

Preliminary Checklist of Phytopathogenic Fungi in Sikkim, India

Prakash Pradhan

West Bengal Biodiversity Board, Department of Environment, Government of West Bengal, Salt Lake, Sector-III, FD415A, Poura Bhawan, 4th Floor, Kolkata, West Bengal, India, 700 106.

email: shresthambj@gmail.com

Abstract: Sikkim is an Indian state with unique cultural and natural landscape. Being rich in bioresources, earlier biodiversity explorations have led to enumeration of varied flora and fauna. However, fungi being an important biodiversity component, and especially, the fungal phytopathogens having potential of impacting human economy and food security, present understanding is needed to make vision for the future. In this regard, past works (1877-2011) on phytopathogenic fungi reported from Sikkim were surveyed. In this manuscript, 98 species of plant pathogenic fungi (including anamorphs) under 76 genera are enlisted. The alphabetical checklist of the genera is provided herewith. Further updates will be added in the subsequent versions of the publication.

Keywords: Biodiversity, Disease, Economy, Food Security, Species

Introduction:

Sikkim is a land of unique cultural and natural landscape. Nestled in the eastern Himalaya, the state is endowed with rich floral and faunal diversity. While explorations till today has led to the current understanding of the state's bioresources with over 4500 flowering plants, 550 Orchids, 36 Rhododendrons, 16 Conifers, 28 Bamboos, 362 Ferns and its allies, 9 Tree Ferns, 30 Primulas, 11 Oaks, over 424 Medicinal plants, 144+ mammals, 550 Birds, 48 Fishes and more than 600 Butterflies (Sikkim Biodiversity, 2015). Yet very little is known about the regional fungal diversity.

Fungi are the indispensable part of an ecosystem, being the second largest biotic group in nature. Amongst many primary functions, phytopathogenesis is an important aspect considering mostly their negative attributes to our economy and food security. It is therefore pertinent to understand the diversity of fungal phytopathogens and associated plant diseases, which will be helpful to develop relevant action plans for the future.

Here, relevant literature has been explored from 1877 to 2011, leading to report of 98 species (including anamorphs) under 76 genera of plant pathogenic fungi. The alphabetical checklist of the species is provided as follows. Further relevant updates will be added in the subsequent versions of the publication.

Genus: *Acantiaria*

- *Acantiaria elegans* (Syd.)Arx.=*Lasiobotrys elegans* (Syd.) Theiss, on *Quercus*, in Sikkim (Theissen, 1914)

Genus: *Alternaria*

- *Alternaria alternata* (Fr.) Keissler. upon living leaves of *Cyphomandra betacea* (Cav.) Sendt., in Sikkim(Sarbhoy and Agarwal, 1991a); *A. alternata* on living leaves of *Pteris* sp., in Gangtok, Sikkim (Sarbhoy and Agarwal, 1991a); *A. alternata* on living leaves of *Luffa aegyptica* Mill. in Gangtok, Sikkim (Sarbhoy and Agarwal, 1991a); *A. alternata* on living leaves of *Wrightia tinctoria* R. Br. in Sikkim (Sarbhoy and Agarwal, 1991a); *A. alternata* causing leaf spot on *Cyphomandra betacea*, in Sikkim (Gupta and Choudhary, 1994)

Genus: *Antromycopsis*

- *Antromycopsis alpina* P. Henn, living leaves of *Rhododendron* sp., on the way to Sikkim (Kapoor and Munjal, 1966)

Genus: *Aschersonia*

- *Aschersonia cubensis* Berk. state of *Hypocrella epiphylla* (Masse) Sacc., on leaves of *Citrus reticulata* Blanco., in Gangtok, Sikkim (Gupta, 1988)

Genus: *Astrosphaeriella*

- *Astrosphaeriella fuscomaculans* Yarnamoto. upon culms of *Arundinaria falcata* Nees, in Sikkim (Kapoor and Lal, 1973)

Genus: *Astrotheca*

- *Astrotheca nigrocornis* Hino on dead culms of *Arundinaria falcata*, in Sikkim (Kapoor and Lal, 1973)

Genus: *Bipolaris*

- *Bipolaris urochloae* (Putterill) Schem. on leaves of *Panicum maximum*, in Gangtok, Sikkim (Gupta and Srivastava, 1992)

Genus: *Botryosphaeria*

- *Botryosphaeria ribis* Gross. & Dugg. causing leaf spot on *Quercus acutissima*, in Gangtok, Sikkim (Srivastava and Verma, 1991)

Genus: *Botrytis*

- *Botrytis fabae* Sardina causing burn boils disease on *Vicia faba*, in Sikkim (Srivastava and Verma, 1999)

