Checklist of the *Glomeromycota* in the Brazilian Savanna

KHADIJA JOBIM[1], BRUNA IOHANNA SANTOS OLIVEIRA[2], BRUNO TOMIO GOTO[3]

[1]*Programa de Pós-Graduação em Sistemática e Evolução, Universidade Federal do Rio Grande do Norte, Campus Universitário, 59072-970, Natal, RN, Brazil*

[2]*Programa de Pós-Graduação em Ciências Ambientais, Universidade Federal do Oeste da Bahia, 47808-021, Barreiras, BA, Brazil*

[3]*Departamento de Botânica e Zoologia, Universidade Federal do Rio Grande do Norte, Campus Universitário, 59072-970, Natal, RN, Brazil*

[*]CORRESPONDENCE TO: *khadija_jobim@hotmail.com*

ABSTRACT — The Brazilian savanna (Cerrado) was the first Brazilian biome to be surveyed for arbuscular mycorrhizal fungi (AMF) and currently comprises the third Brazilian biome in species representation. This paper provides a checklist of arbuscular mycorrhizal fungi (AMF) in the Cerrado. A total of 92 species of AMF have been found in the Brazilian Cerrado over three decades of work conducted in this biome. The results characterize the Cerrado as an important AMF reservoir and show that rupestrian fields, one of several physiognomies of the cerrado, are biologically promising.

KEY WORDS— biodiversity, taxonomy, conservation, cerrado

Introduction

The arbuscular mycorrhizal fungi (AMF) make up the *Glomeromycota* currently divided into three classes (*Archaeosporomycetes*, *Glomeromycetes* and *Paraglomeromycetes*), five orders (*Archaeosporales*, *Diversisporales*, *Gigasporales*, *Glomerales* and *Paraglomerales*), 15 families, 38 genera and approximately 270 species (Oehl et al. 2011; Błaszkowski 2012, 2014; Goto et al. 2012, Marinho et al. 2014; Oehl et al. 2015). These fungi form arbuscular mycorrhizal associations with more than 80% of terrestrial plant, except for one species, *Geosiphon pyriformis*, a unique glomeromycotan forming association with cyanobacteria *Nostoc* (Smith & Read 2008; Wettstein 1915).

The occurrence of the symbiotic relationship between plants and AMF is an important survival strategy for native vegetation (Smith & Read 2008), assuming great importance in ecosystems like the Cerrado, where plants need to constantly deal with conditions of extreme nutritional poverty, given the low fertility and high aluminum saturation of these soils (Alvim & Araújo 1952; Goodland 1971; Negreiros 2004; Oliveira 2009). Various surveys of Cerrado soils show that AMF are associated with a large number of native plants of the region (Miranda et al., 1982, 1984, 2001, 2002, 2005; Smith et al. 1987; Feldmann 1994; Weber & Oliveira 1994).

The Cerrado (*sensu lato*) consists of a set of ecosystems (grasslands, forests, fields and gallery forests) occurring in Central Brazil, with seasonal climate, average annual rainfall of 1,500 mm and yearly average temperatures between 22 and 27 ° C (Klink et al. 2005). It is the second largest biome, occupying 21% of the country (Borlaug 2002). According to data released by IBGE (2004), its area is limited with almost all Brazilian biomes, except the Pampas Biome and coastal and marine ecosystems, although it is noteworthy that there are also portions of Cerrado in the Amazon, Caatinga and Atlantic Forest (Carvalho et al., 2012) (Fig 1).

Significant research on AMF in the Brazilian Cerrado dated from the 80s and include diversity studies with descriptions of new species and impact of mycorrhiza on native vegetation (Bononi & Trufem 1983 Koske & Walker 1985; Walker & Diederichs, 1989; Miranda & Spain 1996a, 1996b; Smith et al. 1987., 1989; Goto et al. 2008; Lima et al. 2014; Pereira et al. 2015). The AMF diversity data in the Cerrado was compiled by Souza et al. (2010; 54 AMF species were reported. Later studies allowed the inclusion of more taxa.

This study provides an updated list of AMF species that occur in the Cerrado, highlighting species that occur exclusively in the biome, new species originally described from material of these habitats and identifying strategic areas for future taxonomic inventories.

Materials & methods

The species list was based in data from: Koske and Walker (1985), Siqueira et al. (1987, 1989), Fernandes et al. (1989), Walker & Diederichs (1989), Balota & Lopes (1996a,b), Spain et al. (1996a,b), Carrenho et al. (1998), Alvarenga et al. (1999), Martins et al. (1999), Gross et al. (2004), Costa et al. (2005), Goto et al. (2008), Pagano and Scotti (2009), Souza et al. (2010), Carvalho et al. (2012), Lima et al. (2014), Carneiro et al. (2015), Coutinho et al. (2015) and Pereira et al. (2015).

The classification follows Oehl et al. (2011) and additional taxa proposed by Błaszkowski (2012, 2014) Goto et al. (2012), Marinho et al. (2014) and Oehl et al. (2015).

