



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

Gautam AK¹, Avasthi S², Prasher IB³, Sushma⁴, Verma RK⁵

¹Faculty of Science, School of Agriculture, Abhilashi University, Mandi-175028, India

²School of Studies in Botany, Jwaji University, Gwalior- 474011, India

³Department of Botany, Mycology and Plant Pathology Laboratory, Panjab University Chandigarh -160014, India

⁴Department of Agriculture, Dolphin PG College of science and Agriculture Chunni Kalan, Fatehgarh Sahib, Punjab, 140307, India

⁵Department of Agriculture, Swami Vivekanand Institute of Engineering and Technology, Banur, Punjab 140506, India

Gautam AK, Avasthi S, Prasher IB, Sushma, Verma RK 2020 – Diversity and distribution of cercosporoid fungi in Himachal Pradesh: an annotated checklist. *Studies in Fungi* 5(1), 17–49, Doi 10.5943/sif/5/1/3

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), *Cercosporiella*, *Distomycovellosiella* and *Mycovellosiella*, *Neocercosporidium*, *Neopseudocercosporiella*, *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 Smilacaceae (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) (Świdarska-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, Świdarska-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 *Rosisphaerella* & *Teratosphaeria* (1 each). *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.

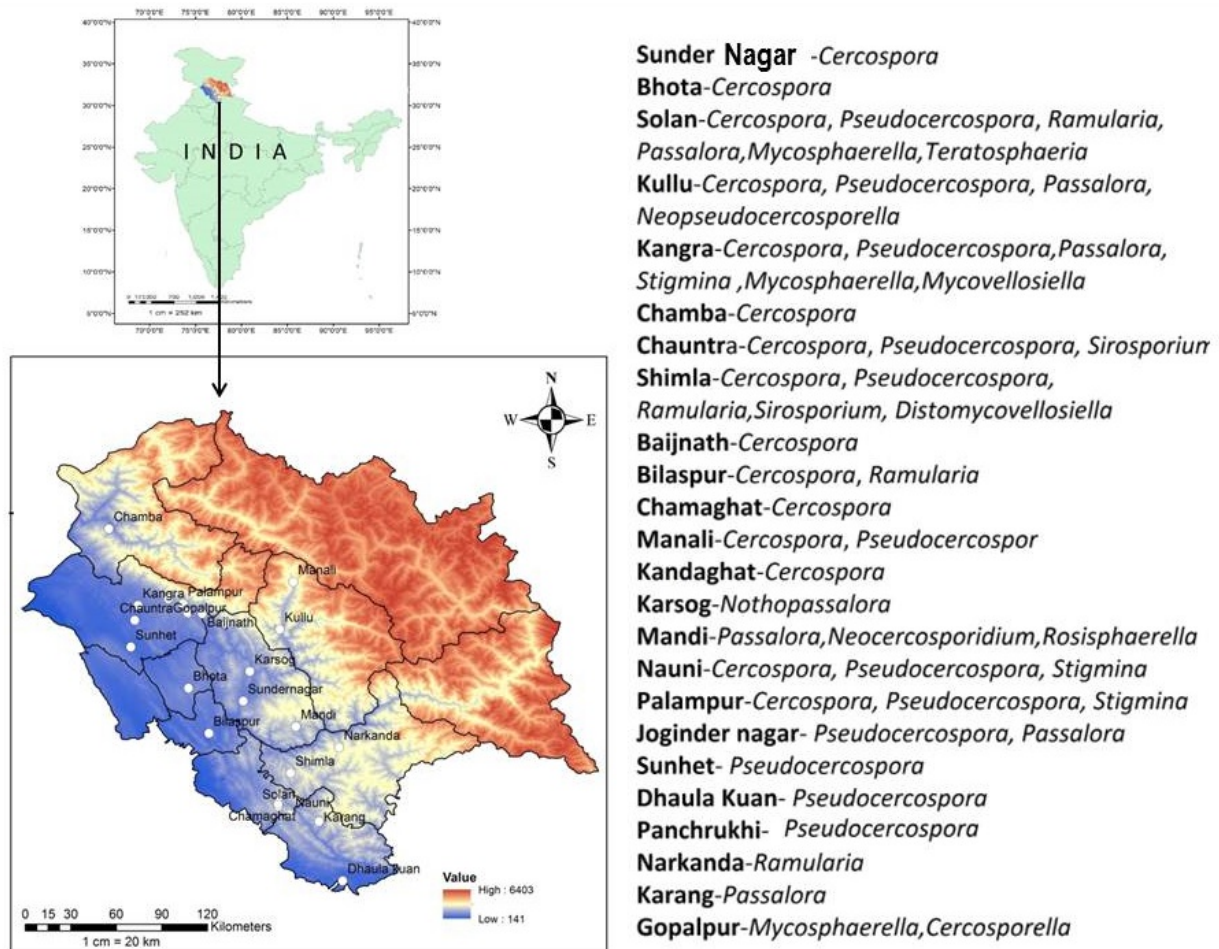


Fig. 1 – Map of Himachal Pradesh showing diversity and distribution of cercosporoid fungi.