Genus: *Cephalosporium*

- *Cephalosporium acremonium* Corda upon *Zea mays*, in Kalimpong, Sikkim (Dhanraj and Mathur, 1965)

Genus: *Ceratocladium*

- *Ceratocladium microspermum* Corda on dead leaves and culms of *Dendrocalamus* sp., in Sikkim (Munjal and Kapoor, 1969)

Genus: *Cercospora*

- *Cercospora kikuchii* (Mats & Tommy) M. W. Gardner. causing aerial blight and collar rot of *Vigna umbellata*, in Sikkim (Srivastava, Gupta and Verma, 1992)
- *Cercospora osbekiae* Chona, Lall & Munjal on leaves of *Osbeckia stellata*, in Chakking, Sikkim (Chona, Lall and Munjal, 1959)
- *Cercospora menthicola* Tehan & Daniela on living leaves of *Oronaria babusae* Roxb., in Sikkim (Sarbhoy and Agarwal, 1991a); on living leaves of *Wrightia tinctoria* R. Br., Sikkim (Sarbhoy and Agarwal, 1991a)
- *Cercospora oxysporum* Berk. & Curt on living leaves of *Amomum subulatum* Roxb., in Sikkim (Sarbhoy and Agarwal, 1991a)

Genus: *Cercosporidium*

- *Cercosporidium bolleanum* (Thum.) Liv & Guo. Anamorph *Mycosphaerella bolleana* Higg. causing vein necrosis and leaf spot on *Ficus auriculata*, in Sikkim (Srivastava and Srivastava, 2000); *C. bolleanum* causing leaf spot on *Ficus infectoria*, in Sikkim (Srivastava and Srivastava, 2000)

Genus: *Chaetomium*

- *Chaetomium funicola* Cooke. on leaves of *Bambusa indica* L. in Gangtok, Sikkim (Gupta, 1988)

Genus: *Chetomella*

- *Chetomella furcata* Cooke & Masee. upon unknown coriaceous leaf, in Sikkim, (Cooke, 1888)

Genus: *Chrysomyxa*

- *Chrysomyxa deformans* (Diet) Jaczen. on *Picea morinda*, in Simla & Dalhausie, H.P., Sikkim (Dietal, 1890)
- *Chrysomyxa himalensis* Barclay on *Rhododendron hedgsonii*, in Sikkim (Puri, 1955)

Genus: *Cladosporium*

- *Cladosporium cladosporioides* (Fres.) de Vries on leaves of *Coix lycrma* Jobi., in Gangtok, Sikkim (Gupta, 1988)
- *Cladosporium herbarum* (Pers.) Link. ex S. F. Gray. on living leaves of *Bougainvillea spectalis* Willd. in Ranipul (mentioned as Ranipur), Sikkim (Sarbhoy and Agarwal, 1991a)

Genus: *Colletotrichum*

- *Colletotrichum gloeosporioides* state of *Glomerella cingulata* Penz. causing Anthracnose on *Amomum subulatum*, in Sikkim (Srivastava, 1989); *C. gloeosporioides* causing leaf spot of wild large Cardamom *Amomum dealbatum*, in Sikkim (Srivastava and Verma, 1999)

Genus: *Corynespora*

- *Corynespora casiicola* (Berk. & Curt.) Wei. on living leaves of *Oronaria babusae* Roxb., in Sikkim (Sarbhoy and Agarwal, 1991a)

Genus: *Curvularia*

- *Curvularia lunata* (Wakker) Boed. on living leaves of *Pteris* sp., in Sikkim (Sarbhoy and Agarwal, 1991a)

Genus: *Dactuliphora*

- *Dactuliphora tarrii* Leakey. causing aerial blight and collar rot of *Vigna umbellata*, in Gangtok, Sikkim (Srivastava, Gupta and Verma, 1992)

Genus: *Didymella*

- *Didymella exitialia* (Moll) Mueller on *Zea mays*, in Gangtok, Sikkim (Payak and Renfro, 1966)
- *Didymella exigua* (Niessl) Sacc. on leaves of *Clerodendron* sp., in Gangtok, Sikkim (Gupta and Srivastava, 1992)

Genus: *Didymosporium*

- *Didymosporium culmigenum* Sacc. on leaves & culms of grass probably of *Saccharum* sp., in Gangtok, Sikkim (Munjal, Chona and Kapoor, 1959); *D. culmigenum* on leaves & culms of grass probably of *Saccharum* sp., in Gangtok, Sikkim (Rangaswami and Sambandam, 1960)

