MEDICINAL PLANTS
SECTION - B.
Atropa belladonna L.

**Common name**: Belladonna

**Natural order**: Solanaceae

*Atropa belladonna* grows wild in Southern England and some parts of Europe and it is cultivated on a commercial scale in the U.S.A. It is grown commercially in some parts of Kashmir.

Belladonna contains, besides several alkaloids, hyoscyamine which has manifold uses in medicine. The indigenous production of Belladonna is much less compared to the country's requirements. To meet the needs, about a lakh of rupees is spent annually for importing the drug.

While describing the fungi of North West Himalaya, Ganguly and Pandota (1963) reported the occurrence of *Alternaria temuissina* and *Ascochyta atronae* from Jammu and Kashmir. Sarwar (1974) described *Cercospora belladonnae* Sarwar from Bangalore.

A blight of Belladonna was recorded and is described here.

1. **Blight of Belladonna**:

Seeds of *Atropa belladonna* obtained from the Regional Research Laboratory, Jammu were sown at the CIMPO E. & D. Farm, Bangalore during October 1971, where a blight disease was recorded. The same disease was also found from CIMPO Manaspal Farm, Srinagar during August 1974.

 Mostly at the time of flowering, small brownish spots were observed on the leaves, which enlarged gradually became darker and sometimes coalesced. Nevertheless, the affected leaves started drying leading to defoliation and in some cases, killing the plants.
**LEGEND**

**Fig. 73** Infection spots on the leaves of *Atropa belladonna* L.

**Fig. 74** *Cercospora belladonnae* Sarwar
Conidiophore and Conidia.

**Fig. 75** Conidia of *Curvularia trifolii* (Kauff.) Boed.

**Fig. 76** *Phomopsis Dioscoreae* Sacc.
From the necrotic region, *Cercospora belladonna* was isolated and in some cases the association of *Periconia clitoriae* was observed.

1. **Cercospora belladonna**e Sarwar (Fig. 74)


   Mycelium septate, branched, subhyaline; conidiophores simple, 2-3 septate, 5-10 in each fascicle, subhyaline to pale brown, straight or slightly curved, coniculate, tip obtuse with a conidial scar, 28.0-42.5 X 3.5-4.0 μ. Conidia (blastoconidia) borne singly and terminally, obclavate, subhyaline, 4-12 septate, straight or slightly curved, base truncate, tip acute, 42.0-80.5 X 3.0-3.5 μ.


2. **Periconia clitoriae** Subram. (Fig. 47)


   Conidiophores in clusters, unbranched, brown in colour, thicker and darker above, up to 4 septate, rarely 5, 110.0-150.0 X 3.0-4.5 μ. Conidia on sporogenous cells which are either single or in group at the apex or just below the septa laterally, globose, 5.0-8.8 X 4.0-6.5 μ. Conidia formed acropetally in simple or branched chains, mature from apex backward, brown, 1-celled, 8-10 μ in diam., globose, thick walled, verrucose.

   On semi dry and dry branches of *Atropa belladonna*, leg.

   M. Sarwar, CIMPO E, & D. Farm, Bangalore, 16.4.1972, CIMPO Herb.


*Periconia clitoriae* constitutes a new record on *A. belladonna*. 
Although two fungi viz., *Coronospora* and *Periconia* were recorded, the pronounced and ubiquitous nature of *Coronospora* indicates the causative role in Atropa blight.

**Control measures:**

Blitox-50 and Blitane in appropriate doses (0.3% per ha.) were tried but they failed to produce the desired effect and, therefore, a broad spectrum or a systemic fungicide is recommended.

**Record of Fungi on Atropa Belladonna from India.**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the disease</th>
<th>Fungi (Causative and Associated)</th>
<th>Place, Author(s)</th>
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</table>

* Discussed in the thesis.
+ New Record.
++ New Species & New Record.
Cassia angustifolia Vahl.

Common names : Indian Senna or Tirunelveli Senna.
Natural order : Leguminosae.

Cassia angustifolia is a native of Arabia. The Arabs introduced it in Southern India where it is cultivated extensively in Tirunelveli, Madurai and Tiruchanapalli.

The leaves and pods of Cassia angustifolia are the main sources of two important glycosides, sennosides A and B which are internationally regarded as the safest organic laxatives. Indian Senna is considered to be the most superior in the world market and our annual export without much of organized trade, goes to about 20 million rupees.

There are in all three fungi associated with the serious wilt and stem burn disease of Cassia angustifolia.

I. Wilt and Stem burn of Senna:

Senna was introduced at CIFOR E. & D. Farm, Bangalore during January 1973, where in some plots a serious wilt and stem burn disease was recorded.

When the plants of Cassia angustifolia were three months old, initially a brown discolouration appeared on the collar region, which slowly turned black and started extending upwards. In most of the cases, it remained at the first fork region, presenting a typical stem-burn look. But in few cases, it covered the whole plant. As the stem-burn zone advances from the collar region, typical wilting of the leaves occurred lost their turgidity, resulting in drying and defoliation. In course of a week’s time, the whole plant died.
**Legend**

Fig. 77  *Curvularia andropogonis* (Zimm.) Boed. - Conidia.

Fig. 78 Pycnidia and pycniospores of *Phoma cimpoensis* Sarwar

Fig. 79  *Cercospora sorghi* - Conidiophores and Conidia.

Fig. A  *Cassia angustifolia* Vahl. showing showing wilt and stem burn symptoms
From the affected collar region, branches and leaves, three fungi viz., *Fusarium avenaceum*, *Alternaria tenuissima* and *Cladosporium oxysporum* were isolated. They are described below:

1. *Fusarium avenaceum* Berk. and Curt.
   (cf. page 21, Fig. 19)

On living stem and collar region of *Cassia angustifolia*,
leg. M. Sarwar, CIMPO E. & D. Farm, Bangalore, 12.6.1973, IMI 177356-a,

2. *Alternaria tenuissima* (Kunze ex Pers.) Wiltshire
   (cf. Page 17, Fig. 29)

On semi dried branches of *Cassia angustifolia*, leg. M. Sarwar,
CIMPO E. & D. Farm, Bangalore, 12.6.1973, IMI 177356-c, CIMPO Herb.

   (cf. Page 109,)

On dried stem of *C. angustifolia* leg. M. Sarwar, CIMPO
E. & D. Farm, Bangalore, 18.6.1973, IMI 177356-b, CIMPO Herb Mycol.
Bang. 204.

All the three viz., *Fusarium avenaceum*, *Alternaria tenuissima* and *Cladosporium oxysporum* are reported as the new records on *Cassia angustifolia*.

