DANILO BATISTA PINHO

BIODIVERSIDADE DE FUNGOS DA FAMÍLIA MELIOLACEAE DE FRAGMENTOS DA MATA ATLÂNTICA DE MINAS GERAIS, BRASIL

Dissertação apresentada à Universidade Federal de Viçosa, como parte das exigências do Programa de Pós-Graduação em Fitopatologia, para obtenção do título de *Magister Scientiae*.

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'A curiosidade é mais importante do que o conhecimento'
(Albert Einstein)

Dedico

Aos meus pais Adão e Maria Eunice, e à minha filha Ingridy.

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BIOGRAFIA

DANILO BATISTA PINHO, filho de Maria Eunice Batista Pinho e Adão dos Santos Pinho, nasceu na cidade de Salinas-MG, no dia 17 de janeiro de 1984.

Em 1999, ingressou no curso Técnico profissionalizante em Agropecuária na Escola Agrotécnica Federal de Salinas, formando em dezembro de 2001.

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No mesmo ano, em 25 de agosto de 2009, transferiu-se do nível de Mestrado para o de Doutorado, também em Fitopatologia, na mesma instituição.

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PINHO, Danilo Batista, M.Sc., Universidade Federal de Viçosa, novembro de 2009. **Biodiversidade de fungos da família Meliolaceae de fragmentos da Mata Atlântica de Minas Gerais, Brasil.** Orientador: Olinto Liparini Pereira. Co-Orientadores: Robert Weingart Barreto e Walnir Gomes Ferreira Júnior.

A Mata Atlântica é um bioma ameaçado de extinção, caracterizado por um elevado nível de endemismo e diversidade de espécies. O conhecimento disponível sobre a diversidade neste bioma envolve espécies vegetais e animais que existem nesta floresta. No entanto, há poucos estudos sobre a diversidade de outros grupos extremamente diversificados, em especial sobre os fungos, restando uma grande lacuna ao conhecimento quanto à biodiversidade existente nesse bioma. A família Meliolaceae abrange espécies de fungos biotróficos que infectam um grande número de espécies de plantas de diferentes famílias distribuídas em regiões tropicais e subtropicais, causando doenças denominadas de míldios negros. Por comumente não causarem doenças severas em hospedeiros economicamente importantes, o estudo sobre esses fitopatógenos tem sido historicamente negligenciado em diversos países. O propósito deste trabalho foi o de contribuir para a ampliação do conhecimento sobre os fungos melioláceos no Brasil. Efetuou-se um levantamento de míldios negros associados às plantas que ocorrem em fragmentos florestais selecionados no município de Viçosa, Minas Gerais. Estes fragmentos representam áreas em estados variados de conservação, desde bastante antropizados até próximos da condição de floresta primária e são classificadas como Floresta Estacional Semidecidual Montana. As cinco áreas são assim conhecidas: Mata da Biologia, Mata da Dendrologia, Mata da Silvicultura, Mata do Paraíso e Mata do Seu Nico. O estudo revelou nove espécies fúngicas a serem propostas como novas associadas a hospedeiros pertencentes as seguintes famílias botânicas: Annonaceae, Asteraceae, Cecropiaceae, Leguminosae, Sapindaceae e Tiliaceae. Quatro taxas associados com plantas das famílias Burseraceae, Meliaceae, Piperaceae e Sapindaceae foram reconhecidas como novas variedades a serem propostas. Além destes, as espécies *Asteridiella cyclopoda*, *A. entebbeensis* var. *codiaei*, *Meliola pazschkeana* var. *macropoda*, *M. trichiliae* e *M. psychotriae* var. *chiococcae* foram encontradas pela primeira vez no Brasil associados com hospedeiros da família Asteraceae, Euphorbiaceae, Leguminosae, Meliaceae e Rubiaceae, respectivamente. Apesar da pequena área representada pelo conjunto de fragmentos de Mata Atlântica explorada,

nove novas espécies, quatro novas variedades e cinco novos relatos de míldios negros associados a vinte espécies de plantas hospedeiras, distribuídos em quatorze famílias botânicas foram encontradas. O elevado número de Melioláceos encontrado nessa pequena área em Viçosa, confirma a grande diversidade e carência de conhecimento sobre este grupo fúngico no bioma Mata Atlântica no Brasil.

ABSTRACT

PINHO, Danilo Batista, M.Sc., Universidade Federal de Viçosa, November of 2009. **Biodiversity of the Meliolaceae fungi family from fragments of the Atlantic Forest of Minas Gerais, Brazil.** Adviser: Olinto Liparini Pereira. Co-Advisers: Robert Weingart Barreto and Walnir Gomes Ferreira Júnior.

The Atlantic Forest is a biome threatened with extinction, characterized by a high level of endemism and species diversity. The available knowledge about the diversity in this biome involves plant and animal species that exist in this forest. However, there are few studies on the diversity of other extremely varied groups, especially about the fungus, leaving a large gap in knowledge related to the biodiversity in this biome. The Meliolaceae family includes biotrophic fungal species that infect a large number of plant species from different families distributed in tropical and subtropical regions, causing diseases called the black mildews. For not usually causing severe diseases in economically important hosts, the study of these pathogens have historically been neglected in many countries. The purpose of this study was to contribute to the expansion of knowledge about the meliolaceous fungi in Brazil. A survey of black mildews associated with plants that occur in forest fragments selected in Viçosa, Minas Gerais was conducted. These fragments represent areas in varying states of preservation, since the very close anthropized to semi-natural condition of primary forest and are classified as tropical seasonal semi-deciduous montane forest. The five areas are well known: “Mata da Biologia”, “Mata da Dendrologia”, “Mata da Silvicultura”, “Mata do Paraíso” and “Mata do Seu Nico”. The study revealed nine fungal species to be proposed as new associated to hosts belonging to the following plant families: Annonaceae, Asteraceae, Cecropiaceae, Leguminosae, Sapindaceae and Tiliaceae. Four associated rates with plants of the Burseraceae, Meliaceae, Piperaceae and Sapindaceae families were recognized as new varieties to be proposed. In addition, the *Asteridiella cyclopoda*, *A. entebbeensis* var. *codiaei*, *Meliola pazschkeana* var. *macropoda*, *M. trichiliae* and *M. psychotriae* var. *chiococcae* species were found for the first time in Brazil associated with hosts of the Asteraceae, Euphorbiaceae, Leguminosae, Meliaceae and Rubiaceae, respectively. Despite the small area represented by a set of fragments from the explored Atlantic forest, nine new species, four new varieties and five new reports of black mildews associated with twenty species of host plants, distributed in fourteen botanical families were found. The high number of

Meliolaceous found in this small area in Viçosa, confirms the great diversity and lack of knowledge about this fungi group in the Brazilian Atlantic Forest.

1. INTRODUÇÃO GERAL

Dentre os biomas brasileiros, as formações florestais da Mata Atlântica (5º bioma mais ameaçado do mundo) assumem grande importância ecológica, pois sua ocorrência em ampla extensão geográfica, considerável diversidade de climas, solos e relevos proporcionaram uma elevada riqueza de espécies e diversidade florística, além de um número elevado de espécies endêmicas (Myers et al., 2000; Geobrasil, 2002).

Inicialmente, à época do descobrimento, a Mata Atlântica estendia-se sobre a cadeia montanhosa paralela ao Atlântico estendendo-se para o interior, desde o Rio Grande do Sul até o Rio Grande do Norte, cobrindo cerca de 15 % do território brasileiro, aproximadamente 1.306.000 Km². Esta área de cobertura está hoje reduzida a 7,5 % de sua área original (Myers et al., 2000; MMA, 2003).

Antes da chegada dos portugueses no início do século XV, o estado de Minas Gerais abrigava aproximadamente 45 % de toda área de Mata Atlântica existente no país. Nesta época, 38 % do território mineiro, 588.384 Km², era coberto por este bioma. Atualmente a Mata Atlântica em Minas Gerais encontra-se reduzida a apenas 3 % de sua área original (Araujo, 2000).

Historicamente, a ação antrópica como promotora da devastação da Mata Atlântica em Minas Gerais, inicia-se logo após o esgotamento das jazidas de ouro de Mariana e Ouro Preto em 1805 (Paniago, 1983). Esse autor descreve que a pecuária extensiva surge como principal atividade econômica da região, iniciando-se a retirada da cobertura vegetal original para implantação de pastagens, dando início ao processo contínuo de ocupação do território. Mais tarde, em meados do século XIX, outra atividade econômica, a cafeicultura, concorreria para aumentar a pressão sobre os recursos naturais, proveniente do vale do Paraíba e leste Paulista, chega à região da Zona da Mata Mineira.

A degradação da Mata Atlântica continua até os dias de hoje estimulada pela política desenvolvimentista da década de 1970, pelo crescimento desordenado dos centros urbanos, exploração de madeira e outros produtos, à política de reforma agrária praticada na década de 80 e à prática de abertura e queimadas de novas áreas para agricultura e pecuária (Morellato & Haddad, 2000).

As modificações na paisagem natural da Zona da Mata mineira prosseguiram promovendo a destruição da densa cobertura florestal da região, estando esta, atualmente, representada na forma de fragmentos florestais dispersos, isolados nas pequenas propriedades rurais e praticamente confinados ao topo das elevações da paisagem, compondo um verdadeiro mosaico de 'ilhas' de vegetação, remanescentes da outrora exuberante vegetação, embora conservem uma parcela representativa da flora original (Silva et al., 2003).

O desmatamento e a fragmentação da Mata Atlântica produziram graves conseqüências para a biota nativa, em função da drástica redução de habitats e isolamento genético das populações (Prado et al., 2008). A redução da vegetação, iniciado há muitas décadas (Paniago, 1983), ocasionou a extinção de espécies em função do tamanho reduzido das áreas remanescentes (Lopes et al., 2002).

A perda da biodiversidade tem preocupado governos e especialistas de todas as partes do mundo. No esforço de preservar a biodiversidade do estado de São Paulo, o governo estadual criou o programa Biota/FAPESP para obtenção de informações sobre aspectos botânicos, zoológicos e microbianos, com o intuito de contribuir na base de conhecimento completo sobre a biodiversidade, orientar a preservação natural, promover o uso sustentável e manejar ecossistemas, utilizando as informações obtidas para regular a concessão de financiamentos e estabelecer metas para um banco de dados (Chapman, 2001).

Estas ações são necessárias para todo o país, pois o Brasil possui coleções restritas, com amostragem pouco representativa dos ecossistemas. Além disso, existem dificuldades para a realização destes trabalhos pela falta de informações taxonômicas e de especialistas para grupos importantes, dificultando a realização de uma catalogação da biodiversidade. Dessa forma, o levantamento do número de espécies existente no Brasil, tem sido feito por meio de estimativas, realizadas muitas vezes por extrapolações baseadas em dados de outras regiões mais bem conhecidas. Outras estimativas são produzidas pela premissa de uma proporcionalidade dos grupos pouco conhecidos em relação àqueles melhor estudados (Geobrasil, 2002).

Apesar da falta de conhecimento sobre a biodiversidade, sabe-se que o Brasil apresenta a maior biodiversidade do mundo, abrigando o maior número de espécies conhecidas de mamíferos, peixes dulcícolas e plantas superiores; o segundo em riqueza de anfíbios, terceiro em aves e quinto em répteis, ou seja, 10 a 20 % do número de espécies conhecidas pela ciência. O Brasil ainda detêm aproximadamente 30 % das florestas tropicais do mundo. Estima-se que a quantidade de espécies existentes no Brasil ainda possa ser dez vezes maior do que a dimensão catalogada (200 mil espécies descritas), ou seja, chegar até a 2 milhões de espécies (Geobrasil, 2002; CVRD, 2005).

As florestas de Minas Gerais também necessitam de estudos sobre biodiversidade, pois estão na mesma situação das demais regiões do País, sofrendo alto grau de perturbação decorrente da expansão demográfica e das atividades agrícola, mineradora e industrial (Oldeman, 1994; Marangon et al., 2003). As áreas de floresta do estado representam uma grande riqueza de espécies que constitui um patrimônio que merece atenção especial, visto que o banco genético ali estabelecido deve ser urgentemente preservado, garantindo a tipologia da região para gerações futuras. O conhecimento destas espécies estabelece uma base para que se possa fazer o manejo dos

recursos com o intuito de preservar esses remanescentes de floresta (Braz et al., 2002; Meira-Neto & Martins, 2002; Marangon et al., 2003; Ferreira, 2006; Pereira et al., 2006; Ferreira-Júnior et al., 2007; Prado et al., 2008).

Em algumas áreas selecionadas do estado já foram realizados estudos sobre a vegetação florestal remanescente que faz parte dos domínios da Floresta Atlântica classificada como Floresta Estacional Semidecidual Montana (Braz et al., 2002). Um exemplo é a chamada Mata da Silvicultura, um fragmento florestal da Zona da Mata de Minas Gerais em área do *campus* da Universidade Federal de Viçosa (UFV), que apesar da pequena dimensão (17 ha) é rica em espécies, já tendo sido ali catalogadas a ocorrência de 154 espécies de plantas pertencentes a 47 famílias botânicas. Além do mais, a Mata da Silvicultura possui espécies arbóreas representativas da flora florestal do norte da Zona da Mata de Minas Gerais (Meira-Neto & Martins, 2002). Outra área do *campus* da UFV é a Mata da Dendrologia. Essa área possui espécies florestais de interesse econômico e representativas da flora da Zona da Mata de Minas Gerais e Mata Atlântica (DEF, 2009).

A reserva da Biologia é outro remanescente florestal inserido no *campus* da UFV com uma área aproximada de 75 ha e que se encontra atualmente em processo de regeneração natural. Os estudos florísticos nesta área identificaram a ocorrência de 131 espécies de plantas, distribuídas em 94 gêneros, pertencentes a 40 famílias botânicas (Ferreira-Júnior et al., 2007).

Também pertencente a área do *campus* da UFV, a Reserva Florestal Mata do Paraíso tem uma área de 195 ha. Alguns trabalhos florísticos realizados na área identificaram 62 espécies de Asteraceae, reunidas em 32 gêneros e 10 tribos (Ferreira, 2006), quatro gêneros e seis espécies de Acanthaceae (Braz et al., 2002), e 30 espécies de Rubiaceae distribuídas em 14 gêneros (Pereira et al., 2006). Somente na Mata da

Pedreira (porção de 39,81 ha da Mata do Paraíso) foram encontradas 197 espécies distribuídas em 53 famílias e 134 gêneros (Marangon et al., 2003). Além da flora, observa-se que a Reserva Florestal Mata do Paraíso desempenha um importante papel na conservação da mastofauna da região de Viçosa-MG, onde já foram registradas 23 espécies de mamíferos, das quais três estão ameaçadas de extinção (Prado et al., 2008).

Outra área em estudo neste trabalho, situa-se em uma propriedade particular denominada Sítio Bom Sucesso, conhecida na região como "Mata do Seu Nico" (Antônio Manoel de Freitas). Esta área tem aproximadamente 35 ha e nunca houve corte rasos ou plantios na área, sendo o fragmento um dos mais bem preservados da Zona da Mata Mineira (Campos, 2002; Irsigler, 2002; Santos, 2005).

Embora já existe bastante conhecimento acumulado sobre a diversidade da fauna e flora da Mata Atlântica, os fungos permanecem quase desconhecidos neste bioma.

Os fungos tem papel central em processos ecológicos fundamentais para a homeostase da biosfera, participando da ciclagem de nutrientes em ecossistemas terrestres e aquáticos, decomposição de materiais de difícil degradação, bioregulação e produzindo associações mutualísticas (associações micorrízicas, endofíticas, liquênicas etc.). Há numerosas aplicações de fungos e seus produtos tais como na alimentação humana, na produção de medicamentos, enzimas e outros produtos industriais. Também são amplamente conhecidos os aspectos nocivos de fungos na deterioração de produtos armazenados, podridão de produtos alimentícios e como agentes etiológicos de doenças no homem, nas plantas cultivadas e nos animais (Alexopoulos et al., 1996). A importância e necessidade do estudo dos fungos é hoje amplamente reconhecida.

Acredita-se que existam 1.500.000 espécies de fungos no planeta, das quais apenas cerca de 100.000 espécies foram descritas (Hawksworth, 2004). Provavelmente,

esses fungos encontram-se distribuídos em um grande número de habitats ainda pouco explorados, como é o caso da Mata Atlântica.

As florestas tropicais são uma das prováveis áreas ricas em fungos por apresentarem uma grande quantidade de microhabitats explorados por uma micobiota diversificada e especializada (Hawksworth, 2001). Existem em média seis espécies de fungos para cada espécie de planta. No entanto, esses dados podem ser considerados conservadores, pois as estimativas feitas foram baseadas fundamentalmente nos resultados das pesquisas de fungos associados a plantas em países de clima temperado (Hawksworth, 1991). O mesmo autor considera que estudos de biodiversidade de fungos devem ser realizados principalmente em florestas tropicais em função do maior número de espécies nas regiões tropicais em relação às regiões temperadas (Hawksworth, 2001).

No entanto, às vésperas da comemoração do ano internacional da biodiversidade, observa-se uma falta de incentivo mesmo em países desenvolvidos, para a formação e atuação de micologistas na sistemática básica de fungos. Esta pode ser a explicação para o decréscimo que se observa no número de espécies fúngicas descritas anualmente. Enquanto 1522 espécies foram descritas em 2004, apenas 853 espécies foram descritas em 2007. Esse decréscimo pode estar ocorrendo também devido à descrição de novas espécies não resultar em muitas citações dos artigos que veiculam tais descobertas. Sendo assim, os órgãos de financiamento destinam poucos recursos aos estudos sobre a biodiversidade fúngica (Crous & Robert, 2008).

No caso do Brasil, estados inteiros e mesmo biomas como a Mata Atlântica permanecem ainda pouco explorados e conhecidos sob o ponto de vista micológico (Soares & Barreto, 2005; Rocha et al., 2008). Há alguns exemplos recentes de trabalhos feitos em parte da área no presente trabalho que revelam o potencial inovador de

pesquisas sobre a micobiota da Mata Atlântica. O trabalho de Rocha (2007) descreve cinco espécies fúngicas a serem descritas como novas (sendo que uma representa um provável gênero novo) associadas à folhagem de uma única espécie arbórea da Mata Atlântica (*Coussapoa floccosa* Akkermans & C. C. Berg). Devido à dependência desses fungos por esta espécie arbórea ameaçada de extinção, estas são também, provavelmente, espécies fúngicas ameaçadas. Além destas espécies, o mesmo autor ainda descreve uma provável espécie nova de fungo associada a *Ocotea dispersa* (Nees) Mez, outra espécie arbórea listada como ameaçada de extinção e também uma provável espécie nova de cercosporóide associado a *Helicostylis tomentosa* (Poepp. & Endl.) Rusby. Existem outras investigações sobre fungos associados à flora nativa de Viçosa conduzidos nos últimos anos (Soares & Barreto, 2005; Vieira et al., 2005; Pereira & Barreto, 2006; Rocha et al., 2008; Silva & Pereira, 2008). Apesar da grande importância do conhecimento das espécies fúngicas associadas às espécies de plantas, poucos dentre os trabalhos recentes tratando da micobiota de plantas nativas em Viçosa e micro-região dão conta da ocorrência de membros da ordem Meliolales. Apenas quatro espécies de míldios negros foram tratadas nestes estudos: *Meliola thalliformis* var. *major* D. J. Soares & R. W. Barreto, associada a *Bathysa australis* (St. Hil.) Benth. & Hook.; *Appendiculella echinus* (P. Henn.) Hoehn, associada a *Cecropia glaziovi* Snethl.; *Meliola psychotriae* Earle, associada a *Mitracarpus hirtus* (L.) DC e *Irenopsis tortuosa* (G. Winter) F. Stevens var. *potomorphes* (Cif.) Hansf., associada a *Pothomorphe umbellata* (L.) Miq. (Pereira & Barreto, 2005; Soares et al., 2006; Pereira & Silva, 2009; Pinho et al., 2009).

Parece que como os melioláceos não causam doenças em hospedeiros economicamente importantes, pouca atenção foi dada a este grupo. Claramente, mais de 90% destes fungos não produz nenhum efeito deletério à planta hospedeira (Hosagoudar

et al., 1997; Sabulal et al., 2006). No entanto, em alguns casos, a colonização do fungo causa lesão foliar (Hansford, 1961; Hosagoudar, 1996; Soares et al., 2006). Além disso, há outros que argumentam que estes fungos aumentam a temperatura foliar nas áreas colonizadas, aumentando a taxa de respiração e transpiração, reduzem a eficiência da fotossíntese e consequentemente ocasionam a redução de metabólitos primários como a clorofila total, açucares solúveis (açúcares redutores) e amido, aumentam o conteúdo de polifenóis, celulose e lignina nas folhas infectadas (Hosagoudar et al., 1997; Manojkumar et al., 2007). Sendo assim, tais efeitos devem ser considerados deletérios para a planta hospedeira.

O fato da família Meliolaceae abranger espécies de fungos biotróficos que infectam um grande número de plantas de diferentes famílias distribuídas em regiões tropicais e subtropicais e os estudos desse grupo fúngico ser geralmente negligenciado, objetivou-se neste trabalho contribuir para a ampliação do conhecimento sobre os melioláceos no Brasil pela realização de um levantamento de míldios negros associados a plantas ocorrendo em fragmentos florestais de Mata Atlântica selecionados no município de Viçosa, Minas Gerais.

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Biodiversity of the Meliolaceae fungi family from fragments of the Atlantic Forest of Minas Gerais, Brazil

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Abstract

Nine new species, four new varieties and five newly reported taxa belonging to the Meliolaceae were collected in a fragment of Atlantic forest from Minas Gerais, Brazil in association with native plants and are described and illustrated herein. The newly described species are: *Appendiculella eupatoriae*, *Asteridiella cecropiae*, *A. balfourodendrae*, *Irenopsis grandiflorae*, *Meliola cassiae-ferrugineae*, *M. mutisiae*, *M. peruiferae*, *Meliola sericeae* and *M. vernaliae*. Newly proposed varieties are: *Asteridiella pipericola* var. *vicosense*, *M. garugae* var. *protii*, *M. guareicola* var. *vicosense* and *M. paullinifolii* var. *rubiginosae*. The following taxa are reported in Brazil for the first time here: *Asteridiella cyclopoda*, *A.*

entebbeensis var. *codiaei*, *Meliola pazschkeana* var. *macropoda*, *M. psychotriae* var. *chiococcae* and *M. trichiliae*. Additionally, other species belonging to the Meliolaceae collected on hosts belonging to the Annonaceae, Apiaceae, Asteraceae, Burseraceae, Cecropiaceae, Euphorbiaceae, Leguminosae (Caesalpinioideae and Papilionoideae), Meliaceae, Piperaceae, Rubiaceae, Rutaceae, Sapindaceae and Tiliaceae in Brazil were also collected and are discussed.

Taxonomical novelties: *Appendiculella eupatoriae* M.Silva & O.L.Pereira; *Asteridiella balfourodendrae* D.B.Pinho & O.L.Pereira; *A. cecropiae* D.B. Pinho & O.L. Pereira; *A. pipericola* var. *vicosense* D.B.Pinho & O.L.Pereira; *Irenopsis grandiflorae* D.B.Pinho & O.L.Pereira; *Meliola cassiae-ferrugineae* D.B.Pinho & O.L.Pereira; *M. garugae* var. *protii* D.B.Pinho & O.L.Pereira; *M. guareicola* var. *vicosense* D.B.Pinho & O.L.Pereira; *M. mutisiae* A.L.Firmino, M.Silva & O.L.Pereira; *M. paullinifolii* var. *rubiginosae* D.B.Pinho & O.L.Pereira; *M. peruiferae* D.B.Pinho & O.L.Pereira; *M. sericeae* D.B.Pinho & O.L.Pereira; *M. vernaliae* D.B.Pinho & O.L.Pereira.

Key words: Ascomycetes, black mildew, Meliolales, taxonomy, tropical fungi.

