ENDEMIC MELIOLAS AND MELIOLAS ON ENDEMIC PLANTS IN WESTERN GHATS, INDIA

V.B. Hosagoudar

Microbiology Division, Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala 695562, India.
Email: hosagoudar@yahoo.co.in

Abstract

The Western Ghats consists of about 4000 species of flowering plants, of which about 1500 are endemic to the area. India harbours about 500 Meliolaceae members belonging to the genera *Amazonia, Asteridiella, Appendiculella, Irenopsis, Meliola* and *Prataprajella*. Of these, 409 taxa with all the representative genera of Meliolaceae in India are known from the Western Ghats. They are categorised thus: 277 Meliolaceae members endemic to the Western Ghats which occur on 306 hosts and 78 Meliolaceae members which occur on 66 hosts endemic to the Western Ghats. One hundred and thirty Meliolaceae members show their phytogeographical affinity with all the six continents except Antarctica. Meliolaceae members are predominantly ectophytes, having superficial mycelium with lateral appressoria; phialides unicellular and ampulliform; setae simple or branched; perithecia globose or flattened-globose; asci unitunicate and early evanescent; ascospores brown, 3-4 -septate, germinate on compatible hosts by producing appressoria.

Keywords

Distribution, endemism, Meliolaceae, Western Ghats

Introduction

The Western Ghats (8º20'-20º40'N & 73º-77ºE) extending from Tapti in Gujarat to Kanniyakumari in Tamil Nadu, traverse through Maharashtra, Goa, Karnataka and Kerala along the West Coast. These hills are inclined gently towards the eastern side and all the rivers like Krishna, Godavari, etc, and their tributaries moist and enrich the soil in the Deccan Plateau and enter the Bay of Bengal through the Eastern Ghats. The western side of the Western Ghats is very steep and much of the rainwater enters the Arabian Sea.

The Western Ghats, which receives much more rainfall than the Eastern Ghats are a magnificent stretch of hill ranges presenting rich and varied flora. Different types of vegetation occur here, namely, scrub jungles, grasslands at the lower altitudes, moist and dry deciduous forests, tropical evergreen and semi-evergreen forests, and montane grasslands and sholas. The work on the survey, inventorisation, mapping of endemics, vegetational mapping, habit study of economically important and medicinal plants, etc. have been carried out. Much of the attention has so far been given only to the phanerogams and the knowledge on the lower groups in tropical forests is meager and fragmentary. It is very much applicable to India, including the Western Ghats.

The Western Ghats harbour about 4000 species of Phanerogams, of which about 1500 are endemics. The main centers of endemism in Western Ghats are Agastyamala hills, Anaimalai high ranges, and Nilgiris-Silent Valley-Wyanad-Kodagu (Nayar 1996, 1997). Based on the Monograph of Meliolales of India (Hosagoudar, 1996) and the subsequent additions to this group (Hosagoudar & Abraham 1996a,b, 1997a,b, 1998a,b,c,d,e; Hosagoudar *et al.*, 1998a,b,c,d, 1999), the total number of Meliolaceae members occurring in India is about 500 taxa belonging to the genera *Amazonia, Asteridiella, Appendiculella, Irenopsis, Meliola* and *Prataprajella.*

Discussion

The world Monograph of Meliolaceae includes 1814 taxa and the subsequent regional floras (Hansford, 1961; Hosagoudar, 1996; Hu *et al*., 1996; Mibey & Hawksworth, 1997) have contributed around 500 taxa to this group. In India, from all sources and groups, 23000 fungal taxa are recorded (Sarbhoy, 1994). Of which, 500 are Meliolaceae, forming 2% of the total Indian mycoflora. When we consider Indian phytogeographical zones, of the 500 Meliolaceae taxa, 400 taxa are from Western Ghats, which counts 82%. Though the species of the genus *Meliola* were reported from Belgaum by Cooke (1880, 1884), the actual study of this group is quite juvenile and most of the taxa known now are from the Western Ghats, which harbour

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Table 1. Meliolas endemic to the Western Ghats

Fungi under the name of host families	Corresponding hosts
	Acanthaceae
Meliola mackenziae Hosag. *et al.*	*Mackenziea gracilis*
M. nilgirianthi Hosag.	*Nilgirianthus heyneanaus*
	Anacardiaceae
Meliola ardigoosii Hosag. & Abraham	*Buchanania lanzan*
M. buchananiicola Hosag.	*Buchanania lanzan*
M. glutae Hosag. & Abraham	*Gluta travancorica*
M. holigarnae Stev.	*Nothopegia beddomei, N. heyneana, N. racemosa, Holigarna arnottiana, H. ferruginea, H. grahamii*
M. nothopegiae Hansf.	*Nothopegia colebrookiana*
M. semecarpi-anacardii Hosag.*et al.*	*Semecarpus anacardium*
M. travancoricae Hosag.	*S. travancorica*
	Ancistrocladaceae
Meliola ancistrocladi Hosag.	*Ancistrocladus heyneanus*
	Angiopteridaceae
Meliola angiopteridis Hansf. var. *indica* Hosag.	*Angiopteris evecta*
	Annonaceae
Irenopsis goniothalami Hosag. & Abraham	*Goniothalamus rhynchantherus*
Meliola artabotrydicola Hosag. & Abraham	*Artabotrys zeylanicus*
M. mitrephorae Hosag. & Rajendran	*Mitrephora heyneana*
M. unonae Hosag. & Abraham	*Meiogyne pannosa*
M. unonicola Hosag. & Abraham	*M. pannosa*
	Apocynaceae
Meliola carissae Doidge var. *spinari* Hosag.	*Carissa spinarum*
M. chilocarpi Hosag. & Abraham	*Chilocarpus atrovirens*
M. ellertoniae Hosag. & Abraham	*Ellertonia rheedii*
M. ervatamiae Hosag.	*Tabernaemontana heyneana*
M. frutescentis Hosag. *et al.*	*Ichnocarpus frutescens*
M. holarrhenae Hansf. & Thirum.	*Holarrhena pubescens* (*=Holarrhena antidysenterica*)
M. hunteriae Hosag.	*Hunteria corymbosa*
M. ichnocarpi Hansf. & Thirum.	*Ichnocarpus frutescense*
M. integripoda Hosag. *et al.*	*Carissa carandas*
M. pepparaensis Hosag. & Abraham	*Tabernaemontana heyneana*
M. simillima Ellis & Everhvar. *major* Hansf.	*Holarrhena pubescens* (*=Holarrhena antidysenterica*)
M. srinivasului Hosag.	*Plumeria alba*
M. thiruvananthapurica Hosag. & Abraham	Apocynaceae member
M. tabernaemontanicola Hansf. & Thirum.	*Tabernaemontana* sp.
	Aquifoliaceae
Meliola ilicis-malabaricae Hosag. & Raghu	*Ilex malabarica*
	Araceae
Asteridiella pothodis (Hansf. & Thirum.) Hansf.	*Pothos scandens*
	Araliaceae
Meliola brassaiopsidis Hosag.	*Brassaiopsis* sp.
M. payakii Hosag.	*Hedera helix*

