

CHAPTER VI

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TAXONOMIC  
TREATMENTS

# 1. INTRODUCTION

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## 1. I N T R O D U C T I O N

A great many fungi are known that have septate hyphae and so far as any one has been able to discover, reproduce only by means of conidia. These fungi comprise the form class Deuteromycetes of the subdivision Deuteromycotina. The form class is divided into three form sub-classes, since all these fungi apparently lack a sexual phase (perfect stage), they are commonly called 'imperfect fungi' or 'Fungi Imperfecti'. With the discovery of the parasexual cycle that operates in many if not all of these fungi and offers them some of the advantages of sexuality, it is not all inconceivable that some of the Deuteromycetes have never had a perfect stage.

According to Ainsworth (1971), there are about 15,000 species included in the subdivision Deuteromycotina. The vast majority of these organisms are terrestrial, although a good number have been reported from marine and fresh water habitats. The majority are either saprobes or weak parasites of plants. A few are parasitic on other fungi and some even trap and consume nematodes. On the other hand, many are of great importance to us because they are parasites that cause serious diseases of plants, animals and human beings. The chemical activities of many Deuteromycetes are also of direct importance to humans. Some are used in the commercial production of certain chemicals, including some antibiotics.

## **2. DEUTEROMYCETES**

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## 2. D E U T E R O M Y C E T E S

Traditionally, the fungi included the subdivision Deuteromycotina have been placed in the single large form class - Deuteromycetes. Recently, however, there has been a tendency to split the Deuteromycotina into the form classes Blastomycetes, Coelomycetes, Hyphomycetes. The form sub-classes Hyphomycetidae, Coelomycetidae and Blastomycetidae are delimited in accordance with the following key.

**KEY TO THE FORM SUBCLASSES OF THE FORM CLASS DEUTEROMYCETES :**

- A. Soma consisting of yeast cells with or without pseudomycelium; true mycelium, if present, not well developed ..... **Blastomycetidae.**
- A.A. Soma consisting of well developed, septate hyphae. ....  
..... B.BB.
- B. Reproduction by means of conidia, borne in pycnidia or acervuli..... **Coelomycetidae.**
- B.B. Conidia, when formed, not borne in pycnidia or acervuli...  
..... **Hyphomycetidae.**

The first criterion is judging the validity of the characters are used in the taxonomy of the Deuteromycetes is

their stability under a variety of environmental conditions. Obviously, a character that changes 'with the wind' is not good one to use in separating taxonomic categories.

In order to discover, however, the stability of a certain characteristic, much experimental work is required that not only is time consuming but also requires elaborate equipment for the control of the environment. A considerable amount of experimental work has shown that many characteristics used in delimiting form-genera of the Deuteromycetes are quite unstable under different environmental conditions, at least in artificial culture.

**SUB-CLASS - COELOMYCETIDAE**

True mycelium present. Produce their conidia in pycnidia or acervuli.

**KEY TO THE ORDERS OF SUB-CLASS COELOMYCETIDAE :**

- 1) Conidia produced in pycnidia. ... **Sphaeropsidales.**
- 2) Conidia produced in acervuli ... **Melanconiales.**

**ORDER SPHAEROPSIDALES**

The distinctive structure of this order is pycnidium. Pycnidia may be quite different in appearance from one form genus to next. They may be superficial or immersed, globose, elongate or cup like, unilocular or multilocular and light or dark in colour.

**KEY TO FAMILIES OF ORDER SPHAEROPSIDALES :**

- 1) Pycnidia are dark coloured, globose, leathery to carbonous, stromatic, non stromatic, generally (but not always) provided with a circular opening  

... **Sphaeropsidaceae.**
- 2) Pycnidia are light coloured, globose, leathery to carbonous, stromatic or non-stromatic.      ... **Nectoridaceae.**
- 3) Pycnidia shield shaped or elongate, flattened  

... **Leptostromataceae.**
- 4) Mature pycnidia more or less cup or saucer shaped.  

... **Excipulaceae.**

**FAMILY SPHAEROPSIDACEAE**

This is a large form family containing saprobic as well as plant parasitic species. Form genera producing hyaline spores. Pycnidia are dark coloured, globose, leathery to carbonous, stromatic, non-stromatic, generally (but not always) provided with a circular opening.

## KEY TO GENERA OF FAMILY SPHAEROPSISIDACEAE

Conidia one celled, ellipsoid or spherical, hyaline,  
Pycnidia smooth, without appendages, papillate; Conidia less than  
15  $\mu$ .

- 1) Causing leaf spots ... Phyllosticta.
- 2) On any part of the host, mostly stems. ... Phoma.
- 3) Conidia over 15  $\mu$  long ... Macrophoma.
- 4) Conidia intermingled with stylospores ... Phomopsis.
- 5) Pycnidia with long beak ... Sphaeronema.

Pycnidia setlose

- 6) Bristles round the ostiole ... Pyrenochaeta.

Pycnidia several to a stroma, irregular

- 7) Conidia small, allantoid ... Cytospora.

Conidia one-celled, coloured, pycnidia glabrous with ostiole.

- 8) Conidia oval to elongate, large ... Sphaeropsis.
- 9) Pycnidia in hyphae of powdery mildews ... Cicinnobolus.  
(Ampelomyces).

Conidia two celled, hyaline, pycnidia glabrous, ostiolate.

- 10) Conidia without appendages ... Ascochyta.

- 11) Conidia with short tufts of bristles at both ends,  
parasitic on rust fungi ... Darlucia.

Conidia coloured, pycnidia glabrous, free, subspherical, ostiolate.

- 12) Conidia without slime, 2 celled ... Diplodia.

- 13) Pycnidia in clusters, subepidermal, conidia 1 celled  
when young; becoming 2 celled at maturity

... Botryodiplodia.

- 14) Conidia X celled, dark coloured, without appendages

... Hendersonia.

Conidia thread like, hyaline or slightly coloured, Pycnidia without  
stroma, glabrous.

- 15) Parasitic on leaves ... Septoria.

**AMPELOMYCES Ces.**( = Cicinnobolus Ehrenb )

Pycnidia dark, rounded, clavate or fusoid, developing on the conidiophores of powdery mildew fungi (Erysiphaceae), with or without ostiole. Conidia hyaline or subhyaline to dark, one celled, ovoid to oblong. Parasitic on Erysiphaceae.

**KEY TO THE STUDIED SPECIES OF AMPELOMYCES Ces. :**

- 1) Pycnidia are amphiphyllous; conidia are hyaline to subhyaline,  $6-8 \approx 3 \mu$ . ... A. major.
- 2) Pycnidia are epiphyllous or hypophyllous; conidia are hyaline to dark colour, various in measurement

... A. quisqualis.

Ampelomyces (= Cicinnobolus) was first described <sup>as species</sup> by Ehrenb (1853). From India, it was first described by Sydow and Butler (1916) as a hyperparasite on Oidium species on Phaseolus mungo var. radiatus from Pusa, Bihar. Venkatnarayan (1946) reported it as parasites on Cyamopsis psoraloides Dc from Bangalore, Mysore. Rao and Salam described it as parasite on Oidium species on leaves, stem and petiole of Pedilanthus tithymaloides Point and leaves of Luffa actuangula, Chrysanthemum indicum L and Hibiscus esculentus L from Hyderabad, A.P.



Patwardhan (1964) reported its existence as a parasite on Hibiscus esculentus L, Pedilanthus tithymaloides Point, Zinnia elegans Jacq, Dahlia variabilis Desf, Impatiens balasmina L, Lagasea mollis Cav, Tamarindus indica L, Leptadenia reticulata W & A, Blepharis asperrima Ness, Hibiscus strumarium L from Poona, Maharashtra. Pugh (1966) described as hyperparasite on powdery mildews and Sarcinella prunicola Pavgi & Singh, as parasite on Prunus perisica from Darjeeling, W.B. Bhatnagar and Porwal (1966) reported its existence as hyperparasite on Sphaerotheca humuli var. fulginia parasitic on Sechium edule, Zennia elegans; Erysiphe polygonii on Chenopodium album and C. ambrosoides; Oidium species on Glycine javanica, Quercus species, Tinospora cordifolia L and Bixa orellanes, Xanthium strumarium L from Udaipur, Rajasthan. Narendra and Rao (1972) described as hyperparasite on Acrosorium species affected leaves by Ciltoria ternatea from Dodballpur, Mysore. Patil (1974) reported as hyperparasite on Oidium cyparissiae Syd. on Euphorbia hirta L from Maharashtra. Amu Singh (1984) reported as hyperparasite on Oidium species on Phaseolus mungo from Chandel, India.

**AMPELOMYCES MAJOR Dearn et Barth**

(= Cicinnobolus major Dearn et Barth)

Dearn et Barth 1917; Mycologia, 1 : 353-847.

Colonies are epiphyllous, whitish in colour, superficial, circular to irregular in shape. Pycnidia are paler brown in

colour, oblong, fusoid, ostiolate, 60-130  $\mu$  long, 42-72  $\mu$  broad, with or without terminal; narrow, long, 3-4 celled appendage. The wall of pycnidium is 2-2.8  $\mu$  thick which is unicellular and interior cells later differentiate into conidiogenous cells. Conidia are subhyaline, single celled, numerous, oblong, 5-9  $\mu$  long and 3-4  $\mu$  broad [TABLE NO.I]

**COLLECTION EXAMINED :**

As hyperparasite on the Oidium species on the leaves of Cosmos bipinnatus (Cav (Compositae) at Shivaji University Campus, Kolhapur, Nov. 1992, M.S.Mishrakoti, Material No. H.C.I.O.41,079

(FIGURE NO.I, PLATE No. I. )

Ampelomyces major on Oidium species on Cosmos bipinnatus Cav differs from Ampelomyces major Dearn et Barth on Oidium species on Grindelia squarrose as follows -

Colonies are epiphyllous, whitish in colour. Pycnidia are pale brown in colour, oblong, 60-130  $\mu$  long and 42-72  $\mu$  broad. Conidia are subhyaline, 5-9  $\mu$  long, 3-4  $\mu$  broad.

**REMARK :**

One of the studied species of genus Ampelomyces <sup>is</sup> major not collected from Indian flora till the present study. So it is new species to India.

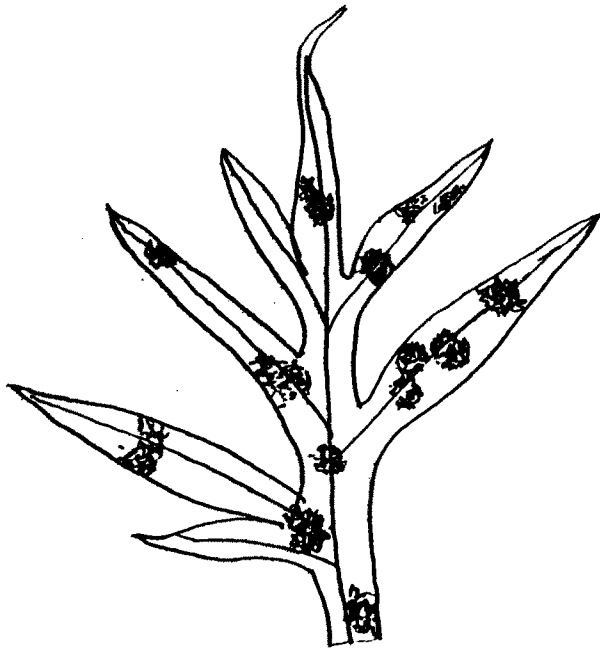
TABLE NO.I - Showing the comparison between Ampelomyces major and present collection under study.

Hyperparasite Host fungus	Host plants with family	Habit	Colony	Spore/fruit	Pycnidia $\mu$ m	Conidia $\mu$ m
<u>Ampelomyces major</u>	<u>Grindelia</u> Stem, <u>squarrose</u> Leaves [Compositae]	Stem, Leaves	Amphiphyllous.	Pycnidia, conidia	Red in colour, Succinate, Subclavate, 15 - 120 X 30 - 65	Hyaline to Subhyaline, 6 - 8 $\approx$ 3
Dearn et Bearth (= <u>Cichno-bolus major</u> )						
Dearn et Bearth						
Present	<u>Cosmos</u> Leaves	Leaves	Epiphyllous, whitish in colour, Loose network	Pycnidia, conidia	Pale brown in colour, oblong, 60 - 130 X 42 - 72	Subhyaline, 5 - 9 X 3 - 4
Collection	<u>bipinnatus</u> Cav [Compositae]					

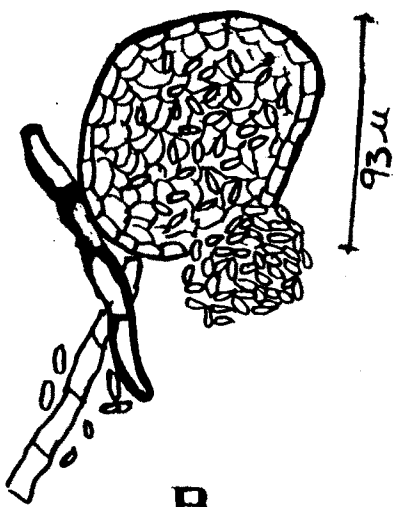
F I G U R E - I  
Ampelomyces major Dearn et Barth  
on  
Oidium Species  
on  
Cosmos bipinnatus Cav,

- A: Habit
- B: Mycelium of powdery mildew X 450
- C: Ampelomyces pycnidium and Conidia X 450

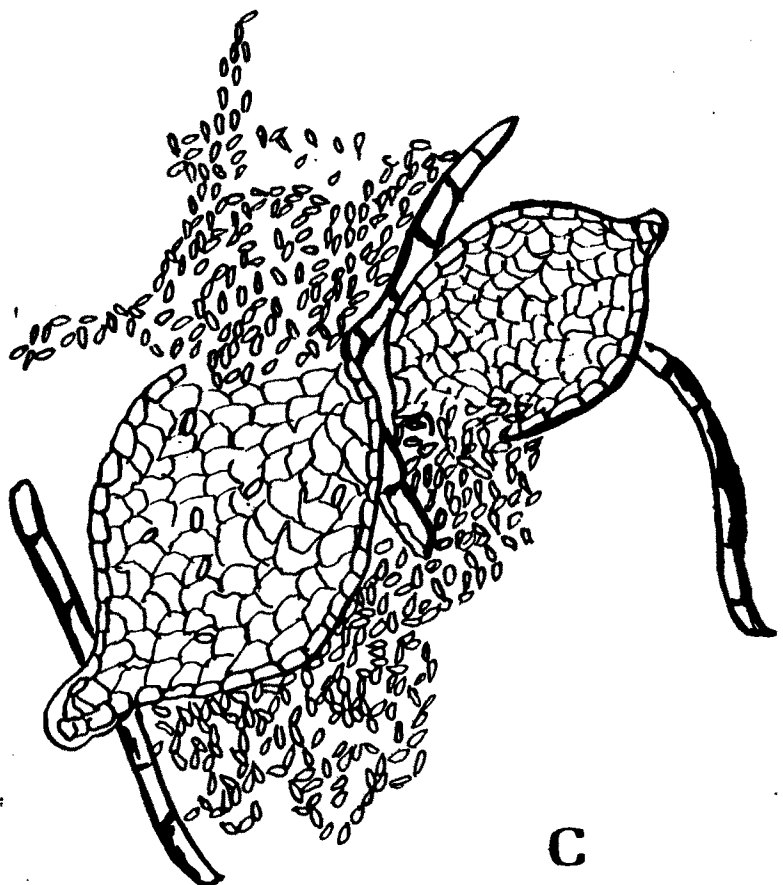
# FIGURE I



A



B



C

P L A T E - I

Ampelomyces major Dearn et Barth

on

Oidium species

on

Cosmos bipinnatus Cav.

A: Habit

B: Ampelomyces pycnidia and conidia on  
powdery mildew

X 160

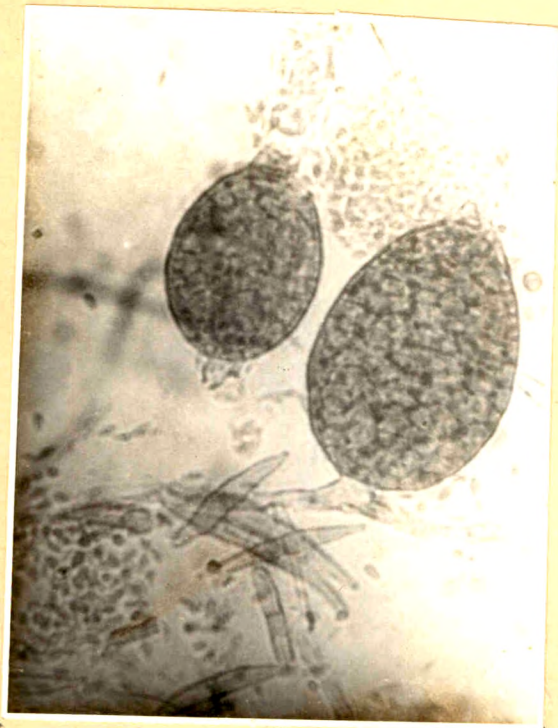
C: Ampelomyces pycnidium and conidia

X 252

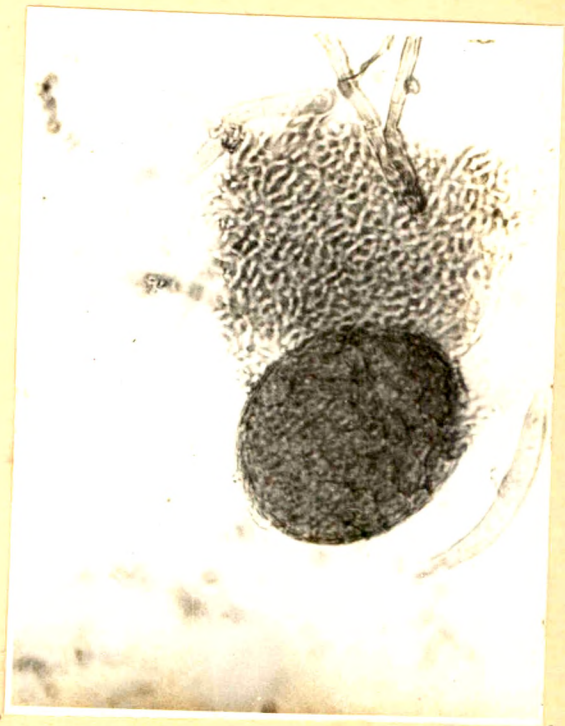
PLATE I



A



B



C

AMPELOMYCES QUISQUALIS Ces(= Cicinnobolus cesati de Bary )

→ Original Reference.

Colonies superficial, epiphyllous to amphiphyllous, whitish, greyish, greyish to black in colour, oval, circular to irregular in shape, sometimes covered the whole leaf surface, causing leaf spots. Pycnidia are developing on the host fungus.. Pycnidia are grey, pale brown-dark brown, black in colour, oblong to oval, fusoid, clavate, rounded, ovoid, ostiolate, 70-135  $\mu$  long, 5-110  $\mu$  broad, with or without terminal; long, narrow, 3-4 celled thick appendage. The wall of pycnidium is 2-4  $\mu$  thick which is unicellular and interior cells which differentiate into conidiogenous cells. Conidia are subhyaline to pale and dark brown in colour, single celled, ovoid, oblong, 3-13  $\mu$  long, 2-6  $\mu$  broad [TABLE No.II].

## COLLECTION EXAMINED -

- 1) As hyperparasite on Cercospora canescens Ell & Mart  
on Cyamopsis psoraloides Dc (Leguminosae) at Shivaji Univer-  
Campus  
sity, Kolhapur, Maharashtra, Oct. 1992, M.S.Mishrakoti  
Material No.H.C.I.O. 41,080. (FIGURE NO. II, PLATE NO. II.)
- 2) As hyperparasite on Cercospora hibisci Earle & Tracy  
on Hibiscus esculentus L (Malvaceae) at Shivaji  
Campus  
University, Kolhapur, Maharashtra. Oct. 1992.  
M.S.Mishrakoti, Material No.H.C.I.O. 41, 081 [FIGURE  
NO. NO.  
III, PLATE III].



- 3) As hyperparasite on Oidium pedilanthi Mathur, Mathur & Bhargav on Pedilanthus tithymaloides Point (Euphorbiaceae) at Shivaji University, <sup>Campus</sup> Kolhapur, Maharashtra, Sept. 1992, Dr.A.N.Thite and M.S.Mishrakoti, Material No.H.C.I.O.41,082 [FIGURE <sup>No.</sup> IV, PLATE <sup>No.</sup> IV].

Ampelomyces quisqualis Ces on Cercospora canescens Ell & Mart on Cyamopsis psoraloides DC; Ampelomyces quisqualis Ces on Cercospora hibisci <sup>Tracy & Earle</sup> on Hibiscus esculentus L; Ampelomyces quisqualis Ces on Oidium pedilanthi Mathur, Mathur & Bhargav on Pedilanthus tithymaloides <sup>point</sup> /differs from Ampelomyces quisqualis Ces as follows -

Pycnidia are found on erysiphaceous and dematiceous fungi. Conidia are subhyaline, oblong.

**REMARK -**

Cercospora canescens Ell & Mart and Cercospora hibisci Tracy & Earle are new hosts for Ampelomyces quisqualis Ces. Thus, it makes new host records.

TABLE NO.II - Showing the comparison between Ampelomyces quisqualis and present collections under study.

