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SYDOWIA
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Editi in notitiam Scientiae Mycologicae Universalis
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Ernst Thirring
1890—1970

Von Kurt Lohwag (Wien)

Mit Porträt

Nach kurzem Leiden ist der bekannte Mykologe und Zoologe, Ober-Studienrat Prof. Dr. Ernst Thirring, im 80. Lebensjahr am 7. Feber 1970 in Wien gestorben. Mit ihm ist nicht nur ein ausgezeichneter Pädagoge, sondern auch ein grosser Naturfreund und Insektenkenner, ein im besonderen auf Laktarien und Russulaceen spezialisierter Mykologe, vor allem aber ein äusserst liebenswerter und stets hilfsbereiter Mensch von uns gegangen.

Ernst Thirring wurde am 5. November 1890 als zweitältester Sohn von 4 Kindern des Bürgerschullehrers Julius Thirring in Wien geboren, besuchte nach der Volksschule von 1901—1908 das Sofiengymnasium in der Zirkusgasse im 2. Wiener Bezirk und maturierte mit Auszeichnung. Dann folgte ein einjähriger Aufenthalt in Alexandrien, wo er auch die Kinder des österreichischen Botschafters als Hauslehrer unterrichtete. Nach Wien zurückgekehrt, widmete er sich an der Wiener Universität dem Studium der Naturwissenschaften, speziell der Zoologie und Paläontologie. 1913 unternahm er eine Reise nach Italien unter Leitung von Professor Dr. O. Abel und dessen Assistenten Dr. O. Antonius. Nun arbeitete er 3 Semester am Zoologischen Institut der Universität Wien bei Prof. Dr. B. Hatschek und 1 Semester am Paläontologischen Institut. Auf Grund seiner unter der Leitung von Prof. Dr. O. Abel und Prof. Dr. K. Diener durchgeführten Dissertation „Form und Funktion der Halswirbelsäule der Säugetiere“ wurde Thirring 1914 zum Doktor der Philosophie promoviert.

1916 rückte Thirring bei den Kaiserjägern als Einjährig-Freiwilliger ein, war an der italienischen Front und rüstete 1918 als Leutnant ab.

Am 1. Juli 1919 wurde ihm die Lehrbefugnis für Naturgeschichte, Mathematik und Physik erteilt. Thirring unterrichtete am Theresianum, dann an der Mittelschule in der Hagenmüllergasse und zuletzt an der Mittelschule in der Geblergasse. Bei seinen Schülern war Thirring sehr beliebt und einer von diesen ist der berühmte Unterwasserforscher Dr. Hans Hass. Studenten der Hochschule für Bodenkultur und der Tierärztlichen Hochschule in Wien fallen durch ihre Kenntnisse, die sie durch ihren Lehrer Thirring erhalten haben, auf und sprechen mit dem Verfasser, der an diesen beiden Hochschulen doziert, oft über den grossartigen Pädagogen.

Bereits vor dem 2. Weltkrieg war Thirring ein arbeitendes Mitglied der Österreichischen Mykologischen Gesellschaft und unterstützte im Krieg die von Heinrich Lohwag geführte Aktion „Ernährung aus dem Walde". Damals mußten Kurse und Exkursionen durchgeführt werden, um der Bevölkerung die Kenntnis der Speisepilze zu vermitteln.

Im Krieg wurden die Räume der Gesellschaft durch Bomben zerstört und im September 1945 starb Heinrich Lohwag. Nun gab es viel Arbeit und Thirring arbeitete stets tatkräftig mit. Als im Jahre 1953 Prof. Dr. Franz Petrak seine Stelle als Präsident der Österreichischen Mykologischen Gesellschaft zurücklegte, wurde Thirring zum Präsidenten gewählt und führte die Gesellschaft bis zu seinem Tode.

Um den internationalen Kontakt mit anderen mykologischen Gesellschaften zu pflegen, wurden im Jahre 1955 die Mykologen-Tagung in Wien, im Jahre 1962 das Mykologen-Treffen in St. Georgen im Attergau und anschliessend die Dreiländer-Tagung Deutschland—Schweiz—Österreich durchgeführt, an welchen er immer mit grossem Interesse mitarbeitete.