EXPERT REVIEWERS: EDUARDO FURRAZOLA, FABIEN CHARLES COSSI HOUNTOUNDJI, GLADSTONE ALVES DA SILVA
UPLOADED — MAY 2016

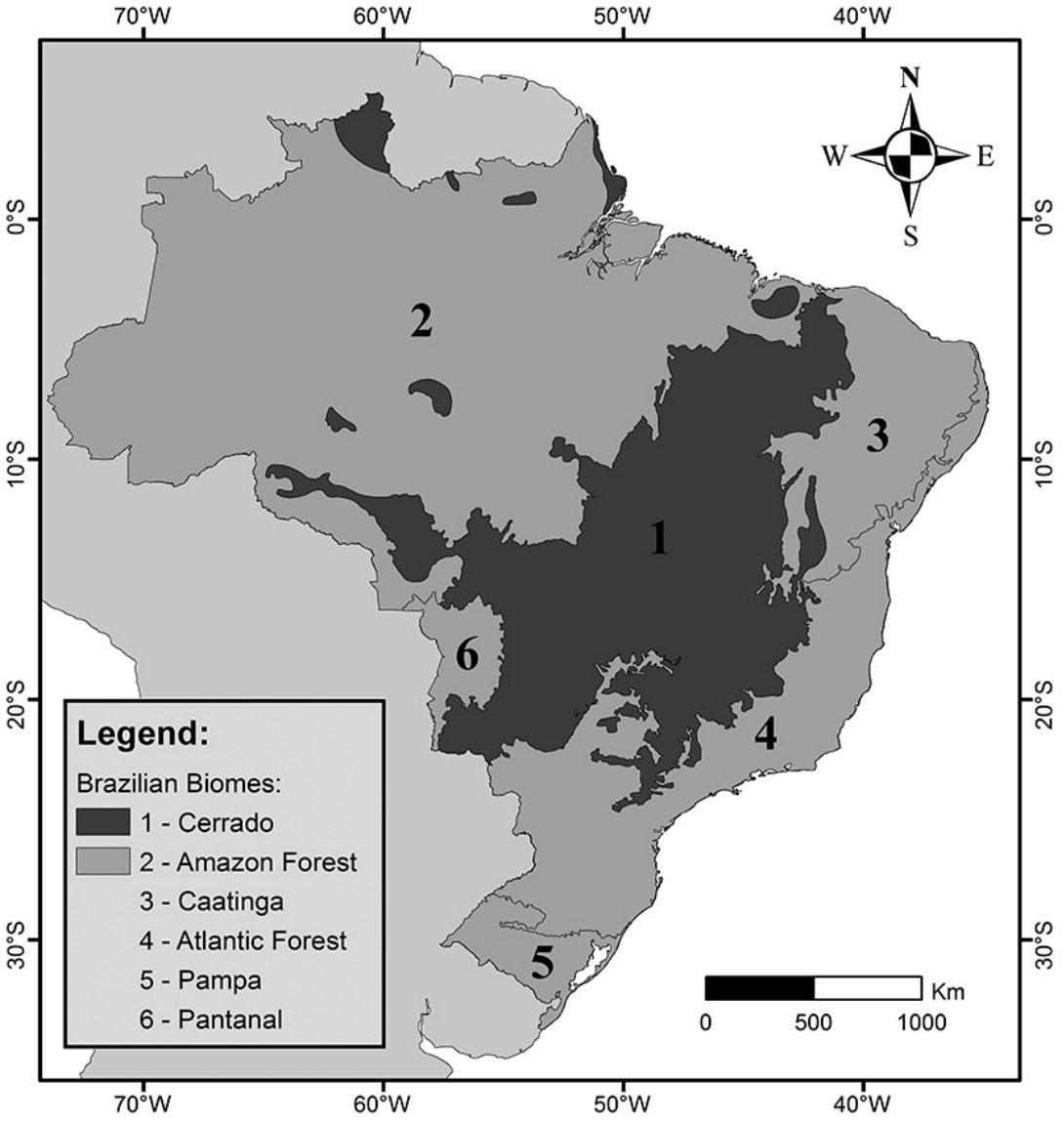

FIG. 1. Map of Brazilian biomes.

Results

A total of 92 species were reported in the Cerrado, seven of which consist of new species described originally from materials collected in these areas (*Acaulospora reducta*, *Ambispora brasiliensis*, *Cetraspora auronigra*, *Dentiscutata cerradensis*, *D. scutata*, *Paraglomus brasilianum* and *Racocetra verrucosa*). *Ambispora brasiliensis* and *C. auronigra* have been previously reported exclusively in the Cerrado, particularly in the physiognomy of rupestrian fields.

Acaulosporaceae

Acaulospora cavernata Błaszk., Cryptogamic Botany 1: 204. 1989.
Habitat: Murundu fields and rupestrian fields.

Acaulospora colossica P.A. Schultz, Bever & J.B. Morton, Mycologia 91: 677. 1999.
Habitat: rupestrian fields.

Acaulospora delicata C. Walker, C.M. Pfeiffer & Bloss, Mycotaxon 25: 622. 1986.
Habitat: rupestrian fields.

Acaulospora denticulata Sieverd. & S. Toro, Angewandte Botanik 61: 217. 1987.
Habitat: Murundu fields and rupestrian fields.

Acaulospora dilatata J.B. Morton, Mycologia 78: 641. 1986.
Habitat: experimental station.

Acaulospora excavata Ingleby & C. Walker, Mycotaxon 50: 100. 1994.
Habitat: experimental station.

Acaulospora foveata Trappe & Janos, Mycotaxon 15: 516. 1982.
Habitat: impacted areas, natural areas, Murundu fields and experimental station.

Acaulospora herrerae Furrazola, B.T. Goto, G.A. Silva, Sieverd. & Oehl, Mycological Progress 97: 405. 2012.
Habitat: impacted and natural areas.

Acaulospora koskei Błaszk., Mycological Research 99: 237. 1995.
Habitat: rupestrian fields.

Acaulospora laevis Gerd. & Trappe, Mycologia Memoirs 5: 33. 1974.
Habitat: agrosystems, Murundu fields and experimental station.

Acaulospora longula Spain & N.C. Schenck, Mycologia 76: 689. 1984.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields.

Acaulospora mellea Spain & N.C. Schenck, Mycologia 76: 689. 1984.
Habitat: agrosystems, natural areas, Murundu fields and rupestrian fields

Acaulospora morrowiae Spain & N.C. Schenck, Mycologia 76: 692. 1984.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields.

Acaulospora reducta Oehl, B.T. Goto & C.M.R. Pereira, Mycotaxon 61: 219. 2015.
Habitat: natural areas.

Acaulospora rehmii Sieverd. & S. Toro, Angewandte Botanik 61: 219. 1987.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields.

Acaulospora rugosa J.B. Morton, Mycologia 78: 645. 1986.
Habitat: rupestrian fields.

Acaulospora scrobiculata Trappe, Mycotaxon 6: 363. 1977.
Habitat: agrosystems, impacted areas, natural areas, Murundu Fields and rupestrian fields.

Acaulospora spinosa C. Walker & Trappe, Mycotaxon 12: 515. 1981.
Habitat: agrosystems, natural areas and rupestrian fields.

Acaulospora tuberculata Janos & Trappe, Mycotaxon 15: 519. 1982.
Habitat: natural areas and Murundu fields.

Kuklospora colombiana (Spain & N.C. Schenck) Oehl & Sieverd., Journal of Applied Botany 80:74. 2006.
≡ *Entrophospora colombiana* Spain & N.C. Schenck, Mycologia 76: 693. 1984.
≡ *Acaulospora colombiana* (Spain & N.C. Schenck) Kaonongbua, J.B. Morton & Bever, Mycologia 102: 1501. 2010.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields

Ambisporaceae

Ambispora appendicula (Spain, Sieverd., N.C. Schenck) C. Walker, Mycological Research 112: 298. 2008.
≡ *Acaulospora appendicula* Spain, Sieverd. & N.C. Schenck, Mycologia 76: 686. 1984.
≡ *Appendicispora appendicula* (Spain, Sieverd. & N.C. Schenck) Spain, Oehl & Sieverd., Mycotaxon 97: 170. 2006.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields and experimental station.

Ambispora brasiliensis B.T. Goto, L.C. Maia & Oehl, Mycotaxon 105: 13. 2008.
≡ *Acaulospora brasiliensis* (B.T. Goto, L.C. Maia & Oehl) C. Walker, Krueger & A. Schüssler, Mycorrhiza 21: 579. 2011.
Habitat: rupestrian fields.

Ambispora callosa (Sieverd.) C. Walker, Vestberg & A. Schüssler, Mycological Research 111: 148. 2006.
≡ *Glomus callosum* Sieverd., Angewandte Botanik 62: 374. 1988.
≡ *Appendicispora callosa* (Sieverd.) C. Walker, Vestberg & A. Schüssler, Mycological Research 111: 254. 2007.
Habitat: impacted areas and rupestrian fields.