Hyperparasite	Host fungus	Host plants with family	Habit	Colony	Spore fruit	Pycnidia	Conidia
<u>Ampelomyces quisqualis</u> Ces	<u>Oidium</u> Species	<u>Luffa actiuangula</u> [Leguminosae] <u>Hibiscus</u> <u>esculentus</u> [Malvaceae]	On Stem, petiole, leaves	Epiphyllous, Hypophyllous, Amphiphyllous, whitish to dark brown in colour		Pycnidia, found on erysiphaceous fungi <i>Measurement</i>	Hyaline to subhyaline, oblong to oval.
(= <u>Cicinnobolus</u> <u>cesatii</u> de Bary)	<u>Erysiphe</u> <u>polygonii</u>	<u>Chenopodium album</u> , <u>C. ambrosoides</u> [Chenopodiaceae]					
* <u>Present</u> <u>Collections</u>							
1)	<u>Cercospora</u> <u>canescens</u> Ell & Mart	<u>Cyamopsis psoralo-</u> <u>ides</u> DC [Leguminosae]	On leaves.	Epiphyllous to amphiphyllous, Whitish to greyish in colour, loose network, some- times covered the whole leaf surface.		Found on erysiphaceous and dematiaceous fungi	Subhyaline, oblong.
2)	<u>Cercospora</u> <u>hibisci</u> Tracy & Earle	<u>Hibiscus</u> <u>esculentus</u> L [Malvaceae]					
3)	<u>Oidium</u> <u>pedilan-</u> <u>thin</u> Mathur	<u>Pedilanthus</u> <u>tithymaloides</u> Point [Euphorbiaceae]					

**F I G U R E - I I**

**Ampelomyces quisqualis Ces**

on

**Cercospora canescens Ell & Mart**

on

**Cyamopsis psoraloides DC**

A: Habit

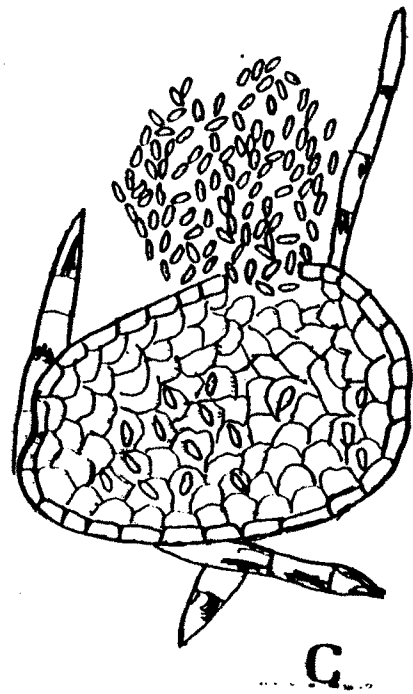
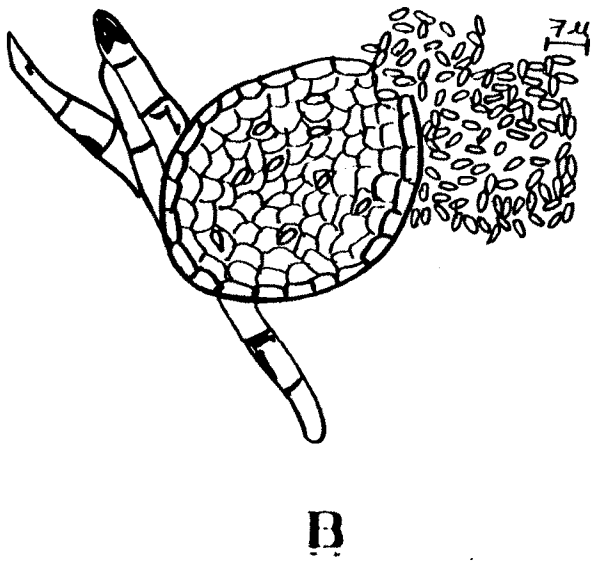
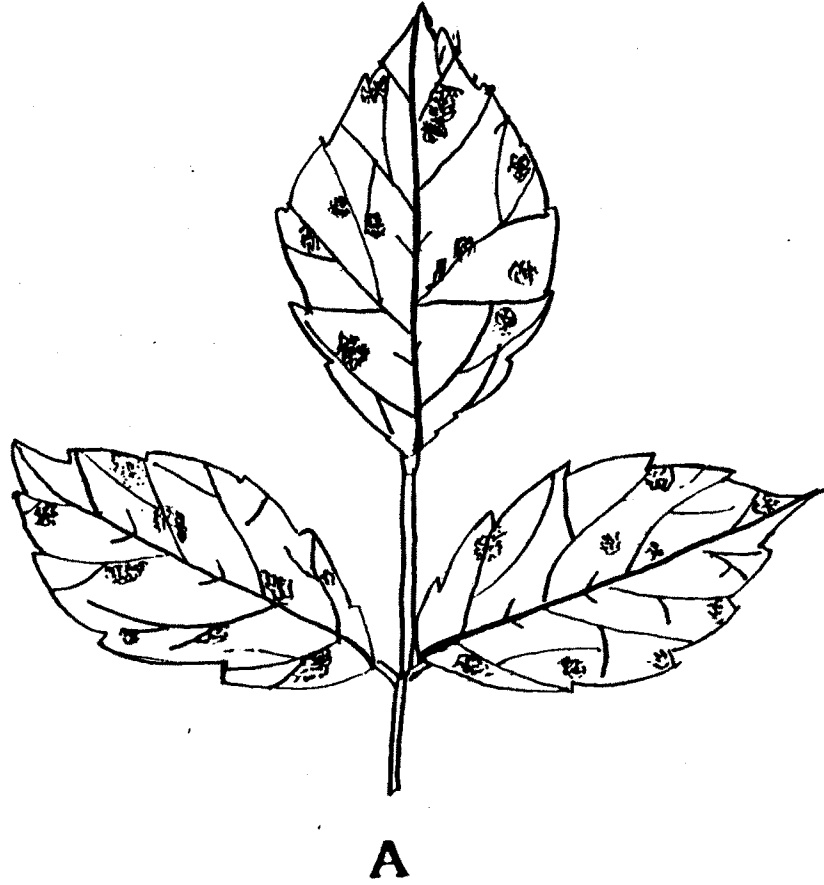
B: Mycelium of Cercospora canescens

X 450

C: Ampelomyces pycnidium and conidia

X 450

# FIGURE II



P L A T E - II

Ampelomyces quisqualis Ces

on

Cercospora canescens Ell & Mart

on

Cyamopsis psoraloides DC

A: Habit

B: Ampelomyces Pycnidium and conidia on

Cercospora canescens

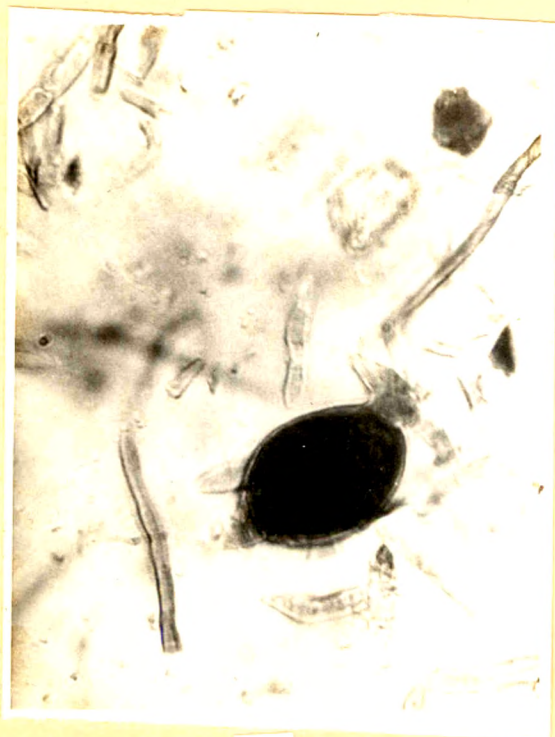
X 160

C: Ampelomyces Pycnidium and Conidia

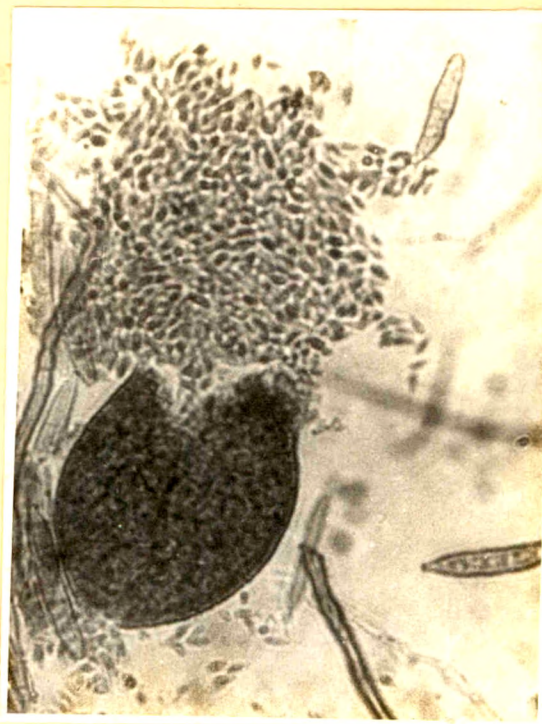
X 160



A



B



C

F I G U R E - III

Ampelomyces quisqualis Ces

on

Cercospora hibisci Tracy & Earle

on

Hibiscus esculentus L

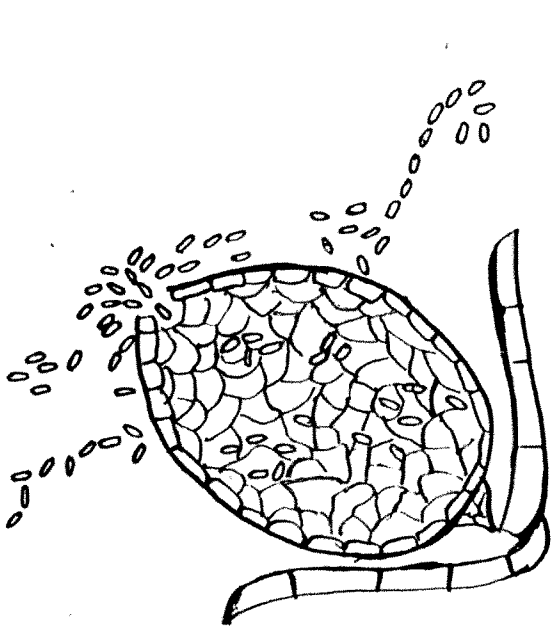
- A: Habit
- B: Host mycelium of Cercospora hibisci X 450
- C: Ampelomyces pycnidium and conidia X 450



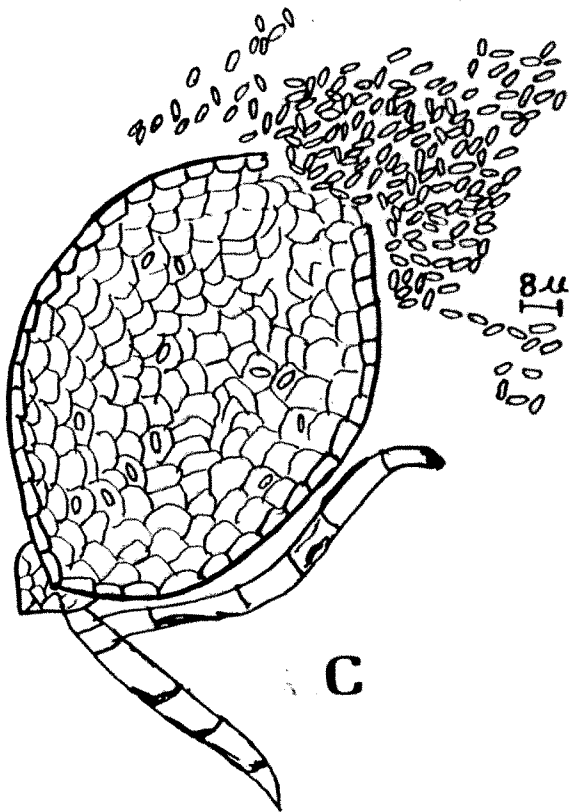
FIGURE III



A



B



C



P L A T E - III

Ampelomyces quisqualis Ces

on

Cercospora hibisci Tracy & Karle

on

Hibiscus esculentus L

A: Habit

B: Ampelomyces Pycnidium on Cercospora hibisci X 196.8

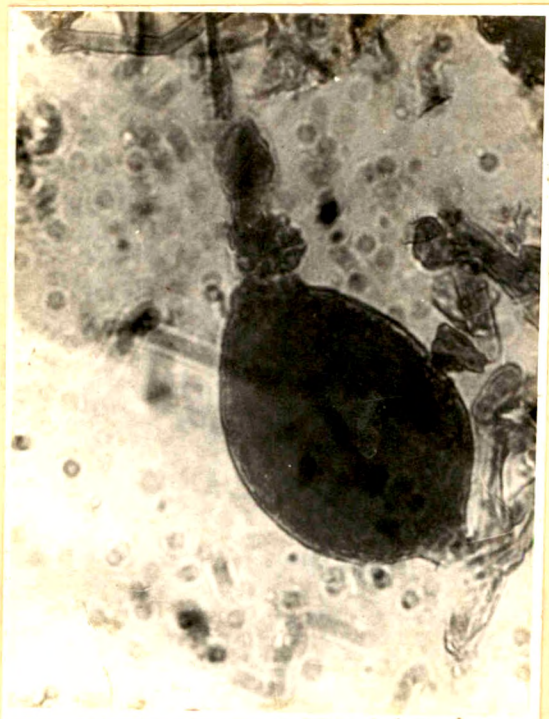
C: Ampelomyces Pycnidium and Conidia. X 160

PLATE III



A

IV\*



B



C

**F I G U R E - I V**

**Ampelomyces quisqualis Ces**

on

**Oidium pedilanthi Mathur**

on

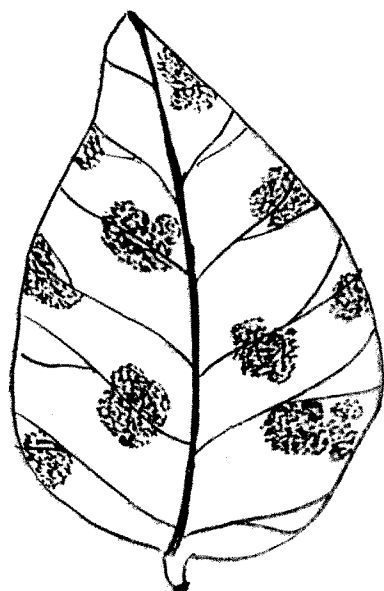
**Pedilanthus tithymaloides Point**

A: Habit

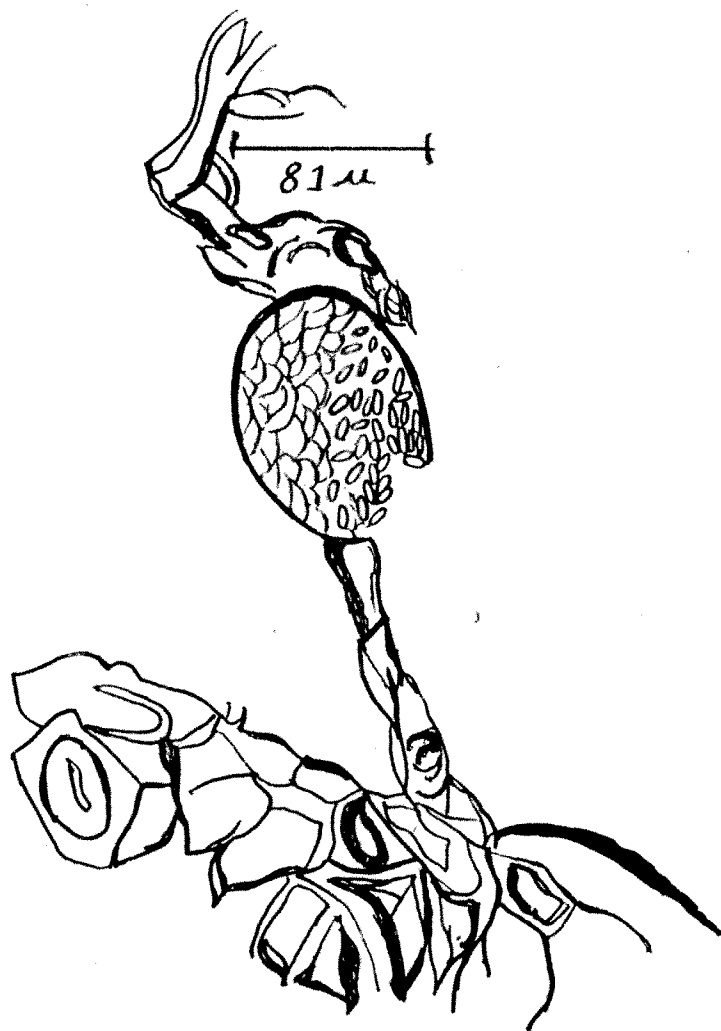
B: Ampelomyces pycnidium and conidia on host  
mycelium of powdery mildew

X 450

# FIGURE IV



A



B

P L A T E - I V

Ampelomyces quisqualis Ces

on

Oidium pedilanthi Mathur

on

Pedilanthus tithymaloides Point

A: Habit

B: Ampelomyces Pycnidium and conidia on host  
mycelium of powdery mildew

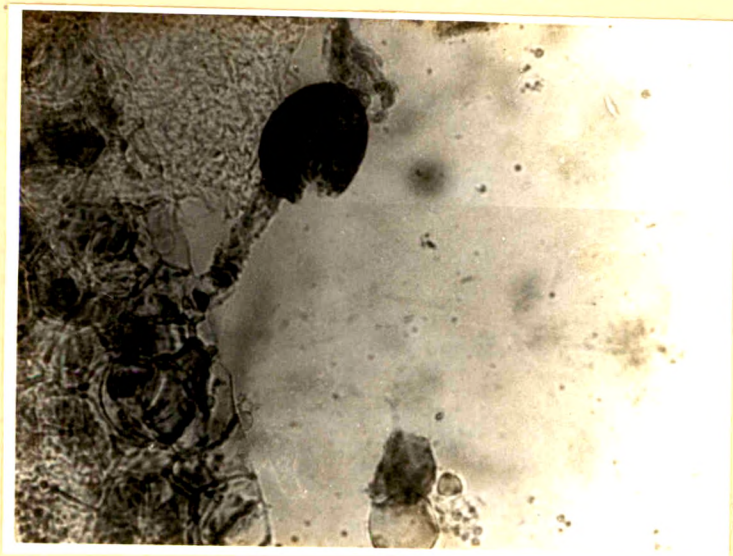
X 100



PLATE IV



A



B

**DARLUCA Cast.**

Pycnidia dark, spherical, ostiolate, superficial, located in rust sori. Conidia hyaline, two celled, ellipsoid or fusoid to oblong, tipped with mucous or bristle like appendages at both ends, parasitic on rust fungi, chiefly on uredia.

**DARLUCA FILUM (Biv) Cast.**

Cast. Cat. Pl. Marsiell Suppl. 53 : 1845.

It was first described by Castagne(1845).Saccardo (1914) described as mycoparasite on uredosori of Puccinia polygani-amphibii on Polygonum species from Mussorie, U.P.Mitter and Tandon (1938) has reported as parasite on Leptodermis lanceolata from Nainital, U.P. Ramakrishnan and Narasimhalu (1941) has reported its existence as hyperparasite of Puccinia penniseti on Pennisetum typhoides and Uromyces setariae italicae on Setaria italica and also by Patil and Rane (1968-69) from Coimbatore, T.N. Padmanabhan and Rafay (1942) reported as hyperparasite on the uredia of Puccinia kuehnii. Padwick (1945) has described as hyperparasite on Uromyces andropogonis-annulatae, Uromyces orientalis and Puccinia chrysopogi from Simla, H.P., Delhi; Nagpur; Pusa, Bihar. Prasada (1948) has reported as hyperparasite on Puccinia graminis, Puccinia triticina on Triticum vulgare from Simla, H.P. Sanwal (1951) has

reported its existence as hyperparasite on Puccinia appludae on Appluda mutica L, Puccinia duthiae on Dicanthium annulatum from Kota, Rajasthan; On Puccinia kuehnii on Erianthus munja, Puccinia invesuta on Phragmitis karka from Delhi. Mathur et al (1962) reported as hyperparasite on Puccinia sorghi and Puccinia maydis from Udaipur, Rajasthan. Wehenyer (1963) has also described as parasite on Kylinga brevifolia Roxb from Himalayas. Roy (1968) has reported as hyperparasite on Puccinia romagnoliana Maire et Sacc on Cyperus rotundus L from Koranga, Assam. Kulkarni, Kotwal and Thite (1969) has reported as hyperparasite on teleutosori of Puccinia purpurea on Sorghum vulgare from Kolhapur, Maharashtra. Nagraj and Kendrick (1972) has described as hyperparasite on Puccinia kuehnii on Saccharum arundinaceum from Pusa, Bihar. Patil (1974) described on telia of Uromyces orientalis Syd on Indigofera cordifolia Heyne. [TABLE NO.III].

Spots are amphiphylous, round to oblong in shape, dark reddish to brown in colour. Pycnidia are reddish brown to black in colour, spherical, ostiolate, superficial, 80-102  $\mu$  long and 80-105  $\mu$  broad. Wall of pycnidium is unicellular, membraneous, which is 2.86-3  $\mu$  thick. Conidia are subhyaline, 2 celled, 1 septate, ellipsoidal, tipped with mucous like appendages at both ends, 3-9  $\mu$  long and 1-3  $\mu$  wide.



**COLLECTION EXAMINED :**

As a hyperparasite on Uromyces appendiculatus (Pers) Unger on leaves of Phaseolus vulgaris Linn (Leguminosae) collected at Katayani, Kolhapur, Maharashtra, Sept. 1992 M.S. Mishrakoti, Material No.H.C.I.O. 41,083 [FIGURE NO.V, PLATE NO.V].