Alle Teilnehmer der Dreiländertagung 1969 in Fritzens in Tirol haben Thirring bei bester Gesundheit angetroffen und werden mit uns zusammen zutiefst von der Nachricht seines Todes erschüttert sein.

In seiner Präsidentenzeit erwies sich Thirring immer als unermüdlicher und anspruchsloser Mitarbeiter, wenn es galt, mühevolle langwierige Arbeit zu machen, wie z. B. Erstellung von Fundlisten von Tagungen und Jahresberichten.

Als bemerkenswerte mykologische Veröffentlichung, die seinen Namen trägt, liegt ausser kleineren Notizen eigentlich nur die Arbeit „*Boletus (Suillus) pseudorubinus* Thirr. nov. spec., ein Beitrag zur Klärung der Zwergröhrlingsarten" vor. Diese Arbeit, die durch seine Nachforschungen in der Literatur auf noch viel Ungeklärtes aufmerksam macht, wird jedem zum Studium empfohlen, der im Begriff ist, *Boletus (Suillus* o. *Xerocomus*, die systematische Einreihung ist noch ungewiss) *amarellus* in eine Fundliste einzusetzen. Diese Arbeit zeigt, wie gründliche wissenschaftliche Ausbildung — Thirring war seiner speziell fachlichen Ausbildung nach Zoologe — verbunden mit dem Streben zu ehrlicher unvoreingenommener Forschung auch auf einem sehr benachbarten Gebiet zu wertvollen Ergebnissen führen kann.

Feinstes verständnisvolles Mitempfinden strahlen die Glückwünsche aus, die Thirring an Heinrich Lohwag zu seinem 60. und an Kurt Lohwag zu seinem 50. Geburtstag gerichtet hat.

Seinen „Ruhestand" verbrachte er grösstenteils in seinem geliebten Kitzbühel in Tirol, wo er seiner Leidenschaft, Pilze und Insekten zu sammeln und zu bestimmen, nachgehen konnte. Noch im hohen Alter wanderte er stundenlang und fuhr mit dem Rad. Thirring verbrachte gerne viele Stunden mit seinen Geschwistern, wo er auch vor kurzem die beschwerliche Reise zu seiner Schwester nach Schweden nicht scheute. Am 10. Juni 1969 heiratete er Frau Johanna, verw. Lutz.

Wer ihn kannte, betrauert in ihm einen warmfühlenden, verantwortungsbewussten Menschen, dem wir alle ein ehrendes Gedenken bewahren wollen.

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Kurt Lohwag zum Gruß! Zeitschrift für Pilzkunde, Bd. 29, 1963, Heft 2, p. 50—52.

Boletus (Suillus) pseudorubinus Thirring nov. Spec. — ein Beitrag zur Klärung der Zwergröhrlings-Arten. Zeitschrift für Pilzkunde, Bd. 28, 1962, Heft 2, p. 29—52.

Über das Vorkommen sehr verschieden gestalteter Sporenformen an einem und demselben Fruchtkörper eines Cortinarius. Zeitschrift für Pilzkunde 1956, Heft 1, p. 5—14; Heft 2, p. 33—42.

Kokkalera, a new Genus of Erysiphaceae

By K. M. Ponnappa

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(With 1 Fig. in the text)

Croton bonplandianus Bail. (= *C. sparsiflorus* Morong.) is a cosmopolitan and gregarious weed native to Paraguay in South America but introduced in South India.

An interesting powdery mildew fungus was collected by the writer first on February 12, 1967 on the leaves of *C. bonplandianus*. Only two out of a large number of infected leaves examined carried the perfect stage of the fungus. Search for the perfect stage was continued till the end of March, but it was in vain. Again on January 20, 1968, the mildew appeared in the same area and some more leaves containing cleistothecia studded within mycelium were collected . It is very interesting to note that out of a large number of plants growing wild, only one plant carried heavy infection of *Oidium* and on a few leaves, its ascigerous stage. A heavy infestation of the hyperparasite *Ampelomyces* was found on other leaves examined.

