

Diseases of Fibre Crops in India ¹⁾

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Summary. The paper briefly reviews the work carried out in India on various diseases of some important fibre-crops so far. Majority of them including the wide-spread and destructive ones are caused by fungi. Next to these rank the diseases due to bacteria, viruses, nutritional disorders and nematodes.

Introduction

Plant fibres have been used by man for several thousand years. Among the fibre crops of economic importance that are mostly cultivated to-day, are: cotton (*Gossypium* spp.) and jute (*Corchorus capsularis* and *C. olitorius*). Besides these, the other fibre crops of lesser importance are: Sannhemp (*Crotalaria juncea*), Mesta (*Hibiscus cannabinus*), Roselle-hemp (*Hibiscus sabdariffa*) and Avage (*Agave* spp.).

Economic Importance

Cotton (*Gossypium* spp.): Cotton is the most important and widely grown fibre crop cultivated throughout India and is the main source for production of finest textiles. It is also a good cash crop.

Jute (*Corchorus* spp.): The cultivation of jute is concentrated in Assam, Bihar, Orissa, Travancore, Tripura, and West Bengal. Jute is used primarily for making coarse woven fabrics (bags and sackings, ropes, twines etc.) required for containers to store or transport large varieties of commodities.

Sann-hemp or Bombay-hemp (*Crotalaria juncea* L.): It is commonly cultivated in India for its fibre (hemp of commerce) and also for green manure. The plant yields very strong fibre used for various kinds of cordage, ropes, twines etc. and also coarse sheets, tents, screens and fishing nets. Sann-hemp fibre is much stronger than jute fibre and stands water well. It is used for making strong paper. It is cultivated on a large scale in Uttar Pradesh, Bihar and Central India. Elsewhere it is cultivated primarily for green manuring.

Mesta (*Hibiscus cannabinus* L.): This plant is cultivated mainly for fibre in the drier tracts of Deccan (comprising Andhra Pradesh, Mysore & Maharashtra), Madhya Pradesh and Bihar. The young

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tender leaves are delicious and are used as vegetable in some regions. The fibre obtained is of commercial value suitable for making ropes, fishing nets and cordage. The plant cuttings are employed in paper manufacture.

Shoe flower or Jaswand (*Hibiscus rosa-sinensis* L.): The bark yields a good fibre.

Roselle hemp (*Hibiscus sabdariffa* L.): It is cultivated in Bihar, Assam, Madras and Andhra Pradesh. Rosella fibre is strong and is employed in the preparation of gunnies, cordage, rope, fishing nets and generally for all purposes for which jute is used. Bags made of roselle fibre are extensively employed in Java for packing sugar. The stalks left over after fibre extraction are used as fuel.

Okra or Bhindi (*Abelmoschus esculentus* L.): The bast of this plant yields a strong useful fibre of a white colour, long and silky. The plant is largely grown for its fruit which is used as a vegetable throughout India.

Silk cotton (*Bombax ceiba* L.): The "silk cotton" tree is indigenous to Gujarat, Kinkan and sub-Himalayan tracts and is often cultivated. The inner bark of the tree yields a good fibre suitable for cordage. The seeds yield so called red silk cotton or Smul cotton. The fibre though strong is too short and soft to be spun; it is largely used for stuffing pillows, cushions etc. Mixed with tree cotton it imparts a silky gloss to the fabrics.

Sisal or Agave (*Agave* spp.): The leaves of Agave yield a valuable coarse fibre. They are also planted along railway embankments and road-sides, and are suitable for hedging and fencing. They may also be planted to check soil erosion. Agave fibre is one of the important hard fibres, which are used in the manufacture of ropes, cordage, twines etc.

Ramie (*Boehmeria nivea* HOOK & ARN.): It is cultivated in some parts of India. In Bengal, it is a garden crop and in Assam it is grown as a regular crop. The fibre is regarded as the longest, toughest and most silky of all vegetable fibres. It has great strength and durability and is highly resistant to the action of water.

Hemp fibre or Bhang (*Cannabis sativa* L.): It is a tall erect annual herb, strongly smelling. The fibre is extracted from the stalks either by water-wetting or dew-wetting. The fibre is strong, lustrous and durable. In India, the cultivation of this plant is permitted in the districts of Almora, Garhwal and Nainital in the Uttar Pradesh for its fibre and not for the production of hemp drugs (i. e. Bhang or Ganja). The plant is also wild in the Himalayas.

Diseases

Several diseases caused by fungi, bacteria, viruses and deficiency or nutritional disorders have been reported on such fibre-crops and a

Table showing different diseases, their causal organisms and distribution etc. of fibre-crops in India