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 & Smilacaceae (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 cercosporoid fungi were reported from Solan (53), Kangra (24) followed by Mandi (17), Shimla (11), Kullu (8), Bilaspur & Sirmour (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 is 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	<i>Cercospora</i>	48	46.7
Fabaceae	10	9.44	<i>Pseudocercospora</i>	23	22.4
Asteraceae	06	5.66	<i>Ramularia</i>	09	8.9
Rosaceae	06	5.66	<i>Passalora</i>	06	5.9
Amaranthaceae	05	4.72	<i>Mycosphaerella</i>	04	3.9
Malvaceae	04	3.77	<i>Stigmina</i>	03	2.9
Smilacaceae	04	3.77	<i>Sirosporium</i>	02	1.9
Acanthaceae	03	2.83	<i>Cercosporella</i>	01	0.9
Poaceae	03	2.83	<i>Mycovellosiella</i>	01	0.9
Polygonaceae	03	2.83	<i>Rosisphaerella</i>	01	0.9
Ranunculaceae	03	2.83	<i>Nothopassalora</i>	01	0.9
Salicaceae	03	2.83	<i>Teratosphaeria</i>	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]

= *Virgatorium* 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, septate 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 apii* 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: Bhota (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)

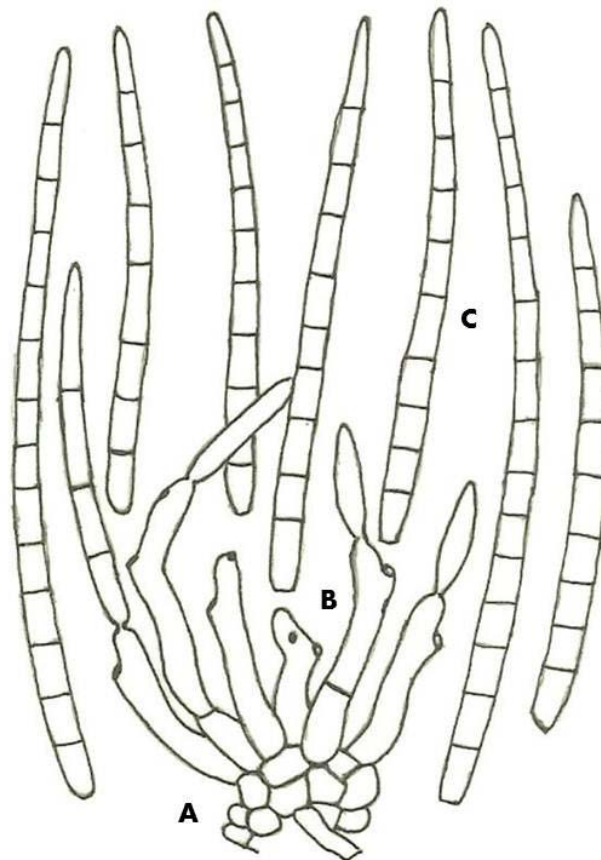


Fig. 2 – *Cercospora apii*. A Conidiophore fascicles. B Conidiophores. C Conidia. (Seifert et al. 2011)

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 *Salmaalial malabarica* (DC.) Schott & Endl. (Malvaceae).

Location: Chamba (Chamba), H.P.

Literature: (Munjal et al. 1960)

Cercospora brachiate 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 (Speg.) 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 dianthi 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 *Syzygium 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 geranii*** 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 *Oplismenus* 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-Ostafrika: 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: JoginderNagar (Mandi) H.P.

Literature: (Singh et al. 1999)

Cercospora zae-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 distinguished 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). *Cercospora* species with secondary mycelium are placed in a separate subgenus namely; 1. *Cercospora* subgen. *Cercospora*: Mycelium internal, secondary mycelium lacking. Conidiophors fasciculate, rarely solitary, emerging through stromata, rarely erupt through cuticle.

2. *Cercospora* 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 *Cercospora* (Index Fungorum 2019 accessed on 06.12.2019) nearly on all plant families.

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

Cercospora persicae (Sacc.) Sacc., *Michelia* 2 (6): 20 (1880)

Host: Leaves of *Prunus armeniaca* (Rosaceae)

Location: Gopalpur (Kangra), H.P.,

Literature: (Sohi et al. 1964)

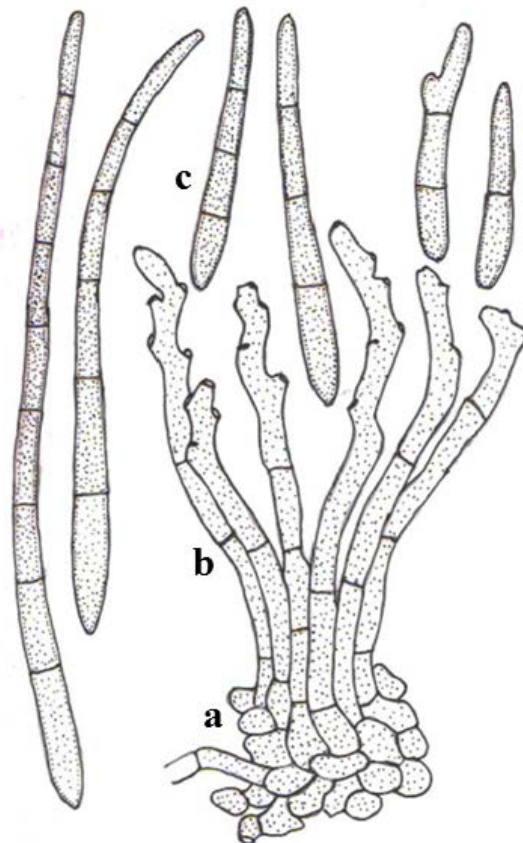


Fig. 3 – *Cercospora virgaureae*. A Conidiophore fascicles. B Conidiophores. C Conidia. (Seifert et al. 2011)

Distomycovellosiella U. Braun, C. Nakash., Videira & Crous, *Studies in Mycology* 87: 330 (2017)

Description & Illustration

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., Anns 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)

= *Cercospora jaguarensis* Chupp & A.S. Mull., Bol. Soc. Venez. Ci. Nat., 8:48. 1942.

