida intermedia (Cif. & Ashford) Langeron & Guerra
BASIONYM: *Blastodendrium intermedium* Cif. & Ashford
LOCALITY: PE (Batista et al. 1961c).

Candida melibiosica H.R. Buckley & Uden
LOCALITY: PE (Batista et al. 1961c, as *Candida parapsilosis* var. *intermedia* Kreger-van Rij & Verona).

Candida mesenterica (A. Geiger) Diddens & Lodder
BASIONYM: *Pseudomonilia mesenterica* A. Geiger
LOCALITY: PE (Batista et al. 1961c).

Candida parapsilosis (Ashford) Langeron & Talice
BASIONYM: *Monilia parapsilosis* Ashford
LOCALITY: PE (Batista et al. 1961c).

Candida sake (Saito & M. Ota) Uden & H. R. Buckley ex S. A. Mey. & Ahearn
BASIONYM: *Eutorulopsis sake* Saito & M. Ota
LOCALITY: PE [Batista et al. 1961c, as *Candida tropicalis* var. *lambica* (F.C. Harrison) Diddens & Lodder].

Candida solani Lodder & Kreger-van Rij
LOCALITY: PE (Batista et al. 1961c).

Candida tropicalis (Castell.) Berkhout

BASIONYM: *Oidium tropicale* Castell.

LOCALITY: PE (Batista et al. 1961c).

Candida vini (J.N. Vallot ex Desm.) Uden & H.R. Buckley ex S.A. Mey. & Ahearn

BASIONYM: *Mycoderma vini* J.N. Vallot ex Desm.

LOCALITY: PE [Batista et al. 1961c, as *Candida mycoderma* (Reess) Lodder & Kreger-van Rij].

Candida zeylanoides (Castell.) Langeron & Guerra

BASIONYM: *Monilia zeylanoides* Castell.

LOCALITY: PE (Batista et al. 1961c).

Debaryomyces hansenii (Zopf.) Lodder & Kreger-van Rij

BASIONYM: *Saccharomyces hansenii* Zopf

LOCALITY: PE [Batista et al. 1961c, as *Rhodotorula minor* (Pollacci & Nann.) Krassiln.].

Geosmithia namyslowskii (K.M. Zalessky) Pitt.

BASIONYM: *Penicillium namyslowskii* K.M. Zalessky

LOCALITY: PE (Batista et al. 1961a, as *Penicillium namyslowskii* K.M. Zalessky).

Gibellulopsis nigrescens (Pethybr.) Zare, W. Gams & Summerb.

BASIONYM: *Verticillium nigrescens* Pethybr.

LOCALITY: PE [Batista et al. 1961a, as *Hyalopus serrae* (Maffei) M.A.J. Barbosa].

Hyalopus keratoplasticum (T. Morik.) M.A.J. Barbosa

BASIONYM: *Cephalosporium keratoplasticum* T. Morik.

LOCALITY: PE (Batista et al. 1961c).

Hyalopus onychophilus (Vuill.) Aschieri

BASIONYM: *Allantospora onychophila* Vuill.

LOCALITY: PE (Batista et al. 1961c).

Khuskia oryzae H.J. Huds.

LOCALITY: PE [Batista et al. 1961a, as *Nigrospora sphaerica* (Sacc.) E.W. Mason].

Phomatospora minutissima (H. Crouan & P. Crouan) N. Lundq.

BASIONYM: *Sphaeria minutissima* H. Crouan & P. Crouan

LOCALITY: MS (Richardson 2001a, b).

Schwanniomyces etchellsii (Kreger-van Rij) M. Suzuki & Kurtzman

BASIONYM: *Pichia etchellsii* Kreger-van Rij

LOCALITY: PE (Batista et al. 1961c, as *Kloeckera faecalis* Bat. & J.S. Silveira).

Schwanniomyces occidentalis Klöcker

LOCALITY: PE [Batista et al. 1961c, as *Kloeckera jensenii* (Klöcker) Janke].

Sphaeronaemella fimicola Marchal

LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Lasiosphaeriaceae Nannf.

Bombardioidea serignanensis (Fabre) N. Lundq.