| Name of the Disease | Causal organism | Distribution and Remarks |
|--|--|---|
| 1 | 2 | 3 |
| <i>Agave americana</i> L. (Century plant, American aloe), F. Amaryllidaceae) | | |
| Leaf spot | <i>Alternaria tenuis</i> auct. | Reported from Calcutta (1969) by MUKHERJI, S. & S. K. Minor. |
| Leaf spot | <i>Ascochyta</i> sp. | Reported from Pusa, Bihar |
| Leaf rot | <i>Botryosphaeria agaves</i> (P. HENN.) BUTLER | Reported from Bilikere (Mysore) |
| Leaf spot | <i>Coniothyria agaves</i> (DUR. & MONT.) PETRAK & SYDOW | Reported from Dehra Dun (U. P.). |
| Leaf rot | <i>Cucurbitaria agaves</i> SYD. & BUTLER | Rare |
| Leaf spot | <i>Diplodia</i> sp. | Report from Shillong (Assam), Pusa (Bihar). |
| Leaf spot | <i>Microdiplodia agaves</i> (NIESSL) TASSI | Report from Allahabad, U. P. |
| Leaf spot | <i>Pleospora bataanensis</i> PETRAK | Described from Allahabad (CHANDRA & TANDON, 1965). |
| Saprophyte | <i>Sirodesmium indica</i> CHANDRA & TANDON | First recorded by PONNAPPA, (1970) from Mysore. |
| Leaf spot | <i>Fusariella concinna</i> (SYD.) HUGHES | From Purandhar (Poona), MHASKAR (1974). |
| Saprophyte | <i>Rosellinia macrospora</i> MHASKAR & RAO | |
| <i>Agave longifolia</i> auct. | | |
| Anthracnose | <i>Colletotrichum agaves</i> CAV. | General Distribution |
| <i>Agave sisalana</i> (= <i>Agave rigida</i> Mill. var. <i>sisalana</i> ENGELM.) | | |
| Anthracnose | <i>Colletotrichum agaves</i> CAV. | On living leaves, reported from Assam, Bengal and Kanpur (U. P.). |
| Root-rot | <i>Hormiscium lechlerianum</i> SACC. | Wilting in nursery, Barrackpore, Bamra (Orissa), MUKHERJEE, 1970. |
| Leaf spot | <i>Leptosphaeria agaves</i> SYD. & BUTLER | Reported from Dehra Dun (U. P.). |
| <i>Agave vera-crucis</i> MILL. | | |
| Sooty-mould | <i>Capnodium anonae</i> PAT. | Report from Bilikere (Mysore). |
| <i>Agave wightii</i> DRUM. & PRAIN | | |
| Leaf spot | <i>Diplodia</i> sp. | Minor |

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| Leaf blight | <i>Phytophthora palmivora</i> BUTLER | Reported by RAMAKR. & SEETHALAKSHMI (1956) from Coimbatore (T. N.). |
| <i>Agave spp.</i> (Sisal) | | |
| Leaf spot | <i>Botryosphaeria agaves</i> (P. HENN.) BUTLER | Rare, reported first from Pusa (Bihar). |
| Anthracnose | <i>Colletotrichum agaves</i> CAV. | A general disease of foliage. |
| Leaf spot | <i>Coniothyria agaves</i> (DUR. & MONT.) PETRAK & SYD. | Reported from Bilikere (Mysore), Dehra Dun (U. P.). |
| Leaf rot | <i>Cucurbitaria agaves</i> SYD. & BUTLER | Reported from Dehra Dun, rare. |
| Leaf spot | <i>Microdiplodia agaves</i> (NIESSL) TASSI | A general infection on foliage. |
| Leaf spot | <i>Striodiplodia agaves</i> (NIESSL) ZAMB. | Reported from Dharwar (Mysore), rare. |
| Saprophytes (Myxomycetes) | <i>Perichaena chrysoperma</i> (CURREY) LISTER | On dead leaves, Mussoorie, (U. P.). |
| Saprophytes | <i>Ceratiomyxa fruticulosa</i> MULLER | On dead leaves, Dehra Dun (U. P.). |
| Saprophytes | <i>Physarum bitectum</i> LISTER | On dead leaves, Mussoorie (U. P.). |
| Saprophytes | <i>Physarum diderma</i> ROST. | On decaying leaves, Mussoorie (U. P.). |
| Saprophytes | <i>Physarum didermoides</i> (PERS.) ROSTAF. | On decaying leaves, Mussoorie (U. P.). |
| Saprophytes | <i>Physarum lateritium</i> (BERK. & RAV.) MORG. | On dead leaves, Mussoorie (U. P.) |
| Saprophytes | <i>Physarum nicaraguense</i> MACBR. | On dead leaves, Mussoorie (U. P.). |
| Saprophytes | <i>Physarum pusillum</i> (BERK. & CURT.) LISTER | On dead leaves, Mussoorie (U. P.). |
| Saprophyte | <i>Physarum vernum</i> SOMM. ex FR. | On dead leaves, Mussoorie, (U. P.). |
| <i>Boehmeria nivea</i> (L.) Gaud. (Ramie, F. Urticaceae) | | |
| Leaf blight | <i>Alternaria tenuis</i> Auct. | First reported by RAO (1962) from Poona. |
| Saprophyte | <i>Allescherina boehmeriae</i> SYD. & BUTLER | On dead stems, Pusa (Bihar). |
| Fibre rot | <i>Aspergillus fumigatus</i> FRES. | Assam (MUSTAFAEE 1971). |
| Leaf spot | <i>Ascochyta rheeae</i> (COOKE) GROVE | A minor foliage disease. |
| Fibre rot | <i>Botryodiplodia</i> sp. | Assam (MUSTAFAEE 1971). |
| Leaf spot | <i>Cercospora boehmeriae</i> PECK | General, first reported by CHOWDHURY (1957) from Jorhat (Assam). |
| Leaf spot | <i>Cercospora krugiana</i> MULLER & CHUPP | First reported by GOVINDU & THIRUMALACHAR (1955). |
| Leaf spot | <i>Curvularia</i> sp. | Minor. |
| Stem canker | <i>Diplodia rheeae</i> COOKE | Reported from Assam. |
| Fibre rot | <i>Fusarium oxysporum</i> SCHL. | Assam (MUSTAFAEE 1971). |