Ambispora fecundispora (N.C. Schenck & G.S. Sm.) C. Walker, Vestberg & A. Schüssler, Mycological Research 112: 298. 2008.
≡ *Glomus fecundisporum* N.C. Schenck & G.S. Sm., Mycologia 74: 81. 1982.
≡ *Appendicispora fecundispora* (N.C. Schenck & G.S. Sm.) C. Walker, Vestberg & A. Schüssler, Mycological Research 111: 254. 2007.
Habitat: natural areas.

Ambispora gerdemannii (S.L. Rose, B.A. Daniels & Trappe) C. Walker, Vestberg & A. Schüssler, Mycological Research 111: 148. 2006.
≡ *Glomus gerdemannii* S.L. Rose, B.A. Daniels & Trappe, Mycotaxon 8: 297. 1979.
≡ *Appendicispora gerdemannii* (S.L. Rose, B.A. Daniels & Trappe) Spain, Oehl & Sieverd., Mycotaxon 97: 174. 2006.
≡ *Archaeospora gerdemannii* (S.L. Rose, B.A. Daniels & Trappe) J.B. Morton & D. Redecker, Mycologia 93: 186. 2001.
Habitat: natural areas.

Archaeosporaceae

Archaeospora leptoticha (N.C. Schenck & G.S. Sm.) J.B. Morton & D. Redecker, Mycologia 93: 184. 2001.
≡ *Glomus leptotichum* N.C. Schenck & G.S. Sm., Mycologia 74: 82. 1982.
≡ *Ambispora leptoticha* (N.C. Schenk & G.S. Sm.) C. Walker, Vestberg & A. Schüssler, Mycological Research 111: 148. 2006.
Habitat: natural areas.

Archaeospora myriocarpa (Spain, Sieverd. & N.C. Schenck) Oehl, G.A. Silva, B.T. Goto & Sieverd., Mycotaxon 117: 430. 2011.
≡ *Acaulospora myriocarpa* Spain, Sieverd. & N.C. Schenck, Mycotaxon 25: 112. 1986.
Habitat: agrosystems and natural areas.

Archaeospora trappei (R.N. Ames & Linderman) J.B. Morton & D. Redecker, Mycologia 93: 183. 2001.
≡ *Acaulospora trappei* R.N. Ames & Linderman, Mycotaxon 3: 556. 1976.
Habitat: agrosystems and experimental station.

Dentiscutataceae

Dentiscutata biornata (Spain, Sieverd. & S. Toro) Sieverd., F.A. de Souza & Oehl, Mycotaxon 106: 342. 2009.
≡ *Scutellospora biornata* Spain, Sieverd. & S. Toro, Mycotaxon 35: 220. 1989.
Habitat: natural areas, rupestrian fields and experimental station.

Dentiscutata cerradensis (Spain & J. Miranda) Sieverd., F.A. de Souza & Oehl, Mycotaxon 106: 342. 2009.
≡ *Scutellospora cerradensis* Spain & J. Miranda, Mycotaxon 60: 130. 1996.
Habitat: natural areas.

Dentiscutata heterogama (T.H. Nicolson & Gerd.) Sieverd., F.A. de Souza & Oehl, Mycotaxon 106: 342. 2009.
≡ *Endogone heterogama* T.H. Nicolson & Gerd., Mycologia 60: 319. 1968.
≡*Gigaspora heterogama* (T.H. Nicolson & Gerd.) Gerd. & Trappe, Mycologia Memoirs 5: 31. 1974.
≡ *Scutellospora heterogama* (T.H. Nicolson & Gerd.) C. Walker & F.E. Sanders, Mycotaxon 27: 180. 1986.
Habitat: impacted areas, natural areas, Murundu fields and experimental station.

Dentiscutata nigra (J.F. Readhead) Sieverd., F.A. de Souza & Oehl, Mycotaxon 106: 342. 2009.
≡ *Gigaspora nigra* J.F. Redhead, Mycologia 71: 187. 1979.
≡ *Scutellospora nigra* (J.F. Redhead) C. Walker & F.E. Sanders. Mycotaxon 27: 181. 1986.
Habitat: experimental station.

Dentiscutata reticulata (Koske, D.D. Miller & C. Walker) Sieverd., F.A. de Souza & Oehl, Mycotaxon 106: 342. 2009.
≡ *Gigaspora reticulata* Koske, D.D. Mill. & C. Walker, Mycotaxon 16: 429. 1983.
≡ *Scutellospora reticulata* (Koske, D.D. Mill. & C. Walker) C. Walker & F.E. Sanders, Mycotaxon 27: 181. 1986.
Habitat: natural areas and Murundu fields.

Dentiscutata scutata (C. Walker & Dieder.) Sieverd., F.A. Souza & Oehl, Mycotaxon 106: 342. 2009.
≡ *Scutellospora scutata* C. Walker & Dieder., Mycotaxon 35: 357. 1989.
Habitat: Murundu fields.

Fuscutata heterogama (T.H. Nicolson & Gerd.) Sieverd., F.A. de Souza & Oehl, Mycotaxon 106: 344. 2009.
Habitat: rupestrian fields.

Fuscutata rubra (Stürmer & J.B. Morton) Oehl, F.A. de Souza & Sieverd., Mycotaxon 106: 347. 2009.
≡ *Scutellospora rubra* Stürmer & J.B. Morton, Mycological Research 103: 951. 1999.
Habitat: rupestrian fields.

Diversisporaceae

Corymbiglomus tortuosum (N.C. Schenck & G.S. Sm.) Błaszk. & Chwat, Acta Mycologica 48: 89-103. 2013.
≡ *Glomus tortuosum* N.C. Schenck & G.S. Sm., Mycologia 74: 83. 1982.
Habitat: agrosystems and Murundu fields.

Redeckera fulvum (Berk. & Broome) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 44. 2010.
≡ *Paurocotylis fulva* Berk. & Broome, Botanical Journal of the Linnean Society 14: 137. 1873.
≡ *Endogone fulva* (Berk. & Broome) Pat., Bulletin de la Société Mycologique de France 19: 341.1903.
≡ *Glomus fulvum* (Berk. & Broome) Trappe & Gerd., Mycologia Memoirs 5: 59. 1974.
Habitat: natural areas.

Entrophosporaceae

Claroideoglomus claroideum (N.C. Schenck & G.S. Sm.) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 21. 2010.
≡ *Glomus claroideum* N.C. Schenck & G.S. Sm., Mycologia 74: 84. 1982.
Habitat: rupestrian fields.

Claroideoglomus etunicatum (W.N. Becker & Gerd.) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 22. 2010.
≡ *Glomus etunicatum* W.N. Becker & Gerd., Mycotaxon 6: 29. 1977.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields.

Claroideoglomus lamellosum (Dalpé, Koske & Tews) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 22. 2010.
≡ *Glomus lamellosum*. Dalpé, Koske & Tews, Mycotaxon 43: 289. 1992.
Habitat: rupestrian fields.
Entrophospora infrequens (I.R. Hall) R.N. Ames & R.W. Schneid., Mycotaxon 8: 348. 1979.
≡ *Glomus infrequens* I.R. Hall, Transactions of the British Mycological Society 68: 345. 1977.
Habitat: agrosystems.