Genus: *Diplodia*

- *Diplodia macrostoma* Earle. on cobs of *Zea mays* in Kalimpong, W.B. and Sikkim (Dhanraj, 1966); *D. macrostoma* on cobs of *Zea mays* in Kalimpong, W.B. and Sikkim (Payak and Renfro, 1966)
- *Diplodia zae* (Schw.) Lev. on cobs of *Zea mays* in Chyakung, Sikkim (Kapoor, 1963)

Genus: *Elsinoe*

- *Elsinoe fici* Srivastava & Verma causing leaf spot disease of *Ficus infectoria*, in Sikkim (Srivastava and Verma, 1990)

Genus: *Endophragmia*

- *Endophragmia elliptica* (Berk. & Br.) M.B. Ellis upon decaying herbaceous stem, in Sikkim (Munjal and Kapoor, 1969)

Genus: *Erysiphe*

- *Erysiphe polygoni* D. C. on living leaves of *Aloe barbadensis* Mill., in Gangtok, Sikkim (Sarbhoy and Agarwal, 1991a)
- *Erysiphe rhododendri* Kapoor on leaves of *Rhododendron* sp., in Sikkim (Kapoor, 1965)
- *Erysiphe sikkimensis* Chona, Kapoor & Gill on living leaves of *Castanopsis tribuloides*, in Sikkim (Chona, Kapoor and Gill, 1960); *E. sikkimensis* on living leaves of *Castanopsis indica* in Sikkim (Chona, Kapoor and Gill, 1960)
- *Erysiphe symploci* Kapoor on leaves of *Symplocos racemosa*, in Sikkim (Kapoor, 1965)

Genus: *Eudarluc*

- *Eudarluc caricis* (Fr.) Eriks. upon *Vigna umbellata*, in Sikkim (Srivastava and Gupta, 1990)

Genus: *Fusarium*

- *Fusarium solani* (Mart.) App. & Wollenw. = *Fusarium viride* (Lechm.) Wollenw. = *Fusarium solani* var. *medium* Wollenw., upon *Citrus reticulata*, in Sikkim (Chattopodhyay and Sengupta, 1967)
- *Fusarium moniliforme* [*Gibberella fujikuroi*], /*Fusarium oxysporum*/*Fusarium solani* causing yellows *Zingiber officinale*, in Sikkim (Bhatm, 2001)

Genus: *Gibberella*

- *Gibberella anne* (Schw.) Petch. on cobs of *Zea mays*, in Rongali, Sikkim (Kapoor, 1963)

Genus: *Glomerella*

- *Glomerella cingulata* (Stonem.) Spauld & Schrenk. causing anthracnose on *Ficus infectoria*, in Gangtok, Sikkim (Srivastava, 1992); *G. cingulata* (Stonem.) Spauld & Schrenk. Anamorph *Colletotrichum gloeosporioides* (Pentz.) Pentz & Sacc. causing leaf spot and on *Ficus auriculata*, in Sikkim (Srivastava and Srivastava, 2000)

Genus: *Guignardia*

- *Guignardia bidwellii* (Ell.) Vida. & Ravazi. on living leaves of *Asplenium nidus* L., in Gangtok, Sikkim (Sarbhoy and Agarwal, 1991b)

Genus: *Helminthosporium*

- *Helminthosporium carbonum* Ulstrup. on leaves of *Zea mays*, in Sikkim and Delhi (Bhowmick and Chona, 1964)

Genus: *Irenopsis*

- *Irenopsis molleriana* (Wint) Stev on *Triumfetta bartramia*, in Sribadham, West Sikkim (Kapoor and Munjal, 1967)

Genus: *Lasiobotrys*

- *Lasiobotrys elegans* (Syd.) Theiss. = *Acantharia elegans* Syd. on *Quercus* sp., in Sikkim (Theissen, 1914)

Genus: *Leptosphaerulina*

- *Leptosphaerulina trifolii* (Rostrup) Petrak causing aerial blight and collar rot on *Vigna umbellata*, in Gangtok, Sikkim (Srivastava, Gupta and Verma, 1992)

Genus: *Leptoxyphium*

- *Leptoxyphium fumago* (Woronichin) R. C. Srivastava. on leaves of *Coix lycrimsa-jobi* in Gangtok, Sikkim (Gupta, 1988)

Genus: *Liroa*

- *Liroa emodensis* (Berk.) Cif. = *Farysia emodensis* (Berk.) Syd = *Ustilago treubii* Solms Lubach on peduncles, branches and ochrae of *Polygonum chinensis*, in Tonglo, Sikkim, Nangki, East Nepal, Kodaikanal and Ootacamund, T.N. and Mahabaleshwar, M.S. (Mundkur and Thirumalachar, 1952)

