Plant Pathology & Quarantine 13(1): 11–30 (2023) ISSN 2229-2217
www.ppqjournal.org **Article**

Doi 10.5943/ppq/13/1/2

Distribution of foliicolous fungi in diverse forest types of Maharashtra State of India

Dubey R* and Pandey AD

Botanical Survey of India, Western Regional Centre, 7, Koregaon Road, Pune 411001, Maharashtra, India

Dubey R, Pandey AD 2023 – Distribution of foliicolous fungi in diverse forest types of Maharashtra State of India. Plant Pathology & Quarantine 13(1), 11–30, Doi 10.5943/ppq/13/1/2

Abstract

Foliicolous fungal diversity studies were conducted to document the distribution of various foliicolous fungi in different forest types of Maharashtra and the garden areas of Pune city. A total of 1801 foliicolous samples were collected, from which a total of 589 fungal isolates belonging 360 fungal species under 197 genera were recorded. Various measures of diversity, such as species richness, indices of diversity and evenness and true diversity were calculated. Maximum and minimum fungal diversity was observed for Southern Indian Moist Deciduous Forests (3B) and West Coast Tropical Evergreen Forests (1A/C4), respectively, in terms of the number of isolates (294 vs 31), observed species richness (194 vs 26), diversity indices (Shannon's = 5.0421 vs 3.2104; Gini-Simpson's = 0.9911 vs 0.9573) and true diversity (Shannon's effective number of species = 154 vs 24). Different forest types greatly differed in terms of species composition as well, as maximum similarity (Jaccard Similarity Index = 10.66%) was observed between Western Subtropical Hill (8A/C2) Forests and West Coast Semi-Evergreen (2A/C2) Forests, with only one species (<1% of total) viz., *Colletotrichum gloeosporioides* common in all forests.

Keywords – diversity indices – fungal diversity – similarity – true diversity

Introduction

Maharashtra state of India, located in the north-western part of peninsular India, is endowed with diverse physiography, vegetation, ecosystems and habitats. The state has a huge potential for explorations and utilization of its untapped biological diversity. The state lies between 15°35′ and 22°02′ N latitudes and 72°36′ and 80°54′ E longitudes and is third largest state of India in terms of area amounting to 307,713 km^2 (FSI 2019). The state may be divided into three broad divisions according to physiography viz., (i) Konkan, the narrow coastal strip of land lying between the Arabian Sea and the Western Ghats; (ii) Western Ghats; (iii) Deccan Plateau. The Western Ghats is considered one of the 'Biodiversity Hotspots' of the world (Myers et al. 2000), and shows high level of endemism in flora and fauna. The State has reported extent of recorded forest area (RFA) of 61,579 km^2 which is 20.01% of its geographical area. As per the Forest Survey of India report (2019), Recorded Forest Area (RFA) in the State is 61,579 km^2, of which 49,546 km^2 is Reserved Forests, 6,733 km^2 is Protected Forest and 5,300 km^2 is Unclassed Forests. Six National Parks, 48 Wildlife Sanctuaries and 6 Conservation Reserves constitute the Protected Area network of the State, covering 3.03% of its geographical area. In terms of forest canopy density classes, the State has 8,720.53 km^2 under Very Dense Forest (VDF), 20,572.35 km^2 under Moderately Dense Forest (MDF) and 21,484.68 km^2 under Open Forest (OF). The forests of Maharashtra have been

Submitted 3 November 2022, Accepted 15 December 2022, Published 11 January 2023
Corresponding Author: Rashmi Dubey – e-mail – dr.rashmidubey@gmail.com

classified into six major types, divided into 16 sub-types and many further sub-divisions depending upon the floristic composition (Champion & Seth 1968). The forests of the Maharashtra support a rich foliicolous fungal flora as they exhibit considerable variation in many aspects such as floristic composition, physiognomy, and life forms (FSI 2019). In Maharashtra, notable work on foliicolous fungi has been done by Pande & Bansude (1980), Pande (1981), Parandekar (1964), Patwardhan (1969), Patil & Magdum (1979), Patil & Pawar (1989), Sawant & Papdiwal (2007), Singh et al. (2011). Recently, Dubey & Pandey (2017, 2019, 2022a, b) published holistic account of follicolous fungi of different regions of Maharashtra by integrating fungal taxonomy with statistical analysis of ecological aspects of fungi. However, no work has been done on the distribution of foliicolous fungal diversity in different forest types prevailing in the state. Although some of the notable works from India include studies on the fungal diversity of 12 different forest types of Arunachal Pradesh, the diversity of endophytic fungi of different forest types of Southern Western Ghats (Murali et al. 2007, Suryanarayanan et al. 2011). Ranadive et al. (2013) have mentioned the forest types of collection localities in their macro-fungal flora (Aphyllophorales) of Pune District of Maharashtra. Thus, a study was undertaken on the distribution of foliicolous fungi in different forest types of Maharashtra, during 2010-2016.

Materials & Methods

Study area

The present study results from the extensive and systematic field collection trips made to different forest types of Maharashtra. For comparison, collections were also made from the garden areas of Pune city, mostly those under Botanical Survey of India. Geographical coordinates of collection sites were noted, which were then used for making collection map with QGIS 3.14 ‘Pi’ version. A total of 96 locations spread over the major geographical regions and forest types of Maharashtra were explored during this period. However, areas with greater forest cover were given higher priority. This is shown in Fig. 1, in which collection location points are superimposed on forest cover map of Maharashtra.

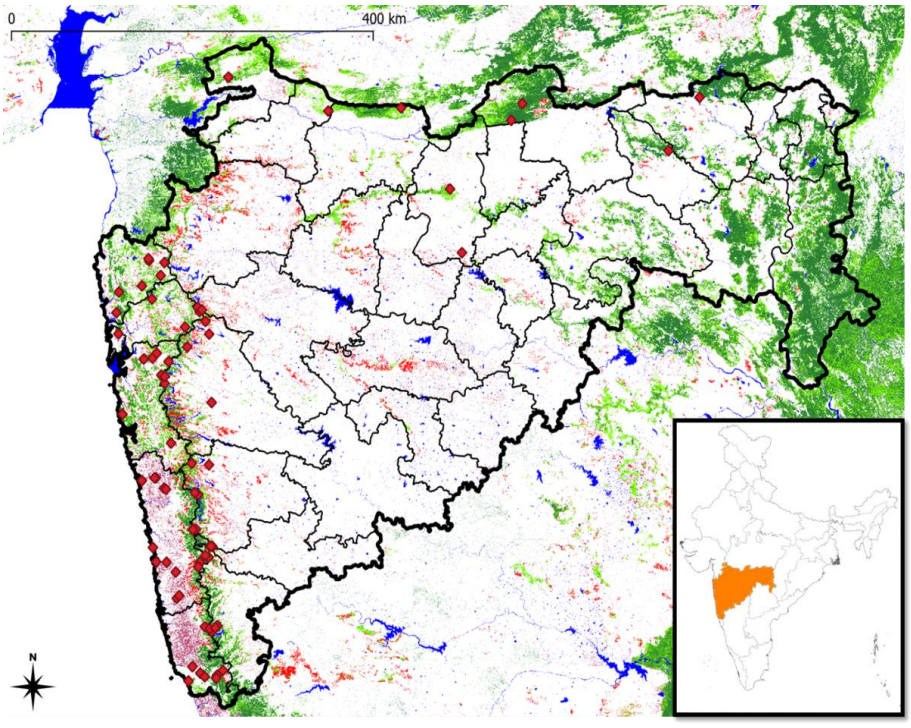

Fig. 1 – Map showing collection locations in Maharashtra and location of Maharashtra state in India (in inset)

Since climatic conditions play a most important role in microbial growth, survey intensity was more during monsoon and winter season and was also conducted taking into account the availability of plants. In the present study, infected dicot, monocot and pteridophyte plants were considered equally for collection of foliicolous fungi. The collected samples included live, senescing and moribund leaves with visible infections; and were plucked from herbaceous plants, bushes, climbers and trees. Locality, collection number, date of collection, host plant and forest types were noted. Samples were brought to the laboratory in separate collection bags. Champion & Seth (1968) was followed for the classification of forest types. Additionally, Flora of Maharashtra (Singh & Karthikeyan 2000) was also consulted at every step to identify the vegetation of various sites of Maharashtra.

Laboratory Processing

Further processing of infected samples involved microscopic studies for which slides were made by hand sectioning and microtome techniques, followed by adding a drop of routine mounts (Lactophenol, Cotton blue or Lactofuchsin) and glycerine separately on the slides. Fungi with sporulating structures were observed under a compound microscope for detailed diagnostic features, with identification further aided by scanning electron microscopic studies for rare or new species. All the holotypes are maintained systematically in the Botanical Survey of India, Western Regional Centre Herbarium, Pune. Descriptions of all new species are submitted to Mycobank.

Data Analysis

We calculate following to study the diversity of foliicolous fungi in different forest types of Maharashtra:

Simpson's Index (*D*), bound between 0 and 1, is probability of two isolates belonging to same species.

$$\text{Simpson's Index } (D) = \sum_{i=1}^{S} {p_i}^2 = \sum_{i=1}^{S} (n_i/N)^2$$

Where p_i = proportion of i^{th} species, n_i = number of isolates of i^{th} species, N = total number of isolates, S = total number of species. In complement of Simpson's Index (*D*), called as Gini-Simpson's Index (*1-D*), higher values imply higher diversity.

$$\text{Gini-Simpson's Index} = 1 - D = 1 - \sum_{i=1}^{S} {p_i}^2$$

Higher values of Shannon's index (*H*) imply higher diversity as the index is associated with uncertainty in correctly guessing species to which next isolate belongs to.

$$\text{Shannon's Index } (H) = \sum_{i=1}^{S} p_i \ln(1/p_i)$$

Where pi is same as in Simpson's Index, ln is natural logarithm.

Pielou's Evenness Index (*J'*), bound between 0 and 1, is normalized Shannon's Index. Higher values of Pielou's index correspond to more equitable species distribution.

$$\text{Pielou's Evenness Index } (J') = \frac{H}{\ln(S)}$$

True diversity, expressed as effective number of species, is obtained by transforming Shannon's index as follows:

$$\text{True Diversity} = \text{Effective number of species (Based on } H) = e^{H}$$

where 'e' is Euler's number or natural base. Shannon's effective number of species is the number of equally abundant species in a hypothetical assemblage for the given value of the Shannon's index. Another reason for converting diversity index into true diversity is that former greatly blurs the magnitude of difference in diversity due to its highly non-linear nature (Jost 2006).

Theoretically, both species richness (here defined as observed number of species) and Shannon's effective number of species are special case of family of diversity measures, known as Hill Numbers (Gotelli & Ellison 2004), given as $q^D = (\sum_{i=1}^{s} p_i^q)^{1/(1-q)}$. Species richness is zeroth order (q = 0) Hill Number, while Shannon's effective number of species is first order (q = 1) Hill number, hence latter is sometimes reported, for instance in Sharma et al. (2015), as "Hill's N1 diversity" or "Hill's H1 diversity". In Hill numbers, as the order (q) increases, the common species get increasingly more weight, while opposite is true for rare species. Thus, species richness being zeroth order Hill Number overweighs rare species, while Simpson's index based Effective number of species being second order (q = 2) Hill Number overweighs common species (Gotelli & Ellison 2004). It is for this reason that Shannon's index has been used for calculating true diversity as it equally weighs both common and rare species.

To analyze similarity in species composition between any two forest types (A & B), Jaccard Similarity Index (JSI) was used, given by:

$$\text{JSI} = \frac{n(A \cap B)}{n(A \cup B)} = \frac{n(A \cap B)}{n(A) + n(B) - n(A \cap B)}$$

Where n(A) and n(B) are number of species in forest types A and B respectively, n(A∩B) is number of species common to both forest types, n(A∪B) is total number of species. The calculated value is bounded between 0 and 1 (hence, can be interpreted in percentage terms as well), with higher values signifying higher similarity.