Gigasporaceae

Gigaspora albida N.C. Schenck & G.S. Sm., Mycologia 74: 85. 1982.
Habitat: natural areas.

Gigaspora decipiens I.R. Hall & L.K. Abbott, Transactions of the British Mycological Society 83: 2014. 1984.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields.

Gigaspora gigantea (T.H. Nicholson & Gerd.) Gerd. & Trappe, Mycologia Memoirs 5: 29. 1974.
≡ *Endogone gigantea* T.H. Nicolson & Gerd., Mycologia 60: 321. 1968.
Habitat: agrosystems, natural areas and rupestrian fields.

Gigaspora margarita W.N. Becker & I.R. Hall, Mycotaxon 4: 155. 1976.
Habitat: agrosystems, natural areas and rupestrian fields.

Gigaspora ramisporophora Spain, Sieverd. & N.C. Schenck, Mycotaxon 34: 668. 1989.
Habitat: experimental station.

Gigaspora rosea T.H. Nicolson & N.C. Schenck, Mycologia 71: 190. 1979.
Habitat: natural areas.

Glomeraceae

Funneliformis geosporus (T.H. Nicolson & Gerd.) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 14. 2010.
≡ *Endogone macrocarpa* var. *geospora* T.H. Nicolson & Gerd., Mycologia 60: 318. 1968.
≡ *Glomus geosporum* (T.H. Nicolson & Gerd.) C. Walker, Mycotaxon 15: 56. 1982.
≡ *Glomus macrocarpum* var. *geosporum* (T.H. Nicolson & Gerd.) Gerd. & Trappe, Mycologia Memoirs 5: 55. 1974.
Habitat: agrosystems, natural areas, rupestrian fields and experimental station.

Funneliformis monosporus (Gerd. & Trappe) Oehl, G.A. Silva & Sieverd., Mycotaxon 116. 102. 2011.
≡ *Glomus monosporum* Gerd. & Trappe, Mycologia Memoirs 5: 41. 1974.
Habitat: natural areas.

Funneliformis mosseae (T.H. Nicolson & Gerd.) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 13:2010.
≡ *Endogone mosseae* T.H. Nicolson & Gerd., Mycologia 60: 314. 1968.
≡ *Glomus mosseae* (T.H. Nicolson & Gerd.) Gerd. & Trappe, Mycologia Memoirs 5: 40. 1974.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields.

Funneliformis multiforus (Tadych & Błaszk.) Oehl, G.A. Silva & Sieverd., Mycotaxon 116: 103. 2011.
≡ *Glomus multiforum* Tadych & Błaszk., Mycologia 89: 805. 1997.
Habitat: rupestrian fields.

Glomus badium Oehl, D. Redecker & Sieverd., Journal of Applied Botany 79: 39. 2005.
≡ *Funneliformis badium* (Oehl, D. Redecker & Sieverd.) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 13. 2010.
Habitat: Murundu fields.

Glomus diaphanum J.B. Morton & C. Walker, Mycotaxon 21: 433. 1984.
≡ *Rhizophagus diaphanum* (J.B. Morton & C. Walker) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 19. 2010.
Habitat: agrosystems, natural areas and rupestrian fields.

Glomus fuegianum (Speg.) Trappe & Gerd., Mycologia Memoirs 5: 58. 1974.
≡ *Endogone fuegiana* Speg., Anales de la Sociedad Científica Argentina 24: 125. 1887.
Habitat: natural areas.

Glomus glomerulatum Sieverd., Mycotaxon 29: 74. 1987.
Habitat: impacted areas, natural areas and rupestrian fields.

Glomus macrocarpum Tul. & C. Tul. (as *macrocarpus*), Giornale Botanico Italiano 1(2): 63. 1844.
≡ *Endogone macrocarpa* (Tul. & C. Tul.) Tul. & C. Tul., Fungi Hypogaei: Histoire et Monographie des Champignons Hypogés 20:1. 1851.
Habitat: natural areas, Murundu fields, rupestrian fields and experimental station.

Glomus microcarpum Tul. & C. Tul. (as *microcarpus*), Giornale Botanico Italiano 1(2): 63. 1844.
≡ *Endogone microcarpa* (Tul. & C. Tul.) Tul. & C. Tul., Fungi Hypogaei: Histoire et Monographie des Champignons Hypogés 20:2. 1851.
Habitat: agrosystems, natural areas and rupestrian fields.

Rhizoglomus clarum (T.H. Nicolson & N.C. Schenck) Sieverd., G.A. Silva & Oehl Mycotaxon 129: 380. 2015.
≡ *Glomus clarum* T.H. Nicolson & N.C. Schenck, Mycologia 71: 182. 1979.
≡ *Rhizophagus clarus* (T.H. Nicolson & N.C. Schenck) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new genera families and new genera 19. 2010.
Habitat: agrosystems, impacted areas, natural areas, Murundu fields and rupestrian fields.

Rhizoglomus fasciculatum (Thaxt.) Sieverd., G.A. Silva & Oehl, Mycotaxon 129: 380. 2015.
≡ *Endogone fasciculata* Thaxt., Proceedings of the American Academy of Arts and Science 57: 308. 1922.
≡ *Glomus fasiculatum* (Thaxt.) Gerd. & Trappe, Mycologia Memoirs 5: 51. 1974.
≡ *Rhizophagus fasciculatus* (Thaxt.) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera. 19. 2010.
Habitat: agrosystems, natural areas and rupestrian fields.

Rhizoglomus intraradices (N.C. Schenck & G.S. Sm.) Sieverd., G.A. Silva & Oehl, Mycotaxon 129: 378. 2015.
≡ *Glomus intraradices* N. C. Schenck & G.S. Sm., Mycologia 74: 78. 1982.
Habitat: agrosystems and impacted areas.

Rhizoglomus invermaium (I.R. Hall) Sieverd., G.A. Silva & Oehl, Mycotaxon 129: 381. 2015.
≡ *Glomus invermaium* I.R. Hall, Transactions of the British Mycological Society 68: 345. 1977.
Habitat: rupestrian fields.

Rhizoglomus manihotis (R.H. Howeler, Sieverd. & N.C. Schenck) Sieverd., G.A. Silva & Oehl, Mycotaxon 129: 381. 2015.
≡ *Glomus manihotis* R.H. Howeler, Sieverd. & N.C. Schenck, Mycologia 76: 695. 1984.
≡ *Rhizophagus manihotis* (R.H. Howeler, Sieverd. & N.C. Schenck) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 19. 2010.
Habitat: natural areas.

Rhizoglomus microaggregatum (Koske, Gemma & P.D. Olexia) Sieverd., G.A. Silva & Oehl, Mycotaxon 129: 381. 2015.
≡ *Glomus microaggregatum* Koske, Gemma & P.D. Olexia, Mycotaxon 26: 125. 1986.
Habitat: agrosystems, natural areas and rupestrian fields.

