Diversity and distribution of cercosporoid fungi in Himachal Pradesh: an annotated checklist

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Abstract
A checklist of cercosporoid fungi reported from Himachal Pradesh, India, has been prepared on the basis of available publications. A total of 103 species belonging to 15 genera of cercosporoid fungi have been reported from Himachal Pradesh on 118 plant species belonging to 46 families. The species richness of cercosporoid fungi in the region was as follows; Cercospora (50), Pseudocercospora (23), Ramularia and Passalora (7 each), Stigmina & Mycosphaerella (3 each), Sirosporium (2), Cercosporella, Distomycovellosiella and Mycovellosiella, Neocercosporidium, Neopseudocercospora, Nothopassalora, Rosisphaerella & Teratosphaeria (1 each). The highest numbers of cercosporoid fungi were recorded on plant hosts of the family Solanaceae (12 species) followed by Fabaceae (10 species), Asteraceae and Rosaceae (8 species each), Amaranthaceae (5 species), Malvaceae and Smilaceae (4 species each), Acanthaceae, Poaceae, Polygonaceae and Ranunculaceae (3 species each), while the rest of families were found associated with 1–2 cercosporoid species.

Key words – fungi – hyphomycetes – India – list – Mycosphaerellaceae – North Western Himalaya

Introduction
The term cercosporoid fungi refer to a large complex of fungi belonging to the Mycosphaerellaceae with a worldwide distribution. Most of them are plant pathogenic fungi that cause diseases on a wide range of hosts, including numerous cultivated plants. With a wide geographic distribution, these fungi are mostly foliar in nature associated with leaf spots on a broad range of plant hosts and are responsible for severe economic losses. However, in case of herbaceous plants, they can attack almost all aerial parts of the plants (Bakhshi et al. 2012, Braun et al. 2013).

The name of the group originates from Cercospora, a genus with continuously increasing group currently comprising more than 3000 species (Crous & Braun 2003). Previously these fungi were named as mitosporic fungi or fungi imperfecti as mostly form asexual morphs and placed under anamorphic fungi of hyphomycetes. Some of them form mycosphaerella-like sexual morphs...
and positioned to the Mycosphaerellaceae (Ascomycota). A majority of anamorphic fungi are conidial stages of ascomycetous fungi (phylum: Ascomycota), and rarely basidiomycetous fungi (phylum: Basidiomycota) (Świderska-Burek 2015). Investigations of cercosporoid fungi have been conducted for over 150 years across the world and reported their wide host range. They are known to cause diseases on major agricultural crops (cereals, vegetables, ornamental plants, forest trees, etc.). They are also known to hyperparasites number of plant pathogens including rust fungi and can be evaluated as biocontrol agents in agriculture sector (Kamal 2010, Phengsintham et al. 2013, Świderska-Burek 2015, Braun et al. 2016, Bakhshi 2019).

Himachal Pradesh is a hilly state of northern India located within the latitudes 30°22'40" – 33°12'40" N and longitudes 75°44'55" – 79°04'20" E. The state shows great variations in elevation ranging from about 350 m (1,148 ft) to 7,000 meters (22,966 ft) above the sea level. It has very high mountains to plain grass lands with average rainfall in the range of 1500-3000 mm. Climatic variations of the state promote the abundance of rich biodiversity here. Total 66.52% of the area of the state is covered very dense evergreen to deciduous forests types. While, alpine shrub and meadows are found distributed in west and northeast Himalaya; alders, birches, rhododendrons and moist alpine shrubs are there as the regional vegetation. The plant pathogens including bacteria, fungi and viruses are also found these changeable geographical and climatic conditions of the state quite favourable for their growth and development. Additionally, these variable geo-climatic conditions of the state also promote overall growth of foliicolous fungi including cercosporoid fungi (Agrios 1997, Chakraborty et al. 1998, Coakley et al. 1999, Ahanger et al. 2013). Review of pertinent literature reveals that foliicolous fungi have been fairly well documented from some parts of India. Relevant literature on cercosporoid fungi of Himachal Pradesh is no doubt available but no thorough and collective inventory for the state. This compilation is prepared with an aim to understand the current status of distribution of cercosporoid fungi in the state of Himachal Pradesh.

Materials & Methods

This checklist is prepared after an exhaustive bibliographic survey of the literature published on cercosporoid fungi of Himachal Pradesh in various national and international journals, monographs, books, book chapters and even magazines up to December 2019. The unpublished data and fungi identified up to genus level have not been included in this checklist. Some species names as reported in the cited publications have been replaced with their currently accepted name according to Index Fungorum (www.indexfungorum.org) as accessed on 06 December, 2019. The checklist arranged as fungal genera with brief taxonomical description, species names with their synonyms, host scientific names with family, literature cited. The host name given in the original citation is sometimes changed to be consistent with current taxonomy based on The Plant List (http://www.theplantlist.org). A geographical map of the state is provided in order to understand exact location of occurrence and distribution of the cercosporoid fungi in Himachal Pradesh (Fig. 1). The cases where species or a proper synonym was not recognized, species name cited originally is used. In order to understand the generic difference, line diagrams redrawn from original source with some modifications are also included in the paper.

Results and Discussion

A total 103 species of cercosporoid fungi belonging 15 genera have been identified and reported from Himachal Pradesh. The species richness in cercosporoid fungi in the region was as follows; Cercospora (50), Pseudocercospora (23), Ramularia (7), Passalora (7), Stigmina (3), Mycosphaerella (3), Sirosporium (2), Cercospora, Distomycovellosiella, Mycovellosiella, Neocercosporidium, Neopseudocercospora, Nothopassalora and Rosisphearella & Teratosphaeria (1each). Cercospora species were found associated with highest 59 host plants belonging to 50 genera and 25 families, including Solanaceae (9 species), Fabaceae (6 species), Asteraceae (5 species), Amaranthaceae (4 species), Acanthaceae & Poaceae (3 species each) and Cucurbitaceae & Malvaceae (2 species each). Similarly, Pseudocercospora species were reported to infect 25 host plants belonging to 23 genera and 21 families. The cercosporid fungi in the genus
Ramularia were reported on 9 host plants of 8 genera of 8 families while, Passalora on 7 host plants of 7 genera of 6 families. Likewise, species of Stigmina were recorded on 3 host plants belonging to 3 genera and 3 families followed by Mycosphaerella (4 plant hosts of 3 genera and 3 families) and Sirosporium (2 plant hosts of 2 genera and 2 families). Rest of the cercosporoid fungi were reported on single plant host with single genus and family. The detailed information of all fungal genera and species along with their host plants is presented in the list of cercosporoid fungi reported from Himachal Pradesh.

Fig. 1 – Map of Himachal Pradesh showing diversity and distribution of cercosporoid fungi.

This checklist of cercosporoid fungi reported from Himachal Pradesh consists of 15 genera recorded on 118 plant species belonging to 46 plant hosts of family. Highest numbers of cercosporoid fungi were recorded on plant hosts of family Solanaceae (12 species) followed by Fabaceae (10 species), Asteraceae & Rosaceae (6 species each), Amaranthaceae (5 species), Malvaceae & Smilaceae (4 species each), Acanthaceae, Poaceae, Polygonaceae & Ranunculaceae (3 species each), while rest of families were found associated with 1–2 species cercosporoid fungi.

After compilation of the literature it was noticed that most of the records of cercosporioid fungi were reported from Solan (53), Kangra (24) followed by Mandi (17), Shimla (11), Kullu (8), Bilaspur & Sirmaur (2 each) and Chamba & Hamirpur (1 each). No records were found reported from Kinnaur, Lahul & Spiti and Una. Number of cercosporoid fungi in the most representative plant families and genera and percentages of total species number is presented in Table 1.

To understand occurrence of these fungi in the state, a location wise distribution of cercosporoid fungi is presented. Since changeable geographical and climatic conditions of the Himachal Pradesh are quite favourable for the growth and development of plant pathogenic fungi, cercosporoid fungi hold an important position among them. The present compilation reveals that
the diversity of cercosporoid fungi in quite high in Himachal Pradesh. However, the further explorations of new collections as well as molecular characterizations will add more species to the cercosporoid species of the state.

Table 1 Number of Cercosporoid fungi in the most representative plant families and genera and percentages of total species number.

| Host Family    | Number of cercosporoid spp. | % age   | Fungal Genera       | Number of fungal spp. | % age   |
|----------------|-----------------------------|---------|---------------------|-----------------------|---------|
| Solanaceae     | 12                          | 11.33   | Cercospora          | 48                    | 46.7    |
| Fabaceae       | 10                          | 9.44    | Pseudocercospora    | 23                    | 22.4    |
| Asteraceae     | 06                          | 5.66    | Ramularia           | 09                    | 8.9     |
| Rosaceae       | 06                          | 5.66    | Passalora           | 06                    | 5.9     |
| Amaranthaceae  | 05                          | 4.72    | Mycosphaerella      | 04                    | 3.9     |
| Malvaceae      | 04                          | 3.77    | Stigmina            | 03                    | 2.9     |
| Smilaceae      | 04                          | 3.77    | Sirosporium         | 02                    | 1.9     |
| Acanthaceae    | 03                          | 2.83    | Cercosporella       | 01                    | 0.9     |
| Poaceae        | 03                          | 2.83    | Mycovelllosiella    | 01                    | 0.9     |
| Polygonaceae   | 03                          | 2.83    | Rosisphaerella      | 01                    | 0.9     |
| Ranunculaceae  | 03                          | 2.83    | Nothopassalora      | 01                    | 0.9     |
| Salicaceae     | 03                          | 2.83    | Teratosphaeria      | 01                    | 0.9     |
| Subtotal       | 62                          | 58.50   | Subtotal            | 100                   | 97.1    |
| Other families (34) | 44 | 41.50     | Other genera (3)   | 03                    | 2.9     |
| Total          | 106                         | 100     | Total               | 103                   | 100     |

List of cercosporoid fungi reported from Himachal Pradesh

A complete list of cercosporoid fungal genera and their species recorded in Himachal Pradesh, their hosts and distribution is presented in alphabetical order:

*Cercospora* Fresen. ex Fuckel, Fungi Rhen. Exs.: No.117 (1863) [Hedwigia 2(15): 133 (1863)]

Fig. 2

= *Cercosporina* Speg., Anal. Mus. nac. B. Aires, Ser. 3 13: 424 (1910) [1911]

= *Virgasporium* Cooke, Grevillea 3(no. 28): 182 (1875)

Description & Illustration

The genus *Cercospora* comprises a group of foliicolous ascomycete responsible for numerous plant diseases. It mainly causes leaf spot diseases in plants with specific symptoms in the form of round, brown, sunken spots on leaves. It is one of the well explored genera of cercosporoid fungi. The sexual stage in most of these fungi is still unknown, however, when identified, it placed in the *Mycosphaerella*. Microscopic characters include mycelium internal, absence of stromata or very small if present; acicular, hyaline and septate conidia with conspicuous hila produced on pigmented, unbranched, sepalate and smooth conidiophores with conspicuously thickened and darkened conidiogenous loci (scars) (Crous & Braun 2003). Currently about 3168 names are available within this genus worldwide (Index Fungorum 2019 accessed on 06.12.2019).

Type species: *Cercospora api* Fresen., typ. cons. prop. (Braun & Crous 2016).

*Cercospora achyranthina* Thirum. & Chupp, Mycologia 40(3): 352 (1948)

Host: On leaves of *Achyranthes aspera* (Amaranthaceae)

Location: Sundernagar (Mandi), H.P.