Results

During the field surveys, foliicolous fungi were isolated from 96 locations spread over the following 5 forest types (Champion & Seth 1968): (i) South Indian Moist Deciduous Forests (3B), under Moist Deciduous Forests (Group 3); (ii) West Coast Semi-evergreen Forests (2A/C2), which is a type of Southern Tropical Semi-Evergreen Forests (2A), under Tropical Semi-Evergreen Forests (Group 2); (iii) Western Subtropical Hill Forests (8A/C2), which is a type of Southern Subtropical Broadleaved Hill Forests (8A), under Subtropical Broadleaved Hill Forests (Group 8); (iv) Southern Tropical Dry Deciduous Forests (5A), under Tropical Dry Deciduous Forests (Group 5); (v) West Coast tropical evergreen forest (1A/C4), which is a type of Southern Tropical Wet Evergreen Forests (1A), under Tropical Wet Evergreen Forests (Group 1). Apart from the above, collections were also made from garden areas of Pune city, especially those under Botanical Survey of India. Collection locations imposed on the forest cover map of Maharashtra are shown in Fig. 1.

A total of 1801 foliicolous samples were collected, from which 589 fungal isolates belonging to 360 fungal species under 197 genera were recorded. The enumeration of fungi is given in Table 1 along with host plant, location under each Forest Type.

All the fungi documented during the studies (197 fungal genera, 360 species and 01 variety) are grouped under Phyla Ascomycota and Basidiomycota. Of these, the fungal species belonging to Phylum Ascomycota are represented by 344 species & 01 variety in 186 Genera and Phylum Basidiomycota by 16 species in 11 genera.

26 species were found exclusively in garden areas of Pune city, which include – *Botryosporium madrasense, Calonectria morganii, Catenularia cubensis, Chaetomella acutiseta, Chaetospermum camelliae, Chalara sp., Ciliochorella mangiferae, Cucurbidothis pityophila, Dictyoarthrinium sacchari, Dictyosporium elegans, Dictyosporium heptasporum, Drechslera rostrata, Fusariella indica, Harpographium fasciculatum, Helicomyces hyderabadensis, Hermatomyces tucumanensis, Heteropatella lacera, Monilochaetes laeensis, Oidium azadirachtae, Oidium caricae, Phaeotrichoconis sp., Tetraploa aristata, Tryblidiopycnis pinastri, Tharoopama livistonae, Vermiculariopsiella papayae, Zygosporium cocos.*

A total of 14 new species were published as a result of the study viz., *Achroiostachys bambusicola, Custingophora ratnagiriensis, Goosiomyces bambusicola, Periconia chandolensis, Sheathnema indicum, Solicorynespora matheranensis, Stigmina koyanensis, Temerariomyces indicus, Tharoopama livistonae, Thirumalacharia thanensis, Tripospermum melghatense, Vermiculariopsiella papayae, Zygosporium cocos, Zygosporium dilleni*.

To elaborate diversity of foliicolous fungi in different forest types the analysis was done at three levels viz., number of isolates, number of species and true diversity. This is also shown in Fig. 2.

Most diverse forest types in terms of the number of isolates obtained, with latter in parentheses, are as follows: South Indian Moist Deciduous (3B) Forests (294), West Coast Semi-Evergreen (2A/C2) Forests (92), Western Subtropical Hill (8A/C2) Forests (86), Southern Tropical Dry Deciduous (5A) Forests (54), West Coast Tropical Evergreen (1A/C4) Forests (31).

Most diverse forest types in terms of the number of species obtained, with latter in parentheses, are as follows: South Indian Moist Deciduous (3B) Forests (194), West Coast Semi-Evergreen (2A/C2) Forests (76), Western Subtropical Hill (8A/C2) Forests (59), Southern Tropical Dry Deciduous (5A) Forests (45), West Coast Tropical Evergreen (1A/C4) Forests (26).

Most diverse forest types in terms of true diversity, measured as Shannon's effective number of species, given in parentheses, are as follows: South Indian Moist Deciduous (3B) Forests (154), West Coast Semi-Evergreen (2A/C2) Forests (68), Western Subtropical Hill (8A/C2) Forests (44), Southern Tropical Dry Deciduous (5A) Forests (42), West Coast Tropical Evergreen (1A/C4) Forests (24). True diversity of the whole study area was 252.

In terms of similarity in species composition, as seen from Table 3, maximum similarity (JSI = 10.66%) was observed between Western Subtropical Hill (8A/C2) Forests and West Coast Semi-Evergreen (2A/C2) Forests. Only one species (<1% of total) viz., *Colletotrichum gloeosporioides* was common in all forests, though not found in city. Further, only 5 species (<1.5% of total) viz., *Cladosporium colocasiae, Kirschsteiniothelia atra, Sordaria fimicola, Torula herbarum, Zygosporium masonii*, were common between forests and garden areas of the city.

To summarize, South Indian Moist Deciduous Forests (3B) were most diverse as evidenced from maximum values for most measures as shown in Table 2, also in Figs 2, 3, viz., Gini Simpson's Index (= 0.9911), Shannon's Index (= 5.0421), Species Richness (194). West Coast Tropical Evergreen Forests (1A/C4), on the other hand, were least diverse in showing minimum values for those very measures. Among forest types, the latter also showed most equitable distribution of fungal taxa due to the highest value of Pielou's index, which was minimum for Western Subtropical Hill Forests. Interestingly, garden areas of Pune city showed values higher than West Coast Semi-Evergreen Forests for all aforementioned measures of fungal diversity.

It was found that Powdery mildew infections were observed more in Southern tropical dry deciduous forests; Black mildews and Sooty molds were found mostly in South Indian moist deciduous forests and Western (montane) subtropical hill forests. With look upon to the community and species composition, fungal species dominance and abundance occurred depending on the environmental conditions as well as host plants.

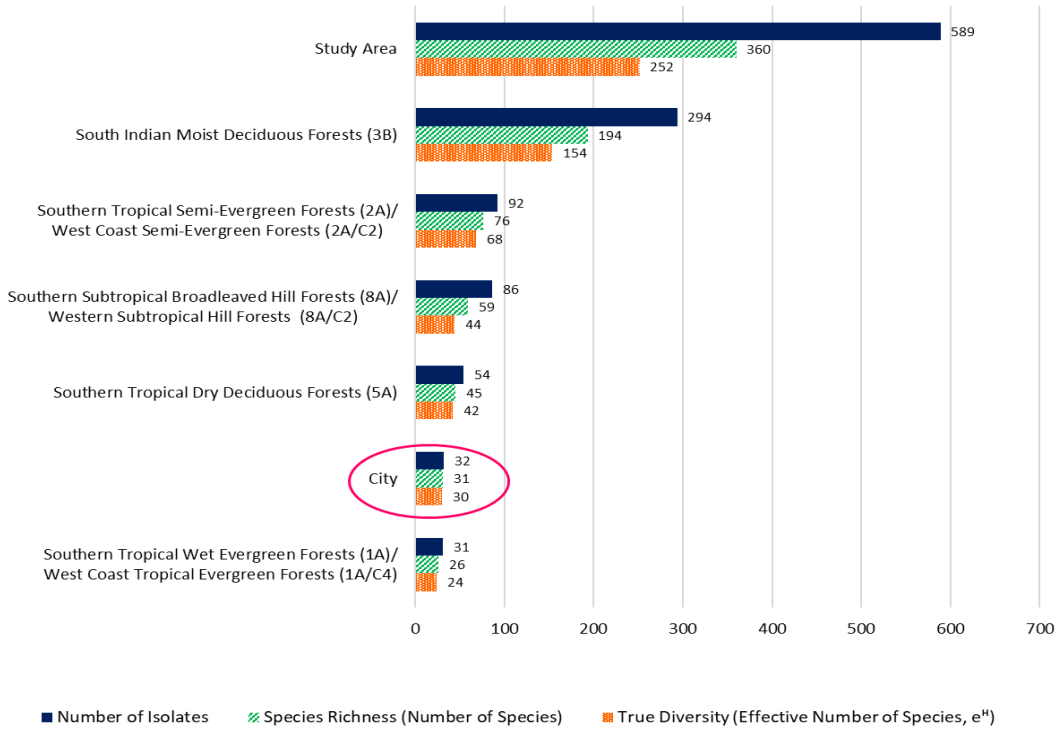

Fig. 2 – Diversity of foliicolous fungi in different forest types of Maharashtra based on number of isolates, species richness (observed number of species) and true diversity (Shannon's effective number of species), with those of city encircled.

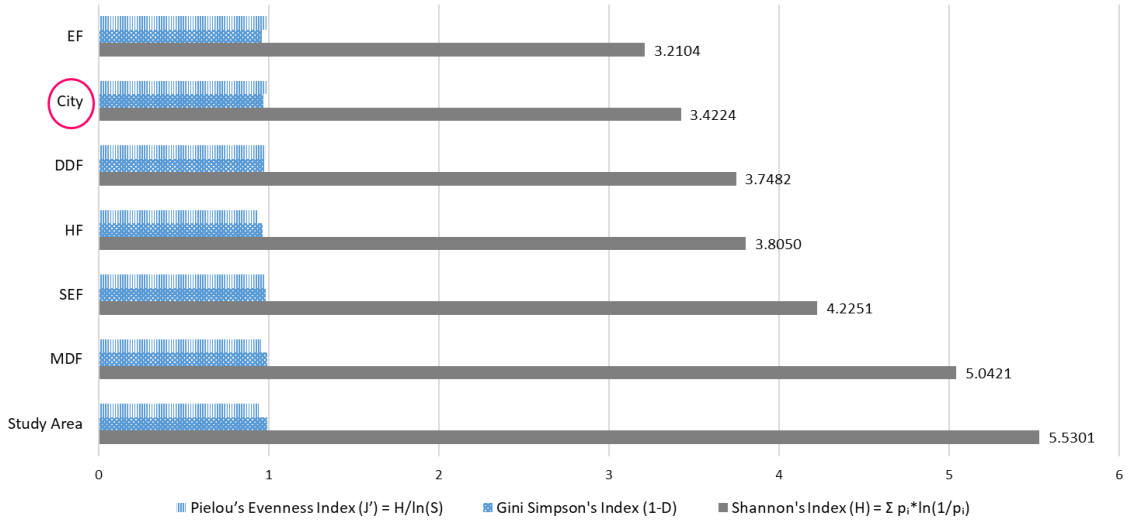

Fig. 3 – Indices of evenness and diversity for different forest types of Maharashtra, with those of city encircled.

Abbreviations used: MDF = South Indian Moist Deciduous Forests (3B), SEF = Southern Tropical Semi-Evergreen Forests (2A)/ West Coast Semi-Evergreen Forests (2A/C2), HF = Southern Subtropical Broadleaved Hill Forests (8A)/ Western Subtropical Hill Forests (8A/C2), DDF = Southern Tropical Dry Deciduous Forests (5A), EF = Southern Tropical Wet Evergreen Forests (1A)/ West Coast tropical evergreen forest (1A/C4). Note: Maximum values are in bold, minimum values are underlined.

Table 1 Enumeration of Foliicolous Fungal Isolates with Host Plants.