Introduction

Brazil is known to have one of the largest biodiversities in the world. Although they are unprecise, existing estimates suggest that it harbours the Earth's richest flora, with at least 50.000 species or one-sixth of the world’s flora (Myers et al. 2000; Mittermeier et al. 2005). In addition, it is recognized that Brazil has two of the 34 hotspots (areas featuring exceptional concentrations of endemic species and experiencing exceptional loss of habitat) in the world

(Mittermeier et al. 2004). One among those hotspots, is the Atlantic forest. This complex biome contains species diversity higher than that of the Amazon forests, and is characterized by high levels of endemism. The original extent of primary Atlantic forest was reduced to *ca* 91.930 km², or 7.5 percent of its original extent. Despite the efforts to preserve what remains of this unique biome it continues to suffer from severe anthropogenic pressure, raising the fears of imminent massive loss of unique species (Myers et al. 2000). It is conjectured that the extent of destruction of this biome combined with the high number of endemic species have already led to extinction of many species even before they were even described by scientists (Morellato and Haddad 2000). Entire groups of organism such as the fungi have generally been poorly studied in the Atlantic forest and there is a general lack of knowledge of the mycobiota associated with whole families of plants (Soares and Barreto 2005; Rocha et al. 2008). The urgent need to survey the remaining areas, such as those in the state of Ceará, for fungi, before their imminent loss was emphasized by Freire and Braun (2009).

The Meliolaceae include a group of ca. 1980 specialized plant parasitic fungi causing normally benign diseases called black mildews (Kirk et al. 2008). They infect plant species belonging to numerous botanicals families and are widely distributed in the tropics and subtropics and are common in Brazil, although still generally poorly studied, inclusively in the Atlantic forest. Pioneering studies were made by Batista and co-workers (Batista et al. 1956; Batista and Maia 1957; Batista et al. 1960; Batista et al. 1962; Batista et al. 1963a; Batista et al. 1963b; Batista et al. 1966; Batista and Poroca 1967; Bezerra et al. 1969; Bezerra et al. 1970). During the last decades, relatively few papers have been published dealing with Meliolaceae from Brazil (Barreto and Evans 1995; Pereira and Barreto 2000; Mafia et al. 2004; Pereira and Barreto 2005; Pereira et al. 2006; Soares et al. 2006; Dutra et al. 2008; Pereira and Silva 2009; Pinho et al. 2009).

Members of the Meliolaceae are obligate ecto-parasites and produce black superficial colonies, branching hyphae bearing appressoria and conidiogenous cells (phialides), globose or flattened perithecia (which may be glabrous, setose or bear appendages), their asci are clavate and contain ascospores which are hyaline when within the ascus, becoming brown with age, are 3-4 septate and constricted at the septae (Hansford 1961; 1963; Hosagoudar 1996; Hosagoudar and Archana 2009).

The largest genus in the Meliolaceae is *Meliola* Fr. (ca. 1297 species) followed by *Asteridiella* McAlpine (ca. 300 spp.), *Appendiculella* Höhn. (ca. 250 spp.), *Irenopsis* F. Stevens (ca. 70 spp.) and *Amazonia* Theiss (ca. 29 spp) (Kirk et al. 2008). The genus *Meliola* is easily separated from *Asteridiella, Appendiculella* and *Irenopsis* for the presence of mycelial setae. In *Asteridiella* the perithecia are always glabrous whether in *Appendiculella* the perithecia bear larviform appendages and in *Irenopsis* they bear setae. Fungi in the genus *Amazonia* differ from all other Meliolaceae by having somewhat flattened perithecia which are covered by a radiate mycelial layer (Hansford 1961; 1963; Hosagoudar 1996).

Two hundred and seventy nine species of Meliolaceae have been reported from Brazil, namely: 162 species of *Meliola* and 32 infra specific taxa; followed by 53 species of *Asteridiella* and 3 infra specific taxa; 17 species of *Irenopsis* and 5 infra specific taxa; 4 species of *Appendiculella* and 3 species *Amazonia* colonizing 131 identified species as well as several species of unknown identity belonging to 77 families (Hansford 1961; Barreto and Evans 1995; Silva and Minter 1995; Pereira and Barreto 2000; Mafia et al. 2004; Pereira and Barreto 2005; Pereira et al. 2006; Soares et al. 2006; Dutra et al. 2008; Pereira and Silva 2009; Pinho et al. 2009).

As these fungi are weak pathogens on either cultivated or wild plants relatively little attention has been paid to the Meliolaceae by scientists (Hosagoudar et al. 1997; Sabulal et al. 2006). In few cases, such as in nurseries situations or for ornamentals attack by members of

the Meliolaceae can render plants unsightly and cause significant losses. For instance, half or more of seedlings colonized by black mildew in nurseries of *Aspidosperma polyneurum* Müll. Arg., *Duranta repens* L. var. *aurea* Hort. and *Schinus molle* L. are rejected for commercialization (Mafia et al. 2004; Pereira et al. 2006; Dutra et al. 2008).

As these fungi are strictly obligate biotrophs, they need to be associated with the living cells of their host plant for their growth and reproduction, and hence are usually host specific or have a very narrow host range (Hansford 1961; Hosagoudar 1996). The biotrophic nature of the Meliolaceae and the consequent host specificity are recognized as having a major significance in the species definition (Müller and Arx 1962). Fungi in the present work on Brazilian Meliolaceae includes fungi associated with the following botanicals families: Annonaceae, Asteraceae, Burseraceae, Cecropiaceae, Euphorbiaceae, Leguminosae (Caesalpinioideae and Papilionoideae), Meliaceae, Piperaceae, Rubiaceae, Rutaceae, Sapindaceae and Tiliaceae.

Material and Methods

A survey of the Meliolaceae occurring in a series of selected areas was performed. These areas are known as “Mata da Biologia”, “Mata da Dendrologia”, “Mata da Silvicultura”, “Reserva Florestal Mata do Paraíso” and “Mata do Seu Nico”, the first four located within the campus of the Universidade Federal de Viçosa and the latter in a private property (Fazenda Bonsucesso) at the vicinity of the campus. All areas are within the boundaries of the municipality of Viçosa, in the state of Minas Gerais, Brazil. These areas were chosen for bearing fragments of Atlantic forest and were repeatedly visited during 2008 and 2009. Samples of infected leaves, showing black mildew symptoms, were collected, photographed and dried in a plant press. Freshly collected samples were examined under a

stereomicroscope OLYMPUS SZ 40. Hand free sections containing the fungal structures and fungal structures scraped with a scalpel from the plant surfaces were mounted in lactophenol. Observations and measurements were carried out with a CARL ZEISS STANDARD W and photographs were taken on an OLYMPUS BX 51 light microscope fitted with a digital camera (EVOLT E330). Sizes of structures are based on 30 measurements for cells of the hypha, apressoria, conidiogenous cells, mycelial and perithecial setae, larviform appendages, perithecia and ascospores. The identification of the species within botanicals families Annonaceae, Asteraceae, Burseraceae, Cecropiaceae, Euphorbiaceae, Meliaceae, Piperaceae, Rubiaceae, Rutaceae, Sapindaceae and Tiliaceae was based sensu Cronquist (1981) and Leguminosae (Caesalpinioideae and Papilionoideae) sensu Polhil & Raven (1981). Representative specimens of the fungi examined were deposited in the herbarium at the Universidade Federal de Viçosa (Herbarium VIC).

Results

Taxonomic Descriptions

Black mildew on Annonaceae

Meliola sericeae D.B.Pinho & O.L.Pereira (To be proposed as new sp.).

(Fig. 1)

Etymology. in reference to the host species, *Xylopia sericea*

Colonies hypophyllous, black, scattered, 2.0-8.0 mm diameter. External mycelium hypophyllous, substraight to slightly undulate, composed of dark brown septate hyphae, cells mostly 22.5-50.0 x 6.0-8.5 μm, branching irregularly at wide angles, producing apressoria and conidiogenous cells. Apressoria alternate, straight or bent; stalk cells cylindrical or cuneate,

dark brown, 7.5-17.5 x 6.0-10.0 μm, head cells ovate, oblong, sometimes entire, often slightly sublobate, dark brown, 15.0-27.5 x 10.0-17.5 μm. Conidiogenous cells (phialides) mixed with apressoria, numerous, opposite or alternate, ampulliform or conoid, neck elongate, brown, 18.5-40.0 x 6.0-8.5 μm. Mycelial setae numerous, scattered and grouped around perithecia, straight, erect to slightly arcuate, simple, apex obtuse, dark brown, 210.0-780.0 x 7.0-12.5 μm. Perithecia black, scattered, globose, 150.0-320.0 μm diameter. Asci evanescent. Ascospores cylindric, oblong to subellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, middle cell large, dark brown, 42.5-67.5 x 16.0-27.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata da Silvicultura, on living leaves of *Xylopia sericea* A. St.-Hil., 13 May 2009, O. L. Pereira (VIC 31246).

Black mildew on Asteraceae

Appendiculella eupatoriae M.Silva & O.L.Pereira (To be proposed as new sp.).

(Fig. 2)

Etymology. in reference to the host genus, *Eupatorium*.

Colonies amphigenous, black, subdense, scattered, 1.0-5.0 mm diameter. External mycelium amphigenous, substraight or undulate, composed of dark brown septate hyphae, cells mostly 22.5-39.0 x 5.0-8.5 μm, branching in acute angles, opposite or unilateral, producing apressoria and conidiogenous cells. Apressoria alternate, antrorse, straight or curved; stalk cells cylindrical, slightly bent, dark brown, 7.5-12.5 x 7.5-10 μm, head cells ovate, irregular, straight to slightly curved, entire to sublobate, dark brown to reddish brown, 17.5-22.5 x 12.5-17.5 μm. Conidiogenous cells (phialides) mixed with apressoria, opposite or

unilateral, ampulliform, bent, brown, 17.5-20.0 x 7.5-8.5 μm. Perithecia numerous, black, scattered, globose, 182.0-243.0 μm diameter; with perithecial appendages. Perithecial appendages more than three per perithecium, larviform, light brown, transversely striate, uncinate in upper half, 107.5-157.5 x 25.0-52.5 μm. Asci evanescent. Ascospores cylindric to ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 45.0-50.0 x 15.0-20.0 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata do Paraíso, on living leaves of *Eupatorium gaudichaudianum* DC., 29 April 2008, O. L. Pereira (VIC 30707).

Asteridiella cyclopoda (F. Stevens) Hansf., Beihefte zur Sydowia 2:619. 1961

(Fig. 3)

Colonies epiphyllous, black, subdense, scattered, 1.0-3.0 mm diameter. External mycelium epiphyllous, substraight to undulate, composed of dark brown septate hyphae, cells mostly 17.5-41.0 x 5.0-7.5 μm, branching in acute angles, opposite or irregular, producing apressoria and conidiogenous cells. Apressoria alternate, antrorse, straight to curved; stalk cells cylindrical to cuneate, dark brown, 3.5–7.5 x 5.0–8.5 μm, head cells globose, ovate, cuneate or angulose, entire, dark brown, 10.0-15.0 x 8.5-12.5 μm. Conidiogenous cells (phialides) numerous, borne on separate mycelial branch, occasionally mixed with apressoria, alternate or opposite, ampulliform, brown, 12.5-20.0 x 6.0-8.5 μm. Perithecia black, scattered, globose, 137.5-235.0 μm diameter. Asci evanescent. Ascospores cylindric to ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, 32.5-42.5 x 11.0-17.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Reserva Florestal Mata do Paraíso, on living leaves of *Vernonia diffusa* Less., 25 May 2009, D. B. Pinho (VIC 31234).

Meliola mutisiae A.L.Firmino, M.Silva & O.L.Pereira (To be proposed as new sp.).

(Fig. 4)

Etymology. in reference to the host genus, *Mutisia*.

Colonies amphigenous, black, scattered, 1.0-3.0 mm diameter. External mycelium amphigenous, straight to substraight, composed of dark brown septate hyphae, cells mostly 15.0-34.0 x 6.0-8.5 μm, branching at acute angles, opposite, producing apressoria and few conidiogenous cells. Apressoria opposite, antrorse; stalk cells cuneate to cylindrical, dark brown, 5.0-7.5 x 2.5-10.0 μm; head cells oblong or ovate, entire, dark brown, 7.5-14.5 x 7.5-12.5 μm. Conidiogenous cells (phialides) mixed with apressoria, opposite, ampulliform, brown, 12.5-18.5 x 6.0-9.5 μm. Mycelial setae scattered to crowded, numerous, verrucose, straight to slightly curved, 3-4 septate, 2-4 times dichotomously branched at the apex, brown, 120.0-160.0 x 8.5-12.5 μm. Perithecia black, scattered, globose, 95.0-225.0 μm diameter. Asci evanescent. Ascospores cylindric to ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 27.5-46.0 x 12.5-20.0 μm.

Material examined: BRAZIL, Minas Gerais Viçosa, Mata do Paraíso, on living leaves of *Mutisia speciosa* Aiton ex Hook., 12 May 2008, O. L. Pereira(VIC 30708).

Black mildew on Burseraceae

Meliola garugae Stev. & Rold var. *protii* D.B.Pinho & O.L.Pereira (To be proposed as new var.)

(Fig. 5)

Etymology. in reference to the host genus, *Protium.*

Colonies hypophyllous, black, dense, scattered, 4.0-11.0 mm diameter. External mycelium hypophyllous, substraight, composed of dark brown septate hyphae, cells mostly 20.0-60.0 x 5.0-7.5 μm, branching at acute angles, opposite, producing apressoria and conidiogenous cells. Apressoria alternate, antrorse, sometimes retrorse; straight or bent, stalk cells cylindrical, dark brown, 2.0-6.0 x 5.0-7.0 μm, head cells oblong, cylindric, straight or bent, entire, sometimes irregular, slightly rounded or truncate at apex, dark brown, 11.0-18.0 x 6.0-9.0 μm. Conidiogenous cells (phialides) mixed with apressoria, numerous, opposite or alternate, conoid to ampulliform, brown, 17.5-28.5 x 5.0-8.5 μm. Mycelial setae scattered, straight, 2-8 septate, simple or often with apex 2-5 dentate, dark brown, 248.0-546.5 x 7.5-10.0 μm. Perithecia black, scattered, globose, 111.0-324.0 μm diameter. Asci evanescent. Ascospores cylindric, oblong to subellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 33.5-44.0 x 10.0-19.0 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata do Seu Nico, on living leaves of *Protium warmingianum* March., 30 April 2009, D. B. Pinho (VIC 31238). BRAZIL, Minas Gerais Viçosa, Mata do Paraíso, on living leaves of *P. warmingianum*, 16 March 2009, D. B. Pinho (VIC 31224). BRAZIL, Minas Gerais Viçosa, Mata da Biologia, on living leaves of *P. warmingianum*, 13 April 2009, D. B. Pinho (VIC 31225).

Black mildew on Cecropiaceae

Asteridiella cecropiae D.B. Pinho & O.L. Pereira (To be proposed as new sp.)

(Fig. 6)

Etymology. in reference to the host genus, *Cecropia.*

Colonies epiphyllous, black, very thin, scattered, 1.0-3.0 mm diameter. External mycelium epiphyllous, straight, substraight to slighthy undulate, composed of dark brown septate hyphae, cells mostly 20.0-45.0 x 7.5-11.0 μm, branching usually at acute angles, opposite, producing apressoria and conidiogenous cells. Apressoria alternate, antrorse, straight to curved; stalk cells cylindrical to cuneate, dark brown, 7.5-15.0 x 7.5-10.0 μm, head cells globose, ovate or cuneate, entire, dark brown to reddish brown, 12.5-18.5 x 12.5-17.5 μm. Conidiogenous cells (phialides) numerous, borne on a separate mycelia branch, opposite, occasionally mixed with apressoria, ampulliform, brown, 17.5-32.5 x 7.5-12.5 μm. Perithecia black, scattered, globose, 110.0-240.0 μm diameter. Asci evanescent. Ascospores cylindric to ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, sometimess 2 septate, constricted at the septa, dark brown, 32.5-42.5 x 13.5-17.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata do Seu Nico, on living leaves of *Cecropia hololeuca* Miq., 18 May 2009, D. B. Pinho (VIC 31247).

Black mildew on Euphorbiaceae

Asteridiella entebbeensis (Hansf. & F. Stevens) Hansf. var. *codiaei* Hansf., Beihefte zur Sydowia 2:210-211. 1961

(Fig. 7)

Colonies amphigenous, black, subdense, scattered, 1.0-2.0 mm diameter. External mycelium amphigenous, substraight to slightly undulate, composed of dark brown septate hyphae, cells mostly 18.5-35.0 x 6.0-8.5 μm, branching usually in wide angles, opposite,

producing apressoria and conidiogenous cells. Apressoria alternate, unilateral, antrorse, straight or bent; stalk cells cylindrical to cuneate, dark brown, 7.5-13.5 x 7.5-10.0 μm, head cells straight or bent, versiform, irregularly and deeply 2-4 lobate, dark brown to reddish brown, 16.0-20.0 x 12.5-25.0 μm. Conidiogenous cells (phialides) scattered, unilateral mostly borne opposite on separate mycelial branch, ampulliform, brown, 15.0-23.5 x 6.0-10.0 μm. Perithecia black, scattered, globose, surface obtusely conoid, 151.5-324.0 μm diameter. Asci evanescent. Ascospores oblong to subellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 40.0-57.5 x 15.0-22.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata da Silvicultura, on living leaves of *Mabea fistulifera* Mart., 11 May 2009, O. L. Pereira (VIC 31245).

Black mildew on Leguminosae

Meliola ferrugineae D.B.Pinho & O.L.Pereira (To be proposed as new sp.)

(Fig. 8)

Etymology. in reference to the host species, *Cassia ferruginea*

Colonies epiphyllous, black, subdense, scattered, 1.0-5.0 mm diameter. External mycelium epiphyllous, straight to substraight, composed of dark brown septate hyphae, cells mostly 15.0-48.0 x 7.5-12.5 μm, branching in acute angles, opposite, producing apressoria and conidiogenous cells. Apressoria alternate, antrorse or bent; stalk cells cylindrical to cuneate, dark brown, 7.5-17.5 x 7.5-10.0 μm, head cells ovate, clavate, bent, entire or irregularly rounded-angulose, dark brown to reddish brown, 15.0-25.0 x 12.5-17.5 μm. Conidiogenous cells (phialides) occasionally mixed with apressoria, but mostly borne on a

separate mycelial branch, opposite, ampulliform, brown, 17.5-32.5 x 7.5-11.0 μm. Mycelial setae scattered, straight, apex obtuse, 3-7 septate, simple, dark brown, 126.5-278.5 x 8.5-12.5 μm. Perithecia black, scattered, globose, 162.0-293.5 μm diameter. Asci evanescent. Ascospores cylindrical or ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 38.5-48.5 x 14.5-20.0 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata da Dendrologia, on living leaves of *Cassia ferruginea* (SCHRADER) Schrader ex DC., 2 September 2009, D. B. Pinho (VIC 31228).

Meliola pazschkeana Gaillard var. *macropoda* Hansf., Beihefte zur Sydowia 2:249. 1961

(Fig. 9)

Colonies amphigenous, mostly epiphyllous, confluent, dense, black, scattered, 1.0-5.0 mm diameter. External mycelium amphigenous, straight to substraight, composed of dark brown septate hyphae, cells mostly 27.5-47.5 x 6.0-8.5 μm, branching at wide angles, opposite, producing apressoria and conidiogenous cells. Apressoria alternate or unilateral, straight, antrorse or bent; stalk cells cylindrical to cuneate, dark brown, 7.5-16.0 x 7.5-11.0 μm, head cells oblong-clavate, ovate, often bent, entire or irregularly sublobate, dark brown to reddish brown, 16.0-22.5 x 13.5-18.5 μm. Conidiogenous cells (phialides) mixed with apressoria, opposite or alternate, ampulliform, brown, 15.0-27.5 x 7.5-11.0 μm. Mycelial setae scattered and grouped around perithecia, widely uncinate in upper half, attenuate at apex, 3-7 septate, simple, dark brown, 142.0-253.0 x 7.5-10.0 μm. Perithecia black, scattered, globose, 167.0-253.0 μm diameter. Asci evanescent. Ascospores oblong or subellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 40.0-52.5 x 12.5-18.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata do Paraíso, on living leaves of *Senna macranthera* (DC. ex Collad.) H.S. Irwin & Barneby, 11 May 2009, D. B. Pinho (VIC 31241).

Meliola peruiferae D.B.Pinho & O.L.Pereira (To be proposed as new sp.)

(Fig. 10)

Etymology. in reference to the host species, *Myroxylon peruiferum*

Colonies amphigenous, mostly epiphyllous, confluent, black, dense, scattered, 1.0-3.0 mm diameter. External mycelium amphigenous, straight, composed of dark brown septate hyphae, cells mostly 15.0-32.5 x 6.0-9.0 μm, branching in wide angles, opposite, producing apressoria and conidiogenous cells. Apressoria opposite, antrorse or slightly bent; stalk cells cylindrical, dark brown, 2.5-5.0 x 5.0-7.5 μm, head cells cylindrical, ovate or cuneate, entire, dark brown, 9.5-12.5 x 5.0-6.0 μm. Conidiogenous cells (phialides) mixed with apressoria, opposite, alternate, ampulliform, brown, 12.5-22.5 x 6.0-10.0 μm. Mycelial setae scattered, substraight to slightly arched, apex obtuse, 3-7 septate, simple, dark brown, 182.0-314.0 x 7.5-10.5 μm. Perithecia black, scattered, globose, 192.0-278.5 μm diameter. Asci evanescent. Ascospores oblong or ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 37.5-50.0 x 14.0-19.0 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata da Dendrologia, on living leaves of *Myroxylon peruiferum* L. f., 2 September 2009, D. B. Pinho (VIC 31249).

Black mildew on Meliaceae

Meliola guareicola F. Stevens var. *vicosense* D.B.Pinho & O.L.Pereira (To be proposed as new var.)

(Fig. 11)

Etymology. in reference to Viçosa, the type locality.

Colonies amphigenous, mostly hypophyllous, confluent, black, dense, scattered, 2.0-8.0 mm diameter. External mycelium amphigenous, substraight to undulate, composed of dark brown septate hyphae, cells mostly 15.0-52.5 x 3.5-9.0 μm, branching at wide angles, opposite or irregular, producing apressoria and conidiogenous cells. Apressoria alternate or unilateral, subantrorse, straight or bent; stalk cells cylindrical to cuneate, dark brown, 2.5-10.0 x 2.5-7.5 μm, head cells globose, ovate or wide pyriform, entire, dark brown, 7.5-16.0 x 7.0-14.0 μm. Conidiogenous cells (phialides) mixed with apressoria, alternate or opposite, ampulliform, brown, 13.0-26.0 x 5.0-12.5 μm. Mycelial setae numerous, scattered and grouped around perithecia, erect to slightly arched, straight or slightly crenate, 3-7 septate, simple, apex acute or obtuse, dark brown, 125.0-324.0 x 4.5-9.5 μm. Perithecia black, scattered, globose, 125.0-245.0 μm diameter. Asci evanescent. Ascospores ellipsoid or oblong, end cells often pointed at apex, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 30.0-47.0 x 10.0-17.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata da Biologia, on living leaves of *Guarea kunthiana* A. Juss., 20 April 2009, D. B. Pinho (VIC 31226). BRAZIL, Minas Gerais Viçosa, Mata do Paraíso, on living leaves of *Guarea kunthiana*, 5 May 2009, D. B. Pinho (VIC 31243). BRAZIL, Minas Gerais Viçosa, Mata da Silvicultura, on living leaves of *Guarea guidonia* (L.) Sleumer, 23 April 2009, D. B. Pinho (VIC 31235). BRAZIL, Minas

Gerais Viçosa, Mata da Biologia, on living leaves of *Trichilia pallida* Sw., 20 April 2009, D. B. Pinho (VIC 31229). BRAZIL, Minas Gerais Viçosa, Mata do Paraíso, on living leaves of *Trichilia pallida*, 4 May 2009, D. B. Pinho (VIC 31237).