Darluca filum (Biv) Cast on Uromyces appendiculatus (Pers) Unger on Phaseolus vulgaris Linn. differs from Darluca filum (Biv) Cast as follows -

Conidia are subhyaline with tipped with mucous like appendages.

**REMARK**

Uromyces appendiculatus (Pers) Unger and Phaseolus vulgaris Linn are new hosts for Darluca filum (Biv) Cast. Thus it makes new host records from India.

TABLE NO. III - Showing the comparison between Darluca filum (Biv.) Cast and present collection under study.

Hyperparasite	Host fungus	Host plant with family	Habit	Colony	Spore/fruit	Pycnidia	Conidia
<u>Darluca filum</u> (Biv) Cast.	<u>Puccinia species,</u> <u>Uromyces species</u>	<u>Pennisetum typhoides</u> <u>Triticum vulgare,</u> <u>Saccharum officinarum</u> <u>Sorghum Vulgare</u> [Graminae]	Stem, leaves	Amphiphylous, reddish-black in colour	Pycnidia conidia found on uredospores and teleutospores	Reddish brown to black in colour, found on uredospores	Hyaline to subhyaline, ellipsoidal to oblong, tipped with mucous or bristle like appendages at both the ends.
<u>Present Collection</u>	<u>Uromyces appendic-ulatus</u> (Pers) Unger	<u>Phaseolus vulgaris</u> L [Leguminosae]	Stem leaves	Reddish to brown in colour.	Pycnidia conidia	Reddish brown to black in colour, found on uredospores	Subhyaline, ellipsoidal, tipped with mucous like appendages at both the ends.

**F I G U R E - V**

**Darluca filum (Biv.) Cast**

on

**Uromyces appendiculatus (Pers) Unger**

on

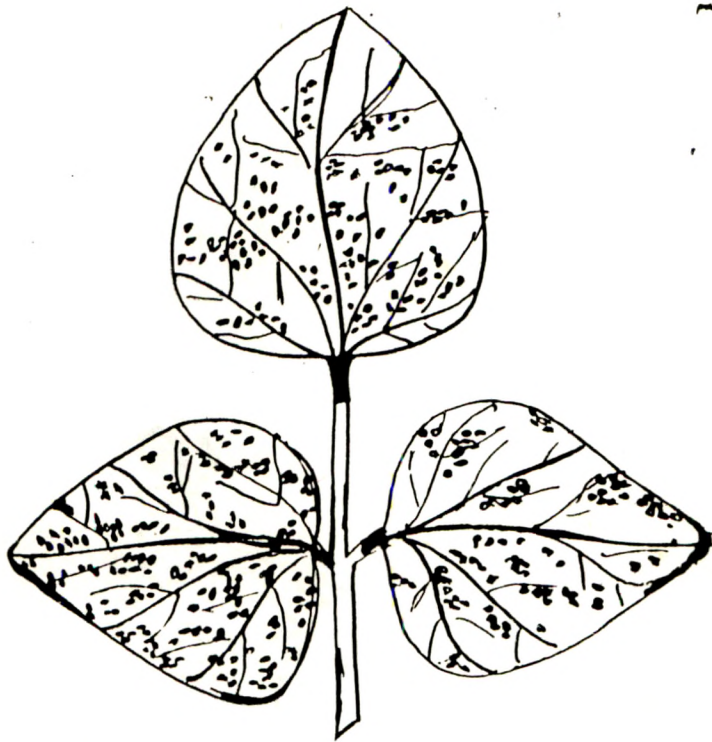
**Phaseolus vulgaris Linn**

A      Habit

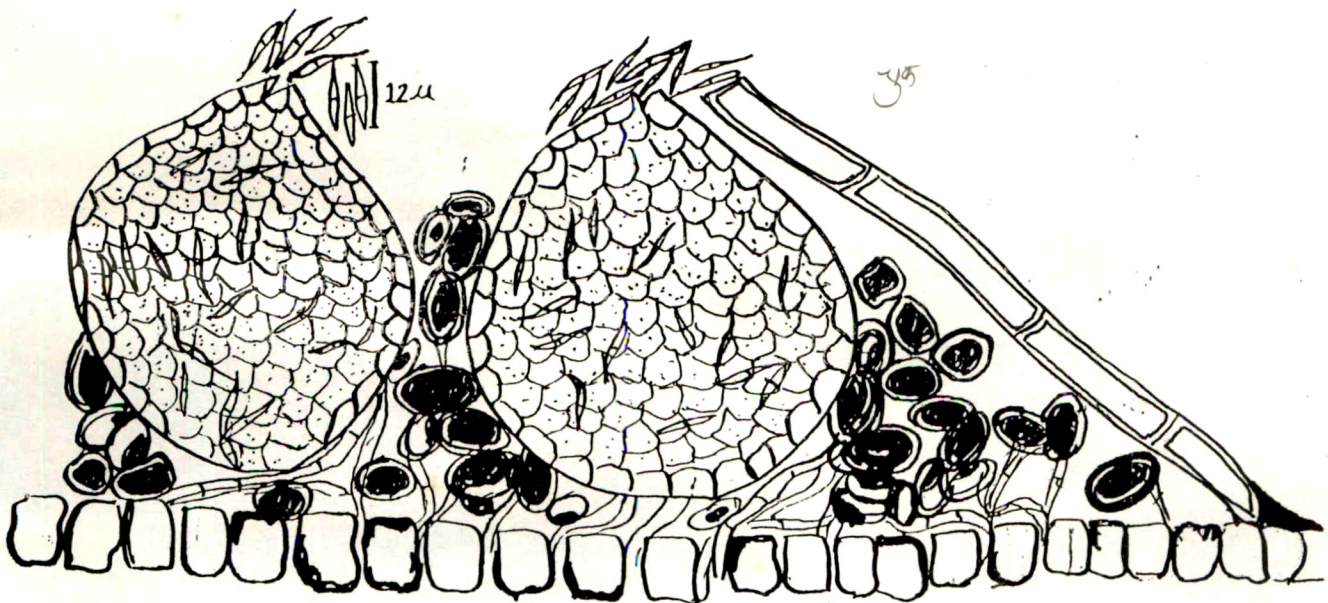
B      Section showing pycnidium with conidia  
on host mycelium of rust

X 450

FIGURE V



A



B

P L A T E - V

Darluca filum (Biv.) Cast

on

Uromyces appendiculatus (Pers) Unger

on

Phaselous vulgaris Linn

A Habit

B Darluca Pycnidia on uredospores of

Uromyces

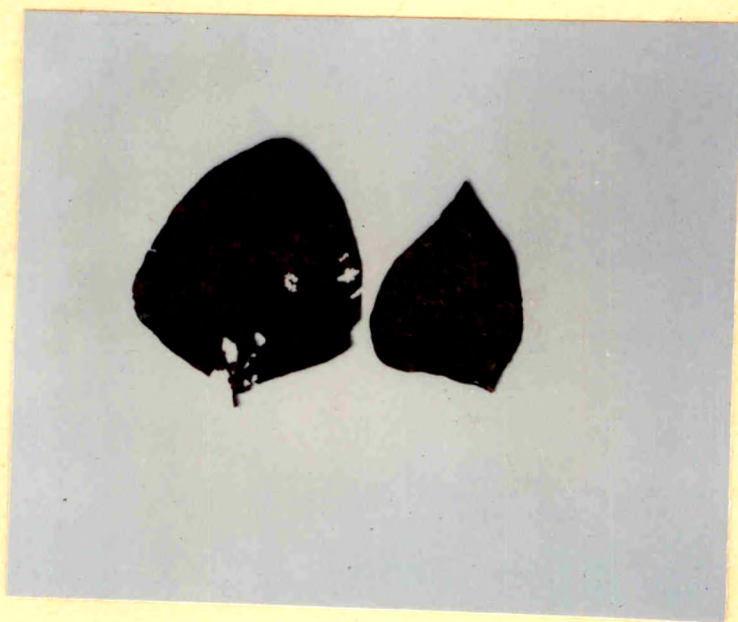
X 50

C Darluca Pycnidium and conidia

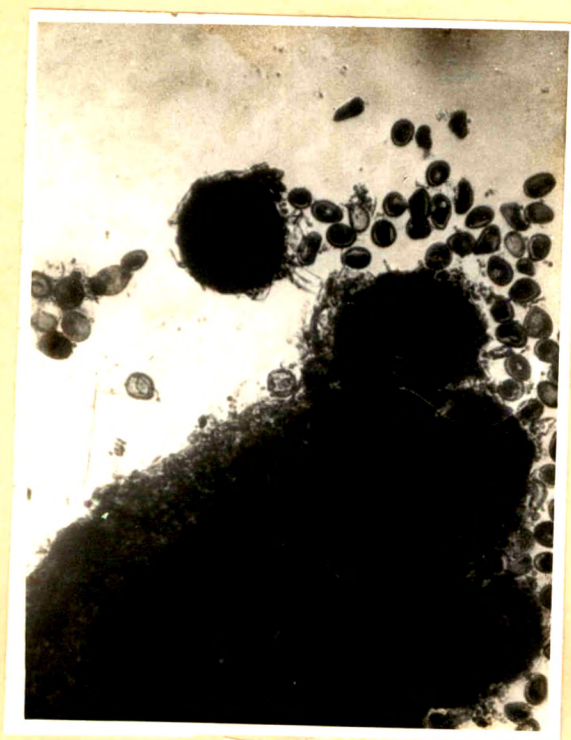
X 160



PLATE V



A



B



C

**SUBCLASS HYPHOMYCETIDAE**

True mycelium present. Conidia produced on special conidiogenous hyphae (conidiophores) arising in various ways other than in pycnidia or acervuli. A few species do not produce spores of any kind.

**KEY TO THE ORDERS OF SUBCLASS HYPHOMYCETIDAE :**

- 1) Produce conidia **...Moniliales.**
- 2) Not produce conidia **... Agnomycetales.**

**ORDER MONILIALES**

It is very large group consisting of probably over 700 species. Many of the placed here are of immense importance to us as either plant pathogens, human pathogens or industrial fungi. There are also some common contaminants of the microbiological laboratory as well as many fungi that are saprobic and may play a significant role in soil ecology.

**KEY OF FAMILY OF ORDER MONILIALES :**

- a. Hyphae scantily developed or lacking; propagation by budding (flase yeasts)
- a. Hyphae present, well developed, reproduction not usually by budding.
- b. Never germination by repetition                   ...**Cryptococcaceae.**
- b. Cells reproducing by budding, and also germinating by repetition as do the basidiospores of many of the Tremellales, of which these forms may be regarded as imperfect species                   ... **Saprobolomycetaceae.**
- c. Neither conidiophore nor hyphae bound together.
- c. Conidiophores and often hyphae united into characteristic fructifications.



- d. Hyphae, conidiophores and conidia hyaline or bright coloured ... **Moniliaceae.**
- d. Hyphae or conidia or both dull coloured, brownish to black ... **Dematiaceae.**
- e. Conidiophores united into a coremium ... **Stibellaceae.**
- e. Hyphae and conidiophores combined in a sporodochium ... **Tuberculariaceae.**

**FAMILY MONILIACEAE**

It is the largest family of order Moniliales. It includes all imperfect fungi which produce conidia on unorganised, hyaline conidiophores or directly on hyaline hyphae. Most species are saprobic, but many are well known plant parasites, animal predators or human pathogens.

**TETRAPOSPORIUM Hughes**

Hughes, 1951. Mycol. Pap., 46 : 25-28.

Colonies effuse, thin, hyperparasitic. Mycelium superficial, stroma none, Conidiophores micronematous or semimacronematous, mononematous, usually very short, pale brown. Conidigenous cells monoblastic, integrated, intercalary, determinate, cylindrical or doliform, denticulate, cylindrical. Conidia solitary, dry, pleurogenous, branched with usually 4 arms, pale olivaceous to brown to black, smooth, multiseptate.

Tetraposporium was first described by Hughes (1951).

**KEY TO TETRAPOSPORIUM Hughes SPECIES STUDIED:**

- 1) Conidia are mor or less than 12  $\mu$  long, non-stellate  
... T. asterinearum
- 2) Conidia are upto 12  $\mu$  long, stellate  
... T. ravenelii

**TETRAOSPORIUM ASTERINEARUM Hughes.**

Hughes, 1951, Mycol. Pap., 46: 25-26.

The mycelium forms a loose network in the thick mycelium of host fungus. Colonies are hypophyllous, greyish to black in colour, diffused, sometimes covered the whole surface of leaf, on stem also. Conidiophores are 42-200  $\mu$  long, 5-11.5  $\mu$  broad, grey to brown in colour, macronematous to semimacronematous. Conidiogenous cells are monoblastic, intercalary, determinate. Conidia 4-20  $\mu$  long, 6-20  $\mu$  broad, solitary, pleurogenous, pale brown-brown, 1-2 septate, with 3-4 divergent arms. Arms are unequal in length and breadth, paler towards the apices, 2-8 septate, constricted middly at the septa, each arm is 20-169  $\mu$  long, 4-22  $\mu$  broad, tapering to 2-6  $\mu$  [TABLE No. IV].

**COLLECTION EXAMINED -**

- 1) As hyperparasite on Capnodium annonae Pat on Ficus glumerata Roxb (Moraceae) at Shivaji University Campus, Kolhapur, Maharashtra Aug. 1992, M.S.Mishrakoti, Material No. H.C.I.O. 41,090. [FIGURE NO.VI, PLATE No. VI].
- 2) As hyperparasite on Capnodium annonae Pat on Ficus religiosa L (Moraceae) at Shivaji University Campus, Kolhapur, Maharashtra, Sept. 1992, Dr.A.N.Thite and M.S.Mishrakoti, Material No. H.C.I.O. 41,089. [FIGURE NO. VII, PLATE NO. VII].

- 3) As hyperparasite on Capnodium eugeniaram Cooke on Syzygium jambolina DC (Myrtaceae) at Town Hall Garden, Kolhapur, Maharashtra, Aug. 1992, M.S. Mishrakoti Material No. H.C.I.O. No. 41,091. [FIGURE NO. VIII, PLATE NO. VIII]

Tetraposporium asterinearum Hughes on Capnodium annonae Pat on Ficus glumerata Roxb; Tetraposporium asterinearum Hughes on Capnodium annonae Pat on Ficus religiosa L; Tetraposporium asterinearum Hughes on Capnodium eugeniaram on Syzygium jambolina DC differs from Tetraposporium asterinearum Hughes as follows -

Conidiophores are macronematous to semimacronematous, grey to brown in colour. Conidia 1-2 septate, with 3-4 divergent arms which are 2-8 septate.

**REMARK -**

Studied genus Tetraposporium is not recorded in Indian Flora. So it is new genus to India.

TABLE No. IV - Showing the comparison between Tetraposporium asterinearum and present collections under study

Hyperparasite	Host fungus	Host plants with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia
<u>Tetraposporium asterinearum</u> Hughes	<u>Capnodium</u> species.	-	Stem, leaves	Amphiphyllous	Conidio- phore, Conidia with 3-4 divergent arms	Micronematous to semimacro- nematous, pale olivaceous to brown divergent in colour.	Septate with 4 arms, pale olivaceous to brown to black, multi- septate
Present Collections							
1)	<u>Capnodium</u> annonae Pat	<u>Ficus glumerata</u> Roxb [Moraceae]	Stem, leaves	Hyphophyllous, greyish to black in colour, some- times covered on whole surface of leaf	Conidio- phore, Conidia with 3-4 divergent arms	Macronematous to semimacro- nematous, divergent brown in colour.	1-2 septate, with 3-4 divergent arms pale brown to brown, arms are 2-8 septate.
2)	<u>Capnodium</u> annonae Pat	<u>Ficus religiosa</u> L [Moraceae]					
3)	<u>Capnodium</u> eugeniarium Cooke	<u>Syzygium</u> jambolina DC [Myrtaceae]					

**F I G U R E - V I**

**Tetraposporium asterinearum Hughes**

on

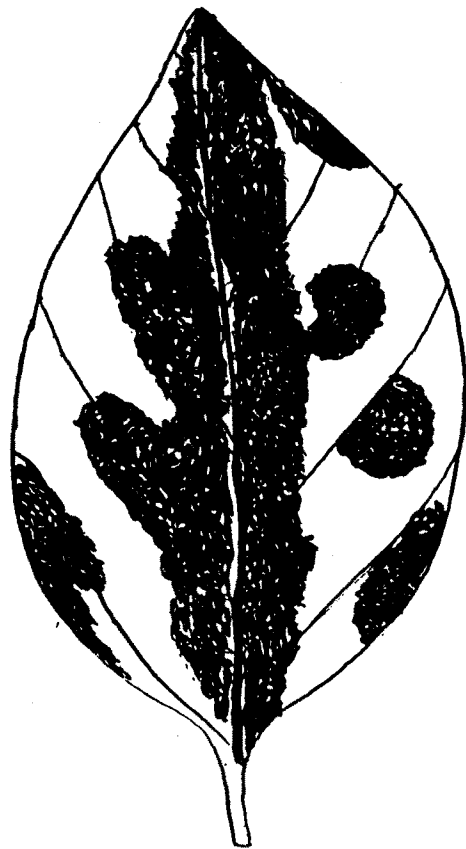
**Capnodium annonae Pat**

on

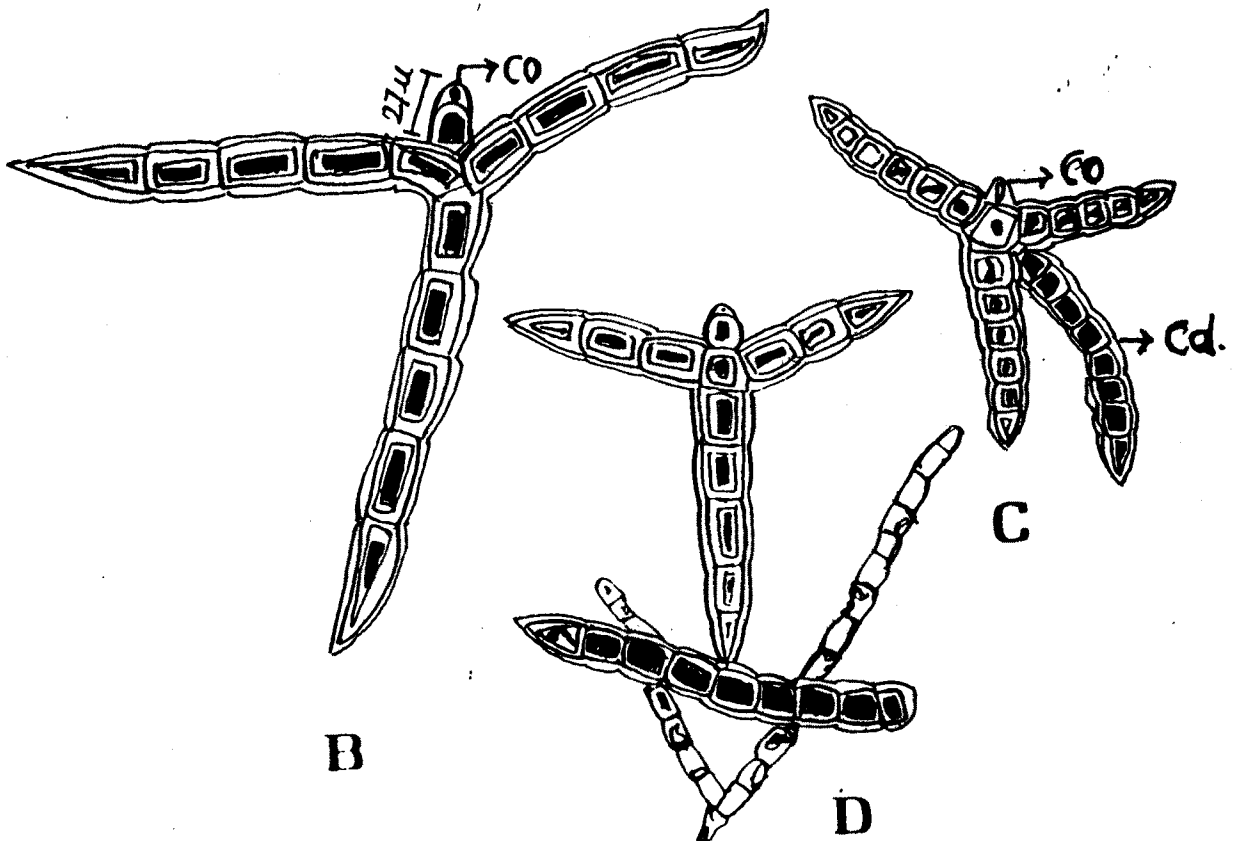
**Ficus glumerata Roxb.**

- A:      Habit
- B:      Conidium X 450
- C:      Conidiophore and conidium X 450
- D:      Host mycelium of Capnodium annonae X 450