Genus: *Macrophomina*

- *Macrophomina phaseolina* (Tassi) Goid. causing leaf spot on *Schima walichii*, in Sikkim (Srivastava and Verma, 1990)

Genus: *Melampsoropsis*

- *Melampsoropsis elaeocarpii* causing Brown leafspot of *Elaeocarpus* sp., in Sikkim, India (Vattiprolu and Agarwal, 2002)

Genus: *Meliola*

- *Meliola himalayensis* Kapoor on *Bridelia montana*, in Sribadum, West Sikkim (Kapoor and Munjal, 1967)
- *Meliola oslodis* Kapoor on *Ostodes paniculata* Singhik, North Sikkim (Kapoor and Munjal, 1967)
- *Meliola symingtoniae* Kapoor on *Symingtonia populnea* in West Sikkim (Kapoor and Munjal, 1967)

Genus: *Memnoniella*

- *Memnoniella echinata* (Rivolta) Galloway on dried fallen twigs of *Bambusa polymorpha*, in Sikkim (Sarbhoy and Agarwal, 1991a); *M. echinata* on dried fallen twigs of *Paradoxa bimornica* Sw., in Sikkim (Sarbhoy and Agarwal, 1991a)

Genus: *Mycosphaerella*

- *Mycosphaerella aethiopes* (Fuck.) Kapoor & Gill on leaves of *Quercus* sp., in Sikkim (Kapoor and Gill, 1961)
- *Mycosphaerella pinodes* causing aerial blight and collar rot on *Vigna umbellata* in Gangtok, Sikkim (Srivastava, Gupta and Verma, 1992)

Genus: *Mycovellosiella*

- *Mycovellosiella cajani* causing flowery spot on Pigeon Peas, in Northern Eastern Hill Region including Sikkim (Gupta and Srivastava, 1991)
- *Mycovellosiella phaseoli* causing farinose leaf spot on *Vigna umbellata*, in Gangtok, Sikkim (Srivastava, Gupta and Verma, 1992)

Genus: *Oidium*

- *Oidium caesalpiniacearum* Hosag. & U Barun. causing powdery mildew on *Bauhinia purpurea*, in Sikkim (Srivastava and Srivastava, 2000)
- *Oidium* sp. causing powdery mildew on *Alnus nepalensis* disease, in Sikkim (Srivastava and Verma, 1991)
- *Oidium* sp. causing aerial blight and collar rot on *Vigna umbellata*, in Gangtok, Sikkim (Srivastava, Gupta and Verma, 1992)

Genus: *Ophiovalsa*

- *Ophiovalsa caryae* (Peck.) Kapoor & Lal (Syn. *Cytospora caryae*) on stem and twigs of *Juglans regia* L., in Sikkim (Kapoor, and Lal, 1982)

Genus: *Palwaniella*

- *Palwaniella castanopsisidis* Kapoor on living leaves of *Castanopsis tribuloides*, in West Sikkim (Kapoor, 1968)

Genus: *Periconia*

- *Periconia digitata* (Cooke) Sacc. on dried twigs of *Bambusa* sp., in Sikkim (Sarbhoy and Agarwal, 1991a)
- *Periconia nilagirica* Subram. on living leaves of *Ipomoea batatas* L., in Sikkim (Sarbhoy and Agarwal, 1991a)

Genus: *Peridermium*

- *Peridermium thomsoni* Berk and Cooke on leaves of *Picea morinda*, in Mahasu, Near Simla, H.P., North West Himalayas, Sikkim, Kulu, H.P. (Cooke, 1877; Cooke 1888)

Genus: *Pestalosphaeria*

- *Pestalosphaeria elacidis* (Booth & Robertson) Van der Aa. on *Prunus communis* L., in Sikkim (Srivastava and Verma, 1987a)

Genus: *Pestalotiopsis*

- *Pestalotiopsis royenae* (Guba) Stey. causing foliar disease on *Amomum subalatum*, in Gangtok, Sikkim (Srivastava and Verma, 1989)

Genus: *Phaeodactylium*

- *Phaeodactylium alpiniae* (Swada) Ellis. causing leaf spot on *Curcuma longa*, in Shilong, Sikkim (Srivastava and Verma, 1987b)

Genus: *Phaeosaccardinula*

- *Phaeosaccardinula butleri* (Syd.) Theiss & Syd. on *Dendroclamus* sp., in Soreng, Sikkim (Kapoor and Munjal, 1968)