Control measures:

To start with only one organic fungicide, Dithane Z-78,
at 2 kg in 1,000 litres of water per hectare, was applied fortnightly.
This gave poor results. Trials are underway with other systemic
fungicide as this annual was only recently introduced.

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<tbody>
<tr>
<td>1.</td>
<td>Wilt and Stem burn</td>
<td>*1. <em>Fusarium semitectum</em></td>
<td>Banga-</td>
<td>Sarwar(1973)</td>
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<td>+2.</td>
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<td>*2. <em>Alternaria tenassima</em></td>
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<td>+3.</td>
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<td>*3. <em>Cladosporium oxy sporus</em></td>
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* Discuss in the thesis.

+ New Record.
Chrysanthemum cinerarinifolium Vis.

= Pyrethrum cinerarinifolium Trev.

Common name : Pyrethrum,
Natural order : Compositae.

C. cinerarinifolium is a native of Dalmatia (Yugoslavia).
It is cultivated on a commercial scale in Algeria, Australia, Brazil, Bulgaria, China, Japan, France, Kenya, and the U.S.S.R.

Pyrethrum is the chief source of Pyrethrin, a contact poison, highly toxic to insects.

An account of the fungal diseases of Pyrethrum was given by Gurzi (1933) and Coet (1935). Fusarium liniicium Koorders and Sclerotium rolfsii causing extensive damage to this crop was described from Cherso and Java islands respectively. Itaka (1928) was the first to describe a wilt and decay of Pyrethrum by Sclerotium rolfsii and also by Fusarium sp., from Japan. From North America, Jones and Huber (1932) reported a serious wilt of Pyrethrum caused by Verticillium albo-atrum. Recently Robertson (1967) gave a detailed account of a Cephalosporium wilt. From India, Ramakrishnan and Soumini (1948) were the first to report a wilt disease of Pyrethrum from Kodaikanal. They studied in detail the syndrome of the disease, recorded the association of three fungi, viz., Phytophthora cambivora (Petri) Buie, Rhizoctonia solani Kühn and Fusarium sp. Further, they conducted pathogenicity tests and pointed out that the affected regions 'over run' by Fusarium sp. while P. cambivora was the real causative organism for the wilt. However, the role of R. solani was not clearly indicated. They also
reported dropping-off of Pyrethrum by Pythium sp., from the same place.

Sivanandappa and Govindu (1965) reported Verticillium wilt caused by *V. albo-atrum* from India and gave a detailed description of the symptoms and supported the view that *V. albo-atrum* Reinke & Berth., and *V. dahliae* be combined as *V. dahliae*, as suggested earlier by Foodyce et al. (1964).

Thakur and Hasein (1971) reported the root-rot caused by *Fusarium solani* (Mart.) Sacc., from the CIMPO Farm, Kashmir.

Two diseases of Pyrethrum recorded at Bangalore and The Nilagiris are described below with their fungi.

I. Blight of Pyrethrum:

During the years 1965, 1970 and 1971 at CIMPO Devanahalli Farm, CIMPO E. & D. Farm, Bangalore and at Cinchona Department Farm, Devanahalli, Octacurund, Tamilnadu, Pyrethrum developed a serious blight in the late winter and/or early summer.

Six months old plants showed brown patches, 2-4 mm in diam. near the apical region of the leaves. The patches enlarged irregularly; necrosis covered the entire leaf and the blight spread in patches thus proving fatal. The new suckers formed during the rainy season too succumbed to the blight in course of time with the result that the entire plant got slowly dried up.

The incident of the blight and the extent of injury was more during October to December than February to April.

The pathogen was isolated on P.D.A. and was identified as *Alternaria tenuissima*. 
1. *Alternaria tenuissima* (Kunze ex Pers.) Wiltshire

( of Page 17, Fig. 298A)


**Pathogenicity test:**

Plants were raised in sterile clay pots containing 500 gm of sterilized soil. The leaves of the healthy plants were inoculated by spraying spore suspension on abraded surface. Controls were maintained.

Typical infection patches developed after six days of inoculation. Infection was from 50 to 80% in cases of surface spraying and rubbing, respectively. Reisolations from the necrotic areas yielded the same fungus.

**Control measures:**

It is rather difficult to eradicate this blight by fungicides. Phyto-sanitary measures followed by two fortnightly sprays of Blitanc and Zineb gave fairly satisfactory results. Spraying Bordeaux mixture (4:4:50), fortnightly soon after the monsoon gave good protection against the infection.

II. **Leaf Blight of Pyrethrum :**

On the Russian variety of Pyrethrum a new leaf spot was noted at the CIMPO Devanahalli farm, Bangalore District which caused more damage than the *Alternaria* blight.

Infection spots brown, 2-6 mm in diam. and were mostly
Fig. 80  *Stemphylium nabara* Sarwar
A, B, C, - Conidiophores, D - Conidia.

Fig. 81  *Alternaria tenuissima* (Kunze ex Pers.)
Wiltshire - A, B, C, D, F - Conidia,
E - Conidiophore.
LEGEND

Fig. 82 An infected plant of Pyrethrum

Fig. 83 Heracleum candicans: Leaf showing infection at the apical region.

Fig. 84 An infected branch of Pyrethrum.
in the apical region of the leaves having dark advancing margins where the affected leaves showed puckering. This was a crippling disease which spread very quickly. Unlike the Alternaria blight, this appeared after the first flowering.

From the affected leaves a species of Stemphylium was isolated. In many cases on semi-dried and dried stems, Cladosporium oxysporum was also noticed.

Stemphylium sp. under discussion is close to S. callistephi Baker and Davis (1950) and S. betryosum (1935). The conidia of this taxon were neither roundish-square to rectangular, as found in S. betryosum nor pointed and broad like S. callistephi. On the contrary they are more or less oval, much longer and narrower with constrictions near the septa. Also it appears distinct from S. circiniformi (Cav.) Wiltshire by virtue of possessing slightly verrucose conidia. Therefore, a new species, Stemphylium nabarii was proposed to accommodate this organism.

1. Stemphylium nabarii Sarwar (Fig. 80)


Conidiophore simple, septate, fusoid, 315 μ long, and 6 μ wide with an apical swelling, up to 8.5 μ wide. Conidia oblong to obovate with a truncate apex, aereogenous on percurrenty proliferating conidiophores, fusoid, suriform, constricted at the septa, 42.0 - 50.0 X 17.0 - 20.0 μ.