# FIGURE VI



A



B

C

D



P L A T E - VI

Tetraposporium asterinearum Hughes

on

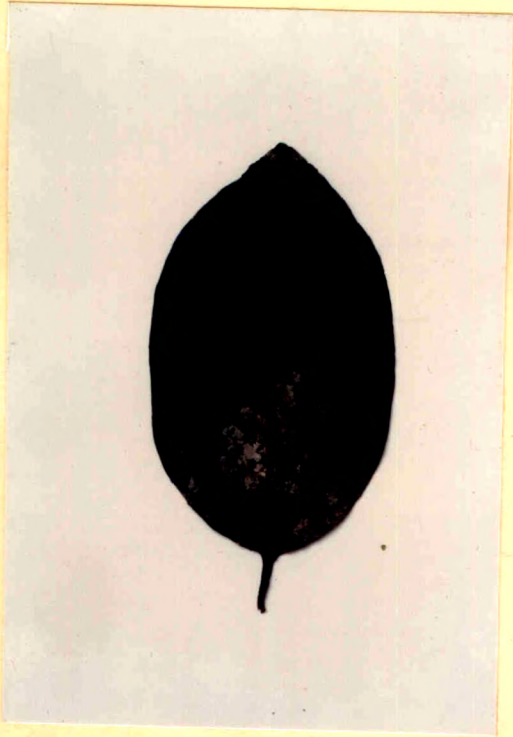
Capnodium annonae Pat

on

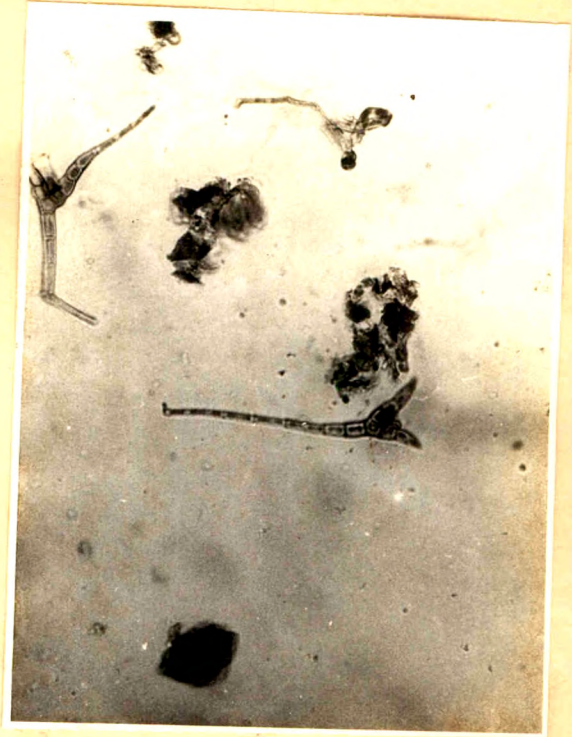
Ficus glumerata Roxb

- A: Habit
- B: Conidia X 100
- C: Conidium X 196.8
- D: Host mycelium of Capnodium annonae X 50

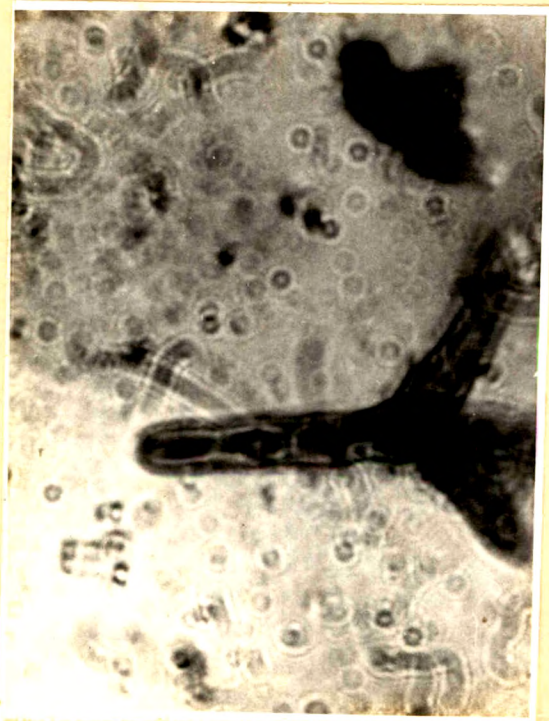
PLATE VI



A



B



C



D

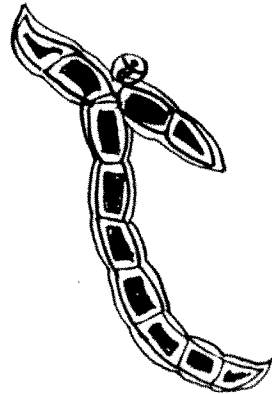
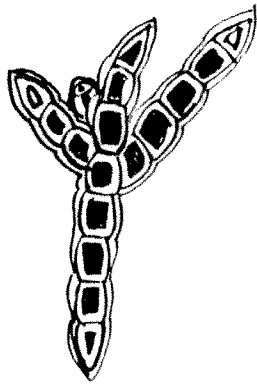
**F I G U R E - V I I**  
**Tetraposporium asterinearum Hughes**  
on  
**Capnodium annonae Pat**  
on  
**Ficus religiosa L.**

- A:      Habit
- B:      Conidium X 450
- C:      Conidiophore and conidium X 450
- D:      Host mycelium of Capnodium annonae X 450

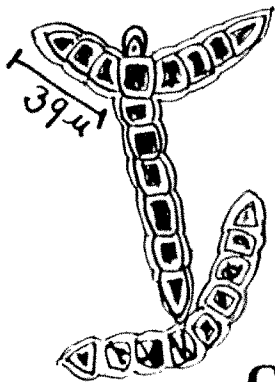
# FIGURE VII



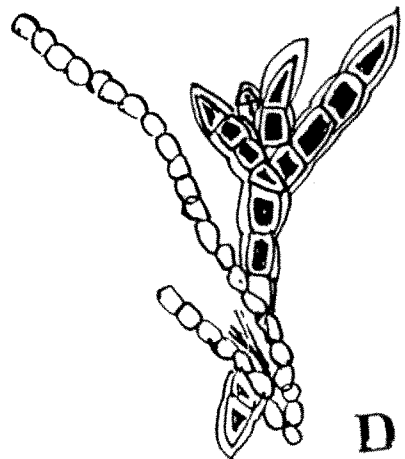
A



B



C



D

P L A T E - VII

Tetraposporium asterinearum Hughes

on

Capnodium annonae Pat

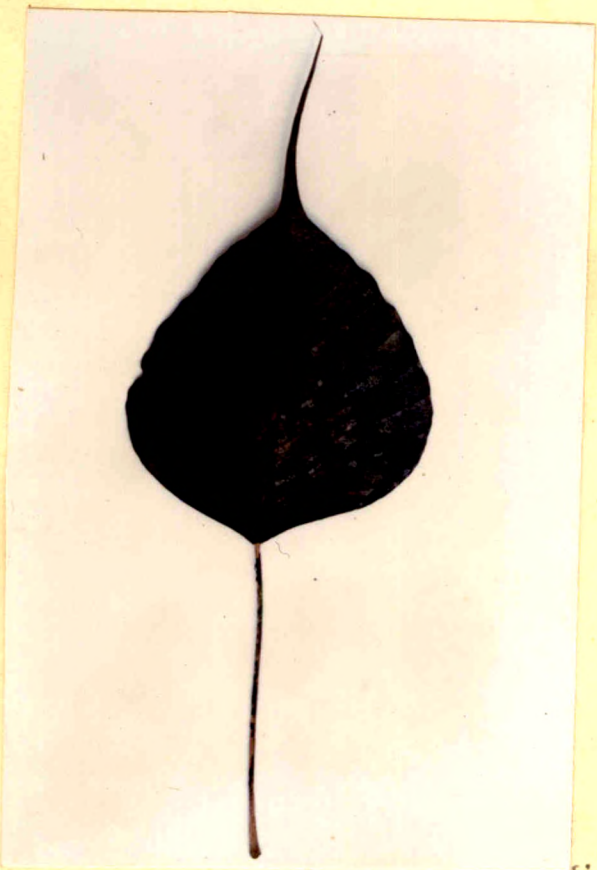
on

Ficus religiosa L

- A: Habit
- B: Conidium X 196.8
- C: Conidiophore and conidium X 201.6
- D: Host mycelium of Capnodium annonae X 160



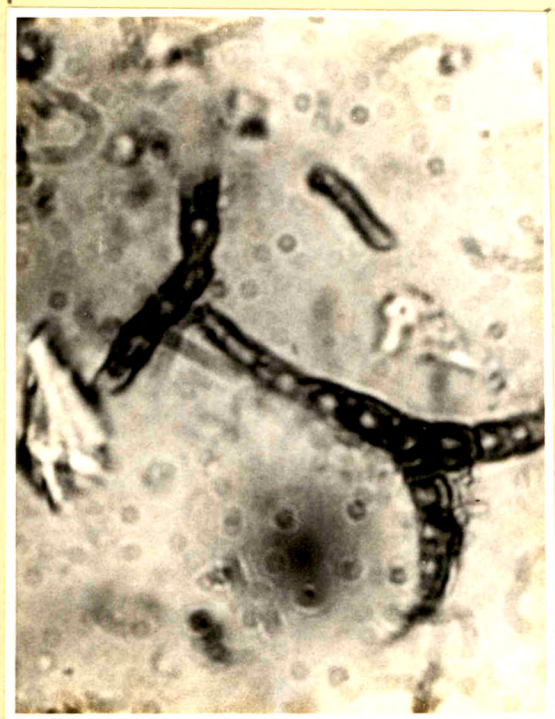
PLATE VII



A



B



C



D

F I G U R E - V I I I

Tetraposporium asterinearum Hughes

on

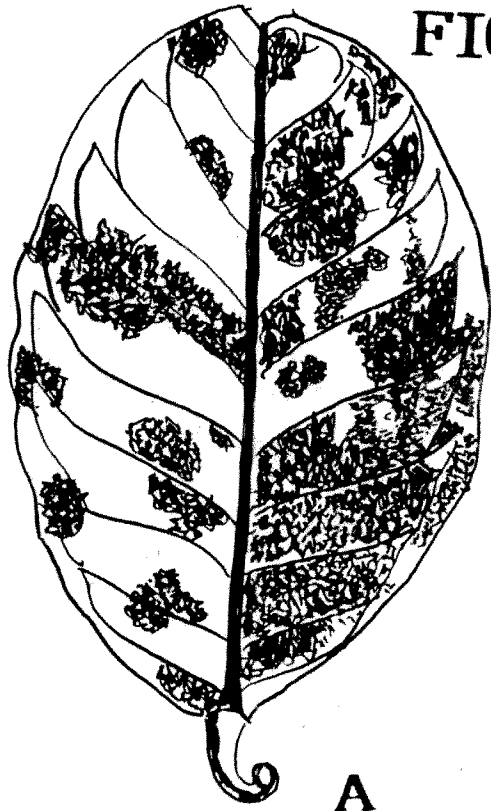
Capnodium eugeniarum Cooke

on

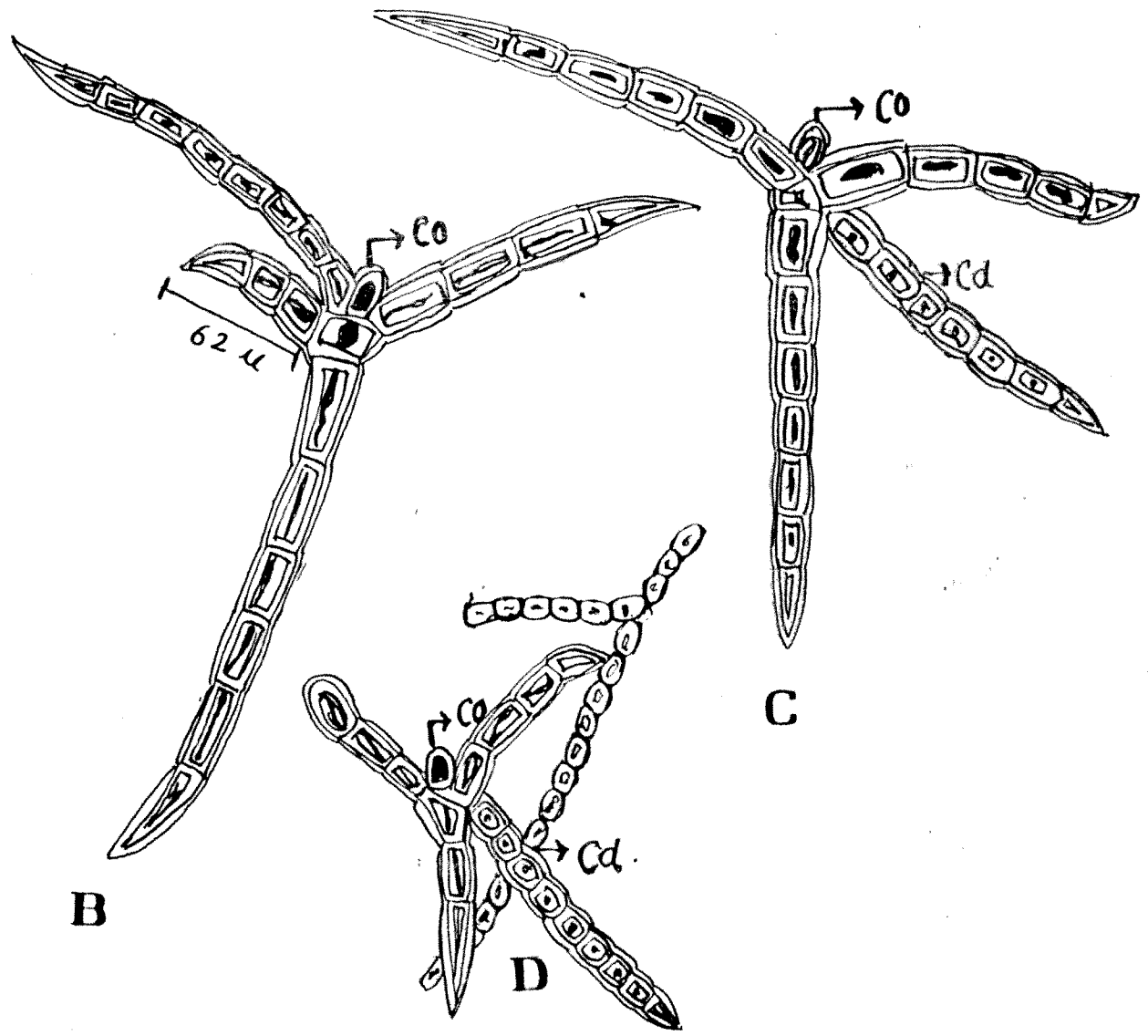
Syzygium jambolina DC

- A: Habit
- B: Conidium X 450
- C: Conidiophore and conidium X 450
- D: Host mycelium of Capnodium eugeniarum X 450

FIGURE VIII



A



B

C

D



P L A T E - V I I I

Tetraposporium asterinearum Hughes

on

Capnodium eugeniarum Cooke

on

Syzygium jambolina DC

- A: Habit
- B: Conidium X 196.8
- C: Conidiophore and Conidium X 315
- D: Host mycelium of Capnodium eugeniarum X 40

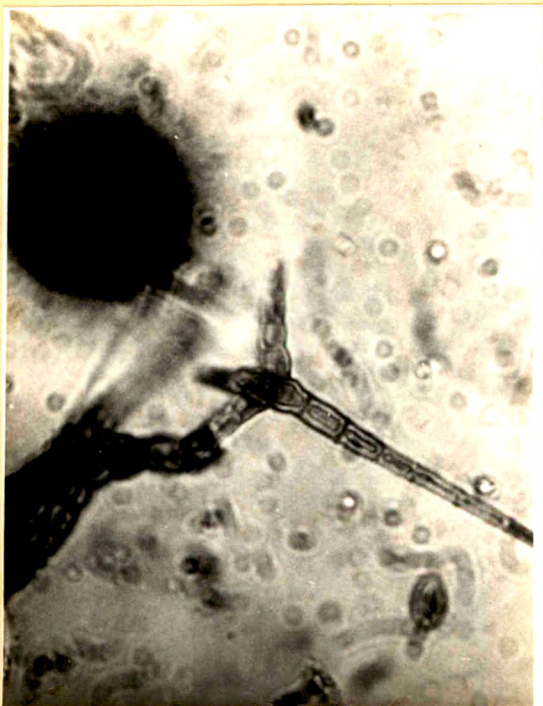
PLATE VIII



A



B



C



D

**TETRAOSPORIUM RAVENELII (Cooke) Hughes.**

Hughes, 1951. Mycol. Pap. C.M.I. 46, P.28 (Syn. Triposporium ravenelii Cooke).

Colonies are diffused, hypophyllous, black in colour, sometimes covered the surface on leaf and stem also. Conidiophores 48-91  $\mu$  long, 3-9  $\mu$  broad, macronematous, brown to dark brown in colour. Conidiogenous cells are monoblastic, intercalary, determinate. Conidia are 8-12  $\mu$  long, 4-7  $\mu$  broad, dry, stellate, 1-2 septate, pale brown-brown in colour, usually with 3-4 divergent arms. Arms are unequal in length and breadth, paler towards the apices, 3-7 septate, constricted at the septa, each arm is 38-105  $\mu$  long, 4-26  $\mu$  broad, tapering to 1-2  $\mu$  .

[TABLE NO. V].

**COLLECTION EXAMINED -**

- 1) As hyperparasite on Capnodium species on Ixora coccinia L (Rubiaceae) at Shivaji University Campus, Kolhapur, Maharashtra, Sept. 1992, Dr.A.N.Thite and M.S.Mishrakoti, Material No. H.C.I.O.41,092. [FIGURE NO. IX, PLATE NO. IX].
- 2) As hyperparasite on Capnodium ramosum Cooke on Mangifera indica L (Anacardiaceae) at Shivaji University

Campus, Kolhapur, Maharashtra, June, 1993,  
M.S.Mishrakoti, Material No. H.C.I.O. 41,093.

[FIGURE NO. X, PLATE NO. X].

Tetraposporium ravenelii (Cooke) Hughes on Capnodium  
species on Ixora coccinia L; Tetraposporium ravenelii  
(Cooke) Hughes on Capnodium ramosum Cooke on Mangifera  
indica L differs from Tetraposporium ravenelii (Cooke)  
Hughes as follows -

Conidiophores are macronematous, brown to dark brown  
in colour. Conidia are 1-2 septate, stellate.

**REMARK -**

Studied genus Tetraposporium is not recorded in Indian  
flora. So it is new genus to India.

**TABLE No.V - Showing the comparison between Tetraposporium ravenelii and present collections under study**

Hyperparasite	Host fungus	Host plants with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia
<u>Tetraposporium ravenelii</u> (Cooke) Hughes	<u>Capnodium</u> species	-	-	Amphiphyllous	Conidio- phore, Conidia with 3-4 divergent arms.	Micronematous to macro- nematos to semimacrone- matous, pale brown in colour.	Upto 2 septate, stellate, Upto 12 $\mu$ long.
<u>Present Collections</u>							
1)	<u>Capnodium</u> Species	<u>Ixora coccinia</u> L [Rubiaceae]	On Stem, leaves	Hypophyllous, black in colour, sometimes covered the whole leaf surface.	Conidio- phore conidia with 3-4 divergent arms.	Macronematous, brown to dark brown in colour.	1-2 septate stellate, 8-12 $\mu$ long
2)	<u>Capnodium</u> ramosum Cooke	<u>Mangifera indica</u> L [Anacardiaceae]					

F I G U R E - I X

Tetraposporium ravenelii (Cooke) Hughes

on

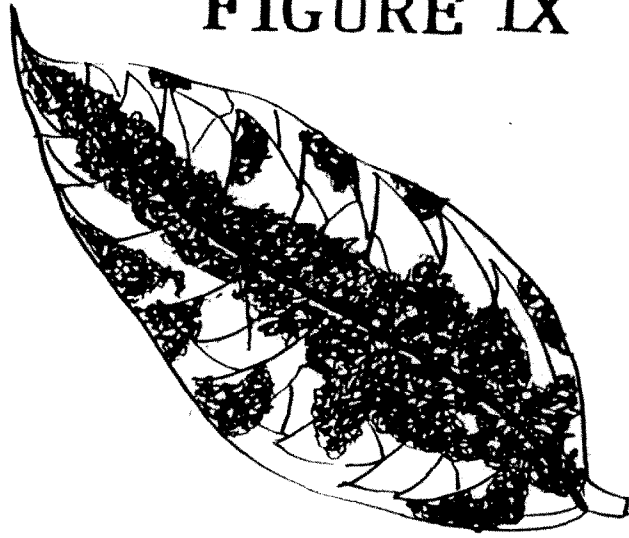
Capnodium species

on

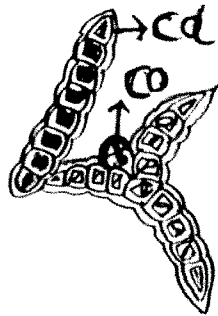
Ixora coccinia L

- A: Habit
- B: Conidia X 450
- C: Conidiophore and conidium X 450
- D: Host mycelium of Capnodium species X 450

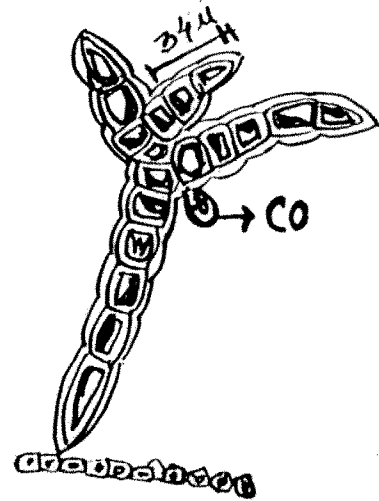
# FIGURE IX



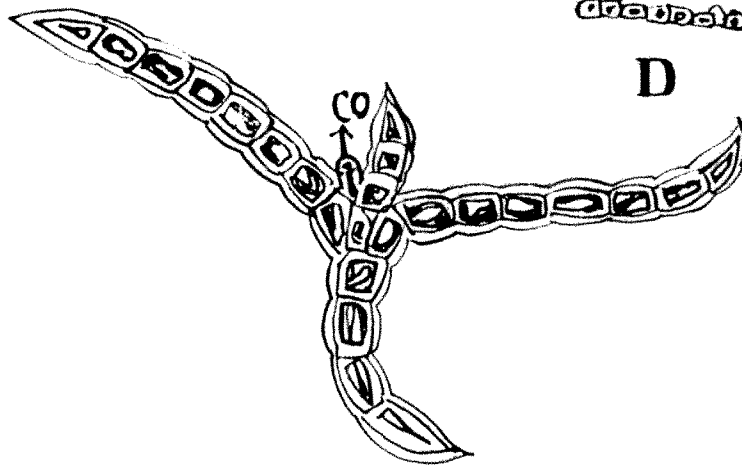
A



C



D



B

P L A T E - I X

Tetraposporium ravenelii (Cooke) Hughes

on

Capnodium species

on

Ixora coccinia L.