Genus: *Phakopsora*

- *Phakopsora elletariaei* (Racib) Communis. on leaves of *Amomum subulatum* Roxb., in Sikkim (Srivastava and Verma, 1987c)

Genus: *Phleospora*

- *Phleospora bullata* (H. & P. Syd.) Comb. Nov. Sutton. on dried twigs & branches of *Bambusa tulda* Roxb., in Gangtok, Sikkim (Sarbhoy and Agarwal, 1991b)

Genus: *Phoma*

- *Phoma exigua* Desm. causing leaf spot on *Phaseolus vulgaris*, in Gangtok, Sikkim (Srivastava, Gupta and Jainath, 1992)
- *Phoma sorghina* (Sacc.) Boerema, Dorenbosch & van Kestern. on leaves of *Thysanolaena agrostis*, in Gangtok, Sikkim (Gupta and Srivastava, 1992)

Genus: *Phyllachora*

- *Phyllachora euryae* causing anthracnose on *Schima wallichii*, in Gangtok, Sikkim (Srivastava, 1992)
- *Phyllachora repens* (Corda.) Sacc. causing leaf tar spot on *Ficus infectoria*, in Sikkim (Srivastava and Srivastava, 2000)

Genus: *Phytophthora*

- *Phytophthora colocasiae* causing leaf blight of *Colocasia esculenta*, in Sikkim (Misra et al., 2011)

Genus: *Plenotrichum*

- *Plenotrichum castanopsisidis* Kapoor & Munjal on leaves of *Castanopsis tribuloides*, in Sikkim (Kapoor and Munjal, 1968)

Genus: *Pseudocercospora*

- *Pseudocercospora macarangae* (Syd.) Derghon. on leaves of *Macraranga denticulata*, in Gangtok, Sikkim (Gupta and Srivastava, 1992)
- *Pseudocercospora* sp. (Syd.) Deig. on leaves of *Boechmeria polystachya* Wedd., in Gangtok, Sikkim (Gupta and Srivastava, 1992)

Genus: *Pseudocercosporidium*

- *Pseudocercosporidium terminaliae* (H. Syd.) Deighton. Anamorph *Mycosphaerella bolleana* Higg. causing leaf spot and mould on *Terminalia bellerica*, in Sikkim (Srivastava and Srivastava, 2000)

Genus: *Puccinia*

- *Puccinia senecionis-scandentis* Lindr on *Senecio scandens*, in Sikkim, Himalayas (Mundkur, 1938; Mundkur and Thirumalachar, 1946)
- *Puccinia ustalis* Berk on leaves of *Ranunculus pulchellus*, in Momay, Samdong, Sikkim, Himalayas (Barclay, 1981)

Genus: *Rhizoctonia*

- *Rhizoctonia solani* Kuhn. causing root and collar rot on *Brassica campestris* var. *saroon*, in Gangtok, Sikkim (Gupta, 1985); *R. solani* Kuhn. causing root and collar rot on *Brassica juncea*, in Gangtok, Sikkim (Gupta, 1985); *R. solani* Kuhn. causing aerial blight on *Macrotyloma uniflorum*, in Sikkim (Srivastava and Gupta, 1989); *R. solani* Kuhn. causing aerial blight on *Phaseolus mungo*, in Sikkim (Srivastava and Gupta, 1989); *R. solani* Kuhn. causing aerial blight on *Phaseolus vulgaris*, in Sikkim (Srivastava and Gupta, 1989); *R. solani* Kuhn. causing aerial blight on *Vigna radiata*, in Sikkim (Srivastava and Gupta, 1989); *R. solani* Kuhn. causing aerial blight and collar rot on *Vigna umbellata*, in Gangtok, Sikkim (Srivastava, Gupta and Verma, 1989); *R. solani* Kuhn. causing aerial blight on *Dahlia*, in, Sikkim (Bag, 2005)

Genus: *Robillarda*

- *Robillarda sessilis* (Sacc.) Sacc. causing leaf spot on *Amomum subulatum* Northern Sikkim (Srivastava, 1991)

Genus: *Sclerotinia*

- *Sclerotinia urnula* (Weinm.) Rehm. upon mummified fruits of *Vaccinium serratum* Wight, in Sikkim (Sharma, 1983)