Yarwood (1957) has recognised seven genera, Thirumalachar (1947), Chiddarwar (1959) and Viégas (1944) have described one genera each of Erysiphaceae. There are, therefore, ten genera of Erysiphaceae recognised on the basis of location of the mycelium, the types of appendages and the number of asci in the perithecia. The fungus under study slightly resembles the genus *Sphareotheca* Lév., which is characterised by the possession of only one ascus in the cleistothecium, indefinite mycelioid appendages and in the *Oidium* stage has conidia containing fibrosin bodies. Nevertheless, the present fungus eventhough contains only one ascus and fibrosin bodies in the conidia in the *Oidium* stage, it markedly differs in the complete absence of appendages, which is one of the important distinguishing characters used in the classification of the powdery mildews. It is, therefore, proposed to erect a new genus, *Kokkalera,* (a name derived from a country dialect to denote dry leaf on which this fungus was collected) to accommodate this fungus whose English and Latin descriptions are as follows:

Kokkalera Ponnappa gen. nov. (Fig. I, B & C).

Mycelium amphigenous, hyaline, white shining growth, ectophytic, effused to sub-dense, persistent; haustoria epidermal, cleistothecia brown to dark brown, solitary or gregarious, hypophyllous, attached to the substratum by means of light brown, septate, irregular, mycelioid structures. No appendages present. Asci and ascospores immature.

Mycelium amphigenum, hyalinum, album, nitidum, ectophyticum, effusum vel subdensum, persistens. Haustoria epidermalia, cleistothecia brunnea vel umbrina, solitaria vel gregaria, affixa ad substratum structuribus brunnescentibus, septatis, irregularibus, mycelioideis. Nulla appendicula. Asci ascosporaeque immaturae.

Kokkalera crotonis Ponnappa sp. nov.

Infection patches hypophyllous, rarely epiphyllous, white shining, effused to sub-dense, persistent, scattered or gregarious; mycelium hyaline, ectophytic, septate, smooth, branched, creeping, covering the entire underside of the leaf giving a silvery white appearance; haustoria epidermal, globose or oval, evanescent; conidia in short chains, unicellular, hyaline, oval, oblong or doliform, thin-walled, 7.25—9.50 μ. Perithecia superficial, profuse, solitary or gregarious, brown to dark brown, hypophyllous, oval, mostly globose with broad concave and irregular, thin-walled obscure cells, 107.00—121.50 × 97.25—121.50 (av. 102.00 × 116.75) μ. No appendages present. Asci hyaline, globose or ovoid and immature. Ascospores hyaline, ovoid, unicellular, probably eight.

Habitat: On living leaves of *Croton bonplandianus* Bail., January 20, 1968, Palace Upper Orchard, Bangalore, Mysore State, leg. K. M. P o n n a p p a, Herb. IMI 134073, England (type).

Fragmenta infecta hypophylla, raro epiphylla, alba nitida, effusa vel subdensa, persistentia, sparsa vel gregaria; mycelium hyalinum, ectophyticum, septatum, laeve, ramosum, serpens, superficiem inferiorem folii omnino celans, aspectum argenteum creans. Haustoria epidermalia, globosa vel ovalia, evanescentia. Conidia brevicatenata, unicellulata, hyalina, ovalia, oblongata vel doliiformia, tenuitunicata, 7.25—9.50 μ. Perithecia superficialia, profusa, solitaria vel gregaria, brunnea vel umbrina, hypophylla, ovalia, plerumque globosa, cellulis amplis, concavis, irregularibus, tenuitunicatis, 107.00 — 121.50 × 97.25 — 121.50 (med. 102.00 × 116.75) μ. Nulla appendicula. Asci hyalini, globosi vel ovoidei, immaturi. Ascosporae hyalinae, ovoideae, unicellulatae, versimiliter 8.