BASIONYM: *Hypocopra serignanensis* Fabre

LOCALITY: No details (Lundqvist 1972).

Cercophora coprophila (Fr.) N. Lundq.

BASIONYM: *Sphaeria coprophila* Fr.

LOCALITY: SC and RS (Lundqvist 1972).

Cercophora coronata (Cailleux) Udagawa & T. Muroi

BASIONYM: *Bombardia coronata* Cailleux

LOCALITY: RJ (Jahn 2000).

Cercophora mirabilis Fuckel

LOCALITY: RS (Jahn 2000, Lundqvist 1972);

PE (Melo, Bezerra & Cavalcanti 2012);

MS (Richardson 2001b).

Lasiosphaeria ovina (Pers.) Ces. & De Not.

BASIONYM: *Sphaeria ovina* Pers.

LOCALITY: GO (Calaça & Xavier-Santos 2012).

Philocopra coprophila Bat. & Pontual

LOCALITY: No details (Lundqvist 1972).

Podospora appendiculata (Auersw. ex Niessl) Niessl

BASIONYM: *Sordaria appendiculata* Auersw. ex Niessl

LOCALITY: No details (Mirza & Cain 1969).

Podospora argentinensis (Speg.) J. H. Mirza & Cain

BASIONYM: *Sordaria argentinensis* Speg.

LOCALITY: MS (Richardson 2001b).

Podospora brasiliensis Cain

LOCALITY: PE (Cain 1962, Mirza & Cain 1969).

Podospora communis (Speg.) Niessl

BASIONYM: *Hypocopra communis* Speg.

LOCALITY: MG (Jahn 2000);

MS (Richardson 2001b);

PE (Melo, Bezerra & Cavalcanti 2012);

No details (Mirza & Cain 1969).

Podospora curvicolla (G. Winter) Niessl

BASIONYM: *Sordaria curvicolla* G. Winter

LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012);

RJ (Jahn 2000);

No details (Mirza & Cain 1969 and Lundqvist 1972).

Podospora dolichopodalis J.H. Mirza & Cain

LOCALITY: MG (Lundqvist 1973 and Jahn 2000).

Podospora fimiseda (Ces. & De Not.) Niessl

BASIONYM: *Sordaria fimiseda* Ces. & De Not.

LOCALITY: RJ (Jahn 2000);

RS (Lundqvist 1972).

Podospora globosa (Masse & E.S. Salmon) Cain

BASIONYM: *Sordaria globosa* Masse & E.S. Salmon.

LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Podospora immersa (R. Stratton) Cain

BASIONYM: *Pleuraea immersa* R. Stratton
LOCALITY: No details (Jahn 2000);
MG (Lundqvist 1973).

Podospora inflatula Cain

LOCALITY: MS (Richardson 2001b);
RS (Cain 1962).

Podospora longicaudata (Griffiths) Cain

BASIONYM: *Pleuraea longicaudata* Griffiths
LOCALITY: RS (Mirza & Cain 1969);
No details (Jahn 2000).

Podospora longispora (Bat. & Pont.) N. Lundq.

BASIONYM: *Sordaria longispora* Bat. & Pont.
LOCALITY: PE (Lundqvist 1972).

Podospora pauciseta (Ces.) Traverso

BASIONYM: *Sphaeria pauciseta* Ces.
LOCALITY: GO (Calaça & Xavier-Santos 2012);
MG (Lundqvist 1972);
MS (Richardson 2001b);
PE (Melo, Bezerra & Cavalcanti 2012);
RJ (Jahn 2000);
No details (Mirza & Cain 1969), all records as *Podospora anserina* (Rabenh.) Niessl.

Schizothecium conicum (Fuckel) N. Lundq.

BASIONYM: *Cercophora conica* Fuckel
LOCALITY: GO [Calaça & Xavier-Santos 2012, as *Podospora conica* (Fuckel) A.E. Bell & Mahoney];
PE (Melo, Bezerra & Cavalcanti 2012).

Schizothecium curvuloides (Cain) N. Lundq.

BASIONYM: *Podospora curvuloides* Cain
LOCALITY: RS (Cain 1962, Mirza & Cain 1969).