= *Cladosporium solanicola* Viegas, Bragantia 6: 368. 1946.

= *Mycovellosiella solanicola* (Viegas) Munt-Cvetk. Lilloa 30: 178. 1960.

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-sinuuous, 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 circumscissa* Sacc., Fungi venet. nov. vel. Crit., Sér. 5: 189 (1878)

= *Cercospora cerasella* (Sacc.) Jacz., Yearbook of Information Concerning Diseases and Injuries of Cultivated and Wild Economic Plants: [1] (1903)

= *Passalora circumscissa* (Sacc.) U. Braun [as 'circumscissa'], Mycotaxon 55: 230 (1995)

= *Pseudocercospora circumscissa* (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)

Location: Solan (Solan) H.P.

Literature: (Paul & Sharma 1999)

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)

= *Cercosporiella 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)

Fig. 4

= *Walkeromyces* Thaug, 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, amerosporous to scolecosporeous, 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)

= *Cercosporidium bellynckii* (Westend.) X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 1(2): 93 (1982)

= *Cladosporium 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)

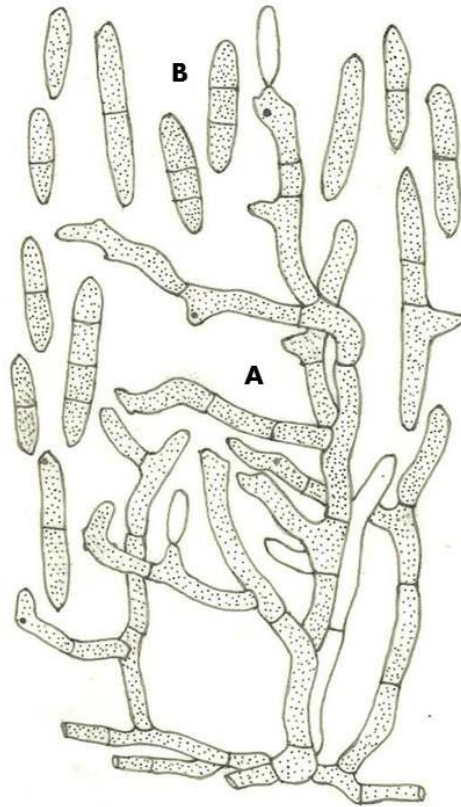


Fig. 4 – *Mycovellosiella cajani*. A Conidiophore. B Conidia. (Seifert et al. 2011)

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)

Neopseudocercospora Videira & Crous, Studies in Mycology 83: 80 (2016)

Description & Illustration

Neopseudocercospora 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 multiseptate, emeries singly or in groups through cuticle or stomata. 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: *Neopseudocercospora capsellae* (Ellis & Everh.) Videira & Crous 2016

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

≡ *Cylindrosporium 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)

≡ *Pseudocercospora 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)

= *Cercospora brassicae* (Fautrey & Roum.) Höhn., Annls mycol. 22(1/2): 193 (1924)

= *Cercospora brassicae* (Fautrey & Roum.) Chupp, in Weiss, U.S. Dept. Agric. Handb. 165: 99 (1960)

= *Cercospora albomaculans* (Ellis & Everh.) Sacc., Syll. fung. (Abellini) 11: 606 (1895)

= *Ramularia rapae* Pim, J. Bot., Lond. 35: 58 (1897)

= *Cercospora rapistri* Hollós, Annls hist.-nat. Mus. natn. hung. 6: 536 (1908)

= *Cylindrosporium nesliae* Bubák, Annls mycol. 14(5): 346 (1916)

= *Cercospora brassicae* Jaap, Verh. bot. Ver. Prov. Brandenb. 64: 59 (1922)

= *Cercospora 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)

= *Cercospora nesliae* Dearn. & Bisby, in Bisby, Buller & Dearness, Fungi of Manitoba and Saskatchewan: 125 (1929)

= *Cercospora conringiae* Annal., Nov. sist. Niz. Rast. 9: 195 (1972)

= *Cercospora goldbachiae* Annal., Nov. sist. Niz. Rast. 9: 196 (1972)

= *Cercospora malcolmiae* Annal., Nov. sist. Niz. Rast. 9: 202 (1972)

= *Cercospora 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, multiseptate, emerging from from stromata, through stomata. Conidia pale brown to olivaceous, smooth, thin-walled, cylindrical to long-obclavate, straight or gently curved, multiseptate 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 speies 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) Fig. 5
 = *Berteromyces* Cif., Sydowia 8(1-6): 267 (1954)
 = *Cercodeuterospora* 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., São Paulo 16: 151 (1915)

Description & Illustration

The genus *Passalora* described by Fries in 1849 was the first genus introduced for cercosporoid hyphomycetes. The fungal species included in this genus are foliicolous, 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 pluriseptate, 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)

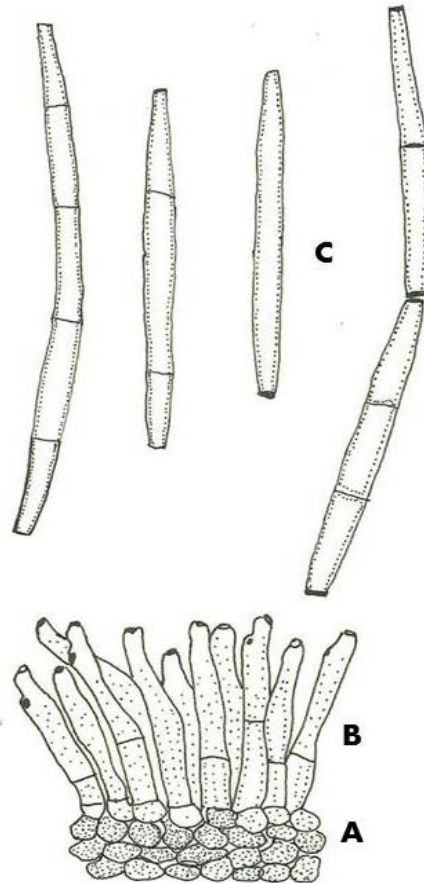


Fig. 5 – *Passalora myracrodruonis*. A Conidiophore fascicles. B Conidiophores. C Conidia. (Inácio & Dianese 1999)