Meliola trichiliae Beeli, Beihefte zur Sydowia 2:412. 1961

(Fig. 12)

Colonies hypophyllous, confluent, black, dense, scattered, up to 2.0-9.0 mm diameter. External mycelium hypophyllous, substraight to undulate, composed of dark brown septate hyphae, cells mostly 15.0-35.0 x 5.0-7.5 μm, branching at wide angles, opposite, producing apressoria and conidiogenous cells. Apressoria alternate or opposite, antrorse, straight or bent; stalk cells cylindrical to cuneate, dark brown, 3.0-8.0 x 4.0-9.0 μm, head cells subglobose, cylindric or clavulate, entire, dark brown, sometimes reddish brown, 8.0-14.0 x 6.0-13.0 μm. Conidiogenous cells (phialides) mixed with apressoria, alternate or opposite, ampulliform, brown, 17.0-36.0 x 6.0-9.0 μm. Mycelial setae scattered, straight, 5-12 septate, simple, apex acute, dark brown, 324.0-597.5 x 6.0-8.5 μm. Perithecia black, scattered, globose, 115.0-297.5 μm diameter. Asci evanescent. Ascospores ellipsoid or oblong, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, the middle cell largest, dark brown, 42.0-55.0 x 15.0-20.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata da Biologia, on living leaves of *Trichilia lepidota* Mart., 20 April 2009, D. B. Pinho (VIC 31227). BRAZIL, Minas Gerais, Viçosa, Mata do Paraíso, on living leaves of *Trichilia lepidota*, 16 March 2009, D. B. Pinho (VIC 31223).

Black mildew on Piperaceae

Asteridiella pipericola Hansf. var. *vicosense* D.B.Pinho & O.L.Pereira (To be proposed as new var.)

(Fig. 13)

Etymology. in reference to Viçosa, type locatity.

Colonies minute, amphigenous, mostly epiphyllous, confluent, black, scattered, 1.0-3.0 mm diameter. External mycelium mostly epiphyllous, substraight to slightly tortuous, composed of dark brown septate hyphae, cells mostly 17.5-37.5 x 5.0-7.5 μm, branching in acute angles, alternate or unilateral, producing apressoria and conidiogenous cells. Apressoria alternate, sometimes unilateral, antrorse, straight or bent, stalk cells cuneate to cylindric, dark brown, 7.5–17.5 x 5.0–10.0 μm, head cells cuneate or ovate, entire, dark brown, 13.5–20.0 x 10.0–15.0 μm. Conidiogenous cells (phialides) mixed with apressoria, opposite, ampulliform, brown, 12.5–27.5 x 5.0–10.0 μm. Perithecia black, globose, 150.0–337.5.0 μm diameter. Asci evanescent. Ascospores oblong or ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 37.5–53.5 x 12.5–20.0 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Reserva Florestal Mata do Paraíso, on living leaves of *Piper gaudichaudianum* Kunth, 11 May 2009, D. B. Pinho (VIC 31242).

Black mildew on Rubiaceae

Meliola psychotriae Earle var. *chiococcae* Hansf., Beihefte zur Sydowia 2:606-607. 1961

(Fig. 14)

Colonies amphigenous, confluent, black, thin, scattered, 1.0-3.0 mm diameter. External mycelium amphigenous, substraight to slightly undulate, composed of dark brown septate hyphae, cells mostly 15.0-32.5 x 6.0-10.0 μm, branching in acute angles, opposite, producing apressoria and conidiogenous cells. Apressoria alternate, sometimes unilateral, antrorse or curved; stalk cells cuneate, dark brown, 6.0-12.5 x 6.0-8.5 μm, head cells ovate, rounded to slightly pointed at apex, entire, dark brown, 12.5-22.5 x 8.5-12.5 μm. Conidiogenous cells (phialides) unilateral, opposite or alternate, mostly borne on a separate mycelia branch, ampulliform, brown, 12.5-20.0 x 6.0-8.5 μm. Mycelial setae scattered, straight, apex acute, 4-10 septate, simple, dark brown, 187.0-466.0 x 6.0-10.0 μm. Perithecia black, scattered, globose, 130.0-175.0 μm diameter. Asci evanescent. Ascospores oblong to ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 28.5-40.0 x 10.0-17.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata do Paraíso, on living leaves of *Chiococca alba* (L.) Hitchc., 4 May 2009, D. B. Pinho (VIC 31236).

Black mildew on Rutaceae

Asteridiella balfourodendrae D.B.Pinho & O.L.Pereira (To be proposed as new sp.)

(Fig. 15)

Colonies amphigenous, mostly epiphyllous, confluent, black, scattered, 1.0-3.0 mm diameter. External mycelium amphigenous, straight to substraight, composed of dark brown septate hyphae, cells mostly 12.5-25.0 x 7.5-12.5 μm, branching in acute angles, opposite, producing apressoria and conidiogenous cells. Apressoria alternate, antrorse, straight or bent; stalk cells cuneate to cylindrical, dark brown, 2.5-10.0 x 6.0-9.0 μm, head cells clavate,

rounded and entire at apex, mostly shallowly rounded-angulose or irregularly, dark brown to reddish brown, 14.0-20.0 x 10.0-15.0 μm. Conidiogenous cells (phialides) mixed with apressoria or borne on a separate mycelia branch, alternate or opposite, ampulliform, neck elongate, brown, 15.0-27.5 x 7.0-12.5 μm. Perithecia black, scattered, globose, 162.0-233.0 μm diameter. Asci evanescent. Ascospores ellipsoid or oblong, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 42.5-49.0 x 14.0-27.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata da Dendrologia, on living leaves of *Balfourodendron riedelianum* (Engl.) Engl., 16 September 2009, D. B. Pinho (VIC 31239).

Black mildew on Sapindaceae

Meliola paullinifolii Bat. var. *rubiginosae* D.B.Pinho & O.L.Pereira (To be proposed as new var.)

(Fig. 16)

Etymology. in reference to the host species, *Paullinia rubiginosa*

Colonies amphigenous, confluent, black, subdense, scattered, 1.0-4.0 mm diameter. External mycelium amphigenous, straight to substraight, composed of dark brown septate hyphae, cells mostly 22.5-42.5 x 7.5-10.0 μm, branching in acute angles, opposite, producing apressoria and conidiogenous cells. Apressoria opposite, unilateral, straight, antrorse or curved, sometimes retrorse; stalk cells cylindrical to cuneate, dark brown, 3.5-10.0 x 6.0-10.0 μm, head cells ovate, entire or irregularly rounded-angulose, dark brown, 11.0-20.0 x 10.0-17.5 μm. Conidiogenous cells (phialides) mixed with apressoria, opposite or alternate, ampulliform, brown, 17.5-27.5 x 7.5-10.0 μm. Mycelial setae scattered and grouped around

perithecia, straight to flexuous, apex acute, 4-7 septate, simple, dark brown, 172.0-334.0 x 6.0-8.5 μm. Perithecia black, scattered, globose, 192.5-275.0 μm diameter. Asci evanescent. Ascospores cylindrical or ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 36.0-45.0 x 13.5-18.5 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata da Dendrologia, on living leaves of *Paullinia rubiginosa* Cambess., 21 May 2009, D. B. Pinho (VIC 31248).

Meliola vernaliae D.B.Pinho & O.L.Pereira (To be proposed as new sp.)

(Fig. 17)

Etymology. in reference to the host species, *Cupania vernalis*

Colonies hypophyllous, confluent, black, dense, scattered, 1.0-12.0 mm diameter. External mycelium hypophyllous, substraight to slightly undulate, composed of dark brown septate hyphae, cells mostly 17.5-50.0 x 5.0-6.0 μm, branching alternate, opposite to irregular at acute to wide angles, producing apressoria and conidiogenous cells. Apressoria alternate, unilateral, antrorse or straight; stalk cells cylindrical, dark brown, 3.5-7.5 x 4.5-7.5 μm, head cells ovate to ellipsoid, entire, dark brown, 7.5-12.5 x 5.5-7.5 μm. Conidiogenous cells (phialides) mixed with apressoria, opposite or alternate, ampulliform with elongated neck, brown, 12.5-35.0 x 5.0-8.5 μm. Mycelial setae scattered, straight to flexuous, 3-7 septate, simple, apex acute simple or 2-3 dentate, dark brown, 214.5-310.0 x 6.0-7.5 μm. Perithecia black, scattered, globose, 192.5-275.0 μm diameter. Asci evanescent. Ascospores oblong to ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 28.0-52.5 x 10.0-17.0 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais Viçosa, Mata do Paraíso, on living leaves of *Cupania vernalis* Cambess., 5 May 2009, D. B. Pinho (VIC 31240).

Black mildew on Tiliaceae

Irenopsis grandiflorae D.B.Pinho & O.L.Pereira (To be proposed as new sp.)

(Fig. 18)

Etymology. in reference to the host species, *Luehea grandiflora*

Colonies epiphyllous, black, scattered, 1.0-2.0 mm diameter. External mycelium epiphyllous, substraight to tortuous, composed of dark brown septate hyphae, cells mostly 15.0-52.5 x 5.0-6.0 μm, branching in acute angles, usually opposite, producing apressoria and conidiogenous cells. Apressoria alternate, unilateral, antrorse or straight; stalk cells cylindrical to cuneate, dark brown, 3.5-11.0 x 5.0-7.5 μm, head cells ovate or cuneate, entire, dark brown, 10.0-15.0 x 6.0-13.5 μm. Conidiogenous cells (phialides) mixed with apressoria, ampulliform, brown, 12.5-21.0 x 5.0-7.5 μm. Perithecia setose, black, scattered, globose, 152.0-247.0 μm diameter. Perithecial setae 2-13, erect-spreading, simple, apex obtuse, straight to substraight, 0-2 septate, dark brown, 62.5-146.0 x 3.5-5.0. Asci evanescent. Ascospores cylindric to ellipsoid, hyaline inside the ascus, becoming brown with age, rounded at the tips, 4-septate, constricted at the septa, dark brown, 27.5-37.5 x 10.0-15.0 μm.

Known distribution: Minas Gerais (Brazil).

Material examined: BRAZIL, Minas Gerais, Viçosa, Mata da Biologia, on living leaves of *Luehea grandiflora* Mart., 20 April 2009, D. B. Pinho (VIC 31231). BRAZIL, Minas Gerais, Viçosa, Mata da Silvicultura, on living leaves of *Luehea grandiflora*, 23 April 2009, D. B. Pinho (VIC 31233).

Discussion

Black mildew on Annonaceae

Twenty-five species and five infra specific taxa of Meliolaceae are known in association with members of the family Annonaceae. The only species reported in Brazil are *Meliola ramicola* Hansf. associated with *Guatteria candolleana* Schltdl. and *M. xylopiae* F. Stevens associated with *Xylopia* sp. (Hansford 1961; Silva and Minter 1995).

Among twenty-two species and five varieties of *Meliola* described in association with plants in this family, only *M. golaensis* Deighton, *M. kuprensis* Deighton, *M. xylopiae* F. Stevens and *M. xylopiae* var. *leonensis* Hansf. were reported in association with *Xylopia* L. (Hansford 1961; Silva and Minter 1995; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009). *Meliola sericea*, the species described in this work differs from all the others by having hypophyllous colonies, longer apressorial stalk cells and hyphal cells, having apressorial head cells that are slightly lobate, mycelial setae grouped around perithecia are erect to slightly arcuate and as corpus having a larger middle cell as well as other biometrics features of the ascospores (Table 1).

Black mildew on Asteraceae

Sixteen specific and three infraspecific taxa belonging to the Meliolaceae are known in association with members of the family Asteraceae (Hansford 1961; Barreto and Evans 1995; Silva and Minter 1995; Hosagoudar 1996; Hosagoudar and Archana 2009). The following species have been reported from Brazil on this host-family: *Appendiculella sororcula* (Speg.) Hansf. associated with *Baccharis pingraea* DC., *Mikania micrantha* Kunth and an

indeterminate Asteraceae, *Asteridiella abnormis* (Theiss.) Hansf. associated with *Baccharis* L., *Irenopsis piptocarphae* Hansf. associated with *Piptocarpha axillaris* (Less.) Baker, *Meliola spegazziniana* G. Winter associated with *Moquinia polymorpha* (Less.) DC. and an indeterminate Asteraceae (Hansford 1961; Barreto and Evans 1995; Silva and Minter 1995).

Three Meliolaceae species have been collected on Asteraceae during this survey.

Only, two species of *Appendiculella* have been described having a member of the *Asteraceae* as hosts: *A. sororcula* and *A. vernoniae.* Only *A. sororcula* has been reported on *Eupatorium* (Hansford 1961; Hosagoudar 1996; Farr and Rossman 2009; Hosagoudar and Archana 2009). The newly proposed species *A. eupatoriae* clearly differs from these other *Appendiculella* in having longer (45-50 µm) and wider (15-20 µm) ascospores and longer (107.5-157.5 µm) and wider (25.0-52.5 µm) perithecial appendages.

The known species of *Asteridiella* reported on Asteraceae are: *A. abnormis* (Theiss.) Hansf., *A. negeri* (Hansf.) Hansf., *A. tomentosa* (G. Winter), *A. cyclopoda* (F. Stevens) Hansf. and *A. cyclopoda* var. *vernoniae* Hosag., C.K. Biju & T.K. Abraham (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Farr and Rossman 2009; Hosagoudar and Archana 2009) but the only that has been reported on *Vernonia* is an variety *A. cyclopoda* (on *V. monosis* Sch. Bip. in India). The fungus collected in this study on *V. diffusa* matched well with the description of *A. cyclopoda* and *V. diffusa* is hence recognized here as a new host for this fungus which is further confirmed as having a wide host-range within the Asteraceae encompassing, additionally to this new record: *Aspilia helianthoides* (Schumach. & Thonn.) Oliv. & Hiern in Guinea; *Aspilia latifolia* A. Chev. in Sierra Leone and Ghana; *Bidens squarrosa* Kunth in Venezuela; *Elephantopus mollis* Kunth in Venezuela; *Elephantopus* sp. in British Guyana; *Melanthera brownii* (DC.) Sch. Bip. in Ghana and Sierra Leone; *Microglossa afzelii* O. Hoffm. in Sierra Leone and Uganda; *Microglossa volubilis* DC. in Sierra Leone, Ghana and Uganda; *Mikania scandens* (L.) Willd. in Uganda; *Pseudelephantopus spicatus*

(B. Juss. ex Aubl.) C.F. Baker in Porto Rico, Virgin Islands and West Indies; *Vernonia* sp. in Uganda and *Wedelia oblonga* (Baker) B.L. Turner in Uganda (Hansford 1961; Farr and Rossman 2009).

Seven *Meliola* species were previously reported on *Asteraceae*, namely: *M. mikaniae* Gaill. *M. spegazziniana* Wint, *M. oleariae* Hansf., *M. angustispora* Stev., *M. elephantopi* Hansf., *M. gymnoloniae* Toro and *M. coreopsidis* Thite & Kulkarni. None of these has been reported on *Mutisia* spp. (Hansford 1961; Hosagoudar 1996; Farr and Rossman 2009; Hosagoudar and Archana 2009). The newly proposed species, *M. mutisiae* differs from the all other species for having longer (27.5-46.25 µm) and wider (12.5-20 µm) ascospores and mycelial setae which are 2-4 times dichotomously branched.

Black mildew on Burseraceae

Six species of Meliolaceae are known in members of the family Burseraceae. The taxa reported in Brazil are *Asteridiella protiicola* (Bat. & Gayão) Hansf. associated with *Protium heptaphyllum* (Aubl.) Marchand, *Meliola protii* F. Stevens associated with *P. heptaphyllum* (Aubl.) Marchand, *M. protii* var. *minor* Bat. & Peres associated with *Protium* sp. and *Meliola pycnostachidis* Hansf. associated with *P. heptaphyllum* var. *brasiliense* Engl. In total, five species and two variety of *Meliola* are known in association with members of the family Burseraceae worldwide (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009). The species of *Meliola* found on leaves of *Protium warmingianum* was found to have a morphology that was very close to that of *M. garugae*, but differing from it by having substraight hyphae, apressorial head cells that are oblong, cylindric, straight or bent, entire, sometimes irregular, slightly rounded or truncate at apex and ascospores width of 10.0-19.0 µm. Hence, the introduction of a new variety is justifiable.

Black mildew on Cecropiaceae

Two species and two varieties are known in members of the family Cecropiaceae. The taxa reported in Brazil are *Asteridiella cecropiicola* (Hansf.) Hansf. associated with *Cecropia* sp. and *Appendiculella echinus* (Henn.) Höhn. associated with *Coussapoa* sp. and *C. glaziovi* Snethl (Hansford 1961; Pereira and Silva 2009).

Only one species of *Asteridiella*, namely *A. cecropiicola*, is known to occur associated to a member of the Cecropiaceae. This species is clearly distinct from that collected during this study. *A. cecropiicola* has substraight hyphae, head cells which are subglobose to widely pyriform, more or less crenulate to angulose and not entire, longer (38.0-45.0 µm) and wider (17.0-19.0 µm) ascospores as compared with the specimen collected in Viçosa. A new species was hence proposed to accommodate this fungus.

Black mildew on Euphorbiaceae

Ninety-seven species and 11 infra specific taxa of Meliolaceae are known in members of the Euphorbiaceae. The species reported in Brazil are *Asteridiella acalyphae* (Rehm) Hansf., *A. alchorneae-incurvae* Hansf., *Appendiculella cornu-caprae* (Henn.) Höhn., *A. sapii* (Hansf.) Hansf., *Irenopsis paulensis* Hansf., *Meliola janeirensis* Hansf., *M. heveae* Vincens, *M. longispora* (Gaillard) F. Stevens, *M. manihoticola* Henn., *M. papillosae* Bat. & H. Maia, *M. perae* Hansf. and *M. tetrorchidiicola* Hansf. (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009).

Asteridiella entebbeensis var. *cordiaei* is newly reported here on leaves of *Mabea fistulifera*.

No fungus in *Asteridiella* has been previously reported on the genus *Mabea* in Brazil or elsewhere (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Farr and Rossman 2009; Hosagoudar and Archana 2009). This fungal taxon was previously recorded only from *Codiaeum variegatum* (L.) Rumph. ex A. Juss. in Papua New Guinea (Hansford 1961; Farr and Rossman 2009). This is therefore both the first report of *A. entebbeensis* var. *codiaei* on this host and in Brazil.

Black mildew on Leguminosae

One hundred and sixty-two species and 38 infra specific taxa of Meliolaceae are known to have hosts in members of the Leguminosae associated to 36 species and 11 varieties in the subfamily Caesalpinioideae, 85 species and 23 varieties in the subfamily Faboideae, 37 species and 4 varieties in the subfamily Mimosoideae and four species in indeterminate Leguminosae (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009). The species of Meliolaceae reported in Brazil are *Asteridiella cassiaecola* (Batista & Silva) Hansf., *A. hymenaeicola* (Gonz. Frag. & Cif.) Hansf., *Irenopsis chamaecristicola* (F. Stevens) F. Stevens, *I. coronata* (Speg.) F. Stevens, *I. toruloidea* (F. Stevens) F. Stevens, *Meliola andina* Gaillard, *M. cassiifolii* Bat., *M. hexaseptata* Bat. & R. Garnier, *M. hoffmannseggiana* Hansf., *M. melanochylae* Hansf., *M. pazschkeana* Gaillard, *M. schizolobii* Syd. & P. Syd., *M. subtortuosa* Rehm, *M. theissenii* Hansf. and *M. toddaliicola* var. *indica* Hansf. & Thirum. associated with plant species of the subfamily Caesalpinioideae, *M. bicornis* G. Winter, *M. constipata* (Speg.) Speg., *M. denticulata* G. Winter, *M. dipterygicola* Bat. & H. Maia, *M. franciscana* Hansf., *M. juruana* Henn., *M. microspora* Pat. & Gaillard, *M. scabriseta* var. *brasiliensis* Hansf., *M. stizolobii* var. *brasiliensis* Hansf., *M. stizolobii* var. *microspora* Bat. & Peres, *M. vignae-gracilis* Hansf. & Deighton associated with plant species

of the subfamily Faboideae, *I. bergrenii* var. *quadriseptat*a Bat. & R. Garnier, *M. acaciarum* Speg., *M. koae* F. Stevens, *M. mimosacearum* Hansf., *M. pithecelobii* var. *uncinata* J.L. Bezerra & Gadêlha associated with plant species of the subfamily Mimosoideae, *Amazonia leguminosarum* Bat., M.P. Herrera & J.L. Bezerra, *M. franciscana* Hansf., *M. robinsonii* Syd. and *M. schizolobii* var. *bauhiniae* associated with an indeterminate Leguminosae.

Two new species of *Meliola* on *Cassia ferruginea* and *Myroxylon peruiferum* are newly described in this publication and *M. pazschkeana* var. *macropoda* is newly reported on *Senna macranthera*.

The species *Meliola aethiops* Sacc., *M. cubitella* (F. Stevens & Tehon) Cif. ex Hansf., *M. aethiops* var. *cassiae* P.N. Rao, *M. aethiops* var. *keralica* Hosag., *M. aethiops* var. *minor* Hansf. & Deighton, *M. cassiae-fistulae* Hosag. & Manojk., *M. gliricidiae* var. *pinetori* Cif., *M. hoffmannseggiana* Hansf. and *M. surattensis* Hosag., T.K. Abraham & J.L. Crane have all been previously reported in association with species of *Cassia*, but the fungus found on *Cassia ferruginea* during this study was dissimilar from these and closer to *M. caesalpiniicola* Deighton and *M. gleditschiae* Speg. Nevertheless the new species associated with *C. ferruginea* clearly differs from these other *Meliola* in having straight to substraight hyphae, larger stalk cells (7.5-17.5 μm), versiform, ovate, clavate, bent, entire or irregularly rounded-angulose apressorial head cells and straight mycelial setae.

No species of Meliolaceae have ever been reported on plants belonging to the genus *Senna* (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009). However, the microscopic observations of the fungus in *Senna macranthera* (DC. ex Collad.) H.S. Irwin & Barneby matched well the description of *Meliola pazschkeana* Gaillard var. *macropoda* Hansf., a taxon previously reported only from *Bauhinia* sp. in Honduras (Hansford 1961; Farr and Rossman 2009). This is therefore the first reported of *M. pazschkeana* var. *macropoda* on this host-genus and the first report of this fungus in Brazil.

Eighty-one species and 22 varieties of *Meliola* are known to have hosts in the subfamily Faboideae (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009). However, no species of Meliolaceae has been reported in *Myroxylon*. The taxa that are closer to the specimen collected from Viçosa are: *M. andirae* Earle, *M. pictetiae* Hansf. and *M. pterocarpicola* Hansf. & Deighton, but the fungus from Viçosa differs from them all by having straight hyphae, opposite apressoria and apressorial head cells which are cylindrical, ovate or cuneate.

Black mildew on Meliaceae

Fifty-eight species and seven infra specific taxa of Meliolaceae are known to be associated to members of the Meliaceae. The species reported in Brazil are *M. platysperma* Theiss. and *M. guareina* Hansf. associated with *Guarea* sp., *M. rickii* Hansf. associated with an indeterminate Meliaceae and *M. trifurcata* Cif. associated with *Carapa* sp. (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009). This publication includes the description of a new variety of *Meliola guareicola* on *Guarea kunthiana, G. guidonia, Trichilia pallida* and the new record of *M. trichiliae* on *T. lepidota.*

Forty-eight species and six varieties of *Meliola* are known in association with members of the family Meliaceae. Of particular relevance for this work are the following taxa: *M. atro-velutina* Speg., *M. chorleyi* Hansf., *M. heyneae* Hansf. & Thirum., *M. opposita* var. *africana* Hansf., *M. sinuosa* Doidge, *M. togoensis* var. *angulata* S. Hughes, *M. trichiliae* Beeli and *M. trichiliicola* Speg. which are known on species of *Trichilia*; *M. guareae* Speg., *M. guareae* var. *major*, *M. guareicola* F. Stevens, *M. guareiella* Hansf., *M. guareina* Hansf., *M. parasitica* F. Stevens and *M. platysperma* Theiss. associated to species of *Guarea* and

Meliola bersamicola Hansf. and *Meliola togoensis* S. Hughes associated to species of *Trichilia* and *Guarea*.