Location	Enumeration of Fungal Isolates with Host Plants
Southern Tropical Dry Deciduous Forests (5A)	
Amaravati (2)	*Capnodium* sp. on *Citrus medica* L., *Cladosporium* sp. on *Syzygium cumini* (L.) Skeels
Aner WLS, Dhule Dist. (4)	*Bahusandhika indica* (Subram.) Subram. 1956 on *Oroxylum indicum* (L.) Benth. ex Kurz, *Chloridium indicum* Subram. 1955 on *Mangifera indica* L., *Phragmospathula brachyspathula* Mercado 1980 on *Roystonea regia* (Kunth) O.F. Cook, *Zygosporium masonii* S. Hughes 1951 on *Ageratum* sp.
Bor WLS, Wardha Dist. (3)	*Capnodium* sp. 4 on *Pennisetum purpureum*, *Haplotrichum curtisii* (Berk.) Hol.-Jech. 1976 on *Albizia* sp., *Scolecoxyphium* sp. on *Helicteres isora* L.
Dnyanganga WLS, Buldhana Dist. (6)	*Ampullifera foliicola* Deighton 1960 on *Maytenus rothiana* (Walp.) Ramamoorthy, *Cercospora apii* Fresen. 1863 on *Lavandula bipinnata* (Roth) Kuntze, *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Lavandula bipinnata* (Roth) Kuntze, ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Woodfordia fruticosa* (L.) Kurz, *Periconia byssoides* Pers. 1801 on *Lavandula bipinnata* (Roth) Kuntze, ***Periconia byssoides*** Pers. 1801 on *Morinda citrifolia* L.
Lonar WLS, Buldhana Dist. (3)	*Graphiola phoenicis* (Moug. ex Fr.) Poit. 1824 on *Phoenix dactylifera* L., *Phyllactinia* sp. on *Diospyros* sp., *Ravenelia hobsoni* Cooke 1880 on *Pongamia pinnata* (L.) Pierre
Melghat TR (East) (13)	*Alternaria alternata* (Fr.) Keissl. 1912 on Cryptolepis sp., *Ampelomyces quisqualis* Ces. 1852 on Cordia sp., ***Ampelomyces quisqualis*** Ces. 1852 on Tectona grandis L.f., *Ampelomyces* sp. on *Murraya koenigii* (L.) Spreng., *Cladosporium oxysporum* Berk. & M.A. Curtis 1868 on *Codiaeum variegatum* (L.) A. Juss., *Cladosporium* sp. on Euphorbiaceae, *Cladosporium* sp. on *Ipomoea* sp., *Erysiphe tectonae* (E.S. Salmon) U. Braun & S. Takam. 2000 on *Tectona grandis* L.f., *Monodictys paradoxa* (Corda) S. Hughes 1958 on *Artocarpus integrefolia* L.f., *Phyllactinia bauhiniae* Y.S. Paul 2009 on *Cassia fistula* L., *Puccinella graminicola* (Burrill) Syd. 1922 on Unidentified Poaceae species 6, *Sarcinella crytolepidae* A. Pande 1978 on *Cryptolepis buchananii* Roem. & Schult., *Uncinula* sp. on *Eriolaena* sp.
Melghat TR (West), Amravati (7)	*Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. 1884 on *Caryea arborea* Roxb., *Coremiella cubispora* (Berk. & M.A. Curtis) M.B. Ellis 1971 on *Caryea arborea* Roxb., *Olivea tectonae* (Racib.) Thirum. 1949 on *Tectona grandis* L.f., *Peridiopsora mori* (Barclay) K.V. Prasad, B.R.D. Yadav & Sullia 1993 on *Ficus hispida* L.f., *Phyllactinia guttata* (Wallr.) Lév. 1851 on *Lagerstroemia* sp., *Puccinia aristidae* Tracy 1893 on Unidentified Poaceae species 7, *Tripospermum melghatense* Rashmi Dubey 2016 on *Terminalia* sp.
Narnala WLS, Akola Dist. (3)	*Alternaria alternata* (Fr.) Keissl. 1912 on *Nyctanthes arbor-tristis* L., *Camarosporium rubicola* (Sacc.) Sacc. 1884 on *Ixora* sp., *Cladosporium herbarum* (Pers.) Link 1816 on *Nyctanthes arbor-tristis* L.
Pench TR, Nagpur Dist. (5)	*Capnodium* sp. on *Diospyros* sp., *Capnodium* sp. 3 on *Holarrhena pubescens* Wall. ex G. Don, *Capnodium* sp. 2 on *Holarrhena pubescens* Wall. ex G. Don, *Cladosporium tenuissimum* Cooke 1878 on *Diospyros* sp., *Sarcinella diospyri* R.C. Rajak & Soni 1981 on *Diospyros* sp.
Toranmal WLS, Nandurbar Dist. (6)	*Cladosporium oxysporum* Berk. & M.A. Curtis 1868 on *Terminalia arjuna* (Roxb.) Wight & Arn., *Physopella hiratsukae* (Syd.) Cummins & Ramachar 1959 on *Tectona grandis* L.f., *Pseudocochliobolus pallescens* Tsuda & Ueyama 1983 on *Euphorbia neriifolia* L., *Schiffnerula celastri* Hosag., Riju & Sabeena 2008 on *Celastrus paniculatus* Willd., *Wiesneriomyces laurinus* (Tassi) P.M. Kirk 1984 on *Achyranthes aspera* L., *Zygosporium masonii* S. Hughes 1951 on *Bougainvillea* sp.
Yaval WLS, Jalgaon Dist. (2)	*Conidiocarpus betle* (Syd., P. Syd. & E.J. Butler) T. Bose 2014 on *Diospyros* sp., *Penicillium atramentosum* Thom 1910 on *Abutilon* sp.
Southern Tropical Wet Evergreen Forests (1A)/ West Coast Tropical Evergreen Forests (1A/C4)	
Amboli Ghat, Sindhudurg Dist. (11)	*Cercospora careyae* T.S. Ramakr. & K. Ramakr. 1950 on *Careya arborea* Roxb., *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. 1884 on *Gnetum ula* Brongn., ***Colletotrichum gloeosporioides*** (Penz.) Penz. & Sacc. 1884 on *Persea* sp., *Meliola*

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
	eugeniae-stocksii Hosag. 1996 on *Ixora brachiata* Roxb., *Meliola ixorae* H.S. Yates 1917 var. *macrospora* Hosag. 1990 on *Ixora brachiata* Roxb., *Meliola ixorae-coccineae* Hosag. & C.M. Pillai 1994 on *Ixora brachiata* Roxb., *Rhinocladium* sp. on *Persicaria auriculata* (Makino) Masam., *Spiropes effusus* (Pat.) M.B. Ellis 1968 on *Ixora brachiata* Roxb., *Spiropes nothofagi* M.B. Ellis 1968 on *Entada rheedii* Spreng., *Verticillium lecanii* (Zimm.) Viégas 1939 on *Caryota urens* L., *Volutella* sp. on *Gnetum ula* Brongn.
Dajipur WLS, Location 1, Kolhapur Dist. (5)	*Asterina henianii* R.C. Verma, M.S. Tripathi & R.K. Chaudhary 1999 on *Syzygium* sp., *Camposporium* sp. on *Memecylon umbellatum* Burm. f., *Meliola diospyri* Syd. & P. Syd. 1911 on *Diospyros* sp., *Meliola ixorae-coccineae* Hosag. & C.M. Pillai 1994 on *Ixora* sp., *Meliola nothopegiae* Hansf. 1957 on *Nothopegia* sp.
Dajipur WLS, Location 2, Kolhapur Dist. (3)	*Asterina henianii* R.C. Verma, M.S. Tripathi & R.K. Chaudhary 1999 on *Syzygium cumini* (L.) Skeels, *Domingoella asterinarum* Petr. & Cif. 1932 on *Memecylon umbellatum* Burm. f., *Meliola memecyli* Syd. & P. Syd. 1917 on *Memecylon umbellatum* Burm. f.
Radhanagari WLS, Location 1, Kolhapur Dist. (6)	*Acremoniula uniseptata* Hüseyın, Selçuk & Akgül 2015 on *Memecylon umbellatum* Burm. f., *Cladosporium oxysporum* Berk. & M.A. Curtis 1868 on *Erythrina corallodendron* L., *Domingoella asterinarum* Petr. & Cif. 1932 on *Memecylon talbotianum* Brandis, *Meliola memecylicola* Hansf. 1957 on *Memecylon talbotianum* Brandis, *Parapericoniella asterinae* (Deighton) U. Braun, Heuchert & K. Schub. 2005 on *Memecylon talbotianum* Brandis, *Tripospermum myrti* (Lind) S. Hughes 1951 on *Erythrina corallodendron* L.
Radhanagari WLS, Location 2, Kolhapur Dist. (6)	*Beltraniella spiralis* Piroz. & S.D. Patil 1966 on *Mangifera indica* L., *Cryptophiale* sp. on *Litsea* sp, *Meliola eugeniae-stocksii* Hosag. 1996 on *Ficus* sp., *Meliola ixorae* H.S. Yates 1917 on *Ixora* sp., *Spiropes guareicola* (F. Stevens) Cif. 1955 on *Ixora* sp., *Stigmina koyanensis* Rashmi Dubey & S. Sengupta 2016 on *Ficus* sp.
Southern Subtropical Broadleaved Hill Forests (8A)/ Western Subtropical Hill Forests (8A/C2)	
Bhimashankar WLS, Pune Dist. (32)	*Alternaria dianthicola* Neerg. 1945 on *Glochidion* sp., *Ampullifera foliicola* Deighton 1960 on *Maytenus rothiana* (Walp.) Ramamoorthy, *Ampullifera foliicola* Deighton 1960 on *Maytenus rothiana* (Walp.) Ramamoorthy, *Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Leea indica* (Burm. f.) Merr., *Balladyna ugandensis* Syd. 1939 on *Pavetta* sp., *Cercospora apii* Fresen. 1863 on *Pogostemon* sp., *Cercospora apii* Fresen. 1863 on *Paracaryopsis* sp., *Colletotrichum capsici* (Syd. & P. Syd.) E.J. Butler & Bisby 1931 on *Agave americana* L., *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. 1884 on *Glochidion* sp., *Colletotrichum lindemuthianum* (Sacc. & Magnus) Briosi & Cavara 1889 on *Pavetta indica* L., *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Barleria* sp., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Glochidion* sp., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Lantana camara* L., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Paracaryopsis* sp., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Pogostemon* sp., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Gnidia glauca* (Fresen.) Gilg, *Dendryphion comosum* Wallr. 1833 on *Agave americana* L., *Domingoella asterinarum* Petr. & Cif. 1932 on *Piper* sp., *Drechslera papendorfii* (Aa) M.B. Ellis 1971 on Poaceae species 3, *Gonatophragmium mayteni* S.K. Singh, L.S. Yadav & P.N. Singh 2009 on *Maytenus rothiana* (Walp.) Ramamoorthy, *Khuskia oryzae* H.J. Huds. 1963 on *Barleria* sp., *Khuskia oryzae* H.J. Huds. 1963 on *Pavetta indica* L., *Lichenoconium boreale* (P. Karst.) Petr. & Syd. 1927 on *Terminalia chebula* Retz., *Melanocarpus* sp. on *Achyranthes aspera* L., *Monostichella salicis* (Westend.) Arx 1957 on *Trichodesma* sp., *Paraphoma fimeti* (Brunaud) Gruyter, Aveskamp & Verkley 2010 on *Rungia* sp., *Passalora leeae* (Chidd.) U. Braun & Crous 2003 on *Leea indica* (Burm. f.) Merr., *Pseudocercospora griseola* (Sacc.) Crous & U. Braun 2006 on *Glochidion* sp., *Pseudocercospora griseola* (Sacc.) Crous & U. Braun 2006 on

