DISCUSSION


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In this work, an attempt has been made for the first time to describe the pathogenic and saprophytic fungi on 35 medicinal and aromatic plants of commercial value.

Section A deals with 24 aromatic plants on which 41 diseases and 105 fungi are described in the thesis. In these 99 are new records, one new forma specialis and 18 new species.

In the case of *Abelmoschus moschatus* Hoench., for the first time two disease viz., wilt and blight are described caused by *Fusarium solani* (Mart.) Sacc. and *Alternaria alternata* (Fr.) Keissler respectively. Both diseases are widespread and can pose a threat to the cultivation of this crop.

Ranakrishnan and Rengaswamy (1948) reported for the first time a rust disease of *Acorus* caused by *Uromyces acori* Sonak. & Rang. Parmelec and Savile (1954) in their study of *Uromyces pyriformis* and *U. sparsanii* on *Acorus* and *Sparanthium* respectively described them as two different species, but, in fact, they are to be regarded as synonymous. They also observed that the paraphyses described by Ranakrishnan and Rengaswamy in *U. acori* were actually deposition of tannin on the Urediniocarpore. Further, on the basis of comparable morphological characters, they combined both the species of *U. pyriformis* and *U. sparsanii* under *Uromyces sparsanii*.

In the studies made here there is good reason to agree with the views of Parmelec and Savile. It is, therefore, proposed to assign the *Uromyces* collected on *A. calamus* to *U. sparsanii*.
Two other fungi have been described on *Acorus calamus*, *Rumularia aromatica*, and *Alternaria tenuissima*.

A new species of *Cercospora* viz., *C. dragunculi* Sarwar was collected from blighted leaves of *Artemisia dragunculis* and the same fungus was again found in association with *Alternaria alternata* causing leaf spot on *Artemisia pallens*.

*Artemisia pallens* suffers from two diseases, a damping-off caused by *Rhizoctonia solani* and a collar rot caused by *Fusarium oxysporum*. The latter fungus is a new forma specialis, *F. oxysporum* forma *dragunculi* Sarwar.

Butler (1918) reported blight of celery, *Apium graveolens*, caused by *Cercospora subit* from India. This disease and a new leaf spot by *Alternaria alternata* (Fr.) Keissler on the same host has been recorded at Bangalore.

In the case of *Bursa delpechiana* Poiss., a leaf spot and a die-back were recorded for the first time. *Cercospora* sp. was reported on *Bursa* later described by Govinda and Thirumalachar (1965) as *C. bursa* from Bangalore. A detailed investigation was conducted on the die-back of *Bursa* and six different fungi were isolated. The etiology and syndrome of the different fungi isolated are presented.

Mohanraj et al. (1972), reported blight of *Cichorium intybus* by *Alternaria cichorii* from India. The Bangalore isolate was a different species. It produced a new purple blotch disease and was determined to be *Alternaria tenuissima* (Kunze ex Pers.) Wiltsh.
The Powdery mildew disease of Coriandrum sativum L. was also recorded at Bangalore. But the fungus was Curvularia harveyi Dc., and showed resemblance to E. polygoni recorded earlier by Salmen (1900) on C. sativum from Coimbatore. Raghunath (1963) described Alternaria poronensis Raghunath as the cause of Coriander blight but the Bangalore isolate was found to be A. temulassina.

A serious anthracnose was recorded on Salvia sclarea, an exotic aromatic plant, and in the absence of any earlier reports all six isolates are reported as new records (Sarwar 1973).

On Matricaria chamomilla, another exotic aromatic plant, four fungi were isolated from wilted plants and were described as new records (Sarwar 1973).

A leaf spot of Cymbopogon flexuosus at Bangalore and Kerala was observed and three fungi viz., Drechslera armena, Alternaria temulassina and Cladosporium herbarum were isolated from the diseased material which are again new records.

A blight and a leaf spot of Cymbopogon martini were recorded at Bangalore and in Karim Nagar District. Curvularia androgononia from the blight sample whereas, Cercospora serchi and a new species of Cordana (C. martini) were isolated from the leaf spot.

Three widespread diseases of Cymbopogon winterianus viz., anthracnose, leaf spot and yellowing & crinkling were recorded at Bangalore, Coorg, West Godawari, Coimbatore and Ratnagiri. There are ten different fungi including two new species isolated from the diseased samples collected from the above stated growing
areas. Yellowing & wrinkling pose a big problem to cultivation of Citronella at many places and although Monochaetella cymbopogonis Punithalingam and Sarwar was isolated from the necrotic regions, the cause of wrinkling disease is not conclusively established. Gupta et al. (1973) regarded it as a mineral deficiency problem and others suspected it to be a virus on account of its typical mosaic symptoms. Application of fertilizers did not release the symptoms nor transmission studies established its viral nature. The possibility of a mycoplasma involvement has not been ruled out.