On living leaves of Chrysanthemum cinerariaefolium,
M. Sarwar, CIMPO Dewanchalli Farm, Bangalore District, 3.10.1964,
2. **Clydesporium herbarum**

( cf. page 22)

On dried leaves of **Chrysanthemum cinezoriaefolium**,  
M. Sarwar, CIMPO Devanahalli Farm, Bangalore District, 24.11.1969,  

**Control measures:**

The efficacy of many copper fungicides was assessed and it was found that after the outbreak of the disease, they hardly prove effective. However, two or three rounds of prophylactic sprays of Bordeaux mixture (4:4:50) reduces the incidence of blight to a great extent.
<table>
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<tbody>
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<td>1.</td>
<td>Pyrothrum wilt</td>
<td>1. Phytophthora cembivora</td>
<td>Kodai-</td>
<td>Ramakrish-</td>
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<td>2. Rhizoctonia solani</td>
<td>kanal.</td>
<td>shnan, T. S.</td>
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<td>3. Fusarium sp.</td>
<td>&amp; Soumini</td>
<td>(1948)</td>
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<td>2.</td>
<td>Damping-off</td>
<td>1. Pythium sp.</td>
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<td>(1948)</td>
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<td>* 3.</td>
<td>Alternaria Blight</td>
<td>1. Alternaria tonnissima</td>
<td>Baran-</td>
<td>Srinath &amp;</td>
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<td>Blight.</td>
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<td>gore.</td>
<td>Sarwar (1965)</td>
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<td>* 4.</td>
<td>Leaf Blight. ++1</td>
<td>Stemphylium rehbarii</td>
<td></td>
<td>(1964)</td>
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<td>+ 2. Closotecium herbarum</td>
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<td>5.</td>
<td>Verticillium wilt.</td>
<td>1. Verticillium albo-strum</td>
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<td>Covindu (1965)</td>
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<td>6.</td>
<td>Fusarium wilt</td>
<td>1. Fusarium solani</td>
<td>Kashmir, Takur &amp;</td>
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<td></td>
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<td>2. Aspergillus sp.</td>
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<td>Akhtar Ha-</td>
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<td>main (1971)</td>
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* Discussed in the thesis.

+ New Record.

++ New Species and New Record.
Datura stramonium L.
= Datura insularis L.

Common name : Datura.
Natural order : Solanaceae.

*Datura stramonium* is one of the 10 species of *Datura* which are found as wild weeds throughout India. On account of its drug value, it is cultivated in the U.S.A. and Europe.

Leaves, stem, root and fruits of *D. stramonium* contain important alkaloids viz., hyoscyamine, atropine and small quantities of scopoline which are used in pharmaceutical preparations in the form of tinctures and extracts. Commonly the dried leaves are used in pipes to relieve asthmatic lung congestion.

Rend (1917) was the first to provide information on the leaf spot of *Datura* and found no similarity between the *Alternaria* disease of *Datura* and the early blight of *Potato* as pointed out by Cooke (1883). He identified the fungus as *Alternaria crassa* (Sacc.) Rend. Butler and Bisby (1931) reported its occurrence on various species of *Datura* including *D. stramonium* from India. Subsequently, it was reported from different parts of the country (Rao, 1962; Hasija, 1966; Bhangaswamy et al. 1970). Rao (1971) presented an account of *Alternaria* from India wherein he also included *A. crassa* on *D. stramonium*.

Another leaf spot causing fungus, *Cercospora daturicola* was reported by Chowdhury (1957) from Assam which was later reported by Thind and Singh (1964) from U.P. Still another species of *Cercospora* viz., *Cercospora jamaicensis* Crupp was also collected
on *D. stramonium* by Mathur et al. (1964) in Rajasthan. Gangopadhyay and Iswar (1972) described in detail charcoal rot disease of *D. stramonium* by *Macrophomina phaseoli*.

Two diseases viz., Leaf spot and Stem canker of *D. stramonium* are recorded and described below with their fungi:

I. **Alternaria leaf spot**

During January - February 1971, a leaf spot disease was noted on *Datura stramonium* and *D. metel* at the CDPO E. & D. Farm, Bangalore. It was noted that defoliation and the poor formation of fruits and seeds was due to this disease which reduced the alkaloid yield by 20%.

From the affected parts, **Alternaria crassa** was isolated.


   = Cercospora crassa Sacc.
   = Michelia 1: 88, 1877.

Spots epiphyllous, 5-10 mm, 2-4 on each leaf, golden brown, concentric zonation; conidiophores dark brown, straight or curved, geniculate, unbranched with a swollen base, 26.0 - 52.0 X 4.0 - 6.5 μ. Conidia (trigonoconidia) golden yellow to pale brown, obclavate, 4-10 septate, constricted at septa, vertical septa, 0-3, 82.0 - 210.0 X 12.0 - 18.0 μ; beak almost double in length than the conidium, slender, hyaline, 3-4 septate, 1.2 - 2.9 μ wide.

II. Branch and Stem Canker.

A serious branch and stem canker disease on *Datura stramonium* was observed during December 1971 at CIHEF Z. & D. Farm, Bangalore.

Fully grown *D. stramonium* plants exhibited distinct yellow areas on normal greenish white stem. The yellow areas which were just above or below the fork region became slightly sunken; the bark got split up and started rolling away with a central dark region. A rough callus was formed around the split area which gradually became elliptical, 1.5 - 3.5 X 0.5 - 1.0 cm sometimes circular, 1 - 1.5 cm in diam. The number of cankers varies from 1-10 on each affected plant, and sometimes 2 or 3 cankers coalesced. When the stem was completely girdled, wilt appeared on the foliage followed by drying and defoliation. The death of the plant was quick but in some cases, it lived in a stunted condition for weeks.

From the necrotic region, a species of *Phomopsis* was collected which is described here as new and named as *Phomopsis stramoniae* Sarwar sp. nov.

1. *Phomopsis stramoniae* sp. nov. Sarwar

Pycnidia amphigenous, minute, black, subepidermal, scattered, ostiolate. Mature conidia *spherischlytö* flask shaped 70 - 250 μ in diam. Pycnidiospores numerous, single type, 1-celled and elliptical, 3.5 - 8.5 X 2.0 - 2.5 μ.

Control measures:

Pruning well below the infected parts and then a weekly spray of Bordeaux mixture (4:4:50) reduces the progress of the disease. As a prophylactic measure, spraying with Bordeaux mixture fortnightly from the second month onwards provides satisfactory protection.