Literature: (Singh et al. 1999)
**Cercospora adhatodae** S. Chowdhury, Lloydia 18: 84 (1955)
*Host:* On leaves of *Adhatoda vasica* L. (Acanthaceae).
*Location:* Bhotia (Hamirpur) H.P.
*Literature:* (Paul et al. 1985b)

**Cercospora albiziae** A.K. Kar & M. Mandal, Trans. Br. mycol. Soc. 53(3): 348 (1969)
*Host:* On leaves of *Albizia lebbek* (L.) Benth (Fabaceae)
*Location:* Solan (Solan) H.P.
*Literature:* (Bhardwaj & Paul 1986)

**Cercospora arachidicola** Hori, Report Nisigahara agric. Exp. Sta., Tokyo: 26 (1917)
*Host:* On leaves of *Arachis hypogaea* L. (Fabaceae)
*Location:* Solan (Solan) H.P.
*Literature:* (Paul & Sharma 1999)

**Cercospora asparagi** Sacc., Michelia 1(no. 1): 88 (1877)
  = *Cercospora asparagicola* (Speg.) Vassiljevsky, in Vassiljevsky & Karakulin, Fungi Imperfecti Parasitici (Hyphomycetes) 1: 296 (1937)
  = *Cercospora caulicola* G. Winter, Hedwigia 24(5): 203 (1885)
  = *Cercosporina asparagicola* Speg., Anal. Mus. nac. B. Aires, Ser. 3 13: 424 (1910) [1911]
*Host:* Leaves & stem of *Asparagus officinalis* L. (Asparagaceae)
*Location:* Solan (Solan), H.P.
*Literature:* (Sydow & Butler 1907, Sydow & Mcrae 1929)

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Fig. 2 – *Cercospora apii*. A Conidiophore fascicles. B Conidiophores. C Conidia. (Seifert et al. 2011)

**Cercospora beticola** Sacc., Nuovo G. bot. ital. 8(2): 189 (1876)
= Cercospora beticola var. poonensis Chidd., Sydowia 13(1-6): 153 (1959)
= Cercosporina beticola (Sacc.) Nakata, T. Nakajima & K. Katimoto, Rep. Agric. Korea: 6 (1915)
Host: Living leaves of Beta vulgaris L. var. mangel (Amaranthaceae).
Location: Katrain (Kullu) and Kangra (Kangra), H.P.
Literature: (Lall et al. 1962)

Cercospora bombacicola Munjal, Lall & Chona, Indian Phytopath. 13(2): 144 (1961) [1960]
Host: leaves of Salmalia malabarica (DC.) Schott & Endl. (Malvaceae).
Location: Chamba (Chamba), H.P.
Literature: (Munjal et al. 1960)

Cercospora brachiata Ellis & Everh., J. Mycol. 4(1): 5 (1888)
Host: On leaves of Amaranthus sp. (Amaranthaceae)
Location: Solan (Solan) H.P.
Literature: (Paul et al. 1985b)

Cercospora canescens Ellis & G. Martin, Am. Nat. 16(12): 1003 (1882)
= Cercospora vignicaulis Tehon, Mycologia 29(4): 436 (1937)
= Cercosporiopsis canescens (Ellis & G. Martin) Miura, Flora of Manchuria and East Mongolia, III Cryptogams, Fungi (Industr. Contr. S. Manch. Rly 27): 527 (1928)
Host: On leaves of Vigna sinensis (L.) Savi Ex Hassk., V. vexillata (L.) A. Rich. (Fabaceae)
Location: Kangra (Kangra) and Solan (Solan), H.P.
Literature: (Roy 1965, Paul et al. 1985b, 348, Paul & Sharma 1999)

Cercospora capsici Heald & F.A. Wolf, Mycologia 3(1): 15 (1911)
Host: On leaves of Capsicum annuum L. (Solanaceae)
Location: Chauntra (Mandi) H.P.
Literature: (Paul et al. 1985a)

Cercospora citrullina Cooke, Grevillea 12(61): 31 (1883)
Host: Leaves of Rumex orientalis and R. nepalensis (Polygoniaceae); Cucurbita moschata Duch. (Cucurbitaceae); Cucumis sativus L. (Cucurbitaceae); Momordica charantia L. (Cucurbitaceae)
Location: Shimla (Shimla) and Solan (Solan), H.P.
Literature: (Padwick 1946, Paul et al. 1985a)

Cercospora daturicola (Spec.) Vassiljevsky, in Vassiljevsky & Karakulin, Fungi Imperfecti Parasitici (Hyphomycetes) 1: 347 (1937)
Host: On leaves of Datura metel L. & Datura stramonium L. (Solanaceae)
Location: Solan (Solan) H.P.
Literature: (Paul et al. 1985b)

Cercospora diantli A.S. Mull. & Chupp, Arq. Inst. Biol. Veget. Rio de Janeiro 3: 93 (1936)
Host: On leaves of Dicliptera roxburghiana Nees. (Acanthaceae)
Location: Solan (Solan) H.P.
Literature: (Chandel 1998)

Cercospora digitalis P.K. Chi & C.K. Pai [as ‘digitalidis’], Acta phytotax. sin. 10: 113 (1966)
Host: On leaves of Digitalis purpurea L. (Plantaginaceae)
Location: Solan (Solan) H.P.
Literature: (Paul et al. 1985b)
Cercospora doryalidis Chupp & Doidge, Bothalia 4: 885 (1948)
Host: On leaves of Flacourtia indica (Burm. f.) Merr. (Salicaceae)
Location: Bilaspur (Bilaspur) H.P.
Literature: (Paul et al. 1985b)

Cercospora duddiae Welles, Phytopathology 13: 364 (1923)
Host: On leaves of Allium tuberosum Rottler ex Spreng. (Amaryllidaceae).
Location: Solan (Solan) H.P.
Literature: (Paul et al. 1985b)

Cercospora eugeniae Chupp, Monograph of Cercospora: 406 (1954)
Host: On leaves of Syzigium cumini (L.) Skeels. (Myrtaceae)
Location: Baijnath (Kangra) H.P.
Literature: (Singh et al. 1999)

Cercospora fukushiana (Matsuura) W. Yamam., Journal of the Society of Tropical Agriculture, Formosa 6: 601 (1934)
Host: On leaves of Impatiens balsamina L. & Impatiens gigantea Edgew. (Balsaminaceae)
Location: Solan (Solan) H.P.
Literature: (Paul et al. 1985b)

Cercospora gerani Kellerm. & Swingle, J. Mycol. 5(2): 74 (1889)
Host: On leaves of Geranium sp. (Geraniaceae)
Location: Kangra (Kangra) H.P.
Literature: (Lall et al. 1961)

Cercospora gerberae Chupp & Viégas, in Viegas, Boln da Soc. Brasil de Agron. 8: 27 (1945)
Host: On leaves of Gerbera sp. (Asteraceae)
Location: Baijnath (Kangra) H.P.
Literature: (Singh et al. 1999)

Cercospora helianthicola Chupp & Viégas, in Viegas, Boln da Soc. Brasil de Agron. 8: 29 (1945)
Host: On leaves of Helianthus annuus L. (Asteraceae)
Location: Solan (Solan) H.P.
Literature: (Singh et al. 1999)

Cercospora hydrangea Ellis & Everh., in Atkinson, J. Elisha Mitchell scient. Soc. 8(2): 52 (1892)
Host: On leaves of Hydrangea sp. (Hydrangeaceae)
Location: Chambaghat (Solan) H.P.
Literature: (Paul et al. 1985c)

Cercospora justiciicola F.L. Tai, Lloydia 11: 47 (1948)
Host: On leaves of Justicia sp. (Acanthaceae)
Location: Chambaghat (Solan) H.P.
Literature: (Paul et al. 1985c)

Cercospora kikuchii (Tak. Matsumoto & Tomoy.) M.W. Gardner, Proc. natn. Acad. Sci. India, Sect. B, Biol. Sci. 36: 12 (1927) [1926]
= Cercosporina kikuchii Tak. Matsumoto & Tomoy., Ann. phytopath. Soc. Japan 1(6): 1(1925)
Host: seeds of Dolichos biflorus L. (Fabaceae) & Glycine max (L.) Merr. (Fabaceae).
Location: Solan (Solan) and Kangra (Kangra), H.P.
Literature: (Saharan 1979, Paul 1989)
**Cercospora leucosticta** Ellis & Everh., J. Mycol. 4(6): 53 (1888)
Host: On leaves of *Melia azadirachta* L. (Meliaceae)
Location: Sundernagar (Mandi) H.P.
Literature: (Singh et al. 1999)

**Cercospora lygodiicola** Lall, J.N. Kapoor & Munjal, Indian Phytopath. 17: 181 (1964)
Host: Leaves of *Lygodium japonicum* (Thunb.) SW. (Lygodiaceae)
Location: Kullu & Manali (Kullu), H.P.
Literature: (Lall et al. 1964)

**Cercospora megaspermae** Bhardwaj & Sharma, Indian Forester 120(6): 545 (1994)
Host: Leaves of *Pistacia integerrima* L. (Anacardiaceae).
Location: Solan (Solan), H.P.
Literature: (Prakasam 1991, Bhardwaj & Sharma 1994)

**Cercospora melongenae** Welles, Phytopathology 12: 63 (1922)
= *Cercosporina melongenae* (Welles) Hara, J. agric. Soc. Japan 32(no. 364): 46 (1928)
Host: On leaves of *Solanum melongena* L. (Solanaceae)
Location: Solan (Solan) H.P.
Literature: (Paul & Sharma 1999)

**Cercospora melothriae** Sawada, Rep.Gov. Res. Ins., Formosa 86: 173 (1943)
Host: On leaves of *Melothria heterophylla* (Lour.) Cogn. (Cucurbitaceae)
Location: Kandaghat (Solan) H.P.
Literature: (Paul et al. 1985c)

**Cercospora mitteriana** Syd., Annls mycol. 35(3/4): 240 (1937)
Host: On leaves of *Dodonaea viscosa* (L.) Jacq. (Sapindaceae)
Location: Solan (Solan) H.P.
Literature: (Paul & Sharma 1999)

**Cercospora nebulosi** Sacc., Nuovo G. bot. ital. 8(2): 189 (1876)
Host: On leaves of *Althea rosea* L. (Malvaceae)
Location: Solan (Solan) H.P.
Literature: (Paul et al. 1985c)

**Cercospora nigri** Tharp, Mycologia 9(2): 112 (1917)
Host: on leaves of *Solanum nigrum* L. (Solanaceae)
Location: Solan (Solan), H.P.
Literature: (Bhardwaj & Paul 1987, Philip et al. 1994a, b)

**Cercospora oplismeni** Lall, H.S. Gill & Munjal, Indian Phytopath. 14(2): 117 (1962) [1961]
Host: Leaves of *Opilismenus* sp. (Poaceae)
Location: Shimla (Shimla), H.P.
Literature: (Lall et al. 1961)

**Cercospora oxyphylli** Pavgi & U.P. Singh, Sydowia 24(1-6): 118 (1971) [1970]
Host: On leaves of *Zanthoxylum alatum* Wall. (Rutaceae)
Location: Solan (Solan) H.P.
Literature: (Paul et al. 1985c)
Cercospora persicae Sacc., Qd Nat.: 189 (1876)
**Host:** Leaves of *Prunus persica* (L.) Batsch (Rosaceae)
**Location:** Solan (Solan), H.P.
**Literature:** (Sharma & Paul 1986)

Cercospora physalidicola Ellis & Barthol., Erythea 4: 28 (1896)
**Host:** On leaves of *Physalis minima* L. (Solanaceae)
**Location:** Nauni (Solan) H.P.
**Literature:** (Paul et al. 1985c)

Cercospora physalidis Ellis, Am. Nat. 16: 810 (1882)
= *Cercosporina physalidis* (Ellis) Miura, Flora of Manchuria and East Mongolia, III Cryptogams, Fungi (Industr. Contr. S. Manch. Rly 27): 525 (1928)
**Host:** On leaves of *Smilax aspera* L. (Solanaceae)
**Location:** Solan (Solan) H.P.
**Literature:** (Paul et al. 1985c)

Cercospora pisi-sativi J.A. Stev., Rep. P.Rico insul. agric. Exp. Station, 1917-18: 138 (1919)
**Host:** On leaves of *Pisum sativum* L. (Fabaceae)
**Location:** Palampur (Kangra) H.P.
**Literature:** (Singh et al. 1999)