Fungi under the name of host families	Corresponding hosts
	Arecaceae
Meliola caryotae Srinivasulu	*Caryota urens*
	Asclepiadaceae
Meliola ceropegiae Hosag. & Ramachandran	*Ceropegia* sp.
M. telosmae Rehm.var. *indica* Hosag. *et al.*	*Tylophora tenuis*
M. telosmae Rehm. var. *radhanagariensis* Hosag.	Asclepiadaceae member
M. tylophorae Hosag.	*Tylophora capparidifolia*
M. toxocarpi Hosag. & Antony	*Toxocarpus beddomei*
	Asteraceae
Meliola coreopsidis Thite & Kulkarni	*Coreopsis aristosa*
	Bambusaceae
Meliola phyllostachydis Yamam. var. *microspora* Hosag. *et al.*	*Bambusa* sp.
	Bignoniaceae
Asteridiella schlegeliae (Stev.) Hansf. var. *stereospermi* Hosag. *et al.*	*Stereospermum colais*
	Boraginaceae
Asteridiella ehretiae Hosag. & Raghu	*Ehretia canarensis*
Meliola ehretiicola Hosag.	*E. canarensis*
	Caesalpiniaceae
Meliola aethiops Sacc.var. *cassiae* Rao	*Cassia fistula*
M. aethiops Sacc. var. *moullavae* Hosag. & Raghu	*Moullava spicata*
M. kingiodendri Hosag. *et al.*	*Kingiodendron pinnatum*
M. surattensis Hosag. *et al.*	*Cassia surattensis*
	Capparaceae
Meliola capparidicola Hosag.	*Capparis divaricata*
	Caprifoliaceae
Meliola goosii Hosag.	*Viburnum punctatum*
	Celastraceae
Amazonia mayteni Hosag. *et al.*	*Maytenus rothiana*
A. patilii Hosag.	*M. emarginata*
Asteridiella lophopetali Hosag. & Raghu	*Lophopetalum wightianum*
Meliola bhesae Hosag.	*Bhesa indica*
M. celastracearum Hosag. & Dayal	*Pleurostylia* sp. (*Pleurostylia opposita*)
M. eunymicola Hosag.	*Euonymus indicus*
	Clusiaceae
Appendiculella calophylli (Stev.) Toro var. *apetali* Hosag. *et al.*	*Calophyllum apetalum*
Meliola ochrocarpi Thite & Patil	*Mammea suriga*
Connaraceae	
Meliola agumbensis (Subhedar & Rao) Hosag.	*Rourea prainiana* *Connarus monocarpus*