Sclerocystis clavispora Trappe, Mycotaxon 6: 359. 1977.
≡ *Glomus clavisporum* (Trappe) R.T. Almeida & N.C. Schenck, Mycologia 82: 710. 1990.
Habitat: agrosystems, natural areas and Murundu fields.

Sclerocystis coremioides Berk. & Broome, Botanical Journal of the Linnean Society 14: 137. 1873.
≡ *Glomus coremioides* (Berk. & Broome) D. Redecker & J.B. Morton, Mycologia 92: 284. 2000.
= *Xenomyces ochraeus* Cesati, Atti della Reale Accademia delle Scienze Fisiche e Mathematichedi Napoli 8(4): 26. 1878.
= *Ackermannia coccogena* Pat., Bulletin de la Société Mycologique de France 18: 183. 1902.
≡ *Sphaerocreas coccogena* (Pat.) von Höhn., Sitzungsberichte der Kaiserlichen Akademie derWissenschaften in Wien Mathematisch-Naturwissenschaftlich Klasse Abteilung I. 118: 401. 1909.
≡ *Sclerocystis coccogena* (Pat.) von Höhn., Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften in Wien Mathematisch-Naturwissenschaftlich Klasse Abteilung I. 119: 399. 1910.
= *Ackermannia dussii* Pat., Bulletin de la Société Mycologique de France 18: 180–181. 1902.
≡ *Sphaerocreas dussii* (Pat.) von Höhn, Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften in Wien Mathematisch-Naturwissenschaftlich Klasse Abteilung I. 118: 401. 1909.
= *Sphaerocreas javanicum* von Höhn, Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften in Wien Mathematisch-Naturwissenschaftlich Klasse. Abteilung I. 117: 1014–1015. 1908.
= *Endogone minutissima* Beeli, Bulletin de la Société Royale de Botanique de Belgique 56: 57. 1923.
= *Sclerocystis alba* Petch, Annals of the Royal Botanic Gardens, Peradenyia 9: 322–383. 1925.
≡ *Endogone alba* (Petch) Gerd. & Trappe, Mycologia Memoir 5: 25. 1974.
Habitat: natural areas.

Sclerocystis sinuosa Gerd. & B.K. Bakshi, Transactions of the British Mycological Society 66: 343. 1976.
≡ *Glomus sinuosum* (Gerd. & B.K. Bakshi) R.T. Almeida & N.C. Schenck, Mycologia 82: 710. 1990.
Habitat: natural areas.

Septoglomus constrictum (Trappe) Sieverd., G.A. Silva & Oehl, Mycotaxon 116: 105. 2011.
≡ *Glomus constrictum* Trappe, Mycotaxon 6: 361. 1977.
≡ *Funneliformis constrictum* (Trappe) C. Walker & A. Schüssler, The *Glomeromycota*: a species list with new families and new genera 14. 2010.
Habitat: rupestrian fields.

Septoglomus deserticola (Trappe, Bloss & J.A. Menge) G.A. Silva, Oehl & Sieverd, Mycotaxon 116: 106. 2011.
≡ *Glomus deserticola* Trappe, Bloss & J.A. Menge, Mycotaxon 20: 123. 1984.
Habitat: agrosystems.

Septoglomus titan B.T. Goto & G.A. Silva, Mycotaxon 125: 105. 2013.
Habitat: impacted areas.

Intraornatosporaceae

Paradentiscutata baiana Oehl, Magna, B.T. Goto & G.A. Silva, Mycotaxon 119: 122. 2012.
Habitat: impacted areas.

Pacisporaceae

Pacispora dominikii (Błaszk.) Sieverd. & Oehl, Journal of Applied Botany 78: 75. 2004.
≡ *Glomus dominikii* Błaszk., Karstenia 27: 37. 1988.
Habitat: rupestrian fields.

Pacispora scintillans (S.L. Rose & Trappe) Sieverd. & Oehl ex Walker, Vestberg & Schüssler, Mycological Research 111: 254. 2007.
≡ *Glomus scintillans* S.L. Rose & Trappe, Mycotaxon 10: 417. 1980.
Habitat: natural areas.

Paraglomeraceae

Paraglomus albidum (C. Walker & L.H. Rhodes) Oehl, G.A. Silva & Sieverd., Mycotaxon 116: 112. 2011.
≡ *Glomus albidum* C. Walker & L.H. Rhodes, Mycotaxon 12: 509. 1981.
Habitat: agrosystems and natural areas.

Paraglomus brasilianum (Spain & J. Miranda) J.B. Morton & D. Redecker, Mycologia 93: 190. 2001.
≡ *Glomus brasilianum* Spain & J.Miranda, Mycotaxon 60: 139. 1996.
Habitat: experimental station.

Paraglomus occultum (C. Walker) J.B. Morton & D. Redecker, Mycologia 93: 190. 2001.
≡ *Glomus occultum* C. Walker, Mycotaxon 15: 50. 1982.
Habitat: agrosystems, impacted areas, natural areas and rupestrian fields.

Paraglomus pernambucanum Oehl, C.M. Mello, Magna & G.A. Silva, Mycological Progress 85: 115. 2013.
Habitat: impacted areas and rupestrian fields.

Scutellosporaceae

Orbispora pernambucana (Oehl, D.K. Silva, N. Freitas & L.C. Maia) Oehl, G.A. Silva & D.K. Silva, Mycotaxon 116: 166. 2011.
≡ *Scutellospora pernambucana* Oehl, D.K. Silva, N. Freitas & L.C. Maia, Mycotaxon 106: 363. 2009.
Habitat: rupestrian fields.

Scutellospora aurigloba (I.R. Hall) C.Walker & F.E. Sanders, Mycotaxon 27: 180. 1986.
≡ *Gigaspora aurigloba* I.R. Hall, Transactions of the British Mycological Society 68: 35. 1977.
Habitat: natural areas.

Scutellospora calospora (T.H. Nicolson & Gerd.) C. Walker & F.E. Sanders, Mycotaxon 27: 180. 1986.
≡ *Endogone calospora* T.H. Nicolson & Gerd., Mycologia 60: 322.1968.
≡ *Gigaspora calospora* (T.H. Nicolson & Gerd.) Gerd. & Trappe, Mycologia Memoirs 5: 28. 1974.

Habitat: natural areas, rupestrian fields and experimental station.

Scutellospora dipapillosa (C. Walker & Koske) C. Walker & F.E. Sanders, Mycotaxon 27: 181. 1986.
Habitat: agrosystems and natural areas.

Scutellospora dipurpurescens J.B. Morton & Koske, Mycologia 80: 520. 1988.
Habitat: rupestrian fields.

Scutellospora tricalypta (R.A. Herrera & Ferrer) C. Walker & F.E. Sanders, Mycotaxon 27: 180. 1986.
≡ *Gigaspora tricalypta* R.A. Herrera & Ferrer, Revista del Jardín Botánico Nacional Habana 1: 49. 1981.
Habitat: natural areas.

Racocetraceae

Cetraspora auronigra Oehl, L.L. Lima, Kozovits, Magna & G.A. Silva, Sydowia 66: 301. 2014.
Habitat: rupestrian fields.