O i d i u m sp. (Fig. I. A).

Mycelium ectophytic, hyaline, smooth, branched, septate, creeping 9.25—10.50 μ in width, forming thick coating on the lower surface and very sparse on the upper surface of the leaves; haustoria globose or oval, epidermal measuring 7.40—8.50 μ in diameter; conidiophores hyaline, composed of 5—6 cells in chains and up to 150 μ long; conidia unicellular, hyaline, oval, oblong or doliform, thin-walled, 9.25—13.23 × 7.25—8.50 μ, in chains of 3—5.

A m p e l o m y c e s sp.

At the advanced stage of infection of the mildew, it was found to be heavily parasitized by this hyperparasite. Pycnidia brown, numerous, oval, obovate to irregularly shaped, 59.50—76.00 × 37.25—52.25 (av. 63.25 × 43.25) μ. The conidia were oval, obovate, fusiform-elliptic or naviculate, unicellular, hyaline to subhyaline, 4.75—9.30 × 2.75—3.75 (av. 6.95 × 3.50) μ.

Infection occurs on leaves, petioles and occasionally on stems in the form of white powdery patches of variable extent. Severe infection of *Oidium* result in the premature droping and death of affected parts.

It may be of interest to note that there are two genera of Ery-

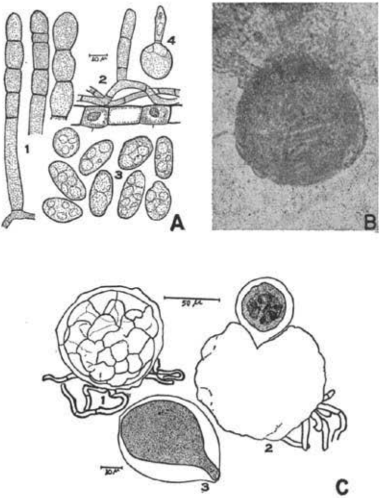

Fig. I. ***Kokkalera crotonis*** **gen** ***et*** **sp. nov. A.** ***Oidium*** **sp. 1. Conidiophore, 2. Section showing conidiophore and haustoria, 3. Conidia, 4. Germinating conidia, B. Photomicrograph of cleistothecium, C. Camera lucida drawing of 1. cleistothecium, 2. Cleistothecium with a single immature ascus, 3. Ascus**

siphaceae recorded on *Croton*. Deighton and Pirozynski (1965) have recorded *Uncinula crotonis* Pirozynski on *C. megalobotrys* from Zambia and Prasad and Sinha (1962) have recorded an *Erysiphe* sp. on *C. sparsiflorus* from Muzaffarpur, Bihar, India.

Summary

Kokkalera, a new genus of Erysiphaceae, is described with *K. crotonis* as type which is characterised by complete absence of cleistothecial appendages and having only one ascus to the cleistothecium.

Acknowledgements

The author is grateful to Dr. V. R. Rao, Entomologist-in-charge, Indian Station, CIBC for encouragement and permission to publih this paper. He is highly indebted to Dr. C. Booth, Commonwealth Mycological Institute, England both for critically going through the manuscript and useful suggestions, and to Mr. P. Basu, Scientific Information Officer, CMI, England for Latin rendering of the new genus and species.

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Bipolaris indica spec. nov.