Schizothecium tetrasporum (G. Winter) N. Lundq.

BASIONYM: *Sordaria tetraspora* G. Winter
LOCALITY: GO (Calaça & Xavier-Santos 2012, as *Podospora tetraspora* (G. Winter) Cain).

Zygopleura zygospora (Speg.) Boedijn

BASIONYM: *Sordaria zygospora* Speg.
LOCALITY: GO (Calaça & Xavier-Santos 2012);
MS (Richardson 2001b).

Metschnikowiaceae T. Kamieński

Metschnikowia reukaufii Pitt & M.W. Mill.

LOCALITY: PE [Batista et al. 1961c, as *Candida reukaufii* (Grüss) Diddens & Lodder].

Microascaceae Luttr. ex Malloch

Kernia retardata Udagawa & T. Muroi

LOCALITY: GO (Calaça & Xavier-Santos 2012).

Lophotrichus bartlettii (Masse & E.S. Salmon) Malloch & Cain
BASIONYM: *Magnusia bartlettii* Masse & E.S. Salmon
LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Nectriaceae Tul. & C. Tul.

Fusariumneocosmosporiellum O'Donnell & Geiser
= *Neocosmospora vasinfecta* E. F. Sm.
LOCALITY: DF (Calaça et al. 2013).

Gibberella fujikuroi (Sawada) Wollenw.
BASIONYM: *Lisea fujikuroi* Sawada
LOCALITY: PE (Batista et al. 1961a, as *Fusarium moniliforme* J. Sheld.).

Pezizaceae Dumort.

Iodophanus carneus (Pers.) Korf
BASIONYM: *Ascobolus carneus* Pers.
LOCALITY: GO (Calaça & Xavier-Santos 2012);
MS (Richardson 2001b).

Iodophanus testaceus (Moug.) Korf
BASIONYM: *Peziza testacea* Moug.
LOCALITY: SC (Brummelen 1967, as *Ascobolus testaceus* Henn.).

Pichiaceae Zender

Issatchenkia orientalis Kudryavtsev
LOCALITY: PE [Batista et al. 1961c as *Candida krusei* (Castell.) Berkhout, as *C. brumptii* var. *aethanolica* Langeron & Guerra and as *C. lobata* Bat. & J.S. Silveira].

Pleosporaceae Nitschke

Curvularia lunata (Wakker) Boedijn
= *Cochliobolus lunatus* R.R. Nelson & F.A. Haasis
LOCALITY: PE [Batista et al. 1961a, as *Curvularia lunata* (Wakker) Boedijn].

Saccharomycetaceae G. Winter

Saccharomyces cerevisiae Meyen ex E.C. Hansen
= *Saccharomyces cerevisiae* Meyen
LOCALITY: PE (Batista et al. 1961c, as *Candida robusta* Diddens & Lodder.).

Kazachstania exigua (Reess ex E.C. Hansen) Kurtzman
= *Saccharomyces exiguus* Reess ex E.C. Hansen
LOCALITY: PE (Batista et al. 1961c).

Saccharomycodaceae Kudryavtsev

Hansenia sporauvarum (Niehaus) Shehata
BASIONYM: *Kloeckera sporauvarum* Niehaus
LOCALITY: PE [Batista et al. 1961c, as *Kloeckera apiculata* (Reess) Janke].

Saccharomycopsidaceae Arx & Van der Walt

Endomycopsis mali (I.M. Lewis) Stell.-Dekk.

BASIONYM: *Endomyces mali* C.E. Lewis

LOCALITY: PE (Batista et al. 1961c).

Sordariaceae G. Winter

Gelasinospora retispora Cain

LOCALITY: GO (Calaça & Xavier-Santos 2012).

Sordaria fimicola (Roberge ex Desm.) Ces. & De Not.

BASIONYM: *Sphaeria fimicola* Roberge ex Desm.

LOCALITY: GO (Calaça & Xavier-Santos 2012);

PE (Batista et al. 1961a, Melo, Bezerra & Cavalcanti 2012);
No details (Lundqvist 1972, Mori, Pereira & Vilela 2008).

Sordaria humana (Fuckel) G. Winter

BASIONYM: *Sphaeria humana* Fuckel.