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
	Glochidion sp., *Trichothecium roseum* (Pers.) Link 1809 on Unidentified Leguminosae sp. 3, *Trichothecium roseum* (Pers.) Link 1809 on *Phyllanthus* sp., *Zygosporium minus* S. Hughes 1951 on *Strobilanthes callosa* Nees
Harishchandragad, location 1, Ahmednagar Dist. (6)	*Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Syzygium* cumini (L.) Skeels, *Balladyna velutina* (Berk. & M.A. Curtis) Höhn. 1910 on *Pavetta indica* L., *Capnodium coartatum* Chomnunti & K.D. Hyde 2011 on *Syzygium* sp., *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Leucas* sp., *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Meyna laxiflora* Robyns, *Stenella plectroniae* Ponnappa 1968 on *Meyna laxiflora* Robyns
Harishchandragad, location 2, Ahmednagar Dist. (4)	*Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Glochidion* sp., ***Ardhachandra cristaspora*** (Matsush.) Subram. & Sudha 1978 on *Glochidion* sp., ***Ardhachandra cristaspora*** (Matsush.) Subram. & Sudha 1978 on *Lagerstroemia microcarpa* Hance, ***Ardhachandra cristaspora*** (Matsush.) Subram. & Sudha 1978 on *Leea indica* (Burm. f.) Merr.
Harishchandragad, location 3, Ahmednagar Dist. (3)	*Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Leea indica* (Burm. f.) Merr., *Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Syzygium* sp., *Pithomyces bulbilus* Satya 1975 on *Jasminum malabaricum* Wight
Mahabaleshwar, Satara Dist. (16)	*Alternaria brassicicola* (Schwein.) Wiltshire 1947 on *Brassica oleracea* var. *botrytis* L. (Cauliflower), *Ampelomyces quisqualis* Ces. 1852 on *Pavetta indica* L., *Balladyna pavettae* Boedijn 1961 on *Pavetta crassicaulis* Bremek., *Cladosporium aecidiicola* Thüm. 1876 on *Pavetta indica* L., ***Cladosporium aecidiicola*** Thüm. 1876 on *Smilax zeylanica* L., *Cladosporium cladosporioides* (Fresen.) G.A. de Vries 1952 on *Fragaria* × *ananassa* Duchesne ex Rozier, *Meliola garhwalensis* S.L. Srivast. & Topal 1981 on *Jasminum malabaricum* Wight, *Meliolina mollis* (Berk. & Broome) Höhn. 1919 on *Memecylon umbellatum* Burm. f., ***Meliolina mollis*** (Berk. & Broome) Höhn. 1919 on *Memecylon umbellatum* Burm. f., ***Meliolina mollis*** (Berk. & Broome) Höhn. 1919 on *Persicaria auriculata* (Makino) Masam., *Pileolaria* sp. on *Jasminum* sp., *Pithomyces chartarum* (Berk. & M.A. Curtis) M.B. Ellis 1960 on *Solanum* sp., *Pseudocercospora griseola* (Sacc.) Crous & U. Braun 2006 on *Glochidion* sp., *Puccinia longinqua* Cummins 1951 on *Persicaria auriculata* (Makino) Masam., *Puccinia oxalidis* Dietel & Ellis 1895 on *Oxalis dehradunensis* Raizada, *Stemphylium solani* G.F. Weber 1930 on *Solanum lycopersicum* L.
Malshej Ghat, Pune Dist. (19)	*Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Ipomoea pes-caprae* (L.) R. Br., *Asterina* sp. on *Ixora brachiata* Roxb., *Cladosporium oxysporum* Berk. & M.A. Curtis 1868 on *Colocasia esculanta* Schott., *Cladosporium* sp. on *Cheilanthes* sp., ***Cladosporium* sp.** on *Plumeria* sp., *Coniella granati* (Sacc.) Petr. & Syd. 1927 on *Ampelocissus* sp. (Vitaceae), *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Argyreia* sp., *Gibberella pulicaris* (Kunze) Sacc. 1877 on *Colocasia esculanta* Schott., *Monochaetia* sp. on *Catunaregam spinosa* (Thunb.) Tirveng., *Oidiopsis haplophylli* (Magnus) Rulamort 1986 on *Euphorbia* sp., *Pestalotiopsis* sp. on *Ixora brachiata* Roxb., *Phoma herbarum* Westend. 1852 on *Bambusa bambos* (L.) Voss, *Phoma* sp. on *Ixora brachiata* Roxb., *Phyllachora* sp. on *Memecylon umbellatum* Burm. f., *Physopella hiratsukae* (Syd.) Cummins & Ramachar 1959 on *Bambusa bambos* (L.) Voss, *Pseudoseptoria stomaticola* (Bäumler) B. Sutton 1980 on Unidentified Asteraceae sp. 1, *Sarcinella cryptostegiae* N. Srivastava, S. Chandra & C. Gupta 1990 on *Cryptostegia* sp., *Sarcinella* sp. on *Bauhinia* sp., ***Sarcinella* sp.** on Unidentified
Pasarni Ghat, Satara Dist. (6)	*Asperisporium pongamiae* (Syd. & P. Syd.) Deighton 1976 on *Pongamia pinnata* (L.) Pierre, *Erysiphe prasadii* (M.K. Bhatn. & K.L. Kothari) U. Braun & S. Takam. 2000 on *Pavetta* sp., *Erysiphe tectonae* (E.S. Salmon) U. Braun & S. Takam. 2000 on *Tectona grandis* L.f., *Isthmospora spinosa* F. Stevens 1918 on *Lagerstromia* sp., *Meliola flemingiicola* Hosag., P.A. Jose & H. Biju 2005 on *Lagerstromia* sp.,

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
	Scolecostigmina fici-elasticae (J.N. Kapoor) U. Braun 1999 on *Ficus benghalensis* L.
South Indian Moist Deciduous Forests (3B)	
On the way to Jhap, Thane Dist. (13)	*Acremoniula sarcinellae* (Pat. & Har.) G. Arnaud ex Deighton 1969 on Periplocaceae sp. no. 1, *Capnodium* sp. 1 on *Ficus racemosa* L., *Circinotrichum olivaceum* (Speg.) Piroz. 1962 on *Mangifera indica*, *Cladosporium cladosporioides* (Fresen.) G.A. de Vries 1952 on *Coix lacryma-jobi* L., *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. 1884 on *Meyna laxiflora* Robyns, *Colletotrichum lindemuthianum* (Sacc. & Magnus) Briosi & Cavara 1889 on *Carissa spinarum* L., *Epicoccum nigrum* Link 1816 on *Tectona grandis* L.f., *Gonatophragmium mayteni* S.K. Singh, L.S. Yadav & P.N. Singh 2009 on Unidentified Leguminosae sp. 2, *Meliola carissae* Doidge 1922 on *Carissa spinarum* L., *Pithomyces ellisii* V.G. Rao & Chary 1972 on *Memecylon umbellatum* Burm. f., *Stauronema sacchari* Syd., P. Syd. & E.J. Butler 1916 on *Coix lacryma-jobi* L., *Virgariella globigera* (Sacc. & Ellis) S. Hughes 1953 on *Memecylon umbellatum* Burm. f., *Zasmidium rubiacearum* (S. Chaudhary, N. Sharma & Kamal) Kamal 2010 on *Meyna laxiflora* Robyns
Shirpur, Thane Dist. (10)	*Cercospora apii* Fresen. 1863 on *Arisaema* sp., ***Cercospora apii*** Fresen. 1863 on *Blumea* sp., *Cercospora blumeicola* S. Das 1958 on *Blumea* sp., *Leptoxyphium glochidion* H. Yang & K.D. Hyde 2014 on *Terminalia elliptica* Willd., *Mitteriella ziziphina* Syd. 1933 on *Ziziphus jujuba* Mill., *Myrothecium roridum* Tode 1790 on Bombax ceiba L., ***Myrothecium roridum*** Tode 1790 on Casearia sp., *Neopestalotiopsis asiatica* (Maharachch. & K.D. Hyde) Maharachch., K.D. Hyde & Crous 2014 on *Bombax ceiba* L., ***Neopestalotiopsis asiatica*** (Maharachch. & K.D. Hyde) Maharachch., K.D. Hyde & Crous 2014 on *Carissa spinarum* L., *Pseudocercospora eupatorii-formosanae* J.M. Yen ex Y.L. Guo & W.H. Hsieh 1995 on *Eupatorium* sp.
Jawhar, Thane Dist. (6)	*Asperisporium pongamiae* (Syd. & P. Syd.) Deighton 1976 on *Pongamia pinnata* (L.) Pierre, *Ampelomyces quisqualis* Ces. 1852 on *Malachra capitata* L., *Chloridium indicum* Subram. 1955 on *Mangifera indica* L., *Phialophora cyclaminis* J.F.H. Beyma 1942 on *Chrysalidocarpus lutescens* Wendl., *Torula herbarum* (Pers.) Link 1809 on *Croton* sp., ***Torula herbarum*** (Pers.) Link 1809 on *Dracaena* sp.
On the way to Dahanu, Thane Dist. (14)	*Asterina woodfordiae* V.P. Sahni 1964 on *Woodfordia fruticosa* (L.) Kurz., *Cercospora apii* Fresen. 1863 on *Colocasia esculenta* (L.) Schott, *Cercospora ricinella* Sacc. & Berl. 1885 on *Euphorbia neriifolia* L., *Cladosporium gallicola* B. Sutton 1973 on *Cordia* sp., *Graphium* sp. on *Macaranga peltata* (Roxb.) Müll.Arg., *Khuskia oryzae* H.J. Huds. 1963 on *Colocasia esculenta* (L.) Schott, *Nigrospora sphaerica* (Sacc.) E.W. Mason 1927 on *Euphorbia neriifolia* L., *Passalora desmanthi* (Ellis & Kellerm.) U. Braun 1999 on *Tinospora cordifolia* (Thunb.) Miers, *Pleurocytospora vestita* Petr. 1923 on *Madhuca longifolia* var. *latifolia* (Roxb.) Chev, *Sarcinella cassiae-fistulae* Hosag. & Shajivaz 2002 on *Cassia fistula* L., *Sarcinella gymnosporiae* Subhedar & Rao ex Hosag. 2002 on Unidentified Plant sp. 10, *Stachybotrys levisporus* (Subram.) Yong Wang bis, K.D. Hyde, McKenzie, Y.L. Jiang & D.W. Li 2015 on *Agave americana* L., *Torula herbarum* (Pers.) Link 1809 on *Agave americana* L., *Zygosporium gibbum* (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Madhuca longifolia* var. *latifolia* (Roxb.) Chev
Pulachiwadi, Thane Dist. (20)	*Amerosporium polynematoides* Speg. 1882 on *Eleusine coracana* (L.) Gaertn., *Ampelomyces quisqualis* Ces. 1852 on *Abelmoschus esculentus* (L.) Moench, *Cercospora apii* Fresen. 1863 on *Alternanthera* sp., *Colletotrichum dematium* (Pers.) Grove 1918 on *Eleusine coracana* (L.) Gaertn., *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. 1884 on *Erythrina* sp., C*olletotrichum lindemuthianum* (Sacc. & Magnus) Briosi & Cavara 1889 on *Meyna laxiflora* Robyns, *Corynespora torulosa* (Syd. & P. Syd.) Crous 2013 on *Ensete superbum* Cheesm., *Deightoniella jabalpurensis* G.P. Agarwal & Hasija 1962 on *Apluda* sp., *Drechslera papendorfii* (Aa) M.B. Ellis 1971 on *Eleusine coracana* (L.) Gaertn., *Drechslera papendorfii* (Aa) M.B. Ellis 1971 on *Ischaemum* sp., *Nigrospora sphaerica* (Sacc.) E.W. Mason 1927 on