One of the fungi collected in Viçosa, was recognized as being rather similar to *M. guareicola,* but differing from it slightly in the following features: epiphyllous colonies, smaller hyphal cells (15.0-20.0 x 6.0-7.0 µm) and mycelial setae having their upper half uncinate or loosely coiled. Such differences were not regarded as sufficient for the proposal of a separate species but were regarded as worthy of recognition at the level of variety.

Additionally *M. trichiliae* is newly reported here on *T. lepidota.* This species has been previously reported only from *Trichilia retusa* Oliv. in Congo, on *Chisocheton chinensis* Merr. in China and on *Trichilia* sp. in Cuba. (Hansford 1961; Farr and Rossman 2009).

Black mildew on Piperaceae

Worldwide 20 species and 4 infra-specific taxa of meliolaceous fungi are known on members of Piperaceae (Hansford 1961; Silva and Minter 1995; Hosagoudar 1996; Hosagoudar and Archana 2009). However, only three species and one variety have been reported in Brazil: *Irenopsis tortuosa* (G. Winter) F. Stevens associated with *Piper sidaefolium* Link & Otto, *Irenopsis tortuosa* var. *potomorphes* (Cif.) Hansf. associated with *Pothomorphe umbellata* (L.) Miq., *Meliola bifida* Cooke and *Meliola indica* Syd. & P. Syd. var. *careyae* F. Stevens associated with *Peperomia scandens* Ruiz & Pav. (=*Piper scandens* Sw.) (Hansford 1961; Silva and Minter 1995; Pinho et al. 2009).

Two species of *Asteridiella* are known on members of Piperaceae, *A. pipericola* Hansf. associated with *Piper guineense* Schumach. & Thonn. and *P. capense* L. f. and *A. glabroides* (F. Stevens) Hansf. associated with *P. aduncum* L., *P. villiramulum* C. DC., *P. breve* C. DC. ex Trel. and *P. smilacifolium* Kunth (Hansford 1961; Farr and Rossman 2009). The fungus

collected at Viçosa was very similar to *A. pipericola*, but differed from the published description of this fungus by having amphigenous colonies, cuneate or ovate and entire apressorial head cells and opposite conidiogenous cells. In addition it has smaller hyphal cells (5.0-7.5 μm) that *A. pipericola* (7.0-8.0 μm). Hence, the introduction of a new variety is justifiable. This also representes the first Brazilian report of an *Asteridiella* on a Piperaceae.

Black mildew on Rubiaceae

Ninety-three species and 37 infra specific taxa of Meliolaceae are known to colonize members of the Rubiaceae. The species reported in Brazil are *Amazonia psychotriae* (Henn.) Theiss., *Asteridiella penicilliformis* (Gaillard) Hansf. and *A. seminata* (Berk. & M.A. Curtis) Hansf. associated with *Psychotria* sp., *A. glabra* var. *major* Hansf. and *M. casearieae-guianensis* Hansf. associated with *Sabicea cinerea* Aubl., *M. anceps* Syd. associated with *Uncaria guianensis* (Aubl.) J.F. Gmel., *M. melanochylae* Hansf. associated with *Genipa americana* L., *M. psychotriae* Earle associated with *Mitracarpus hirtus* and an indeterminate Rubiaceae, *M. amphigena var. tontaneae* Hansf., *M. spirobelia* Bat. & M.P. Herrera and *M. woodiana* Sacc. associated with indeterminate Rubiaceae and *Meliola thalliformis* Deighton var. *major* D.J. Soares & R.W. Barreto associated with *Bathysa australis* (St. Hil.) Benth. & Hook. f. (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Pereira and Barreto 2005; Soares et al. 2006; Hosagoudar and Archana 2009).

The only taxon of Meliolaceae described in association with a plant in the genus *Chiococca* is *M. psychotriae* Earle var. *chiococcae* Hansf. [associated with *Chiococca alba* (L.) Hitchc.]. Morphology of the fungus collected in Viçosa on *C. alba* fitted well within the description of *M. psychotriae* var. *chiococcae*, a species previously reported from Barbados, Cuba, Florida, Puerto Rico and the Virgin Islands. This is therefore the first report of *M.*

psychotriae var. *chiococcae* on *C. alba* in Brazil (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Farr and Rossman 2009; Hosagoudar and Archana 2009).

Black mildew on Rutaceae

Fifty species and 15 infra specific taxa Meliolaceae are known in association with members of the Rutaceae. The species reported in Brazil are *Meliola galipeae* Syd. associated with *Galipea* sp., *Meliola rickiana* Hansf. associated with *Zanthoxylum* sp. and *Meliola koniaensis* Hansf. & Deighton associated with *Monnieria trifolia* L. (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009).

Six species and three varieties of *Asteridiella* are known to cause black mildew on members of the Rutaceae: *A. acronychiae-pedunculatae* Hosag., *A. casimiroae* Hansf., *A. fagaricola* (Speg.) Hansf., *A. fagaricola* var. *zanthoxyli* Hansf., *A. glycosmidis* V.B. Hosag., C.K. Biju & T.K. Abraham, *A. obesa* (Speg.) Hansf., *A. obesa* var. *clausenae* Hansf., *A. obesa* var. *obesula* (Speg.) Hansf and *A. trachylaena* (Syd.) Hansf. (Hansford 1961; Hosagoudar 1996; Biju et al. 2005; Hosagoudar and Archana 2009). Among these species, only *A. obesa* was recorded in association with *Balfourodendron riedelianum* (Engl.) Engl. The newly proposed species *A. balfourodendrae* clearly differs from these other *Asteridiella* in having longer (42.5-49.0 µm) and wider (14.0-27.5 µm) ascospores.

Black mildew on Sapindaceae

Sixty-five species and 25 infra specific taxa of Meliolaceae are known in association with members of the Sapindaceae. The species reported in Brazil are *Asteridiella cupaniae* Hansf. associated with *Cupania revoluta* Rolfe and *Cupania* sp., *Asteridiella guatemalensis*

(Hansf.) Hansf. associated with *C. emarginata* and *Cupania* sp., *Irenopsis cupaniicola* Hansf. associated with *C. vernosa* and *C. emarginata* Cambess., *Meliola burseracearum* F. Stevens, *M. campylopoda* Syd., *M. cupaniae-majoris* Bat. and *M. rigida* Doidge associated with *Cupania* sp., *M. capensis* (Kalchbr. & Cooke) Theiss var. *cupaniae* (K. & C.) Theiss. associated with *C. vernalis* Cambess., *M. cupaniicola* Bat. associated with *C. revoluta* Rolfe, *M. lyoniae* F. Stevens associated with *Dodonaea* sp., *M. parenchymatica* Gaillard associated with indeterminate Sapindaceae, *M. paulliniifolii* Bat. and *M. paulliniae* F. Stevens associated with *Paullinia pinnata* L., *M. paulliniae, M. paulliniicola* Hansf. and *Meliola paulliniana* Bat. & Nascim. associated with *Paullinia* sp., *M. sapindi-esculenti* Hansf. associated with *Sapindus esculentus* A. St.-Hil., *M. serjaniae* F. Stevens and *M. serjaniae* var. *major* associated with *Serjania* sp., *M. talisiana* Bat. & H. Maia associated with *Talisia esculenta* (A. St.-Hil.) Radlk. and *Meliola tijucensis* Hansf. associated with *Allophylus* sp. (Hansford 1961; Silva and Minter 1995; Hosagoudar 1996; Rodriguez and Piepenbring 2007; Hosagoudar and Archana 2009).

Of all fifty species and twenty-five varieties of *Meliola* known on members of the Sapindaceae (Hosagoudar and Archana 2009; Hosagoudar 1996; Hansford 1961) only, *M. crucifera* Starbäck, *M. paulliniae* F. Stevens, *M. paulliniae* var. *dentata* F. Stevens, *M. paulliniana* Bat. & Nascim., *M. paulliniicola* Hansf. and *M. paulliniifolii* are associated with species of *Paullini*a (Hansford 1961; Hosagoudar 1996; Hosagoudar and Archana 2009). The specimen collected on *P. rubiginosa*, although very close to *M. paulliniifolii,* has apressoria wich are only opposite or unilateral. In addition it has smaller mycelial setae (172.0-334.0 x 6.0-8.5 μm) that *M. paulliniifolii* (215.0-800.0 x 12.5-15.5 μm) and has its mycelial setae grouped around perithecia (Batista et al. 1960). Hence, the introduction of a new variety was necessary.

While four species and one variety of *Meliola* are known to be associated with *Paullinia*, five species and two varieties are associated with the genus *Cupania*: *M. campylopoda*, *M. cupaniae-majoris*, *M. capensis* var. *cupaniae* Hansf., *M. capensis* var. *mataybae* (F. Stevens) Hansf., *M. cupaniae majoris* Bat., *M. cupaniicola* and *M. variaseta* F. Stevens. The species described on *C. vernalis* differs from all other species on *Cupania* by having substraight hypha, alternate apressoria, ovate to ellipsoid and entire apressorial head cells and having longer (28-52.5 µm) and wider (10-17 µm) ascospores then the other *Meliola* described on these plants.

Black mildew on Tiliaceae

Twenty species and six varieties of Meliolaceae have been described attacking members of the family Tiliaceae (Hansford 1961; Silva and Minter 1995; Hosagoudar 1996; Hosagoudar and Archana 2009). There is one single species of Meliolaceae reported in Brazil on this plant family. This is *Asteridiella amoena* (Syd.) Hansf. associated with *Christiana africana* DC. (Silva and Minter 1995).

The fungus found in Viçosa causing black mildew on a Tiliaceae was a typical *Irenopsis.* Four species and five varieties of *Irenopsis* are known on Tiliaceae worldwide: *I. coimbatorica* Hosag., C.M. Pillai & Raghu, *I. coronata* (Speg.) F. Stevens, *I. coronata* var. *christianae (*Deighton) Hansf. & Deighton, *I. coronata* var. *philippinensis* F. Stevens & Roldan, *I. triumfettae* (F. Stevens) Hansf. & Deighton, *I. triumfettae* var. *glyphaeicola* (Deighton) Hansf. & Deighton, *I. triumfettae* var. *indica* Hosag. & T.K. Abraham, *I. triumfettae* var. *vanderystii* (Beeli) Hansf. & Deighton and *I. lagunae* Hansf. (Hansford 1961; Hosagoudar 1996; Farr and Rossman 2009; Hosagoudar and Archana 2009;). Among these species only, *I. coronata* and *I. triumfettae* are known to be associated with species of the

genus *Luehea*, namely to *Luehea divaricata* Mart. and *Luehea speciosa* Willd., respectively. The fungus found in Viçosa is rather dissimilar from those species and has a morphology that is closer to that of *I. coimbatorica* and *I. coronata* var. *christianae.* Nevertheless it couldn't be placed into any of those species as it has ovate or cuneate head cells, perithecial setae that are straight to substraight and different sized ascospores (27.5-37.5 x 10.0-15.0 µm) justifying the proposal of a new species to accommodate it.

The discovery, during this relatively brief survey, of nine new species, four new varieties and six new records of members of the Meliolaceae confirms the scarcity of knowledge about this large fungal family and indicates that numerous black mildews still await to be discovered in such poorly studied tropical ecosystems.

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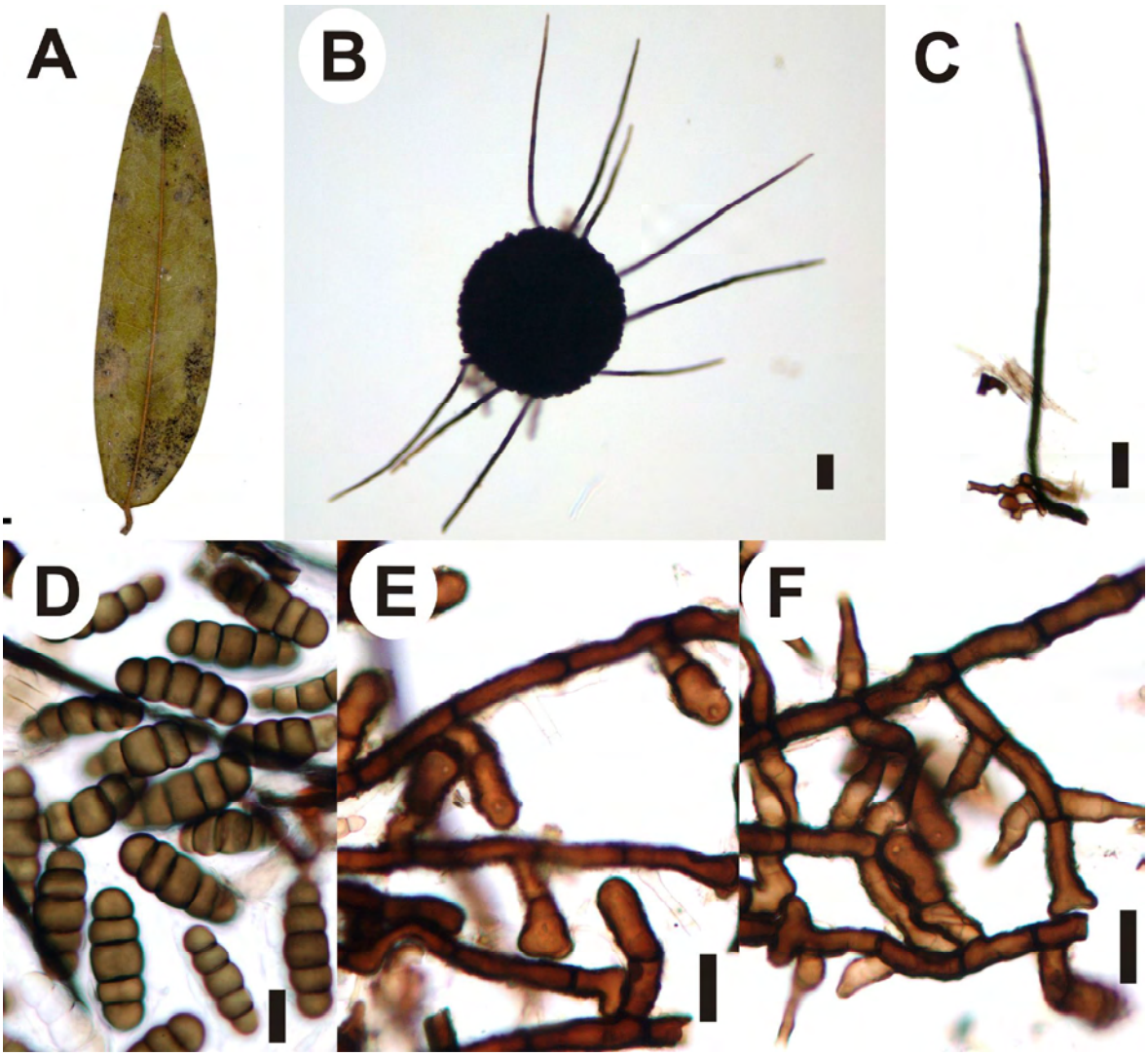

Figure 1. *Meliola sericeae* on *Xylopia sericea:* A. Colonies hypophyllous; B. Perithecium with mycelial setae around perithecium; C. Mycelial setae; D. Ascospores; E. Apressoria; F. Conidiogenous cells. Bars=50 µm (B-C); 20 µm (D-F).

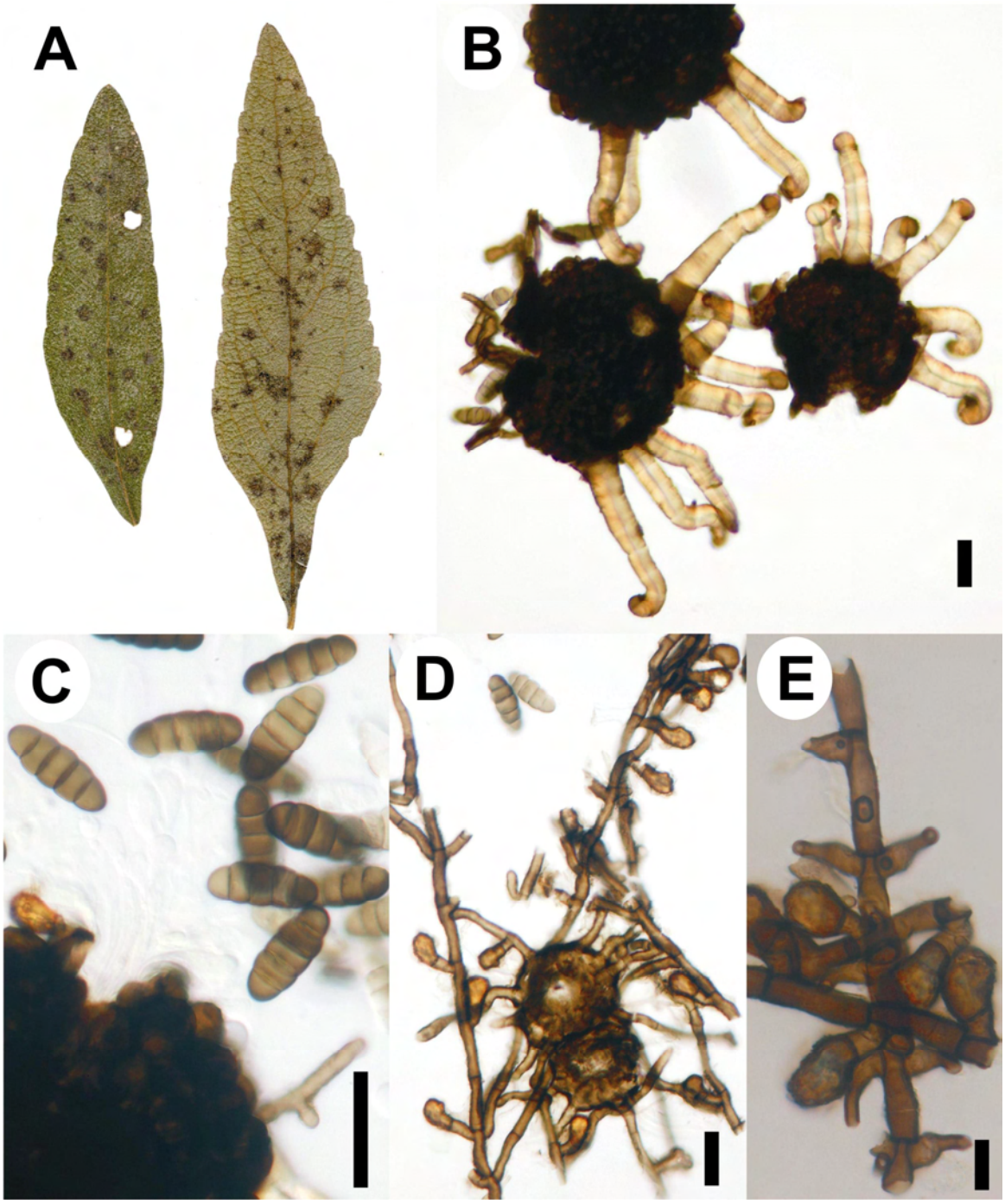

Figure 2. *Appendiculella eupatoriae* on *Eupatorium gaudichaudianum:* A. Colonies amphigenous; B. Perithecia with larviform appendages; C. Ascospores; D. Apressoria; E. Conidiogenous cells. Bars = 50 µm (B-C); 30 µm (D-E).

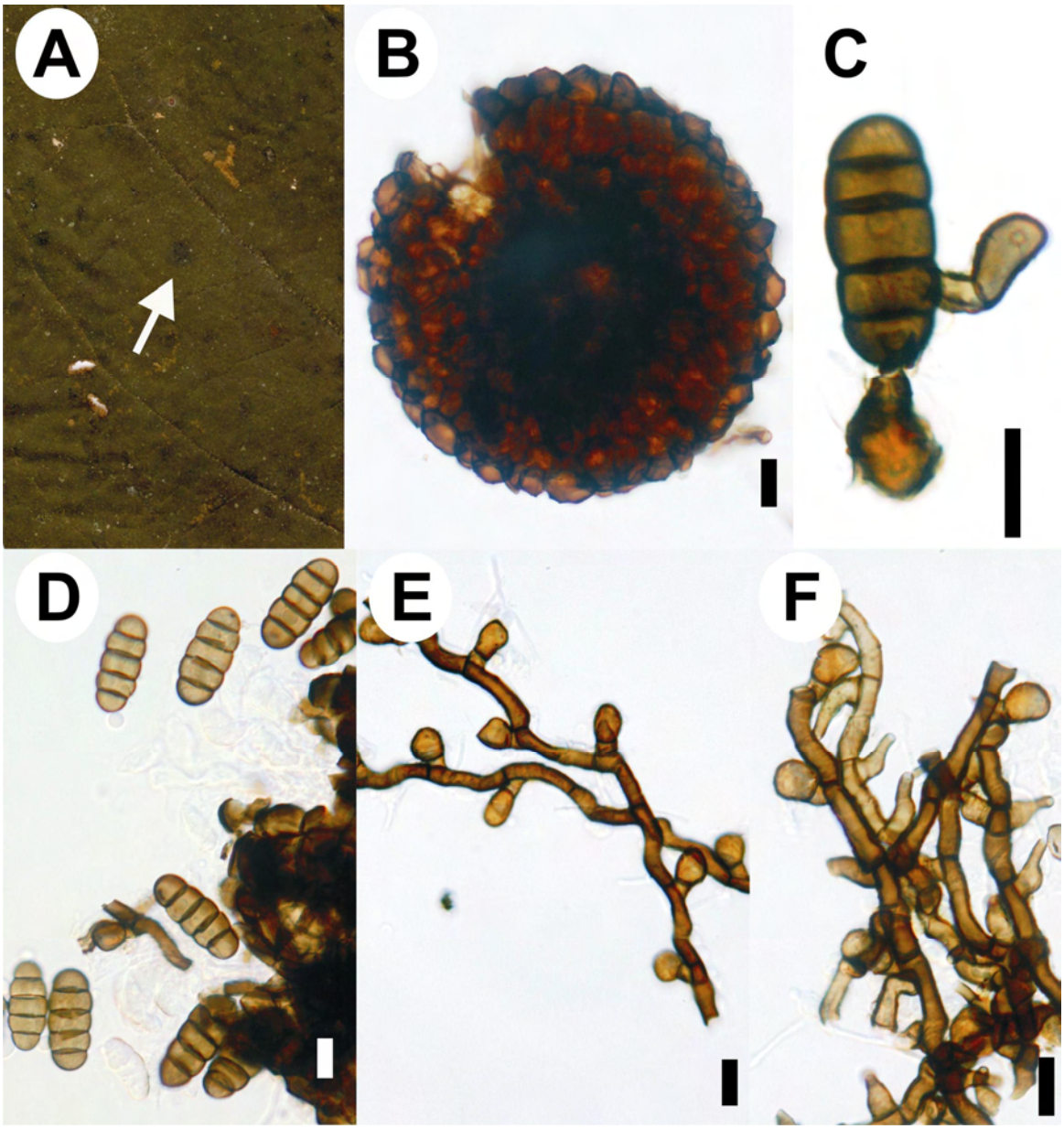

Figure 3. *Asteridiella cyclopoda* on *Vernonia diffusa:* A. Colonies epiphyllous; B. Perithecium; C. Germinated ascospore producing two apressoria; D. Ascospores; E. Apressoria; F. Conidiogenous cells. Bars = 30 µm (B); 15 µm (C-F).