| Name of the Disease 1 | Causal organism 2 | Distribution and Remarks 3 |
|---|--|--|
| Fibre rot | <i>Penicillium</i> sp. | Assam (MUSTAFEE 1971). |
| Fibre rot | <i>Torula</i> sp. | Assam (MUSTAFEE 1971). |
| <i>Bombax ceiba</i> L. (= <i>B. malabaricum</i> DC., = <i>Salmalia malabarica</i> (DC.) SCHOTT & ENDL.), Simul or Semur, Silk-Cotton Tree F. Bombacaceae). | | |
| Sooty moulds | <i>Capnodium</i> sp. | General, black sooty growth on leaves. |
| Leaf spot | <i>Cercospora bombacina</i> RAMAKR. T. S. & K. | First described by RAMAKR. T. S. & K. (1950) from Walayar (Malabar), Kerala. |
| Leaf spot | <i>Cercospora bombacicola</i> MUNJAL et al. | MUNJAL et al. (1960) from Chamba, (H. P.). |
| Saprophyte | <i>Circinotrichum maculaeformae</i> NEES | PATIL (1964) reported from Poona. |
| Leaf spot | <i>Cladotrichum foliicola</i> (NIESSL) FERRO | Reported from Dehra Dun (BAGCHEE & SINGH, 1954). |
| Anthracnose | <i>Colletotrichum dematium</i> (PERS. ex FR.) | Reported from Allahabad (U. P.), minor. |
| Saprophyte | <i>Diatrype salmaliae</i> TILAK | On dried stems, at Aurangabad (R. RAO, 1966). |
| Cankers | <i>Haplosporella salmaliae</i> TILAK & RAO | On dried stems, at Aurangabad (TILAK & R. RAO, 1964). |
| White spongy rot | <i>Lentinus sajor-caju</i> FR. | BAGCHEE & SINGH (1954) reported from Dehra Dun. |
| Leaf spot | <i>Phyllosticta bombacis</i> BATISTA | MAHAKUL & MOHANTY (1969) reported from Bhubaneswar (Orissa). |
| White spongy rot | <i>Pleurotus flabellatus</i> (BERK. & BR.) SACC. | Reported from F. R. I., Dehra Dun, BAGCHEE & SINGH (1954). |
| White spongy rot | <i>Polyporus triabilis</i> BOSE | Reported from F. R. I., Dehra Dun, BAGCHEE & SINGH (1954). |
| Spongy sap-rot | <i>Polystictus hirsutus</i> FR. | Reported from F. R. I., Dehra Dun, BAGCHEE & SINGH (1954). |
| Mottled sap-rot | <i>Schizophyllum commune</i> FR. | Reported from F. R. I., Dehra Dun, BAGCHEE & SINGH (1954). |
| Leaf spot | <i>Sphaeloma bombacis</i> | At Mahabaleshwar, WANI & THIRUMALACHAR (1969). |
| White spongy rot | <i>Trametes corrugata</i> (PERS.) BRES. | Reported from F. R. I., Dehra Dun (BAGCHEE & SINGH 1954). |
| White spongy rot | <i>Trametes meyerii</i> KLOTZ. | Reported from F. R. I., Dehra Dun (BAGCHEE & SINGH 1954). |
| White spongy rot | <i>Trametes persoonii</i> FR. | Reported from F. R. I., Dehra Dun (BAGCHEE & SINGH 1954). |
| Saprophyte | <i>Tympanopsis lantanæ</i> R. RAO | On dried stems, at Aurangabad (TILAK & RAO, 1969). |
| <i>Cannabis sativa</i> L. (Hemp, Ganja, Bhang, True hemp or Soft hemp., F. Cannabinaceae). | | |
| Leaf spot | <i>Ascochyta prasadii</i> SHUKLA & PATHAK | SHUKLA & PATHAK (1968) from Udaipur. |
| Leaf blight | <i>Cercospora cannabina</i> WAKEFIELD | A general foliage disease. |
| Leaf spot | <i>Cercospora cannabis</i> HARA et FUKUI | Reported from Mysore by THIRUM. & CHUPP (1948). |

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| Saprophyte | <i>Chaetomium succineum</i> AMES | On leaves, Allahabad (SUDHIR 1964). |
| Downy mildew | <i>Pseudoperonospora cannabina</i> (OTTH) HOERNER | Reported from Delhi. |
| Stem rot | <i>Sclerotinia sclerotiorum</i> (LIB.) de BARY | Rare. |
| Wilt and dry rot | <i>Sclerotium rolfsii</i> SACC. | A general field disease. |
| Leaf spot | <i>Septoria cannabis</i> (LASCH.) SACC. | Reported from Pusa (Bihar), Dehra Dun (U. P.), Jammu & Kashmir. |
| <i>Corchorus capsularis</i> L. (Jute, F. Tiliaceae) | | |
| Fibre degradation | <i>Aspergillus atropurpureus</i> ZIMM. | Reported from Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Aspergillus fumigatus</i> FRES. | Reported from Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Aspergillus glaucus</i> LINK | Reported from Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Aspergillus terreus</i> THOM | Reported from Calcutta (BASU & GHOSH, 1950). |
| Saprophyte | <i>Cephalophora uniformis</i> ANANTH. | On fibre, at Poona (ANANTHANARAYANANAN, 1963). |
| Fibre degradation | <i>Chaetomium chartarum</i> BERK. | On Jute and fibre, Calcutta (ROY, 1948). |
| Fibre degradation | <i>Chaetomium brasiliense</i> BATISTA et PONTUAL | On jute and jute fibre, Calcutta (ROY, 1948). |
| Fibre degradation | <i>Chaetomium indicum</i> CORDA | On jute and jute fibre, Calcutta (ROY, 1948). |
| Fibre degradation | <i>Chaetomium funiculum</i> COOKE | On jute and jute fibre, Calcutta (ROY, 1948). |
| Anthraxnose | <i>Colletotrichum capsici</i> f. <i>corchorum</i> GHOSH | An important and wide-spread disease in W. Bengal of economic importance. |
| Stem canker | <i>Diplodia corchori</i> SYD. | First recorded by SHAW (1924). |
| Fibre rot | <i>Dendrophoma</i> sp. | On jute fabrics, Calcutta (BOSE & BHATTACHARYA, 1962). |
| Wilt | <i>Fusarium solani</i> (MART.) APP. & WOLLENW. | Reported from Calcutta, rare. |
| Collar, stem & root rot | <i>Macrophomina phaseoli</i> (MAUBL.) ASHBY | A serious and economically important disease, in Bengal, Bihar, Assam and Orissa, also causes seedling blight. |
| Ring spot | <i>Myrothecium roridum</i> TODE ex FR. | MUNJAL (1960) reported from Delhi. |
| Stem rot | <i>Macrophoma corchori</i> SAW. | First recorded by SHAW (1924), minor. |
| Saprophyte | <i>Oedocephalum indicum</i> ANANTH. | On jute bags, from Poona. |
| Saprophyte | <i>Orbilbia obscura</i> GHOSH et al. | On jute bags, Barrackpore (W. Bengal). |
| Mildew | <i>Oidium</i> sp. | General foliage disease. |
| Fibre degradation | <i>Paecilomyces varioti</i> BAIN. | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium adametzi</i> ZALESKI | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium brefeldianum</i> DODGE | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium citrinum</i> THOM | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |

| Name of the Disease 1 | Causal organism 2 | Distribution and Remarks 3 |
|-------------------------------|---|--|
| Fibre degradation | <i>Penicillium cyaneum</i> (BAIN. & SORT.) BIOURGE | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium implicatum</i> BIOURGE | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium luteum</i> ZUKAL | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium ochro chloron</i> BIOURGE | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium purpurogenum</i> STOLL | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium variabile</i> SOPP. | On Jute and its fibre, Calcutta (BASU & GHOSH, 1950). |
| Fibre degradation | <i>Penicillium vermiculatum</i> DANGEARD | On rotting jute cloth, Calcutta (BHATTACHARYA & BASU, 1954). |
| Fibre degradation | <i>Penicillium verrucosum</i> PEYRONEL <i>Stemphylium consortiale</i> (THUEN.) GR. & SKOLKE | On jute fibre and cloth, Calcutta. |
| Fibre degradation | <i>Phoma</i> sp. | On stored fibres, Calcutta (BOSE & BHATTACHARYA, 1962). |
| Leaf spot | <i>Phyllosticta</i> sp. | Reported from Calcutta, minor. |
| Root rot | <i>Rhizoctonia</i> sp. | Minor. |
| Wilt | <i>Sclerotium rolfsii</i> SACC. | A general field disease. |
| Saprophyte | <i>Valsa (Euvalsa) corchori</i> SYD. & BUTLER | On stems, Poona. |
| Saprophyte | <i>Septonema punctiformae</i> B. & C. | On old jute bag, Poona (ANANTHANARAYANAN, 1963). |
| Saprophyte | <i>Trichothecium roseum</i> LINK | On old jute bag, Poona (ANANTHANARAYANAN, 1963). |
| Fibre degradation | <i>Talaromyces vermiculatus</i> BENJAMIN | On fibre, Calcutta. |
| Fibre degradation | <i>Verticillium glaucum</i> BONORDEN | On Jute cordages, Kanpur (U. P.). |
| Wilt (Bacterial) | <i>Pseudomonas solanacearum</i> E. F. SM. | Reported from West Bengal, SHARMA & MUKH. (1970). |
| Mosaic | Virus | Two strains reported by BISHT & MATHUR (1964) from U. P. |
| <i>Corchorus olitorius</i> L. | (Jute) | |
| Leaf spot | <i>Botryodiplodia theobromae</i> PAT. | Minor disease |
| Leaf spot | <i>Cercospora macutensis</i> SYD. | A general foliage disease. |
| Stem canker | <i>Diplodia corchori</i> SYD. | Reported from Pusa, Bengal and Assam. |
| Stem rot | <i>Macrophomina phaseoli</i> (MAUBL.) ASHBY | Very severe and common disease of economic importance. |
| Stem gall | <i>Physoderma corchori</i> LINGAPPA | Reported by DAS & GUPTA (1964) from West Bengal, also by PRAKASH & GHOSH (1964). |
| Root rot | <i>Rhizoctonia</i> sp. | General disease. |

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| Leaf spot | <i>Phyllosticta</i> sp. | General disease. |
| Mildew | <i>Acrosporium</i> (= <i>Oidium</i> sp.) sp. | General disease. |
| Wilt (Bacterial) | <i>Pseudomonas solanacearum</i> E. F. SM. | Reported by SHARMA & MUKH. (1970) from West Bengal. |
| <i>Crotalaria juncea</i> L. (Sunn-Hemp, Bombay Hemp, F. Leguminosae) | | |
| Leaf spot | <i>Alternaria crotalariaicola</i> RAO | First described by RAO (1964) from Poona. |
| Leaf blight | <i>Alternaria tenuissima</i> (FR.) WILT. | At Poona, recorded by GARUD (1970), a minor disease. |
| Leaf blight | <i>Bipolaris tetramera</i> (MCK.) SHOEM. | First described by NAPHADE (1968) from Poona. |
| Wilt | <i>Corticium solani</i> BOURD. & GALZIN | A new disease reported by PANDOTRA & SASTRY (1967) from Jammu-Tawi. |
| Leaf spot | <i>Cercospora crotalariae</i> SACC. | General, CHONA et al. (1959). |
| Anthraxnose | <i>Colletotrichum curvatum</i> BRIANT & MARTYN. | First reported by MITRA (1937) on seedlings. Some detailed studies by KEMPANNA et al. (1960) from Bangalore. (THAKUR 1971). |
| Stem rot | <i>Corticium solani</i> BOURD. & GALZ. | A general field disease of great economic importance. |
| Vascular wilt | <i>Fusarium oxysporum</i> SCHL. f. sp. <i>crotalariae</i> GORDON. | |
| Leaf spot | <i>Helminthosporium crotalariae</i> CHOWDHURY | First described by CHOWDHURY (1955) from Kikilmukh (Assam). |
| Leaf spot | <i>Leptosphaerulina australis</i> MCALP. | From Poona (NAPHADE, 1970). |
| Powdery mildew | <i>Leveillula taurica</i> (LEV.) ARN. | Ashy growth on foliage, general. |
| Wilt & root rot | <i>Macrophomina phaseoli</i> (MAUBL.) ASHBY | An important field disease of economical significance. |
| Wilt | <i>Neocosmospora vasinfecta</i> E. F. SM. | Reported from Dehra Dun, Pusa (Bihar ?, Samalkot (Madras) Minor. |
| Powdery mildew | <i>Oidium erysiphoides</i> FR. | From Varanasi, U. P. (UPADHYAY & PAVGI 1967). |
| Stem rot | <i>Pellicularia rolfsii</i> (SACC.) WEST. | Isolated from decomposing plants, New Delhi (CHONA et al. 1958). |
| Saprophyte | <i>Penicillium minio-luteum</i> DIERCKX | A severe disease in Uttar Pradesh |
| Root rot | <i>Pellicularia rolfsii</i> (SACC.) WEST. | RAO (1964) recorded for the first time from Poona. |
| Leaf spot | <i>Phyllosticta crotalariae</i> SPEG. | First described by RAO & SOLANKURE (1971) from Poona. |
| Stem spot | <i>Pyrenochaeta crotalariae</i> RAO & SOLANK. | A general field disease. |
| Brown root rot | <i>Rhizoctonia solani</i> KUHN | Infection on leaves and stems, a minor disease. |
| Galls | <i>Synchytrium ajrekari</i> PAYAK & THIRUM. | General on leaves and stems. |
| Rust | <i>Uromyces decoratus</i> SYD. | Isolated from decomposing plants, New Delhi (CHONA et al. 1958). |
| Saprophyte | <i>Zythia bicolor</i> B. & BR. | |