- A: Habit
- B: Conidium X 25.2
- C: Conidiophore and conidia X 196.8
- D: Host mycelium on Capnodium species X 78.75



PLATE IX



A



B



C



D

**F I G U R E - X**

**Tetraposporium ravenelii (Cooke) Hughes**

on

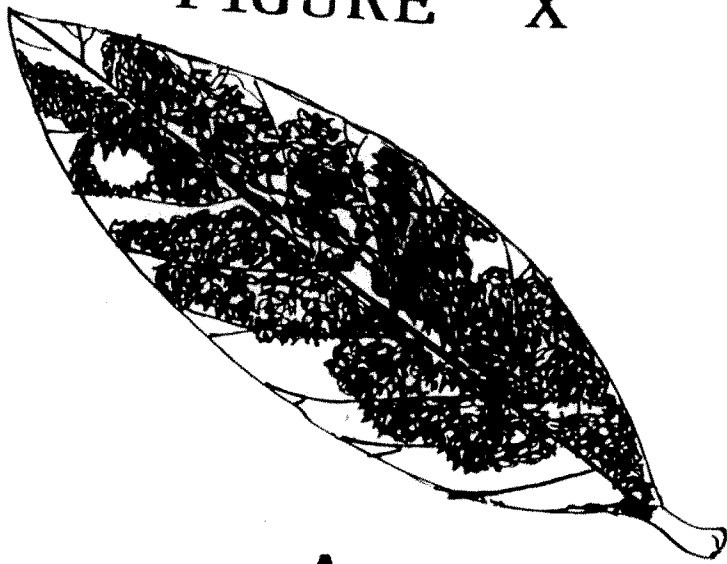
**Capnodium ramosum Cooke**

on

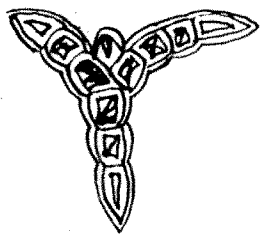
**Mangifera indica L.**

- A: Habit
- B: Conidium X 450
- C: Conidiophore and conidium X 450
- D: Host mycelium of Capnodium ramosum X 450

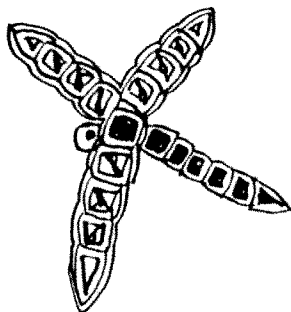
FIGURE X



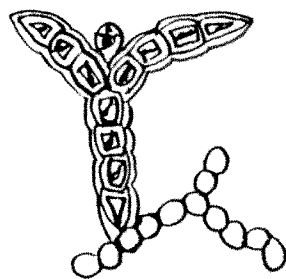
A



B



C



D

P L A T E - X

Tetraposporium ravenelii (Cooke) Hughes

on

Capnodium ramosum Cooke

on

Mangifera indica L

A:	Habit	
B:	Conidia	X 196.8
C:	Conidium	X 196.8
D:	Host mycelium of <u>Capnodium ramosum</u>	X 78.75



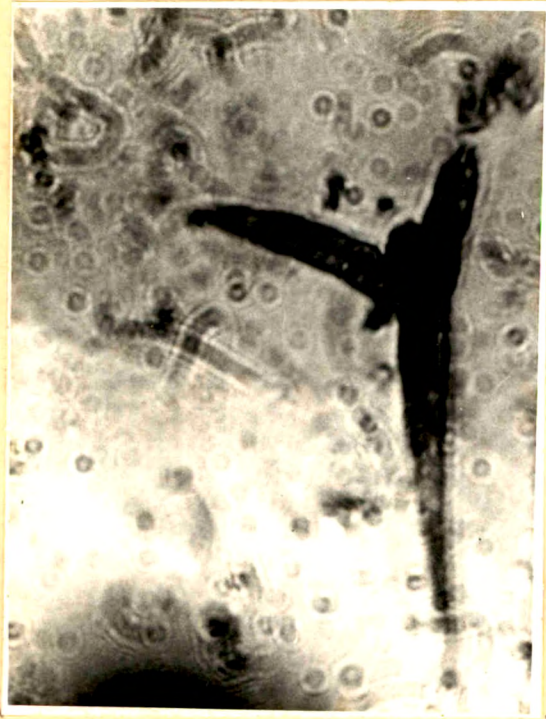
PLATE X



A



B



C



D

**FAMILY DEMATIACEAE**

Both hyphae and conidia are typically dark, but sometimes the hyphae are alone or conidia only are dark. As in the Moniliaceae, no organised fruiting body is produced. The majority of forms are saprobic but some are plant parasites and few are parasitic on animals and humans.

**KEY OF STUDIED GENERA OF FAMILY DEMATIACEAE -**Conidia 0-septate -

- |    |                   |                           |
|----|-------------------|---------------------------|
| 1) | Conidia spherical | ... <u>Hansfordia</u> .   |
| 2) | Conidia oval      | ... <u>Tripospermum</u> . |
| 3) | Conidia reniform  | ... <u>Virgaria</u> .     |

Conidia 0-3 septate -

- |    |  |                          |
|----|--|--------------------------|
| 1) | Conidia subcylindrical or long ellipsoidal | ... <u>Passalora</u> .   |
| 2) | Conidia oblong                             | ... <u>Spadicoides</u> . |

Conidia 1-2 septate, (cruciatly septate)

- |    |                          |                            |
|----|--------------------------|----------------------------|
| 1) | Conidia are subspherical | ... <u>Dictyoarthium</u> . |
|----|--------------------------|----------------------------|

**HANSFORDIA Hughes.**

Hughes 1951, Mycol. Pap. 43 : 15-42

Colonies effuse, pale to dark olivaceous grey or greyish brown, hairy or velvety. Mycelium superficial or immersed. Separate setae absent but in some species the upper part of the conidiophore is sterile and setiform or there are setiform branches. Conidiophores are macronematous, mononematous, erect or repent, branched, straight or flexuous, hyaline to brown, smooth. Conidiogenous cells polyblastic, integrated or terminal or discrete, sympodial, cylindrical or clavate, denticulate. Conidia solitary, dry, simple, acropleurogenous, ellipsoidal, fusiform, spherical or subspherical, hyaline to pale brown, smooth or verruculose, 0-septate.

**HANSFORDIA PULVINATA (Berk & Curt) Hughes.**

Hughes 1958, Can. J. Bot. 30 : 77.

Hansfordia pulvinata (Berk & Curt) Hughes was first described by Hughes (1951). Hughes (1958) has reported as parasite on Sportrichium canescens Speg and Verticillium cercosporae Peter & Cif. Mittal and Sharma (1979) reported as parasite on Shorea robusta from Dehra Dun. Krishna and Singh (1979) reported as a hyperparasite on Cercospora arachidicola and Cercospora personata on Arachis hypogea from GB Pant Univ.

Agric. Technol., Pantnagar. Siddaramaiah et al (1981) reported as a hyperparasite on Cercospora arachidicola and Cercosporidium personatum on Arachis hypogea from College of Agriculture, Dharwad, Karnataka. Singh and Kamal (1985) reported as a parasite on Thespesia lampas and as a hyperparasite on Mycovellosiella solani - torvi on Solanum torvum. Pseudocercospora meibomie on Desmodium pulchellum and Stigmia millettiae on Milletia auriculata from Gorakhpur.

Colonies are epiphyllous, grey to olivaceous grey, hairy, circular to irregular in shape. Conidiophores are macronematous, mononematous, erect, repent, very variable in length, unbranched, flexous, pale olive to mid brown in colour, the paler upper part bears a number of primary branches and ends as a rule in a conidiogenous cell although the apex may occasionally be sterile and setiform. The primary branches bear secondary branches which may be themselves be branched. Conidiogenous cells are subhyaline, smooth, polyblastic, integrated and terminal, upto 28  $\mu$  long, 1.75-3.8  $\mu$  thick, sympodial, cylindrical, denticulate. Conidia are dry, solitary, acropleurogenous, simple, fusiform, 0 septate, spherical, olivaceous brown in colour, verruculose, 3-9  $\mu$  diameter.

[ TABLE NO. VI ]



**COLLECTION EXAMINED -**

As hyperparasite on Cercospora hibisci Tracy & Earle on the leaves of Hibiscus esculentus L (Malvaceae) collected from Shivaji University Campus, Kolhapur, Maharashtra, Oct. 1992. M.S.Mishrakoti, Material No. H.C.I.O. 41, 081.

[FIGURE NO. XI, PLATE NO. XI].

Hansfordia pulvinata (Berk & Curt) Hughes on Cercospora hibisci Earle & Tracy on Hibiscus esculentus L differs from Hansfordia pulvinata (Berk & Curt) Hughes as follows -

Colonies are epiphyllous, grey to olivaceous grey, hairy. Conidiophores are repent, flexous, pale olive to mid brown in colour, Conidia are spherical, olivaceous brown, verruculose, 3-9  $\mu$  diameter.

**REMARK -**

Cercospora hibisci Tracy & Earle and Hibiscus esculentus L are new hosts for Hansfordia pulvinata (Berk & Curt) Hughes in India. Thus, it makes new host records from India.

TABLE NO. VI - Showing the comparison between Hansfordia pulvinata and present collection under study.

Hyperparasite	Host fungus	Host plant with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia
<u>Hansfordia pulvinata</u> (Berk & Curt) Hughes	<u>Cercospora, Verticillium, Mycovellosiella</u> <u>Pseudocercospora,</u> <u>Stigmimonia</u>	<u>Arachis hypogea</u> [Leguminosae] <u>Solanum torvum</u> [Solanaceae]	Leaves	Olivaceous grey to grey in colour, hairy or velvety	Conidio-phore, conidia	Repent or erect, straight or flexous; hyaline to brown.	Subspherical, to spherical, colourless to pale brown, verruculose to minutely echinulate 4-7 $\mu$ diameter.
<u>Present Collection</u>	<u>Cercospora hibisci</u> Earle & Tracy	<u>Hibiscus esculentus</u> L [Malvaceae]	Leaves	Epiphyllous olivaceous grey in colour, Hairy	Conidio-phore, conidia	Repent, flexous, pale olive to mid brown	Spherical, olivaceous brown, verruculose, 3-9 $\mu$ diameter

F I G U R E - X I

Hansfordia pulvinata (Berk & Curt) Hughes

on

Cercospora hibisci Earle & Tracy

on

Hibiscus esculentus L.

A : Habit

B, C: Conidiophore and Conidia

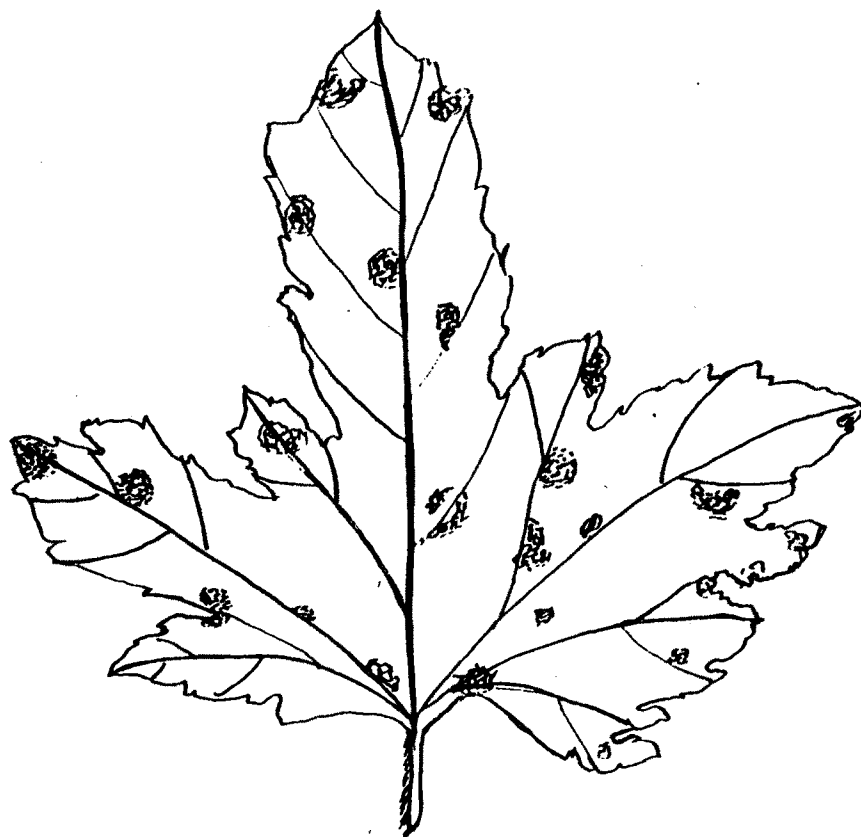
X 450

D : Host mycelium of Cercospora hibisci

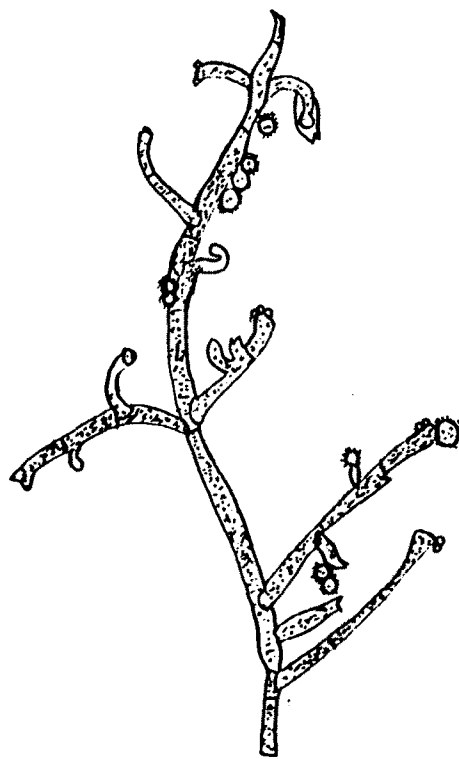
X 450

12 mms

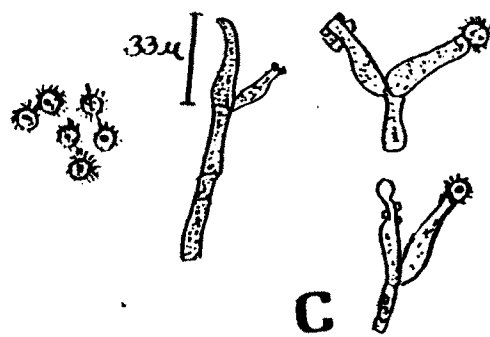
FIGURE XI



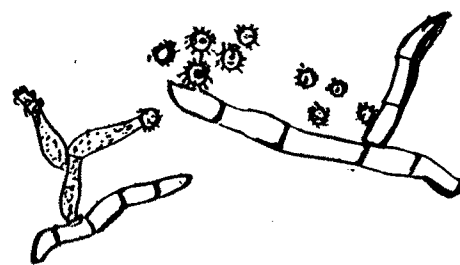
A



B



C



D

P L A T E - X I

Hansfordia pulvinata (Berk & Curt) Hughes

on

Cercospora hibisci Tracy & Earle

on

Hibiscus esculentus L

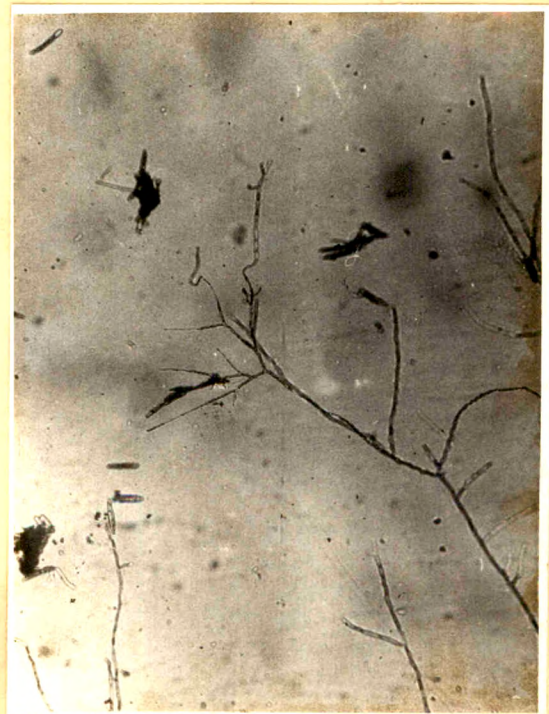
- A: Habit
- B: Conidiophore and Conidia X 100
- C: Host mycelium of Cercospora hibisci X 32



A



B



C

**TRIOSPERMUM Speg.**

Spegazzini, 1918 Physis , 4(17) : 295.

Colonies effuse, brown-blackish brown to black in colour, often rust like. Mycelium superficial, sometimes, torulose. Stroma none. Setae and hypopodia absent. Conidiophores macronematous, mononematous, erect or ascending, unbranched or occasionally loosely branched, pale to mid brown or olivaceous brown, smooth. Conidiogenous cells monoblastic or polyblastic, integrated, terminal or intercalary, determinate, doliiform or cylindrical. Conidia solitary, dry, acrogenous or pleurogenous, branched, usually made up of a pyriform or ellipsoidal stalk cell and 4 divergent, subulate, multiseptate arms, pale to mid brown or olivaceous brown, smooth.

**KEY TO STUDIED SPECIES OF TRIOSPERMUM Speg. ✓**

- 1) Conidia made up of ellipsoidal stalk cell and with 3-4 multiseptate arms ... **T. acerinum.**
- 2) Conidia with arms of which one arm lies parallel to the stalk cell ... **T. myrti.**

**TRIOSPERMUM ACERINUM (Syd.) Speg.**

Hughes S.J. 1951 Mycol. Pap. 46 : 10-22.

First described by Spegazzini (1918) From India, it was described as parasite on Mangifera indica L by Das and Mohanty (1972) from Orissa.

Colonies are effuse, hypophyllous, brown to black in colour, crust like superficial. Conidiophores are semi macronematous, mononematous, erect, unbranched, pale olivaceous to mid brown in colour, smooth, Conidiogenous cells monoblastic, integrated, intercalary, determinate, doliiform which is upto 108  $\mu$  long and 2-6  $\mu$  thick. Conidia solitary, dry, pleurogenous, made up of ellipsoidal stalk and 4 divergent subulate, multiseptate arms, 2-7 septate, pale olivaceous to brown, smooth, 4-12  $\mu$  long, 7-10  $\mu$  broad, one celled.

[TABLE NO. VII].

**COLLECTION EXAMINED :**

As hyperparasite on Capnodium ramosum Cooke on leaves of Mangifera indica L (Anacardiaceae) at Mahabaleshwar on Jan., 1993. M.S.Mishrakoti, Material No. H.C.I.O. 41,095.

[FIGURE NO.XII, PLATE NO. XII].



Tripaspermum acerinum (Syd.) Speg. on Capnodium ramosum Cooke on leaves of Mangifera indica L differs from Tripaspermum acerinum (Syd.) Speg as follows -

Colonies are hypophyllous, effuse, brown to black in colour, crust like. Conidiophores are erect, unbranched, pale olivaceous to mid brown in colour, smooth. Conidiogenous cells are monoblastic, intercalary, doliform. Conidia are pleurogenous, made up of ellipsoidal stalk cell and 4 divergent arms, 2-7 septate, pale olivaceous to brown in colour.

**REMARK -**

Capnodium ramosum Cooke is new host fungus for Tripaspermum acerinum (Syd.) Speg. Thus, it makes a new host record. Tripaspermum acerinum is not recorded in the Maharashtra. Thus, it is new record to state of Maharashtra.

TABLE NO. VII - Showing the comparison between Tripospermum acerinum and present collection under study

Hyperparasite	Host fungus	Host plant with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia
<u>Tripospermum acerinum</u> (Syd) Speg.	-	<u>Mangifera indica</u> L. [Anacardiaceae]	Leaves	Blackish brown to black, effuse, crust like, superficial or torulose	Conidio-phore, conidia with 3-4 arms.	Erect or ascending, unbranched or occasionally loosely branched, pale to mid brown-brown-olivaceous brown, conidogenous cells are polyblastic or monoblastic terminal or intercalary doliform or cylindrical.	Acrogenous or pleurogenous, Made up of a pyriform or ellipsoidal stalk cell, with multiseptate arms pale to mid brown or olivaceous brown in colour.
<u>Present Collection</u>	1) <u>Capnodium ramosum</u> Cooke	<u>Mangifera indica</u> L. [Anacardiaceae]	Leaves, Stem	Hypophyllous, brown to black colour, crustlike, superficial.	Conidio-phore, conidia with 3-4 arms.	Erect, unbranched, pale olivaceous to mid brown conidogenous cells are monoblastic, intercalary, doliform.	Pleurogenous, made up of a ellipsoidal stalk cell, 2-7 septate arms, pale olivaceous to brown in colour.