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
	Eleusine coracana (L.) Gaertn., *Periconia minutissima* Corda 1837 on *Eleusine coracana* (L.) Gaertn., *Sarcinella gmelinae* Hosag., Archana, Harish, Riju & D.K. Agarwal 2008 on *Tectona grandis* L.f., *Thirumalacharia thanensis* Rashmi Dubey 2018 on *Coix lacryma-jobi* L., *Trichoconiella padwickii* (Ganguly) B.L. Jain 1976 on *Achyranthes aspera* L., *Tripospermum acrobaticum* F.B. Rocha & R.W. Barreto 2010 on *Thespesia lampas* (Cav.) Dalzell, *Tripospermum myrti* (Lind) S. Hughes 1951 on Combretaceae sp. 1, ***Tripospermum myrti*** (Lind) S. Hughes 1951 on *Triumfetta rhomboidea* Jacq., *Volutina concentrica* Penz. & Sacc. 1902 on *Coix lacryma-jobi* L., *Xepiculopsis graminea* (Lib.) Nag Raj 1993 on Coix lacryma-jobi L.
Suryamal, Thane Dist. (3)	*Sarcinella loranthacearum* Hosag., Jac. Thomas & D.K. Agarwal 2011 on *Firmiana colorata* (Roxb.) R.Br., *Tripospermum acrobaticum* F.B. Rocha & R.W. Barreto 2010 on *Leea indica* (Burm. f.) Merr., *Zygosporium minus* S. Hughes 1951 on *Strobilanthes callosa* Nees
Tansa WLS, Thane Dist. (8)	*Achroiostachys bambusicola* Rashmi Dubey 2021 on *Bambusa bambos* (L.) Voss, *Ampelomyces quisqualis* Ces. 1852 on *Malachra capitata* L., *Cercospora apii* Fresen. 1863 on *Actinodaphne angustifolia* Nees., ***Cercospora apii*** Fresen. 1863 on *Amorphophallus* sp., *Domingoella asterinarum* Petr. & Cif. 1932 on *Malachra capitata* L., *Pyriculariopsis* sp. on *Commelina benghalensis* L., *Sordaria fimicola* (Roberge ex Desm.) Ces. & De Not. 1863 on *Pandanus tectorious* Sol. Ex Park., *Wiesneriomyces laurinus* (Tassi) P.M. Kirk 1984 on *Pandanus tectorious* Sol. Ex Park.
On the way to Sanjay Gandhi National Park, Mumbai Metropolitan Region (9)	*Alternaria chlamydospora* Mouch. 1973 on *Ficus religiosa* L., *Cercospora apii* Fresen. 1863 on Fern, ***Cercospora apii*** Fresen. 1863 on Poaceae species 1, *Colletotrichum dematium* (Pers.) Grove 1918 on Unidentified Poaceae species 1, *Fusicoccum* sp. on *Calliandra haematocephala* Hassk., ***Fusicoccum* sp**. on Arecacea, *Phoma multirostrata* (P.N. Mathur, S.K. Menon & Thirum.) Dorenb. & Boerema 1973 on *Calliandra haematocephala* Hassk., *Phoma* sp. on Arecaceae, *Temerariomyces indicus* Rashmi Dubey 2018 on *Nymphaea rubra* Roxb. ex Andrews
Sanjay Gandhi National Park, Mumbai Metropolitan Region (13)	*Asterostomella* sp. on Unidentified, *Cercospora* sp. on Unidentified, *Chalara siamense* Pinnoi 2002 on *Pongamia pinnata* (L.) Pierre, *Gonatophragmium* sp. on *Ficus hispida* L.f., *Helicomina costi* M.A. Salam & P.N. Rao 1958 on *Costus speciosus* Konig, *Meliola buteae* Hafiz Khan, Azmatullah & Kafi 1955 on *Butea monosperma* (Lam.) Taub., *Meliola holarrhenae* Hansf. & Thirum. 1948 on *Holarrhena pubescens* Wall. ex G. Don, *Meliola hyptidis* Syd. & P. Syd. 1910 on *Plectranthus* sp., *Meliola mitragynae* Syd. & P. Syd. 1913 on *Mitragyna parviflora* (Roxb.) Korth, *Periconia lateralis* Ellis & Everh. 1886 on *Pongamia pinnata* (L.) Pierre, *Sarocladium strictum* (W. Gams) Summerb. 2011 on *Ludwigia* sp., *Virgariella globigera* (Sacc. & Ellis) S. Hughes 1953 on *Helictores isora* L., *Zygosporium oscheoides* Mont. 1842 on *Bambusa vulgaris* Schrad. ex J.C. Wendl
Wada, Thane Dist. (2)	*Beltrania querna* Harkn. 1884 on *Eucalyptus* sp., *Moorella speciosa* P. Rag. Rao & D. Rao 1964 on *Eugenia* sp.
On the way to Ganesh kund, Thane Dist. (1)	Ramularia pusilla Unger 1833 on Ficus religiosa L.
On the way to Matheran, Raigad Dist. (2)	*Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Diospyros* sp., *Echidnodella polyalthiae* Hosag. 2004 on *Ixora* sp.
On the way to Panvel, Raigad Dist. (2)	*Drechslera papendorfii* (Aa) M.B. Ellis 1971 on Poaceae species 4, *Stachybotrys* sp. on *Ficus hispida* L.f.
Phansad WLS, Raigad Dist. (5)	*Beltrania* sp. on Unidentified, *Capnodium* sp.1 on *Psidium guajava* L., *Dictyochaeta* sp. on Unidentified, *Meliola unonicola* Hosag. & T.K. Abraham 1997 on *Diospyros* sp., *Sarcinella* sp. on Unidentified
Raigad Forest (1)	*Periconia cambrensis* E.W. Mason & M.B. Ellis 1953 on *Bambusa bambos* (L.) Voss

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
Dapoli, Ratnagiri Dist. (3)	*Bahusandhika indica* (Subram.) Subram. 1956 on *Cocos nucifera* L., *Excipulariopsis narsapurensis* (Subram.) Spooner & P.M. Kirk 1982 on *Cocos nucifera* L., *Isthmospora spinosa* F. Stevens 1918 on *Jasminum malabaricum* Wight
Forest Range, Dapoli, Ratnagiri Dist. (7)	*Asterina wrightii* Berk. & M.A. Curtis 1875 on *Paramignya monophylla* Wight, *Domingoella asterinarum* Petr. & Cif. 1932 on *Cocos nucifera* L., *Fusarium oxysporum* Schltdl. 1824 on *Cocos nucifera* L., *Isthmospora spinosa* F. Stevens 1918 on *Holarrhena pubescens* Wall. ex G. Don, *Spiropes guareicola* (F. Stevens) Cif. 1955 on *Careya arborea* Roxb., ***Spiropes guareicola*** (F. Stevens) Cif. 1955 on *Ixora brachiata* Roxb., *Zygosporium gibbum* (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Cocos nucifera* L.
Ganpatipule, Ratnagiri Dist. (1)	*Periconia cookei* E.W. Mason & M.B. Ellis 1953 on *Ipomoea pes-caprae* (L.) R. Br.
Khed, Ratnagiri Dist. (1)	*Harpographium* sp. on *Dracena fragrans* (L.) Ker Gawl.
Kirbet, Ratnagiri Dist. (2)	*Meliola melanoxylonis* Hosag. & C.M. Pillai 1994 on *Carissa spinarum* L., *Repetophragma ellisii* (Piroz.) R.F. Castañeda, McKenzie & K.D. Hyde 2011 on *Bambusa bambos* (L.) Voss
Kodawali-Rajapura, Ratnagiri Dist. (6)	*Acrodictys balladynae* (Hansf.) M.B. Ellis 1961 on *Catunaregam spinosa (*Thunb.) Tirveng., *Balladyna vanderystii* (Hansf.) Arx 1962 on *Catunaregum spinosa* (Thunb.) Tirveng., *Colletotrichum lindemuthianum* (Sacc. & Magnus) Briosi & Cavara 1889 on *Dalbergia latifolia* Roxb., *Phyllachora* sp. on *Ixora brachiata* Roxb., *Prathigada terminaliae* (Syd.) B. Sutton 1994 on *Terminalia* sp., *Zygosporium gibbum* (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Dalbergia latifolia* Roxb.
Kurne-Lanje Tal RF, Ratnagiri Dist. (3)	*Domingoella asterinarum* Petr. & Cif. 1932 on *Woodfordia fruticosa* (L.) Kurz., *Goosiomyces bambusicola* Rashmi Dubey & Moonambeth 2014 on *Bambusa bambos* (L.) Voss, *Meliola bauhiniicola* W. Yamam. 1941 on *Bauhinia* sp.
Near Amba Ghat, Ratnagiri Dist. (1)	*Cladosporium colocasiae* Sawada 1916 on *Hibiscus rosa-sinensis* L.
On the way to Khed, Ratnagiri Dist. (3)	*Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. 1884 on *Ficus benghalensis* L., *Puccinia kraussiana* Cooke 1882 on *Smilax* sp., *Rhinocladium* sp. on *Macaranga peltata* (Roxb.) Müll.Arg.
Panval, Ratnagiri Dist. (1)	*Custingophora ratnagiriensis* Rashmi Dubey & Moonambeth 2013 on *Zizyphus onenoplia* (L.) Mill.
Rajapura, Ratnagiri Dist. (1)	*Penicillium notatum* Westling 1911 on *Careya arborea* Roxb.
Ratnagiri (1)	*Khuskia oryzae* H.J. Huds. 1963 on Unidentified Poaceae species 5
Akeri, Sawantwadi, Sindhudurg Dist. (27)	*Aphanofalx* sp. on *Bambusa bambos* (L.) Voss, *Asperisporium pongamiae* (Syd. & P. Syd.) Deighton 1976 on *Pongamia pinnata* (L.) Pierre, *Asterina jasminicola* H.S. Yates 1918 on *Jasminum* sp., *Balladyna pavettae* Boedijn 1961 on *Synedrella nodiflora* (L.) Gaertn., *Cercosporella thunbergiae* Hansf. 1944 on *Thunbergia* sp., *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. 1884 on *Careya arborea* Roxb., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Hygrophila auriculata* (Schumach.) Heine, ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Clerodendrum grandiflorum* (Hook.) Schauer, ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Sida cordifolia* L., *Didymella fabae* G.J. Jellis & Punith. 1991 on *Tectona grandis* L.f., *Gibberella baccata* (Wallr.) Sacc. 1878 on *Thunbergia* sp., *Hansfordiellopsis lichenicola* (Bat. & H. Maia) Deighton 1965 on *Macaranga peltata* (Roxb.) Müll.Arg., *Meliola careyae* (F. Stevens) Hosag. 2003 on *Careya arborea* Roxb., *Meliola desmodii-triquetri* Hosag. & Manojk. 2004 on *Desmodium triflorum* (L.) DC, *Meliola tylophorae* Hosag. 1990 on Tylophora sp., *Neopestalotiopsis asiatica* (Maharachch. & K.D. Hyde) Maharachch., K.D. Hyde & Crous 2014 on *Cocos nucifera* L., *Periconia byssoides* Pers. 1801 on *Thunbergia* sp., ***Periconia byssoides*** Pers. 1801 on *Eupatorium* sp., ***Periconia byssoides*** Pers. 1801 on