Cercospora ricinella Sacc. & Berl., Atti Inst. Veneto Sci. lett., ed Arti, Sér. 6 3: 721 (1885)
Synonymy:
= *Cercospora albidomaculans* G. Winter, Hedwigia 24(5): 202 (1885)
= *Cercospora ricini* Speg., Anal. Mus. nac. Hist. nat. B. Aires 6: 343 (1898) [1899]
= *Cercosporina ricinella* (Sacc. & Berl.) Speg., Anal. Mus. nac. B. Aires, Ser. 3 13: 429 (1910) [1911]
**Host:** On leaves of *Ricinus communis* L. (Euphorbiaceae)
**Location:** Mandi (Mandi) H.P.
**Literature:** (Singh et al. 1999)

Cercospora sesami Zimm., Ber. über Land. und Forstwirth. Deutsch-Ostafrica: 29 (1904)
**Host:** On leaves of *Sesamum indicum* L. (Pedaliaceae)
**Location:** Solan (Solan) H.P.
**Literature:** (Munjal & Sharma 1976)

Cercospora solani Thüm., Hedwigia 19: 135 (1880)
**Host:** On leaves of *Solanum nigrum* L. (Solanaceae).
**Location:** Solan (Solan) H.P.
**Literature:** (Paul et al. 1985c)

Cercospora solanicola G.F. Atk., J. Elisha Mitchell scient. Soc. 8(2): 53 (1892)
**Host:** Tuber of *Solanum tuberosum* L. (potato) in storage (Solanaceae)
**Location:** Shimla (Shimla), H.P.
**Literature:** (Rai 1983)

Cercospora solani-tuberosi Thirum., Amer. Potato J. 30: 96 (1953)
**Host:** On leaves of *Solanum tuberosum* L. (Solanaceae)
**Location:** Solan (Solan) H.P.
**Literature:** (Paul et al. 1985c)
**Cercospora sonchi** Chupp, Monograph of Cercospora: 159 (1954)  
= Cercospora sonchi var. taraxaci Govindu & Thirum., Sydowia 18(1-6): 21 (1965) [1964]  
**Host:** On leaves of *Sonchus oleraceus* L. (Asteraceae)  
**Location:** Solan (Solan) H.P.  
**Literature:** (Paul et al. 1985c)  

**Cercospora sorghi** Ellis & Everh., J. Mycol. 3(2): 15 (1887)  
= *Cercospora sorghi* f. *maydis* (Ellis & Everh.) Sacc., Syll. fung. (Abellini) 10: 656 (1892)  
= *Cercospora sorghi* var. *ciccaronei* (N. Pons) U. Braun, Schlechtendalia 5: 48 (2000)  
= *Cercospora sorghi* var. *maydis* Ellis & Everh., J. Mycol. 3(2): 15 (1887)  
= *Phaeoramularia ciccaronei* N. Pons, Fitopatol. Venez. 6(1): 2 (1993)  
**Host:** Leaves of *Zea mays* L. (Poaceae).  
**Location:** Kullu (Kullu), H.P.  
**Literature:** (Lall et al. 1963)  

**Cercospora tageticola** Ellis & Everh., J. Mycol. 8(2): 72 (1902)  
**Host:** On leaves of *Tagetes patula* L. (Asteraceae)  
**Location:** Solan (Solan) H.P.  
**Literature:** (Munjal & Sharma 1976)  

**Cercospora traversoana** Sacc. [as ‘traversiana’], Annls mycol. 2(1): 18 (1904)  
**Host:** On leaves of *Trigonella foenum-graecum* L. (Fabaceae).  
**Location:** Kangra (Kangra) H.P.  
**Literature:** (Singh et al. 1999)  

**Cercospora violae** Sacc., Nuovo G. bot. ital. 8(2): 187 (1876)  
= *Cercospora violae* var. *minima* Gonz. Frag. & Cif., Boln Real Soc. Españ. Hist. Nat., Biologica 27: 278 (1927)  
= *Cercospora violae* var. *minor* Rota-Rossi, Atti Ist. bot. R. Univ. Pavia, 2 Sér. 13: 199 (1914)  
**Host:** On leaves of *Viola serpens* Wall. (Violaceae)  
**Location:** Joginder Nagar (Mandi) H.P.  
**Literature:** (Singh et al. 1999)  

**Cercospora zeae-maydis** Tehon & E.Y. Daniels, Mycologia 17(6): 248 (1925)  
**Host:** Seeds of *Zea mays* L. (Poaceae).  
**Location:** Solan (Solan), H.P.  
**Literature:** (Paul et al. 1990, Paul et al. 1985b)  

**Cercospora zinnia** Ellis & G. Martin, J. Mycol. 1(1): 20 (1885)  
**Host:** On leaves of *Zinnia elegans* Jacq. (Asteraceae).  
**Location:** Solan (Solan) H.P.  
**Literature:** (Munjal & Sharma 1976, Paul & Bhardwaj 1986b)  

**Cercosporella** Sacc., Michelia 2 (6): 20 (1880)  
Fig. 3  

**Description & Illustration**  
**Cercosporella** (Mycosphaerellaceae) is a group of phytopathogenic cercosporoid fungi, mostly causing leaf spot diseases. The genus is lacking of pigment in the conidiophores and spores, which distinguishes it from the genus *Cercospora* and other members of the family. Primary mycelium is internal, and stroma present. Conidiophores fasciculate, simple or branched, smooth, emerging through the stromata. Conidiogenous cells integrated, terminal, polyblastic, sympodial,
conspicuously cicatrized, and geniculate at old conidial scars. Secondary mycelium rare consisting of external repent, hyaline hyphae which bear secondary conidiophores as lateral branches. Conidial scars conspicuous, thickened, colourless and refractive, the thickening extending beyond the areas occupied by the base of the conidium. A minute papilla in the centre of the old scar and a minute frill at the apex of the conidiogenous cell are often seen. Conidia colourless or faintly greenish, smooth, thin-walled, usually subcylindric and slightly obclavate, sometimes fusiform, 1-many septate, with an obtuse apex and narrowed at the base. Hilum slightly convex, colourless, refractive, slightly thickened but often not very conspicuous (Deighton 1973). Cercosporella species with secondary mycelium are placed in a separate subgenus namely; 1. Cercosporella subgen. Cercosporella: Mycelium internal, secondary mycelium lacking. Conidiophors fasciculate, rarely solitary, emerging through stromata, rarely erump through cuticle.

2. Cercosporella subgen. Pseudovellosiella: Primary mycelium internal, secondary mycelium external, superficial. Conidiophors fasciculate and/or solitary, arising from creeping secondary hyphae (Braun 1995). There are 274 epithets reported worldwide in the genus Cercosporella (Index Fungorum 2019 accessed on 06.12.2019) nearly on all plant families.

Type species: Cercosporella cana (Sacc.) Sacc., Michelia 2(no. 6): 20 (1880)

Cercosporella persicae (Sacc.) Sacc., Michelia 2 (6): 20 (1880)
Host: Leaves of Prunus armeniaca (Rosaceae)
Location: Gopalpur (Kangra), H.P.,
Literature: (Sohi et al. 1964)

Fig. 3 – Cercosporella virgaureae. A Conidiophore fascicles. B Conidiophores. C Conidia. (Seifert et al. 2011)

Distomycovellosiella U. Braun, C. Nakash., Videira & Crous, Studies in Mycology 87: 330 (2017)
The genus *Distomycovellosiella* comprises a group of plant pathogenic fungi producing caespituli hypophyllous, pale brown or olivaceous, floccose colonies in infected substrate. Mycelium in host tissue hyaline and internal, produce pale brown to brown external hyphae. Stromata either absent or small, if present. Conidiophores arising solitary from external hyphae as straight to geniculate, simple, sometimes branched or through stomata as loose to dense coremioid fascicles. Conidia pale brown to pale olivaceous, smooth to verruculose, ovoid, obovoid, obclavate, clavate, cylindrical, fusiform, straight or slightly curved, aseptate, borne unbranched or branched chains (catenate) (Videira et al. 2017).

**Type species:** *Distomycovellosiella brachycarpa* (Syd.) U. Braun, C. Nakash., Videira & Crous 2017

*Distomycovellosiella brachycarpa* (Syd.) U. Braun, C. Nakash., Videira & Crous, in Videira, Groenewald, Nakashima, Braun, Barreto, de Wit & Crous, Stud. Mycol. 87: 330 (2017)

= *Cercospora brachycarpa* Syd., Annls mycol. 28(1/2): 207 (1930)
= *Mycovellosiella brachycarpa* (Syd.) Deighton, Mycol. Pap. 137: 8 (1974)
= *Passalora brachycarpa* (Syd.) U. Braun & Crous, in Crous & Braun, CBS Diversity Ser. (Utrecht) 1: 87 (2003)

**Host:** Leaves of *Solanum tuberosum* L. (Solanaceae).

**Location:** Shimla (Shimla), H.P.

**Literature:** (Kamal 2010)

*Mycosphaerella* Johanson, Öfvers. K. Svensk. Vetensk.-Akad. Förhandl. 41(no. 9): 163 (1884)

**Description & Illustration**

*Mycosphaerella* is one of the largest genera of plant pathogenic fungi. Mycelium is internal and external; brached, septate, olivaceous to brown, thinwalled, smooth. Superficial (external) hyphae are generally emerging through stomata. Conidiophores are solitary or form loose to fairly dense fascicles. Single conidiophores arising from superficial hyphae, erect, straight, subcylindricalconical to geniculate-sinuous, unbranched, 0–3-septate, olivaceous brown to brown, thin-walled and smooth. Conidiogenous cells are integrated, terminal or conidiophores reduced to conidiogenous cells and bearing solitary, obclavate-cylindrical, straight to curved or even sigmoid conidia. The conidia are generally 2–12-septate, subhyaline to pale olivaceous brown, thin-walled, smooth, apex obtuse to subacute, base short obconically truncate with slightly thickened and darkened hila (Sivanesan 1984, Crous et al. 2000). There are 1787 epithets reported worldwide in the genus *Mycosphaerella* (Index Fungorum 2019 accessed on 06.12. 2019).

**Type species:** *Mycosphaerella punctiformis* (Pers.) Starbäck 1889

*Mycosphaerella cerasella* Aderh., Ber. dt. bot. Ges. 18: 246 (1900)

= *Cercospora cerasella* Sacc., Michelia 1(no. 2): 266 (1878)
= *Cercospora circumcissa* Sacc., Fungi venet. nov. vel. Crit., Sér. 5: 189 (1878)
= *Cercosporella cerasella* (Sacc.) Jacz., Yearbook of Information Concerning Diseases and Injuries of Cultivated and Wild Economic Plants: [1] (1903)

= *Passalora circumcissa* (Sacc.) U. Braun [as ‘circumcissa’], Mycotaxon 55: 230 (1995)
= *Pseudocercospora circumcissa* (Sacc.) Y.L. Guo & X.J. Liu, Mycosystema 2: 231 (1989)
= *Sphaerella cerasella* (Aderh.) Sacc. & P. Syd., Syll. fung. (Abellini) 16: 469 (1902)

**Host:** On leaves of *Prunus persica* (L.) Batsch (Rosaceae)
Mycosphaerella cruenta Latham, Mycologia 26(6): 525 (1934)  
= Cercospora cruenta Sacc., Michelia 2(no. 6): 149 (1880)  
= Pseudocercospora cruenta (Sacc.) Deighton, Mycol. Pap. 140: 142 (1976)  
**Host:** Leaves of *Dolichos biflorus* L. (Fabaceae); *Populus yunnanensis* Dode. (Salicaceae)  
**Location:** Solan (Solan) and Kangra (Kangra), H.P.  
**Literature:** (Paul & Sharma 1999, Kamal 2010)  