Genus: *Sclerotium*

- *Sclerotium rolfsii* causing wilt of *Aerides* sp., in Pakyong, Sikkim (Bag, 2003); *S. rolfsii* causing wilt of *Cattleya* sp., in Pakyong, Sikkim (Bag, 2003); *S. rolfsii* causing wilt of *Dendrobium* sp. in Pakyong, Sikkim (Bag, 2003); *S. rolfsii* causing wilt of *Eria coronaria* in Pakyong, Sikkim (Bag, 2003); *S. rolfsii* causing wilt of *Habenaria* sp. in Pakyong, Sikkim (Bag, 2003); *S. rolfsii* causing wilt of *Spathoglottis* sp. in Pakyong, Sikkim (Bag, 2003); *S. rolfsii* causing rot of pseudobulbs of wilt of *Coelogyne corymbosa* in Pakyong, Sikkim (Bag, 2003); *S. rolfsii* causing wilt and basal rot on pseudostems of *Vanda coerulea*, in Pakyong, Sikkim (Bag, 2006); *S. rolfsii* causing basal rot on pseudostems of *Vanda stangeana*, in Pakyong, Sikkim (Bag, 2006); *S. rolfsii* causing wilt of *Acampe papillosa*, in Pakyong, Sikkim (Bag, 2006); *S. rolfsii* causing wilt of *Lulsia* sp., in Pakyong, Sikkim (Bag, 2006); *S. rolfsii* causing wilt of *Robiquetia spatulata*, in Pakyong, Sikkim (Bag, 2006); *S. rolfsii* causing wilt of *Vanda roxburghii*, in Pakyong, Sikkim (Bag, 2006); *S. rolfsii* causing basal rot on pseudobulbs of *Phaius flavus*, in West Bengal, Sikkim (Bag, 2004; Bag, 2006); *S. rolfsii* causing soft rot of *Paphiopedilum venustum*, in West Bengal, Sikkim (Bag, 2004)

Genus: *Septoria*

- *Septoria lablabina* Srivastava & Verma causing leaf spot on *Dolichos lablab* (*Lablab purpureus*), in Sikkim (Srivastava and Verma, 1999)

Genus: *Sporisorium*

- *Sporisorium setaricolum* (Thrium & Safe.) Bag & Agarwal com. nov. on ovaries of *Setaria* sp., in Ranipul, Sikkim (Bag and Agrawal, 2001)

Genus: *Stagonospora*

- *Stagonospora curtisi* (Berk) Sacc on leaves of *Amaryllis* sp., in Eastern Sikkim (Munjhal and Kapoor, 1962)

Genus: *Stenocarpella*

- *Stenocarpella macrospora* Srivastava & Verma causing zonate leaf spot on *Zea mays*, in Sikkim (Srivastava and Verma, 1999)

Genus: *Taphrina*

- *Taphrina coerulescens* Srivastava & Verma causing leaf blotch on *Quercus acutissima*, in Sikkim (Srivastava and Verma, 1999)

Genus: *Torula*

- *Torula herbarum* (Pers.) Link ex S. F. Gray on living leaves of *Grevillea robusta* A. Cunn. Ex. R. Br., in Sikkim (Sarbhoy and Agarwal, 1991a)

Genus: *Trichothyriella*

- *Trichothyriella quercigena* (Berk.) Theiss on leaves of *Quercus* sp., in Sikkim (Theissen, 1914)

Genus: *Tripospermum*

- *Tripospermum mytri* (Lind.) Hughes. on leaves of *Coix lycrimsa* Jobi., in Gangtok, Sikkim (Gupta, 1988)

Genus: *Uredo*

- *Uredo panacis* Syd nov. spec. on leaves of *Aralia (Panax) pseudoginseng*, in Sikkim (Butler and Bisby, 1960)

Genus: *Venturia*

- *Venturia inaequalis* (Cooke) Wint. causing apple scab on Apple, in Sikkim (Mallik, Shukla and Bhatia, 1985)

References

- Bag, M.K. and Agrawal, D.K. 2001. Taxonomic studies on smut fungi from North-Eastern India. *Indian Phytopathology*, 54(2):219-225
- Bag, T. K. 2003. Orchid wilt incited by *Sclerotium rolfsii* on some Indian orchids. *Indian Journal of Hill Farming*, 16(1/2):97-98
- Bag, T. K. 2004. Two new orchid hosts of *Sclerotium rolfsii* from India. *Plant Pathology*, 53(2):255.
- Bag, T. K. 2005. Aerial blight of *Dahlia* incited by *Rhizoctonia solani* Kuhn - a new disease. *Journal of Hill Research*, 18(1): 35-36.
- Bag, T. K. 2006. Report of orchid wilt (*Sclerotium rolfsii*) on *Vanda* group of orchids. *Journal of Hill Research*, 19(1):44-45