Fungi under the name of host families	Corresponding hosts
M. connari Yates var. *indica* Hosag.	*C. sclerocarpus*
	Convolvulaceae
Meliola erycibes-paniculatae Hosag.	*Erycibe paniculata*
	Cornaceae
Asteridiella masstixiae Hosag. & Raghu	*Mastixia arborea*
	Cyperaceae
Meliola tibigirica Hosag. & Abraham	*Rhnchospora corymbosa*
	Dichapetalaceae
Meliola dichapetali Hansf. & Thirum.	*Dichapetalum gelonioides*
	Ebenaceae
Asteridiella eucleae Hansf. var. *microspora* Hosag. & Raghu	*Diospyros candolleana*
A. kapoorii Hosag. & Raghu	*Diospyros* sp.
Meliola diospyri Sydow & Sydow	*Diospyros montana, D. angustifolia* (*=D. nigrescens*), *D. pruriens, D. sylvatica, D. malabarica*
M. megalocarpa Sydow var. *microspora* Hosag. & Goos	*D. buxifolia*
	Elaeagnaceae
Meliola elaeagni Hansf. & Thirum.	*Elaagnus latifolia* (*= E. kologa*), *Elaeagnus indica*
	Elaeocarpaceae
Asteridiella elaeocarpi-tuberculati Hosag.	*Elaeocarpus tuberculatus*
	Erythropalaceae
Meliola erythropali Hosag.	*Erythropalum scandens* (*= E. populifolium*)
	Euphorbiaceae
Asteridiella crotonis Hosag.	*Croton zeylanicus*
A. macarangicola Hosag.	*Macaranga peltata*
A. resinosi Hosag.	*Mallotus resinosus*
A. crotonicola Hosag. & Abraham	*Croton malabaricus*
Meliola drypeticola Hosag.	*Drypetes longifolia*
M. drypeticola Hosag.	*Epirinus mallotiformis*
M. fahrenheitiae Hosag. & Abraham	*Fahrenheitia zeylanica*
M. glochidii Stev. & Rold. ex Hansf. var. *velutini* Hosag.	*Glochidion velutinum*
M. karnatakensis Hosag. *et al.*	*Glochidion* sp.
M. malloticola Hosag.	*Mallotus philippensis*
M. radhanagariensis Hosag.	Euphorbiaceae member
M. thiteana Hosag.	*Glochidion* sp.
M. trewiae Hosag.	*Trewia polycarpa, Trewia nudiflora*
	Fabaceae
Asteridiella millettiae Hosag. *et al.*	*Millettia rubiginosa*
Meliola atylosiae Hosag.	*Atylosia lineata*
M. banosensis Sydow var. *puerariae* Hosag.	*Pueraria* sp.
M. banosensis Sydow var. *puericola* Hosag.	*Pueraria tuberosa*
M. bantamensis Hansf. var. *keralensis* Hosag.	*Desmodium motorium* (*= D. gyrans*)
M. bataanensis Sydow var. *indica* Hosag. & Abraham	*Millettia rubiginosa*
M. clitoriae Hosag.	*Clitoria ternatea*
M. desmodi-pulchelli Hosag *et al.*	*Desmodium pulchellum*
M. millettiae-chrysophyllae Deight. var. *indica* Hosag. *et al.*	*Millettia splendens*
M. mucunae Hansf. var. *hirsutae* Hosag.	*Mucuna hirsute*
M. mucunae-acuminatae Hansf. var. *indica* Hosag. *et al.*	*Mucuna pruriens*
M. peguensis Hosag. *et al.*	*Millettia peguensis*
M. phaseoli Thite *ex* Hosag.	*Vigna khandalensis*
M. pongamiae Hosag. & Abraham	*Pongamia pinnata*
M. teramni Sydow var. *millettiae* Hosag.	*Millettia rubiginosa*
	Flacourtiaceae
Amazonia flacourtiae Hosag. *et al.*	*Flacourtia* sp.
Asteridiella caseariicola Hosag.	*Casearia esculenta*
A. scolopiae Hosag.	*Scolopia crenata*
Meliola scolopiae Doidge var. *indica* Hosag.	*Scolopia crenata*
	Gentianaceae
Meliola exaci Hosag.	*Exacum tetragonum*
	Gesneriaceae
Asteridiella cyrtandrae (Stev.) Hansf. var. *didymocarpi* Hosag.	*Didymocarpus humboltianus*
	Icacinaceae
Amazonia gomphandrae Hosag.	*Gomphandra coriacea*
Meliola chandrasekharanii Hosag.	*Apodytes dimidiata, Nothopodytes nimmoniana*
M. gomphandrae Hosag. & Abraham	*Gomphandra coriacea*
M. dimidatae Hosag.	*Apodytes dimidiata*
M. sarcostigmaticola Hosag. & Abraham	*Sarcostigma kleinii*
M. sarcostigmatis Hosag.	*Sarcostigma kleinii*
M. stemonuri Hosag.	*Gomphandra tetrandra* (*= Stemonurus tetrandra*)
	Lauraceae
Amazonia actinodaphnes Hosag.	*Actinodaphne malabarica*
A. cinnamomi Hosag.	*Cinnamomum riparium*
Meliola actinodaphnecola Hosag. & Abraham	*Actinodaphne malabarica*
M. beilschmiediicola Hosag.	*Beilschmiedia wightii*
M. beilschmiediae Yamam. var. *cinnamomicola* Hosag.	*Cinnamomum malabatrum*
M. cholakadensis Hosag. *et al.*	Lauraceae member
M. cinnamomi Hosag. & Abraham	*Cinnamomum* sp.
M. cryptocariicola Hosag. & Raghu	*Cryptocarya bourdillonii*
M. drepanochaeta Sydow var. *insignis* Hosag.	*Litsea insignis*
M. floridensis Hansf. var. *pudukadensis* Hosag.	*Persea macrantha*
M. gooseana Hosag. & Abraham	*Actinodaphne* sp.

Fungi under the name of host families	Corresponding hosts
M. kakachiana Hosag.	*Cryptocarya beddomei*
M. kaveriappai Hosag. *et al.*	*Cinnamomum* sp.
M. linderae Yamam. var. *microspora* Hosag. & Abraham	*Actinodaphne malabarica*
M. litseae Sydow var. *floribundae* Hosag.	*Litsea floribunda*
M. litseae Sydow var. *insignis* Hosag.	*Litsea insignis*
M. litseae Sydowvar. *keralensis* Hosag.	*Litsea stocksii* var. *glabrescens*
M. litseae Sydow var. *microspora* Hosag.	*Litsea floribunda*
M. mannavanensis Hosag. *et al.*	*Litsea* sp.
M. patileana Hosag.	*Cryptocarya bourdillonii*
M. pudukadensis Hosag.	*Litsea* sp.
M. pushpangadanii Hosag. & Abraham	*Cryptocarya bourdillonii*
M. ramacharii Hosag.	*Persea macrantha*
M. shettyi Hosag. *et al.*	*Actinodaphne* sp.
M. linderae Yamam. var. *microspora* Hosag. & Abraham	*Actinodaphne malabarica*
	Lecythidaceae
Meliola indica Sydow var. *careyae* Stev.	*Careya arborea*
	Leeaceae
Amazonia leeae Hansf. & Thirum.	*Leea indica*
A. leeae Hansf. & Thirum	*L. macrophylla*
Irenopsis leeae Hansf. var. *indica* Hosag.	*L. indica*
	Loganiaceae
Meliola gardneriae Hansf. & Thirum.	*Gardneria* sp.
M. gardneriae Hansf. & Thirum. var. *indica* Hosag. *et al.*	*G. ovata*
	Loranthaceae
Meliola dendropthoicola Hosag. & Abraham	*Dendrophthoe falcate*
M. loranthacearum Hosag. & Abraham	*D. falcata*
M. prataprajii Hosag. & Abraham	*D. falcate*
	Lythraceae
Meliola woodfordiae Srinivasulu	*Woodfordia fruticosa*
	Malvaceae
Amazonia abutili Hosag.	*Abutilon ramosum*
Asteridiella julostylidis Hosag. & Abraham	*Julostylis polyandra*
Irenopsis mudumalaiensis Hosag.	*Kydia calycina*
Meliola kydiae-calycinae Hansf. & Thirum.	*K. calycina*
	Marantaceae
Asteridiella schumannianthi Hosag. *et al.*	*Schumannianthus virgatus*
	Melastomataceae
Meliola affinis Sydow var. *indica* Hosag.	*Memecylon edule*
M. attayarica Hosag. & Abraham	*Memecylon* sp.
M. memecylicola Hansf. var. *indica* Hosag.	*M. depressum*
	Meliaceae
Irenopsis chukrasiae Hosag.	*Chukrasia tabularis*
I. indica (Anahosur) Hosag.	*Aphanamixis polystachya*
Meliola aphanamixidis Hosag.	*Aphanamixis polystachya*
M. chukrasiae Hosag.	*Chukrasia* sp.