Mycosphaerella pruni-persicae Deighton, Trans. Br. mycol. Soc. 50(2): 328 (1967)  
= Cercospora persicae Sacc. [as ‘persica’], Qd Nat.: 189 (1876)  
= Cercospora persicae (Sacc.) Sacc. [as ‘persica’], Michelia 2(no. 6): 20 (1880)  
= Clasterosporium persicae (Sacc.) Tsuji, Ann. phytopath. Soc. Japan 1(2): 33 (1919)  
= Fusarium persicae (Sacc.) G.F. Atk., J. Elisha Mitchell scient. Soc. 8(2): 41 (1892)  
= Miuraea persicae (Sacc.) Hara, Byogaichu-Hoten (Manual of Pests and Diseases): 224 (1948)  
= Mycosphaerella persicae B.B. Higgins & F.A. Wolf [as ‘persica’], Phytopathology 27: 695 (1937)  
**Host:** Leaves of *Prunus armeniaca* L. (Rosaceae)  
**Location:** Gopalpur (Kangra), H.P.  
**Literature:** (Sohi et al. 1964, Sohi & Gupta 1966)  

Mycovellosiella Rangel, Archos Jard. bot., Rio de J. 2: 71 (1917)  
= Walkeromyces Thaung, Trans. Br. mycol. Soc. 66(2): 213 (1976)  

**Description & Illustration**  
*Mycovellosiella* is a genus of plant pathogen fungi infecting wide range of plants. These symptoms of these fungi on infected plants appear as effuse, greyish or olivaceous brown, velvety colonies on leaves with internal primary and abundant secondary hyaline to pigmented mycelium. Stromata absent or small/ rudimentary. Conidiophores solitary, arising from superficial hyphae, as well as fasciculate, subhyaline to pigmented, simple or branched. Conidiogenous cells integrated, terminal, intercalary or pleurogenous, polyblastic, sympodial, cicatrized, conidial scars conspicuous, thickened and darkened. Conidia solitary or catenate branched, aeroresporous to scolecosporous, acropleurogenous, simple, cylindrical with rounded ends, narrowly ellipsoidal, fusiform to obclavate, hyaline to pigmented, smooth, 0-3 or more septate. The genus consists in total 201 records worldwide (Index Fungorum 2019 accessed on 06.12.2019).  

**Type species:** *Mycovellosiella cajani* (Henn.) Rangel ex Trotter, Sylloge Fungorum 25: 942 (1931)  

*Mycovellosiella bellynckii* (Westend.) Constant., Cryptog. Mycol. 3(1): 67 (1982)  
= Cercospora bellynckii (Westend.) Niessl, Hedwigia 15: 1 (1876)  
= Cercosporellidium bellynckii (Westend.) X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 1(2): 93 (1982)  
= Cladosporidium bellynckii Westend., Bull. Acad. R. Sci. Belg., Cl. Sci. 21(2): 240 (1854)  
= Passalora bellynckii (Westend.) U. Braun, Mycotaxon 55: 228 (1995)  
= Passalora bellynckii (Westend.) Poonam Srivast., Journal of Living World 1(2): 115 (1994)  
**Host:** Leaves of *Beta cicla* (L.) Pers. (Amaranthaceae)  
**Location:** Kangra (Kangra), H.P.  
**Literature:** (Lall et al. 1961)
**Neocercosporidium** Videira & Crous, Studies in Mycology 87: 325 (2017)

**Description & Illustration**

*Neocercosporidium* is a genus of phytopathogenic fungi appears as amphigenous, punctiform, scattered to dense, dark brown to blackish spots. These fungi possess internal and external, branched, septate, subhyaline to medium olivaceous brown, thin-walled, smooth mycelium. Conidiophores arising from stromata well-developed, substomatal to intraepidermal, immersed, brown to dark brown stromata, in small to large and loose to dense fascicles, when dense almost coremioid, rarely solitary, smooth, olivaceous to dark olivaceous brown throughout or paler at the tips, thin-walled, erect, straight, subcylindrical to strongly geniculate-sinuous, simple or occasionally branched, sometimes reduced to conidiogenous cells. Conidiogenous cells integrated, terminal, proliferating sympodially, occasionally percurrently. Conidia solitary, subhyaline to pale olivaceous or brownish, smooth, thin-walled, multi-septate, obclavate-cylindrical, apex obtuse to subobtuse, base round to short obconically truncate, hila slightly thickened, darkened and refractive (Videira et al. 2017). As this is newly reported genus of cercosporid fungi, only one record of type species namely, *Neocercosporidium smilacis* is available (Index Fungorum 2019 accessed on 06.12.2019).

**Type species:** *Neocercosporidium smilacis* (Thüm.) U. Braun, C. Nakash., Videira & Crous 2017

*Neocercosporidium smilacis* (Thüm.) U. Braun, C. Nakash., Videira & Crous, in Videira, Groenewald, Nakashima, Braun, Barreto, de Wit & Crous, Stud. Mycol. 87: 326 (2017)

= *Cercospora smilacis* Thüm., Inst. Rev. Sci. Litt., Coimbra 27: 14 (1879)

= *Passalora smilacis* (Thüm.) U. Braun, in Triebel, Arnoldia 14: 30 (1997)

**Host:** On leaves of *Smilax aspera* L. (Smilacaceae).

**Location:** Mandi (Mandi) H.P.

**Literature:** (Paul & Sharma 1999)

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**Fig. 4** – *Mycovellosiella cajani*. A Conidiophore. B Conidia. (Seifert et al. 2011)
**Neopseudocercosporella** Videira & Crous, Studies in Mycology 83: 80 (2016)

**Description & Illustration**

*Neopseudocercosporella* is phytopathogenic fungi causing leaf spots. These fungi hold internal, hyaline, septate, branched mycelium with stromata well developed to nearly absent. Conidiophores generally hyaline, sometimes faintly pigmented, smooth, simple, straight, slightly curved or geniculate-sinuous, usually aseptate, one- to multisepate, emeries singly or in groups through cuticle or stoma. Conidia smooth, thin walled, pigmented to hyaline, arranged singly (solitary). Shape varies from subcylindrical to obclavate, with apex obtuse to subacute and base truncate (Videira et al. 2016). Only two species are recorded worldwide for this genus (IndexFungorum 2019 accessed on 06.12.2019).

**Type species:** *Neopseudocercosporella capsellae* (Ellis & Everh.) Videira & Crous 2016

*Neopseudocercosporella capsellae* (Ellis & Everh.) Videira & Crous, in Videira, Groenewald, Braun, Shin & Crous, Stud. Mycol. 83: 86 (2016)

≡ *Cylindrosporum capsellae* Ellis & Everh., Journal of Mycology 3 (11): 130 (1887)
≡ *Cercoseptoria capsellae* (Ellis & Everh.) H.C. Greene, Transactions of the Wisconsin Academy of Science 47: 127 (1959)
≡ *Pseudocercosporella capsellae* (Ellis & Everh.) Deighton, Mycological Papers 133: 42 (1973)
≡ *Cercoseptoria capsellae* (Ellis & Everh.) Arx, Proceedings van de Koninklijke Nederlandse Akademie van Wetenschappen Section C 86 (1): 35 (1983)
≡ *Pseudocercospora capsellae* (Ellis & Everh.) M.J. Morris & Crous, South African Journal of Botany 60 (6): 325 (1994)
≡ *Cylindrosporium brassicae* Fautrey & Roum., Revue mycol., Toulouse 13(no. 50): 61 (1891)
≡ *Cercosporella brassicae* (Fautrey & Roum.) Höhn., Annls mycol. 22(1/2): 193 (1924)
≡ *Cercosporella brassicae* (Fautrey & Roum.) Chupp, in Weiss, U.S. Dept. Agric. Handb. 165: 99 (1960)
≡ *Cercosporella albomaculans* (Ellis & Everh.) Sacc., Syll. fung. (Abellini) 11: 606 (1895)
≡ *Ramularia rapae* Pim, J. Bot., Lond. 35: 58 (1897)
≡ *Cercosporella rapistrii* Hollós, Annls hist.-nat. Mus. natn. hung. 6: 536 (1908)
≡ *Cylindrosporium nesliae* Bubák, Annls mycol. 14(5): 346 (1916)
≡ *Cercosporella brassicae* Jaap, Verh. bot. Ver. Prov. Brandenb. 64: 59 (1922)
≡ *Cercosporella nesliana* Baudyš & Picb. [as ‘nesleana’], Acta Soc. Sci. nat. moravo-siles. 1(5): 305 (1924)
≡ *Cercospora raphanistri* Baudyš & Picb., Acta Soc. Sci. nat. moravo-siles. 1(5): 306 (1924)
≡ *Cercosporella nesliana* Dearn. & Bisby, in Bisby, Buller & Dearness, Fungi of Manitoba and Saskatchewan: 125 (1929)
≡ *Cercosporella conringiae* Annal., Nov. sist. Niz. Rast. 9: 195 (1972)
≡ *Cercosporella goldbachiæ* Annal., Nov. sist. Niz. Rast. 9: 196 (1972)
≡ *Cercosporella malcolmiae* Annal., Nov. sist. Niz. Rast. 9: 202 (1972)
≡ *Cercosporella litvinoviae* Annal., Nov. sist. Niz. Rast. 9: 200 (1972)

**Host:** Leaves of *Brassica rapa* (Brassicaceae)

**Location:** Kullu (Kullu), H.P.

**Literature:** (Gangopadhyay & Kapoor 1976)

*Nothopassalora* U. Braun, C. Nakash., Videira & Crous, Studies in Mycology, 87: 257-421 (2017)

**Description & Illustration**
*Nothopassalora* is a genus of hyphomycetous, phytopathogenic fungi causing leaf spot diseases on *Arachis hypogaea*. These fungi have internal, septate, branched, hyaline to pale brown coloured mycelium and dark, epidermal, substomatal, subglobose stromata. Conidiophores fasciculate, pale to medium brown, smooth to verruculose, simple, straight to flexuous, geniculate-sinuous at the apex, multisepetate, emerging from from stromata, through stomata. Conidia pale brown to olivaceous, smooth, thin-walled, cylindrical to long-obclavate, straight or gently curved, multisepetate borne singly on conidiogenous cells. Shape of conidia reflects rounded apex and sometimes narrowing into a beak, rounded base or obconically truncate and dark thickened hila (Videira et al. 2017). As this is newly reported genus of cercosporid fungi, only one record of type species namely, *Nothopassalora personata* is available (Index Fungorum 2019 accessed on 06.12.2019).