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, Schlechtendalia 5: 70 (2000)

= *Cercospora occidentalis* Cooke, Hedwigia 17: 39 (1878)

= *Ramularia cassiicola* Heald & F.A. Wolf [as 'cassiaeicola'], 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. (Smilacaceae)

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, transversely septate, rarely with single or few oblique septa, hilum 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: (Munjil & 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 geranii* 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.

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

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. (Smilacaceae)

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

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

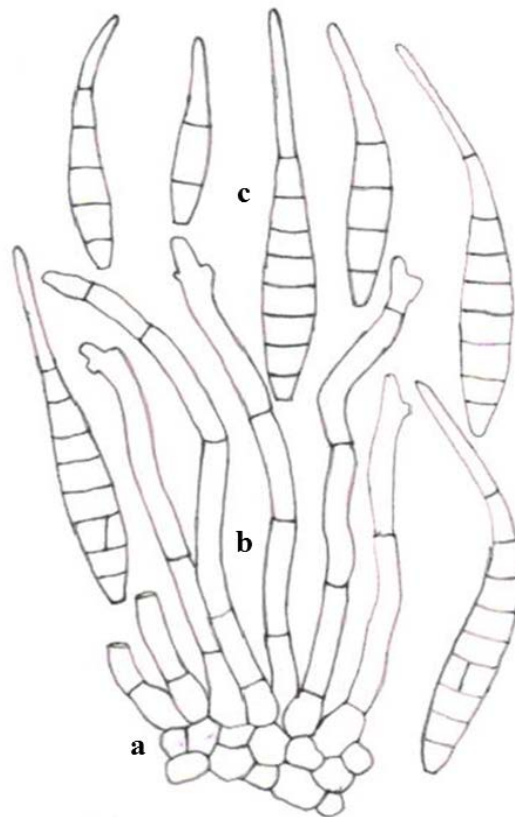


Fig. 6 – *Pseudocercospora vitis*. A Conidiophore fascicles. B Conidiophores. C Conidia. (Seifert et al. 2011)

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)

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)

Pseudocercospora ocimicola (Petr. & Cif.) Deighton, Mycol. Pap. 140: 149 (1976)

= *Cercospora ocimicola* Petr. & Cif., Anns 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., Anns 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. Cercospora, 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. Cercospora, 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: (Munjaj & 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: (Munjaj & 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. Schröt. [as 'Cylindrospora'], in Cohn, Krypt.-Fl. Schlesien (Breslau) 3.2(4): 490 (1897) [1908]

= *Entylomella variabilis* (Fuckel) Cif., Annlis 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: (Munjaj & Sharma 1976, Paul & Sharma 1999)

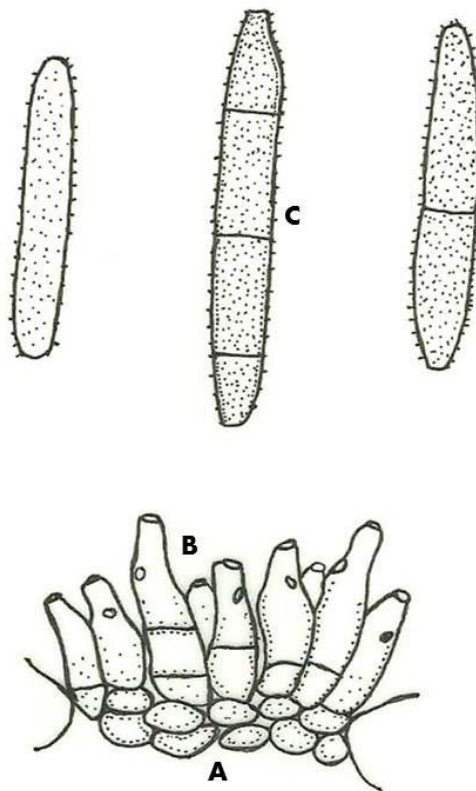


Fig. 7 – *Ramularia didyma*. A Conidiophore fascicles. B Conidiophore tips. C Conidia. (Braun 1998)

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 intyernal 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 synnematos, 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 bears 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, onle one record of type speies 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, rugose or verrucose. There are about 34 epithets reported worldwide in the genus *Sirosporium* (Index Fungorum 2019 accessed on 06.12.2019).