| Name of the Disease 1 | Causal organism 2 | Distribution and Remarks 3 |
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| Mosaic | Virus disease, Southern Sunn-hemp mosaic virus (TMV — Strain). | General distribution (RAYCHAUDHURI, 1947). |
| Leaf spot (Bacterial) | <i>Xanthomonas patelii</i> DESAI & SHAH | Described by DESAI & SHAH (1959) from Anand (Gujarat). |
| <i>Gossypium</i> spp. (<i>G. arboreum</i> L., <i>G. herbaceum</i> L., <i>G. hirsutum</i> L., <i>Gossypium</i> sp. etc. Cotton, F. Malvaceae). | | |
| Leaf spot | <i>Alternaria macrospora</i> ZIMM. | Common and wide spread disease, detailed studies by RANE & PATEL (1956). |
| Leaf spot | <i>Alternaria tenuis</i> auct. | General, first reported by RAO (1963) from Poona. |
| Leaf blight | <i>Ascochyta gossypii</i> SYD. | Rare, reported from Kashmir. |
| Saprophyte | <i>Ascotricha chartarum</i> BERK. | On cotton wool, Bangalore. |
| Saprophyte | <i>Aspergillus niger</i> van TIEGH. | On fibre and seed, also causes boll rot, general distribution. |
| Saprophyte | <i>Aspergillus atropurpureus</i> ZIMM. | On fibre and seeds, Calcutta. |
| Saprophyte | <i>Aspergillus fumigatus</i> FRES. | On fibre and seeds, Bombay |
| Saprophyte | <i>Aspergillus ustus</i> (BARM.) THOM & CHURCH | On fibre and seeds, Madras |
| Saprophyte | <i>Basidiobolus</i> sp. | On fibre, rare. |
| Sooty mould | <i>Capnodium</i> sp. | A general disease in winter. |
| Sooty mould | <i>Caldariomyces indicus</i> | DWIVEDI 1961, from Varanasi, U. P. |
| Leaf spot | <i>Cercospora gossypina</i> COOKE | A common foliage disease. |
| Leaf spot | <i>Cercospora gossypii</i> LALL, GILL & MUNJAL. | First described by LALL et al. (1961). |
| Rust | <i>Ceratium desmium</i> (BERK. & BR.) ARTH. | General disease. |
| Saprophyte | <i>Chaetomium amphitrichum</i> CORDA | On rotting stems, Nagpur, Pusa (Bihar). |
| Seedling blight | <i>Cochliobolus spicifer</i> NELSON | Also causes seed rot, pre- and post-emergence death of seedlings and defoliation of adult plants. BEDI et al. (1967) reported from Hissar (Haryana), Punjab. |
| Leaf spot | <i>Corynespora casiicola</i> (B. & C.) WEI. | From A. P. C. (SHARMA & NAYUDU 1970). |
| Stem rot | <i>Diplodia gossypina</i> COOKE | Reported from Bombay, also causes capsule rot, rare. |
| Vascular wilt | <i>Fusarium oxysporum</i> f. sp. <i>vasinfectum</i> (AKT.) SNYDER & HANSEN. | A very severe and wide-spread disease of great economic importance. |
| Leaf spot | <i>Curvularia lunata</i> (WAKK.) BOED. | From Maharashtra (PATIL & GADAGE 1972). |