**Type species:** *Nothopassalora personata* (Berk. & M.A. Curtis) U. Braun, C. Nakash., Videira & Crous 2017

*Nothopassalora personata* (Berk. & M.A. Curtis) U. Braun, C. Nakash., Videira & Crous, in Videira, Groenewald, Nakashima, Braun, Barreto, de Wit & Crous, Stud. Mycol. 87: 333 (2017)

= *Cercospora personata* (Berk. & M.A. Curtis) Ellis, J. Mycol. 1(5): 63 (1885)

= *Cercosporidium personatum* (Berk. & M.A. Curtis) Deighton, Mycol. Pap. 112: 71 (1967)

= *Cercosporiopsis personata* (Berk. & M.A. Curtis) Miura, Flora of Manchuria and East Mongolia, III Cryptogams, Fungi (Industr. Contr. S. Manch. Rly 27): 527 (1928)

= *Cladosporium personatum* Berk. & M.A. Curtis, in Berkeley, Grevillea 3 (no. 27): 106 (1875)

= *Passalora personata* (Berk. & M.A. Curtis) S.A. Khan & M. Kamal, Pakist. J. scient. ind. Res. 13: 188 (1961)

= *Phaeoisariopsis personata* (Berk. & M.A. Curtis) Arx, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 86(1): 43 (1983)

**Host:** On leaves of *Arachis hypogaea* L. (Fabaceae).

**Location:** Karsog (Mandi) H.P.

**Literature:** (Singh et al. 1999)

*Passalora* Fr., Summa veg. Scand., Sectio Post. (Stockholm): 500 (1849)

= *Berteromyces* Cif., Sydowia 8(1-6): 267 (1954)

= *Cercideuterospora* Curzi, Boll. R. Staz. Patalog. Veget. Roma 12: 3 (1932)

= *Cercosporidium* Earle, Muhlenbergia 1(2): 16 (1901)

= *Cercosporiopsis* Miura, Flora of Manchuria and East Mongolia, III Cryptogams, Fungi (Industr. Contr. S. Manch. Rly 27): 527 (1928)

= *Fulvia* Cif., Atti Ist. bot. Univ. Lab. crittog. Pavia, sér. 5 10(2): 246 (1954)

= *Phaeoramularia* Munt.-Cvetk., Lilloa 30: 182 (1960)

= *Tandonell* S.S. Prasad & R.A.B. Verma, Indian Phytopath. 23(1): 112 (1970)

= *Vellosiella* Rangel, Boln Agric., Sào Paulo 16: 151 (1915)

**Description & Illustration**

The genus *Passalora* described by Fries in 1849 was the first genus introduced for cercosporid hyphomycetes. The fungal species included in this genus are folicicolous, however, also caulicolous, causing leaf spots or other lesions. Mycelium superficial, internal and external, branched, septate, thin, almost smooth walled, pigmented to colourless. *Stromata* either absent or if well-developed, substomatal to interaepidermal, subhyaline to pigmented composed of loosely to densely aggregated swollen hyphal cells. Conidiophores solitary, loosely to densely fasciculate, arising from internal hyphae or stromata, unbranched or sometimes branched, sometimes in sporodochia or synnemata, macronematous, cylindrical, filiform to strongly geniculate-sinuous, olivaceous to medium dark brown. Conidia solitary, or catenate in simple or branched acropetal
chains, amero- to scolecosporous, aseptate to plurieuseptate, rarely with additional distosepta, pale olivaceous to distinctly pigmented, smooth to finely rough, hila conspicuous, somewhat thickened and darkened-refractive. Over 727 epithets are available in Index fungorum for this genus (Index Fungorum 2019 accessed on 06.12.2019).

**Type species:** *Passalora bacilligera* (Mont. & Fr.) Mont. & Fr. In Mont., Sylloge generum specierumque cryptogamarum: 305. 1849.

*Passalora avicularis* (G. Winter) Crous, U. Braun & M.J. Morris, in Morris & Crous, S. Afr. J. Bot. 60(6): 329 (1994)
  
  = *Cercospora avicularis* G. Winter, J. Mycol. 1(10): 125 (1885)
  
  = *Pseudocercospora avicularis* (G. Winter) A.Z.M. Khan & Shamsi, Bangladesh J Bot. 12(2): 108 (1983)

**Host:** Leaves of *Polygonum aviculare* L. (Polygonaceae).

**Location:** Kullu (Kullu) and Kangra (Kangra), H.P.

**Literature:** (Lall et al. 1961, Kamal 2010)

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*Passalora concors* (Casp.) U. Braun & Crous, in Crous & Braun, CBS Diversity Ser. (Utrecht) 1: 134 (2003)
  
  = *Cercospora concors* (Casp.) Sacc., Syll. fung. (Abellini) 4: 449 (1886)
  
  = *Fusisporium concors* Casp., Monatsber. Königl. Preuss. Akad. Wiss. Berlin: 314 (1855)
  
  = *Mycovellosiella concors* (Casp.) Deighton, Mycol. Pap. 137: 21 (1974)

**Host:** Leaves of *Solanum tuberosum* L. (Solanaceae).

**Location:** Solan (Solan), H.P.
**Literature:** (Paul & Sharma 1999)

**Passalora lathyri-aphacae** (Lall, H.S. Gill & Munjal) U. Braun & Crous, in Crous & Braun, CBS Diversity Ser. (Utrecht) 1: 244 (2003)

- *Cercospora lathyri-aphacae* Lall, H.S. Gill & Munjal, Indian Phytopath. 14(2): 117 (1962) [1961]
- *Cercospora lathyrae-aphacae* Lall, Gill & Munjal. Leaves of *Lathyrus aphaca* Kangra H.P.

**Host:** Leaves of *Lathyrus aphaca* L. (Fabaceae).

**Location:** Karang (Sirmaur), Kangra, H.P.

**Literature:** (Lall et al. 1961, Kamal 2010)

**Passalora occidentalis** (Cooke) U. Braun, Schlechtdelia 5: 70 (2000)

- *Cercospora occidentalis* Cooke, Hedwigia 17: 39 (1878)
- *Ramularia cassiicola* Heald & F.A. Wolf [as ‘cassiaecola’], Bull. Bureau Plant Industry U.S. Dep. Agric. 226: 101 (1912)
- *Cercosporina occidentalis* (Cooke) Sacc., Syll. fung. (Abellini) 25: 906 (1931)
- *Phaeoramularia occidentalis* (Cooke) Deighton, in Ellis, More Dematiaceous Hyphomycetes (Kew): 322 (1976)

**Host:** Leaves of *Cassia tora* (L.) Roxb (Caesalpiniaceae).

**Location:** Mandi (Mandi), H.P.

**Literature:** (Lall et al. 1961, Kamal 2010)

**Passalora pallidissima** (Chupp) U. Braun, in Braun, Crous & Nakashima, IMA Fungus 5(2): 357 (2014)

- *Cercospora pallidissima* Chupp, Monograph of Cercospora: 350 (1954)
- *Pseudocercospora pallidissima* (Chupp) Deighton, Mycol. Pap. 140: 149 (1976)

**Host:** Leaves of *Smilax aspera* L. (Smilaceae)

**Location:** Mandi (Mandi), H.P.

**Literature:** (Chona et al. 1959, Kamal 2010)

**Passalora squalidula** (Peck) U. Braun, in Braun & Mel’nik, Trudy Botanicheskogo Instituta im. V.L. Komarova 20: 95 (1997)

- *Cercospora squalidula* Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 33: 29 (1883) [1880]
- *Pseudocercospora squalidula* (Peck) Y.L. Guo & X.J. Liu, in Guo, Fungi and Lichens of Shennongjia. Mycological and Lichenological Expedition to Shennongjia (Beijing): 366 (1989)

**Host:** Leaves of *Clematis gouriana* Roxb. ex DC. (Ranunculaceae)

**Location:** Mandi (Mandi), H.P.

**Literature:** (Lall et al. 1961, Kamal 2010)

**Passalora verbeniphila** (Speg.) Crous & U. Braun, Mycotaxon 57: 310 (1996)

- *Cercospora verbeniphila* Speg., Boln Acad. nac. Cienc. Córdoba 29(2-3): 179 (1926)

**Host:** On leaves of *Verbena* sp. (Verbenaceae).

**Location:** JoginderNagar (Mandi) H.P.

**Literature:** (Paul et al. 1985a)

**Pseudocercospora** Speg., Anal. Mus. nac. B. Aires, Ser. 3 13: 437 (1910) [1911] Fig. 6

- *Sawada*, Report of the Department of Agriculture, Government Research Institute of Formosa 87: 77 (1944)
- *Cercocladospora* G.P. Agarwal & S.M. Singh, Proc. natn. Acad. Sci. India, Sect. B, Biol. Sci. 42(4): 439 (1974) [1972]
- *Dictyocephala* A.G. Medeiros, Publicações Inst. Micol. Recife 372: 13 (1962)
- *Macraea* Subram., Proc. Indian Acad. Sci., Pl. Sci. 36B: 164 (1953) [1952]
Prathigada Subram., in Subramanian & Ramakrishnan, Journal of Madras Univ., B 26: 366 (1956)

Semipseudocercospora J.M. Yen, Mycotaxon 17: 361 (1983)

Ancylospora Sawada, Report of the Department of Agriculture, Government Research Institute of Formosa 87: 77 (1944)

Cercoseptoria Petr., Annls mycol. 23(1/2): 69 (1925)

Ciferriella Petr., Annls mycol. 28(5/6): 409 (1930)

Helicomina L.S. Olive, Mycologia 40(1): 16 (1948)

Jaczewskiella Murashk., Mater. Mikol. Fitopat. Ross. 5(2): 5 (1926)

Marcosia Syd. & P. Syd., Annls mycol. 14(1/2): 96 (1916)

Phaeoisariopsis Ferraris, Annls mycol. 7(3): 280 (1909)

Prathigada Subram., in Subramanian & Ramakrishnan, Journal of Madras Univ., B 26: 366 (1956)

Pseudopuccinia Höhn., in Weese, Mitt. bot. Inst. tech. Hochsch. Wien 2(2): 41 (1925)

Rhopaloconidium Petr., Sydowia 6(1-4): 300 (1952)

Semipseudocercospora J.M. Yen, Mycotaxon 17: 361 (1983)

Septoriopsis F. Stevens & Dalbey, Mycologia 11(1): 4 (1918) [1919]

Stigmina E. Bald. & Cif., Atti Ist. bot. R. Univ. Pavia, 3 Sér. 10: 70 (1937)

Description & Illustration

Pseudocercospora is a widely distributed genus of ascomycete fungi estimated to contain over 100 species. The genus found predominantly in tropical regions, can cause leaf spots, fruit spots, fruit rot, and blight disease. The genus is a well-known anamorph of Mycosphaerella. It can be characterized by combination of characters such as internal as well as external mycelium, conidiophores solitary, arising from superficial hyphae, lateral or terminal, fasciculate, septate or aseptate, brown to pale brown in color, synnematous or forming distinct sporodochia; Conidia solitary, rarely catenate, scolecosporous, rarely non-scolecosporous, didymosporous – phragmosporous or helocosporous, pale olivaceous to dark brown, tranversly septate, realy with single or few oblique septa, hilium unthickened, not darkened, conidial succession schizolytic. Over 1686 epithets are available with Index fungorum for this genus (Index Fungorum 2019 accessed on 06.12.2019).

Type species: Pseudocercospora vitis (Lev.) Speg., Annales Mus. Nac. Hist. Nat. Buenos Aires 20: 438. 1910.

Pseudocercospora abelmoschi (Ell. & Everh.) Deighton, Mycol. Pap. 140: 138 (1976)

= Cercospora abelmoschi Ellis & Everh. 1893

Host: Leaves of Hibiscus rosa-sinensis L., Abelmoschus esculentus (L.) Moench. (Malvaceae)

Location: Solan (Solan) and Palampur (Kangra) H.P.

Literature: (Dhancholia & Singh 1992, Paul & Sharma 1999)

Pseudocercospora blumeae (Thüm.) Deighton, Mycol. Pap. 140: 140 (1976)

= Cercospora blumeae Thüm., Revue mycol., Toulouse 2(1): 38 (1880)

= Chaetotrichum blumeae (Thüm.) Petr., Sydowia 10(1-6): 129 (1957) [1956]

Host: Leaves of Buddleia sp. (Loganiaceae)

Location: Shimla (Shimla) & Sundernagar (Mandi), H.P.