From blighted Foeniculum vulgare Kanal and Khan (1962) described Foeniculum foeniculi sp. nov. But the Foeniculum isolate from Bangalore possessed all the characters of Foeniculum kirkmanii (Hegy.) Petrak and was, therefore, identified as F. kirkmanii. A blight by A. tenuis was earlier described by Deshpande and Schuril (1965) from this host from Rajasthan but the fungus is now described as A. alternata sensu Simon (1967).

Cercospora jasminicola was first reported by Perakrishnan and Sundaram (1941) on Jasminum grandiflorum from Coimbatore but has since been found to be common in all jasmine growing areas. In addition to C. jasminicola, presence of Alternaria alternata and Closdoporus cladosporides have also been recorded here.

A wilt disease of Narcissus chrysanthemum was observed at Bangalore and four fungi viz., Fusarium solani, Closdoporus atricollum, Macrophomina phaseolina and Pleospora infectosa were isolated.
Pandey and Ganjily (1964) described a leaf spot of Ocimum basilicum by Cercospora congoensis. A similar disease was also recorded at Bangalore, but the fungus was identified as Cercospora reinicola Petrak and Ciferri. One more disease of Basil, leaf and stem blight, appeared to be more severe at Bangalore caused by Macrophomina phaseolina (Tassi) Goel.

Wilt of Helianthus graminifolius is a very serious disease in many growing areas. The disease was recorded for the first time and a detailed account of the development, mortality rate and impact of wilt on the quality and quantity of Geranium oil has been discussed. Apart from Fusarium oxysporum var. radicola, the presence of Botryodiplodia theobromae also was considered significant in pathogenesis.

Efforts were made to control the wilt problem by various fungicidal treatments and by screening varieties for resistance/tolerance from the Geranium germplasm available from the Nilgiris. Micro-nutrients treatment showed some marginal improvement but the experiments were inconclusive.

Section B deals with 11 medicinal plants on which 10 diseases are described. In all 26 fungi were isolated, out of which 20 were new records and 6 were given new specific rank.

A leaf spot disease was recorded on Atropa belladonna by C. belladonna sp. nov. from Manipur, Kashmir and Bangalore. From the necrotic region, Periconia clitoriae Subram. was also isolated. A wilt and stem burn disease was recorded for the first time on Cassia nystifolia from Bangalore. From the
affected plants Fusarium solani, Alternaria tenuissima and Cladosporium oxy sporum were isolated. These are new records.

Bisby (1931) reported the occurrence of Alternaria grasse on various species of Datura, including D. stramonium from India. Apart from Alternaria leaf spot, for the first time, a branch and stem canker by Phomopsis stramoniae sp. nov. Sarwar on D. stramonium was described.

Two new species of Corcospora and Staphylium viz., C. digitalidis Sarwar and S. digitalidis Sarwar respectively were described on Digitalis lutea causing leaf spot and blight diseases respectively.

Three serious diseases of Panvelia serpentina viz., Leaf spot by Alternaria alternata, Powdery mildew by Leveillula taurica and die-back by Colletotrichum dematium earlier recorded by Varadarajan (1958) and Lele and Asha Pan (1967) were found at Bangalore also. A new species of Phaeotrichospora associated with the leaf spot and a new species of Curvularia isolated from the die-back sample are described.

A new leaf spot of Solanum khasianum caused by Corcospora khasianum Sarwar was recorded. Alternaria tenuissima was also found on this host.

A serious leaf and twig blight of Vincia rosea was found at Bangalore and four fungi were isolated viz., Corcospora vincae Sarwar, Alternaria tenuissima (Kunze ex Pers.) Wiltshire, Cladosporium cladosporides (Pers. ex. Fr.) de Vries and Periconia byssoides Pers. ex. Merat, and C. vincae is the new species and the other are new records.
In many cases the ubiquitous presence of *Cercosporella* sp. and *Alternaria* sp. was noted on many of these plants. These genera play a parasitic role as well as that of a secondary saprophytic invader under Bangalore agro-climatic conditions.

In all 1051 fungi belonging to different groups collected/isolated from 35 selected medicinal and aromatic plants belonging to widely separated plant families growing in different parts of India, under varying agro-climatic regions. These fungi include 18 new species, a new form, specialis and 99 new records which are presented here in a thesis form.