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| Anthracnose | <i>Glomerella gossypii</i> (SOUTHW.) EDG. (C. S. = <i>Colletotrichum indicum</i> DASTUR) | Detailed studies by DASTUR (1934) & WILSON (1961). |
| Wilt | <i>Pellicularia rolfsii</i> (SACC.) WEST (I. S. = <i>Sclerotium rolfsii</i> SACC.) | A general field disease. |
| Leaf spot | <i>Helminthosporium gossypii</i> TUCKER | General disease, detailed studies by RANE and PATEL (1956) |
| Leaf blight | <i>Helminthosporium spiciferum</i> MCK. | Reported from Punjab and Hariyana, SURYANARAYANA et al. (1966). |
| Powdery mildew | <i>Leveillula taurica</i> (LEV.) ARNAUD | A general foliage disease. |
| Root-rot & stem-break | <i>Macrophomina phaseoli</i> (MAUBL.) ASBHY. (<i>Rhizoctonia bataticola</i> (TAUB.) BUTL.) | A serious disease of great economic importance, in parts of Gujarat, U. P., Punjab. SULAIMAN & PATIL (1966) reported two races of this pathogen. |
| Saprophyte | <i>Memnoniella echinata</i> (RIV.) GALLOWAY | On fibres and decaying fabrics, Poona (ANANTHANARAYANAN, 1963). |
| Saprophyte | <i>Mucor hygrophilus</i> OUDEM. | On fibres, rare. |
| Root rot | <i>Macrophomina phaseoli</i> (MAUBL.) ASHBY var. <i>indica</i> MONIZ & BHIDE | Reported from Maharashtra and Gujarat with detailed studies of this pathogen (MONIZ & BHIDE, 1963). |
| Sooty mould | <i>Microxyphiella hibiscifolia</i> BAT. et al. | Reported from Punjab by SINGH and GROVER (1968). |
| Wilt | <i>Verticillium albo-atrum</i> R. & B. | Reported from Madras State, NATARAJAN (1968). |
| Wilt | <i>Verticillium dahliae</i> KLEBAHN | Reported by DASTUR et al. (1960). |
| Leaf-blight | <i>Myrothecium roridum</i> TODE ex FR. | General distribution (MUNJAL, 1960). |
| Wilt | <i>Neocosmospora vasinfecta</i> SMITH | |
| Stigmatomycosis | <i>Nematospora naggpuri</i> DASTUR | First described by DASTUR & SINGH (1930) from Nagpur. The fungus causes internal boll-rot. |
| Powdery mildew | <i>Acrosporium</i> sp. (x = <i>Oidium</i> sp.) | A general foliage disease. |
| Saprophyte | <i>Penicillium</i> sp. | On fibres, Bombay. |
| Saprophyte (Myxomycetes) | <i>Perichaena vermicularis</i> (SCHW.) ROSTAF. | On decaying bolls, Toklai (Assam), AGNIHOTHRUDU (1959). |
| Powdery mildew | <i>Oidiopsis gossypii</i> (WAKEF.) f. <i>indica</i> RAYCH. | Described by RAYCHAUDHURI (1949). |
| Leaf spot | <i>Pestalotia gossypii</i> HORI ex S. THURUDA | Rare (DASTUR et al. 1960). |
| Rust | <i>Phakopsora desmium</i> (BERK. & BR.) CUMMINS | A general foliage disease. |
| Saprophyte | <i>Phycomyces</i> sp. | On fibre, rare. |

| Name of the Disease 1 | Causal organism 2 | Distribution and Remarks 3 |
|---|---|---|
| Leaf-spot | <i>Phyllosticta gossypina</i> ELL. & MART. | A common foliage disease, detailed studies by BHAGWAT & BHIDE (1967) from Poona. |
| Seedling blight | <i>Phytophthora nicotianae</i> var. <i>parasitica</i> DAST. (= <i>Phytophthora parasitica</i> DASTUR) | A general disease in rainy season (DASTUR 1931, MITRA, 1929), also causes seedling-blight and boll rot. |
| Damping-off | <i>Pythium aphanidermatum</i> (EDS.) FITZ. | On seedlings, also causes wet rot, general (MAHMUD 1951). |
| Branch knots | <i>Pleosphaeropsis gossypii</i> DIED. | On dead branches, Pusa (Bihar). |
| Saprobe | <i>Podozephyrium indicum</i> SHARMA et al. | On leaves, from Delhi (SHARMA et al. 1973). |
| Grey mildew | <i>Ramularia areola</i> ATK. P. S. = <i>Mycosphaerella areola</i> EHR. & WOLF | Very severe disease, of general distribution. Perfect stage first reported by GOKHALE & MOGHE (1967) from Nagpur. |
| Root-rot | <i>Rhizoctonia bataticola</i> (TAUB.) BUTLER | Reported from M. P., a severe disease (DASTUR, 1931). |
| Root-rot | <i>Rhizoctonia solani</i> KUHN | Reported from M. P., a severe disease (DASTUR, 1931). |
| Saprophyte | <i>Rhizopus nodosus</i> NAMYS | On cotton seeds, Madras. |
| Black soft rot | <i>R. nigricans</i> EHRENB. | Boll-rot in storage (Poona, RAO 1974). |
| Wilt-Verticillium | <i>V. albo-atrum</i> REINKE & BERTH. | From Coimbatore T. N., (NATRAJAN et al. 1968). |
| Wilt-Verticillium | <i>V. dahliae</i> KLEB. | From Madras, T. N. (PANDIAN & ISAAC. 1971). |
| Wilt & Basal rot | <i>Sclerotium rolfsii</i> SACC. | UPPAL (1932) reported from Bombay State. |
| Saprophyte | <i>Stachybotrys lobulata</i> BERK. | On fabrics, Poona (ANANTHARAYANAN, 1963). |
| Saprophyte | <i>Trichocladium opacum</i> (CDA.) HUGHES | On fabrics, Poona (ANANTHARAYANAN, 1963). |
| Pink rot | <i>Trichothecium roseum</i> LINK | Boll-rot in storage (Poona, RAO 1974). |
| Fibre degradation | <i>Verticillium glaucum</i> BONORDEN | Reported on cordage, Kanpur, U. P. |
| Black arm (angular leaf-spot) | Bacterial disease, <i>Xanthomonas malvacearum</i> (E. F. SM.) DOWSON. | Very severe and wide-spread disease of economic importance, reports of virulent races (VERMA & SINGH, 1970). |
| Wilt | <i>Xanthomonas Celebensis</i> var. <i>gossypii</i> RAMALINGAM et al. | A new disease reported from Coimbatore (T. N.) by RAMALINGAM et al. (1965). |
| Virus: Little or small Virus leaf | | Severe, general distribution (GOKHALE, 1936). |
| Stenosis | | Reported by UPPAL et al. (1944). |

Nematodous diseases:

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| Root-knot | <i>Meloidogyae</i> spp. | Very severe disease in Punjab and other parts. |
| Non-Parasitic: | (physiological, nutritional or deficiency): | |
| Red leaf | N ₂ (Nitrogen) deficiency in soil | Reported from Punjab and Maharashtra States. |
| Tirak or Bad-opening | Excess alkali salts (alkaline) in soils. | A severe disease in Punjab. |
| Inward rolling of the leaves (marginal) | Soil defect | Reported by AFZAL et al. (1935), VASUDEVA (1940) from Punjab. |
| <i>Hibiscus cannabinus</i> L. (Mesta, Kenak, Deccab hemp, Ambadi, Bimbli fibre, F. Malvaceae): | | |
| Leaf spot | <i>Alternaria dianthi</i> ST. & HALL | A general foliage disease |
| Hyper-parasite | <i>Ampelomyces quisqualis</i> CES. | A common hyper-parasite on <i>Acrosporium</i> sp. stage. |
| Leaf spot | <i>Cercospora abelmoschi-cannabini</i> (SAWADA) PRASAD et al. | Described by PRASAD et al. (1960) from Rajasthan. |
| Leaf spot | <i>Cercospora abelmoschi</i> ELL. & EV. | Reported from Nizamabad (A. P.). |
| Leaf spot | <i>Cercospora hibisci</i> TRACY & EARLE | Reported from West Bengal. |
| Leaf spot | <i>Cercospora hibiscina</i> ELL. & EV. | Reported from Bangalore (THIRUMALACHAR & CHUPP, 1948) and from Calcutta and Pusa (Bihar). |
| Flower blight | <i>Choanephora infundibulifera</i> (CURREY) CUNN. | |
| Anthracnose | <i>Colletotrichum hibisci</i> POLL. | A severe foliage disease at Calcutta (West Bengal). |
| Stem rot | <i>Diplodia hibiscina</i> CKE. & ELL. | Reported from Cuttack (Orissa) and Dehra Dun (U. P.) |
| Powdery mildew | <i>Erysiphe cichoracearum</i> DC. | From Coimbatore (T. N.), NARAYANASWAMI et al. (1968). |
| Leaf spot | <i>Helminthosporium</i> sp. | A minor disease. |
| Saprophyte | <i>Ulosporium hibisci</i> STEV. & PIERCE | Reported from Gujarat on stems and roots. |
| Root rot | <i>Macrophomina phaseoli</i> (MAUBL.) ASHBY. | An important and severe field disease, general distribution. |
| Leaf blight | <i>Phyllosticta hibiscina</i> ELLIS & EVERH. | First reported by RAO (1964) from Poona. |
| Stem rot | <i>Pellicularia filamentosa</i> (PAT.) ROGERS | Reported from Bombay, Maharashtra. |
| Leaf & stem rot | <i>Phoma sabdariffae</i> SACC. | Reported from West Bengal. |
| Tip rot | <i>Phoma</i> sp. | GHOSH & MUKHERJI (1957) reported from Nilganj (W. Bengal). |
| Wilt & Stem rot | <i>Sclerotium rolfsii</i> SACC. | First reported by HUSAIN and THAKUR (1964) from Kalyanpur (Kaupur). |
| Brown rot | <i>Volutella</i> sp. | A rare disease, reported from West Bengal. |

| Name of the Disease 1 | Causal organism 2 | Distribution and Remarks 3 |
|---|--|---|
| <i>Abelmoschus esculentus</i> (L.) Moench. (= <i>Hibiscus esculentus</i> L.), | | Okra, Bhindi, Lady's finger: |
| Leaf spot | <i>Alternaria dianthi</i> S. & H. | First reported by RAO (1962) from Poona. |
| Leaf spot | <i>Alternaria tenuis</i> auct. | HASIJA (1969) described this disease from Jabalpur M. P. |
| Hyperparasite | <i>Ampelomyces quisqualis</i> CES. (Syn. = <i>Cicinnobolus cesatii</i> de BARY) | A common hyperparasite on <i>Acrosporium</i> sp. |
| Leaf spot | <i>Cercospora abelmoschi</i> ELL. & EV. | Reported from Annamalaiagar (T. N.), South India. |
| Leaf spot | <i>Cercospora hibisci</i> TRACY & EARLE | A common foliage disease. |
| Leaf spot | <i>Cercospora malayaensis</i> STEV. & SOLTHEIM | A general foliage disease. |
| Anthracnose | <i>Colletotrichum capsici</i> (SYD.) BUTLER | General. |
| Anthracnose | <i>Colletotrichum hibisci</i> POLL. | Reported from Nadiad (Gujarat), Dehra Dun (U. P.). |
| Powdery mildew | <i>Erysiphe cichoracearum</i> DC. | General disease |
| Leaf spot | <i>Cercospora peninsula</i> RANG. & SRIDHARAN | Reported from Hebbal, Mysore. |
| Slimy fruit rot | <i>Fusarium scripti</i> LAMB. et FANTR. | In storage, Allahabad (SRIVASTAVA et al., 1964). |
| Fruit rot | <i>Fusarium semitectum</i> BERK. & RAV. | In storage, general. |
| Fruit rot | <i>Fusarium oxysporum</i> SCHL. | In storage, general. |
| Seedling wilt | <i>Fusarium solani</i> (MART.) APPL. & WOLL. | Reported by CHATTOPADHYAY and BASU (1957) from Calcutta. |
| Fruit rot | <i>Cladosporium</i> sp. | General rot in storage |
| Black spot | <i>Helminthosporium nodulosum</i> (BERK. & CURT.) SACC. | On stored fruits, reported by TANDON & VERMA (1964), from Allahabad. |
| Leaf spot | <i>Leptosphaerulina australis</i> MC ALP. | General |
| Soft rot | <i>Mucor</i> sp. | A general fruit rot in storage. |
| Root rot | <i>Macrophomina phaseoli</i> (MAUBL.) ASHBY | An important field disease, general. |
| Ring spot | <i>Myrothecium roridum</i> TODE ex FR. | On leaves, first recorded by MUNJAL (1960). |
| Leaf spot | <i>Leptosphaerulina australis</i> MC ALP. | Reported from Hyderabad-Deccan, A. P. |
| Root & Collar rot | <i>Ozonium tezanum</i> NEAL & WESTER var. <i>parasiticum</i> THIRUM. | SINGH (1963) reported this disease from Chota-Nagpur. |
| Saprobe | <i>Pseudotorula verrucospora</i> MATHUR & SINGH | On dried branches, reported by MATHUR & SINGH (1964), from Rajasthan. |
| Seedling blight | <i>Phytophthora palmivora</i> BUTLER | Reported from Coimbatore, BALAKRISHNAN (1947). |