F I G U R E - X I I

Tripospermum acerinum (Syd.) Speg.

on

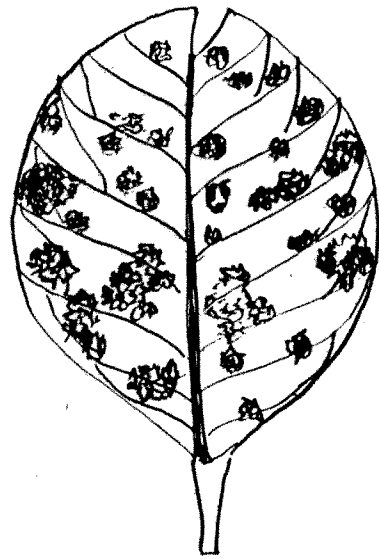
Capnodium ramosum Cooke

on

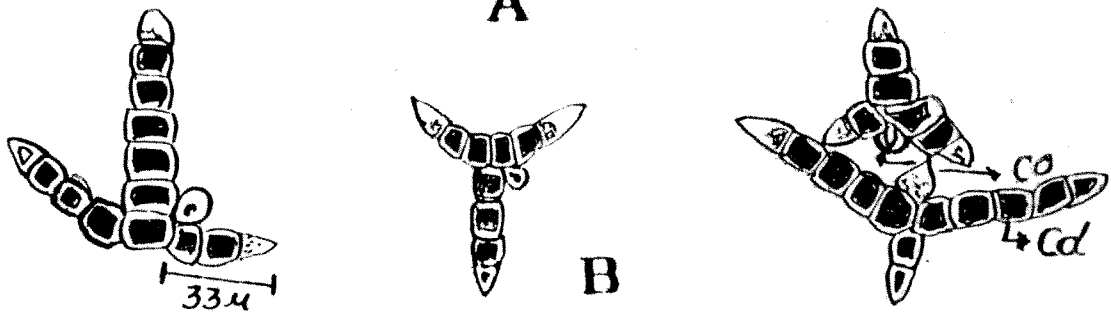
Mangifera indica L

- |   |   |       |
|---|---|-------|
| A | Habit                                     |       |
| B | Conidia                                   | X 450 |
| C | Conidiophore and conidia                  | X 450 |
| D | Host mycelium of <u>Capnodium ramosum</u> | X 450 |

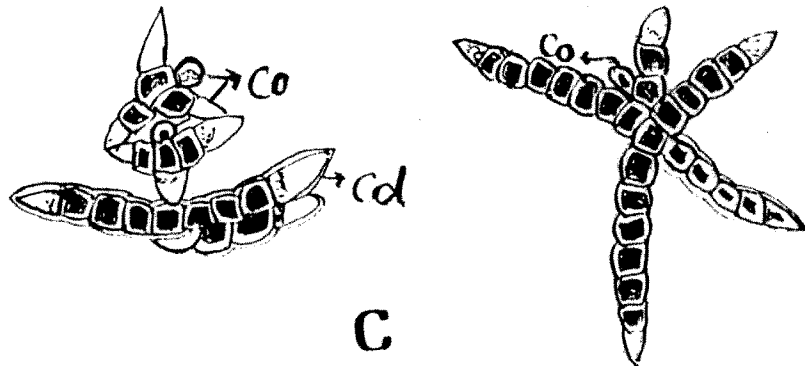
# FIGURE XII



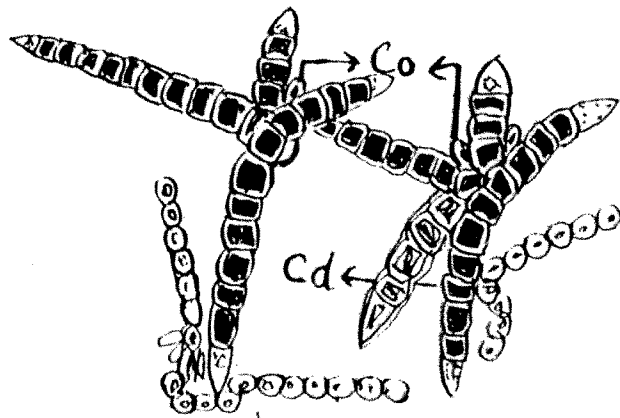
A



B



C



D

P L A T E- XII

Tripospermum acerinum (Syd.) Speg.

on

Capnodium ramosum Cooke

on

Mangifera indica L.

- A: Habit
- B: Conidiophores X 315
- C: Conidium X 315
- D: Host mycelium of Capnodium ramosum X 315

PLATE XII



A



B



C



D



**TRIOSPERMUM MYRTI (Lind) Hughes.**

Hughes, 1951, Mycol. Pap. 46: 17-18.

Colonies effuse, black in colour, hypophyllous, sometimes covered the whole upper leaf surface. Hyphae are 4-8  $\mu$  thick. Cells often doliiform. Conidiophores are upto 69  $\mu$  long, 2-5  $\mu$  thick, semimacronematous, mononematous, erect, pale olivaceous to brown in colour, unbranched, smooth. Conidiogenous cells are monoblastic, integrated, intercalary, determinate, doliiform. Conidia are solitary, pleurogenous, subhyaline, one celled, 4-6  $\mu$  long, 2-4  $\mu$  broad, 4 divergent arms with ellipsoidal stalk cell, 2-5 septate, often constricted at the septa, one of the arm usually lies parallel to stalk cell, each arm is upto 25  $\mu$  long, 2-3  $\mu$  thick, tapering to 2  $\mu$  . [TABLE NO. VIII].

**COLLECTION EXAMINED -**

As hyperparasite on Capnodium species on the leaves of Exocecaria agallocha L. (Exocecariaceae) at Shivaji University Campus, Sept. 1993. M.S.Mishrakoti, Material No. H.C.I.O.41,096

[FIGURE NO. XIII, PLATE NO. XIII].

Tripospermum myrti (Lind.) Hughes on Capnodium species on Exocecaria agallocha L differs from Tripospermum myrti (Lind.) Hughes as follows -

Colonies are black, hypophyllous, sometimes covered the whole upper surface of leaf. Conidiophores are upto 69  $\mu$  long, 2-5  $\mu$  thick, erect, unbranched, pale olivaceous to brown. Conidia are subhyaline, arms are 2-5 septate.

**REMARK -**

One of the studied species Tripospermum myrti is not recorded in Indian flora. So T. myrti is new species to India.



TABLE NO. VIII - Showing the comparison between Tripopermium myrti with present collection under study.

Hyperparasite	Host fungus	Host plants with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia
<u>Tripopermium myrti</u> (Lind) Hughes		<u>Arundinaria</u> (Graminae) <u>Fraxinus</u> (Oleaceae) <u>Sparticum</u> (Leguminosae)	Leaves	Black, thin, crust like	Conidio- phore, conidia with arms.	Up to 90 $\mu$ long, 4-8 $\mu$ thick, erect or ascending unbranched or loosely branched, pale o mid brown or olivaceous brown.	Subhyaline to dark, 1-4 septate arms.
<u>Present collection</u>	<u>Capnodium</u> species	<u>Exocecaria</u> <u>agallocha</u> L [Exocecariaceae]	Leaves	Hyphylous, black in colour, covered on whole leaf surface	Conidio- phore, conidia with arms.	Upto 69 $\mu$ long, 2-5 $\mu$ thick, erect, unbranched, pale oliva- ceous to brown in colour.	Subhyaline, 2-5 septate arms.

F I G U R E - XIII

Tripospermum myrti (Lind) Hughes

on

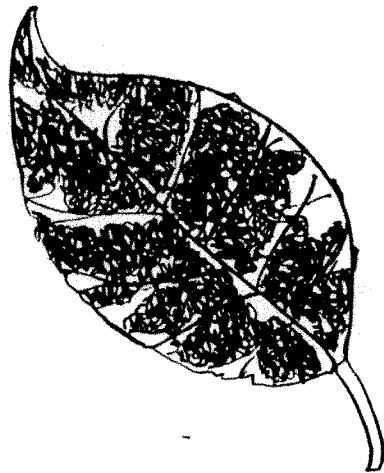
Capnodium species

on

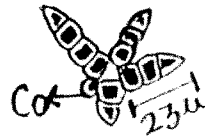
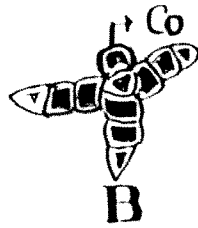
Exocecacia agallocha L

- A: Habit
- B: Conidia X 450
- C: Conidiophore and conidia X 450
- D: Host mycelium of Capnodium species X 450

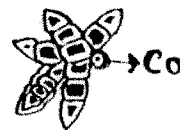
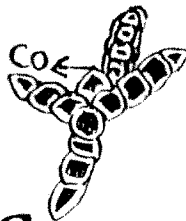
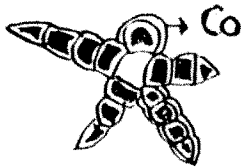
# FIGURE XIII



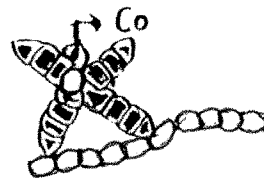
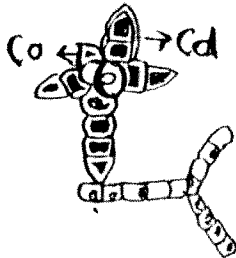
A



B



C



D

P L A T E - XIII

Tripospermum myrti (Lind.) Hughes

on

Capnodium species

on

Exoecaria agallocha L.

A: Habit

B: Conidium

X 196.8

C: Conidiophore and Conidia on host mycelium of

Capnodium species

X 32

PLATE XIII



A



B



C

**VIRGARIA Nees.**

Nees ex S.F.Gray; Nees, 1817 Syst. Pilze Schwamme: 54;  
S.F.Gray, 1822, Nat. Arr. Br. Pl. 1: 552.

Colonies effuse, dark olive to brown or almost black, often thick and felt like. Mycelium mostly superficial, partly immersed. Stroma none. Conidiophores macronematous, mononematous, erect or ascending, extensively branched, straight or flexuous, pale to mid brown, smooth. Conidiogenous cells polyblastic, integrated, terminal or branches sympodial, cylindrical, denticulate, denticles cylindrical, numerous. Conidia solitary, dry, acropleurogenous, simple, reniform, pale to mid brown, smooth, 0-septate.

**VIRGARIA NIGRA (Link) Nees.**

ex. S.F. Gray; 1821: Nat. Arr. Br. Pl. 1: 553

Virgaria nigra was first described by Nees (1817). From India, it was reported by Subramanian (1956) as parasite on dead stems from Thanthipandal, Kambakkam Hills, Tamil Nadu.

Colonies effuse, dark olive in colour, hypophyllous, partly superficial, partly immersed. Conidiophores ascending, macronematous, mononematous, extensively branched, flexuous, pale to mid brown, smooth, 75-280  $\mu$  long, 2-3  $\mu$  broad. Conidiogenous cells are polyblastic, terminal, integrated, branches are

sympodial, denticulate, denticles cylindrical, numerous. Conidia solitary, dry, acropleurogenous, simple, one celled, reniform, often obliquely attenuated at the base, hyaline, smooth, 4-6  $\mu$  long, 2-4  $\mu$  broad.

[TABLE NO. IX].

**COLLECTION EXAMINED -**

As a hyperparasite on Tremella species on wood of Delonix regia (Caesalpinaceae) at Shivaji University Campus, Kolhapur, Maharashtra, Aug. 1993. *(material No.*

[FIGURE NO. XIV, PLATE NO. XIV].

Virgaria nigra (Link) Ness on Tremella species on wood of Delonix regia differs from Virgaria nigra as follows -

Colonies are effuse, dark olive in colour. Conidiophores are flexous, ascending, pale to mid brown. Conidiogenous cells are flexous. Conidia are hyaline, 4-6  $\mu$  long, 2-4  $\mu$  broad.

**REMARK -**

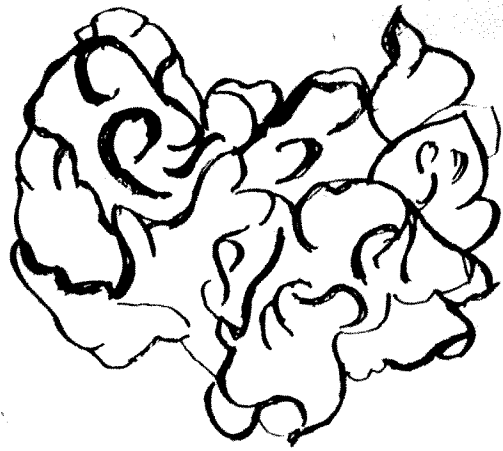
Tremella species and Delonix regia both are new hosts for Virgaria nigra. Thus, it makes a new host record. Virgaria nigra is not recorded in Maharashtra. So it is new record to State of Maharashtra.

TABLE NO. IX - Showing the comparison between Virgaria nigra and present collection under study.

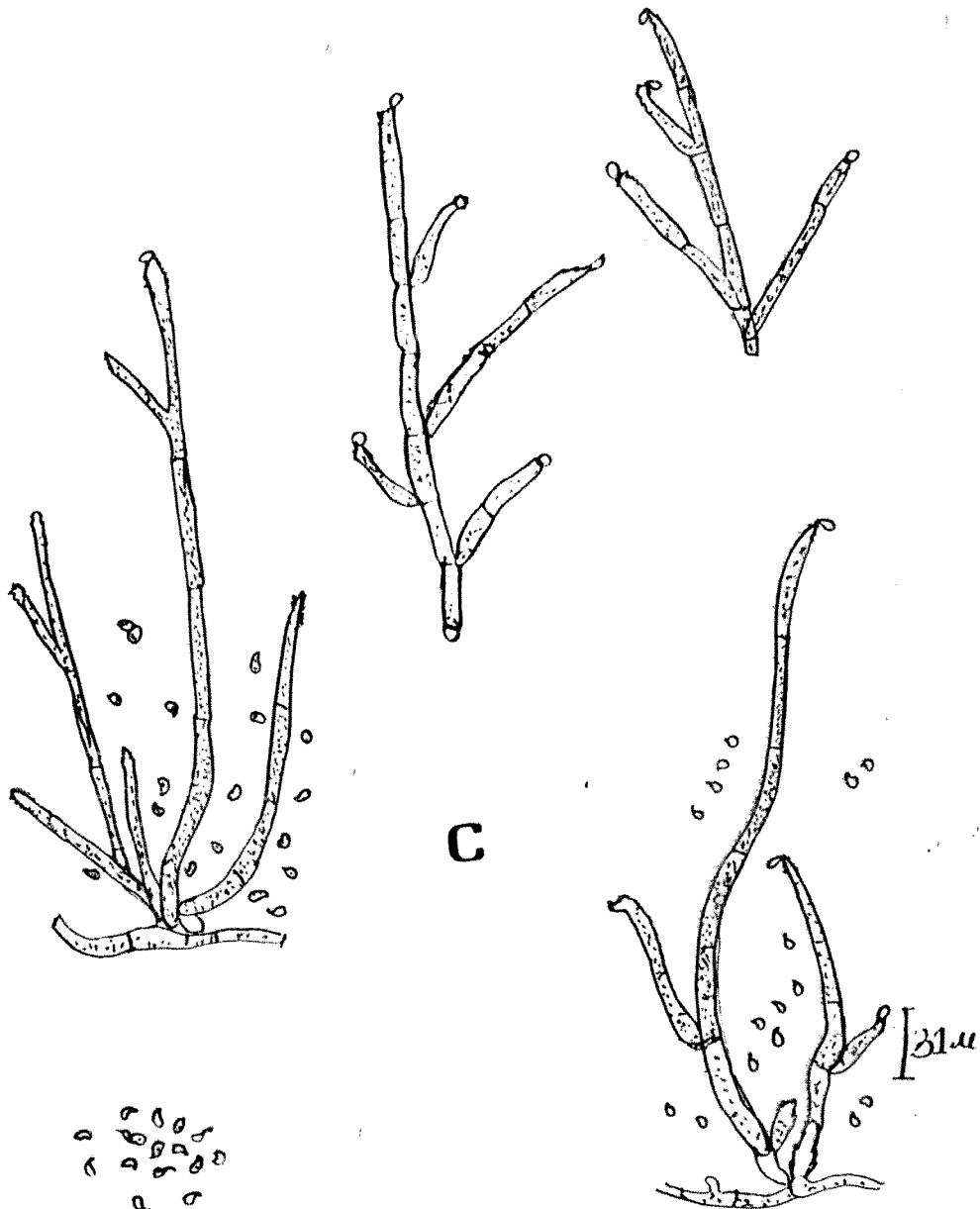
Hyperparasite	Host fungus	Host plant with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia $\mu$ m
<u>Virgaria nigra</u>	-	<u>Acer</u> [Aceraceae] <u>Betula</u> [Betulaceae] <u>Combretum</u> [Combretaceae] <u>Corylus</u> [Betu- ceae] Fagus[Fagaceae] Fraxinus [Oleaceae] Juglans [Juglandaceae] <u>Sorbus</u> [Rosaceae]		Effuse, often thick, or felt like, dark olive to brown in colour or almost black	Conidio- phore, conidia.	Straight or flexous, ascending or erect, brown in colour. Conidiogenous cells flexous or straight.	Pale to mid brown 4-6 X 2.5-4
<u>Present collection.</u>	<u>Tremella species</u>	<u>Delonix regia</u> [Casealpinaceae]	On dead wood	Hyphylous effuse, dark olive in colour.	Conidio- phore, conidia.	Flexous, ascending pale to mid brown in colour. conidiogenous cells flexous.	Hyaline, 4-6 X 2-4



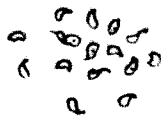
# FIGURE XIV



A



C



B

131u

P L A T E - XIV

Virgaria nigra Ness

on

Tremella Species

on

Delonix regia

A: Habit

B: Conidiophores and Conidia

X 78.75

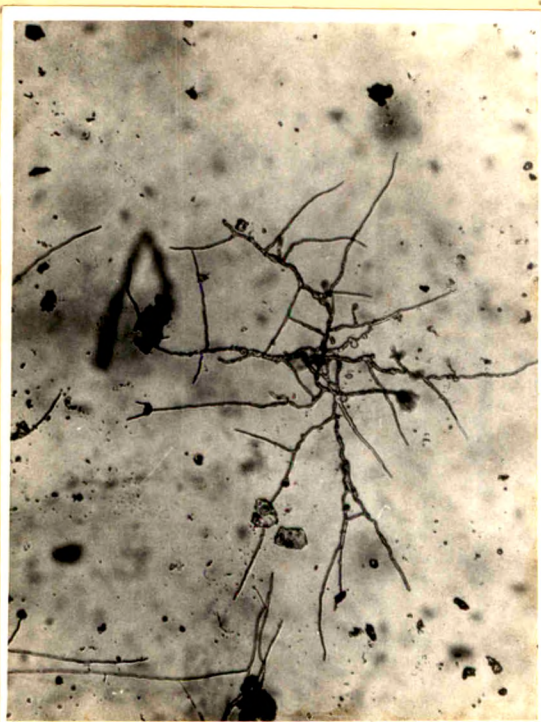
C: Conidiophores

X 80

PLATE XIV



A



B



C

PASSALORA Fries.

Fries, 1849, Summa Veg. Scand : 500.

Colonies usually hypophyllous, effuse, olivaceous, velvety, sometimes causing leaf spots. Mycelium immersed. Conidiophores macronematous, mononematous, caespitose, emerging through stomata, unbranched or occasionally branched, straight or flexous, olivaceous or brown, smooth. Conidiogenous cells polyblastic, sympodial, integrated, terminal becoming intercalary. Conidia dry, solitary, acropleurogenous, obclavate, pale olivaceous brown, smooth, mostly one septate, the proximal cell swollen and long ellipsoidal, the distal cell narrow, subcylindrical to very long ellipsoidal, rarely 2-3 septate.

PASSALORA BACILLIGERA (Mont & Fr)

1856, in Montagne's Syll. Gen. Sp. Crypt: 305.

Passalora bacilligera (Mont & Fr) was first described Mont and Fries (1856).

Colonies usually hypophyllous, effuse, velvety, olivaceous in colour, causing leaf spots. Mycelium immersed. Conidiophores are macronematous mononematous, caespitose, unbranched, olivaceous in colour, smooth, often in fascicles at about 12 in number, 30-140  $\mu$  long, 3-5.5  $\mu$  thick at the base, swelling towards the apex to 4-6.5  $\mu$  . Conidia are solitary, dry,

acropleurogenous, obclavate, pale olivaceous to brown in colour, smooth, mostly one septate, the proximal cell is swollen and long, ellipsoidal, the distal cell is narrow, subcylindrical to very long ellipsoidal, 20-61  $\mu$  long, proximal cell 4-10.5  $\mu$  thick and distal cell is 3.5-6.5  $\mu$  thick.

**[TABLE NO. X]**

**COLLECTION EXAMINED -**

As hyperparasite on the Oidium species on Tinospora cordifolia L (Minispermaceae) Mahavir Garden area, Kolhapur, Maharashtra, Sept. 1992. M.S.Mishrakoti, Material No. H.C.I.O. 41, 086 **[FIGURE NO. XV, PLATE NO. XV].**

Passalora bacilligera (Mont & Fr) on Oidium species on Tinospora cordifolia L differs from Passalora bacilligera (Mont & Fr) as follows -

Colonies are hypophyllous, effuse, velvety, olivaceous in colour, immersed. Conidiophores are upto 140  $\mu$  long, 3-5.5  $\mu$  thick at base.

**REMARK -**

One of the studied species of genus Passalora is bacilligera not collected from Indian flora till the present study. So it is new species to India.