Literature: (Chona et al. 1959, Singh et al. 1999)

Pseudocercospora buddlejae (W. Yamam.) Goh & W.H. Hsieh Trans. mycol. Soc. R.O.C. 2(2):114 (1987c)

= Cercospora buddlejae W. Yamam., Trans. Nat. Hist. Soc. Formosa 26: 279 (1936)

Host: Leaves of Buddleia sp. (Loganiaceae)
**Location:** Shimla (Shimla), H.P.
**Literature:** (Chona et al. 1959)

*Pseudocercospora cannabina* (Wakef.) Deighton, Mycol. Pap. 140: 141 (1976)
  = *Cercospora cannabina* Wakef., Bull. Misc. Inf., Kew (nos 9 & 10): 314 (1917)
**Host:** On leaves of *Cannabis sativa* L. (Cannabaceae).
**Location:** Solan (Solan) H.P.
**Literature:** (Munjal & Sharma 1976)

*Pseudocercospora cinereae* (Pavgi & U.P. Singh) Deighton, Mycol. Pap. 140: 141 (1976)
  = *Cercospora cinereae* Pavgi & U.P. Singh, Mycopath. Mycol. appl. 23: 188 (1964)
  = *Pseudocercospora cinereae* (Pavgi & U.P. Singh) Deighton, Mycol. Pap. 140: 141 (1976)
**Host:** On leaves of *Veronica cinerea* Raf. (Plantaginaceae)
**Location:** Chauntra (Kangra) H.P.
**Literature:** (Paul et al. 1985b)

*Pseudocercospora diclipterae* (A.K. Kar & M. Mandal) Deighton, Trans. Br. mycol. Soc. 88(3): 388 (1987)
  = *Cercospora diclipterae* A.K. Kar & M. Mandal, Trans. Br. mycol. Soc. 53(3): 337 (1969)
**Host:** On leaves of *Dianthus caryophyllus* L. (Caryophyllaceae)
**Location:** Solan (Solan) H.P.
**Literature:** (Paul et al. 1985b)

*Pseudocercospora dolichi* (Ellis & Everh.) J.M. Yen, Bull. trimest. Soc. mycol. Fr. 97(3): 152 (1981)
  = *Cercospora dolichi* Ellis & Everh., J. Mycol. 5(2): 71 (1889)
**Host:** Leaves and seeds of *Vigna unguiculata* (L.) Walp. (Leguminosae)
**Location:** Solan (Solan) and Kangra (Kangra), H.P.
**Literature:** (Sharma 1977, Saharan 1979, Paul & Bhardwaj 1986b, Kamal 2010)

*Pseudocercospora eupatoriicola* (Govindu & Thirum.) A.Z.M. Khan & Shamsi, Bangladesh Journal of Botany 12(2): 113 (1983)
  = *Cercospora eupatoriicola* Govindu & Thirum. [as ‘eupatoricola’], Sydowia 8(1-6): 225 (1954)
**Host:** On leaves of *Ageratina adenophora* (Spreng.) R.M.King & H.Rob. (Compositae).
**Location:** Palampur (Kangra) H.P.
**Literature:** (Singh et al. 1999)

*Pseudocercospora geraniicola* U. Braun, Cryptog. bot. 3(2-3): 241 (1993)
  = *Cylindrosporium geraniii* Ellius & Evern., J Mycol. 4:52, 1882
  = *Pseudocercospora geranii* (W.B. Cooke & Shaw) U. Braun, 19991.
  = *Cercospora geranii* Kellern. & Swingle, J Mycol., 5:74, 1889.
**Host:** Geranium sp. (Geraniaceae)
**Location:** Kullu (Kullu) & Kangra (Kangra), H.P.
**Literature:** (Kamal 2010)

*Pseudocercospora jujubae* (S. Chowdhury) A.Z.M. Khan & Shamsi, Bangladesh J Bot. 12(2): 117 (1983)
  = *Cercospora jujubae* S. Chowdhury, Indian J Agric Res., 16:525, 1946
  = *Cladosporium zizyphi* P. Karst., Rev. Mycol. 12 (46): 78, 1890.
**Host:** Leaves of *Zizyphus jujube* Lamk.; *Z. Oenoplia* (L.) Mill. (Rhamnaceae)
**Location:** Joginder Nagar (Mandi), H.P.
**Pseudocercospora mississippiensis** (Tracy & Earle) R.F. Castañeda & U. Braun, Cryptog. bot. 1(1): 52 (1989)

= *Cercospora mississippiensis* Tracy & Earle, Bull. Torrey bot. Club 22: 179 (1895)

**Host:** Leaves of *Smilax* sp. (Smilaceae)

**Location:** Kangra & Palampur (Kangra) and Shimla (Shimla), H.P.

**Literature:** (Chona et al. 1959, Kamal 2010)

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**Pseudocercospora mori** (Hara) Deighton, Mycol. Pap. 140: 148 (1976)

= *Cercospora mori* Hara, Journal of the Sericultural Association of Japan 27(no. 314): 227 (1918)

**Host:** Leaves of *Morus alba* L. (Moraceae)

**Location:** Kangra & Palampur (Kangra), H.P.

**Literature:** (Paul et al. 1986)

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**Pseudocercospora murrayae** (A.K. Kar & M. Mandal) Deighton, Trans. Br. mycol. Soc. 88(3): 388 (1987)

= *Cercospora murrayae* A.K. Kar & M. Mandal, Trans. Br. mycol. Soc. 53(3): 357 (1969)

**Host:** On leaves of *Murraya koenigii* (L.) Sprang. (Rutaceae)

**Location:** Sunhet (Kangra) H.P.

**Literature:** (Paul et al. 1985b)

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**Pseudocercospora ocimicola** (Petr. & Cif.) Deighton, Mycol. Pap. 140: 149 (1976)
= *Cercospora ocimicola* Petr. & Cif., Annls mycol. 30(3/4): 324 (1932)

**Host:** On leaves of *Ocimum tenuiflorum* L. (Lamiaceae)

**Location:** Nauni (Solan) H.P.

**Literature:** (Paul et al. 1985b)

*Pseudocercospora paludicola* (Speg.) U. Braun, Schlechtendalia 5: 67 (2000)

= *Cercospora paludicola* Speg., Anal. Soc. cient. argent. 13(1): 29 (1882)

**Host:** Leaves of *Polygonum* sp. (Polygonaceae)

**Location:** Solan (Solan) & Shmila (Shimla), H.P.

**Literature:** (Munjal et al. 1960, Kamal 2010)

*Pseudocercospora platanigena* Videira & Crous, in Videira, Groenewald, Nakashima, Braun, Barreto, de Wit & Crous, Stud. Mycol. 87: 410 (2017)

**Host:** Leaves of *Platanus orientalis* L. (Platanaceae)

**Location:** Manali (Kullu), H.P.

**Literature:** (Bakshi et al. 1970)

*Pseudocercospora plumeriae* (Chupp) Tak. Kobay., Nishij. & C. Nakash., Mycoscience 39(2): 188 (1998)

= *Cercospora plumeriae* Chupp, Monograph of Cercospora: 49 (1954)

**Host:** Leaves of *Plumeria tomentosa* (Apocynaceae).

**Location:** Dhaulakuan (Sirmour), H.P.

**Literature:** (Sohi & Gupta 1966, Kamal 2010)

*Pseudocercospora punicae* (Henn.) Deighton, Mycol. Pap. 140: 151 (1976)

= *Cercospora punicae* Henn., Bot. Jb. 37: 165 (1905)

**Host:** Leaves of *Punica granatum* L. (Lythraceae).

**Location:** Solan (Solan), H.P.

**Literature:** (Paul et al. 1985a)

*Pseudocercospora riachueli* (Speg.) Deighton, Mycol. Pap. 140: 129 (1976)

= *Cercospora horiana* Togashi & Katsuki, Sci. Rep. Yokohama Natl. Univ., Sect. 2 1: 4 (1952)

= *Cercospora riachueli* Speg., Anal. Soc. cient. argent. 10(1): 33 (1880)

= *Pseudocercospora riachueli var. horiana* (Togashi & Katsuki) U. Braun & Crous, in Crous & Braun, CBS Diversity Ser. (Utrecht) 1: 354 (2003)

**Host:** Living leaves of *Vitis vinifera* L. (Vitaceae).

**Location:** Kullu (Kullu), H.P.

**Literature:** (Munjal & Seth 1966, Munjal & Sharma 1975, Kamal 2010)

*Pseudocercospora salicina* (Ellis & Everh.) Deighton, Mycol. Pap. 140: 94 (1976)

**Host:** Leaves of *Salix tetrasperma* Roxb. (Salicaceae)

**Location:** Panchrukhi (Kangra), H.P.

**Literature:** (Paul & Sharma 1999)

*Pseudocercospora subsessilis* (Syd. & P. Syd.) Deighton, Mycol. Pap. 140: 154 (1976)

= *Cercospora subsessilis* Syd. & P. Syd., Annls mycol. 11(4): 329 (1913)

= *Cercospora subsessilis* var. azadirachtae R.C. Srivast. [as ‘azadirachtii’], Zentbl. Bakt. ParasitKde, Abt. II 135(6): 559 (1980)

= *Cercosporina subsessilis* (Syd. & P. Syd.) Sacc., Syll. fung. (Abellini) 25: 911 (1931)

**Host:** On leaves of *Azadirachta indica* A. Juss. (Meliaceae)

**Location:** Solan (Solan) H.P.
Literature: (Paul & Sharma 1999)

*Pseudocercospora sydowiana* (Chupp) U. Braun & Crous, in Braun, Schlechtendalia 2: 25 (1999)

  = *Cercospora sydowiana* Chupp, Monograph of Cercospora: 363 (1954)
  = *Cercospora woodfordiae* Syd., in Sydow & McRae, Annals Cryptog. Exot. 2(3-4): 271 (1929) [1930]

  = *Pseudocercospora woodfordiae* X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 12(1): 32 (1993)

Host: On leaves of *Woodfordia floribunda* (L.) Kurz (Lythraceae)

Location: Solan (Solan) H.P.

Literature: (Paul et al. 1985a)

*Pseudocercospora withaniae* (Syd. & P. Syd.) Deighton, Mycol. Pap. 140: 155 (1976)

  = *Cercospora withaniae* Syd. & P. Syd., Annls mycol. 10(5): 444 (1912)

Host: On leaves of *Withania somnifera* (L.) Dunal. (Solanaceae)

Location: Solan (Solan) H.P.

Literature: (Paul & Bhardwaj 1986b)

*Ramularia* Unger, Exanth. Pflanzen (Wien): 119 (1833) Fig. 7

Description & Illustration

*Ramularia* is a genus of hyphomycetes fungi that harbours plant pathogens responsible for yield losses to many important crops. Disease symptoms of these fungi appear as small brown spots, surrounded by a yellow halo on the leaf surface. Later, neighbouring spots join together to form large brown patches. These fungi produce hyaline conidiophores and conidia with distinct, thick, dark, refractive conidiogenous loci and conidial hila. *Mycosphaerella* is sexual morph of these fungi. Microscopic characteristics include internal (external also) mycelium, superficial branched, septate, hyaline, smooth hyphae; stromata almost lacking to well-developed; Conidiophores in small to moderately large fascicles, loose to moderately dense, erect, straight, subcylindrical to geniculate-sinuous, unbranched or occasionally branched, hyaline, thin-walled, smooth, arising from internal hyphae or stromata, emerging through stomata; Conidia solitary or catenate, short conidia narrowly ellipsoid-ovoid to subcylindrical, longer conidia cylindrical, hyaline, thin-walled, verruculose, apex obtuse, rounded to truncate, base obconically truncate, slightly thickened and darkened hila. Total 1179 epithets are available with Index fungorum for this genus (Index Fungorum 2019 accessed on 06.12.2019).

Type species: *Ramularia pusilla* Unger, Exanth. Pflanzen (Wien): 169 (1833)

*Ramularia decipiens* Ellis & Everh., J. Mycol. 1(5): 70 (1885)

Host: Leaves of *Rumex orientalis* Bernh. ex Schult. & Schult.f. & *R. nepalensis* Spreng. (Polygonaceae); *Ranunculus laetus* Wall. ex Hook. f. & J.W. Thomson (Ranunculaceae)

Location: Shimla (Shimla) and Solan (Solan), H.P.