Fungi under the name of host families	Corresponding hosts
M. heyneae Hansf. & Thirum.	*Trichilia connaroides*
M. nairii Hosag.	*Aphanamixis polystachya*
M. reinwardtiodendri Hosag.	*Reinwardtiodendron anamalaiense*
M. swieteniicola Hosag. *et al.*	*Swietenia mahagoni*
	Menispermaceae
Meliola cycleae Hosag.	*Cyclea peltata*
M. cissampelicola Hansf. & Thirum.	*Cissampelos convolvulacea*
	Mimosaceae
Amazonia abaremae Hosag. & Antony	*Pithecellobium monadelphum* (= *Abarema bigemina*)
Meliola melanoxylonis Hosag. & Pillai	*Acacia melanoxylon*, *Acacia sinuata*
	Moraceae
Meliola artocarpi Yates var. *indica* Hosag. *et al.*	*Artocarpus gomezianus* ssp. *zeylanicus*
M. bangalorensis Hansf. & Thirum.	*Ficus* sp.
M. dorsteniae Hosag. & Abraham	*Dorstenia indica*
M. ficicola Hansf. & Thirum.	*Ficus* sp.
M. integrifolii Patil ex Hosag.	*Artocarpus heterophyllus*
M. ovatipoda Hansf. & Thirum.	*Ficus* sp.
	Myristicaceae
Meliola myristicae Hosag. & Raghu	*Myristica fatua* var. *magnifica*
M. knemae Hansf. var. *macrospora* Hosag. & Abraham	*Knema attenuata*
	Myrsinaceae
Meliola antistrophecola Hosag. & Abraham	*Antistrophe serratifolia*
M. rapaneae Sydow var. *microspora* Hosag. & Ganesan	*Rapanea wightiana*
	Myrtaceae
Amazonia syzygii Hosag.	*Syzygium cumini*
Meliola eugeniae-stocksii Hosag.	*Syzygium stocksii* (= *Eugenia stocksii*)
M. eugeniicola Stev.	*E. eucalyptoides*
M. gersoppaensis Hosag. *et al.*	*Syzygium* sp.
M. laxa Gaill. var. *indica* Hosag. *et al.*	*S. zeylanicum*
M. maduraiensis Hosag. *et al.*	*S. lanceolatum*
M. pulchella Speg. var. *syzygii* Hosag.	*S. laetum*
M. ranganathii Hansf.	*Eugenia* sp.
M. syzygii-benthamiani Hosag. & Abraham	*Syzygium benthamianum*
	Olacaceae
Meliola olacicola Hosag.	*Olax wightiana*
	Oleaceae
Asteridiella websteri Hosag.	*Olea dioica*
Meliola ligustri Hosag.	*Ligustrum robustum* ssp. *walkeri* (=*Ligustrum walkeri*)
M. malabarensis Hansf.	*Olea dioica*
M. mayapiicola Stev. var. *indica* Hosag.	*Chionanthus mala-elengi*

Fungi under the name of host families	Corresponding hosts
	Opiliaceae
Meliola cansjerae Hansf. & Thirum.	*Cansjera rheedii*
M. cansjerae Hansf. & Thirum. var. *indica* Hosag. *et al.*	*C. rheedii*
M. cansjericola Hosag.	*C. rheedii*
M. opiliae Sydow	*Opilia amentacea*
	Pandanaceae
Meliola kapoorii Hosag. & Raghu	*Pandanus* sp.
M. pandanacearum Hosag. & Abraham	*Pandanus* sp.
	Periplocaceae
Meliola hemidesmicola Hosag.	*Hemidesmus indicus*
	Piperaceae
Meliola thetei Hosag.	*Piper nigrum*
	Poaceae
Meliola cymbopogonis Kapoor	*Cymbopogon nardus, C. flexuosus*
M. themedae Stev. & Rold. ex Hansf. var. *indica* Hosag.	*Themeda cymbaria*
M. panici Earle var. *macropodia*	*Cyrtococcum longipes* Hosag. & Abraham
	Polygonaceae
Meliola polygoni Srinivasulu	*Polygonum chinense*
M. polygonicola Hosag.	*P. chinense*
	Rhamnaceae
Amazonia gouaniae Hosag. & Braun	*Gouania microcarpa*
M. zizyphi Hansf. & Thirum.	*Ziziphus glabrata, Z. rugosa Z. xylopyrus*
	Rhizophoraceae
Meliola anisophyllaeae Hansf. & Deight. var. *caralliae* Hosag. *et al.*	*Carallia brachiata* (= *C. integrerrima*)
	Rosaceae
Meliola rubiella Hansf. var. *indica* Hosag.	*Rubus niveus*
	Rubiaceae
Amazonia goosii Hosag. & Abraham	*Canthium* sp.
A. goosii Hosag. & Abraham var. *microspora* Hosag. *et al.*	*Psychotria globicepala*
Meliola canthii-angustifolii Hosag.	*Canthium angustifolium*
M. chandolensis Patil ex Hosag.	*Ixora Pavetta* (=*I. parviflora*)
M. henryi Hosag.	*Canthium rheedii, C. parviflorum*
M. ixorae Yates var. *psychotriae* Hosag. & Abraham	*Psychotria macrocarpa*
M. ixorae Yates var. *macrospora* Hosag.	*Ixora elongata, I. nigricans, I. coccinea*
M. ixorae-coccineae Hosag. & Pillai	*I. coccinea*
M. kanniyakumariana Hosag.	*Hedyotis albo-nervia, H. gamblei*
M. plectroniae Hansf.	*Canthium dicoccum, C. rheedii*
M. psychotriae-nudiflorae Hosag.	*Psychotria nudiflora, Ixora coccinia*
M. weberae Kapoor	*Tarenna asiatica*
M. wendlandiae Hosag.	*Wendlandia thyrsoidea* (=*W. notoniana*), *W. tomentosa*
	Rutaceae
Amazonia acronychiae Hosag.	*Acronychia pedunculata*
A. melicopecola Hosag. & Abraham	*Melicope lunuankenda*
Asteridiella acronychiae-pendunculatae Hosag.	*Acronychia pedunculata*
Meliola cadigensis Yates var. *glycosmidis* (Kapoor) Hosag.	*Glycosmis mauritiana G. macrocarpa*
M. clausenae Hosag.	*Clausena indica*
M. cranei Hosag. & Goos	*Atalantia wightii, A. rotundifolia*
M. luvungae Hosag.	*Luvunga eleuthersandra* (=*L. sarmentosa*), *Euodia lunu-ankenda*
M. paramignyae Hosag.	*Paramignya beddomei* (*P. armata*), *P. monophylla*
M. rickiana Hansf. var. *zanthoxyli* Hosag.	*Zanthoxylum ovata, Z. ovalifolium*
M. tenella Pat. var. *atalantiicola* Hosag.	*Atalantia monophylla*
M. toddaliicola Hansf. var. *indica* Hansf. & Thirum.	*Toddalia asiatica*
M. vepridis Hosag. *et al.*	*Vepris bilocularis*
M. zanthoxyli-ovalifolii Hosag.	*Zanthoxylum ovalifolium*
	Santalaceae
Meliola osyridicola Hansf.	*Osyris quadripartita*
M. osyridicola Hansf. var. *indica* Hosag.	*O. quadripartita*
M. scleropyri Hosag.	*Scleropyrum pentandrum*
	Sapindaceae
Meliola allophyli-concanici Hosag.	*Allophylus concanicus*
M. allophyli-serrulati Hosag. & Abraham	*A. serratus*
M. capensis (Kalch. & Cooke) Theiss. var. *emerginati* Hosag. *et al.*	*Sapindus emerginatus*
M. capensis (Kalch. & Cooke) Theiss. var. *schleicherae* Hosag. & Pillai	*Schleichera oleosa*
M. dimocarpi Hosag. & Abraham	*Dimocarpus longan*
M. filicii Hosag.	*Filicium decipiens*
M. filiciicola Hosag. *et al.*	*F. decipiens*
M. otonephelii Hosag.	*Otonephelium stipulaceum*
M. otophorae Yates var. *indica* Hosag. & Ravikumar	*Lepisanthes senegalensis*
M. jayachandranii Hosag.	*Isonandra lanceolata*
	Scrophulariaceae
Meliola toreniae Hosag.	*Torenia travancorica*
	Simaroubaceae
Meliola ailanthi Sharma *et al.*, emend. Hosag.	*Ailanthus triphysa*
	Solanaceae
Meliola mahabaleshwarensis Srinivasulu	*Solanum giganteum*