- Barclay, A. 1981. Additional Uredineae from the neighbourhood of Simla. *Journal of Asiatic Society of Bengal*, 60:211-230.
- Bhatn, N. 2001. In vitro evaluation of some leaf extracts against *Fusarium* spp. causing yellows of ginger in Sikkim. *Plant Disease Research*, 16(2):259-262.
- Bhowmick, T.P. and Chona, B.L. 1964. *Helminthosporium carbonum* Ullstrup on maize in India. *Indian Phytopathology*, 17:337-338
- Butler, E.J. and Bisby, G.R. (Revised By R.S. Vasudeva). 1960. *The Fungi of India*. Indian Council of Agricultural Research Bulletin Publications New Delhi.
- Chattopodhyay, S.B. and Sengupta, S.K. 1967. Twig blight disease of Orange. *Science and Culture*, 33:129.
- Chona, B.L., Kapoor, J.N. and Gill, H.S. 1960. Studies on Powdery mildews from India-I. *Indian Pyhtopathology*, 13:72-75
- Chona, B.L., Lall, G. and Munjal, R.L. 1959. Some *Cercospora* species from India-I, *Indian Pyhtopathology*, 12:76-84.
- Cooke, M.C. 1877. Some Parasites of Coniferae. *Indian Forester*, 3:88-96.
- Cooke, M.C. 1878. Some Indian fungi. *Grevillea*, 6:117-118.
- Cooke, M.C. 1888. New exotic fungi. *Grevillea*, 17:42-43.
- Dhanraj, K.S. 1966. Dry rot of maize caused by *Diplodia macrospora* Earle. *Indian Phytopathology*, 10:120.
- Dhanraj, K.S. and Mathur, S.B. 1965. Ear rot of maize caused by *Cephalosporium acremonium* Corda - a new record from India. *Indian Phytopathology*, 18:393-394.
- Dietal, P. 1890. Uredineen aus dem Himalaya. *Hedwigia*, 29:259-270.
- Gupta, D.K. 1985. Root and collar rot of mustard in Sikkim. *Indian Journal of Mycology and Plant Pathology*, 15: 325.
- Gupta, D.K. 1988. New host records of fungi from India. *Indian Phytopathology*, 41(3):506.
- Gupta, D.K. and Choudhary, K.C.B. 1994. New leaf spot of tomato caused by *Alternaria alternata*. *Indian Journal of Mycology and Plant Pathology*, 24(3):238.
- Gupta, D.K. and Srivastava, L.S. 1991. Floury spot of arhar - a new disease from NEH Region, Sikkim. *Plant Disease Research*, 6(1):103
- Gupta, D.K. and Srivastava, L.S. 1992. New records from India. *Indian Phytopathology*, 45(2):277.
- Kapoor, J.N. 1963. Cob rot of maize in Sikkim. *Indian Phytopathology*, 16:381-382.
- Kapoor, J.N. 1965. Two powdery mildews from Sikkim. *Indian Phytopathology*, 18:90-92.
- Kapoor, J.N. 1968. New microfungi from India. *Transactions of the British Mycological Society*, 51:328-333.
- Kapoor, J.N. and Gill, H.S. 1961. Notes on Indian Ascomycetes-I. *Indian Phytopathology*, 14:149-153.
- Kapoor, J.N. and Lal, S.P. 1973. Notes on Himalayan microfungi. *Kavaka*, 1:51-54.
- Kapoor, J.N. and Lal, S.P. 1982. Two species of *Ophiovalsa* from India. *Indian Phytopathology*, 35:144-146.
- Kapoor, J.N. and Munjal, R.L. 1966. Indian species of Stilbaceae. *Indian Phytopathology*, 19:346-356.
- Kapoor, J.N. and Munjal, R.L. 1967. Notes on Indian Meliolinae. *Indian Phytopathology*, 20:151-159.
- Kapoor, J.N. and Munjal, R.L. 1968. Additions to Indian fungi. *Indian Phytopathology*, 21:107-112.
- Mallik, F., Shukla, N.B. and Bhatia, V. 1985. Apple scab in Sikkim - a new record. *Plant Protection bulletin, New Delhi* 36(2/3):121-122