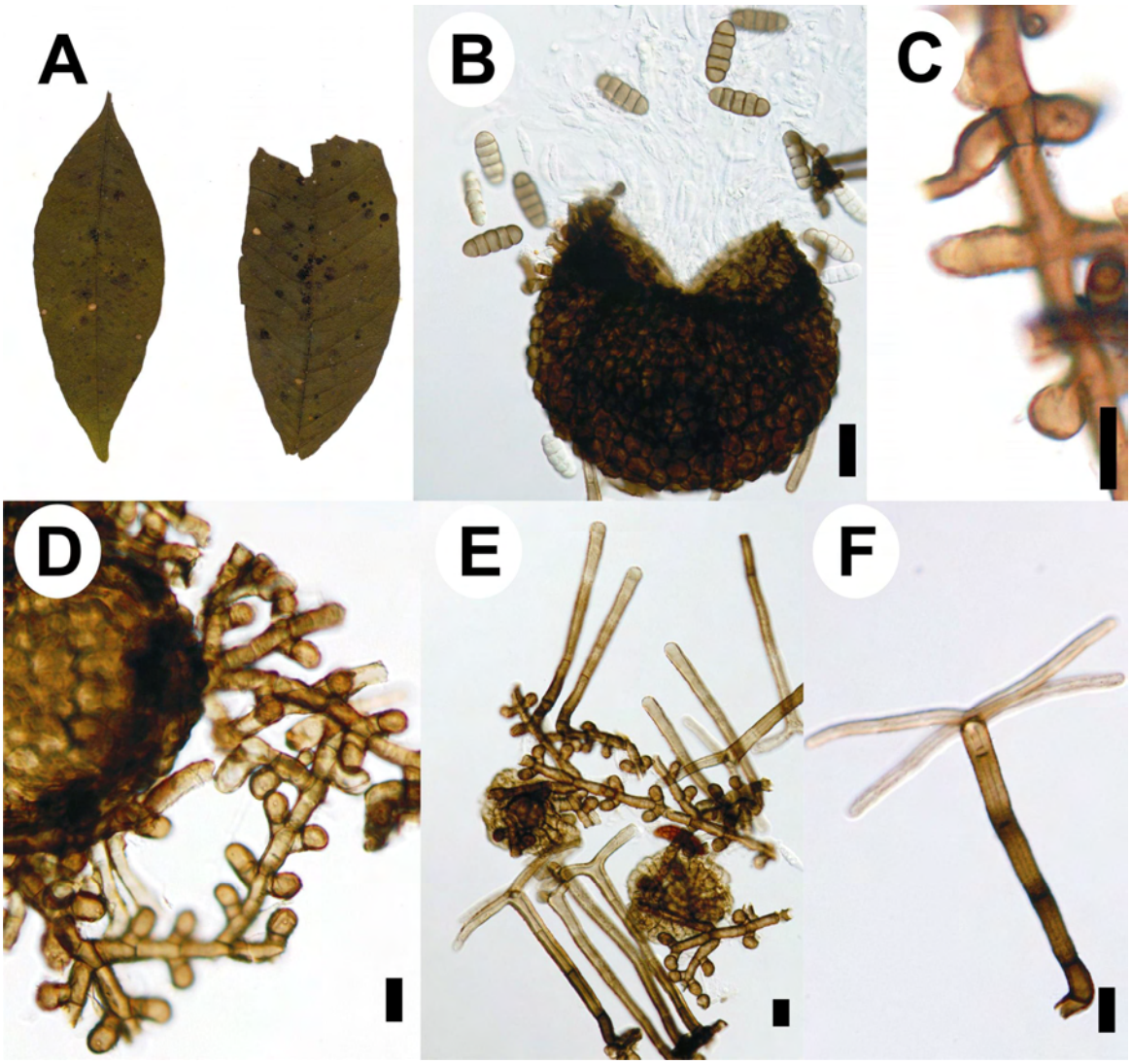

Figure 4. *Meliola mutisiae* on *Mutisia speciosa:* A. Colonies amphigenous; B. Perithecium and ascospores; C. Conidiogenous cells; D. Apressoria E-F. Mycelial setae. Bars = 50 µm (B); 15 µm (C-F).

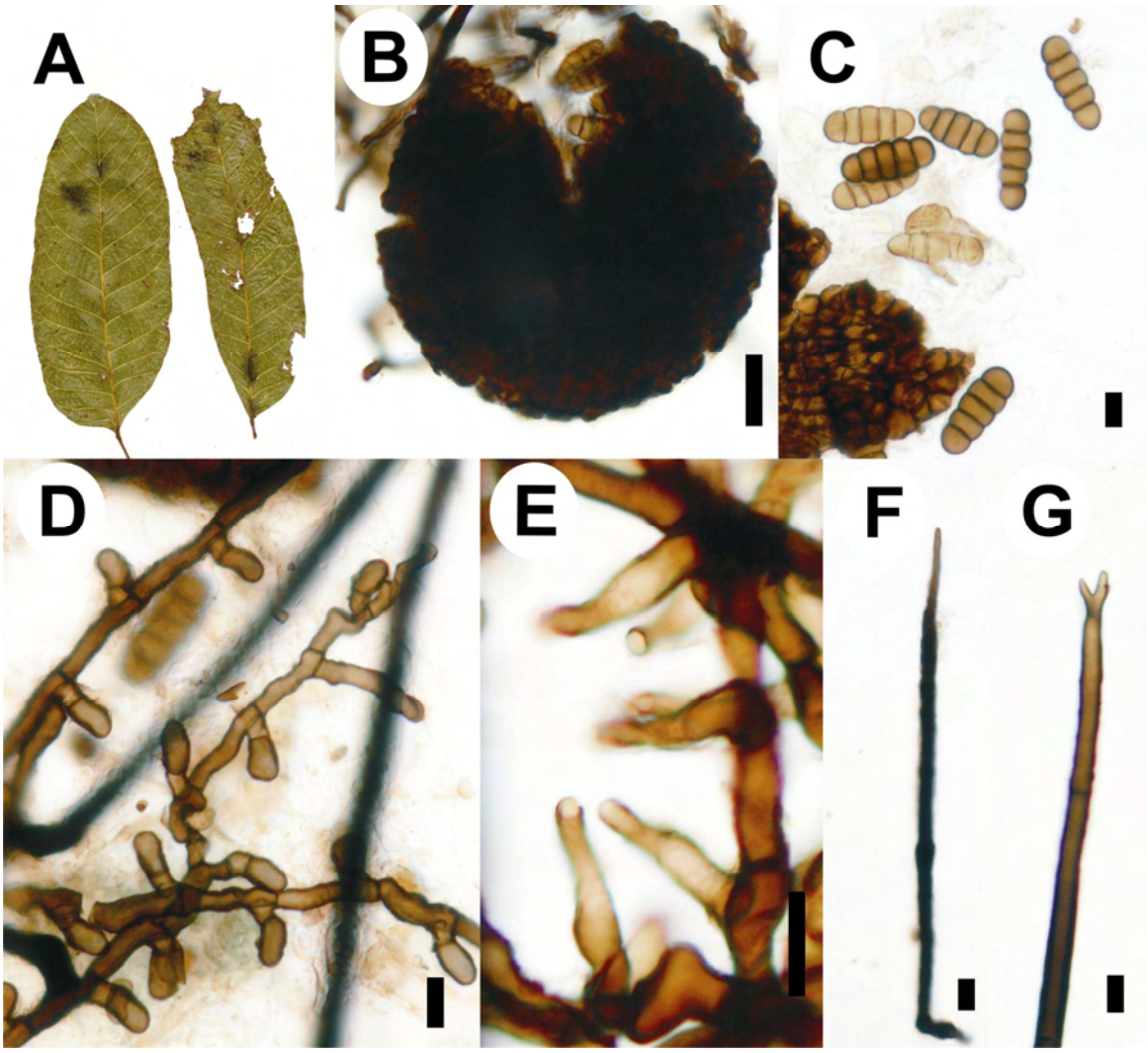

Figure 5. *Meliola garugae* var. *protii* on *Protium warmingianum:* A. Colonies hypophyllous; B. Perithecium; C. Ascospores; D. Apressoria; E. Conidiogenous cells; F. Mycelial setae simple; G. Detail of dentate-cristate apex of setae. Bars = 50 µm (B); 15 µm (C-G).

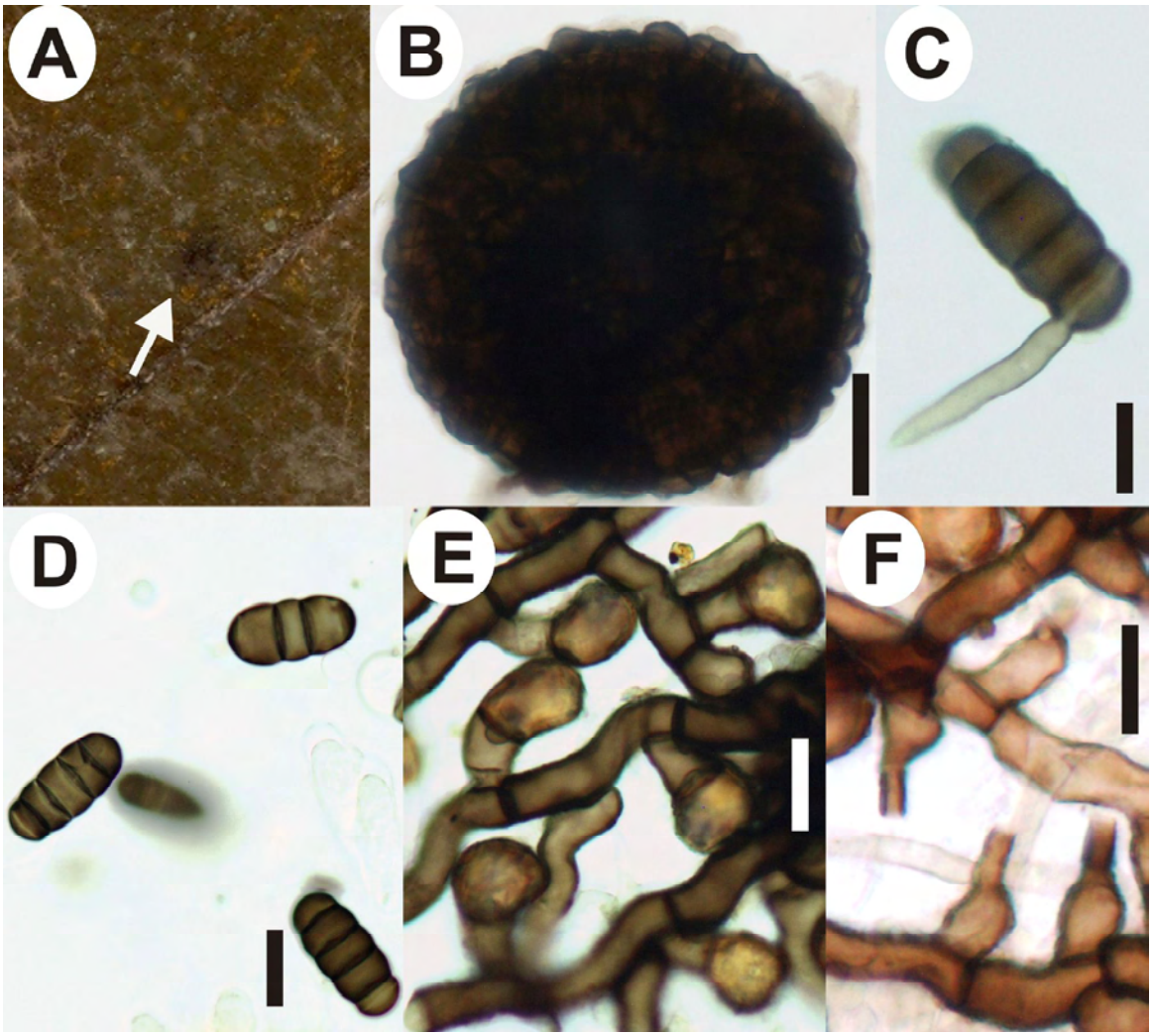

Figure 6. *Asteridiella cecropiae* on *Cecropia hololeuca:* A. Colonies epiphyllous; B. Perithecium; C. Ascospore germination; (D) Ascospores; E. Apressoria; F. Conidiogenous cells. Bars = 50 µm (B); 20 µm (C-F).

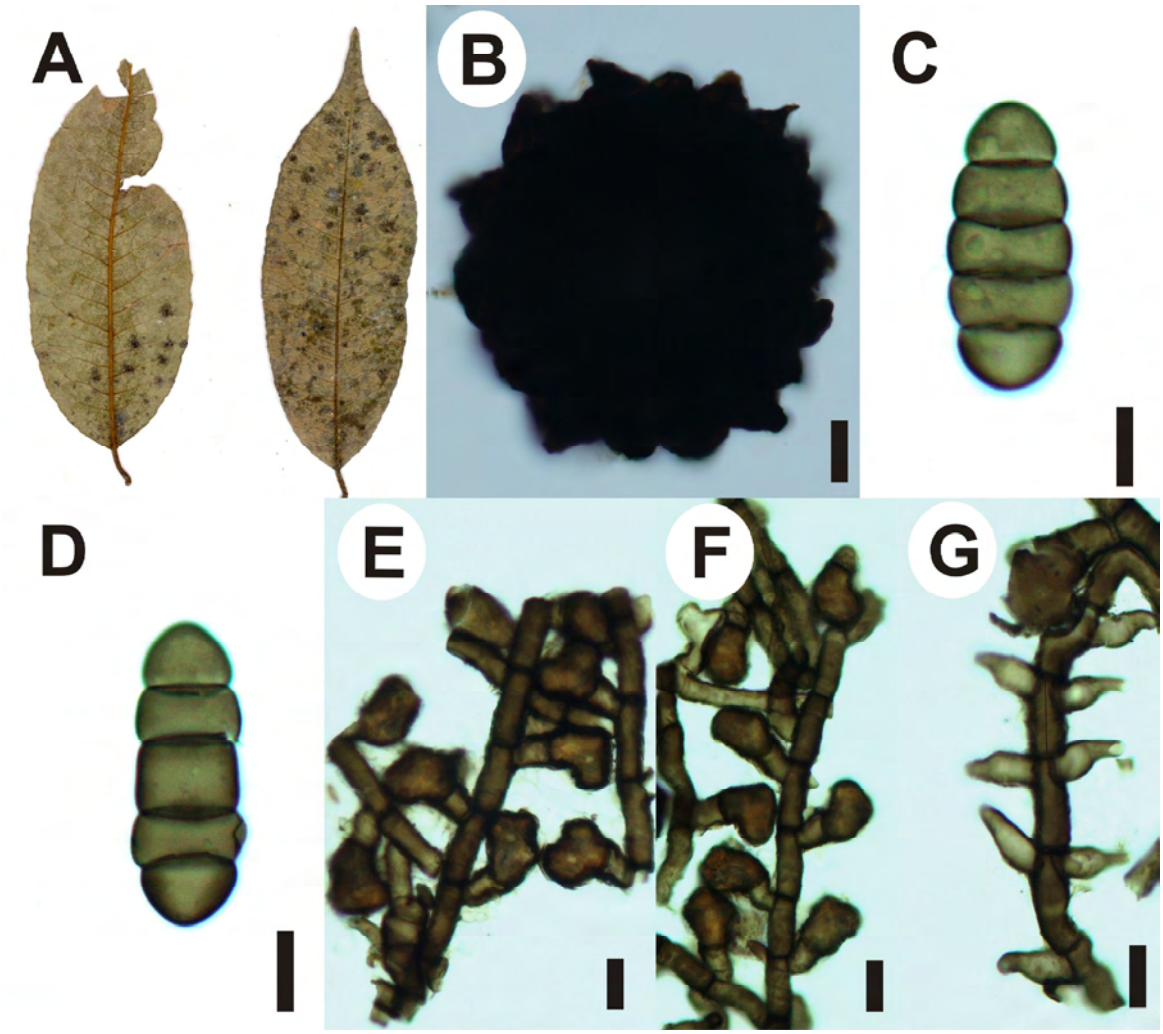

Figure 7. *Asteridiella entebbeensis* var. *cordiaei* on *Mabea fistulifera:* A. Colonies amphigenous; B. Perithecium; C-D. Ascospores; E-F. Apressoria; G. Conidiogenous cells. Bars = 50 µm (B); 15 µm (C-G).

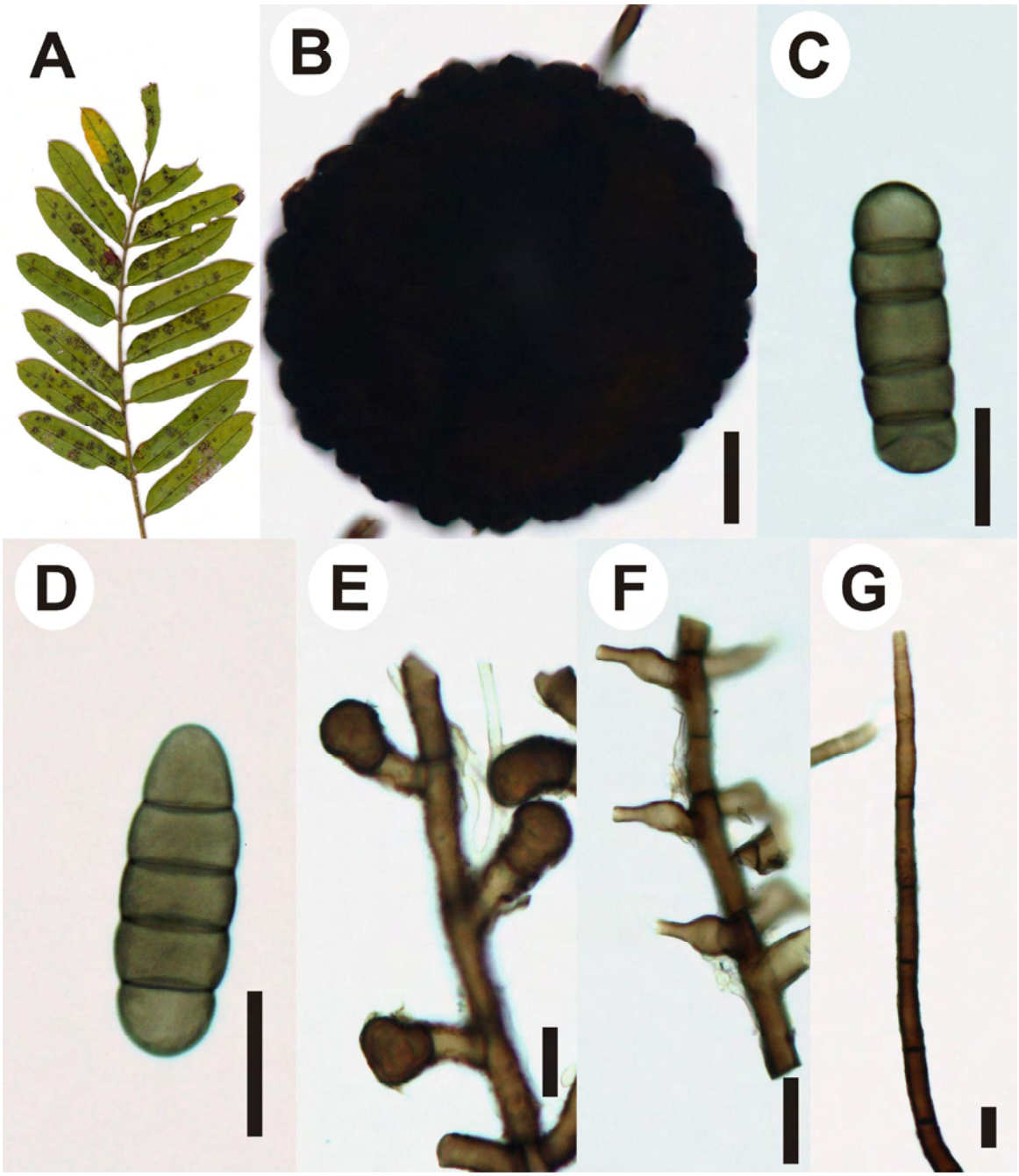

Figure 8. *Meliola ferrugineae* on *Cassia ferruginea:* A. Colonies epiphyllous; B. Perithecium; C. Ascospores cylindrical and (D) ellipsoid; E. Apressoria; F. Conidiogenous cells; G. Mycelial setae. Bars = 50 µm (B); 25 µm (C-G).

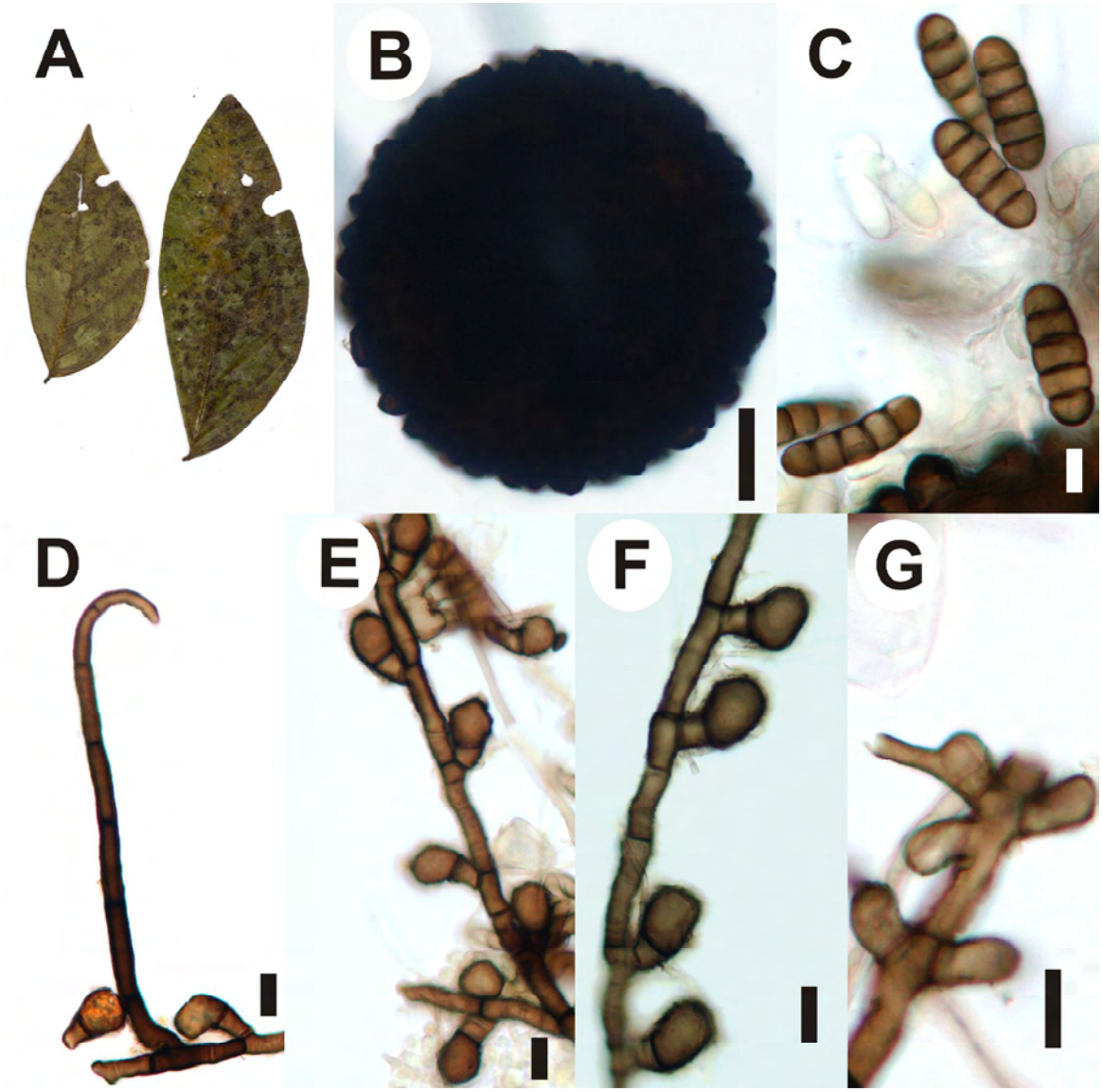

Figure 9. *Meliola pazschkeana* var. *macropoda* on *Senna macranthera:* A. Colonies amphigenous; B. Perithecium; C. Ascospores; D. Uncinate mycelial setae; E. Apressoria alternate and (F) unilateral; G. Conidiogenous cells. Bars = 50 µm (B); 15 µm (C-G).