Fungi under the name of host families	Corresponding hosts
	Staphyleaceae
Meliola staphyleacearum Hosag.	*Turpinia sp.*
Prataprajella turpiniicola (Hosag.) Hosag.	*T. malabarica*
	Sterculiaceae
Asteridiella anamalaiana Hosag.	*Sterculia urens*
A. heritiericola (Thite & Patil) Hosag.	*Heritiera littoralis*
Irenopsis eriolaenae Hosag.	*Eriolaena quinquelocularis*
I. helicteridis Hosag.	*Helicteres isora*
Meliola pterospermi Stev. var. *microspora* Hosag. & Raghu	*Pterospermum reticulatum*
	Stilaginaceae
Asteridiella antidesmaticola Hosag. & Abraham	*Antidesma alexiteria*
	Strychnaceae
Meliola strychnacearum Hosag. & Abraham	*Strychnos* sp.
	Symplocaceae
Amazonia karnatakensis Hosag. & Manian	*Symplocos* sp.
	Symphoremataceae
Meliola symphorematicola Hosag. *et al.*	*Symphorema involucratum*
	Theaceae
Meliola gordoniae Hosag.	*Gordonia obtusa*
	Thymelaeaceae
Irenopsis mysorensis Hansf. & Thirum.	*Gnidia glauca*
	Tiliaceae
Asteridiella grewiae Patil ex Hosag.	*Grewia asiatica* (= *G. subinaequalis*)
Irenopsis coimbatorica Hosag. *et al.*	*Grewia* sp.
I. triumfettae (Stev.) Hansf. & Deight. var. *indica* Hosag. & Abraham	*Triumfetta* sp.
Meliola grewiae Hansf. var. *longispora* Hosag. & Raju	*Grewia tiliifolia*
M. thirumalacharii Hosag. & Rajendran	*Grewia nervosa* (= *Microcos paniculata*)
	Vacciniaceae
Amazonia kakachiana Hosag.	*Vaccinium leschenaultii* var. *zeylanica*
Irenopsis vaccinii Hosag. *et al.*	*V. leschenaultii*
	Verbenaceae
Asteridiella clerodendricola Hosag.	*Clerodendrum viscosum*
A. vivekananthanii Hosag.	*C. viscosum*
Meliola altissimae Hosag.	*Vitex altissima*
M. castlerockensis Srinivasulu	*Clerodendrum serratum*
M. premnicola Hosag.	*Premna glaberrima*

68% of endemic meliolas on 306 host plants. Among the host plants endemic to Western Ghats, 66 harbour 78 Meliolaceae members. Interestingly, 277 endemic meliolas have 306 hosts. Hence, some Meliolaceae taxa have host range. In case of endemic hosts, the 66 hosts have been infected with 79 fungi. Hence, some hosts have more than one member of Meliolaceae. Of the known taxa, 130 found in India have wider geographical distribution and have an affinity with other Asian countries like Philippines, Java, Japan, China, etc. as for example *Amazonia peregrina* Sydow, *Asteridiella formosensis* (Yamam.) Hansf., *A. malloticola* (Yamam.) Hansf., *A. pitya* (Sacc.) Hansf., *A. quercina* Hansf., *Irenopsis thespesiae* Hansf., *I. tjibodensis* Hansf., *Meliola bauhiniicola* Yamam., *M. commixta* Sydow., *M. connari* Yates, etc. Other taxa are common to Africa e.g. *Amazonia peregrina* Sydow, *Meliola africana* Hansf., *M. arundinis* Pat., etc. The floristic affinity is also there with South America in having common elements like *Asteridiella sapotacearum* Hansf., *Irenopsis paulensis* Hansf., *Meliola clavulata* Wint. etc. Few taxa are also common to Western Ghats and North America such as *Asteridiella americana* Hansf., *Meliola floridensis* Hansf., etc. There are also common elements with Australia such as *Asteridiella malloti* (Hansf. & Thirum.) Hansf., *Irenopsis crotonis* (Stev. & Tehon) Stev., etc. The European elements such as *Meliola anacardii* Zim., *M. clavulata* Wint., etc. are also in the Western Ghats. However, the affinity is more towards Asian and African countries. It may thus be seen that meliolaceous fungi of Western Ghats have affinity with all the continents of the earth except Antarctica. Certain elements of Western Ghats have wider phytogeographic range e.g. *Appendiculella calostroma* (Desm.) Hohnel, *Asteridiella callista* (Rehm.) Hansf., *Irenopsis molleriana* (Wint.) Stev., *Meliola bicornis* Wint., *M. clavulata* Wint., *M. malacotricha* Speg., *M. panici* Earle, etc.