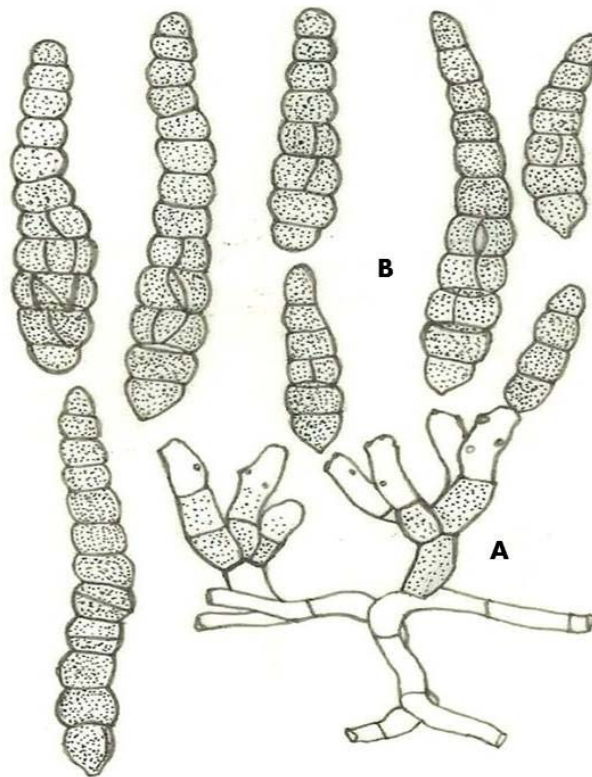


Fig. 8 – *Sirosporium antenniformae*. A Conidiophores. B Conidia. (Seifert et al. 2011)

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)

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: Naudi (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 diseases 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 fasciculate, 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 worldwide for this genus (Index Fungorum 2019 accessed on 06.12.2019).

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

Teratosphaeria eucalypti (Cooke & Masee) Crous, *Persoonia* 23: 115 (2009)

= *Pseudocercospora eucalypti* (Cooke & Masee) Y.L. Guo & X.J. Liu, *Mycosystema* 2: 234 (1989)

= *Kirramyces eucalypti* (Cooke & Masee) J. Walker, B. Sutton & Pascoe, *Mycol. Res.* 96(11): 920 (1992)

= *Phaeophleospora eucalypti* (Cooke & Masee) 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):

285 (1988)

= *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 (Solan) H.P.

Literature: (Paul & Sharma 1999)

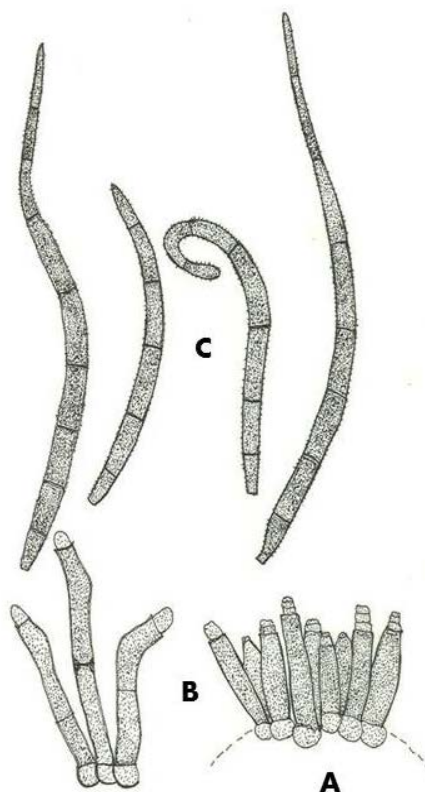


Fig. 9 – *Stigmina curvispora*. A Conidiophore fascicles. B Conidiophores. C Conidia. (Braun et al 2016)

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.	<i>Abelmoschus esculentus</i>	<i>Pseudocercospora abelmoschi</i> (Ell. & Everh.) Dieghton
2.	<i>Achyranthes aspera</i>	<i>Cercospora achyranthina</i> Thirum. & Chupp.
3.	<i>Adhatoda vasica</i>	<i>Cercospora adhatodae</i> S. Chowdhury
4.	<i>Ageratina adenophora</i>	<i>Pseudocercospora eupatoriicola</i> (Govindu & Thirum.) A.Z.M. Khan & Shamsi
5.	<i>Albizia lebbek</i>	<i>Cercospora albiziae</i> A.K. Kar & M. Mandal
6.	<i>Allium tuberosum</i>	<i>Cercospora duddiae</i> Welles
7.	<i>Althea rosea</i>	<i>Cercospora nebulosi</i> Sacc.
8.	<i>Amaranthus</i> sp.	<i>Cercospora brachiata</i> Ellis & Everh.
9.	<i>Arachis hypogaea</i>	<i>Cercospora arachidicola</i> Hori; <i>Nothopassalora personata</i> (Berk. & M.A. Curtis) U. Braun

Table 2 Continued.