**RECORD OF FUNGI ON Datura stramonium FROM INDIA.**

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Name of the disease</th>
<th>Fungi (Causative &amp; Associated)</th>
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<tr>
<td>* 1.</td>
<td>Leaf spot</td>
<td>1. Alternaria cirsica</td>
<td>India</td>
<td>Butler &amp; Bisty (1931)</td>
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<td>Mysore.</td>
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<td>Mangaswamy et al. (1970)</td>
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<td>Rau (1971)</td>
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<td>Bengaluru</td>
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<td>Sarwar (1971)</td>
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<td>* 2.</td>
<td>Branch and Stem canker</td>
<td>1. Phomopsis stramonina</td>
<td>Bengaluru</td>
<td>Sarwar (1971)</td>
</tr>
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</table>

* Discussed in the thesis.
++ New Species and New Record.
Digitalis lanata Ehrh.

Common name: Wooly Fox glove.
Natural order: Scrophulariaceae.

Digitalis lanata is a native of Europe and Asia and is found naturally growing in Kashmir at an altitude of 5,000 - 8,000 feet. It is cultivated on a commercial scale at the CDFO Farms in Yarikah and Tungsari (Kashmir).

There are two species of Digitalis viz., D. lanata and D. purpurea which constitute the most important pharmaceutical plants of today. Of the two species, the leaves of D. lanata serve as a better source of the glycoside digitoxin used for regulating cardiac movement. It is also used as a myocardial stimulant in cardiac congestion.

Sarwar and Srinath (1965) described Corcospora digitalidis found in association with the leaf spot of D. lanata. Again from Bangalore, Sarwar (1974) reported Stephylinium digitalidis Sarwar. on the same host.

Two diseases viz., Leaf spot and Blight of D. lanata are described with their associated fungi here.

I. Corcospora Blight:

Since 1962, CDFO has been trying to acclimatise Digitalis sp. especially D. lanata at high altitudes in South India.

At CDFO Devarahalli Farm, D. lanata was introduced from Jammu, a serious leaf blight disease was observed during January 1964 and the same also occurred at CDFO E. & D. Farm, Bangalore during 1967.
At the apical region of the leaves, light brown spots were found which gradually increased in size and occupied half to entire leaf blade; the necrotic areas ultimately became dark brown and hastened the withering of the leaves. It was found that the disease, if allowed to develop took a long time to kill the plant. But browning and withering of the foliage reduces the yield of digoxin to a great extent.

From the necrotic areas Cercosporella digitalidias Sarwar was isolated.

*Cercosporella digitalidias* Sarwar (Fig. 54)
Sydowia 21, 1965.

Mycelium septate, branched, subhyaline, conidiophore simple 2-3 septate, 4-15 in each fascicle, subhyaline to pale brown, straight or slightly curved, sometimes geniculate, tip obtuse, or sub truncate with a spore scar on it, 25.5 - 33.0 X 3.0 - 4.5 µ. Conidia borne singly and terminally, obclavate, subhyaline, 3-7 septate or slightly curved, base truncate, tip acute, 45.0 - 68.0 X 3.0 - 3.7 µ.


Control measures:

After the outbreak of leaf spot and consequent blight, it is very difficult to control or eradicate the disease. But with prophylactic care, i.e., spraying Bordeaux mixture (4:4:50) fortnightly all round the year protects the plants very well.
II. *Stemphylium leaf spot*:

A leaf spot disease was recorded at CIMPO E. & D. Farm, Belur, during October - November 1969, which was somewhat similar to that of *Corrosium* blight.

At the distal end of the outer leaves, small black areas appeared and after a few days it was observed that the remaining part of the lamina dried up. The formation of black areas and drying of the leaves spread to other leaves and the whole plant turned into a mass of dry leaves.

The necrotic region *Stemphylium digitalididis* Sarvar was isolated.

*Stemphylium digitalididis* Sarvar (Fig. 96)

Conidiophores simple, septate, measuring up to 350 μ, long and 6 μ wide, with an apical swelling measuring up to 10 μ. Conidia oblong to obclavate with a truncate apex, aseptate, conidiogenous proliferating conidiophores, muriform, longitudinal septa are light compared to the cross septa, constricted at the septa, measuring 32.0 - 45.5 X 13.0 - 15.0 μ.


**Control measures**:

*Stemphylium* blight proved to be a more difficult disease to control as there was hardly any effect of copper, zinc or manganese dithio carbamate fungicides.
**RECORD OF FUNGI ON DIGITALIS LANATA FROM INDIA.**

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<tr>
<td>*1.</td>
<td>Leaf spot</td>
<td><strong>+1. Cercosporella digitilis</strong></td>
<td>Bangalore, Sarwar &amp; Srinath</td>
<td>(1965)</td>
</tr>
</tbody>
</table>

* Discussed in the thesis.

**+ New Species and New Record.**
LE G E N D

Fig. 86 Dioscorea composita Hemsl. showing leaf spots.

Fig. 87 Stemphylium digitalidis Sarwar Conidiophores and Conidia.

Fig. 88 Alternaria alternata (Fr.) Keissler - Conidia.

Fig. 89 Cerкосpora dioscoreae Sacc. Conidiophores and Conidia.
LEGEND

Fig. 90  Blighted branch of \textit{Datura stramonium} L.

Fig. 91  A branch of \textit{Datura stramonium} showing sunker areas.

Fig. 92  \textit{Datura stramonium} showing branch and stem canker.

Fig. 93  A branch of \textit{D. stramonium} showing a canker.
LEGEND

Fig. 94  A plot of *Digitalis lanata* Ehrh. showing infected plants in the front.

Fig. 95  A diseased plant of *Digitalis lanata*

Fig. 96  *Stemphylium digitalidis* Sarwar 550 X.
Dioscorea *composite* Hems.

Common name : Medicinal Yam.
Natural order : Dioscoreaceae.

Out of 600 species belonging to Dioscoreaceae, 30 have been reported from India which are mostly the edible yams but *D. composite* is an exotic species, introduced from Central America where, apart from Mexico and Puerto Rico, it grows in wild state. It is cultivated on a large scale in Mexico, Puerto Rico, U.S.A., and South Africa. It was recently found that *D. composite* grown under Indian conditions contains the highest quantity of sapogenin which constitutes the basic raw material for the synthesis of steroids, steroid hormones, including sex hormones, used as an active ingredient in oral contraceptive pills.

*D. composite* and the two other Central American species, viz., *D. spiculiflora* and *D. floribunda* were introduced at the CIMPO Devarahalli Farm, Bangalore District during May 1966.

Much work has been done on the pathology of *D. alata* (edible yam) and on *D. deltoidea* (an indigenous medicinal plant) but so far there is no report of any fungus on *D. composite*. In a few instances, however, the host is reported as Dioscorea species by Govindu and Thirumalachar (1956), Rangaswamy *et al.* (1970) but considering the exotic nature of the plant, it is less likely that they have referred to *D. composite*.

The fungi and the diseases recorded on *D. composite* are as follows.
I. Leaf spot.