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| Root and Collar rot | <i>Pythium aphanidermatum</i> (EDS.) FITZ. | SINGH (1963) from Chotanagpur, soft rot in storage, Poona. |
| Fruit rot | <i>Pythium indicum</i> BALAKRISHNAN | Reported from Coimbatore (T. M.). |
| Leaf spot | <i>Phyllosticta hibiscina</i> ELL. & EV. | First reported by RAO (1963) from Poona. |
| Fruit rot | <i>Rhizoctonia bataticola</i> (TAUB.) BUTLER | On stored fruits at Allahabad (TANDON & VERMA, 1964). |
| Saprobe | <i>Fumago</i> sp. | On stored fruits at Allahabad (TANDON & VERMA, 1964). |
| Wilt | <i>Sclerotium rolfsii</i> SACC. | An important field disease, general. |
| Galls | <i>Synchytrium hibisci</i> GUPTA & SINHA | GUPTA & SINHA (1951) described from Agra, U. P. on leaves & stems. |
| Rust | <i>Uromyces heterogeneus</i> COOKE | General distribution. |
| Wilt | <i>Verticillium dahliae</i> KLEB. | General disease. |
| Leaf spot (Bacterial) | <i>Xanthomonas esculenti</i> RANG. & EASWARAN | RANGASWAMI and EASWARAN (1962) described this disease from Annamalainagar (T. M.). |
| <i>Hibiscus rosa-sinensis</i> L. (Shoe-Flower, Jaswand) | | |
| Saprophyte | <i>Anthostomella hibisci</i> RAMAKR. | On dead stems, Ernakulum (Kerala). |
| Leaf spot | <i>Cercospora abelmoschi</i> ELL. & EVER. | Reported from Varanasi (U. P.). |
| Leaf spot | <i>Cercospora hibisci</i> TRACY & EARLE | A common foliage disease. |
| Flower blight wet rot | <i>Choanephora infundibulifera</i> (CURREY) CUNNINGHAM | General, or a weak parasite. |
| Flower blight & wet rot | <i>Choanephora cucurbitarum</i> THAXTER | General, but a weak parasite. |
| Leaf spot | <i>Colletotrichum hibisci</i> POLL. | A minor foliage disease. |
| Leaf spot | <i>Colletotrichum malvacearum</i> PAVGI & SINGH | Described by PAVGI and SINGH (1965) from Varanasi (U. P.). |
| Saprophyte | <i>Physarum serpula</i> MORG. | On decaying, bark at Tocklai (Assam), AGNIHOTHRUDU (1959). |
| Sooty mould | <i>Microxyphiella hibiscifolia</i> | SINGH & GROVER (1968) reported from Punjab. |
| Leaf spot | <i>Phyllosticta hibiscina</i> ELL. & EV. | A minor foliage disease. |
| Leaf spot (Bacterial) | <i>Pseudomonas hibiscicola</i> RANG. & GOWDA | First described by RANGASWAMI and GOWDA (1963) from Madras. |
| Leaf-curl | Virus | First reported by BHARGAGA (1952), minor disease. |
| <i>Hibiscus sabdariffa</i> L. (Roselle hemp, Patwa, or Roselle fibre plant). | | |
| Leaf spot | <i>Alternaria dianthi</i> S. & H. | A general foliage disease. |
| Leaf spot | <i>Cercospora hibisci</i> TRACY & EARLE | A general foliage disease. |

| Name of the Disease 1 | Causal organism 2 | Distribution and Remarks 3 |
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| Anthracnose Leaf spot Stem rot | <i>Colletotrichum</i> sp. <i>Curvularia lunata</i> (WAKK.) BOED. <i>Diplodia hibiscina</i> COOKE & ELLIS var. <i>Sabdariffae</i> SACC. | A minor disease. A weak foliage pathogen. Reported from Allahabad (U. P.). |
| Leaf spot Wilt Leaf blight Leaf & stem rot Leaf & stem rot Stem rot | <i>Cercospora malayaensis</i> ST. & SOLHEIM <i>Fusarium</i> sp. <i>Helminthosporium tetramera</i> MCKINNEY <i>Phoma sabdariffa</i> SACC. <i>Phytophthora parasitica</i> DASTUR <i>Sclerotinia sclerotiorum</i> (LIB.) de BARY | Reported from Pusa (Bihar) and Delhi. Rare. A minor foliage disease. Reported from Jorhat (Assam.). Reported from Calcutta (West Bengal). Detailed studies by MUNDKUR (1934). |

large number of papers have been published from time to time on these aspects resulting in the accumulation of extensive literature, which, however, is scattered. An attempt has been made in this compilation to bring together all such literature together with diseases reported on these crops from India in a single concise publication. The diseases are classified on the basis of crops, arranged alphabetically with their causal organisms, nature and distribution, thus making this compilation complete so far as India is concerned. It is hoped, that such a publication will be of great utility not only to the Systematic Mycologists, but also to Plant Pathologists, the Extension Officers, Plant Protection Personnel and Progressive Farmers.

The hosts are arranged in an alphabetical order.

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