Sr. No.	Host Plant	Cercosporoid fungi
10.	<i>Ardisia solanacea</i>	<i>Stigmia ardisiae</i> Munjal & Kulshr.
11.	<i>Asparagus officinalis</i>	<i>Cercospora asparagi</i> Sacc.
12.	<i>Azadirachta indica</i>	<i>Cercospora leucosticta</i> Ellis & Everh.; <i>Pseudocercospora subsessilis</i> (Syd. & P. Syd.) Deighton
13.	<i>Beta cicla</i>	<i>Mycovellosiella bellynckii</i> (Westend.) Constant.
14.	<i>Beta vulgaris</i> L. var. <i>mangel</i>	<i>Cercospora beticola</i> Sacc
15.	<i>Brassica rapa</i>	<i>Neopseudocercospora capsellae</i> (Ellis & Everh.) Videira & Crous
16.	<i>Buddleia</i> sp.	<i>Pseudocercospora blumeae</i> (Thüm.) Deighton; <i>Pseudocercospora buddlejae</i> (W. Yamam.) Goh & W.H. Hsieh
17.	<i>Cannabis sativa</i>	<i>Pseudocercospora cannabina</i> (Wakef.) Deighton
18.	<i>Capsicum annuum</i>	<i>Cercospora capsici</i> Heald & F.A. Wolf
19.	<i>Cassia tora</i>	<i>Passalora occidentalis</i> (Cooke) U. Braun
20.	<i>Celtis occidentalis</i>	<i>Sirosporium celtidis</i> (Biv.) M.B. Ellis
21.	<i>Clematis gouriana</i>	<i>Passalora squalidula</i> (Peck) U. Braun
22.	<i>Cucumis sativus</i>	<i>Cercospora citrullina</i> Cooke
23.	<i>Cucurbita moschata</i>	<i>Cercospora citrullina</i> Cooke
24.	<i>Datura metel</i>	<i>Cercospora daturicola</i> (Speg.) Vassiljevsky
25.	<i>Datura stramonium</i>	<i>Cercospora daturicola</i> (Speg.) Vassiljevsky
26.	<i>Dianthus caryophyllus</i>	<i>Pseudocercospora diclipterae</i> (A.K. Kar & M. Mandal) Deighton
27.	<i>Dicliptera roxburghiana</i>	<i>Cercospora dianthi</i> A.S. Mull. & Chupp
28.	<i>Digitalis purpurea</i>	<i>Cercospora digitalis</i> P.K. Chi & C.K. Pai
29.	<i>Dodonaea viscosa</i>	<i>Cercospora mitteriana</i> Syd.
30.	<i>Dolichos biflorus</i>	<i>Cercospora kikuchii</i> (Tak. Matsumoto & Tomoy.) M.W. Gardner; <i>Mycosphaerella cruenta</i> Latham
31.	<i>Eucalyptus</i> sp.	<i>Teratosphaeria eucalypti</i> (Cooke & Masee) Crous
32.	<i>Flacourtia indica</i>	<i>Cercospora doryalidis</i> Chupp & Doidge
33.	<i>Fragaria vesca</i>	<i>Ramularia narkandensis</i> Deighton
34.	<i>Geranium</i> sp.	<i>Cercospora geranii</i> Kellerm. & Swingle; <i>Pseudocercospora geraniicola</i> U. Braun
35.	<i>Gerbera</i> sp.	<i>Cercospora gerberae</i> Chupp & Viégas
36.	<i>Glycine max</i>	<i>Cercospora kikuchii</i> (Tak. Matsumoto & Tomoy.) M.W. Gardner
37.	<i>Gossypium</i> sp.	<i>Ramularia gossypii</i> (Speg.) Cif.
38.	<i>Helianthus annuus</i>	<i>Cercospora helianthicola</i> Chupp & Viégas
39.	<i>Hibiscus rosa-sinensis</i>	<i>Pseudocercospora abelmoschi</i> (Ell. & Everh.) Dieghton
40.	<i>Hydrangea</i> sp.	<i>Cercospora hydrangeae</i> Ellis & Everh.
41.	<i>Impatiens balsamina</i>	<i>Cercospora fukushiana</i> (Matsuura) W. Yamam.
42.	<i>Impatiens gigantea</i>	<i>Cercospora fukushiana</i> (Matsuura) W. Yamam.
43.	<i>Justicia</i> sp.	<i>Cercospora justiciicola</i> F.L. Tai
44.	<i>Lathyrus aphaca</i>	<i>Passalora lathyr-aphacae</i> (Lall, H.S. Gill & Munjal) U. Braun & Crous
45.	<i>Lygodium japonicum</i>	<i>Cercospora lygodiicola</i> Lall, J.N. Kapoor & Munjal
46.	<i>Melothria heterophylla</i>	<i>Cercospora melothriae</i> Sawada
47.	<i>Momordica charantia</i>	<i>Cercospora citrullina</i> Cooke
48.	<i>Morus alba</i>	<i>Pseudocercospora mori</i> (Hara) Deighton; <i>Sirosporium mori</i> (Syd. & P. Syd.) M.B. Ellis
49.	<i>Murraya koenigii</i>	<i>Pseudocercospora murrayae</i> (A.K. Kar & M. Mandal) Deighton
50.	<i>Ocimum tenuiflorum</i>	<i>Pseudocercospora ocimicola</i> (Petr. & Cif.) Deighton
51.	<i>Oplismenus</i> sp.	<i>Cercospora oplismeni</i> Lall, H.S. Gill & Munjal
52.	<i>Phaseolus mungo</i>	<i>Ramularia phaseoli</i> Klotzsch
53.	<i>Phaseolus vulgaris</i>	<i>Ramularia phaseoli</i> Klotzsch
54.	<i>Physalis minima</i>	<i>Cercospora physalidicola</i> Ellis & Barthol.
55.	<i>Pistacia integririma</i>	<i>Cercospora megaspermae</i> Bhardwaj & Sharma
56.	<i>Pisum sativum</i>	<i>Cercospora pisi-sativi</i> J.A. Stev.

Table 2 Continued.

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

Table 2 Continued.

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

Acknowledgements

Authors are grateful to their respective organizations for providing the necessary laboratory facilities and valuable support during the study. We thank the anonymous reviewers for their critical comments and suggestions.