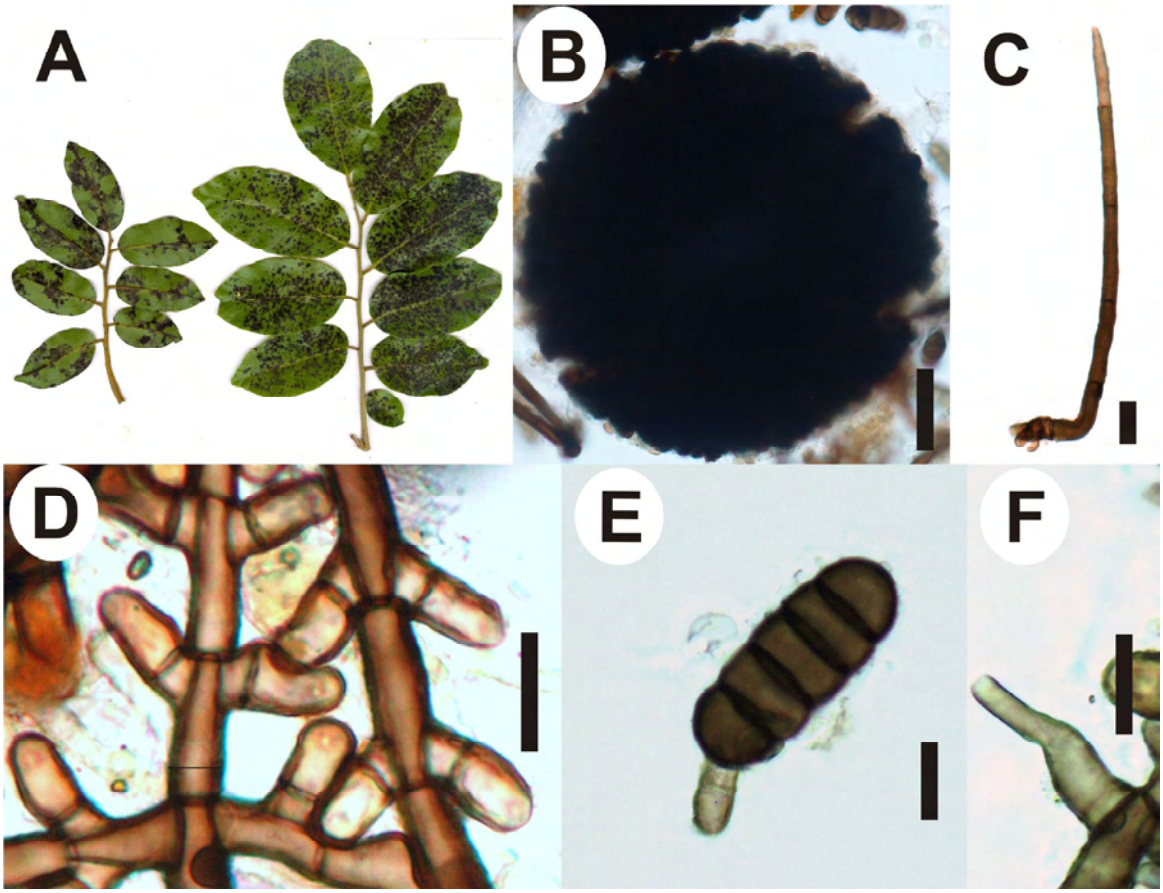

Figure 10. *Meliola peruiferae* on *Myroxylon peruiferum:* A. Colonies amphigenous; B. Perithecium; C. Mycelial setae; D. Apressoria; E. Ascospore germination; F. Conidiogenous cells. Bars = 50 µm (B); 20 µm (C-F).

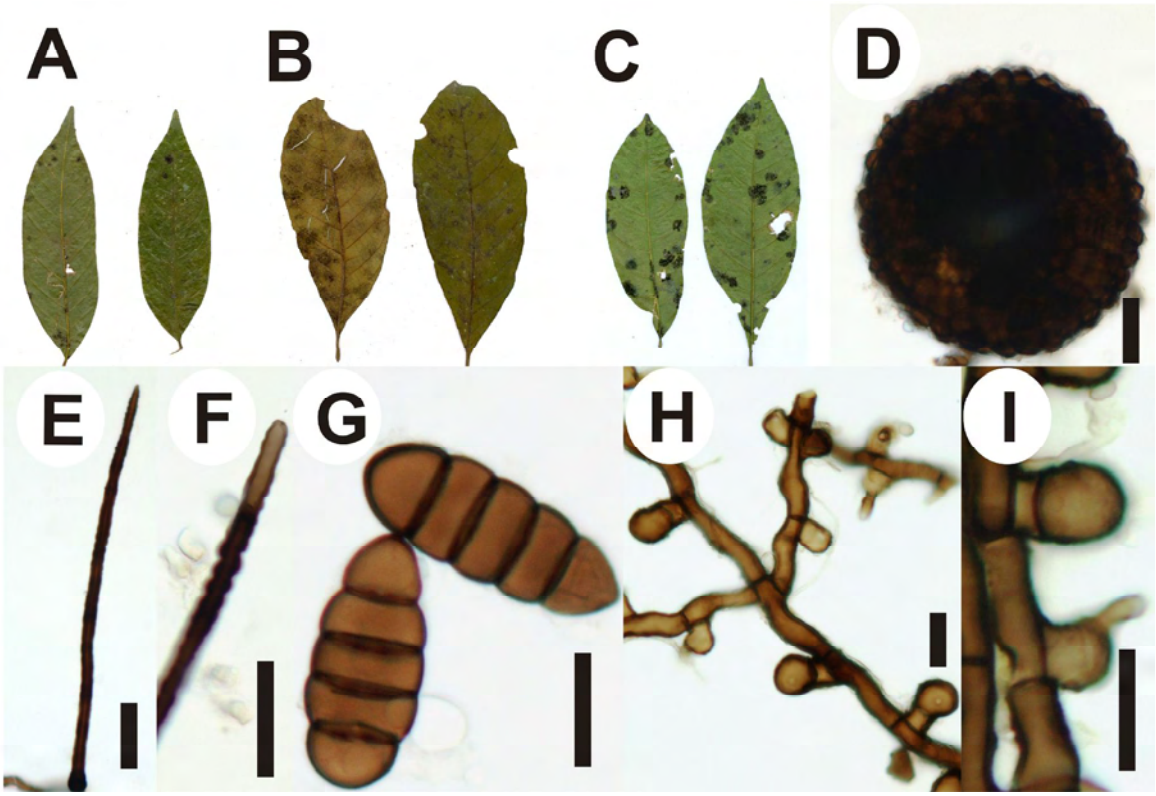

Figure 11. *Meliola guareicola* var. *vicosense* on *Trichilia pallida* (A), *Guarea kunthiana* (B), *Guarea guidonia* (C): A-C. Colonies amphigenous; D. Perithecium; E. Mycelial setae; F. Crenate mycelial setae; G. Ascospores; H. Apressoria; I. Conidiogenous cells. Bars=50 µm (D-F); 20 µm (G-I).

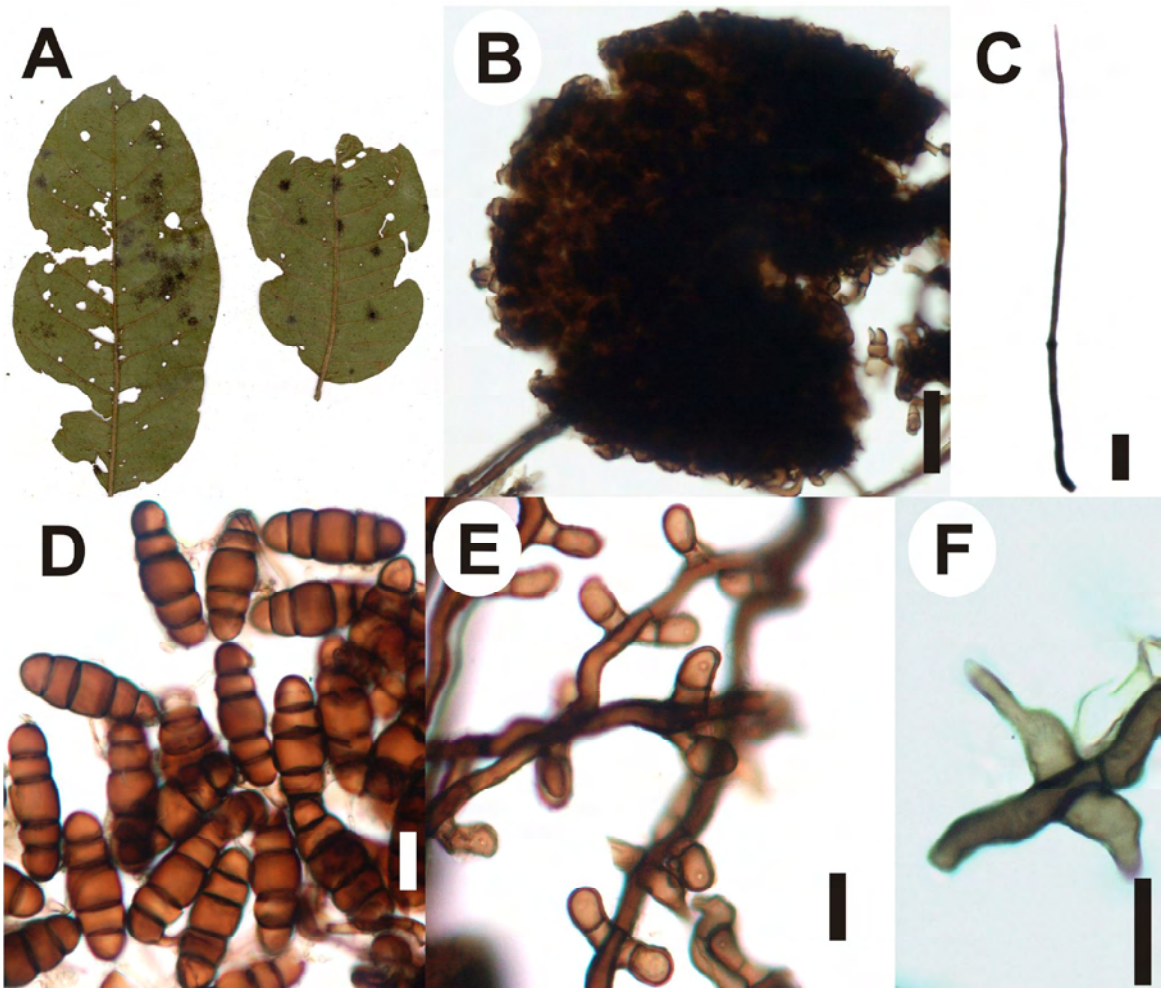

Figure 12. *Meliola trichiliae* on *Trichilia lepidota:* A. Colonies hypophyllous; B. Perithecium; C. Mycelial setae; D. Ascospores; E. Apressoria; F. Conidiogenous cells. Bars=50 µm (B-C); 20 µm (D-F).

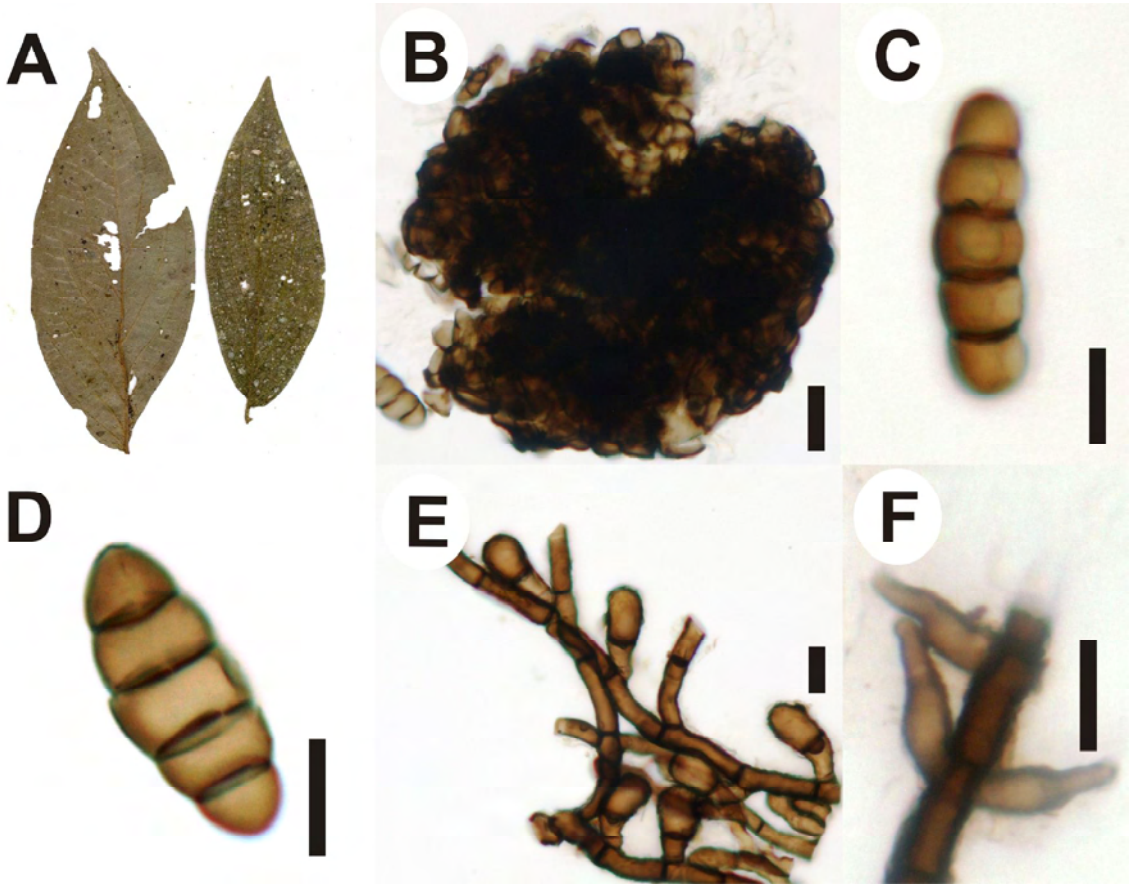

Figure 13. *Asteridiella pipericola* var. *vicosense* on *Piper gaudichaudianum:* A. Colonies amphigenous; B. Perithecium; C-D. Ascospores; E. Apressoria; F. Conidiogenous cells. Bars=50 µm (B); 20 µm (C-F).

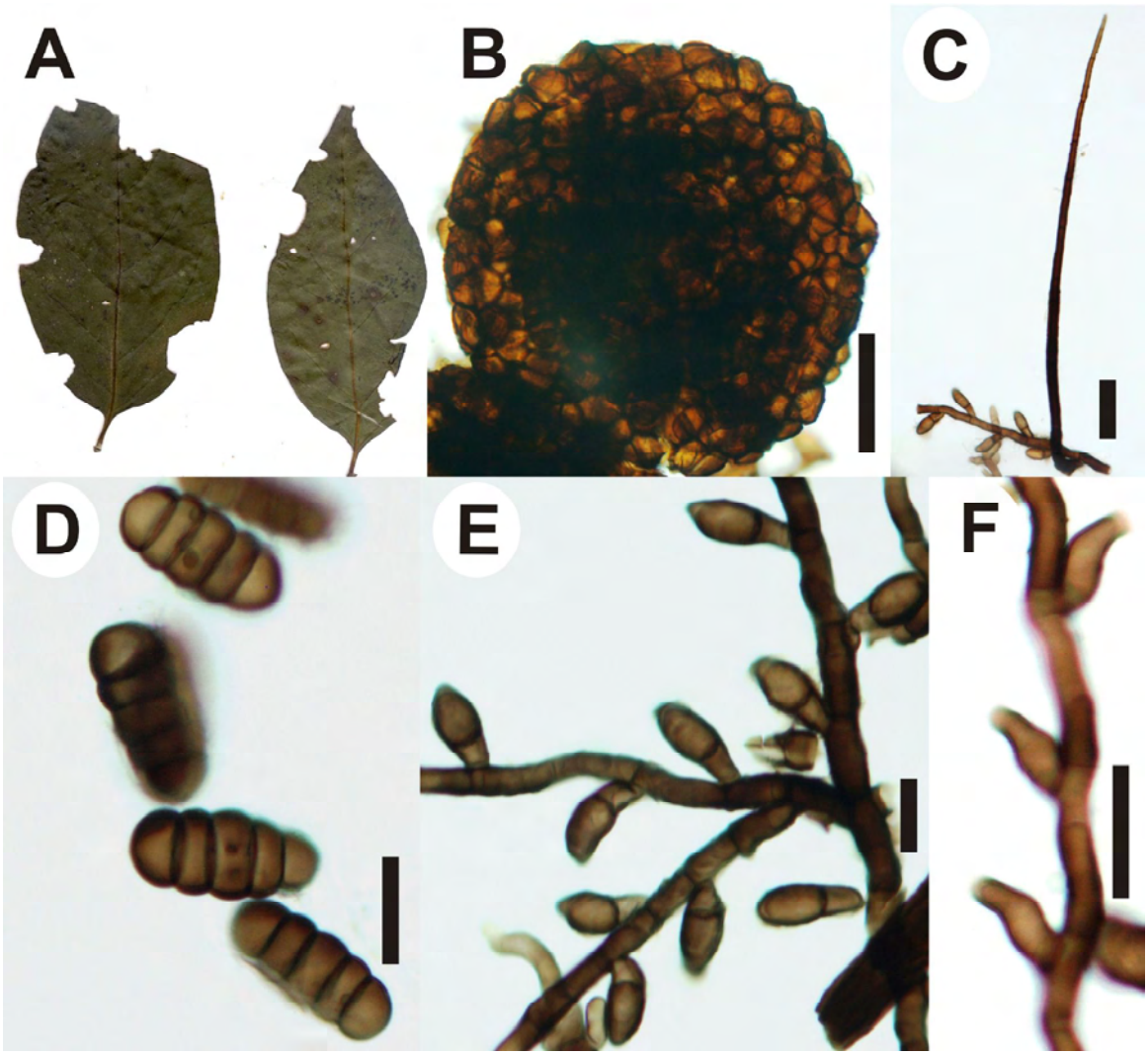

Figure 14. *Meliola psychotriae* var. *chiococcae* on *Chiococca alba:* A. Colonies amphigenous; B. Perithecium; C. Mycelial setae; D. Ascospores; E. Apressoria; F. Conidiogenous cells. Bars=50 µm (B-C); 20 µm (D-F).

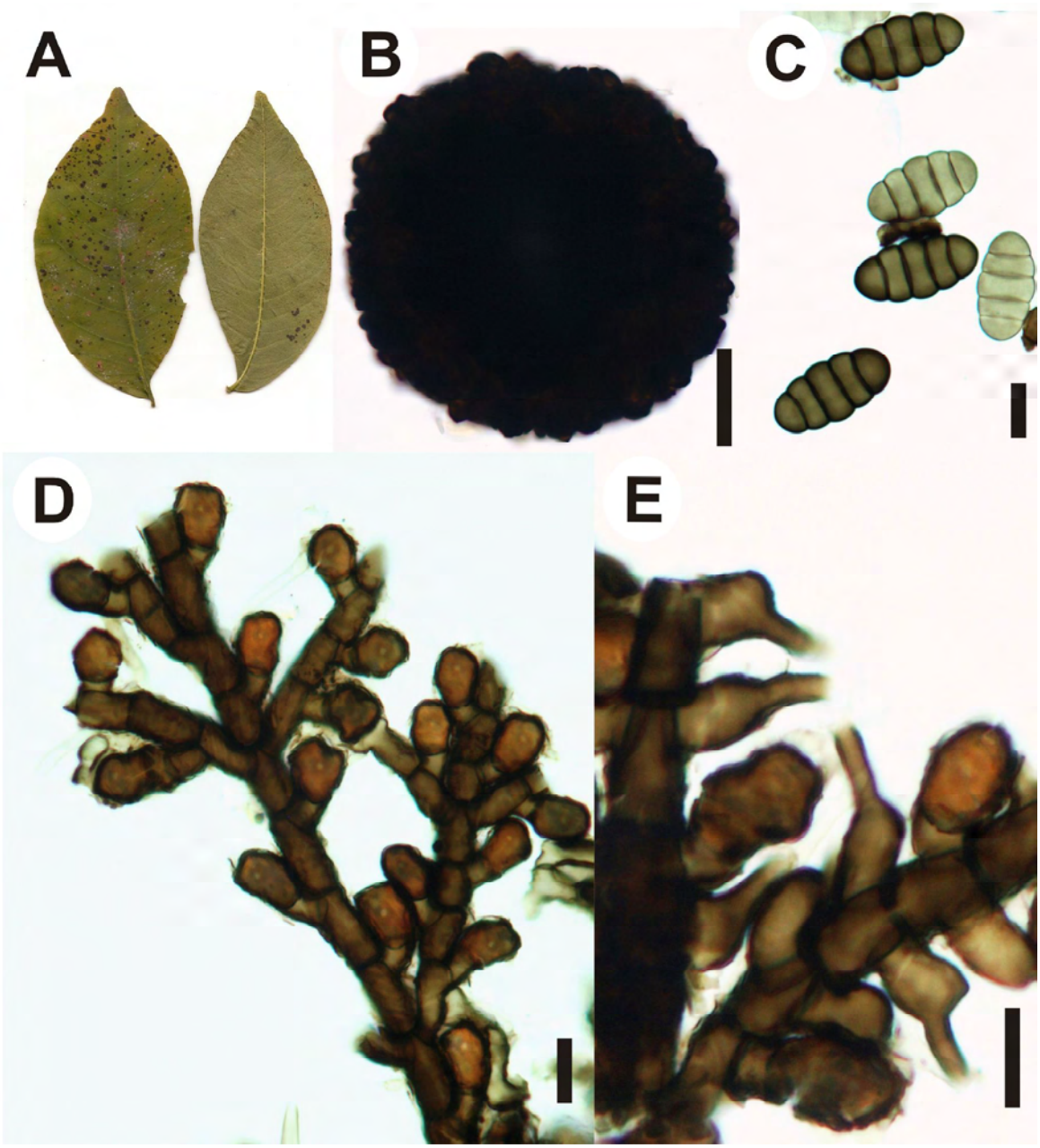

Figure 15. *Asteridiella obesa* on *Balfourodendron riedelianum:* A. Colonies amphigenous; B. Perithecium; C. Ascospores; D. Apressoria; E. Conidiogenous cells. Bars=50 µm (B); 20 µm (C-D); 15 µm (E).