Cetraspora gilmorei (Trappe & Gerd.) Oehl, F.A. de Souza & Sieverd., Mycotaxon 106: 338. 2009.
≡ *Gigaspora gilmorei* Trappe & Gerd., Mycologia Memoirs 5: 27. 1974.
≡ *Scutellospora gilmorei* (Trappe & Gerd.) C. Walker & F.E. Sanders, 1986.
Habitat: agrosystems, natural areas, rupestrian fields and experimental station.

Cetraspora spinosissima (C. Walker & Cuenca) Oehl, F.A. de Souza & Sieverd., Mycotaxon 106: 340. 2009.
≡ *Scutellospora spinosissima* C. Walker & Cuenca, Annals of Botany 82: 723. 1998.
Habitat: rupestrian fields.

Cetraspora pellucida (T.H. Nicolson & N.C. Schenck) Oehl, F.A. de Souza & Sieverd., Mycotaxon 106: 338. 2009.
≡ *Gigaspora pellucida* T.H. Nicolson & N.C. Schenck, Mycologia 71: 189. 1979.
≡ *Scutellospora pellucida* (T.H. Nicolson & N.C. Schenck) C. Walker & F.E. Sanders, Mycotaxon 27: 181. 1986.
Habitat: agrosystems, natural areas and experimental station.

Racocetra coralloidea (Trappe, Gerd. & I. Ho) Oehl, F.A. de Souza & Sieverd., Mycotaxon 106: 336. 2009.
≡ *Gigaspora coralloidea*. Trappe, Gerd. & I. Ho, Mycotaxon 106: 336. 2009.
≡ *Scutellospora coralloidea* (Trappe, Gerd. & I. Ho) C. Walker & F.E. Sanders, Mycotaxon 27: 181.1986.
Habitat: natural areas.

Racocetra fulgida (Koske & C. Walker) Oehl, F.A. de Souza & Sieverd., Mycotaxon 106: 336. 2009.
≡ *Scutellospora fulgida* Koske & C. Walker, Mycotaxon 27: 221. 1986.
Habitat: rupestrian fields.

Racocetra persica (Koske & C. Walker) Oehl, F.A. de Souza & Sieverd., Mycotaxon 106: 336. 2009.
≡ *Gigaspora persica* Koske & C. Walker, Mycologia 77: 708. 1985.
≡ *Scutellospora persica* (Koske & C. Walker) C. Walker & F.E. Sanders, Mycotaxon 27: 181. 1986.
Habitat: natural areas and experimental station.

Racocetra tropicana Oehl, B.T. Goto & G.A. Silva, Nova Hedwigia 92: 72. 2011.
Habitat: impacted areas.

Racocetra verrucosa (Koske & C. Walker) Oehl, F.A. Souza & Sieverd., Mycotaxon 106: 337. 2009.
≡ *Gigaspora verrucosa* Koske & C. Walker, Mycologia 77: 705. 1985.
≡ *Scutellospora verrucosa* (Koske & C. Walker) C. Walker & F.E. Sanders, Mycotaxon 27: 181. 1986.
Habitat: agrosystems and natural areas.

Discussion

Since the last compilation by Souza et al. (2010), in which the record of the occurrence of 54 AMF species in the Cerrado was possible, this checklist represents an increase of 70% in the taxa registered. This expresses the biological potential of the Cerrado in terms of biodiversity. That figure is still 34% of *Glomeromycota* species described in the world and 60% of species recorded for Brazil, a fact that stands out the Cerrado as the third most representative biome in species of the country, behind only by Atlantic rainforest and Caatinga (Goto et al. 2010, 2012; Souza et al. 2010; Carvalho et al. 2012; Lima et al. 2012; Mello et al. 2012; Silva et al. 2012; Bonfim et al. 2013; Leal et al. 2013; Stürmer et al. 2013; Gomide et al. 2014; Novais et al. 2014; Pereira et al. 2014; Coutinho et al. 2015).

From 15 *Glomeromycota* families, 13 are represented in the Cerrado, with *Glomeraceae* showing greater representatives (20%), followed by *Acaulosporaceae* (10%) as observed in other Brazilian biomes (Goto et al. 2010; Stürmer et al. 2013; Gomide et al. 2014).

Regarding representative sample areas, we highlight the Rupestrian fields. Of the 92 species recorded for the cerrado, 47 are present in these regions. The high number of species inhabiting Rupestrian fields highlights the authenticity of phytophysiognomy front to the Cerrado context and it contrasts with the limited taxonomic inventories conducted in these regions (Carvalho et al. 2012; Coutinho et al. 2015). These areas, inventoried for AMF by Carvalho et al. (2012) and Coutinho et al. (2015), are inserted in a transition zone between the Atlantic Forest and Cerrado and are considered areas of "special biological significance" (Drummond et al. 2005). In this context, its profile representation draws attention to the need for new areas of Rupestrian fields be taken into account in studies of taxonomy and diversity, due to its island setting (restricted to the tops of mountains disjoint), which occurs more than one thousand species of endemic plants (Prance 1994). The evaluation of different areas would provide important information to understanding of the AMF diversity standards. Among the diversity of vegetation types that make up the Cerrado, the mounds fields also represent unexplored regions, with the realization of just a taxonomic inventory in which it was possible to record 15 species (16% of the species occurring in the Cerrado). Unexplored or poorly inventoried areas may consist of reservoir to new AMF species whose value to the floristic maintenance is unknown (Souza et al. 2010).

Taking into account the nature of the Cerrado, recognized as biodiversity hotspot (Myers 1988), studies aimed at bioprospecting of AMF diversity in understudied vegetation types of the Cerrado will enable the expansion of knowledge about this important biome and the provision subsidies for the development of public policies for their conservation.

Acknowledgements

The authors thank the CAPES for financial support to K Jobim and the BIS Oliveira and the National Council for Scientific and Technological Development (CNPq) for grant to BT Goto.

Reference

Alvarenga MIN, Siqueira JO, Vide AC. 1999. Teor de carbono, biomassa microbiana, agregação e micorriza em solos de Cerrado com diferentes usos. Cienc. Agrotec. 23: 617–625.

Alvim PT, Araújo WA. 1952. El suelo como factor ecológico en el desarrolo de la vegetación en el centro oeste del Brasil. Turrialba 2:153–160. http://dx.doi.org/10.1590/S0102-33062010000200003

Balota EL, Lopes ES. 1996. Introdução de fungo micorrízico arbuscular no cafeeiro em condições de campo. II. Flutuação sazonal de raízes, de colonização e de fungos micorrízicos arbusculares associados. Rev. Bras. Ciênc. Solo, Campinas 20: 225–232.

Balota EL, Lopes ES. 1996. Introdução de fungo micorrízico arbuscular no cafeeiro em condições de campo. I. Persistência e interação com espécies nativas. R. Bras. Ci. Solo, 20:217–223.