A high yielding strain of *Dioscorea composite* obtained from Ballis India Limited was introduced in 1965 first as an experimental trial at the CDFO Dewanahalli Farm, Bangalore District and after evaluating the yield etc., the stock was planted at CDFO E. & D. Farm, Bangalore during 1960 where a leaf spot disease was recorded on two year old plants.

Big brownish spots 5-10 mm in diam. were noted mostly on the margin of the older leaves. They enlarged irregularly, the colour of the patches remained the same, or sometime it became paler and the texture of the affected areas at times became relatively thinner than the surrounding lamina. The affected leaves become dry leading to defoliation.

From the affected leaves, *Cercospora dioecrea* Ellis & Martin was isolated. In many cases the presence of *Alternaria alternata* was also noted.

1. *Cercospora dioecrea* Ellis & Martin (Fig. 89)

   Amer. Nat. 16: 1003, 1883.

   Chupp, C. A monograph of the fungus genus *Cercospora*, p. 197, 1953.


   = *Cercospora rubilascens* E. & E.

   J. Mycol. 4: 115, 1888.

Spots brown, 0.5 - 1.0 cm broad, irregular, mostly near the margin, fruiting amphigenous, but often hypophyllous, conidiophores in tufts, brown, simple, septate, sympodial, 30.0 - 40.0 X 3.0 - 4.0 u; conidia (blastosporidia) sub-cylindrical, slightly narrow upward,
subhyaline, 4-8 septate, 40.5 - 86.0 x 4.0 - 4.5 μm.


It is a new host record on D. composite.

Control measures:

After observing the conventional phyto sanitary practices, a weekly spray of Blitex-50, 0.3% was given for two months from January to March gave satisfactory results.

II. Phomopsis blight of Dioscorea:

On some of the creepers of D. composite a severe disease was recorded at the office premises of CIMPO Regional centre, Bangalore.

Small light grey, more or less circular spots with black margin appeared on two year old creepers. Affected leaves dropped off prematurely and the infection spots were covered with numerous pycnidia. At the advanced stage, petiole and stem also developed elongated blackish brown lesions.

From the affected leaves, Phomopsis dioscoreae was identified.

Phomopsis dioscoreae Sacc.

Pycnidia minute, black, sub-epidermal, ornament and ostiolate. Mature pycnidia flask shaped, 80.0 - 360.0 μm in diameter and the neck measures 22.5 - 76.5 μm in length. Pycnidiospores numerous, single type, 1-celled and elliptical, 4.5 - 6.8 x 2.2 - 2.7 μm.
On leaves, petiole and stem of *Dioscorea composita*,

Bang. 198.

This constitute a new host record.

Control measures:

A spray of Furadan was found effective.

### RECORD OF FUNGI ON *Dioscorea composita* FROM INDIA.

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Name of the disease</th>
<th>Fungi (Causative &amp; Associated)</th>
<th>Place, Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>1.</em></td>
<td>Leaf spot</td>
<td><em>1. Cercospora</em> <em>dioscoreae</em></td>
<td>Bangalore, Sarwar(1972)</td>
</tr>
<tr>
<td><em>2.</em></td>
<td>Phytophysis blight.</td>
<td><em>1. Phytophysis</em> <em>dioscorea</em></td>
<td></td>
</tr>
</tbody>
</table>

* Discussed in the thesis.

+ New Record.
**Herculeum condicans** L.

Common name: Cow Parsnip.
Natural order: Umbelliferae.

*Herculeum condicans* grows wild in certain parts of Kashmir, as a perennial herbaceous plant.

In recent years, *H. condicans* is gaining importance due to its extremely amazing pharmacological properties. It is the source of a new furanocumarin, heraclein, extracted from the roots.

Arthur and Cummings (1933) recorded *Puccinia heraclei* from Srinagar on *Herculeum condicans*. Cummings (1943) further reported *Aecidium stewartianum* on *H. condicans* from Kashmir. Sukapuri and Thirumalaiah (1963) in their studies of *Septoria* sp. described *Septoria condicans* from India.

*H. condicans* has shown good response to the socio-climatic conditions of Bangalore and it grew very well in the beginning. But in 1972, when the plants were about 8 months old, a serious blight disease was noticed.

**Leaf Blight of Herculeum**

A severe leaf blight disease by a species of *Cercospora* was recorded at Bangalore, which is described below.

Pale brown patches, 4-6 mm were found on the apical and peripheral region of the leaves. They gradually increased in size, turned dark brown in colour, eventually the necrosis covered the entire leaf area and proved fatal to the plants.

The fungus was reported as *Cercospora condicans* Sarwar.
Cercospora candida\textsuperscript{a} Sarwar (\textit{Fig. 66})


Mycelium septate branched, subhyaline; conidiophore simple, 2-4 septate, 4-12 in each fascicle, subhyaline to pale brown, straight or slightly curved, sometimes geniculate, tip obtuse with a spore scar, 22.5 - 32.0 × 2.0 - 4.5 μ. Conidia (blastic conidia) borne singly and terminally, obclavate, subhyaline, 4-7 septate, slightly curved, base truncate, tip acute, 48.5 - 70.0 - 3.0 - 3.7 μ.


\textit{Control measures}:

Three weekly sprays of 0.3 % Blitox-50, at the onset of brown spots with necessary phytosanitary procedure controls the blight.

\textbf{RECORD OF FUNGI ON \textit{HERACLEUM CANDIDUM} FROM INDIA.}

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Name of the Disease</th>
<th>Fungi (Causative and Associated)</th>
<th>Place</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rust</td>
<td>\textit{Puccinia heraclei}</td>
<td>Srinagar, Kashmir</td>
<td>Arthur Curnins (1930)</td>
</tr>
<tr>
<td>2.</td>
<td>-</td>
<td>\textit{Accidium stewartieum}</td>
<td>Kashmir</td>
<td>Curnins (1943)</td>
</tr>
<tr>
<td>3.</td>
<td>Leaf spot</td>
<td>\textit{Septoria candida}</td>
<td>India, Sukkur</td>
<td></td>
</tr>
</tbody>
</table>

* Discussed in the thesis.
+ New Record.
Rauvolfia serpentina Benth. ex Kurz.

= Rauvolfia longifolia A. DC. Mgr.

= Rauvolfia stonophylla Donn. Sm.

Common names : Sarpagandha or Rauvolfia.
Natural order : Apocynaceae.