LOCALITY: No details (Lundqvist 1972).

Sordaria lappae Potebnia

LOCALITY: RS (Lundqvist 1972).

Sordaria occidentalis Bat. & Pontual

LOCALITY: PE and MG (Lundqvist 1972).

Sporormiaceae Munk

Sporormiella isomera S.I. Ahmed & Cain

LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Sporormiella leporina (Niessl) S.I. Ahmed & Cain

BASIONYM: *Sporormia leporina* Niessl

LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Sporormiella megalospora (Auersw.) S.I. Ahmed & Cain

BASIONYM: *Sporormia megalospora* Auersw.

LOCALITY: MS (Richardson 2001b).

Sporormiella minima (Auersw.) S.I. Ahmed & Cain

BASIONYM: *Sporormia minima* Auersw.

LOCALITY: GO (Calaça & Xavier-Santos 2012);

MS (Richardson 2001b);

PE (Melo, Bezerra & Cavalcanti 2012).

Thelebolaceae Eckblad

Coprotus lacteus (Cooke & W. Phillips) Kimbr.

BASIONYM: *Ascobolus lacteus* Cooke & W. Phillips

LOCALITY: MS (Richardson 2001b).

Coprotus leucopocillum Kimbr., Luck-Allen & Cain

LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Coprotus niveus (Fuckel) Kimbr., Luck-Allen & Cain

BASIONYM: *Ascobolus niveus* Fuckel

LOCALITY: PE (Melo, Bezerra & Cavalcanti 2012).

Thelebolus polysporus (P. Karst.) Otani & Kanzawa

BASIONYM: *Pezizula polyspora* P. Karst.

LOCALITY: MS [Richardson 2001b, as *Ryparobius polysporus* (P. Karst.) Sacc.].

Trichocomaceae E. Fisch.

Aspergillus flavus Link

LOCALITY: PE (Batista et al. 1961a).

Aspergillus fumigates Fresen.

LOCALITY: PE (Batista et al. 1961a).

Aspergillus japonicus Saito

LOCALITY: PE (Batista et al. 1961a).

Aspergillus niger Tiegh.

LOCALITY: PE (Batista et al. 1961a).

Aspergillus stellatus Curzi

LOCALITY: PE (Batista et al. 1961a, as *Aspergillus varicolor* Thom & Raper).

Aspergillus tamari Kita

LOCALITY: PE (Batista et al. 1961a).

Aspergillus ustus (Bainier) Thom & Church

BASIONYM: *Sterigmatocystis usta* Bainier.

LOCALITY: PE (Batista et al. 1961a).

Aspergillus versicolor (Vuill.) Tirab.

BASIONYM: *Sterigmatocystis versicolor* Vuill.

LOCALITY: PE (Batista et al. 1961a).

Penicillium citrinum Thom

LOCALITY: PE (Batista et al. 1961a, c, as *Penicillium steckii* K.M. Zalesky).

Penicillium glabrum (Wehmer) Westling

BASIONYM: *Citromyces glaber* Wehmer

LOCALITY: PE (Batista et al. 1961a, as *Penicillium frequentans* Westling).

Penicillium simplicissimum (Oudem.) Thom

BASIONYM: *Spicaria simplicissima* Oudem.

LOCALITY: PE (Batista et al. 1961a, as *Penicillium janthinellum* Biourge).

Talaromyces funiculosus (Thom) Samson, Yilmaz, Frisvad & Seifert

BASIONYM: *Penicillium funiculosum* Thom

LOCALITY: PE (Batista et al. 1961c, as *Penicillium funiculosum* Thom).

Xylariaceae Tul. & C. Tul.

Poronia oedipus (Mont.) Mont.

BASIONYM: *Sphaeria punctata* var. *oedipus* Mont.

LOCALITY: MS (Richardson 2001b).

Basidiomycota

Agaricaceae Chevall.

Cyathus stercoreus (Schwein.) De Toni
BASIONYM: *Nidularia stercorea* Schwein.
LOCALITY: MS (Richardson 2001b).