Błaszkowski J, Chwat G, Góralska A, Przemyslaw R, Kovács GM. 2015. Two new genera, *Dominikia* and *Kamienskia*, and *D. disticha* sp. nov. in *Glomeromycota*. Nova Hedwigia 100: 225 – 238. http://dx.doi.org/10.1127/nova_hedwigia/2014/0216

Błaszkowski, J. 2012. *Glomeromycota*. W. Szafer Institute of Botany Polish Academy of Sciences, Kraków, p. 304.

Bonfim JA, Vasconcellosa RLF, Stürmer SL, Cardoso EJBN. 2013. Arbuscular mycorrhizal fungi in the Brazilian Atlantic forest: A gradient of environmental restoration. Appl. Soil Ecol. 71: 7–14. http://dx.doi.org/10.1016/j.apsoil.2013.04.005

Bononi VLR, Trufem SFB. 1983. Endomicorrizas vesículo-arbusculares do cerrado da Reserva Biológica de Moji-Guaçú, SP, Brasil. Rickia 10: 55–84

Borlaug NE. 2002. Feeding a world of 10 billion people: the miracle ahead. In: R. Bailey (ed.). Global warming and other eco-myths. Competitive Enterprise Institute, Roseville, EUA, pp. 29–60.

Carneiro MAC, Ferreira DA, Souza ED, Paulino HB, Saggin-Junior OJ, Siqueira JO. 2015. Arbuscular mycorrhizal fungi in soil aggregates from fields of “murundus” converted to agriculture. Pesq. agropec. bras. 50: 313–321. http://dx.doi.org/10.1590/S0100-204X2015000400007

Carrenho R, Trufem SFB, Bononi VLR. Arbuscular mycorrhizal fungi in *Citrus sinensis*/ *C. limon* treated with Fosety-Al and Metalaxyl. Mycol Res. 102: 677-682. http://dx.doi.org/10.1017/S0953756297005649

Carvalho F, Souza FA, Carrenho R, Souza FMM, Jesus EC, Fernandes GW. 2012. The mosaic of habitats in the high-altitude Brazilian rupestrian fields is a hotspot for arbuscular mycorrhizal fungi. Appl. Soil Ecol. 52: 9–19. http://dx.doi.org/10.1016/j.apsoil.2011.10.001

Costa CMC, Cavalcante UMT, Goto BT, Santos VF, Maia LC. 2005. Fungos micorrízicos arbusculares e adubação fosfatada em mudas de mangabeira. Pesq. agropec. bras., Brasília 40: 225–232. http://dx.doi.org/10.1590/S0100-204X2005000300005

Coutinho ES, Fernandes GW Berbara RLL, Valério HM, Goto BT. 2015. Variation of arbuscular mycorrhizal fungal communities along an altitudinal gradient in rupestrian fields in Brazil. Mycorrhiza (In press). http://dx.doi.org/10.1007/s00572-015-0636-5

Drummond GM, Martins CS, Machado ABM., Sebaio FA, Antonini Y. 2005. Biodiversidade em Minas Gerais: um Atlas para sua conservação. 2 ed. Fundação Biodiversitas, Belo Horizonte, 94p.

Feldmann F. 1994. Mycorrhizal situation of native trees in the Brazilian tropical ecosystems Varzea, Igapo, and Terra Firme. In: Lieberei R,Voß??? K, Brügmann C., eds. Hamburg, Tropische Nutzpflanzen, p.70-77.

Fernandes A, Siqueira JO. 1989. Micorrizas vesicular-arbusculares em cafeeiros da região Sul do Estado de Minas Gerais. Pesq. agropec. bras., Brasília, 24(12): 1489–1498.

Gomide PHO, Silva MLN, Soares CRFS, Cardoso EL, Carvalho F, Leal PL, Marques RM, Stürmer SL. 2014. Fungos micorrízicos arbusculares em fitofisionomias do pantanal da nhecolândia, mato grosso do sul. R. Bras. Ci. Solo 38:1114-1127. http://dx.doi.org/10.1590/S0100-06832014000400007

Goodland R. Oligotrofismo e alumínio no cerrado. 1971. In: Ferri, M. G. (Ed.) III Simpósio sobre o cerrado. EdUSP, São Paulo 44–60.

Goto BT, Maia LC, Oehl F. 2008. *Ambispora brasiliensis*, a new ornamented species in the arbuscular mycorrhiza-forming *Glomeromycetes*. Mycotaxon 105: 11–18.

Goto BT, Silva GA, Assis DMA, Silva DKA, Souza RG, Ferreira ACA, Jobim K, Mello CMA, Vieira HEE, Maia LC, Oehl F. 2012. *Intraornatosporaceae*: (*Gigasporales*), a new family with two new genera and two new species. Mycotaxon 119: 117–132. http://dx.doi.org/10.5248/119.117

Gross E, Cordeiro L, Caetano FH. 2004. Nodulação e micorrização em *Anadenanthera peregrina* var. falcata em solo de Cerrado autoclavado e não autoclavado. R. Bras. Ci. Solo 28:95–101. http://dx.doi.org/10.1590/S0100-06832004000100010

IBGE - Instituto Brasileiro de Geografia e Estatística. 2004. Rio de Janeiro: IBGE.

Klink CA, Machado RB. 2005. Conservation of the Brazilian cerrado. Conserv. Biol. 19:707–713. http://dx.doi.org/10.1111/j.1523-1739.2005.00702

Koske RE, Walker C. 1985. Species of *Gigaspora* (*Endogonaceae*) with roughened outer walls. Mycologia 77: 702–720.

Leal PL, Siqueira JO, Stürmer SL. 2013. Switch of tropical Amazon forest to pasture affects taxonomic composition but not species abundance and diversity of arbuscular mycorrhizal fungal community. Appl. Soil Ecol. 71: 72–80. http://dx.doi.org/10.1016/j.apsoil.2013.05.010

Lima LL, Kozovits AR, Assis DMA, Silva GA, Oehl F. 2014. *Cetraspora auronigra*, a new glomermycetes species from Ouro Preto, Minas Gerais (Brazil). Sydowia 66: 299–308. http://dx.doi.org/10.12905/0380.sydowia66(2)2014-0299

Marinho F, Silva GA, Ferreira ACA, Veras JSN, Sousa NMF, Goto BT, Maia LC, Oehl F. 2014. *Bulbospora minima*, a new genus and a new species from semi-arid Northeast Brazil. Sydowia 66: 313–323. http://dx.doi.org/10.12905/0380.sydowia 66(2)2014-0313

Martins CR, Miranda JCC, Miranda LN. 1999. Contribuição de Fungos Micorrízicos Arbusculares nativos no estabelecimento de *Aristida setifolia* Kunth em áreas degradadas do Cerado. Pesq. Agropec. Bras. 34: 665–674. http://dx.doi.org/10.1590/S0100-204X1999000400019

Mello CMA, Silva GA, Vieira HEE, Silva IR, Maia LC, Oehl F. 2012. *Fuscutata aurea*, a new species in the *Glomeromycetes* from cassava and maize fields in the Atlantic rainforest zone in Northeastern Brazil. Nova Hedwigia 95: 267–275. http://dx.doi.org/10.1127/0029-5035/2012/0037

Miranda JCC, Miranda, LN. 2001. Seleção e recomendação de uso de espécies de fungos micorrízicos arbusculares. Planaltina, DF: Embrapa Cerrados, Comunicado Técnico, 52, 3p.