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
	Unidentified plant sp.9, *Pestalotiopsis funerea* (Desm.) Steyaert 1949 on *Leea indica* (Burm. f.) Merr., *Porrectotheca* sp. on *Bambusa bambos* (L.) Voss, *Prillieuxina polyalthiae* Hosag. & T.K. Abraham 1999 on *Desmodium* sp., *Pseudocercospora conyzae* Sawada ex Goh & W.H. Hsieh 1987 on *Eupatorium* sp., *Pseudocercospora* sp. 1 on *Cissus* sp., *Stenella plectroniae* Ponnappa 1968 on *Carissa congesta* Wight, *Tripospermum myrti* (Lind) S. Hughes 1951 on *Mussaenda* sp., *Zygosporium masonii* S. Hughes 1951 on *Artocarpus heterophyllus* Lam.
Amboli Ghat, Sindhudurg Dist. (22)	*Aschersonia aleyrodis* Webber 1897 on *Grewia* sp., ***Aschersonia aleyrodis*** Webber 1897 on *Helicteres isora* L., *Asterina capparis* Syd., P. Syd. & E.J. Butler 1911 on *Capparis* sp., *Chloridium indicum* Subram. 1955 on *Mangifera indica* L., *Cladosporium cladosporioides* (Fresen.) G.A. de Vries 1952 on *Hibiscus esculentus* L., *Cladosporium colocasiae* Sawada 1916 on *Clerodendrum grandiflorum* (Hook.) Schauer, ***Cladosporium colocasiae*** Sawada 1916 on *Eupatorium* sp., ***Cladosporium colocasiae*** Sawada 1916 on *Lygodium* sp., ***Cladosporium colocasiae*** Sawada 1916 on *Blumea* sp., *Cladosporium oxysporum* Berk. & M.A. Curtis 1868 on *Cassia* sp., *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Clerodendrum grandiflorum* (Hook.) Schauer, *Custingophora olivacea* Stolk, Hennebert & Klopotek 1968 on *Clerodendrum grandiflorum* (Hook.) Schauer, *Helicoceras celtidis* (Biv.) Linder 1931 (syn. Sirosporium celtidis) on Unidentified Leguminosae sp. 4, *Meliola ixorae* H.S. Yates 1917 var. *macrospora* Hosag. 1990 on *Ixora brachiata* Roxb., *Meliola mangiferae* Earle 1905 on *Mangifera indica* L., *Pestalotiopsis linearis* Maharachch. & K.D. Hyde 2012 on *Mangifera indica* L., *Sphacelia* sp. on *Grewia* sp., ***Sphacelia*** sp. on *Diploclisia* sp., *Spiropes guareicola* (F. Stevens) Cif. 1955 on *Citrus medica* L., *Zygosporium gibbum* (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Mangifera indica* L., *Zygosporium masonii* S. Hughes 1951 on *Mangifera indica* L., ***Zygosporium masonii*** S. Hughes 1951 on *Clerodendrum grandiflorum* (Hook.) Schauer
Fanaswadi, Sawantwadi, Sindhudurg Dist. (19)	*Acarophialophora* sp. on *Dillenia pentagyna* Roxb., *Aschersonia aleyrodis* Webber 1897 on *Ziziphus jujuba* Mill., *Cladosporium* sp. on Unidentified plant, *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Dillenia pentagyna* Roxb., *Dendryphiella vinosa* (Berk. & M.A. Curtis) Reisinger 1968 on *Dillenia pentagyna* Roxb., *Dendryphion* state of *Pleospora papaveracea* (De Not.) Sacc. 1883 on leaves of *Dillenia pentagyna* Roxb., *Domingoella asterinarum* Petr. & Cif. 1932 on *Dillenia pentagyna* Roxb., *Isthomospora* state of *Trichothyrium asterophorum* (Berk. & Broome) Höhn. 1908 on *Isthomospora* state of *Trichothyrium asterophorum* (Berk. & Broome) Höhn. 1908 on the leaves of *Mangifera indica* L., *Meliola allophyli-serrulati* Hosag. & T.K. Abraham 1998 on *Allophylus* sp., *Meliola eugeniae-stocksii* Hosag. 1996 on *Ixora brachiata* Roxb., *Meliola ziziphi* Hansf. & Thirum. 1948 on *Ziziphus jujuba* Mill., *Pestalotiopsis anacardii* Kamil, T.P. Devi, N. Mathur, O.P. Singh, P. Pandey, Prabhak. & V. Patil 2012 on *Mangifera indica* L., *Pestalotiopsis linearis* Maharachch. & K.D. Hyde 2012 on *Glochidion velutinum* Wight, ***Pestalotiopsis linearis*** Maharachch. & K.D. Hyde 2012 on *Glochidion velutinum* Wight, *Philonectria* sp. on *Dillenia pentagyna* Roxb., *Polytretophora calcarata* Mercado 1983 on *Dendrocalamus* sp., *Sphacelia* sp. on *Ziziphus jujuba* Mill, *Spiropes melanoplaca* (Berk. & M.A. Curtis) M.B. Ellis 1968 on *Mangifera indica* L., *Zygosporium dilleni* Rashmi Dubey 2014 on *Dillenia pentagyna* Roxb.
Kesari, Sindhudurg Dist. (37)	*Amazonia elaeocarpi* Hosag., D.K. Agarwal, H. Biju & Archana 2007 on *Leea indica* (Burm. f.) Merr., *Aschersonia aleyrodis* Webber 1897 on *Ziziphus jujuba* Mill., *Asterina jambolanae* A.K. Kar & Maity 1970 on *Eugenia* sp., *Cladosporium colocasiae* Sawada 1916 on *Thysanolaena latifolia* (Roxb. ex Hornem.) Honda, *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Dregea volubilis* (L.f.) Benth. ex Hook.f., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Pogostomon* sp., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Thysanolaena latifolia* (Roxb. ex Hornem.) Honda, *Didymella fabae* G.J. Jellis &

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
	Punith. 1991 on *Ficus* sp., *Gliocladium penicillioides* Corda 1840 on *Cocos nucifera* L., *Glomerella cingulata* (G.F. Atk.) Spauld. & H. Schrenk 1903 on *Tylophora indica* (Burm.f.) Merr., *Helicosporium lumbricoides* Sacc. 1877 on *Cocos nucifera* L., *Isthmospora spinosa* F. Stevens 1918 on Periplocaceae sp. no. 2, ***Isthmospora spinosa*** F. Stevens 1918 on *Tylophora indica* (Burm.f.) Merr., *Khuskia oryzae* H.J. Huds. 1963 on *Thysanolaena latifolia* (Roxb. ex Hornem.) Honda, *Kirschsteiniothelia atra* (Corda) D. Hawksw. 2014 on Periplocaceae sp. 2, *Meliola alstoniae* Koord. 1907 on Unidentified plant sp. 8, *Meliola hemidesmicola* Hosag. 1996 on Periplocaceae sp. 2, *Meliola melanoxylonis* Hosag. & C.M. Pillai 1994 on *Acacia auriculiformis* A. Cunn. ex Benth., *Meliola pongamiae* Hosag. & T.K. Abraham 1999 on *Pongamia pinnata* (L.) Pierre, *Meliola semecarpi-anacardii* Hosag., Kaver., Raghu & Goos 1994 on *Semecarpus anacardium* L.f., *Meliola tylophorae-indicae* Hosag. & Manojk. 2004 on *Tylophora indica* (Burm.f.) Merr., *Meliolina mollis* (Berk. & Broome) Höhn. 1919 on *Leea indica* (Burm. f.) Merr., *Metulocladosporiella musae* (E.W. Mason) Crous, Schroers, J.Z. Groenew., U. Braun & K. Schub. 2006 on *Cocos nucifera* L., *Periconia lateralis* Ellis & Everh. 1886 on *Pogostemon* sp., *Periconiella telopeae* (Hansf.) M.B. Ellis 1967 on Unidentified plant sp.8, *Pestalotiopsis linearis* Maharachch. & K.D. Hyde 2012 on *Acacia* sp., *Phoma tropica* R. Schneid. & Boerema 1975 on *Ficus* sp., *Questieriella strychni* Hosag. 2004 on *Pongamia pinnata* (L.) Pierre, *Septoria* sp. on unidentified plant sp., *Stachybotrys levisporus* (Subram.) Yong Wang bis, K.D. Hyde, McKenzie, Y.L. Jiang & D.W. Li 2015 on *Ixora coccinea* L., *Stenella araguata* Syd. 1930 on *Mesua ferrea* L., *Tetraploa ellisii* Cooke 1879 on *Ixora coccinea* L., *Vamsapriya indica* Gawas & Bhat 2006 on Unidentified Leguminosae sp. 1, *Vizella oleariae* H.J. Swart 1971 on *Ixora coccinea* L., *Zygosporium gibbum* (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Leea indica* (Burm. f.) Merr., ***Zygosporium gibbum*** (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Pogostemon* sp., *Zygosporium masonii* S. Hughes 1951 on *Ficus religiosa* L.
Kudal, Sindhudurg Dist. (21)	*Asteridiella depokensis* (Hansf.) Hansf. 1957 on *Vitex negundo* L., *Asterina jasminicola* H.S. Yates 1918 on *Jasminum* sp., *Domingoella asterinarum* Petr. & Cif. 1932 on *Jasminum multiflorum* (Burm. f.) Andrews, ***Domingoella asterinarum*** Petr. & Cif. 1932 on Justicia adhatoda L., *Isthmospora spinosa* F. Stevens 1918 on *Strychnos nux-vomica* L., ***Isthmospora spinosa*** F. Stevens 1918 on *Volkameria inermis* L., *Kirschsteiniothelia atra* (Corda) D. Hawksw. 2014 on *Jasminum multiflorum* (Burm. f.) Andrews, *Meliola eugeniae-jamboloidis* Hansf. 1954 on *Carissa spinarum* L., *Meliola hyptidis* Syd. & P. Syd. 1910 on *Volkameria inermis* L., *Meliola ixorae* H.S. Yates 1917 var. *macrospora* Hosag. 1990 on *Ixora coccinea* L., *Meliola jasminicola* Henn. 1895 on *Jasminum multiflorum* (Burm. f.) Andrews, ***Meliola jasminicola*** Henn. 1895 on *Strychnos nux-vomica* L., *Meliolina mollis* (Berk. & Broome) Höhn. 1919 on *Memecylon umbellatum* Burm. f., *Pirozynskiella solaninum* (Sacc. & P. Syd.) S. Hughes 2007 on *Jasminum multiflorum* (Burm. f.) Andrews, *Sphacelia* sp. on Unidentified plant sp. 11, *Spiropes capensis* (Thüm.) M.B. Ellis 1968 on *Vitex negundo* L., *Spiropes japonicus* (Henn.) M.B. Ellis 1968 on *Vitex negundo* L., *Spiropes melanoplaca* (Berk. & M.A. Curtis) M.B. Ellis 1968 on *Volkameria inermis* L., *Zygosporium gibbum* (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Ixora coccinea* L., ***Zygosporium gibbum*** (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Leea indica* (Burm. f.) Merr., *Zygosporium masonii* S. Hughes 1951 on *Leea indica* (Burm. f.) Merr.
Sawantwadi, Sindhudurg Dist. (12)	*Acroconidiellina arecae* (Berk. & Broome) M.B. Ellis 1971 on *Areca catechu* L., *Asterina delicatula* Syd., P. Syd. & Bal 1921 on *Jasminum* sp., *Cladosporium oxysporum* Berk. & M.A. Curtis 1868 on *Hibiscus trionum* L., *Meliola pandanacearum* Hosag. & T.K. Abraham 1999 on *Pandanus tectorius* Parkinson ex Du Roi, *Mycovellosiella solani-torvi* (Gonz. Frag. & Cif.) Deighton 1974 on *Grewia* sp., *Periconia* sp. on *Passiflora* sp., *Phoma nebulosa* (Pers.) Mont. 1860 on *Ipomea* sp., *Puccinia phragmitis* (Schumach.) Tul. 1854 on *Smilax* sp., *Sheathnema indicum*