Rauvolfia serpentina grows in all tropical parts but is found wild in India, Pakistan, Ceylon, Burma and Siam. There are about 120 species of Rauvolfia but interest is mostly centred on the Indian R. serpentina and more recently on the African R. vomitoria. The roots and leaves of R. serpentina were long used in Unani and Ayurvedic medicines as antidote for bite of reptiles, stings of insect, hypertension and various nervous disorders and insanity. In all there are about 2 dozen different alkaloids in R. serpentina but the most important are reserpine, reserpinine, serpentinine, serpenine, ajmaline and ajmalinone which are chiefly used in the pharmaceutical industries.

R. serpentina is one of our oldest and important plants and due to its manifold applications in Indian medicine, a considerable work has been done on almost every aspect including mycology and plant pathology, especially in Jammu and Gujarat where it was under large scale cultivation.

Varadarajan (1958, 1964, 1964 and 1966) reported four important diseases of Rauvolfia from Panoli (Gujarat), giving in detail the symptoms of the diseases, morphology of the fungi, pathogenicity and also developed a few successful control measures. He recorded Blight by Alternaria tenuis in 1958, leaf spot by Hellicularia filamentosa in 1964, reported anthracnose by Colletotrichum-
gleosporides Renz. from Mexico in 1964, leaf spot and premature
defoliation by *Grvalxia lunata.*

Ganguli and Pandotra (1963) for the first time reported
powdery mildew of *R. serpentine* by *Leveillula trisica* from Jammu.
Janardhanan et al. (1964) described Fusarium wilt by *F. oxysporum*
and again Pandotra and Ganguly (1969) found the association of
*F. oxysporum* and *F. solani* on the same host. Pandotra et al. (1966)
also described Corynespora cassicola and Corynespora rauwolfiae on
*R. serpentine*.

Lale and Asha Ram (1967) from I.A.R.I., recorded a
serious die-back disease of *R. serpentine* by Colletotrichum dematiu.
They gave an elaborate account of the syndrome and etiology, patho-
genicity, percentage of casualties and efficacy of three fungicides.

Ramakrishnan, T.S. and K. (1960) recorded Mycosphaerella
rauwolfiae, from Walayar, Halbera. Padma et al. (1970) reported
on the rhizosphere mycosflora of *R. serpentine* and found the presence
of *Mucor, Cunninghamella, Chaenotheca, Chaetomium, Phoma,
Stachybotrys, Trichosporium* and *Heterosporium.*

The diseases and their fungi recorded on *R. serpentine*
can be as follows:

I. Leaf Blight;

At the CIPRO Farm, Devanahalli and also at CIPRO E. & D.
Farm, Bengaluru, a leaf blight disease was recorded mostly during
early winter season. When the plants were about one year old,
small brownish spots appeared on the leaves, mostly at the margin
which gradually enlarged, covered the entire lamina followed by the
drying and defoliation. The shedding of leaves was not often but yet affected the general growth and resulted in a stunted root system.

From the necrotic areas, Alternaria alternata was isolated.

*Alternaria alternata* (Fr.) Keissler

(cf. page 15, Fig. 3)


Pathogenicity test:

A spore suspension was prepared from 8 day-old cultures by mixing a culture slant of *A. alternata* in 50 ml of sterile water. Spore suspension was sprayed on healthy potted plants by an atomizer and they were maintained along with the control in a separate well-protected chamber. After 8 days, few marginal brown spots appeared and from the necrotic areas, the same fungus was reisolated.

Control measures:

Soon after the rainy season, fortnightly spray of 0.3% Biflux till early summer protects the plants very well.

II. Powdery mildew

The occurrence of powdery mildew on *Hauwlfia* is common throughout India, and especially during the drier parts of the year. The disease was observed at CIMPO Devanahalli Farm, and also at CIMPO E. & D. Farm, Bangalore.

White powdery or dusty growth of fungal spores were first seen on the leaves which gradually extended to the stem, floral parts
as well as to fruits. In severe attack, death of the plant was also recorded. Generally it affected the rate of growth of the plants and also of underground parts which directly reduces the yield of alkaloid.

*Leveillula truxia* (Lev.) Arn. was isolated from the affected leaves and stems of *R. serpentina*.

*Leveillula truxia* (Lev.) Arn.


Control measures:
Karanthene WD (25% dinitrophenyl crotonate), 1 kg per hectare fortnightly, 4 sprays proved most effective.

III. *Cercospora* leaf spot.

At CDPO Devanahalli Farm, and also at CDPO E. & D. Farm, Bangalore occurrence of brown spots mostly on the older parts of *Rauwolfia* is common.

Usually when the plants were about 2 years old, brownish spots appeared on the margin and also on apical ends of leaves which enlarged gradually, sometimes coalesced and became darker in color. In a few days time, it resulted in defoliation due to drying of the
LEGEND

Fig. 97 Collectotrichum dematium (Pers. ex Fr.) Grove. Conidiophores, setae and conidia.

Fig. 98 Cercospora rauvolfiae Chupp. & Muller Conidiophores and Conidia.

Fig. 99 Phaeotricocnis rauvolfiae sp. nov. Conidiophore and Conidia.
affected leaves and thus the growth of the plant was very much affected.

From the necrotic areas, two fungi viz., Cercospora and Phaeotrichoconis were isolated.

Earlier, *C. rawolfigia* Muller and Chaya (1942) and *C. serpentinae* Pandita (1966) were described on *R. serpentina*. The two referred species have much in common except in the size of conidiophore and conidia which perhaps were the main consideration for Pandita erecting new species, *C. serpentinae*, although he did not offer any reasons for it. But in the absence of any distinct difference the old name is retained and the fungus is classified as *C. rawolfigia* with the corresponding change of spelling in *Rauwolfia*.

1. Cercospora rawolfigia Chaya and Muller (Fig. 98)  
   = Cercospora serpentinae Pandita and Husain  
   Pandita, V.R. and Husain, A.  

Leaf spots amphigenous, dark brown, irregular in shape, upto 15 mm in diam. fruiting olivaceous, hyophyllous, conidiophores, pale to dark brown, erect sometimes bent at the tip, septate, tip obtuse, 30.0 - 42.5 X 3.0 - 3.5 μ. Conidia light yellow, straight or slightly curved, filiform, tip obtuse, base truncate, measuring 45.5 - 55.2 X 2.5 - 3.2 μ.


The other collected fungus is a *Phaeotrichoconis* Subram. It differs from the reported species as the conidia are well
constricted at the septation, second cell always broader and longer and point of attachment of the conidia is considerably pointed. Hence the organism is designated as a new species and named as Phaeo-
trichochonis ruwelfiae Sp. nov. Sarwar.