Miranda JCC, Sousa DMG, Miranda LN. 1984. Influência de fungos endomicorrízicos vesicular-arbusculares na absorção de fósforo e no rendimento de matéria seca de plantas de sorgo. Rev. Bras. Ciênc. Solo 8(1): 31–36.

Miranda JCC, Vilela L, Miranda LN. 2005. Dinâmica e contribuição da micorriza arbuscular em sistemas de produção com rotação de culturas. Pesq. Agrop. Bras. 40: 1005–1014.http://dx.doi.org/10.1590/S0100-204X2005001000009

Miranda JCC. 1982. Influência de fungos endomicorrtricos inoculados a campo na cultura de sorgo e soja em um solo sob cerrado. Rev.Bras. Ciênc. Solo 6(1): 19–23.

Miranda JCC. 2002. Importância da micorriza arbuscular para o cultivo da soja na região do cerrado (EMBRAPA-CPAC, Comunicado técnico 75).

Myers N. 1988. Threatened biotas: “Hot spots” in tropical forests. The Environmentalist 8: 187–208.

Negreiros D. 2004. Qualidade nutricional do solo e desenvolvimento de quatro leguminosas de campo rupestre. Universidade Federal de Minas Gerais, Belo Horizonte, 57p.

Novais CB, Borges WL, Jesus EC, Júnior OJS, Siqueira JO. 2014. Inter and intraspecific functional variability of tropical arbuscular mycorrhizal fungi isolates colonizing plants. Appl. Soil Ecol. 76: 78–86. http://dx.doi.org/10.1016/j.apsoil.2013.12.010

Oehl F, Castro IS, Palenzuela J, Silva GA. 2015. *Palaeospora spainii*, a new arbuscular mycorrhizal fungus from Swiss agricultural soils. Nova Hedwigia 101: 89 – 101. http://dx.doi.org/10.1127/nova_hedwigia/2014/0229

Oehl F, Sieverding E, Palenzuela J, Ineichen K, Silva GA. 2011. Advances in *Glomeromycota* taxonomy and classification. IMA Fungus 2: 191–199. http://dx.doi.org/10.5598/imafungus.2011.02.02.10

Oliveira JRG, Souza RG, Silva FSB, Mendes ASM, Yano-Melo AM. 2009. O papel da comunidade de fungos micorrízicos arbusculares (FMA) autóctones no desenvolvimento de espécies vegetais nativas em área de dunas de restinga revegetadas no litoral do Estado da Paraíba. Revista Brasil. Bot. 32(4): 663–670.http://dx.doi.org/10.1590/S0100-84042009000400005

Pagano MC, Scotti MR. 2009. A survey of the mycorrhiza occurrence in *Paepalanthus bromelioids* and *Bulbostylis* sp. in rupestrian, Brazil. Micol. Appl. Int. 21: 1–10.

Pereira CMR, Silva DKA, Ferreira ACA, Goto, BT, Maia LC. 2014. Diversity of arbuscular mycorrhizal fungi in Atlantic forest areas under different land uses. Agriculture, Ecosystems and Environment 185: 245–252. http://dx.doi.org/10.1016/j.agee.2014.01.005

Pereira CMR, Goto BT, da Silva DKA, Ferreira ACA, de Souza FA, da Silva GA, Maia LC, Oehl F. 2015. *Acaulospora reducta* sp. Nov. and *Acaulospora excavata,* two glomeromycotan fungi with pitted spores from Brazil. Mycotaxon (in press).

Prance GT. 1994. A comparison of the efficacy of higher taxa and species numbers in the assessment of biodiversity in the Neotropics. Philosophical Transactions of the Royal Society London, Series B: Biological Sciences 345: 89–99. http://dx.doi.org/ 10.1098/rstb.1994.0090

Silva DKA, Pereira CMR, Souza RG, Silva GA, Oehl F, Maia LC. 2012. Diversity of arbuscular mycorrhizal fungi in resting and dunes areas in Brazilian Northeast. Biodivers. Conserv. 21: 2361–2373. http://dx.doi.org/10.1007/s10531-012-0329-8

Siqueira JO, Colozzi-Filho A, Oliveira E, Fernandes AB, Florence ML. 1987. Micorrizas vesicular-arbusculares em mudas de cafeeiro produzidas no sul do estado de Minas Gerais. Pesq. Agropec. Bras. 22(1):31–38.

Siqueira JO, Colozzi-Filho A, Oliveira E, Fernandes AB, Florence ML. 1987. Micorrizas vesicular-arbusculares em mudas de cafeeiro produzidas no sul do estado de Minas Gerais. Pesq. Agropec. Bras. 22(1):31–38.

Siqueira JO, Colozzi-Filho A, Oliveira E. 1989. Ocorrência de micorrizas vesicular-arbusculares em agro e ecossistemas do estado de Minas Gerais. Pesq. Agropec. Bras. 24(12): 1499–1506.

Smith SE, Read D. 2008. Mycorrhizal Symbiosis. 3ª ed. San Diego: Academic Press.

Soicke H, Almeida ER, Costa AF. 1986. Characterisation of flavonoids from *Baccharis trimera* and their properties. Planta Medica 52: 37–39.

Souza FA, Stürmer SL, Carrenho R, Trufem SFB. Classificação e taxonomia de fungos micorrízicos arbusculares e sua diversidade e ocorrência no Brasil. In: Siqueira, J.O.; Souza, F.A.; Cardoso, E.J.B.N.; Tsai, S.M. (Org.). Micorrizas: 30 anos de pesquisas no Brasil. 1 ed. Lavras: Editora UFLA, 2010. pp 15–73.

Spain JL, Miranda JC. 1996a. *Scutellospora cerradensis*: an ornamented in the *Gigasporaceae* (*Glomales*) from the Cerrado region of Brazil. Mycotaxon 60: 129–136.

Spain JL, Miranda JC. 1996b. *Glomus brasilianum*: an ornamented in the *Glomaceae*. Mycotaxon 60: 137–142.

Stürmer SL, Stürmer R, Pasqualini D. 2013. Taxonomic Diversity and community structure of arbuscular mycorrhizal fungi (Phylum *Glomeromycota*) in three maritime sand dunes in Santa Catarina State, South Brazil. Fungal Ecology 6: 27–36. http://dx.doi.org./10.1016/j.funeco.2012.10.001

Walker C, Diederichs C. 1989. *Scutellospora scutata* sp. nov., a newly described endomychorrhizal fungus from Brazil. Mycotaxon 35: 357–361.

Weber OB, Oliveira E. 1994. Ocorrência de fungos micorrízicos vesículoarbusculares em citros nos Estados da Bahia e Sergipe. Pesq. Agropec. Bras. 29(12): 1905–1914.

Wettstein F. 1915. *Geosiphon* Fr Wettst, eine neue, interessante Siphonee. Österr Bot Z 65: 145–56.