Psathyrellaceae Vilgalys, Moncalvo & Redhead

Coprinellus curtus (Kalchbr.) Vilgalys, Hoppole & Jacq. Johnson
BASIONYM: *Coprinus curtus* Kalchbr.
LOCALITY: MS (Richardson 2001b, as *Coprinus curtus* Kalchbr).

Coprinellus heptemerus (M. Lange & A.H. Sm.) Vilgalys, Hoppole & Jacq. Johnson
BASIONYM: *Coprinus heptemerus* M. Lange & A. H. Sm.
LOCALITY: MS (Richardson 2001b, as *Coprinus heptemerus* M. Lange & A. H. Sm.).

Coprinellus pellucidus (P. Karst.) Redhead, Vilgalys & Moncalvo
BASIONYM: *Coprinus pellucidus* P. Karst.
LOCALITY: MS (Richardson 2001b, as *Coprinus pellucidus* P. Karst.).

Coprinopsis cordispora (T. Gibbs) Watling & M.J. Richardson
BASIONYM: *Coprinus cordisporus* T. Gibbs
LOCALITY: GO (Calaça & Xavier-Santos 2012, as *Coprinus patouillardii* Quél.);
MS (Richardson 2001b, as *Coprinus cordisporus* T. Gibbs),

Coprinopsis nivea (Pers.) Redhead, Vilgalys & Moncalvo
BASIONYM: *Agaricus niveus* Pers.
LOCALITY: GO [Calaça & Xavier-Santos 2012, as *Coprinus niveus* (Pers.) Fr.].

Coprinopsis radiata (Bolton) Redhead, Vilgalys & Moncalvo
BASIONYM: *Agaricus radiatus* Bolton
LOCALITY: MS [Richardson 2001b, as *Coprinus radiatus* (Bolton) Gray].

Coprinopsis stercorea (Fr.) Redhead, Vilgalys & Moncalvo
BASIONYM: *Coprinus stercoreus* Fr.
LOCALITY: MS (Richardson 2001b, as *Coprinus stercoreus* Fr.).

Parasola misera (P. Karst.) Redhead, Vilgalys & Hoppole
BASIONYM: *Coprinus miser* P. Karst.
LOCALITY: GO (Calaça & Xavier-Santos 2012, as *Coprinus miser* P. Karst.);
PE (Alves & Cavalcanti 1996).

Strophariaceae Singer & A.H. Sm.

Psilocybe argentina (Speg.) Singer
BASIONYM: *Deconica argentina* Speg.
LOCALITY: PE (Wartchow et al. 2007);
RJ (Guzmán 1983).

Psilocybe caeruleoannulata Singer ex Guzmán
LOCALITY: RS (Silva, Cortez & Silveira 2012).

Psilocybe coprophila (Bull.) P. Kumm.

BASIONYM: *Agaricus coprophilus* Bull.

LOCALITY: PR (Stijve & Meijer 1993);

RS [Cortez & Coelho 2004, Silva, Cortez & Silveira 2012, as *Deconica coprophila* (Bull.) P. Karst.];
No details (Guzmán 1983).

Psilocybe cubensis (Earle) Singer

BASIONYM: *Stropharia cubensis* Earle

LOCALITY: ES (Vinha 1988);

PE (Wartchow et al. 2007);

PR (Stijve & Meijer 1993);

RS (Guzmán 1978, Cortez & Coelho 2004).

Psilocybe merdaria (Fr.) Ricken

BASIONYM: *Agaricus merdarius* Fr.

LOCALITY: No details (Spegazzini 1919).

Psilocybe pegleriana Guzmán

LOCALITY: PE (Wartchow et al. 2007).

Psilocybe subcubensis Guzmán

LOCALITY: SP (Rosa et al. 2003).

Protostropharia alcis (Kytöv.) Redhead, Thorn & Malloch

= *Stropharia alcis* Kytöv.

LOCALITY: RS (Cortez & Silveira 2008 as *Stropharia alcis* var. *austrorbrasiliensis* Cortez & R.M. Silveira).

Protostropharia semiglobata (Batsch) Redhead, Moncalvo & Vilgalys

BASIONYM: *Agaricus semiglobatus* Batsch.

LOCALITY: RS (Cortez & Coelho 2004, Cortez & Silveira 2008, as *Stropharia semiglobata* (Batsch) Quél.).