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
	Rashmi Dubey & Moonnambeth 2014 on *Pandanus tectorius* Parkinson ex Du Roi, *Torula* sp. on *Passiflora* sp., *Veronaeopsis simplex* (Papendorf) Arzanlou & Crous 2007 on *Piper nigrum* L., *Volutina concentrica* Penz. & Sacc. 1902 on *Areca catechu* L.
Vengurla, Sindhudurg Dist. (8)	*Cladosporium spongiosum* Berk. & M.A. Curtis 1868 on *Casaeria* sp., *Diplodia* sp. on *Agave americana* L., *Melanocarpus* sp. on *Pandanus tectorius* Parkinson ex Du Roi, *Mycovellosiella solani-torvi* (Gonz. Frag. & Cif.) Deighton 1974 on *Vitex trifolia* L., *Prathigada* sp. on *Pandanus tectorius* Parkinson ex Du Roi, *Puccinia phragmitis* (Schumach.) Tul. 1854 on *Smilax* sp., *Stauronema spinificis* Subhedar & V.G. Rao 1976 on *Spinifex littoreus* (Burm.f.) Merr., *Tripospermum myrti* (Lind) S. Hughes 1951 on *Dalbergia* sp.
Phonda Ghat, Sindhudurg Dist. (9)	*Aschersonia* sp. on *Terminalia chebula* Retz., *Cercospra* sp. on Unidentified plant, ***Cladosporium* sp.** on *Lygodium* sp., ***Cladosporium* sp**. on *Grewia* sp., ***Cladosporium* sp.** on *Bougainvillea* sp., *Meliola* sp. on *Terminalia catappa* L., *Mycosphaerella* sp. on *Grewia* sp., *Pseudocercospora* sp. on *Bougainvillea* sp., *Sporidesmium* sp. on *Lagerstromia* sp.
Southern Tropical Semi-Evergreen Forests (2A)/ West Coast Semi-Evergreen Forests (2A/C2)	
Amboli Ghat, Sindhudurg (4)	*Colletotrichum* sp. on *Piper nigrum* L., ***Colletotrichum*** sp. on Grewia sp., Verticillium sp. on Carvia callosa (Nees) Bremek., Wiesneriomyces sp. on Unidentified plant
Junnar, Pune Dist. (13)	*Alternaria tenuissima* (Kunze) Wiltshire 1933 on *Cycas* sp., *Asterina hydrocotyles* Hosag. & C.K. Biju 2005 on *Lawsonia inermis* L., *Coniothyrium eucalypticola* B. Sutton 1971 on *Capparis grandis* L.f., *Didymella fabae* G.J. Jellis & Punith. 1991 on *Commelina* sp., *Monodictys putredinis* (Wallr.) S. Hughes 1958 on *Dioscorea* sp., *Pestalotiopsis inflexa* Maharachch. & K.D. Hyde 2012 on *Ixora brachiata* Roxb., *Phoma* sp. on *Tinospora cordifolia* (Thunb.) Miers, *Stemphylium vesicarium* (Wallr.) E.G. Simmons 1969 on Unidentified Asteraceae sp. 2, *Trichothecium roseum* (Pers.) Link 1809 on *Cucumis* sp., ***Trichothecium roseum*** (Pers.) Link 1809 on Dalbergia sp., ***Trichothecium roseum*** (Pers.) Link 1809 on *Ficus benghalensis* L., *Zygosporium gibbum* (Sacc., M. Rousseau & E. Bommer) S. Hughes 1958 on *Syzygium* sp., *Zygosporium oscheoides* Mont. 1842 on *Cycas* sp.
Lonavala, Pune Dist. (5)	*Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Syzygium cumini* (L.) Skeels, *Hemibeltrania nectandrae* (Bat. & H. Maia) Piroz. 1963 on *Litsea stocksii* (Meisner) J.Hk., *Pestalotiopsis palustri*s Nag Raj 1993 on *Tylophora dalzelli*i Hook. f., *Stenella* sp. on *Smilax* sp., *Zygosporium majus* Piroz. 1972 on *Strobilanthes callosa* Nees
Khandala, Pune Dist. (14)	*Aschersonia* sp. on *Carissa congesta* Wight, *Asterina wrightiae* Syd. 1931 on *Lagerstroemia* sp., *Cercospora apii* Fresen. 1863 on *Impatiens balsamina* L., *Colletotrichum dematium* (Pers.) Grove 1918 on *Thespesia populenea* (L.) Sol. ex Corrêa, *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. 1884 on *Smilax* sp., *Colletotrichum lindemuthianum* (Sacc. & Magnus) Briosi & Cavara 1889 on Unidentified plant sp. 5, *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Canthium* sp., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Jasminum malabaricum* Wight, Gliomastix sp. on *Bridelia retusa* (L.) A. Juss., *Monostichella indica* B. Sutton 1980 on *Holarrhena pubescens* Wall. ex G. Don, *Periconia lateralis* Ellis & Everh. 1886 on Unidentified, *Pestalotiopsis palustris* Nag Raj 1993 on *Canthium dicoccum* (Gaertn.) Merr., *Puccinia imposita* Arthur 1919 on *Smilax* sp., *Ulocladium botrytis* Preuss 1851 on *Canthium* sp.
Karjat, Raigad Dist. (6)	*Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Jasminum odoratum* Noronha, *Colletotrichum dematium* (Pers.) Grove 1918 on Euphorbiaceae, ***Colletotrichum dematium*** (Pers.) Grove 1918 on Unidentified Poaceae species 2, *Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Eupatorium* sp., ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei 1950 on *Laportea* sp., *Zygosporium masonii* S. Hughes 1951 on *Ficus benghalensis* L.

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
Khopoli, Raigad Dist. (1)	*Corynespora cassiicola* (Berk. & M.A. Curtis) C.T. Wei 1950 on *Cassia* sp.
Matheran, Raigad Dist. (10)	*Ardhachandra cristaspora* (Matsush.) Subram. & Sudha 1978 on *Flacourtia indica* (Burm.f.) Merr., *Cirsosia vateriae* Hosag. 2012 on Unidentified plant species -4, *Coniothyrium palmarum* Corda 1840 on *Roystonea regia* (Kunth) O.F. Cook, *Dictyosporium subramanianii* B. Sutton 1985 on *Roystonea regia* (Kunth) O.F. Cook, *Fusarium solani* (Mart.) Sacc. 1881 on *Desmodium* sp., *Microsphaeropsis sarcinellae* (V.P. Sahni) Morgan-Jones 1975 on *Roystonea regia* (Kunth) O.F. Cook, *Phaeoisaria clematidis* (Fuckel) S. Hughes 1958 on *Roystonea regia* (Kunth) O.F. Cook, *Pithomyces pavgii* (V.R. Nath) M.E. Palm, E.L. Stewart & Rossman 1981 on *Bambusa bambos* (L.) Voss, *Solicorynespora matheranensis* Rashmi Dubey & Moonnambeth 2014 on *Roystonea regia* (Kunth) O.F. Cook, *Stachybotrys echinatus* (Rivolta) G. Sm. 1962 on *Roystonea regia* (Kunth) O.F. Cook
Chandoli NP, location 1, Sangli Dist. (3)	*Asterostomella* state of *Asterina jasmini* Hansf. 1948 on *Jasminum* sp., *Erysiphe tectonae* (E.S. Salmon) U. Braun & S. Takam. 2000 on *Tectona grandis* L.f., *Tretospora thitei* Hosag., T.K. Abraham, N. Ahmad & A.K. Sarbhoy 1999 on *Catunaregam spinosa* (Thunb.) Tirveng.
Chandoli NP, location 2, Sangli Dist. (2)	*Diplococcium spicatum* Grove 1885 on *Dalbergia sissoo* DC., *Nigrospora sacchari* (Speg.) E.W. Mason 1927 on *Dalbergia sissoo* DC.
Chandoli NP, location 3, Sangli Dist. (3)	*Asterina jasmini* Hansf. on *Jasminum malabaricum* Wight, Asterostomella state of *Asterina jasminicola* H.S. Yates 1918 on *Jasminum* sp., *Uromyces nassellae* Cummins 1956 on *Jasminum* sp.
Chandoli NP, location 1, Satara Dist. (2)	*Aithaloderma viride* L.R. Fraser 1935 on *Olea dioica* Roxb., *Capnodium* sp. 3 on Unidentified plant sp.3
Chandoli NP, location 2, Satara Dist. (2)	*Periconia chandolensis* Rashmi Dubey 2017 on *Saccharum officinarum* L., *Sarcinella* sp. on *Elaeagnus conferta* Roxb.
Koyna WLS, Location 1 (Metindoli), Satara Dist. (13)	*Amazonia syzygii* Hosag. 1989 on *Syzygium cumini* (L.) Skeels, *Beltrania mangiferae* Munjal & J.N. Kapoor 1963 on *Mangifera indica* L., *Beltrania rhombica* Penz. 1882 on *Mangifera indica* L., *Craspedodidymum* sp. on *Bridelia* sp., *Domingoella asterinarum* Petr. & Cif. 1932 on *Dimocarpus longan* Lour, ***Domingoella asterinarum*** Petr. & Cif. 1932 on *Syzygium cumini* (L.) Skeels, *Gyrothrix circinata* (Berk. & M.A. Curtis) S. Hughes 1958 on *Actinodaphne angustifolia* Nees., *Humicola fuscoatra* Traaen 1914 on *Syzygium cumini* (L.) Skeels, *Idriella lunata* P.E. Nelson & S. Wilh. 1956 on *Allophylus cobbe* (L.) Raeusch., *Isthmospora spinosa* F. Stevens 1918 on Unidentified plant sp. 7, *Meliola agrostistachydis* Hosag. & G. Rajkumar 2005 on *Agrostistachys* sp., *Meliola holigarnae* F. Stevens 1928 on *Holigarna* sp., *Meliola* sp. on *Casaeria* sp.
Koyna WLS, Location 2 (Kusapur), Satara Dist. (11)	*Asteridiella malloticola* (W. Yamam.) Hansf. 1957 on *Mallotus philippensis* (Lam.) Muell Arg., *Asterina morellae* Hosag., C.K. Biju & T.K. Abraham 2001 on *Garcinia* sp., *Asterostomula pavettae* Hosag. & Sabeena 2012 on *Pavetta* sp., *Balladyna velutina* (Berk. & M.A. Curtis) Höhn. 1910 on *Pavetta indica* L., *Conidiocarpus* sp. on *Syzygium cumini* (L.) Skeels, *Cryptomyces* sp. on *Casaeria* sp., *Domingoella asterinarum* Petr. & Cif. 1932 on *Dimocarpus longan* Lour., *Pestaliopsis guepinii* (Desm.) Steyaert 1949 on *Leea indica* (Burm. f.) Merr., *Pseudocercospora griseola* (Sacc.) Crous & U. Braun 2006 on *Glochidion ellipticum* Wight, *Pseudocercospora viticicola* (J.M. Yen & Lim) J.M. Yen 1980 on *Woodfordia fruticosa* (L.) Kurz, *Ramularia vitis* (Richon) U. Braun 1988 on *Vitex negundo* L.
Chandoli NP, location 1, Kolhapur Dist. (1)	*Aithaloderma viride* L.R. Fraser 1935 on *Olea dioica* Roxb.

Table 1 Continued.

Location	Enumeration of Fungal Isolates with Host Plants
Chandoli NP, location 2, Kolhapur Dist. (2)	*Aithaloderma viride* L.R. Fraser 1935 on *Olea dioica* Roxb., *Uredo* sp. on *Flacourtia* sp.
City Garden Areas	
Garden Areas, Pune City (32)	*Botryosporium madrasense* Raghuk. 1970 on *Dracena fragrans* (L.) Ker Gawl., *Calonectria morganii* Crous, Alfenas & M.J. Wingf. 1993 on *Azadirachta indica* A. Juss., *Catenularia cubensis* Hol.-Jech. 1982 on *Cocos nucifera* L., *Chaetomella acutiseta* B. Sutton & A.K. Sarbhoy 1976 on *Bambusa bambos* (L.) Voss, *Chaetospermum camelliae* Agnihothr. 1962 on *Phoenix sylvestris* (L.) Roxb., *Chalara* sp. on *Dracena fragrans* (L.) Ker Gawl., *Ciliochorella mangiferae* Syd. 1935 on *Mangifera indica* L., *Cladosporium colocasiae* Sawada 1916 on *Caryota urens* L., *Cucurbidothis pityophila* (J.C. Schmidt & Kunze) Petr. 1921 on *Dracena fragrans* (L.) Ker Gawl., *Dictyoarthrinium sacchari* (J.A. Stev.) Damon 1953 on *Bambusa bambos* (L.) Voss, *Dictyosporium elegans* Corda 1836 on *Roystonea regia* (Kunth) O.F. Cook, *Dictyosporium heptasporum* (Garov.) Damon 1952 on *Livistona chinensis* (Jacq.) R.Br. ex Mart., *Drechslera rostrata* (Drechsler) M.J. Richardson & E.M. Fraser 1968 on *Roystonea regia* (Kunth) O.F. Cook, *Fusariella indica* R.Y. Roy & B. Rai 1968 on *Cocos nucifera* L., ***Fusariella indica*** R.Y. Roy & B. Rai 1968 on *Bambusa bambos* (L.) Voss, *Harpographium fasciculatum* (Sacc.) Sacc. 1880 on *Dracena fragrans* (L.) Ker Gawl., *Helicomyces hyderabadensis* P. Rag. Rao & D. Rao 1964 on *Roystonea regia* (Kunth) O.F. Cook, *Hermatomyces tucumanensis* Speg. 1910 on *Roystonea regia* (Kunth) O.F. Cook, *Heteropatella lacera* Fuckel 1874 on Unidentified plant sp. 6, *Kirschsteiniothelia atra* (Corda) D. Hawksw. 2014 on *Albizia saman*, *Monilochaetes laeensis* (Matsush.) Réblová, W. Gams & Seifert 2011 on *Dracena fragrans* (L.) Ker Gawl., *Oidium azadirachtae* Narayanas. & K. Ramakr. 1969 on *Azadirachta indica* A. Juss., *Oidium caricae* F. Noack 1898 on *Carica papaya* L., *Phaeotrichoconis* sp. on *Roystonea regia* (Kunth) O.F. Cook, *Sordaria fimicola* (Roberge ex Desm.) Ces. & De Not. 1863 on *Roystonea regia* (Kunth) O.F. Cook, *Tetraploa aristata* Berk. & Broome 1850 on *Roystonea regia* (Kunth) O.F. Cook, *Tharoopama livistonae* Rashmi Dubey & Moonambeth 2013 on *Livistona chinensis* (Jacq.) R.Br. ex Mart., *Torula herbarum* (Pers.) Link 1809 on *Agave americana* L., *Tryblidiopycnis pinastri* Höhn. 1918 on *Ficus religiosa* L., *Vermiculariopsiella papayae* Rashmi Dubey & Moonambeth 2014 on *Carica papaya* L., *Zygosporium cocos* Rashmi Dubey 2014 on *Cocos nucifera* L., *Zygosporium masonii* S. Hughes 1951 on *Roystonea regia* (Kunth) O.F. Cook