The future work on this group should be concentrated on the following aspects:

1. The present knowledge on black mildews is fragmentary and inadequate.
2. A thorough knowledge of these bionts is badly needed
3. Are these biotrophs symbionts or only parasites?
4. The hot spots, hottest spots, etc. are recognized mainly on the basis of the presence of endemic angiosperms. It will be worthwhile to see how lower groups which are serving us in the form of life-saving drugs, recycling to keep the balance of the biome, etc. could contribute in recognizing such categories.

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Table 2. Meliolas on endemic plants of Western Ghats

Endemic host plant	Fungi
Abarema bigemina	*Amazonia abaremae* Hosag. & Abraham
Actinodaphne malabarica	*A. actinodaphnes* Hosag.
A. malabarica	*Meliola actinodaphnecola* Hosag. & Abraham
A. malabarica	*M. linderae* Yamam. var. *microspora* Hosag. & Abraham
Allophylus concanicus	*M. allophyli-concanici* Hosag.
Ancistrocladus heyneanus	*M. ancistrocladi* Hosag.
Antistrophe serratifolia	*M. antistrophecola* Hosag. & Abraham
Atalantia wightii	*M. cranei* Hosag. & Goos
Atylosia lineata	*M. atylosiae* Hosag.
Beilschmiedia wightii	*M. beilschmiediicola* Hosag.
Blepharis asperrima	*M. acanthacearum* Hansf. var. *occidentalis* Hansf.
Calophyllum apetalum	*Appendiculella calophylli (*Stev.) Toro var. *apetali* Hosag. *et al.*
C. austroindicum	*A. calophylli* (Stev.) Toro var. *apetali* Hosag. *et al.*
Chionanthus mala-elengi	*Asteridiella americana* Hansf.
C. mala-elengi	*Meliola linocierae-malabaricae* Hosag.
C. mala-elengi	*M. mayapiicola Stev.* var. *indica* Hosag.
Cinnamomum malabatrum	*Meliola beilschmiediae* Yamam. var. *cinnamomicola* Hosag.
C. riparium	*Amazonia cinnamomi* Hosag.
Connarus sclerocarpus	*Meliola connari* Yates
C. *sclerocarpus*	*M. connari* Yates var. *indica* Hosag.
Croton malabaricus	*Asteridiella crotonicola* Hosag. & Abraham
Cryptocarya beddomei	*Meliola kakachiana* Hosag.
C. bourdillonii	*M. cryptocariicola* Hosag. & Raghu
C. bourdillonii	*M. patileana* Hosag.
C. bourdillonii	*M. pushpangadanii* Hosag. & Abraham
Cyrtococcum longipes	*M. panici* Earle var. *macropodia* Hosag. & Abraham
Diospyros pruriens	*M. diospyri* Sydow
Dysoxylum malabaricum	*M. petrakii* Stev. & Rold.
Ellertonia rheedii	*M. ellertoniae* Hosag. & Abraham
Syzygium stocksii (= *Eugenia stocksii*)	*M. eugeniae-stocksii* Hosag.
Gluta travancorica	*M. glutae* Hosag. & Abraham
Goniothalamus rhychantherus	*Irenopsis goniothalami* Hosag. & Abraham
Gordonia obtusa	*Meliola gordoniae* Hosag.
Hedyotis albo-nervia	*M. kanniyakumariana* Hosag.
H. gamblei	*M. kanniyakumariana* Hosag.
Holigarna grahamii	*M. holigarnae* Stev.
H. arnottiana	*M. holigarnae* Stev.
Ilex malabarica	*M. ilicis-malabaricae* Hosag. & Raghu
Julostylis polyandra	*Asteridiella julostylidis* Hosag. & Abraham
Kingiodendron pinnatum	*Meliola kingiodendri* Hosag. *et al.*
Knema attenuata	*M. knemae* Hansf. var. *macrospora* Hosag. & Abraham
Ligustrum perrotteti	*M. mayapeae* Stev.
Litsea coriacea	*M. litseae* Sydow var. *rotundipoda* Hansf.
L. stocksii var. *glabrescens*	*M. litseae* Sydow var. *keralensis* Hosag.
Luvunga eleutherandra (= *L. sarmentosa)*	*M. luvungae* Hosag.
Mackenziea gracilis	*M. mackenzieae* Hosag. *et al.*
Meiogyne pannosa	*M. unonae* Hosag. & Abraham
M. pannosa	*M. unoniicola* Hosag. & Abraham
Memecylon depressum	*M. memecyli* Sydow
M. depressum	*M. memecylicola* Hansf. var. *indica* Hosag.
M. talbotianum	*M. heudelotii* Gaill.
Millettia rubiginosa	*Asteridiella millettiae* Hosag. *et al.*
Millettia rubiginosa	*Meliola bataanensis* Sydow
M. rubiginosa	*M. bataanensis Sydow* var. *indica* Hosag. & Abraham
M. rubiginosa	*M. teramni* Sydow var. *millettiae* Hosag.
M. splendens	*M. millettiae-chrysophyllae* Deight. var. *indica* Hosag. *et al.*
Moullava spicata	*M. aethiops* Sacc. var. *moullavae* Hosag. & Raghu
Mussaenda belilla	*M. anceps* Sydow
Myristica fatua var. magnifica	*M. myristicae* Hosag.
Nilgirianthus heyneanus	*M. nilgirianthi* Hosag.
Nothopegia heyneana	*M. nothopegiae* Hansf.
Otonephelium stipulaceum	*M. otonephelii* Hosag.
Pittosporum dasycaulon	*M. polytricha* Kalch. & Cooke
Premna glaberrima	*M. premnicola* Hosag.
Psychtria globicephala	*Amazonia goosii* Hosag. & Abraham var. *microspora* Hosag. *et al.*
P. macrocarpa	*M. ixorae* Yates var. *psychotriae* Hosag. & Abraham
P. macrocarpa	*M. pterospermi* Stev. var. *microspora* Hosag. & Raghu
P. nudiflora	*Meliola psychotriae-nudiflorae* Hosag.
Reinwardtiodendon anamalaiense	*M. reinwardtiodendri* Hosag.
Rungia sisparensis	*M. acanthacearum* Hansf. var. *occidentalis* Hansf.
Semecarpus travancorica	*M. semecarpicola* Hansf.
S. travancorica	*M. travancoricae* Hosag.
Syzygium benthamianum	*M. syzygii-benthamiani* Hosag. & Abraham
S. laetum	*M. pulchella* Speg. var. *syzygii* Hosag.
Tabernaemontana heyneana	*M. ervatamiae* Hosag.
T. heyneana	*M. pepparaensis* Hosag. & Abraham
Toxocarpus beddomei	*M. toxocarpi* Hosag. & Antony
Vepris bilocularis	*M. macropoda* Sydow
V. bilocularis	*M. vepridis* Hosag.