**TABLE NO.X** - Showing the comparison between Passalora bacilligera and present collection under study.

Hyperparasite	Host fungus	Host plant with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia
<u>Passalora bacilligera</u> Mont & Fr.	-	<u>Alnus species</u> (Betulaceae)	Leaves	Hairy or velvety	Conidio- phore, conidia	Up to 180 $\mu$ long, 3-5 $\mu$ thick at the base.	21-68 $\mu$ long proxi- mal cell 4.5 - 8.5 $\mu$ thick, distal cell 3.5-5 $\mu$ thick.
<u>Present Collection</u>	<u>Oidium</u> Species	<u>Tinospora cordifolia</u> L [Minispermaceae]	Leaves	Hypophyllous, effuse, olive in colour velvety, immersed.	Conidio- phore, conidia	Upto 140 $\mu$ long, 3-3.5 $\mu$ thick at the base	20-61 $\mu$ long, proxi- mal cell 4-10.5 $\mu$ thick, distal cell 3.5-6.5 $\mu$ thick

F I G U R E - X V

Passalora bacilligera Mont & Fr

on

Oidium species

on

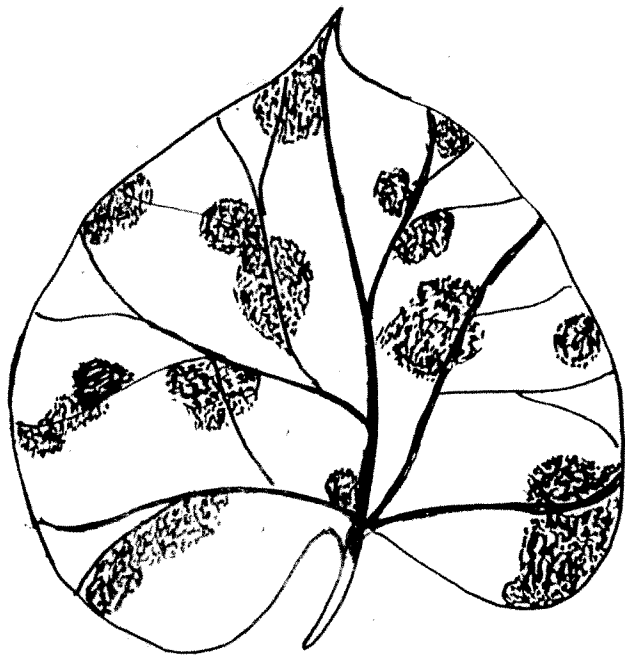
Tinospora cordifolia L.

- A: Habit
- B: Conidia X 450
- C: Conidiophore and conidia X 450
- D: Host mycelium of Oidium species X 450

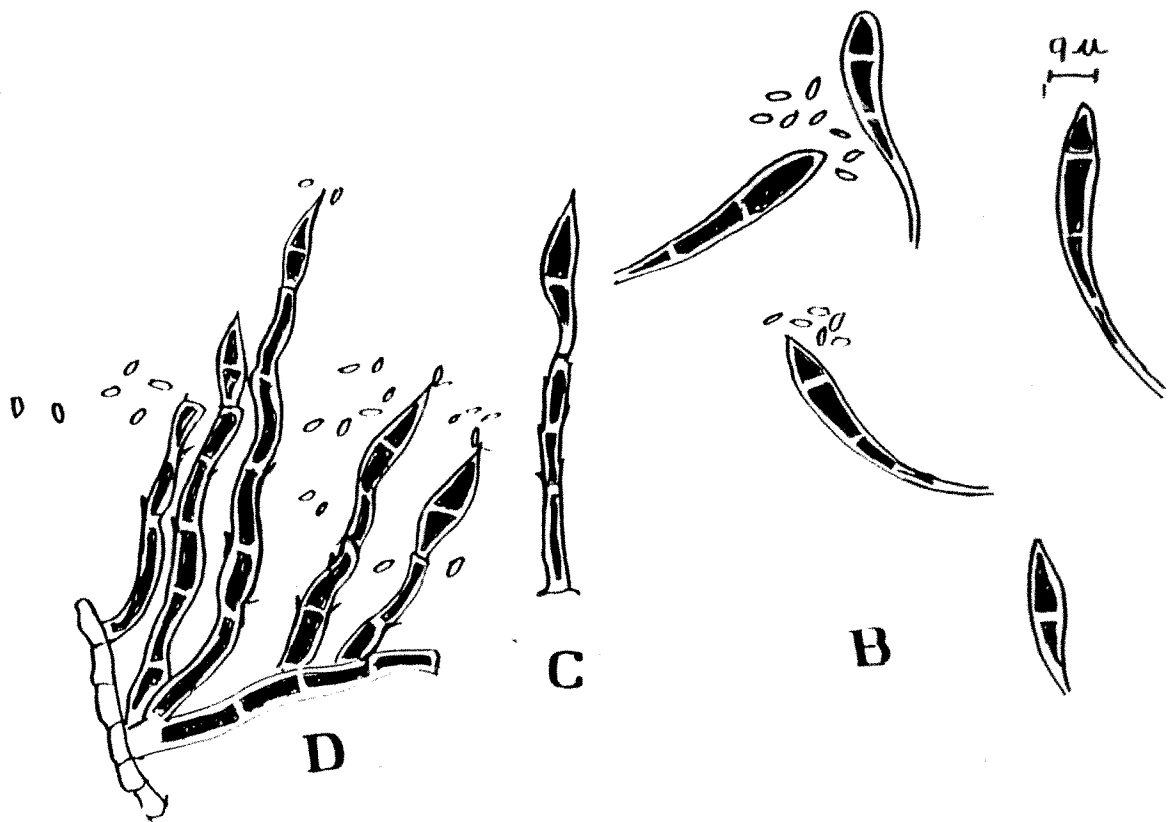
6 10 70



# FIGURE XV



A



C

B

D



P L A T E - X V

Passalora bacilligera Mont & Fr.

on

Oidium sp<sup>eci</sup>es

on

Tinospora cordifolia L

A: Habit

B: Conidia

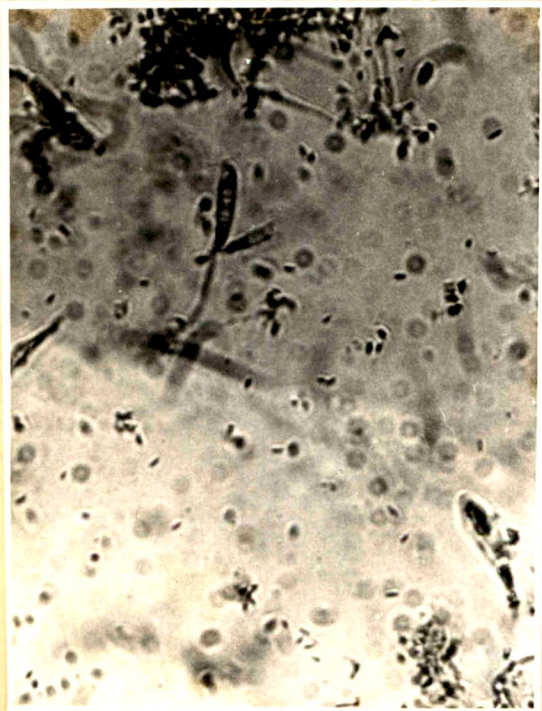
X 157.5

C: Conidiophores in fascicles and Conidia

X 80



A



B



C

**SPADICOIDES Hughes.**

Hughes, 1958, Can. J. Bot. 36 : 805-806

Colonies effuse, dark olivaceous brown, blackish brown or black, hairy or velvety. Mycelium partly superficial, partly immersed. Conidiophores macronematous, mononematous, generally unbranched, straight or flexuous, pale to very dark brown or olivaceous, smooth. Conidiogenous cells polytretic, integrated, terminal and intercalary, determinate, cylindrical. Conidia solitary, dry, acropleurogenous, ellipsoidal, oblong, rounded at the ends or obovoid, mid pale to dark brown or reddish brown, smooth, 0-3 septate, sometimes with thick, black or dark brown bands at the septa.

**SPADICOIDES BINA (Corda) Hughes.**

Hughes, 1958, as 'binum', Can. J. Bot. 36: 806.

Ellis M.B. 1963 :Mycol. Pap. 93: 6-14.

Spadicoides bina (Corda) Hughes was first described by Hughes (1958) as 'binum'.

Colonies are effuse, whitish - dark brown to black in colour, epiphyllous, hypophyllous, sometimes covered the whole leaf surface, velvety. Mycelium is partly superficial and partly immersed. Conidiophores are macronematous, mononematous, generally unbranched, straight, erect, smooth, hyaline-subhyaline, mid to very dark, paler towards the apex, 2-7 septate, dark

band at the septa, 80-250  $\mu$  long, 2-5  $\mu$  broad. Conidiogenous cells are polytretic, integrated, terminal and intercalary, determinate and cylindrical. Conidia dry, solitary, acropleurogenous, developing through minute channels in the thick wall of conidiogenous cell, simple, oblong, rounded at the ends, occasionally ellipsoidal, subhyaline to mid pale to brown, almost with dark blue to brown band at the septum, 16-40  $\mu$  long, 11-18  $\mu$  broad. [TABLE No. XI ].

**COLLECTION EXAMINED -**

- 1) As hyperparasite on the Aecidium crini kalchbr on the leaves of Crinum defixisum kalchbr (Amaryllidaceae) in Shivaji University Campus, Kolhapur, Maharashtra, July, 1993. Dr.A.N.Thite, Material No. H.C.I.O. 41,087.

[FIGURE NO. XVI, PLATE NO. XVI].

- 2) As hyperparasite on Capnodium species on the leaves of Pongamia glabra Vent (Leguminosae) in Rajarampuri area, Kolhapur, Maharashtra, Oct. 1992, Dr.A.N.Thite and M.S.Mishrakoti, Material No. H.C.I.O. 41,086.

[FIGURE NO. XVII, PLATE NO. XVII ]

Spadicoides bina (Corda) Hughes on Capnodium species on Pongamia glabra Vent. and Spadicoides bina (Corda) Hughes on Aecidium crini Kalchbr on Crinum defixisum Kalchbr differs

from Spadicoides bina (Corda) Hughes as follows -

Colonies are whitish daark brown to black in colour, epiphyllous, hypophyllous, sometimes covered the whole leaf surface, velvety. Conidiophores are straight, hyaline to subhyaline, 2-7 septate. Conidia subhyaline, mid pale to brown.

**REMARK -**

One of the studied species of genus Spadicoides is bina not collected from India flora till the study. Thus, it is new species to India.

TABLE NO. XI - Showing the comparison between Spadicoides bina and present collections under study,

Hyperparasite	Host fungus	Host plant with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia
<u>Spadicoides bina</u> (Corda) Hughes	-	<u>Betula</u> (Betulaceae) <u>Celtis, Ulmus</u> (Ulmaceae) <u>Fagus, Quercus</u> (Fagaceae) <u>Pinus</u> (Coniferae) <u>Prunus</u> (Rosaceae)	On stem, leaves	dark olivaceous brown, blackish brown or black, hairy or velvety	Conidiophore	Straight or flexuous, pale to very dark brown or olivaceous, multiseptate.	Mid pale to dark brown or reddish brown.
Present Collections.	1) <u>Capnodium</u> species	<u>Pongamia glabra</u> <u>Vent</u> [Leguminosae]	On stem, leaves	hypophyllous, epiphyllous	conidiophore, conidia	straight, hyaline to subhyaline 2-7 septate	Subhyaline to mid pale to brown.
	2) <u>Aecidium crini</u> Kaichbr	<u>Crinum defixisum</u> <u>Kalchbr</u> [Amaryllidaceae]		white to black in colour, velvety sometimes covered the whole leaf surface.			

F I G U R E - X V I

Spadicoides bina (Corda) Hughes

on

Aecidium crini Kalchbr

on

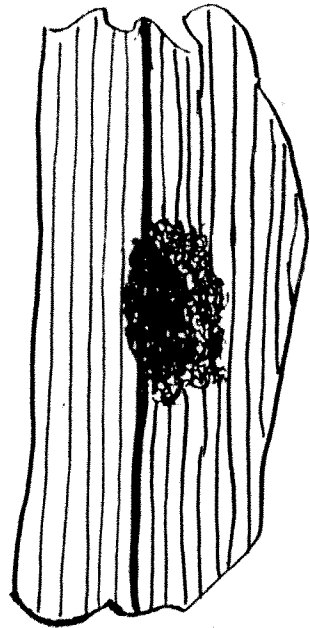
Crinum defixisum Kalchbr

- A: Habit
- B: Conidia X 450
- C: Conidiophore and Conidia X 450
- D: Host mycelium of Aecidium crini X 450

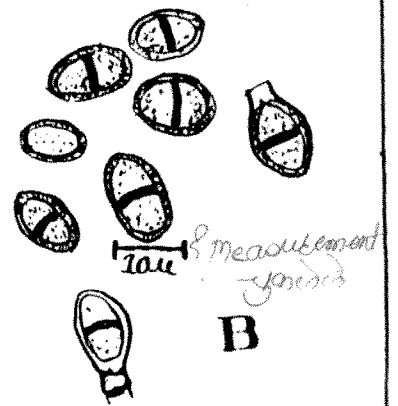
10 mm



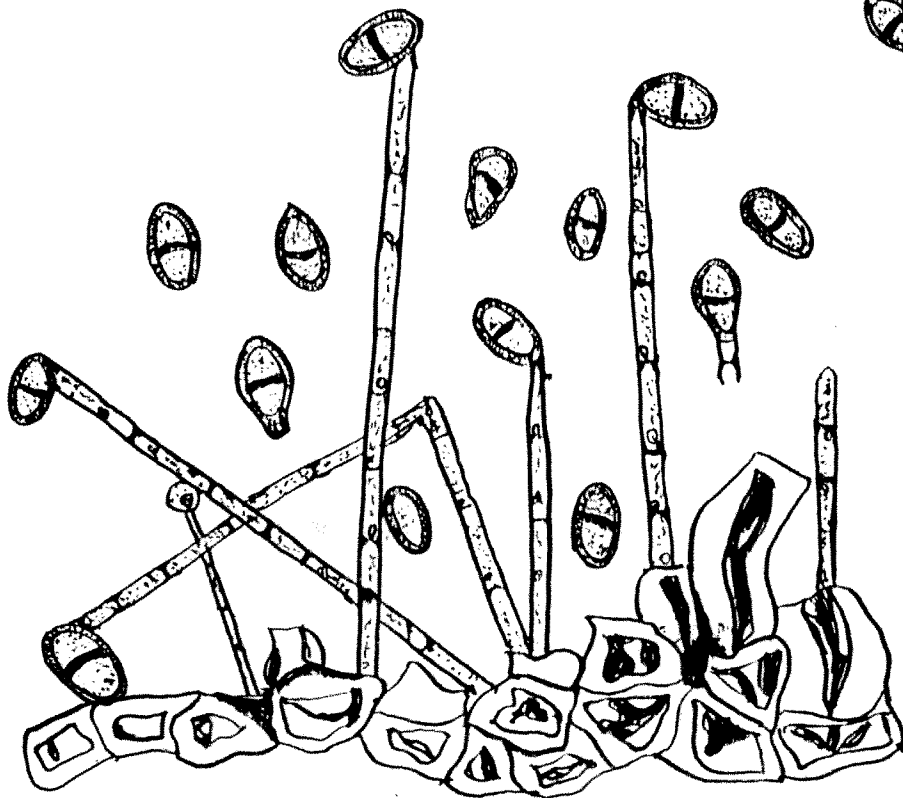
# FIGURE XVI



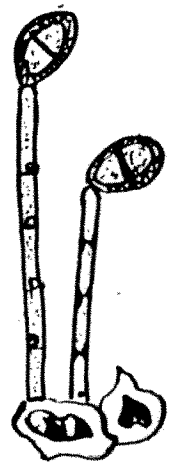
A



B



D



C



P L A T E - XVI

Spadicoides bina (Corda) Hughes

on

Aecidium crini Kalchbr

on

Crinum defixisum Kalchbr

A: Habit

B: Conidiophore and Conidia on uredospores  
of Aecidium crini

X 126

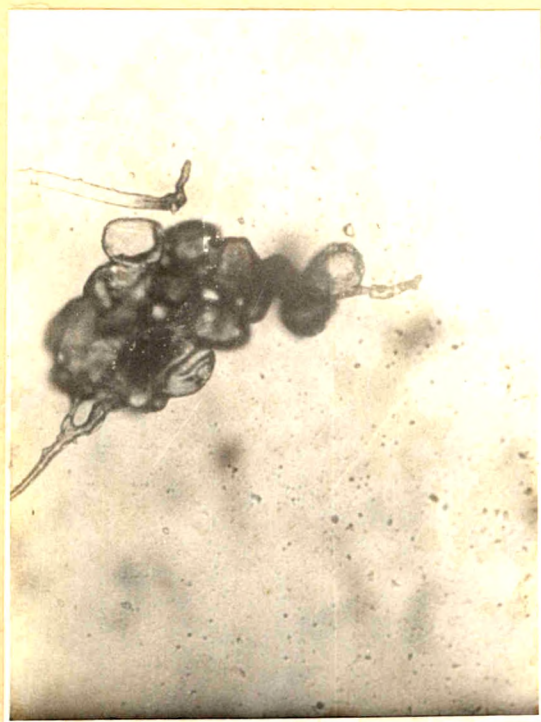
C: Conidiophore and Conidia

X 78.75

PLATE XVI



A



B



C

F I G U R E - X V I I

Spadicoides bina (Corda) Hughes

on

Capnodium Species

on

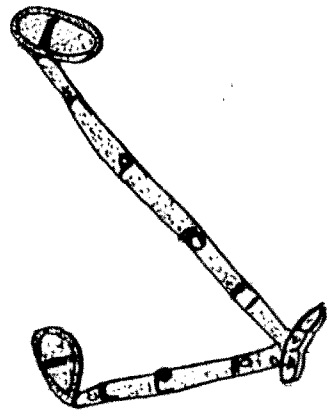
Pongomia glabra Vent.

- A: Habit
- B: Conidia X 450
- C: Conidiophore and conidia X 450
- D: Host mycelium of Capnodium species X 450

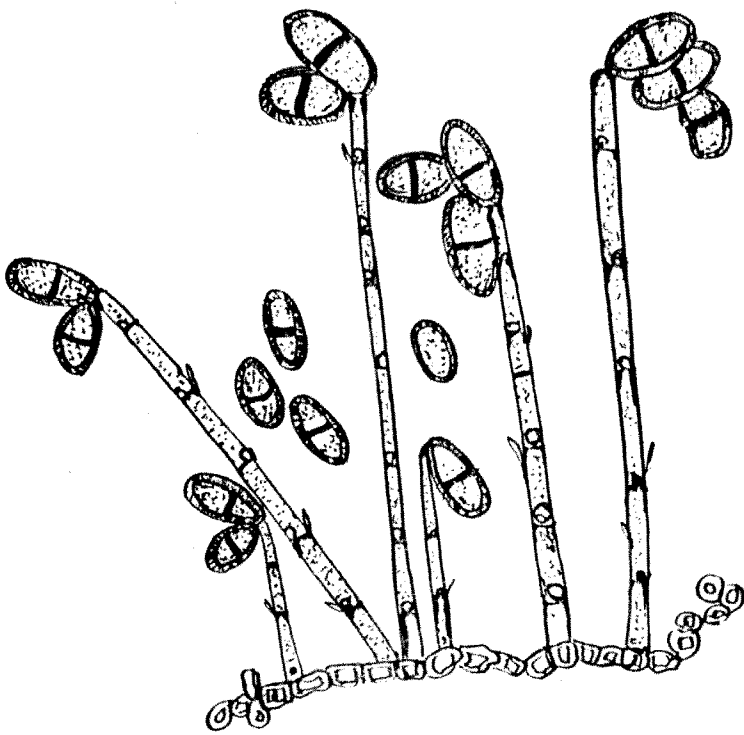
FIGURE XVII



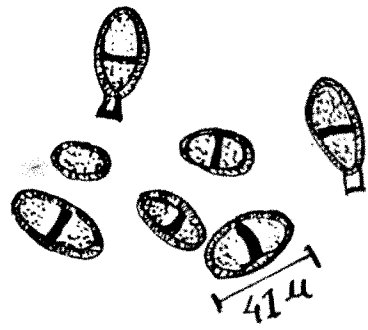
A



C



D



B

P L A T E - XVII

Spadicoides bina (Corda) Hughes

on

Capnodium Species

on

Pongamia glabra Vent

A: Habit

B: Conidiophores and conidia on host mycelium of  
Capnodium species

X 100

C: Conidiophores and Conidia

X 100

D: Conidia

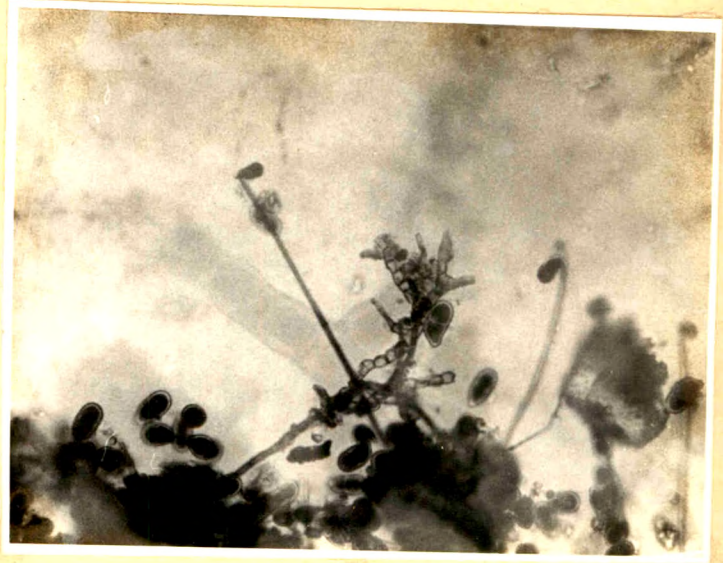
X 315



PLATE XVII



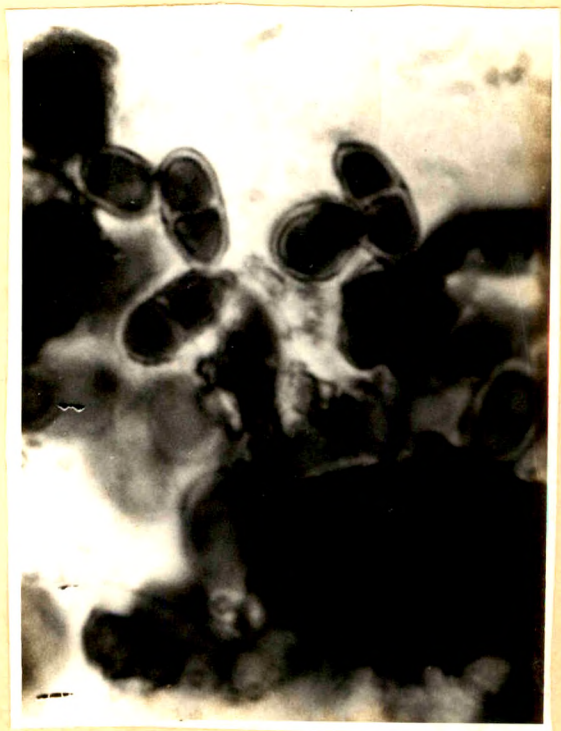
A



B



C



D

**DICTYOARTHINIUM Hughes.**

Hughes, 1952. Mycol. Pap. 48 : 29-33.