Table 2 Measures of diversity calculated for five different forest types of Maharashtra, for the city area of Pune as well as for the state of Maharashtra as a whole.

	Study Area	MDF	SEF	HF	DDF	EF	City
Gini Simpson's Index $(1\text{-}D) = 1\text{-}\Sigma p_i^2 = 1\text{-}\Sigma(n_i/N)^2$	0.9930	**0.9911**	0.9828	0.9654	0.9746	0.9573	0.9668
Shannon's Index (H) $= \Sigma\ p_i * \ln(1/p_i)$	5.5301	**5.0421**	4.2251	3.8050	3.7482	3.2104	3.4224
Pielou's Evenness Index (J') = H/ln(S)	0.9395	0.9571	0.9756	0.9332	0.9847	0.9854	**0.9966**
True Diversity = Effective number of species (Based on H) = e^H	252	**154**	68	44	42	24	30
Species Richness = Number of species	360	**194**	76	59	45	26	31
Number of Isolates	589	**294**	92	86	54	31	32

Abbreviations used: MDF = South Indian Moist Deciduous Forests (3B), SEF = Southern Tropical Semi-Evergreen Forests (2A)/ West Coast Semi-Evergreen Forests (2A/C2), HF = Southern Subtropical

Broadleaved Hill Forests (8A)/ Western Subtropical Hill Forests (8A/C2), DDF = Southern Tropical Dry Deciduous Forests (5A), EF = Southern Tropical Wet Evergreen Forests (1A)/ West Coast tropical evergreen forest (1A/C4). Note: Maximum values are in bold, minimum values are underlined.

Table 3 Jaccard Similarity Index.

JSI	**MDF**	**SEF**	**HF**	**DDF**	**City**	**EF**
MDF	1.0000					
SEF	0.0630	1.0000				
HF	0.0952	**0.1066**	1.0000			
DDF	0.0482	0.0522	0.0947	1.0000		
City	0.0227	0.0094	0.0000	0.0133	1.0000	
EF	0.0377	0.0200	0.0366	0.0290	0.0000	1.0000

Abbreviations used: MDF = South Indian Moist Deciduous Forests (3B), SEF = Southern Tropical Semi-Evergreen Forests (2A)/ West Coast Semi-Evergreen Forests (2A/C2), HF = Southern Subtropical Broadleaved Hill Forests (8A)/ Western Subtropical Hill Forests (8A/C2), DDF = Southern Tropical Dry Deciduous Forests (5A), EF = Southern Tropical Wet Evergreen Forests (1A)/ West Coast tropical evergreen forest (1A/C4). Note: Maximum values are in bold.

Discussion

As foliicolous fungi prevail in dense tropical forest areas (Arnold et al. 2000), therefore, emphasis of field survey was greater on dense forest cover. Consequently 05 forest types (as per Champion & Seth 1968) of the state were surveyed. The results show that foliicolous fungal diversity in garden areas of Pune city was higher than in West Coast Tropical Evergreen Forest (1A/C4), as revealed by higher values of almost all the measures of diversity such as species richness, Gini Simpson's index, Shannon's index and true diversity.

As seen in Fig. 3, values of Gini-Simpson's index for different forest types are virtually indistinguishable from each other. Even in Shannon's index, though the value for South Indian Moist Deciduous Forests (3B) is 57.12% higher than West Coast Tropical Evergreen Forest (1A/C4), but when converted to true diversity the difference becomes 650%. This is another reason to convert Shannon's index into true diversity, since former greatly diminishes the magnitude of difference in diversity due to its highly non-linear nature (Jost 2006). Similar insight was obtained by Dubey & Pandey (2022c) in their analysis of diversity of microfungi of Sanjay Gandhi National Park, Maharashtra, India. A general trend can be seen from Table 2 that – Number of isolates ≥ Species Richness ≥ True Diversity. While first part (Number of isolates ≥ Species Richness) is obvious, the second part (Species Richness ≥ True Diversity) is hardly surprising since true diversity is meant to deflate species richness by incorporating abundance (number of isolates) to reveal 'true' level of diversity.

Different forest types greatly differed in terms of species composition as well, as maximum similarity (JSI = 10.83%) was observed between Western Subtropical Hill (8A/C2) Forests and West Coast Semi-Evergreen (2A/C2) Forests, with only one species (<1% of total) viz., *Colletotrichum gloeosporioides* common in all forests. Additionally, only 5 species (<1.5% of total) were common between forests and garden areas of the city.

In the case of semi-evergreen and dry deciduous forests, the initial fungal colonizer remains round the year or a succession takes place by eliminating the initial colonizer or a large number of fungal pathogens co-exist and affect the same host substratum simultaneously. With regard to the community and species composition, almost same fungal flora was observed in moist deciduous forests, semi-evergreen forests and forest plantations; however, fungal species dominance and abundance occurred depending on the environmental conditions as well as host plants. It is clear from our studies that huge range of forest micro-habitats combined with favourable climatic conditions and altitudinal gradient decides the fungal distribution and which is high in tropical

forests of Western Ghats. The present study thus provides unique perspective on diversity and ecological aspects of foliicolous fungi in relation to the forest types in which they occur.

Acknowledgements

Authors would like to express their special thanks and gratitude to Dr. A.A. Mao, Director, Botanical Survey of India, for his kind support and for providing all the research facilities. They also extend their gratitude to the Head of the office, Botanical Survey of India, Western Regional Centre, Pune, for his kind support. The work was financially supported by the Ministry of Environment, Forest & Climate Change, New Delhi. All officials of Sanjay Gandhi National Park are also thankfully acknowledged for their support during surveys.

References

Arnold AE, Maynard Z, Gilbert GS, Coley, PD, Kursar TA. 2000 – Are tropical fungal endophytes hyperdiverse? Ecology letters, 3(4), 267–274.

Champion HG, Seth SK. 1968 – A revised survey of the forest types of India. Natraj Publishers, Dehradun, India.

Dubey R, Pandey AD. 2017 – Percentage distribution of foliicolous fungi of Maharashtra, India with respect to their disease symptoms: a novel study. Mycologia Iranica 4(2), 103–120.

Dubey R, Pandey AD. 2019 – Statistical analysis of foliicolous fungal biodiversity of Konkan region, Maharashtra, India: A novel approach. Plant Pathology & Quarantine 9(1), 77–115.

Dubey R, Pandey AD. 2022a – Inventory and Data Analysis of Leaf inhabiting fungi of Protected Areas of Northern Maharashtra, India. Indian Phytopathology 75, 315–323.

Dubey R, Pandey AD. 2022b – Documentation and statistical approach towards foliar fungi found in Western Ghats (Desh region of Maharashtra), India. Plant Pathology & Quarantine 12(1), 77–104. Doi 10.5943/ppq/12/1/6

Dubey R, Pandey AD. 2022c – Documentation & Statistical Analysis of Diversity of Microfungi of Sanjay Gandhi National Park, Maharashtra, India. Asian Journal of Mycology, 5(1): 130–196. Doi 10.5943/ajom/5/1/10

FSI. 2019 – Forest Survey of India 2019, India State of Forest Report (ISFR 2019). Ministry of Environment, Forest & Climate Change. Government of India, Dehradun, India. 187p.

Gotelli NJ, Ellison AM. 2004 – Primer of ecological statistics, Second Edition. Sinauer Associates Publishers, Sunderland, Massachusetts, USA.

Jost L. 2006 – Entropy and diversity. Oikos 113(2), 363–375.

Murali TS, Suryanarayanan TS, Venkatesan G. 2007 – Fungal endophyte communities in two tropical forests of southern India: diversity and host affiliation. Mycological Progress 6(3), 191–199.

Myers N, Mittermeier RA, Mittermeier CG, Da Fonseca GA, Kent J. 2000 – Biodiversity hotspots for conservation priorities. Nature 403(6772), 853–858.

Pande A, Bansude GM. 1980 – *Leptosphaeria* leaf-spot of *Agave* – a new record from India. Maharashtra Vigyan Mandir Patrika 15(1), 31–32.

Pande A.1981 – Three foliicolous fungi from India. Maharashtra Vigyan Mandir Patrika 16, 33–36.

Parandekar SA. 1964 – A contribution to the fungi of Maharashtra. Journal of University of Poona, Science & Technology Sections 26, 57–65.

Patil SD, Magdum DK. 1979 – Some *Cercospora* species from Ganeshkhind area. Maharashtra Vigyan Mandir Patrika 14, 49–51.

Patil MS, Pawar AB. 1989 – Studies in foliicolous fungi –V. Indian Phytopathology 42, 247–252.

Patwardhan PG. 1969 – Studies in the Powdery Mildews (Erysiphaceae) of Maharashtra (India): I ascigerous. J. Shivaji University 2, 55–57.

Ranadive KR, Jite PK, Ranade VD, Vaidya JG. 2013 – Flora of Aphyllophorales from Pune district-part I. Journal on New Biological Reports 2(3), 188–227.

Sawant RJ, Papdiwal PB. 2007 – Studies on leaf spot diseases of *Annona squamosa* L. in Beed district of Maharashtra. Bioinfolet, 4: 227–228.

Sharma D, Gosai K, Dutta J, Arunachalam A, Shukla AK. 2015 – Fungal diversity of twelve major vegetational zones of Arunachal Himalaya, India. Current Research in Environmental & Applied Mycology 5(2), 101–119. Doi 10.5943/cream/5/2/4

Singh N, Todawat J, Papdiwal PB. 2011 – Leaf spot diseases of some fruit trees of Aurangabad district, Maharashtra. Bioinfolet 8, 87–90.

Singh NP, Karthikeyan S. 2000 – Flora of Maharashtra State, Dicotyledones Vol. 1: Ranunculaceae-Rhizophoraceae. Botanical Survey of India, Calcutta.

Suryanarayanan TS, Murali TS, Thirunavukkarasu N, Rajulu G et al. 2011 – Endophytic fungal communities in woody perennials of three tropical forest types of the Western Ghats, southern India. Biodiversity and Conservation 20(5), 913–928.