Table 3. Meliolas common to Western Ghats and other countries

Name of the Fungus	Other places
Amazonia peregrina Sydow	Philippines, Taiwan, Uganda
A. psychotriae (Henn.) Theiss	Congo, Java, Puerto Rico, San Domingo, Sierra Leone, Uganda
Appendiculella calostroma (Derm.) Hohnel	Brazil, Chile, China, Costa Rica, Hawai Japan, New South Wales, Philippines, Puerto Rico, San Thome, South Africa, Taiwan, Uganda, Venezuela
Asteridiella americana Hansf.	Florida
A. callista (Rehm) Hansf.	Amboina, Guyana, Ecuador, Grenada, Java, Philippines, Puerto Rico, Trinidad
A. combreti (Stev.) Hansf. var. *leonensis* Hansf.	Congo, Ghana, Java, New Guinea, Philippines, Sierra Leone, Uganda
A. confragosa (Sydow) Hansf.	Malaysia, Philippines, Sumatra
A. cyclopoda (Stev.) Hansf.	Guyana, Ghana, Puerto Rico, Sierra Leone, Uganda, Venezuela
A. entebbeensis (Hansf. & Stev.) Hansf.	Congo, Ghana, Sierra Leone, Uganda
A. formosensis (Yamam.) Hansf.	Taiwan
A. malloti (Hansf. & Thirum.) Hansf.	Java, New South Wales, Philippines
A. malloticola (Yamam.) Hansf.	Philippines, Taiwan
A. pitya (Sacc.) Hansf.	Japan
A. quercina Hansf.	China, Philippines
A. sapotacearum Hansf.	Brazil
A. vacciniicola Hansf.	Philippines
Irenopsis benguetensis Stev. & Rold. ex Hansf.	China, Java, Philippines
I. crotonis (Stev. & Techon) Stev.	New South Wales, Trinidad
I. leeae Hansf. var. *javensis* Hansf.	Ghana, Uganda
I. molleriana (Wint.) Stev.	Congo, Costo Rica, Ghana, Jamaica, Java, Panama, Paraguay, Puerto Rica, San Domingo, San Thome, Sierra Leone
I. paulensis Hansf.	Brazil
I. sidae (Rehm) Hughes	Guinea, Philippines
I. thespesiae Hansf.	Java
I. tjibodensis Hansf.	Java, Philippines
I. triumfettae (Stev.) Hansf. & Deight.	Jamaica, Java, Panama, Puerto Rico, Trinidad
Meliola acanthacearum Hansf. var. *occidentalis* Hansf.	Jamaica, Puerto Rica
M. aequatoriensis Petrak	Ecuador, Malaysia
M. aethiops Sacc. var. *longiseta* Deight.	Sierra Leone
M. africana Hansf.	Java, Sierra Leone, Uganda
M. aglaicola Hansf.	Indonesia
M. alstoniae Koord	Congo, Ghana, Java, Malaysia, Philippines, San Domingo
Meliola anacardii Zim.	British Guiana, Costa Rica, Java, Malaysia, Philippines, San Domingo
M. anceps Sydow	Costa Rica, Malaysia, Philippines, Venezuela
M. artocarpi Yates	Malaysia, Philippines
M. arundinis Pat.	China, Philippines, Queens land, Taiwan, Uganda
M. bataanensis Sydow	Philippines
M. bauhiniicola Yamam.	Taiwan
M. bicornis Wint.	Amboina, Brazil, Cameroon, China, Congo, Costa Rica, Ecuador, Ghana, Honduras, Jamaica, Java, Panama, Philippines, Puerto Rico, San Domingo, Sierra Leone, Suriname, Trinidad, Uganda, Venezuela
M. buteae Hafiz *et al.*	China, Pakistan
M. butleri Sydow	Philippines, Taiwan
M. canthii Hansf.	Uganda
M. capensis (Kalch. & Cooke) Theiss. var. *allophylicola* Hansf. & Deight.	Ghana, Sierra Leone
M. capensis (Kalch & Cooke) Theiss. var. *malayensis* Hansf.	China, Malaysia, Philippines
M. carissae Doidge var. *indica* Hansf.	Myanmar
M. chandleri Hansf.	Uganda
M. citricola Sydow	China, Indonesia, Java, New Guinea, Philippines, Singapore, Sri Lanka, Sumatra.
M. clavulata Wint.	Brazil, Cameroon, Congo, Cost Rica, Ghana, Guyana, Honduras, Jamaica, Java, Panama, Puerto Rico, San Domingo, San Thome, Sierra Leone, Taiwan, Tanzania, Trinidad, Uganda, Venezuela
M. clerodendricola Henn.	Amboina, Cameroon, Celebes, Congo, Cuba, Ghana, Japan, Penang, Philippines, San Domingo, Sierra Leone, China, Tropical Africa, Uganda
M. clerodendricola Henn. var. *micromera* (Sydow) Hansf.	Java, Philippines
M. commixta Sydow	Philippines
M. conarii Sydow	Amboina, Malaysia, Philippines, Pakistan
M. connari Yates	Philippines
M. cookeana Speg.	Congo, Florida, Java, Philippines, Sierra Leone Taiwan
M. cookeana Speg. var. *viticis* (Hansf.) Hansf.	Java, Malaysia, Taiwan, Uganda
M. crescentiae Stev.	Brazil, Honduras, Malaysia, San Domingo, Trinidad, Venezuela
M. daviesii Hansf.	Congo, Myanmar, Uganda
M. densa Cooke	New Guinea, Queensland, Sierra Leone
M. dichotoma Berk. & Curt. var. *kusanoi* (Henn.) Hansf.	Japan
M. diospyri Sydow var. *yatesiana* (Trott.) Hansf. & Deight.	Philippines, Taiwan
M. entadicola Deighton	Siera Leone
M. erythrinae Sydow	Java, New Guinea, Philippines
M. erythroxylifolii Bat. & Vital	Brazil
M. eugeniae-jamboloides Hansf.	Java
M. floridensis Hansf.	Florida
M. furcata Lev.	Brazil, Costa Rica, Cuba, Honduras, Jamaica, Panama, Philippines, Puerto Rico, South Africa, Surinam
M. garciniae Yates	Cameroon, Malaysia, Philippines, Sierra Leone, South Africa, Tanzania