References

- Agrios GN. 1997 – Plant Pathology 4th ed., Academic Press, San Diego, CA. 635 pp.
- Ahanger RA, Bhat HA, Bhat TA, Ganie SA et al. 2013 – Impact of Climate Change on Plant Diseases. *International Journal of Modern Plant & Animal Sciences* 1, 105–115.
- Bakhshi M, Arzanlou M, Babai-Ahari A. 2012 – Comprehensive check list of Cercosporoid fungi from Iran. *Plant Pathology & Quarantine* 2, 44–55
- Bakhshi M. 2019 – Epitypification of *Cercospora rautensis*, the causal agent of leaf spot disease on *Securigera varia*, and its first report from Iran. *Fungal Systematics and Evolution* 3, 157–163.
- Bakshi BK, Reddy MAR, Singh B. 1970 – An unrecorded decay in living deodar. *Indian Forester* 96: 72–74.
- Bhardwaj LN, Paul YS. 1986 – Pathological problems of Siris. (*Albizia lebbek* Benth.) in Himachal Pradesh. In: National Symposium on Researches in Social Forestry for Rural Development. New Delhi, 1-2 January 1986, p. 18–19 (Abst.).
- Bhardwaj LN, Paul YS. 1987 – *Cercospora nigri* Tharp Var. *Microspora* Var. Nov. Causing Leaf Spot of *Solanum nigrum* L. *Indian Forester* 113, 509–510.
- Bhardwaj LN, Sharma RC. 1994 – Some new fungal diseases of *Pistacia integerrima* from Himachal Pradesh. *Indian Forester* 120, 545–547.
- Braun U. 1995 – A monograph of *Cercospora*, *Ramularia* and allied genera (Phytopathogenic Hyphomycetes), Vol. 1. Eching bei Munchen: IHW Verlag.
- Braun U. 1998 – A monograph of *Cercospora*, *Ramularia* and allied genera (Phytopathogenic Hyphomycetes), Vol. 2. Eching bei Munchen: IHW Verlag.
- Braun U, Crous PW, Nakashima C. 2016 – Cercosporoid fungi (Mycosphaerellaceae) 5. Species on dicots (Anacardiaceae to Annonaceae). *IMA Fungus* 7, 161–216.
- Braun U, Crous PW. 2016 – (2415) Proposal to conserve the name *Cercospora* (Ascomycota: Mycosphaerellaceae) with a conserved type. *Taxon* 65(1), 185.
- Braun U, Nakashima C, Crous PW. 2013 – Cercosporoid fungi (*Mycosphaerellaceae*) 1. Species on other fungi, *Pteridophyta* and *Gymnospermae*. *IMA Fungus* 4, 265–345.
- Chakraborty S, Murray GM, Magarey PA, Yonow T et al. 1998 – Potential impact of climate change on plant diseases of economic significance to Australia. *Australian Plant Pathology* 27, 15–35.
- Chandel SS. 1998 – Hitherto unrecorded diseases of carnation from Himachal Pradesh. *Indian Journal of Plant Pathology* 16, 70–71.
- Chona BL, Lall G, Munjal RL. 1959 – Some *Cercospora* species from India-1. *Indian Phytopathology* 12, 76–84.
- Coakley SM, Scherm H, Chakraborty S. 1999 – Climate change and plant disease management. *Annual Review of Phytopathology* 37, 399–426
- Crous PW, Aptroot A, Kang J, Braun U, Wingfield MJ. 2000 – The genus *Mycosphaerella* and its anamorphs. *SIIDies in Mycology* 45, 107–121.

- Crous PW, Braun U. 2003 – *Mycosphaerella* and its Anamorphs, 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series 1. Utrecht, Netherland.
- Deighton PC. 1973 – *Ramularia narkandensis* sp. nov. on *Fragaria* in India. Transactions of British Mycological Society 60, 162–164.
- Dhancholia S, Singh S. 1992 – Outbreak of *Cercospora abelmoschi* Ell & Ev. in Himachal Pradesh. Himachal Journal of Agricultural Research 18, 60.
- Fries EM. 1849. Summa vegetabilium Scandinaviae. Sectio Posterior. Stockholm: A. Bonnier
- Gangopadhyay S, Kapoor KS. 1976 – A new leaf spot disease of *Brassica rapa* in Kullu valley. Science & Culture 42, 619–620.
- Inácio CA, Dianese JC. 1999 – A new *Mycovellosiella* species on *Myracrodruon urunduva*. Mycotaxon 72, 253–263.
- Kamal. 2010 – Cercosporoid fungi of India. Bishen Singh Mahendra Pal Singh, Dehradun, India.
- Lall G, Gill HS, Munjal RL. 1961 – Some *Cercospora* spp. from India-V. Indian Phytopathology 14, 115–119.
- Lall G, Gill HS, Munjal RL. 1962 – Some *Cercospora* spp. from India-VIII. Indian Phytopathol. 15:243-245.
- Lall G, Kapoor JN, Munjal RL. 1963 – A new leaf spot disease of maize in India. Indian Phytopathology 16, 240–241.
- Lall G, Kapoor JN, Munjal RL. 1964 – Some fern inhabiting *Cercospora* spp. from India. Indian Phytopathology 17, 181–183.
- Munjal RL, Kulshreshtha DD. 1968 – Some dematiaceous hyphomycetes from India-V. *Stigmins* sp. Indian Phytopathology 21, 309–314.
- Munjal RL, Seth KK. 1966 – *Cercospora* sp. causing leaf spot of grapes in India. Indian Phytopathology 19, 209–213.
- Munjal RL, Sharma AD. 1976 – Additions to mycoflora of Himachal Pradesh-I. Himachal Journal of Agricultural Research 4, 87–91.
- Munjal RL, Lall G, Chona BL. 1960 – Some *Cercospora* species from India-IV. Indian Phytopathology 13, 144–149.
- Munjal RL, Sharma AD. 1975 – Mycoflora of conifer seeds. Indian Journal of Mycology and Plant Pathology 5, 145–148.
- Padwick GW. 1946 – Notes on Indian Fungi-III. Mycological Papers. Imperial Mycological Institute 17, 12.
- Paul YS, Bhardwaj LN. 1986a – *Cucurbitaria berberidis* on *Berberis lycium*. Indian Phytopathology 39, 320.
- Paul YS, Bhardwaj LN. 1986b – Additions to fungi of Himachal Pradesh III. Himachal Journal of Agricultural Research 12, 150–153.
- Paul YS, Sharma RC. 1999 – Commonly occurring fungi of Himachal Pradesh without mycological records. Dr. YS Pamnar Univ. of Hort. & Fty. Solan. 10 pp.
- Paul YS, Singh BM. 1986 – Additions to fungi of India. Indian Phytopathology 39(2): 317.
- Paul YS, Bhardwaj LN, Sharma RC. 1990 – Additions to fungi of Himachal Pradesh – III (Hyphomycetes). Indian Journal of Plant Pathology 20, 196–199.
- Paul YS. 1989 – Seed borne mycoflora of soybean and its control in Himachal Pradesh. Indian Journal of Mycology and Plant Pathology 19, 253–257.
- Paul YS, Sugha SK, Pal J. 1985a – Fungi new to Himachal Pradesh – II. Mycological Herbarium specimens, Deptt. of Mycol. & Plant Pathol. Dr. YSP UHF, Solan 3 pp.
- Paul YS, Aganvala RK, Sharma RC. 1985b – Additions to fungi of Himachal Pradesh Hypomycetes I. Mycological Herbarium specimens, Deptt. Mycol. & Plant Pathol. Dr. YSP UHF. Solan, 4 pp.
- Paul YS, Aganvala RK, Sharma RC. 1985c – Additions to fungi of Himachal Pradesh Hypomycetes II. Mycological Herbarium specimens, Deptt. Mycol. & Plant Pathol. Dr. YSP UHF. Solan, 4 pp.