Literature: (Padwick 1946, Paul & Sharma 1999)

*Ramularia didyma* Unger, Exanth. Pflanzen (Wien): 169 (1833)

  = *Didymaria didyma* (Unger) Pound, Am. Nat. 23: 163 (1889)
  = *Ramularia didyma* f. ranunculi-repentis Thüm., Mycoth. Univ., cent. 30: no. 2976 (1881)
  = *Ramularia ranunculi* Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 35: 141 (1884)
  = *Ramularia calthae* Lindr., Acta Soc. Fauna Flora fenn. 23(no. 3): 15 (1902)
  = *Ramularia didyma* var. *pulsatillae* (Hollós) U. Braun, Monogr. Circosorella, Ramularia

Allied Genera (Phytopath. Hyphom.) 2: 240 (1998)

  = *Ramularia exigua* U. Braun, Mycotaxon 51: 57 (1994)
  = Ramularia didyma var. *exigua* (U. Braun) U. Braun, Monogr. Circosorella, Ramularia

Allied Genera (Phytopath. Hyphom.) 2: 240 (1998)
**Host:** Leaves of *Ranunculus leatus* Wall. ex. Hook. f. & J.W. Thomson (Ranunculaceae)
**Location:** Solan (Solan), H.P.
**Literature:** (Munjal & Sharma 1976)

*Ramularia gossypii* (Speg.) Cif., Atti Ist. bot. Univ. Lab. crittog. Pavia, sér. 5 19: 124 (1962)
- *Septocylindrium gossypii* (Speg.) Subram., Hyphomycetes (New Delhi): 309 (1971)
- *Ramulariopsis gossypii* (Speg.) U. Braun, Nova Hedwigia 56(3-4): 432 (1993)
- *Septocylindrium areola* (G.F. Atk.) Pound & Clem., Minn. bot. Stud. 1 (Bulletin 9): 651 (1896)
- *Symphyosira areola* (G.F. Atk.) Sawada, Special Publication College of Agriculture, National Taiwan University 8: 232 (1959)
- *Mycosphaerella areola* Ehrlich & F.A. Wolf, Phytopathology 22: 238 (1932)

**Host:** Leaves of *Gossypium* sp. (Malvaceae)
**Location:** Bilaspur (Bilaspur), H.P.
**Literature:** (Paul et al. 1985c)

*Ramularia lineola* Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 32: 43 (1880) [1879]

**Host:** Leaves of *Taraxacum officinale* (L.) Wigg. (Asteraceae)
**Location:** Solan (Solan), H.P.
**Literature:** (Munjal & Sharma 1976)

*Ramularia narkandensis* Deighton, Trans. Br. mycol. Soc. 60(1): 162 (1973)

**Host:** Leaves of *Fragaria vesca* L. (Rosaceae);
**Location:** Narkanda (Shimla), H.P.
**Literature:** (Deighton 1973)

*Ramularia phaseoli* (O.A. Drumm.) Deighton, Trans. Br. mycol. Soc. 50(1): 125 (1967)

**Host:** Leaves of *Phaseolus vulgaris* L. (Fabaceae); *Phaseolus mungo* (L.) Hepper (Fabaceae)
**Location:** Solan (Solan), H.P.
**Literature:** (Sohi et al. 1965, Paul & Bhardwaj 1986a)

*Ramularia rufomaculans* Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 34: 46 (1883) [1881]
- *Ramularia rufomaculans* var. *gallica* Sacc., G. bot. Ital., n.s. 23(2): 229 (1916)
- *Ramularia rufomaculans* var. *longispora* U. Braun & C.F. Hill, Mycol. Progr. 1(1): 26 (2002)
- *Septocylindrium rufomaculans* (Peck) Pound & Clem., Minn. bot. Stud. 1 (Bulletin 9): 651 (1896)

**Host:** Leaves of *Polygonum pterocarpum* Wall. (Polygonaceae)
**Location:** Solan (Solan), H.P.
**Literature:** (Paul & Sharma 1999)

*Ramularia variabilis* Fuckel, Jb. Nassau. Ver. naturk. 23-24: 361 (1870) [1869-70]
- *Cylindrosporium variabilis* (Fuckel) J. Schröter. [as ‘Cylindrospora’], in Cohn, Krypt.-Fl. Schlesien (Breslau) 3.2(4): 490 (1897) [1908]
- *Entylomella variabilis* (Fuckel) Cif., Annls mycol. 26(1/2): 17 (1928)
- *Ovularia variabilis* (Fuckel) E. Bommer & M. Rousseau, Flora mycol. Bruxelles: 274 (1884)

**Host:** Leaves of *Verbascum thapsus* L. (Scrophulariaceae)
**Location:** Solan (Solan), H.P.
**Literature:** (Munjal & Sharma 1976, Paul & Sharma 1999)
**Rosisphaerella** Videira & Crous, Studies in Mycology, 87: 257-421 (2017)

**Description & Illustration**

*Rosisphaerella* is assembly of phytopathogenic, foliicolous fungi reported to cause diseases on plant leaves as circular or irregular leaf spots. These fungi possess internal mycelium composed of hyaline and pale brown to brown, septate, branched hyphae. Stromata absent or small, epidermal, substomatal, brown to dark brown, if present. Conidiophores arises as solitary to fascicule, often synnematous, dark olivaceous brown near base and paler toward the tip, smooth, simple, multiseptate, straight to sinuous, usually geniculate-sinuous from stromata or few brown cells. Conidiogenous cells bear single pale to medium olivaceous brown, smooth to finely verruculose, cylindrical to obclavate, straight to mildly curved, septate conidia, obconically truncate at base and rounded at apex, hila somewhat thickened and darkened (Videira et al. 2017). As this is newly reported genus of cercosporid fungi, only one record of type species namely, *Rosisphaerella rosicola* is available (Index Fungorum 2019, accessed on 06.12.2019).

**Type species:** *Rosisphaerella rosicola* (Pass.) U. Braun, C. Nakash., Videira & Crous 2017

*Rosisphaerella rosicola* (Pass.) U. Braun, C. Nakash., Videira & Crous, in Videira, Groenewald, Nakashima, Braun, Barreto, de Wit & Crous, Stud. Mycol. 87: 350 (2017)

= *Cercospora rosicola* Pass. [as ‘rosaecola’], in Thümen, Just’s Bot. Jahresber. 3: 276 (1877)

= *Mycosphaerella rosicola* (Pass.) B.H. Davis, Mycologia 30(3): 296 (1938)

= *Phaeosphaerella rosicola* (Pass.) Tomilin, Opredelitel’ Gribov roda Mycosphaerella Johans: 285 (1979)

= *Phaeosporella rosicola* (Pass.) Tomilin, Opredelitel’ Gribov roda Mycosphaerella Johans: 285 (1979)

= *Passalora rosicola* (Pass.) U. Braun, Mycotaxon 55: 234 (1995)
Host: On leaves of *Rosa indica* L. (Rosaceae); *Smilax aspera* L. (Smilacaceae).
Location: Mandi (Mandi) H.P.
Literature: (Chona et al. 1959, Singh et al. 1999)

*Sirosporium* Bubák & Serebrian., Hedwigia 52: 273 (1912) total 34 epithets on 15.3.19 Fig. 8

Description & Illustration
*Sirosporium* is a plant pathogenic fungi produces disease symptoms on leaves as effuse, velvety, oilvaceous, radish or dark blackish brown spots or colonies. Mycelium partially submerged or superficial with macronematous, micronematous or mononematous, branched or unbranched, plae to mid brown, smooth or verrucose conidiophores. Conidia simple, solitary, dry, cylindrical with rounded ends, septate transversely or sometime longitudinally, smooth, ruguse or verrucose. There are about 34 epithets reported worldwide in the genus *Sirosporium* (Index Fungorum 2019 accessed on 06.12.2019).

Fig. 8 – *Sirosporium antenniformae*. A Conidiophores. B Conidia. (Seifert et al. 2011)

Type species: *Sirosporium antenniformae* (Berk. & Curt.) Bubak & Serebrianikow, in M.B. Ellis Mycol. Pap., 87: 2-11. 1963.

*Sirosporium celtidis* (Biv.) M.B. Ellis, Mycol. Pap. 87: 4 (1963)
Host: Leaves *Celtis occidentalis* L. (Cannabaceae).
Location: Shimla (Shimla), H.P.
Literature: (Paul et al. 1986, Kamal 2010)

*Sirosporium mori* (Syd. & P. Syd.) M.B. Ellis, Mycol. Pap. 87: 7 (1963)
Host: Leaves of *Morus alba* L. (Moraceae).
Location: Chauntra (Mandi), H.P.
Literature: (Paul & Singh 1986, Paul et al. 1986, Kamal 2010)
**Stigmina** Sacc., Michelia 2 (6): 22 (1880)  

**Description & Illustration**  
*Stigmina* is a foliicolous genus of plant pathogenic fungi. These fungi appear underside of leaves as punctiform, brown to black colonies. Mycelium mostly internal, septate, hyaline to brown, immersed in or beneath stromata. Stromata well developed, emerged, erumpent or superficial, subhyaline to dark brown. Conidiophores absent or macronematous, short and packed closely to form sporodochia, smooth or verrucose, unbranched, straight or flexuous, hyaline to brown or olivaceous brown. Conidia solitary, apical, dry or formed in gelatinous matrix, acrogenous, simple, cylindrical, brown, rounded at apex, truncate at the base, smooth to verruculose, transversely septate and sometimes 1 or more oblique septation. There are 165 epithets reported worldwide in the genus *Stigmina* (Index Fungorum 2019 accessed on 06.12.2019).

**Type species:** *Stigmina platani* (Fuckel) Sacc., Michelia 2(no. 6): 22 (1880)

*Stigmina ardisiae* Munjal & Kulshr., Phytopathology 21(3): 309 (1968)  
**Host:** Leaves of *Ardisia solanacea* Roxb. (Primulaceae)  
**Location:** Kangra (Kangra), H.P.  
**Literature:** (Munjal & Kulshreshtha 1968)

*Stigmina carpophilla* (Lév.) M.B. Ellis, Mycol. Pap. 72: 56 (1959)  
**Host:** Leaves of *Prunus persica* (L.) Batsch & *Prunus domestica* L. (Rosaceae)  
**Location:** Nauni (Solan), H.P.  
**Literature:** (Sharma & Paul 1986)

*Stigmina terminaliae* Munjal & Kulshr., Phytopathology 21(3): 312 (1968)  
**Host:** Leaves of *Terminalia chebula* Retz. (Combretaceae)  
**Location:** Palampur (Kangra), H.P.  
**Literature:** (Munjal & Kulshreshtha 1968)

**Teratosphaeria** Syd. & P. Syd., Annales Mycologici 10 (1): 39 (1912)

**Description & Illustration**  
*Teratosphaeria* is a genus of foliicolous fungi causing leaf spot dieases as subcircular to irregular, pale brown to almost gray spots on both surfaces of leaves. Stromata usually lacking on lower leaf surface and present as subglobular, brown on upper surface of leaves. Conidiophores subhyaline to very pale yellowish olivaceous, emerges solitary to fascicule, sparingly septate, curved to tortuous, unbranched to slightly branched. Conidia pale olivaceous to hyaline, cylindrical to attenuated, straight to curved with subtruncate to long obconically truncate base (Sydow & Sydow 1912). Total 99 epithets are recorded worldwiwide for this genus (Index Fungorum 2019 accessed on 06.12.2019).

**Type species:** *Teratosphaeria fibrillosa* Syd. & P. Syd. 1912

*Teratosphaeria eucalypti* (Cooke & Massee) Crous, Persoonia 23: 115 (2009)  
= *Pseudocercospora eucalypti* (Cooke & Massee) Y.L. Guo & X.J. Liu, Mycosystema 2: 234 (1989)  
= *Kirramyces eucalypti* (Cooke & Massee) J. Walker, B. Sutton & Pascoe, Mycol. Res. 96(11): 920 (1992)  
= *Phaeophleospora eucalypti* (Cooke & Massee) Crous, F.A. Ferreira & B. Sutton, S. Afr. J. Bot. 63(3): 113 (1997)  
= *Stagonospora pulcherrima* (Gadgil & M.A. Dick) H.J. Swart, Trans. Br. mycol. Soc. 90(2):
= Readeriella pulcherrima (Gadgil & M.A. Dick) Crous & U. Braun, in Crous, Braun & Groenewald, Stud. Mycol. 58: 26 (2007)

Host: On leaves of Eucalyptus sp. (Myrtaceae).

Location: Solan (Sol) H.P.

Literature: (Paul & Sharma 1999)

Fig. 9 – Stigmina curvispora. A Conidiophore fascicles. B Conidiophores. C Conidia. (Braun et al 2016)

Host and Fungus Index

In this section scientific name of host plants along with the cercosporoid fungi occurring on them are provided in table 2.