Phaeotrichochonis ruwelfiae sp. nov. Sarwar (Fig. 99)

Colonies greyish brown, cottony, mycelium superficial, branched, greyish brown; conidiophores not sharply distinguishable from the hyphae, unbranched, erect, septate, slightly swollen at the apex, pale brown, 60 - 140 µ long, 3.5 - 7.0 µ wide. Conidia solitary, elongate, fusiform, golden brown, thick walled, 5-6 septate, always second cell broader and longer than others, well constricted at the septa, point of attachment narrow, dark, 50.0-80 µ long, 17 - 25 µ wide at the broadest part, appendage long, hyaline, 50.0 - 100.0 X 1.0 - 2.5 µ.

On living leaves of Rauwolfia serpentina, leg. M. Sarwar,
CIDPG E. & D. Farm, Bangalore, 10.4.1966, CIDPG Herb. Mycol.
Beng. 129.

Control measures:

Fortnightly spray of Flitane 0.3% from January - April controls the spots very well.

IV. Die-back.

At the CIDPG Regional Centre, Bangalore, where a small stand of R. serpentina was maintained for the study of abscission layer at the inflorescence region, a die-back disease was observed during February - March 1967.
On leaves, twigs and flowers of *R. serpentina*, numerous spots bearing acervuli were found scattered all over the surface which later on resulted in the complete destruction of the lamina and entire shoot.

_Colletotrichum dematioides* and _Curvularia* sp. were isolated from the affected twigs and leaves.

1. *Colletotrichum dematioides* (Pers. ex Fr.) Grove

(of page 110, Fig. 629)


In view of the strikingly different morphological character with all the other described species of _Curvularia_, the under report is designated as a new species and named as _Curvularia rauwolffiae_ sp. nov.

2. *Curvularia rauwolffiae* sp. nov. Sarwar (Fig. 48)

Mycelium branched, septate, subhyaline. Conidiophores pale brown, simple, septate, 2-5 μm diam. variable in length, geniculate, producing conidia singly and acrogenously; conidia 3 septate, fusiform, straight, second cell darker, third cell broader, apical cell hyaline, tip rounded, 24.0 - 40.0 X 10.0 - 20.0 μm.


**Control measures:**

A fortnightly spray of 0.2 % Dithane Z-78 with suitable sanitation practices reduces the incidence of die-back.
<table>
<thead>
<tr>
<th>S.no.</th>
<th>Name of the disease</th>
<th>Fungi (Causative &amp; Associated)</th>
<th>Place</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sarwar (1973)</td>
</tr>
<tr>
<td>2.</td>
<td>Leaf spot</td>
<td>*1. Pellicularia filamentosa</td>
<td></td>
<td>Varadarajan (1964)</td>
</tr>
<tr>
<td>3.</td>
<td>Leaf spot</td>
<td>*1. Curvularia lunata</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sarwar (1967)</td>
</tr>
<tr>
<td>5.</td>
<td>Fusarium wilt.</td>
<td>*1. F. oxysporum</td>
<td>Jammu</td>
<td>Janardhanan et al. (1964)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2. F. oxysporum * and</td>
<td></td>
<td>Pandit et al. (1966)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2. F. solani</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Leaf spot</td>
<td>*1. Cryptospore cucicola</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2. Pheostichosporus reuvelfiae</td>
<td></td>
<td>Sarwar (1973)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2. Curvularia reuvelfiae</td>
<td></td>
<td>Sarwar (1973)</td>
</tr>
</tbody>
</table>

* Disussed in the thesis
++ New Species and New Record.
Solanum khasianum C.B. Clarke.

var. Chatterjeanum Sen Gupta

= Solanum khasianum Clarke

Common name : Solanum khasianum.
Natural order : Solanaceae.

Solanum khasianum is found wild in the Khasi and Jaintia hills of Assam, NEFA, Sikkim, West Bengal, the Nilgiris and some parts of Karnataka.

The berries of S. khasianum has recently gained prominence because of its richness in 'solasonine' which serves as a starting material for the production of various steroid hormones including oral contraceptives.

Bordoloi et al. (1971) reported a wilt disease of Solanum khasianum from Assam caused by Fusarium oxysporum Schlecht. ex Fr. which becomes more serious at the time of flowering and fruiting. He also suggested that instead of transplanting, the direct sowing of S. khasianum, preferably in the months of September-October, reduces the wilt incidence.

A leaf spot disease was recorded at Bangalore which is described below:

I. Ceratospora leaf spot:

Seeds of Solanum khasianum obtained from the Regional Research Laboratory, Jammu were sown at CIMPO E. & D. Farm, Bangalore during September 1970 where, in addition to nematode infection, a new leaf spot disease was also recorded.

When the plants were about 4 months old, brown spots,
LEGEND

Fig. 100  Mildewed plants of *Rauwolfia serpentina* Benth. ex Kurz.

Fig. 101  *Solanum khasianum* showing leaf spots.
3 - 5 mm in diam. were observed, mostly in the central region of the leaves. The spots which were only on a few plants in the beginning, started becoming more common, enlarged in size and resulted in defoliation.

From the affected parts, Cerкосpora khasiannae and *Alternaria tenuissima* were isolated:

1. **Cerкосpora khasiannae** Sarwar


   Leaf spots amphigenous, round to oval, mycelium septate, branched, subhyaline; conidiophore simple, 2-3 septate, 4-8 in each fascicle, subhyaline to pale brown, slightly curved, geniculate. Conidia (*blastoconidia*) borne singly and terminally, obclavate, subhyaline, 3-8 septate, slightly curved, base truncate, tip acute, 40.0 - 78.5 X 3.0 - 3.5 μm.


2. **Alternaria tenuissima** (Kunze, ex Pers.) Wiltshire

   (cf. Page 17, Fig. 29)


   This is a new host record.

**Control measures:**

Fortnightly spray of Blitane, a copper oxychloride + Zineb before flowering till fruiting controls the occurrence of leaf spots satisfactorily.
<table>
<thead>
<tr>
<th>No.</th>
<th>Disease</th>
<th>Fungi</th>
<th>Place</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wilt</td>
<td><em>Fusarium oxysporum</em></td>
<td>Assam</td>
<td>Bordoloi et al. (1971)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ 2. <em>Alternaria tenuissima</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Discussed in the thesis.
+ New Record.
++ New Species and New Record.
Vinca rosea L.

= Calthorpea rosea L.
= Lockheedia rosea (L.) Reichb.

Common names: Sadabahar, Sadaphul or Vinca.
Natural order: Apocynaceae.

Vinca rosea is a native of West Indies but is commonly grown throughout India mostly in cemeteries. There are two varieties of Vinca i.e., the Pink and the White flowered, both are common.