- Paul YS, Sharnia RC, Bhardwaj LN. 1986 – Additions to fungi of Himachal Pradesh - Hyphomycetes 111 Mycological Herbarium specimens. Deptt. of Mycol[^] & Plant Pathol. Dr. YSP UHF. Solan, 3 pp.
- Phengsintham P, Chukeatirote E, McKenzie EHC, Hyde KD, Braun U. 2013 – Monograph of Cercosporoid fungi from Laos. *Current Research in Environmental & Applied Mycology* 3, 34–158.
- Philip T, Govindaiah, Saramangala HS. 1994b – Two new host records in mulberry. *Indian Phytopathology* 47, 214.
- Philip T, Janardhan L, Govindaiah, Bajaj Ak. 1994a – Black leaf spot disease of mulberry- first report. *Indian Journal of Sericulture* 33, 186–187.
- Prakasam V. 1991 – Red leaf spot of cinnamon in lower pulney hills of Tamil Nadu. *Indian Cocoa, Aracnut, and Spices Journal* 14, 123.
- Rai RP. 1983 – *Cercospora solanicola* as a cause of tuber rot of potato in storage. *Indian Phytopathology* 36, 390–392.
- Roy AK. 1965 – Additions to fungal flora of Assam-I. *Indian Phytopathology* 18, 327–334.
- Saharan GS. 1979 – Seed borne mycoflora of horse gram (*Dolichos biflorus* L.). *Indian Phytopathology* 32, 138–140.
- Seifert K, Morgan-Jones G, Gams W, Kendrick B. 2011 – The Genera of Hyphomycetes. CBS-KNAW Fungal Biodiversity Centre, The Netherlands.
- Sharma RC, Paul YS. 1986 – New diseases of peach (*Prunus persica* L.) from India. *Indian Journal of Plant Pathology* 4, 182.
- Sharma AD. 1977 – Two new diseases of *Dolichos biflorus* in India. *Indian Journal of Plant Pathology* 7, 170.
- Singh A, Paul YS, Dhancholia S. 1999 – Additions to fungi of Himachal Pradesh. National Symposium on Plant Disease Scenarios under changing Agroecosystems. HPKV Palampur, October 29–30, 1999.
- Sivanesan A. 1984 – The Bitunicate Ascomycetes and their anamorphs. Lubrecht & Cramer Ltd., Liechtenstein, pp182
- Sohi HS, Gupta GK. 1966 – Additions to the fungi of Himachal Pradesh. *Indian Phytopathology* 19, 230–231.
- Sohi HS, Jain SS, Sharma SL, Verma BR. 1964 – New records of plant disease from Himachal Pradesh. *Indian Phytopathology* 17, 42–45.
- Sohi HS, Sharma SL, Verma BR, Sachdev KB. 1965 – Leaf spot of bean caused by *Ramularia phaseolus* Petrak. *Indian Phytopathology* 18, 165.
- Świdorska-Burek U. 2015 – Cercosporoid fungi of Poland. Wrocław: Polish Botanical Society. *Monographiae Botanicae* 105, 1–164.
- Sydow H, Butler EJ. 1907 – Fungi Indiane Orientalis Pars-I. *Annals of Mycology* 424–445
- Sydow H, Mcrae W. 1929 – Hyphomycetes Indiae orientalis. *Annales de Cryptogamie Exotique* 2, 262–271.
- Sydow H, Sydow P. 1912 – Beschreibungen neuer südafrikanischer Pilze. *Annales Mycologici* 10, 33–45.
- Videira SIR, Groenewald JZ, Braun U, Shin HD, Crous PW. 2016 – All that glitters is not *Ramularia*. *Studies in Mycology* 83, 49–163.
- Videira SIR, Groenewald JZ, Nakashima C, Braun U et al. 2017 – Mycosphaerellaceae – Chaos or clarity? *Studies in Mycology* 87, 257–421.