Name of the Fungus	Other places
M. gemellipoda Doidge	Congo, Ghana, Malaysia, Sierra Leone
M. geniculata Sydow & Butler	Ghana, Java, Sierra Leone, Uganda
M. glochidiicola Yamam.	Taiwan
M. gneti Hansf.	Java, Philippines
M. groteana Sydow	Congo, Philippines, Sierra Leone, Tanzania, Uganda
M. heudelotii Gaill.	Senegambia
M. indica Sydow	Java, Philippines
M. ixorae Yates	Sri Lanka, Philippines
M. jasmini Hansf. & Stev.	Ghana, Malaysia, Sierra Leone, Uganda
M. jatrophae Stev.	Puerto Rica
M. linderae Yamam,	China, Taiwan
M. litseae Sydow var. *rotundipoda* Hansf.	Java, Philippines
M. lobeliae Stev.	Hawaii
M. longiseta Hohnel	Samoa (Africa)
M. machili Yamam.	Java, Taiwan
M. macropoda Sydow	Costa Rica, Panama
M. malacotricha Speg.	Brazil, Congo Belge, Costa Rica, Ghana, Guyana, Honduras, Malaysia, Panama, Paraguay, Philippines, Puerto Rico, San Domingo, Sierra Leone, Sri Lanka, Taiwan, Uganda
M. malacotricha Speg. var. *major* Beeli	Congo
M. mangiferae Earle	Amboina, Brazil, Costa Rica, Guyana, Jamaica, Java, Malaysia, Panama, Philippines, Puerto Rico, Trinidad, Venezuela
M. mayapeae Stev.	Puerto Rico
M. memecyli Sydow	Java, Philippines
M. motatanensis Hansf.	Venezuela
M. neolitseae Yamam.	China, Taiwan
M. nephelii Sacc. var. *singalensis* Hansf.	Sri Lanka
M. oldenlandiae Hansf.& Stev.	Uganda
M. oligomera Sydow	Sri Lanka, Java, Philippines
M. opiliae Sydow var. *singalensis* Hansf.	Sri Lanka
M. palmicola Wint. var. *africana* Hansf.	China, South Africa, Uganda
M. panici Earle	Congo, Costa Rica, Ecuador, Grenada, Indonesia, Jamaica, Java, Malaysia, Panama, Philippines, Puerto Rico, San Domingo, Sierra Leone, Singapore, Surinam, Uganda, Venezuela
M. panici Earle var. *laciacidis* (Toro) Hansf.	Costa Rica, Ecuador, Guyana, Honduras, Panama, Puerto Rico, San Domingo, Venezuela
M. parvula Sydow	Philippines
M. petchii Hansf.	Sri Lanka
M. petrakii Stev. & Rold *ex* Hosag.	Philippines
M. phyllostachydis Yamam.	Japan, Taiwan
M. pogostemonis Hansf.	Sri Lanka
M. polytricha Kalch. & Cook	New South Wales, South Africa, Uganda
M. psychotriae Earle	Brazil, Congo, Ecuador, Indonesia, Java, Philippines, Puerto Rico, San Domingo, Sierra Leone, Uganda, Venezuela
M. pterocarpi Yates	Indonesia, Philippines, Sumatra
M. quadrispina Racib.	Ambonia, Congo, Java, Philippines
M. ramosii Sydow	Philippines
M. randiicola Hansf.	Java
M. roureae Sydow var. *major* Hansf. & Deight.	Sierra Leone
M. rubiella Hansf.	Philippines
M. sacchari Sydow	Philippines
M. salaciae Hansf.	Sierra Leone, Uganda
M. semecarpicola Hansf.	Philippines
M. serjaniae Stev. var. *major* Hansf.	Brazil, Costa Rica
M. spigeliae Hansf.	Brazil, Ecuador, Honduras, Panama
M. stenospora Wint.	Ghana, Malaysia, Philippines, San Thome, Surinam, Uganda
M. stenospora Wint. var. *major* Hansf.	Java, Philippines
M. stephaniae Hansf.	Java
M. symplocicola Yamam.	Taiwan
M. tamarindi Sydow	Ghana, Philippines, Sierra Leone
M. tawaoensis Hansf.	British North Borneo
M. tecleae Hansf. var. *toddaliae-asiaticae* Hansf.	Uganda
M. tenella Pat.	China, Java,
M. tenella Pat. var. *atalantiae* (Pat.) Hansf.	Sri Lanka, Taiwan, China
M. tetradeniae (Berk.) Theiss & Sydow	Sri Lanka
M. toddaliae Doidge	South Africa
M. transvaalensis Doidge	South Africa
M. trichostroma (Kuze) Toro & Sydow	Brazil, Colombia, Costa Rica, Ecuador, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Puerto Rico, San Domingo, Surinam, Trinidad, Venezuela
M. twaitesiana Hansf.	Sri Lanka
M. zanthoxyli Hansf.	Sri Lanka

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