Recently its importance has shot up as a group of alkaloids, commonly designated as 'VLB' group have been found promising against diabetes, cancer and cardiac diseases. In the Indian system of medicine it was practised for long against diabetes and wasp sting.

Dastur (1916) described Phytosphera coloensae on V. rosea from Fussa, Bihar.


A serious leaf-twig blight disease was recorded at CRFO E. & D. Farm, Bangalore which is described with its fungi.

I. Leaf Twig Blight of Vinca:

A new and serious leaf and twig blight disease was recorded on both Pink and White varieties of Vinca at Bangalore.

The disease appeared on one year old plants as brown patches,
LEGEND

Fig. 102 *Rauvolfia serpentina* showing leaf blight.

Fig. 103 A branch of *Vinca rosea* showing leaf spots.
LEGEND

Fig. 104 Alternaria crassa (Sacc.) Rand. 550 x.

Fig. 105 Alternaria alternata (Fr.) Keissler 550 x.

Fig. 106 Pestalotiopsis mangiferae (F. Henn.) Steyaert Conidia 550 x.

Fig. 107 Telia of Fusicus nakanihiki 550 x.
3-6 mm in diam. with feeble zonation on the leaves enlarging irregularly. Necrosis slowly covered the entire lamina. The attachment of the infected leaves, even at the initial stage became very weak which resulted in the total defoliation of the branches. Later, the affected branches in the apical region started getting dried which worked downwards and in course of two weeks, the whole plant appeared to be a mass of dried dead twigs.

From all the necrotic spots of the leaves and from the affected branches, *Cercospora vincae* was collected. In addition, *Alternaria tenuissima*, *Cladosporium cladosporiodes* and *Periconia byssoides* elsewhere were noted.

1. *Cercospora vincae* :

   Sylwia, 1974 (in press).

Leaf spots ophidigenous, 1 or 2 on a leaf, pale brown, round to oval, mycelium intercellular, septate, branched, subhyaline, conidiophores simple, 2-3 septate, fasciculate, subhyaline to pale brown, slightly curved, geniculate, tip obtuse or sub truncate, with a conidial scar, 24.0 - 36.0 x 3.0 - 4.5 μm. Conidia (blastocentric) borne singly and terminally, subhyaline, obclavate, 3-8 septate, straight or slightly curved, base truncate, tip subacute, 48.0 - 62.0 x 3.0 - 3.5 μm.


2. *Alternaria tenuissima* (Kunze ex Pers.) Wiltshire

   (cf. Page 17, Fig. 29)

3. *Cladosporium cladosporioides* (Frøsæn.) de Vries.

(cf. Page 13, )


4. *Periconia byssoides* Pers. ex Norst

(cf. Page 60. )


It is pertinent to point out here that Tilak 1958, and V.G. Rao 1962, reported *Periconia byssoides* under three names, viz., *P. parasitica* Tilak, *P. zanthicola* V.G. Rao and *P. incremen* V.G. Rao. Further, even in 1958, Tilak took *P. hypogaea* as a valid epithet and compared his new species with it and considered the taxa as a parasite. It is really unfortunate to note that Anahosur and Fazalnoor 1972 cited *Periconia Bon*. Paradoxically, like the authors of Indian parasitic species, Anahosur and Fazalnoor described *P. byssoides* as producing leaf blight of Soybean which, in fact, is a secondary invader, a fact which was established as early as 1953 by Mason and Ellis (1953).

*Cercospora vinca* was found to be responsible for the leaf-twig blight of *Vigna*. The three other fungi viz., *A. terumiennis*. 

: 157 :
C. cladosporides and P. byssoides have been collected as saprophytes or secondary invaders. They are found to be new records.

Control measures:

A fortnightly spray of Bordeaux mixture (4:4:50) on three months old plants and onwards minimizes the formation of leaf spots and twig blight to a great extent.

RECORD OF FUNGI ON VIGNA ROSEA FROM INDIA.

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Name of the disease</th>
<th>Fungi (Causative and Associated)</th>
<th>Place, Author(s)</th>
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<tbody>
<tr>
<td></td>
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<td>+ 2. Alternaria tenuissima</td>
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<td>+ 3. Cladosporium cladosporides</td>
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<td>+ 4. Petricola byssoides</td>
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</tbody>
</table>

* Discussed in the thesis.
+ New Record.
++ New Species and New Record.
*Withania somnifera* Danae

Common names: Ashwagandha or Agandh.

Natural order: Solanaceae.

*Withania somnifera* is a native of India, found throughout the drier parts, especially in Madhya Pradesh, where this is cultivated in over 5,000 hectares. It is also common in parts of South Africa.

Ashwagandha is one of the oldest and widely used plant of Ayurvedic and Unani systems of medicine in which almost all the parts of the plant are used for curing various disorders. Besides other alkaloids, it contains 'somniferine', which is used for hypnosis and as a sedative.

Mandkur and Ahmad (1946) were the first to report the occurrence of *Cercospora withaniae* from a locality which is now in Pakistan. Later, Vasudeva (1954) recorded it from the I.A.R.I., New Delhi. Subsequently, Pandittra and Guggil (1964) reported the same fungus from Jammu and Kashmir.

A *Cercospora* leaf spot was recorded on *Withania somnifera* from Bangalore also which is described below.

**Leaf spot:**

A few plants of *Withania somnifera* were planted at the CIIPO Devanahalli Farm, Bangalore District during 1964-1965, where a leaf spot disease was noticed.

Small greenish brown spots manifested on the leaves which grew irregularly and covered the entire lamina, creating drying and defoliation.

*Cercospora withaniae* was isolated from the affected areas.
Cercospora withaniae H. & P. Sydew.

Ann. mycol. 10: 444, 1912.

Saccardo, Syll. Fung. 25: 891, 1931.

Chupp, C., A monograph of Genus Cercospora, p.553, 1963

Vasudeva, R.S. Indian Cercosporae, ICAR Publ. 1961.


Leaf spots small, 25- 45 u in diam. light brown, indistinct, conidiophores short, continuous, 2-4 septate, with few geniculate, 30.0 - 55.0 x 3.0 - 4.5 u, olivaceous, conidia subhyaline, filiform, 2-5 septate, ends obtuse, tapering towards the apex, 45.0 - 65.0 x 2.5 - 3.7 u.


**RECORD OF FUNGI ON TITH. SOMNIFER. FROM INDIA.**

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Name of the disease</th>
<th>Fungi (Causative &amp; Associated)</th>
<th>Place</th>
<th>Author(s)</th>
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<td>2. ________________</td>
<td>Jurr and</td>
<td>Pandotra and</td>
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<td>Bangalore</td>
<td>Sarwar (1966)</td>
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*Discussed in the thesis.*