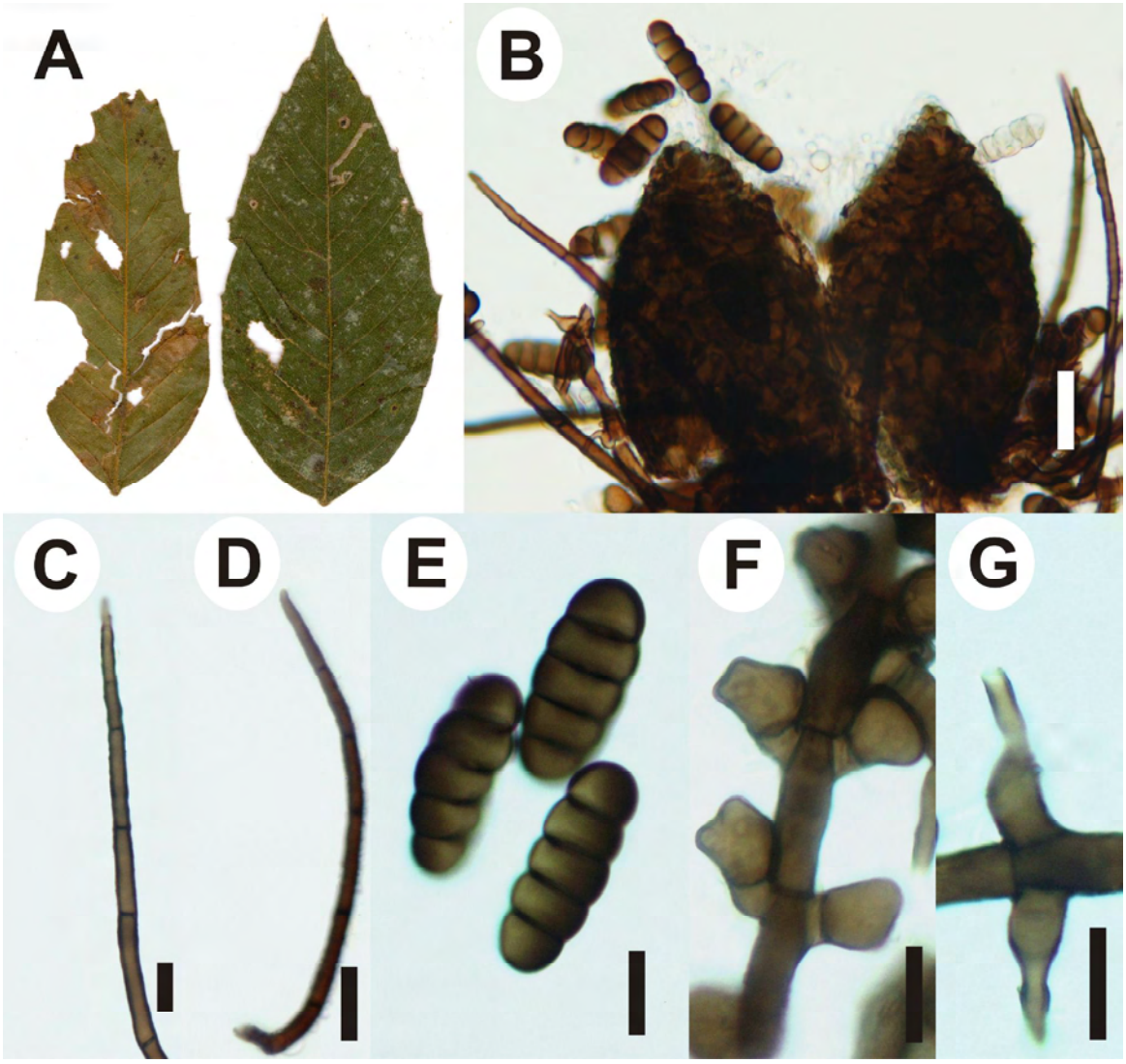

Figure 16. *Meliola paullinifolii* var. *rubiginosae* on *Paullinia rubiginosa:* A. Colonies amphigenous; B. Perithecium; C. Mycelial setae straight and (D) flexuous; E. Ascospores; F. Apressoria; G. Conidiogenous cells. Bars=50 µm (B); 20 µm (C-G).

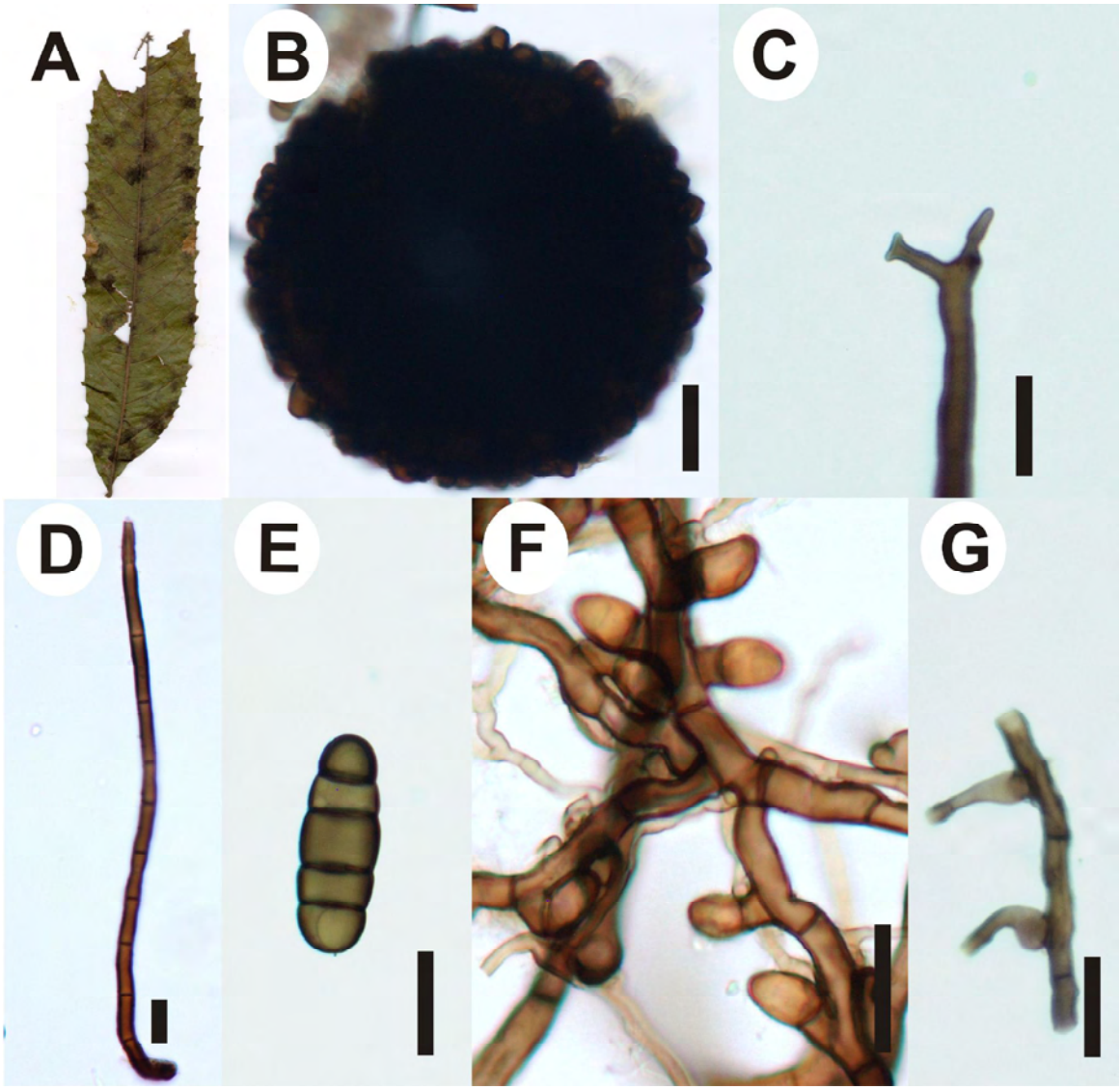

Figure 17. *Meliola vernaliae* var. *rubiginosae* on *Cupania vernalis:* A. Colonies hypophyllous; B. Perithecium; C. Detail of mycelial setae with two dentate-cristate; D. Mycelial setae; E. Ascospores; F. Apressoria; G. Conidiogenous cells. Bars=50 µm (B); 20 µm (C-G).

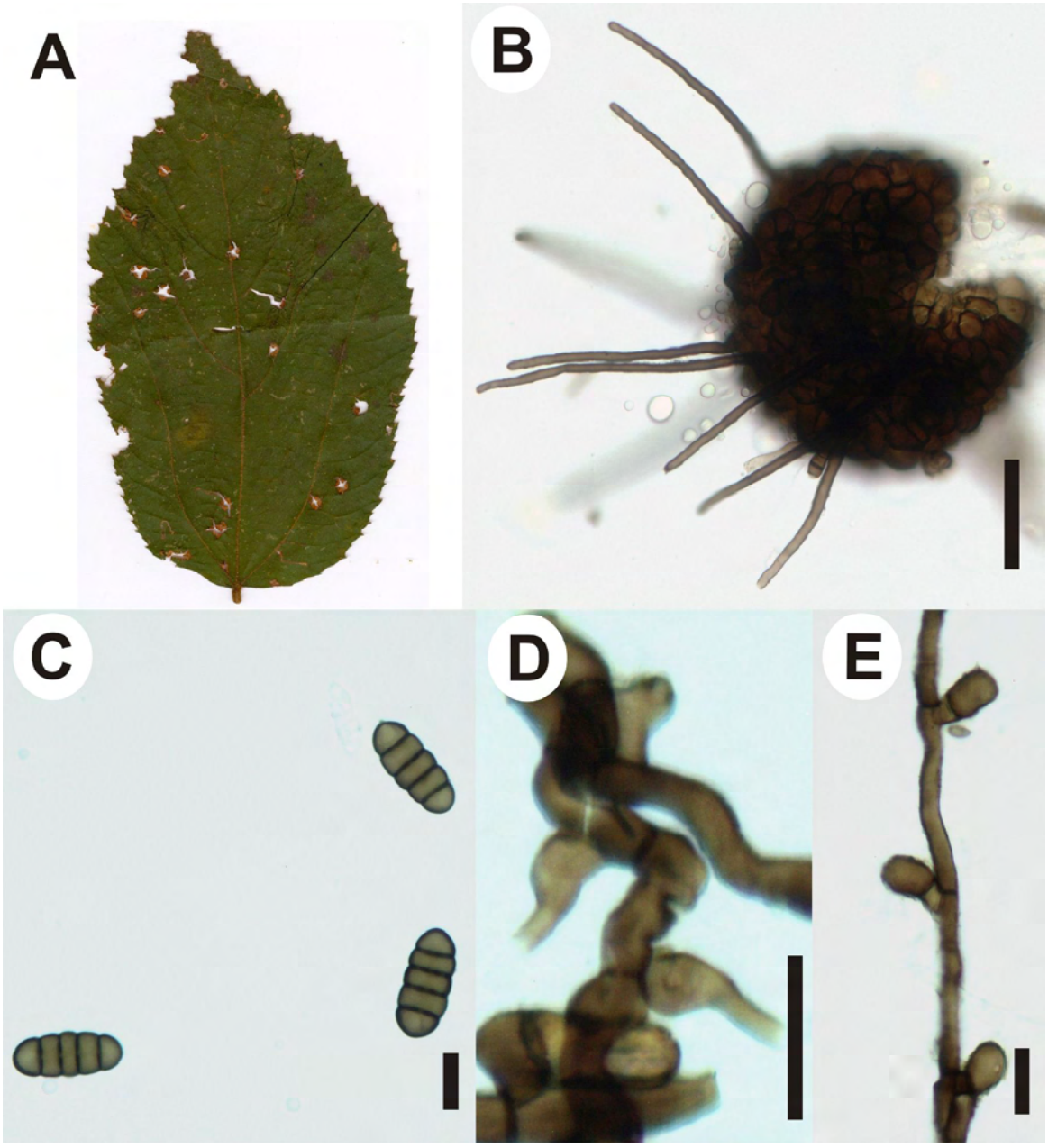

Figure 18. *Irenopsis grandiflorae* on *Luehea grandiflora*: A. Colonies epiphyllous; B. Setose perithecium; C. Ascospores; D. Conidiogenous cells; E. Apressoria;. Bars = 50 µm (B); 20 µm (C-E).

Table 1. Biometrics features of the species of *Meliola* associated with *Xylopia* spp.

Species	Hyphal cell (µm)	Length of apressorial stalk cell (µm)	Ascospores (µm)
*M. golaensis**	10.0-18.0 x 7.0-10.0	4.0-7.0	43.0-47.0 x 19.0-22.0
*M. kuprensis**	12.0-24.0 x 7.0-9.0	3.0-8.0	44.0-50.0 x 24.0-25.0
*M. sericeae***	22.5-50.0 x 6.0-8.5	7.5-17.5	42.5-67.5 x 16.0-27.5
*M. xylopiae**	25.0-35.0 x 7.0-9.0	3.0-5.0	48.0-54.0 x 20.0-26.0
M. xylopiae var. *leonensis**	20.0-30.0 x 6.0-7.0	4.0-9.0	42.0-53.0 x 15.0-19.0

*Hansford 1961; **This publication.

2. Appendix

Appendix 1. Index of Meliolaceae found in fragments of Atlantic Forest of Minas Gerais, Brazil.

Host Family	Fungi	Host	Location
Annonaceae	*Meliola sericeae*	*Xylopia sericea*	Mata da Silvicultura
Asteraceae	*Appendiculella eupatoriae*	*Eupatorium gaudichaudianum*	Mata do Paraíso
	Asteridiella cyclopoda	*Vernonia diffusa*	Mata do Paraíso
	Meliola mutisiae	*Mutisia speciosa*	Mata do Paraíso
Burseraceae	*Meliola garugae* var. *protii*	*Protium warmingianum*	Mata do Seu Nico, Mata do Paraíso, Mata da Biologia
Cecropiaceae	*Asteridiella cecropiae*	*Cecropia hololeuca*	Mata do Seu Nico
Euphorbiaceae	*Asteridiella entebbeensis* var. *codiaei*	*Mabea fistulifera*	Mata da Silvicultura
Leguminosae	*Meliola ferrugineae*	*Cassia ferruginea*	Mata da Dendrologia
	Meliola pazschkeana var. *macropoda*	*Senna macranthera*	Mata do Paraíso
	Meliola peruiferae	*Myroxylon peruiferum*	Mata da Dendrologia
Meliaceae	*Meliola guareicola* var. *vicosense*	*Guarea kunthiana, Guarea guidonia, Trichilia pallida*	Mata da Biologia, Mata do Paraíso, Mata da Silvicultura,
	Meliola trichiliae	*Trichilia lepidota*	Mata da Biologia, Mata do Paraíso
Piperaceae	*Asteridiella pipericola* var. *vicosense*	*Piper gaudichaudianum*	Mata do Paraíso
Rubiaceae	*Meliola psychotriae* var. *chiococcae*	*Chiococca alba*	Mata do Paraíso
Rutaceae	*Asteridiella balfourodendrae*	*Balfourodendron riedelianum*	Mata da Dendrologia
Sapindaceae	*Meliola paullinifolii* var. *rubiginosae*	*Paullinia rubiginosa*	Mata da Dendrologia

Host Family	Fungi	Host	Location
	Meliola vernaliae	*Cupania vernalis*	Mata do Paraíso
Tiliaceae	*Irenopsis grandiflorae*	*Luehea grandiflora*	Mata da Biologia, Mata da Silvicultura

Appendix 2. Index of Meliolaceae reported in Brazil.

Host Family	Fungi	Host
Acanthaceae (2)	*Asteridiella mendonciae* (Hansf.) Hansf.	*Mendoncia coccinea* Vell.
	Meliola beloperonis Viegas	*Beloperone* sp.
Anacardiaceae (12)	*Meliola brachyodonta* Syd.	*Anacardium occidentale* L.
	Meliola decidua Speg.	*Mangifera indica* L.
	Meliola lanigera Speg.	*Lithraea* sp.
	Meliola lanigera Speg.	*Schinus* sp.
	Meliola lanigera Speg.	*Schinus terebinthifolius* Raddi
	Meliola lanigera Speg.	*Schinus molle* L.
	Meliola mangiferae Earle	*Mangifera indica* L.
	Meliola rhoina Doidge	*Schinus dependens* Ortega
	Meliola rhoina Doidge	*Schinus molle* L.
	Meliola rhoina var. *schini* Hansf.	*Schinus molle* L.
	Meliola rhois Henn.	*Rhus* sp.
	Meliola rhois var. *africana* Hansf.	*Schinus dependens* Ortega
	Meliola rhois var. *africana* Hansf.	*Schinus molle* L.
	Meliola rhois var. *lithraeae* Hansf.	*Lithraea molleoides* (Vell.) Engl.
	Meliola rhois var. *lithraeae* Hansf.	*Lithraea brasiliensis* Marchand
	Meliola rhois var. *lithraeae* Hansf.	*Schinus* sp.
	Meliola tapirirae F. Stevens & Tehon	*Tapirira guianensis* Aubl.
	Meliola weigeltii Kunze	*Astronium fraxinifolium* Schott ex Spreng.
	Meliola weigeltii var. *fraxinifolii* Bat.	*Astronium fraxinifolium* Schott ex Spreng.
Annonaceae (3)	*Meliola ramicola* Hansf.	*Guatteria candolleana* Schltdl.
	Meliola xylopiae F. Stevens	*Xylopia* sp.
	Meliola xylopiifolii Bat. & J.L. Bezerra	*Xylopia* sp.
Apocynaceae (7)	*Meliola aspidospermatis* Speg.	*Aspidosperma polyneuron* Müll. Arg.
	Meliola clavatispora Speg.	Non-identified
	Meliola euopla Syd.	*Forsteronia* sp.
	Meliola furcata Lév.	*Echites cururu* Mart.
	Meliola guamensis Syd.	Non-identified
	Meliola hancorniae J.L. Bezerra & T.T. Barros	*Hancornia speciosa* Gomes
	Meliola laevipoda Speg.	*Aspidosperma quebracho* Griseb.
Aquifoliaceae (1)	*Meliola ilicis* Henn.	*Ilex chamaedryfolia* Reissek
Araceae (1)	Meliola philodendricola Hansf.	*Philodendron* sp.
Araliaceae (1)	*Meliola didymopanacis* Henn.	*Didymopanax* sp.

Host Family	Fungi	Host
Arecaceae (1)	*Meliola palmicola* G. Winter	*Astrocaryum* sp.
Aristolochiaceae (1)	*Meliola aristolochiicola* F. Stevens	*Aristolochia triangularis* Cham.
Asclepiadaceae (1)	*Meliola asclepiadacearum* var. *brasiliensis* Hansf.	*Asclepias* sp.
Bignoniaceae (20)	*Asteridiella amphilophii* Hansf.	*Amphilophium vauthieri* A. DC.
	Asteridiella arachnoidea (Speg.) Hansf.	Non-identified
	Asteridiella leeicola Hansf.	*Tabebuia* sp.
	Asteridiella tabebuiae (Bat. & J. Silva) Hansf.	*Tabebuia ipe* (Mart. ex K. Schum.) Standl.
	Irenopsis brasiliensis (Speg.) Hansf.	*Anemopaegma prostratum* DC.
	Irenopsis brasiliensis (Speg.) Hansf.	Non-identified
	Irenopsis brasiliensis (Speg.) Hansf.	*Pyrostegia venusta* (Ker Gawl.) Miers
	Meliola ariquemensis Bat. & Cavalc.	Non-identified
	Meliola asperipoda Hansf.	Non-identified
	Meliola bidentata Cooke	Non-identified
	Meliola bidentata var. *elongata* Bat. & H. Maia	Non-identified
	Meliola bidentata var. *minor* Hansf.	*Arrabidaea* sp.
	Meliola bidentata var. *minor* Hansf.	Non-identified
	Meliola bignoniacearum (F. Stevens) Cif.	Non-identified
	Meliola crescentiae var. *major* Bat. & H. Maia	*Crescentia cujete* L.
	Meliola dentifera Syd. & P. Syd.	*Arrabidaea* sp.
	Meliola gnathonella F. Stevens & Tehon	*Jacaranda* sp.
	Meliola gnathonella F. Stevens & Tehon	Non-identified
	Meliola herteri Hansf.	*Parabignonia maximilianii* (Mart. ex DC.) Bureau ex K. Schum.
	Meliola manaosellae Hansf.	*Manaosella platidactyla* (Barb. Rodr.) J.C. Gomes
	Meliola newbouldiae Hansf. & Deighton	Non-identified
Bixaceae (1)	*Meliola bixae* Hansf.	*Bixa orellana* L.
Boraginaceae (2)	*Asteridiella usteriana* (Rehm) Hansf.	*Cordia* sp.
	Meliola cordiae-rufescentis Hansf. & Bat.	*Cordia rufescens* A. DC.
Burseraceae (4)	*Asteridiella protiicola* (Bat. & Gayão) Hansf.	*Protium heptaphyllum* (Aubl.) Marchand
	Meliola protii F. Stevens	*Protium heptaphyllum* (Aubl.) Marchand
	Meliola protii var. *minor* Bat. & Peres	*Protium* sp.
	Meliola pycnostachidis Hansf.	*Protium heptaphyllum* var. *brasiliense* Engl.
Leguminosae Caesalpinioideae (17)	*Asteridiella cassiaecola* (Batista & Silva) Hansf.	*Cassia bacillaris* L. f.
	Asteridiella hymenaeicola (Gonz. Frag. & Cif.) Hansf.	*Hymenaea* sp.