Tremellaceae Fr.

Cryptococcus curvatus (Diddens & Lodder) Golubev

BASIONYM: *Candida heveanensis* var. *curvata* Diddens & Lodder.

LOCALITY: PE [Batista et al. 1961c, as *Candida curvata* (Diddens & Lodder) Lodder & Kreger-van Rij.].

Trichosporonaceae Nann.

Trichosporon pullulans (Lindner) Diddens & Lodder

BASIONYM: *Oidium pullulans* Lindner

LOCALITY: PE (Batista et al. 1961a).

Incertae sedis

Rhodotorula glutinis (Fresen.) F.C. Harrison

BASIONYM: *Cryptococcus glutinis* Fresen.

LOCALITY: PE (Batista et al. 1961a, c).

Rhodotorula mucilaginosa (A. Jörg.) F.C. Harrison

BASIONYM: *Torula mucilaginosa* A. Jörg.

LOCALITY: PE [Batista et al. 1961c, as *Rhodotorula rubra* (Demme) Lodder].

Rhodotorula pallida Lodder

LOCALITY: PE (Batista et al. 1961c).

Sporobolomyces roseus Kluyver & C.B. Niel

LOCALITY: PE (Batista et al. 1961a).

Slime Mold

Myxomycota

Arcyriaceae Rostaf. ex Cooke

Arcyria cinerea (Bull.) Pers.

BASIONYM: *Trichia cinerea* Bull.

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008, Bezerra, Farias & Cavalcanti 2010).

Cribrariaceae Corda

Cribraria cancellata (Batsch) Nann-Bremek.

BASIONYM: *Mucor cancellatus* Batsch

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008).

Cribraria microcarpa (Schrad.) Pers.

BASIONYM: *Dictydium microcarpum* Schrad.

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008).

Cribraria violacea Rex

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008).

Liceaceae Chevall.

Licea tenera E. Jahn

LOCALITY: No details (Hagelstein 1944).

Physaraceae Chevall.

Physarum cinereum (Batsch) Pers.

BASIONYM: *Lycoperdon cinereum* Batsch

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008, Bezerra et al. 2008).

Physarum roseum Berk. & Broome

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008, Bezerra et al. 2008).

Stemonitidaceae Fr.

Comatricha mirabilis R. K. Benj. & Poitras

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008, Tenório et al. 2009).

Trichiaceae Chevall.

Hemitrichia calyculata (Speg.) M. L. Farr

BASIONYM: *Hemiarcyria calyculata* Speg.

LOCALITY: PE (Silva & Cavalcanti 2012).

Hemitrichia minor G. Lister

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008, Bezerra, Farias & Cavalcanti 2010).

Metatrichia vesparium (Batsch) Nann.-Bremek.ex G. W. Martin & Alexop.

BASIONYM: *Lycoperdon vesparium* Batsch.

LOCALITY: SE (Bezerra, Silva & Cavalcanti 2008; Bezerra, Farias & Cavalcanti 2010).

Chromista

Oomycota

Pythiaceae J. Schröt.

Globisporangium debaryanum (R. Hesse) Uzuhashi, Tojo & Kakish.

BASIONYM: *Pythium debaryanum* R. Hesse

LOCALITY: PE (Batista et al. 1961a).

Myxobacteria

Proteobacteria

Polyangiaceae Janh

Chondromyces crocatus Berk. & M.A. Curtis

LOCALITY: GO (Calaça & Xavier-Santos 2012).

Acknowledgments

We are grateful to all those who contributed to this work, especially to François Valade, Francesco Doveri, Michael J. Richardson, Joop Van Der Lee, Sandra F. B. Trufem, André L. C. M. Azevedo Santiago, Michel Delpont and Airton Viriato, for granting us the bibliography. We thank CNPq and the Universidade Estadual de Goiás for the support that enabled us to carry out this study, and Jéssica Araújo, Kamila Souto Leichtweis and Larissa Simões Calaça for constant help in revising it. We thank the reviewers, Michael J. Richardson, Carlos Antonio Inácio and Gabriele Cacialli, for their attention in the revision of the manuscript.

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