Colonies are compact or effuse, black, pulverent. Conidiophores are basauxic, micronematous, mononematous, arising usually from subspherical or cupulate. Conidiophore mother cells, straight or flexous. Conidia solitary, dry, acropleurogenous, simple, oblong or square rounded at the corners, often flattened in one plane, muriform or cruciately septate, echinulate or verruculose.

**DICTYOARTHINIUM SACCHARI (Stevenson) Damon**

Damon, 1953. Bull. Torrey Bot. Club, 80. 164.

From India, it was first described as parasite by Ananth and Chikanna (1961) on the dead leaves of Cocos nucifera L., dead leaf sheath of Musa paradisiaca and dead stem of Ixora species from Eranakulum, Kerala; dead grass culms from University Botanical Lab. Garden, Madras, Tamil Nadu. Nair and Tyagi (1961) described it as parasite on dead wheat straw from Jodhpur, Rajasthan. Bilgrami (1963) described it as parasite on leaves of Draceana terminalis Von from Allahabad, U.P. Lall and Yadav (1964, 1965) described it as parasite on decaying stem of Andropogon sorghum and Triticum vulgare L from Patna, Bihar. Raghuvver Rao and Dev Rao (1964) described it as parasite on dead leaves of Saccharum officinarum from Nizamabad, Hyderabad;

A.P. Lodha and Chandra Reedy (1974) described it as parasite on fruits of tomato from Warangal, A.P. Monoharachary (1974) described it from soil from Hyderabad.

Colonies are compact, black in colour, hypophyllous, pulverent, often pulvinate, superficial. Conidiophores upto 128  $\mu$  long, 6-8.6  $\mu$  thick, basauxic, macronematous, mononematous, arising single from subspherical conidiophore mother cells, flexous, narrow, cylindrical, hyaline with thick brown transverse septa, smooth, 5.6-7  $\mu$  long and 3-5  $\mu$  wide. Conidiogenous cells are monoblastic, integrated, intercalary, cylindrical, denticulate, denticles are very short, cylindrical, truncate. Conidia dry, solitary, acropleurogenous, simple, oblong and square rounded at corners, spherical or subspherical, often flattened in one plane, 4 celled, mid to dark, verruculose, dark brown in colour.

[TABLE NO. XII].

**COLLECTION EXAMINED -**

As hyperparasite on Oidium species on leaves of Tamarindus indica L (Leguminosae) at Katyayani-Kolhapur, Maharashtra, Sept. 1992, M.S.Mishrakoti, Material No. H.C.I.O. 41,084.

[FIGURE NO. XVIII, PLATE NO. XVIII ].



Dictyoarthinium sacchari (Stevenson) Damon on Oidium species on Tamarindus indica L differs from Dictyoarthinium sacchari (Stevenson) Damon as follows -

Colonies are compact, hypophyllous, superficial. Conidiophore mother cells are 5.6 - 7  $\mu$  long, 3-5  $\mu$  wide. Conidiophores are 128  $\mu$  long, arising from subspherical conidiophore mother cells; flexuous, narrow, hyaline with thick brown transverse septa. Conidia are spherical to subspherical, 4 celled, mid to very dark, dark brown, cruciately septate, verruculose.

**REMARK -**

Oidium species and Tamarindus indica L both are new hosts for Dictyoarthinium sacchari (Stevenson) Damon. Thus it makes new host records.

TABLE NO.XII - Showing the comparison between Dictyoarthinium sacchari and present collection under study.

Hyperparasite	Host fungus	Host plant with family	Habit	Colony	spore/fruit	Conidiophore	Conidia
<u>Dictyoarthinium sacchari</u> (Stevnson) Damon		<u>Annans</u> (Bromeliaceae) <u>Bambusa</u> (Graminae) <u>Cymbopogon</u> (Graminae) <u>Cassia</u> (Leguminosae) <u>Dracaena</u> (Liliaceae) <u>Erythrina</u> (Leguminasae) <u>Phragmitis</u> (Graminae) <u>Saccharum</u> (Graminae) <u>Zinnia</u> (Compositae)	On Stem, leaves.	Compact or effuse, a close network	Conidio- phore, conidia	Conidiophore mother cells are 5-8 $\mu$ long, 2-6 $\mu$ broad conidiophores are upto 138 $\mu$ long arising from cupulate or sub-spherical conidio- phore mother cells; flexous or straight colourless to pale brown	Square to spherical to subspherical pale to dark brown muri- form or cruciately septate, verruculose or echinulate.
<u>Present Collection</u>	<u>Oidium species</u>	<u>Tamarindus indica</u> L [Leguminosae]	On leaves	Hypophyllous, black compact	Conidio- phore, conidia	Conidiophore mother cells are 5.6 - 7 $\mu$ long, 3 - 5 $\mu$ broad, conidiophores are 128 $\mu$ long arising from sub-spherical conidiophore mother cells; flexous, hyaline with thick brown transverse septa.	Subspherical to spherical, mid to very dark brown, cruciately septate, verruculose.

F I G U R E - XVIII

Dictyoarthinium sacchari (Stevenson) Damon

on

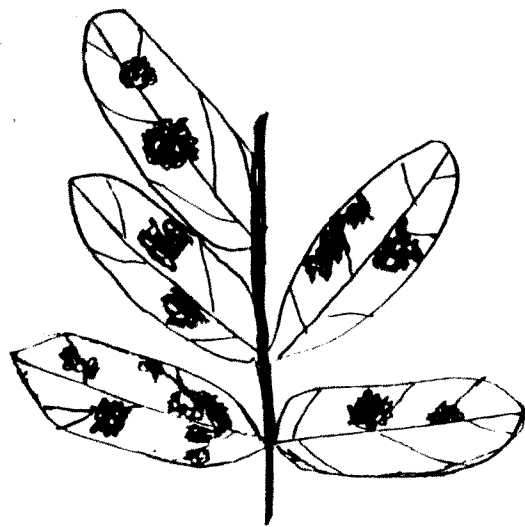
Oidium species

on

Tamarindus indica L

- A: Habit
- B: Conidia X 450
- C: Conidiophore and Conidia X 450
- D: Host mycelium of Oidium species X 450

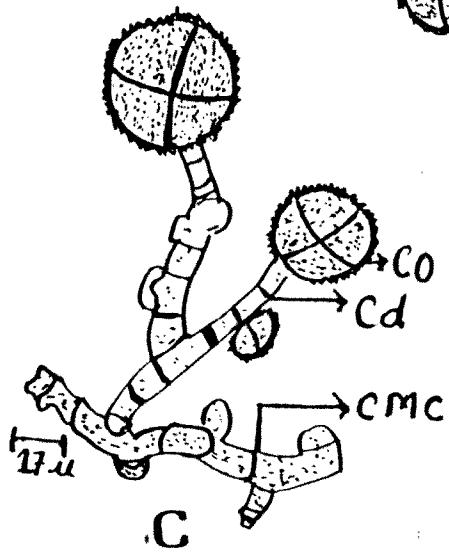
# FIGURE XVIII



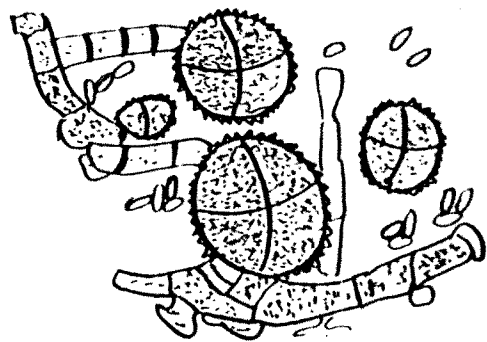
A



B



C



D

P L A T E - XVIII

Dictyoarthinium sacchari (Stevenson) Damon

on

Oidium Species

on

Tamarindus indica L.

- A: Habit
- B: Conidiophore and conidiophore mother cells X 160
- C: Conidiophores and conidia X 157.5

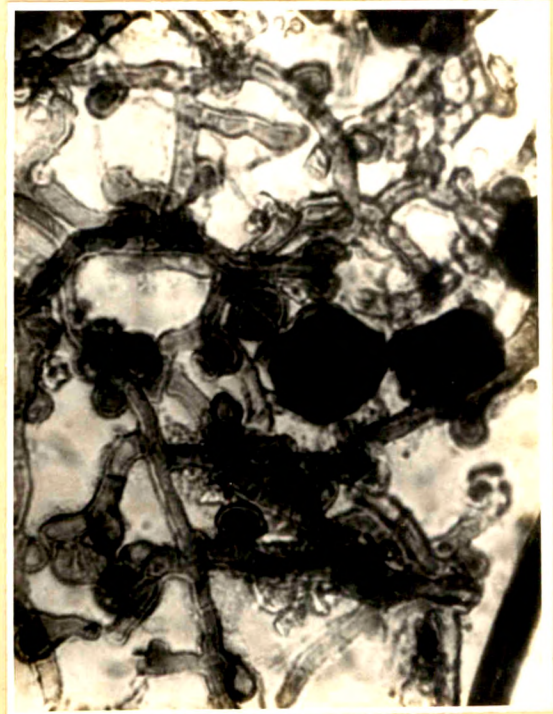
PLATE XVIII



A



B



C

**FAMILY TUBERCULARIACEAE**

They all produced sporodochia. According to Ainsworth (1971), there are about 160 form genera in this group. In the family, generally conidia are produced in Phialides.

TUBERCULINA Sacc.

Sporodochia small, breaking out in or near rust pustule. Conidiophores hyaline, simple bearing single conidia terminally. Conidia hyaline, one celled, globose or ovoid, to irregular. Parasitic on rusts.

TUBERCULINA PERSINCIA (Ditm.) Sacc.

Saccardoo P.A. Michelia 2 : 34, 1880.

Tuberculina persincia was first described by Saccardo (1880). From India, it was described by Ramakrishnan (1951) as a hyperparasite on aecidia of Aecidium pavettae and Aecidium species on Strobilanthus cuspidatus Burliar from Nilgiri, Tamil Nadu Mathur, Tyagi and Agnihotri (1962) also reported as hyperparasite on Aecidium species on Dichrostachys cinerea W & A from Udaipur, Rajasthan. Sataya (1964) reported its existence as hyperparasite on teleutosori of Puccinia heterospora B & C on Sida veronicifolia Lam from Bhopal, M.P. Sathe (1966) described as hyperparasite on Vitis woodrow stapf from Poona, Maharashtra.



Sporodchia epiphyllous, whitish in colour, circular to irregular in shape, superficial, small, on the rust fungus. Conidiophores are erect, hyaline, simple in bunch, unbranched, 18-40  $\mu$  long, 4-5  $\mu$  broad, bear conidia terminally. Conidia hyaline, globose, one celled, 0-septate, 9-10  $\mu$  diameter, simple, numerous.

[ TABLE NO. XIII ]

**COLLECTION EXAMINED -**

As hyperparasite on Puccinia heterospora B & C on the leaves of Sida rhombifolia L (Compositae) at Shivaji University Campus, Kolhapur, Maharashtra, Sept. 1993, Dr.A.N.Thite and M.S.Mishrakoti, Material No. H.C.I.O. 41,094.

[ FIGURE NO. XIX, PLATE NO. XIX ].

Tuberculina persincia (Ditm.) Sacc on Puccinia heterospora B & C on Sida rhombifolia L differs from Tuberculina persincia as follows -

Sporodochia epiphyllous, whitish, circular to irregular, superficial, small. Conidiophores are erect, simple in bunch, unbranched, hyaline. Conidia are hyaline, one celled, globose.

**REMARK -**

Sida rhombifolia L is new host for Tuberculina persincia.  
So it is new host record.

TABLE NO. XIII - Showing the comparison between Tuberculina persincia and present collections under study.

Hyperparasite	Host fungus	Host plant with family	Habit	Colony	Spore/fruit	Conidiophore	Conidia
<u>Tuberculina persincia</u> (Ditm) Sacc.	<u>Aecidium</u> Species <u>Puccinia heterospora</u>	<u>Strobilanthus cuspidatus</u> <u>Sida vernicifolia</u> [Compositae]	Leaves	Small, breaking out in or near rust pustule	Conidio- phore, conidia	Erect or repent, unbranched or occasion- ally loosely branched. Hyaline to subhyaline	Hyaline, globose to ovoid.
	<u>Puccinia heterospora</u> B & C	<u>Sida rhombifolia</u> L [Compositae]	Leaves	Epiphyllous, white in colour	Conidio- phore, conidia	Erect, unbranched Hyaline	Hyaline, globose.

Present  
Collection

**F I G U R E - X I X**

**Tuberculina persincia (Ditm.) Sacc**

on

**Puccinia heterospora B & C**

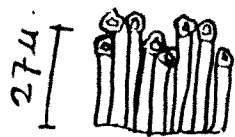
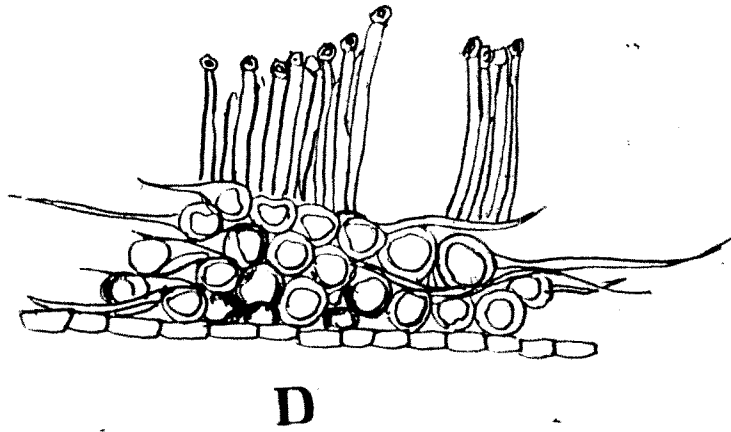
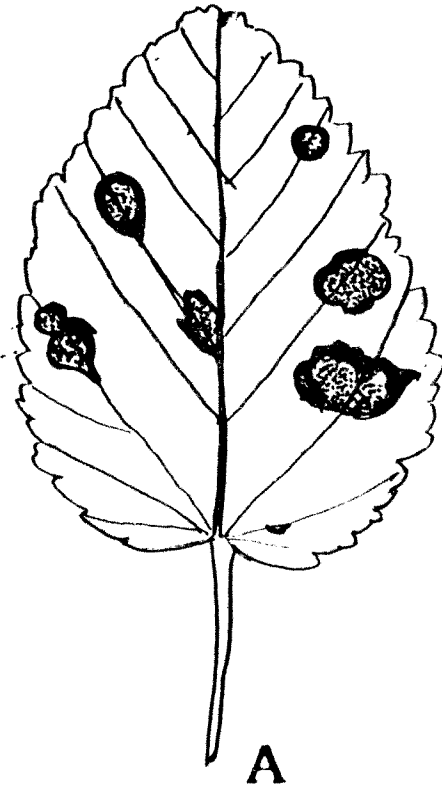
on

**Sida rhombifolia L**

- A: Habit
- B: Conida X 450
- C: Conidiophore X 450
- D: Host mycelium of Puccinia heterospora X 450

13 mb

# FIGURE XIX



C

B

P L A T E - XIX

Tuberculina persincia (Ditm.) Sacc.

on

Puccinia heterospora B & C

on

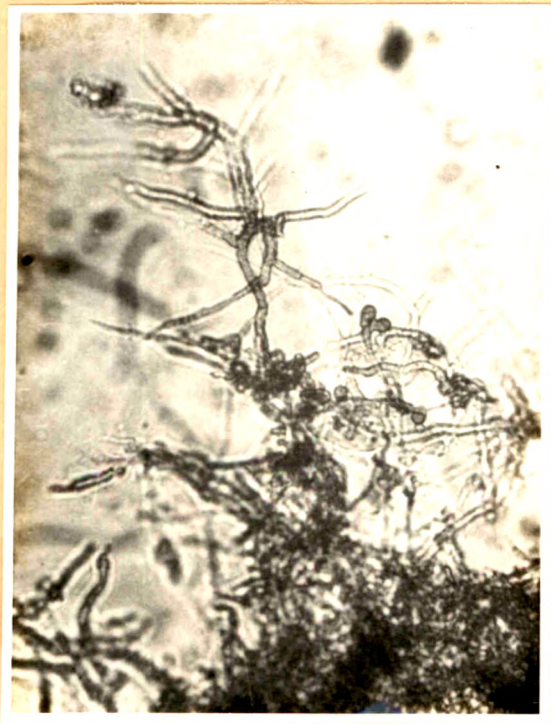
Sida rhombifolia L

- A: Habit
- B: Conidiophores and conidia X 100
- C: Conidiophores and conidia on host mycelium of  
Puccinia heterospora X 80

PLATE XIX



A



B



C

### **3. SUMMARY**

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## 3. S U M M A R Y

In all thirteen deuteromycetous members representing ten genera are described. Genus Tetraposporium represented by T. asterinearum and T. ravenelii are being described for first time in India. Similarly, four species i.e. Ampelomyces major, Tripospermum myrti, Passalora bacilligera and Spadicoides bina are the species which make new additions to fungal flora of India. Hansfordia pulvinata, Virgaria nigra, Tripospermum acerinum are the new species for the State of Maharashtra. Similarly, Ampelomyces quisqualis on Cercospora canescens and Cercospora hibisci, Darluca filum on Uromyces appendiculatus, Tetraposporium asterinearum on Capnodium annonae and Capnodium eugeniaram, T. ravenelii on Capnodium Sp. and Capnodium ramosum, Hansfordia pulvinata on Cercospora hibisci, Tripospermum acerinum on Capnodium ramosum, T. myrti on Capnodium, Sp. Virgaria nigra on Tremella Sp. Passalora bacilligera on Oidium Sp., Spadicoides bina on Capnodium Sp. and Aecidium crini. Dictyoarthinium on Oidium sp. sacchari/make the new fungal host records. Whereas, Ampelomyces major on Cosmos bipinnatus, Darluca filum on Phaseolus vulgaris, Tetraposporium asterinearum on Ficus glumerata; F. religiosa and Syzygium jambolina; T. ravenelii on Ixora coccinia and Mangifera indica, Hansfordia pulvinata on Hibiscus esculentus, Tripospermum myrti on Exocecaria agallocha, Virgaria nigra on Delonix regia,

Passalora bacilligera on Tinospora cordifolia, Spqdicoides bina  
on Crinum defixisum and Pongamia glabra, Dictyoarthnium sacchari  
on Tamarindus indica and Tuberculina persincia on Sida rhombifolia  
are the hyperparasites of fungi growing on these angiospermic  
hosts which in their turn are new host records.

\*\*\*

TABLE NO. B - Summary

Genera New to India	Species New to India	New to State	New to Host Fungus	New to Angiospermic Host
1) <u>Tetraposporium</u> <u>asterinearum</u>	1) <u>Ampelomyces</u> <u>major</u>	1) <u>Hansfordia</u> <u>pulvinata</u>	1) <u>Ampelomyces</u> <u>quisqualis</u>	1) <u>Ampelomyces</u> <u>major</u>
2) <u>T. ravenelii</u>	2) <u>Tripospermum</u> <u>myrti</u>	2) <u>Virgaria</u> <u>nigra</u>	2) <u>Darluca</u> <u>filum</u>	2) <u>Darluca</u> <u>filum</u>
	3) <u>Passalora</u> <u>bacilligera</u>	3) <u>Tripospermum</u> <u>acerinum</u>	3) <u>Tetraposporium</u> <u>asterinearum</u>	3) <u>Tetraposporium</u> <u>asterinearum</u>
	4) <u>Spadicoides</u> <u>bina</u>		4) <u>Tetraposporium</u> <u>ravenelii</u>	4) <u>Tetraposporium</u> <u>ravenelii</u>
			5) <u>Hansfordia</u> <u>pulvinata</u>	5) <u>Hansfordia</u> <u>pulvinata</u>
			6) <u>Passalora</u> <u>bacilligera</u>	6) <u>Virgaria</u> <u>nigra</u>
			7) <u>Dictyoarthinium</u> <u>sacchari</u>	7) <u>Passalora</u> <u>bacilligera</u>
			8) <u>Spadicoides</u> <u>bina.</u>	8) <u>Spadicoides</u> <u>bina</u>
				9) <u>Dictyoarthinium</u> <u>sacchari</u>
				10) <u>Tuberculina</u> <u>persincia</u>