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With Plate I

Drechsler's (1923) paper on the graminicolous species of *Helmisporium* Link ex S. F. Gray (Shoemaker, 1959) was a major break-through in the taxonomy of this genus and set a clear line of work for the posterity based on shape of conidia, nature of the hilum and pattern of conidial germination. Nisikado (1928) divided the genus into two subgenera, *Cylindro-helmisporium* and *Eu-helmisporium*, the former including forms with cylindrical conidia germinating from any cell and the latter with fusoid conidia germinating from the two polar ends. Shoemaker (1959, 1962) seggregated out two groups of species from *Helmisporium* sensu lato, both showing the terminal conidium at first which later became lateral due to subterminal growth of the conidiophore. Certain species with cylindric conidia germinating from any cell were referred to the genus *Drechslera* Ito, (Ito, 1930) while those showing bipolar germination to *Bipolaris* Shoemaker. *Helmisporium* sensu strictu (Shoemaker, 1959) was considered to show the formation of conidia simultaneously both at the apex and sides of the conidiophores. Ibrahim (1966) in a study using an electronic computer, confirmed the validity of *Drechslera* and *Bipolaris* as separate genera. Nature of the conidial hilum, among other characters, is an important feature of these fungi. The genus *Bipolaris* comprises of two sets of species, one with non-protuberant or inserted hilum conidia with *Cochliobolus* Drechsler as the perfect stage and the other with protuberant hilum conidia and *Trichometasphaeria* Luttrell as the perfect stage (Drechsler, 1934; Luttrell, 1958, 1963; Nelson, 1965). This paper describes a new species *Bipolaris indica* spec. nov., named after the country of origin, and showing smallest conidia in the protuberant hilum section of the genus.

Bipolaris indica spec. nov. (Figs. 1—11).

Caespites in Czapek-Dox agaro effusi, in culturis post septem dies ad $30 \pm 1°$ C usque ad 6 cm diam. acerescentes; mycelium intramatricale brunneo-nigrum, mycelium aereum olivaceum; conidiophora olivacea vel obscure brunnea 81.6—365 $\times$ 8.5—10.2 μ, plerumque simplices, ramosa, ad basim 42.5—170 μ longam intervallis 17—50 μ septata, superne in parte fertili 42—192 longa geniculata, cicatricibus conidiorum ad intervalla 13.6—102 μ praedita, interdum in hyphas steriles longas antice iterum in conidiophora transeuntes protracta; conidia primum terminalia, continua et hyalina, postea lateralia, 17—60 × 14—38 μ obscure olivacea, continua vel 2—7-septata, clavata, interdum fusoidea, raro in antice furcata recta vel lenissime curvula, in apice latissima, basim versus paulatim attenuata, cellula basali plerumque obconica et hilo prominulo praedita, plerumque tubis polaribus duobus germinantia, rarissime tubo apicali deficiente vel etiam tubis basalibus duobus ornata.

Colonies on Czapek-Dox agar spreading, attaining a diameter of about 6.0 cms. in one week old cultures at 30 ± 1° C, submerged mycelium brownish black, aerial mycelium copiously sporulating and olivaceous brown. Conidiophores olivaceous to dark brown, 81.6—365.0 μ × 8.5—10.2 μ, generally unbranched, rarely branched, consisting of a lower stalk 42.5—170.0 μ region with septa at intervals of 17.0—50.0 μ and an upper fertile 42.0—192.0 μ region, fertile region geniculate, with 4—6 conidial scars at intervals of 13.6—102.0 μ, sometimes the fertile portion proliferating into a long sterile portion in turn terminated by a fertile region, with widely spaced scars, the conidiophore system in such cases measuring more than 1.0 mm. in length. Conidia terminal at first, becoming lateral later due to subterminal growth of the conidiophore, one-celled and hyaline at first, later becoming 17.0—60.0 μ × 14.0—38.0 μ, dark olivaceous and 1—8 celled, usually clavate, sometimes fusoid, rarely forked at the apex, straight or slightly curved, widest just below the apex and gradually tapering to the base, basal cell almost obconical and generally with a protuberant hilum, releasing globose hyaline cells on applying pressure, germinating through two polar semi-axial germ-tubes, in exceptional cases the apical germ-tube absent while in others two basal germ-tubes present. The pefect stage not known.
Isolated from the flowers of *Brassica nigra* collected from Lucknow, India in March 1967. Type culture deposited in the Commonwealth Mycological Institute as IMI 129790.

The important conidial features of seven known protuberant hilum species of *Bipolaris* have been presented in Table 1 and compared with those of *B. indica* spec. nov., from where it will be clear that the new species proposed in this paper is clearly distinct on account of its significantly small conidial size.