Host Family	Fungi	Host
Caesalpinioideae	*Asteridiella hymenaeicola* (Gonz. Frag. & Cif.) Hansf.	*Hymenaea courbaril* L.
	Irenopsis chamaecristicola (F. Stevens) F. Stevens	*Cassia* sp.
	Irenopsis coronata (Speg.) F. Stevens	*Copaifera langsdorffii* Desf.
	Irenopsis toruloidea (F. Stevens) F. Stevens	*Cassia hoffmannseggii* Mart. ex Benth.
	Meliola andina Gaillard	*Peltogyne discolor* Vogel
	Meliola caesalpiniae var. *bauhiniae* M.L. Farr	*Bauhina* sp.
	Meliola cassiifolii Bat.	*Cassia bacillaris* L. f.
	Meliola dipterygicola Bat. & H. Maia	*Dipteryx odorata* (Aubl.) Willd
	Meliola hexaseptata Bat. & R. Garnier	*Copaifera officinalis* (Jacq.) L.
	Meliola hoffmannseggiana Hansf.	*Cassia hoffmannseggii* Mart. ex Benth.
	Meliola hoffmannseggiana Hansf.	*Cassia bacillaris* L. f.
	Meliola melanochylae Hansf.	*Hymenaea* sp.
	Meliola pazschkeana Gaillard	*Bauhina* sp.
	Meliola schizolobii Syd. & P. Syd.	*Schizolobium excelsum* Vogel
	Meliola schizolobii Syd. & P. Syd.	*Diptychandra* sp.
	Meliola subtortuosa Rehm	Non-identified
	Meliola theissenii Hansf.	*Bauhina* sp.
	Meliola toddaliicola var. *indica* Hansf. & Thirum.	*Cassia* sp.
	Meliola toddaliicola var. *indica* Hansf. & Thirum.	*Cassia bacillaris L. f.*
Canellaceae (1)	*Meliola cinnamodendri* J.A. Stev.	*Cinnamodendron axillare* (Nees) Endl. ex Walp.
Capparaceae (3)	*Irenopsis capparidicola* Bat. & A.F. Vital	*Capparis cynophallophora* L.
	Irenopsis capparidicola var. *opposita* Batista & Maia	*Capparis* sp.
	Irenopsis cynophallophorae Bat. & A.F. Vital	*Capparis cynophallophora* L.
Caricaceae (2)	*Meliola jacaratiae* Bat. & J.L. Bezerra	*Jacaratia dodecaphylla* (Vell.) A. DC.
	Meliola lanceolata-setosa var. *crassospora* Bat. & J.L. Bezerra	*Jacaratia dodecaphylla* (Vell.) A. DC.
Celastraceae (4)	*Asteridiella pleurostyliae* (Berk. & Broome) Hansf.	Non-identified
	Irenopsis tehoniana (Trotter) Hansf.	Non-identified
	Meliola buxicola Doidge	*Goupia paraensis* Huber
	Meliola guaranitica Speg.	Non-identified
Class Acotyledones (11)	*Asteridiella glabriuscula* (Speg.) Hansf.	Non-identified
	Asteridiella subcrustacea (Speg.) Hansf.	Non-identified
	Irenopsis cornuta (Rehm) Hansf.	*Dicksonia* sp.
	Irenopsis cornuta (Rehm) Hansf.	*Adiantum trapeziforme* L.
	Irenopsis pteridicola (F. Stevens) Hansf.	Non-identified
	Meliola acamptinga Speg.	Non-identified
	Meliola leopoldina Theiss.	Non-identified
	Meliola leptopus Theiss.	Non-identified
	Meliola mattogrossensis Starbäck	Non-identified

Host Family	Fungi	Host
Class Acotyledones	*Meliola mitchellae* var. *orthopus* Theiss.	Non-identified
	Meliola wainioi Pat.	Non-identified
	Meliola zigzag var. *discreta*	Non-identified
Clusiaceae (1)	*Meliola symphoniae* (Hansf.) Cif.	*Symphonia globulifera* L. f.
Cochlospermaceae (1)	*Meliola cochlospermifolii* Bat.	*Cochlospermum insigne* A. St.-Hil.
Combretaceae (1)	*Meliola buchenaviae* Bat.	*Buchenavia capitata* (Vahl) Eichler
Compositae (4)	*Appendiculella sororcula* (Speg.) Hansf.	*Baccharis pingraea* DC.
	Appendiculella sororcula (Speg.) Hansf.	Non-identified
	Appendiculella sororcula (Speg.) Hansf.	*Mikania micrantha* Kunth
	Asteridiella abnormis (Theiss.) Hansf.	*Baccharis* sp.
	Irenopsis piptocarphae Hansf.	*Piptocarpha axillaris* (Less.) Baker
	Meliola spegazziniana G. Winter	*Gochnatia polymorpha* (Less.) Cabrera
	Meliola spegazziniana G. Winter	Non-identified
	Meliola spegazziniana G. Winter	*Moquinia polymorpha* (Less.) DC.
Connaraceae (1)	*Asteridiella tremae* (Speg.) Hansf.	*Rourea glabra* Kunth
Convolvulaceae (3)	*Meliola malacotricha* Speg.	*Dichondra repens* J.R. Forst. & G. Forst.
	Meliola malacotricha Speg.	*Dichondra* sp.
	Meliola malacotricha Speg.	*Ipomoea* sp.
	Meliola clavulata G. Winter	*Ipomoea* sp.
	Meliola clavulata G. Winter	*Ipomoea pes-caprae* (L.) R. Br.
	Meliola clavulata G. Winter	Non-identified
	Meliola clavulata var. *batatae* F. Stevens	Non-identified
Cyclanthaceae (1)	*Meliola carludovicae* Hansf.	*Carludovica* sp.
Cyperaceae (4)	*Meliola argentina* Speg.	*Scirpus giganteus* Kunth
	Meliola uleana Pazschke	*Eleocharis* sp.
	Meliola palmicola G. Winter	*Trentepohlia* sp.
	Meliola remireae Bat.	*Remirea maritima* Aubl.
Ericaceae (2)	*Asteridiella gaylussaciae* (Hansf.) Hansf.	*Gaylussacia brasiliensis* (Spreng.) Meisn.
	Asteridiella puiggariana Hansf.	*Gaylussacia* sp.
	Meliola callosperma Speg.	*Gaylussacia* sp.
Erythroxylaceae (1)	*Meliola erythroxylifoliae* Bat. & A.F. Vital	*Erythroxylum* sp.
Euphorbiaceae (12)	*Appendiculella cornu-caprae* (Henn.) Höhn.	Non-identified host
	Asteridiella acalyphae (Rehm) Hansf.	*Acalypha* sp.
	Asteridiella alchorneae-incurvae Hansf.	*Alchornea incurva*
	Asteridiella sapii (Hansf.) Hansf.	*Sapium* sp.
	Irenopsis paulensis Hansf.	*Acalypha* sp.
	Meliola janeirensis Hansf.	*Croton* sp.

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Euphorbiaceae	*Meliola manihoticola* Henn.	*Manihot utilissima* Pohl
	Meliola tetrorchidiicola Hansf.	*Tetrorchidium rubrivenium* Poepp.
	Meliola heveae Vincens	*Hevea brasiliensis* (Willd. ex A. Juss.) Müll. Arg.
	Meliola perae Hansf.	*Pera leandri* Baill.
	Meliola longispora (Gaillard) F. Stevens	*Croton* sp.
	Meliola papillosae Bat. & H. Maia	*Euphorbia papillosa* A. St.-Hil.
	Meliola patella Theiss.	*Sebastiana* sp.
Flacourtiaceae (4)	*Amazonia caseariae* Viégas	*Casearia sylvestris* Sw.
	Meliola caseariae Petr. & Cif.	*Casearia* sp.
	Meliola caseariae-guianensis Hansf.	*Casearia* sp.
	Meliola casearíicola Hansf.	*Casearia engleri* Gilg.
	Meliola casearíicola Hansf.	*Casearia sylvestris* Sw.
	Meliola casearíicola Hansf.	*Casearia* sp.
Gesneriaceae (1)	*Meliola wismarensis* var. *besleriae* Hansf.	*Besleria umbrosa* Mart.
Gramineae (3)	*Meliola panici* var. *major* Hansf.	*Panicum* sp.
	Meliola panici var. *aristidae* (Bat. & J. Silva) Hansf.	*Aristida marginalis* Ekman
	Meliola setariae Hansf. & Deighton	*Setaria sulcata* Raddi
Humiriaceae (1)	*Meliola effusa* var. *macrospora* Bat. & Holanda	*Sacoglottis* sp.
Icacinaceae (3)	*Meliola adunciseta* Hansf.	*Villaresia* sp.
	Meliola villaresiae Henn.	*Villaresia* sp.
	Meliola villaresiana Hansf.	*Villaresia* sp.
Labiatae (3)	*Asteridiella anastomosans* (G. Winter) Hansf.	*Hyptis* sp.
	Meliola ambigua Pat. & Gaillard	Non-identified
	Meliola hyptidis Syd. & P. Syd.	Non-identified
Lauraceae (3)	*Asteridiella calva* (Speg.) Hansf.	Non-identified
	Irenopsis ocoteae (F. Stevens) F. Stevens	*Ocotea* sp.
	Meliola cassythae Bat., Cavalc. & V.D. Silveira	*Cassytha filiformis* L.
Lecythidaceae (2)	*Irenopsis masakensis* var. *major* Bat. & H. Maia	*Eschweilera ovata* (Cambess.) Miers
	Irenopsis omphaleae Hansf.	*Eschweilera ovata* (Cambess.) Miers
Leguminosae (6)	*Amazonia leguminosarum* Bat., M.P. Herrera & J.L. Bezerra	Non-identified
	Asteridiella usteri (Hansf.) Hansf.	Non-identified
	Meliola castanha Theiss.	Non-identified
	Meliola franciscana Hansf.	Non-identified
	Meliola robinsonii Syd.	Non-identified
	Meliola schizolobii var. *bauhiniae* Hansf.	Non-identified
Leguminosae Caesalpinioideae (17)	*Asteridiella cassiaecola* (Batista & Silva) Hansf.	*Cassia bacillaris* L. f.

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Leguminosae Caesalpinioideae	*Asteridiella hymenaeicola* (Gonz. Frag. & Cif.) Hansf.	*Hymenaea* sp.
	Asteridiella hymenaeicola (Gonz. Frag. & Cif.) Hansf.	*Hymenaea courbaril* L.
	Irenopsis chamaecristicola (F. Stevens) F. Stevens	*Cassia* sp.
	Irenopsis coronata (Speg.) F. Stevens	*Copaifera langsdorffii* Desf.
	Irenopsis toruloidea (F. Stevens) F. Stevens	*Cassia hoffmannseggii* Mart. ex Benth.
	Meliola andina Gaillard	*Peltogyne discolor* Vogel
	Meliola caesalpiniae var. *bauhiniae* M.L. Farr	*Bauhina* sp.
	Meliola cassiifolii Bat.	*Cassia bacillaris* L. f.
	Meliola dipterygicola Bat. & H. Maia	*Dipteryx odorata* (Aubl.) Willd
	Meliola hexaseptata Bat. & R. Garnier	*Copaifera officinalis* (Jacq.) L.
	Meliola hoffmannseggiana Hansf.	*Cassia hoffmannseggii* Mart. ex Benth.
	Meliola hoffmannseggiana Hansf.	*Cassia bacillaris* L. f.
	Meliola melanochylae Hansf.	*Hymenaea* sp.
	Meliola pazschkeana Gaillard	*Bauhina* sp.
	Meliola schizolobii Syd. & P. Syd.	*Schizolobium excelsum* Vogel
	Meliola schizolobii Syd. & P. Syd.	*Diptychandra* sp.
	Meliola subtortuosa Rehm	Non-identified
	Meliola theissenii Hansf.	*Bauhina* sp.
	Meliola toddaliicola var. *indica* Hansf. & Thirum.	*Cassia* sp.
	Meliola toddaliicola var. *indica* Hansf. & Thirum.	*Cassia bacillaris L. f.*
Leguminosae Mimosoideae (5)	*Irenopsis berggrenii* var. *quadriseptata* Bat. & R. Garnier	*Mimosa caesalpiniifolia* Benth.
	Meliola acaciarum Speg.	*Acacia pedicellata* Benth.
	Meliola acaciarum Speg.	*Acacia polyphylla* DC.
	Meliola acaciarum Speg.	*Mimosa* sp.
	Meliola koae F. Stevens	*Stryphnodendron* sp.
	Meliola mimosacearum Hansf.	Non-identified
	Meliola pithecellobii var. *uncinata* J.L. Bezerra & Garnier	*Pithecellobium diversifolium* Benth.
Leguminosae Papilionoideae (12)	*Meliola bicornis* G. Winter	Non-identified
	Meliola constipata (Speg.) Speg.	*Collaea virgata* Benth.
	Meliola denticulata G. Winter	*Centrosema virginianum* (L.) Benth.
	Meliola dipterygicola Bat. & H. Maia	*Dipteryx odorata* (Aubl.) Willd.
	Meliola erythrinae Syd.	*Erythrina* sp.
	Meliola franciscana Hansf.	*Lonchocarpus* sp.
	Meliola juruana Henn.	*Lonchocarpus* sp.
	Meliola juruana Henn.	*Swartzia* sp.
	Meliola juruana Henn.	*Lonchocarpus ulei* Harms ex Ule
	Meliola microspora Pat. & Gaillard	*Tephrosia toxicaria* (Sw.) Pers.
	Meliola scabriseta var. *brasiliensis* Hansf.	Non-identified
	Meliola scabriseta var. *calopogonii*	*Centrosema* sp.
	Meliola stizolobii var. *brasiliensis* Hansf.	Non-identified
	Meliola stizolobii var. *brasiliensis* Hansf.	*Galactia* sp.
	Meliola stizolobii var. *microspora* Bat. & Peres	*Tephrosia toxicaria* (Sw.) Pers.
	Meliola vignae-gracilis Hansf. & Deighton	Non-identified

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Loganiaceae (4)	*Asteridiella buddleyicola* (Henn.) Hansf.	*Buddleia americana* L.
	Asteridiella inermis (Kalchbr. & Cooke) Hansf.	*Buddleia* sp.
	Asteridiella obducens (Gaillard) Hansf.	*Buddleia* sp.
	Meliola spigeliae Hansf.	*Spigelia* sp.
Loranthaceae (1)	*Meliola glaziovii* Hansf.	Non-identified
Lythraceae (2)	*Irenopsis lagerstroemiae* Bat. & Nascim.	*Lagerstroemia indica* L.
	Irenopsis lagerstroemiae var. *major* Hansf.	*Lagerstroemia indica* L.
Magnoliaceae (2)	*Asteridiella crustacea* (Speg.) Hansf.	*Drimys* sp.
	Asteridiella werdermannii (Hansf.) Hansf.	*Drimys winteri* J.R. Forst. & G. Forst.
Malpighiaceae (9)	*Irenopsis malpighiicola* Hansf.	Non-identified
	Meliola byrsonimae F. Stevens	*Byrsonima lancifolia* A. Juss.
	Meliola byrsonimae var. *minor* Hansf.	*Byrsonima sericea* DC.
	Meliola byrsonimicola F. Stevens & Tehon	*Byrsonima laurifolia* Kunth
	Meliola byrsonimicola F. Stevens & Tehon	*Byrsonima crispa* A. Juss.
	Meliola byrsonimina F. Stevens & Tehon	Non-identified
	Meliola crenata G. Winter	Non-identified
	Meliola crenatofurcata Syd. & P. Syd.	Non-identified
	Meliola malpighiacearum Hansf.	Non-identified
	Meliola usteriae Hansf. & Deighton	Non-identified
Malvaceae (1)	*Meliola goianensis* Bat. & H. Maia	*Sida* sp.
Marantaceae (1)	*Meliola calatheicola* var. *minor* Bat. & H. Maia	*Calathea tuberosa* (Vell.) Körn.
Melastomataceae (3)	*Asteridiella melastomatacearum* (Speg.) Hansf.	Non-identified
	Asteridiella melastomatacearum (Speg.) Hansf.	*Clidemia hirta* (L.) D. Don
	Meliola camaragibeicola Bat. & H. Maia	*Mouriria* sp.
Meliaceae (4)	*Meliola guareina* Hansf.	*Guarea* sp.
	Meliola platysperma Theiss.	*Guarea* sp.
	Meliola rickii Hansf.	Non-identified
	Meliola trifurcata Cif.	*Carapa* sp.
Menispermaceae (1)	*Meliola parreirae* Bat.	*Cissampelos parreira* Vell.
Minimiaceae (1)	*Meliola mollinediae* Theiss.	*Mollinedia elegans* Tul.
Moraceae (3)	*Appendiculella echinus* (Henn.) Höhn.	*Coussapoa* sp.
	Appendiculella echinus (Henn.) Höhn.	*Cecropia glaziovi* Snethl.
	Asteridiella cecropiicola (Hansf.) Hansf.	*Cecropia* sp.

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Moraceae	*Meliola soroceana* Bat.	*Sorocea ilicifolia* Miq.
Myrsinaceae (2)	*Asteridiella theisseniana* Hansf.	*Myrsine* sp.
	Meliola armata Speg.	*Myrsine* sp.
Myrtaceae (10)	*Asteridiella atricha* var. *major* Hansf.	Non-identified
	Asteridiella mammillata (Hansf.) Hansf.	Non-identified
	Meliola densa Cooke	Non-identified
	Meliola eugeniae-jamboloidis Hansf.	Non-identified
	Meliola fagarae Hansf.	*Myrtus communis* L.
	Meliola psidii Fr.	*Psidium guajava* L.
	Meliola pulchella Speg.	Non-identified host
	Meliola ranganathii Hansf.	*Myrtus communis* L.
	Meliola trichostroma (Kunze) Toro	*Psidium guajava* L.
	Meliola trichostroma (Kunze) Toro	*Psidium araca* Raddi
	Meliola trichostroma (Kunze) Toro	*Psidium* sp.
	Meliola trichostroma var. *macrospora* Bat. & Peres	*Psidium guajava* L.
Nyctaginaceae (1)	*Meliola kisubiensis* var. *neeae* Bat. & R. Garnier	*Neea* sp.
Olacaceae (3)	*Asteridiella cordiae-salicifoliae* Hansf.	*Ximenia americana* L.
	Asteridiella valdiviensis (Speg.) Hansf.	*Ximenia americana* L.
	Asteridiella ximeniae (Bat. & J. Silva) Hansf.	*Ximenia americana* L.
Palmae (4)	*Asteridiella iquitosensis* (Henn.) Hansf.	*Bactris* sp.
	Asteridiella manaosensis (Henn.) Hansf.	*Mauritia aculeata* Kunth
	Meliola acristae var. *cocoës* Hansf.	*Cocos nucifera* L.
	Meliola palmicola G. Winter	*Bactris* sp.
Phytolaccaceae (1)	*Meliola phytolaccae-dioicae* Hansf.	*Phytolacca dioica* L.
Piperaceae (4)	*Irenopsis tortuosa* (G. Winter) F. Stevens	*Piper sidaefolium* Link & Otto
	Irenopsis tortuosa var. *potomorphes* (Cif.) Hansf.	*Pothomorphe umbellata* (L.) Miq.
	Meliola bifida Cooke	*Peperomia scandens* Ruiz & Pav.
	Meliola indica var. *careyae* F. Stevens	*Peperomia scandens* Ruiz & Pav.
Plantaginaceae (1)	*Meliola plantaginis* Hansf. & F. Stevens	*Plantago* sp.
Rhamnaceae (1)	*Meliola tridentata* Hansf.	*Scutia arenicola* (Casar.) Reissek
Rosaceae (1)	*Appendiculella calostroma* (Desm.) Höhn.	*Rubus brasiliensis* Mart.
	Appendiculella calostroma (Desm.) Höhn.	*Rubus urticifolius* Poir.
	Appendiculella calostroma (Desm.) Höhn.	*Rubus* sp.
	Appendiculella calostroma (Desm.) Höhn.	*Geum chiloense* Balb. ex Ser.

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Rosaceae	*Appendiculella calostroma* (Desm.) Höhn.	*Geum brasiliense*
Rubiaceae (12)	*Amazonia psychotriae* (Henn.) Theiss.	*Psychotria* sp.
	Asteridiella glabra var. *major* Hansf.	*Sabicea cinerea* Aubl.
	Asteridiella penicilliformis (Gaillard) Hansf.	*Psychotria* sp.
	Asteridiella seminata (Berk. & M.A. Curtis) Hansf.	*Psychotria* sp.
	Meliola alibertiae F. Stevens	*Alibertiae edulis* (l. C. Richard) A. Richard DC
	Meliola amphigena var. *tontaneae* Hansf.	Non-identified
	Meliola anceps Syd. & P. Syd.	*Uncaria guianensis* (Aubl.) J.F. Gmel.
	Meliola caseariae-guianensis Hansf.	*Sabicea cinerea* Aubl.
	Meliola melanochylae Hansf.	*Genipa americana* L.
	Meliola psychotriae Earle	Non-identified
	Meliola psychotriae Earle	*Mitracarpus hirtus* (L.) DC.
	Meliola spirobelia Bat. & M.P. Herrera	Non-identified
	Meliola thalliformis var. *major* D.J. Soares & R.W. Barreto	*Bathysa australis* (A. St.-Hil.) Benth. & Hook. f.
	Meliola woodiana Sacc.	Non-identified
Rutaceae (3)	*Meliola galipeae* Syd. & P. Syd.	*Galipea* sp.
	Meliola rickiana Hansf.	*Zanthoxylum* sp.
	Meliola koniaensis Hansf. & Deighton	*Monnieria trifolia* L.
Sapindaceae (22)	*Asteridiella cupaniae* Hansf.	*Cupania revoluta* Rolfe
	Asteridiella cupaniae Hansf.	*Cupania* sp.
	Asteridiella guatemalensis (Hansf.) Hansf.	*Cupania emarginata* Cambess.
	Asteridiella guatemalensis (Hansf.) Hansf.	*Cupania* sp.
	Irenopsis cupaniicola Hansf.	*Cupania vernalis* Cambess.
	Irenopsis cupaniicola Hansf.	*Cupania emarginata* Cambess.
	Meliola burseracearum F. Stevens	*Cupania* sp.
	Meliola campylopoda Syd.	*Cupania* sp.
	Meliola capensis var. *cupaniae* Hansf.	*Cupania vernalis* Cambess.
	Meliola cupaniae-majoris Bat.	*Cupania* sp.
	Meliola cupaniicola Bat.	*Cupania revoluta* Rolfe
	Meliola lyoniae F. Stevens	*Dodonaea* sp.
	Meliola parenchymatica Gaillard	Non-identified
	Meliola paulliniae F. Stevens	*Paullinia pinnata* L.
	Meliola paulliniae F. Stevens	*Cupania* sp.
	Meliola paulliniana Bat. & Nascim.	*Paullinia* sp.
	Meliola paulliniicola Hansf.	*Paullinia* sp.
	Meliola paulliniifolii Bat.	*Paullinia pinnata* L.
	Meliola rigida Doidge	*Cupania* sp.
	Meliola sapindacearum Speg.	*Sapindus saponaria* L.
	Meliola sapindacearum Speg.	*Paullinia elegans* Cambess.
	Meliola sapindi-esculenti Hansf.	*Sapindus esculentus* A. St.-Hil.
	Meliola serjaniae F. Stevens	*Serjania* sp.
	Meliola serjaniae var. *densa* Hansf.	Non-identified
	Meliola serjaniae var. *major* Hansf.	*Serjania* sp.
	Meliola talisiana Bat. & H. Maia	*Talisia esculenta* (A. St.-Hil.) Radlk.
	Meliola tijucensis Hansf.	*Allophylus* sp.
	Meliola microspora Pat. & Gaillard	*Vandellia diffusa* L.

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Sapotaceae (5)	*Asteridiella sapotacearum* (Hansf.) Hansf.	Non-identified
	Asteridiella sapotacearum var. *longipoda* (Hansf.) Hansf.	Non-identified
	Meliola bumeliae Hansf.	*Lucuma sp.*
	Meliola pradosiae Bat.	*Pradosia lactescens* (Vell.) Radlk.
	Meliola snowdenii Hansf. & F. Stevens	Non-identified
Scrophulariaceae (2)	*Meliola ambigua* Pat. & Gaillard	Non-identified
	Meliola microspora Pat. & Gaillard	*Vandellia diffusa* L.
	Meliola microspora Pat. & Gaillard	Non-identified
Solanaceae (9)	*Asteridiella boerhaviifolii* Bat. & Peres	*Solanum boerhaviaefolium* Sendtn.
	Asteridiella laeta (Theiss.) Hansf.	*Solanum* sp.
	Asteridiella naucina (Syd.) Hansf.	*Solanum pulverulentum* Pers.
	Asteridiella plebeja (Speg.) Hansf.	Non-identified
	Asteridiella winteri (Speg.) Hansf.	*Solanum* sp.
	Meliola fuscidula Gaillard	*Solanum* sp.
	Meliola pauciseta Hansf.	*Solanum* sp.
	Meliola wismarensis var. *brasiliensis* Hansf.	*Solanum* sp.
	Meliola wismarensis var. *puyoensis* Syd.	*Solanum* sp.
Sterculiaceae (1)	*Meliola buettneriae* J.A. Stev.	*Buettneria ramosissima* Pohl.
Strelitziaceae (3)	*Meliola foliae-ravenalae* Bat. & Nascim.	*Ravenala guyannensis* (Rich.) Steud.
	Meliola musae (Kunze ex Fr.) Mont.	*Ravenala guyannensis* (Rich.) Steud.
	Meliola musae (Kunze ex Fr.) Mont.	*Ravenala* sp.
Styracaceae (2)	*Asteridiella aberrans* (F. Stevens) Hansf.	*Styrax* sp.
	Asteridiella styracicola (Speg.) Hansf.	*Styrax leprosus* Hook. & Arn.
Tiliaceae (1)	*Asteridiella amoena* (Syd.) Hansf.	*Christiana africana* DC.
Ulmaceae (1)	*Asteridiella tremae* (Speg.) Hansf.	*Trema* sp.
Velloziaceae (1)	*Asteridiella barbaceniae* (Hansf.) Hansf.	*Barbacenia purpurea* Hook.
Verbenaceae (5)	*Asteridiella aegiphilae* (Hansf.) Hansf.	*Aegiphila lhotszkiana* Cham.
	Asteridiella pittieri (Toro) Hansf.	*Duranta repens* var. *aurea* Hort.
	Meliola ambigua Pat. & Gaillard	*Lantana* sp.
	Meliola ambigua Pat. & Gaillard	*Lantana camara* L.
	Meliola cantareirensis Hansf.	*Vitex montevidensis* Cham.
	Meliola pseudocapensis Hansf.	*Aegiphila* sp.
Vitaceae (2)	*Meliola furcata* Lév.	*Cissus sicyoides* L.
	Meliola furcata Lév.	*Cissus* sp.
	Meliola juruana Henn.	*Cissus sicyoides* L.
Winteraceae (1)	*Meliola corallina* Mont.	*Drimys brasiliensis* Miers