Table 2 Host and fungus index for cercosporoid fungi occurring in Himachal Pradesh

| Sr. No. | Host Plant          | Cercosporoid fungi                                                |
|---------|---------------------|------------------------------------------------------------------|
| 1.      | Abelmoschus esculentus | Pseudocercospora abelmoschi (Ell. & Everh.) Dieghton             |
| 2.      | Achyranthes aspera   | Cercospora achryanthina Thirum. & Chupp.                         |
| 3.      | Adhatoda vasica      | Cercospora adhatodae S. Chowdhury                                |
| 4.      | Ageratina adenophora | Pseudocercospora eupatoriicola (Govindu & Thirum.) A.Z.M. Khan & Shamsi |
| 5.      | Albizia lebbek       | Cercospora albiziae A.K. Kar & M. Mandal                         |
| 6.      | Allium tuberosum     | Cercospora duddiae Welles                                        |
| 7.      | Althea rosea         | Cercospora nebulosi Sacc.                                        |
| 8.      | Amaranthus sp.       | Cercospora brachiate Ellis & Everh.                              |
| 9.      | Arachis hypogaea     | Cercospora arachidicola Hori; Nothopassalora personata (Berk. & M.A. Curtis) U. Braun |
| Sr. No. | Host Plant       | Cercosporoid fungi                                      |
|--------|------------------|--------------------------------------------------------|
| 10.    | Ardisia solanacea| Stigmina ardisiae Munjal & Kulsh.                     |
| 11.    | Asparagus officinalis | Cercospora asparagi Sacc.                           |
| 12.    | Azadirachta indica | Cercospora leucosticta Ellis & Everh.; Pseudocercospora subsessilis (Syd. & P. Syd.) Deighton |
| 13.    | Beta cicla       | Mycovellosiella bellynckii (Westend.) Constant.     |
| 14.    | Beta vulgaris L. var. mangel | Cercospora beticola Sacc.                   |
| 15.    | Brassica rapa    | Neopseudocercosporella capsellae (Ellis & Everh.) Videira & Crous |
| 16.    | Buddleia sp.     | Pseudocercospora blumeae (Thüm.) Deighton; Pseudocercospora buddlejae (W. Yamam.) Goh & W.H. Hsieh |
| 17.    | Cannabis sativa  | Pseudocercospora cannabina (Wakef.) Deighton        |
| 18.    | Capsicum annum   | Cercospora capsici Heald & F.A. Wolf                |
| 19.    | Cassia tora      | Passalora occidentalis (Cooke) U. Braun             |
| 20.    | Celtis occidentalis | Sirosporium celtidis (Biv.) M.B. Ellis              |
| 21.    | Clemaits gouriana | Passalora squalidula (Peck) U. Braun               |
| 22.    | Cucumis sativus  | Cercospora citrullina Cooke                         |
| 23.    | Cucurbita moschata | Cercospora citrullina Cooke                       |
| 24.    | Datura metel     | Cercospora daturicola (Speg.) Vasiljevsky           |
| 25.    | Datura stramonium| Cercospora daturicola (Speg.) Vasiljevsky           |
| 26.    | Diospyros kaki   | Pseudocercospora diciantherae (A.K. Kar & M. Mandal) Deighton |
| 27.    | Digitalis purpurea | Cercospora digitalis P.K. Chi & C.K. Pai          |
| 28.    | Dodonaea viscosa | Cercospora mitteriana Syd.                           |
| 29.    | Dolichos biflorus| Cercospora kikuchii (Tak. Matsumoto & Tomoy.) M.W. Gardner; Mycosphaerella cruenta Latham |
| 30.    | Eucalyptus sp.   | Teratosphaeria eucalypti (Cooke & Massse) Crous     |
| 31.    | Flacourtia indica | Cercospora doryalis Chupp & Doidge                  |
| 32.    | Fragaria vesca   | Ramularia narkandensis Deighton                     |
| 33.    | Geranium sp.     | Cercospora gerani Kellerm. & Swingle; Pseudocercospora geranicola U. Braun |
| 34.    | Gerbera sp.      | Cercospora gerberae Chupp & Viégas                  |
| 35.    | Glycine max      | Cercospora kikuchii (Tak. Matsumoto & Tomoy.) M.W. Gardner |
| 36.    | Gossypium sp.    | Ramularia gossypii (Speg.) Cif.                     |
| 37.    | Helianthus annuus| Cercospora helianthicola Chupp & Viégas             |
| 38.    | Hibiscus rosa- sinensis | Pseudocercospora abelmoschii (Ell. & Everh.) Dieghton |
| 39.    | Hydrangea sp.    | Cercospora hydrangeae Ellis & Everh.                |
| 40.    | Impatiens balsamina | Cercospora fukushiana (Matsuura) W. Yamam.          |
| 41.    | Impatiens gigantea| Cercospora fukushiana (Matsuura) W. Yamam.         |
| 42.    | Justicia sp.     | Cercospora justiciicola F.L. Tai                    |
| 43.    | Lathyrus aphaca  | Passalora lathyrus-apahaca (Lall, H.S. Gill & Munjal) U. Braun & Crous |
| 44.    | Lathyrus sativum | Cercospora lygodii lall, J.N. Kapoor & Munjal       |
| 45.    | Melothria heterophylla | Cercospora melothriae Sawada                       |
| 46.    | Momordica charantia | Cercospora citrullina Cooke                        |
| 47.    | Morus alba       | Pseudocercospora mori (Hara) Deighton; Sirosporium mori (Syd. & P. Syd.) M.B. Ellis |
| 48.    | Murraya koenigii  | Pseudocercospora murrayae (A.K. Kar & M. Mandal) Deighton |
| 49.    | Ocimum tenuiflorum| Pseudocercospora ocimicola (Petr. & Cif.) Deighton |
| 50.    | Opisthenema sp.  | Cercospora opisleni Lall, H.S. Gill & Munjal       |
| 51.    | Phaseolus mungo  | Ramularia phaseoli Klotzsch                          |
| 52.    | Phaseolus vulgaris | Ramularia phaseoli Klotzsch                         |
| 53.    | Physalis minima  | Cercospora phalalidicola Ellis & Barthol.            |
| 54.    | Pistacia integrima | Cercospora megaspermae Bhardwaj & Sharma           |
| 55.    | Pisum sativum    | Cercospora pisi-sativi J.A. Stev.                   |
Table 2 Continued.

| Sr. No. | Host Plant          | Cercosporoid fungi                                                                 |
|---------|---------------------|----------------------------------------------------------------------------------|
| 57.     | Platanus orientalis | Pseudocercospora platanigena Videira & Crous                                   |
| 58.     | Plumeria tomentosa  | Pseudocercospora plumeriae (Chupp) Tak. Kobay.                                  |
| 59.     | Polygonum aviculare | Passalora avicularis (G. Winter) Crous                                            |
| 60.     | Polygonum pterocarpum | Ramularia rufomaculans Peck.                                                          |
| 61.     | Polygonum sp.       | Pseudocercospora paludicola (Speg.) U. Braun                                         |
| 62.     | Populus yunnanensis | Mycosphaerella cruenta Latham                                                        |
| 63.     | Prunus armeniaca    | Mycosphaerella pruni-persicae Deighton; Cercospora persicae (Sacc.) Sacc.            |
| 64.     | Prunus domestica    | Stigmina carophylla (Lév.) M.B. Ellis                                              |
| 65.     | Prunus persica      | Cercospora persica Sharma & Paul; Stigmina carpophylla (Lév.) M.B. Ellis; Mycosphaerella cerasella Aderh. |
| 66.     | Punica graminata    | Pseudocercospora punicae (Henn.) Deighton                                           |
| 67.     | Ranunculus laetus   | Ramularia decipiens Ellis & Everh.; Ramularia didyma Unger                        |
| 68.     | Ricinus communis    | Cercospora ricinella Sacc. & Berl.                                                 |
| 69.     | Rosa indica         | Rosisphaerella rosicola (Pass.) U. Braun                                            |
| 70.     | Rumex nepalensis    | Cercospora citrullina Cooke; Ramularia decipiens Ellis & Everh.                    |
| 71.     | Rumex orientalensis | Cercospora citrullina Cooke; Ramularia decipiens Ellis & Everh.                    |
| 72.     | Salix tetrasperma   | Pseudocercospora salicina (Ellis & Everh.) Deighton                                |
| 73.     | Salmalia malabarica | Cercospora bombacicola Munjal, Lall & Chona                                         |
| 74.     | Sesamum indicum     | Cercospora sesami Zimm.                                                            |
| 75.     | Smilax aspera       | Cercospora physalisidis Ellis; Passalora pallidissima (Chupp) U. Braun; Rosisphaerella rosicola (Pass.) U. Braun; Neocercosporidium smilacis (Thüm.) U. Braun, C. Nakash., Videira & Crous |
| 76.     | Smilax sp.          | Pseudocercospora mississippiensis (Tracy & Earle) R.F. Castañeda & U. Braun         |
| 77.     | Solanum melongena   | Cercospora melongena Welles                                                        |
| 78.     | Solanum nigrum      | Cercospora nigri var. microsporae Bhardwaj & Paul; Cercospora solani Thüm.           |
| 79.     | Solanum tuberosum   | Cercospora solani-tuberosi Thirum.; Cercospora solanicola G.F. Atk.; Passalora concors (Casp.) U. Braun & Crous; Distomycellosiella brachycarpa (Syd.) U. Braun, C. Nakash. |
| 80.     | Sonchus oleraceus    | Cercospora sonchi Chupp                                                             |
| 81.     | Syzigium cumini     | Cercospora eugeniae Chupp                                                           |
| 82.     | Tagetes patula      | Cercospora tageticola Ellis & Everh.                                                |
| 83.     | Taraxacum officinale | Ramularia lineola Peck                                                               |
| 84.     | Terminalia chebula  | Stigmina terminalia Munjal & Kulshr.                                                |
| 85.     | Trigonella foenum-graecum | Cercospora traversoana Sacc.                                                          |
| 86.     | Verbascom thapsus   | Ramularia variabilis Fuckel                                                          |
| 87.     | Verbena sp.         | Passalora verbeniphila (Speg.) Crous & U. Braun                                     |
| 88.     | Veronica cinerea    | Pseudocercospora cinerea (Pavgi & U.P. Singh) Deighton                             |
| 89.     | Vigna sinensis      | Cercospora canescens Ellis & G. Martin                                               |
| 90.     | Vigna vexillata     | Cercospora canescens Ellis & G. Martin                                               |
| 91.     | Vigna unguiculata   | Pseudocercospora dolichi (Ellis & Everh.) J.M. Yen                                 |
| 92.     | Viola serpens       | Cercospora violae Sacc.                                                             |
| 93.     | Vitis vinifera      | Pseudocercospora riachueli (Speg.) Deighton                                         |
| 94.     | Withania somnifera  | Pseudocercospora withaniae (Syd. & P. Syd.) Deighton                                |
| 95.     | Woodfordia floribunda | Pseudocercospora sydowiana (Chupp) U. Braun & Crous                                |
| 96.     | Zanthoxylum alatum  | Cercospora oxyphylli Pavgi & U.P. Singh                                              |
| 97.     | Zea mays            | Cercospora sorghi Ellis & Everh.; Cercospora zeae-maydis Tehon & E.Y. Daniels        |
| 98.     | Zinnia elegans      | Cercospora zinniae Ellis & G. Martin                                                |
Table 2 Continued.

| Sr. No. | Host Plant          | Cercosporoid fungi                                                                 |
|---------|---------------------|-----------------------------------------------------------------------------------|
| 99.     | Zizyphus jujube     | Pseudocercospora jujubae (S. Chowdhury) A.Z.M. Khan & Shamsi                      |
| 100.    | Zizyphus oenoplia   | Pseudocercospora jujubae (S. Chowdhury) A.Z.M. Khan & Shamsi                      |

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