- Misra, R. S., Mishra, A. K., Sharma, K., Jeeva, M. L. and Hegde, V. 2011. Characterisation of *Phytophthora colocasiae* isolates associated with leaf blight of taro in India. Archives of Phytopathology and Plant Protection, 44(6):581-591.
- Mundkur, B.B. 1938. Fungi of India, Supplement-I, ICAR Science Monograph. 12:54.
- Mundkur, B.B. and Thirumalachar, M.J. 1952. Ustilaginales of India. Commonwealth Mycological Institute: 83 pp.
- Mundkur, B.B. and Thirumalachar, M.J. 1946. Revision and additions to Indian fungi-I. Mycological Paper of Imperial Mycological Institute, 16: 27.
- Munjaj, R.L. and Kapoor, J.N. 1962. Notes on miscellaneous Indian fungi-VII. Indian Phytopathology, 15:259-263.
- Munjaj, R.L. and Kapoor, J.N. 1969. Some Hyphomycetes from the Himalayas. Mycopathologia et Mycologia Applicata, 39:121-128.
- Munjaj, R.L., Chona, B.L. and Kapoor, J.N. 1959. Notes on some miscellaneous Indian fungi-VI. Indian Phytopathology, 12:176-181.
- Payak, M. and Renfro, B.L. 1966. Diseases of maize new to India. Indian Phytopathology, 19:122.
- Puri, Y.N. 1955. Rusts and wood rotting fungi on some of the important Indian conifers. Forest Bulletin Dehradun (New Series Mycology), 179:10.
- Rangaswami, G. and Sambandam, C.N. 1960. Influence of substrate on spore size of *Alternaria melongenae*. Phytopathology, 50:486-488.
- Sarbhoj, A.K. and Agarwal, D.K. 1991a. Studies on Dematiaceous fungi-IX. Indian Phytopathology, 44(4): 560-561.
- Sarbhoj, A.K. and Agarwal, D.K. 1991b. Six new host records of fungi. Indian Phytopathology, 44(4):561-562.
- Sharma, M.P. 1983. The genus *Sclerotinia* Fuckel in India. Biovigyanam, 9:105-108.
- Sikkim Biodiversity, 2015: <http://sikkimforest.gov.in/Biodiversity.htm#flo>; Retrieved 02.04.2015
- Srivastava, L.S. 1989. Anthracnose of large cardamom-a new disease. Plant Disease Research, 4: 161-162.
- Srivastava, L.S. 1991. A new leaf spot disease of large cardamom caused by *Robillarda sessilis* (Sacc.) Sacc. from Sikkim. Plant Disease Research, 6(1):98
- Srivastava, L.S. 1992. Two new fungal diseases of forest trees in Sikkim. Plant Disease Research, 7(1):56-57
- Srivastava, L.S. and Gupta, D.K. 1989. Aerial blight of french bean, groundnut, soybean, black gram and horse gram new record from India. Plant Disease Research, 4(2):163-164.
- Srivastava, L.S. and Gupta, D.K. 1990. *Eudarlucacaris* on *Uromyces appendiculatus* - a new host record for India. Plant Disease Research, 5(1):100
- Srivastava, L.S. and Srivastava, M.L. 2000. Some unrecorded fungal disease of forest trees of Sikkim. Indian Forester, 125(7):797-798.
- Srivastava, L.S. and Verma, R.N. 1987a. A new disease of pear caused by *Pestalotiopsis elacidis*. Science and Culture, 53:290
- Srivastava, L.S. and Verma, R.N. 1987b. A new leaf spot of *Curcuma longa* in Sikkim. Current Science, 56:673-674.
- Srivastava, L.S. and Verma, R.N. 1987c. *Amomum subulatum* - a new host for *Phakopsora elletariaei* (Racib) *communis* from Sikkim. Current Science, 56:544
- Srivastava, L.S. and Verma, R.N. 1989. Leaf streak (C.O. *Pestalotiopsis royenae*) - a new disease of cardamom from Sikkim. Current Science, 58(12):682-683.
- Srivastava, L.S. and Verma, R.N. 1990. Some newly recorded fungal diseases of forest trees of Sikkim. Indian Forester, 116(1):89-90.

- Srivastava, L.S. and Verma, R.N. 1991. A new leaf spot disease of *Quercus acutissima* from India. *Plant Disease Research*, 6(1):89.
- Srivastava, L.S. and Verma, R.N. 1999. Note on new fungal disease from Sikkim. *Journal of Hill Research*, 12(1):79-80.
- Srivastava, L.S., Gupta, D.K. and Jainath. 1992. A new leaf spot disease of french bean from India. *Plant Disease Research*, 7(1):76-79.
- Srivastava, L.S., Gupta, D.K. and Verma, R.N. 1992. Some unrecorded rice bean disease from India. *Plant Disease Research*, 7(1):72-76.
- Theissen, F. 1914. Die Trichothyriazeen Beih. Bot. Centralb 32: 1-16
- Vattiprolu, P.K. and Agarwal, D.K. 2002. *Melampsoropsis elaeocarpii* sp. nov. on *Elaeocarpus* sp. from India. *Indian Phytopathology*, 55(3):331-332.