Acknowledgements

Thanks are due to Dr. G. C. Ainsworth and Dr. M. B. Ellis for their valuable comments on the species, to Dr. F. Petrak for latinizing the specific diagnosis and to the Council of Scientific and Industrial Research, India for financing the work.

Table 1.

Conidial characters of protuberant hilum species of *Bipolaris*.

Species	No. of septa	Conidia Length × Width (μ)	Reference
B. halodes Drech.	1—12	20—105 × 10—14	Drechsler, 1923.
B. holmii Luttrell	5—11	56—134 × 14—31	Luttrell, 1963.
B. pedicellatum Henry	—	—	Nelson, 1965. *
B. monoceros Drech.	3—10	40—150 × 15—22	Drechsler, 1923.
B. rostratum Drech.	8—15	32—184 × 14—22	Drechsler, 1923.
B. turcicum Passerini	1— 8	45—132 × 15—25	Drechsler, 1923.
B. micropus Drech.	3— 9	28— 92 × 10—18	Drechsler, 1923.
B. indica spec. nov.	0— 7	17— 60 × 11—38	

* Because of the nonavailability of Henry's (1924) paper, the figures by Nelson (1965) were studied from where the conidia appear to be 6—7 septate and 89.0—94.0 μ × 27.0—28.0 μ.

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Plate I.

Bipolaris indica spec. nov. on Czapek-Dox agar. 1—6. Successive stages in conidia formation. Figs. 3, 4 show apically forked conidia, 1 × 870, 2 × 562, 3, 4 × 604, 5 × 713, 6 × 560. 7. Conidium showing protuberant hilum × 688. 8—10. Conidia showing various paterns of germination, 8 × 737, 9 × 794, 10 × 772. 11. Conidium showing the release of hyaline globose cells on applying pressure × 832.

* Not seen in original.

Contribution to our Knowledge of Ascomycetes of India-XIX

By Tilak S. T. & S. B. Kale

(Botany Department Marathawada University, Aurangabad)

(With five figures)

In the earlier papers (1960—67) 65 ascomycetes have described from India. The present paper constitutes XIX in series, in which *Tubeufia* Penz & Sacc. on *Acacia catechu* W. & A., *Myriangum* Mont. & Berk. on *Grewia tiliaefolia* Vahl., *Allosoma* Syd. on *Meneya laxiflora* Robyns., *Peltosphaeria* Berl. on *Capparis spinosa* L. and *Pleomassaria* Speg. on *Anona squamosa* L., have been described, of which *Tubeufia* Penz. & Sacc., *Allosoma* Syd., *Peltosphaeria* Berl. and *Pleomassaria* Speg. constitute new generic records for India.

66. **Tubeufia acaciae** sp. nov.

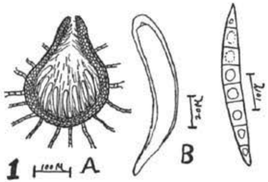

Fig. 1. *Tubeufia acaciae* sp. nov. — A. Vertical section of the perithecium. — B. Ascus and ascospores

Perithecia superficialia, singularia vel greges minutos formantia, primum violacea vel rubra, postea nigrescentia, non collabascentia, setosa, globosa vel piriformia, ostiolata, 300—375 × 225—255 μ, ostiolo minuto papilliformi, periphysato praedita; asci clavati vel cylindracei, stipitati, crasse tunicati 8-spori 95—144 × 17—21 μ, paraphysati; sporae fusoideae, utrinque paulatim attenuatae et subacuminatae, rectae, inaequilaterae vel curvulae hyalinae, transverse 5—7 septatae, 48—56 × 6—7 μ; paraphyses filiformes.

Perithecia bright coloured, voilet to red, blackening with age, superficial, singly or in small groups, on the bark, never collapsing, hairy or setose, globose to pear-shaped, ostiolate, ostiole slightly papillate and periphysate. Perithecia measuring from 300—375 × 225—255 μ. Asci clavate to cylindrical, stalked, bitunicate, thick-walled, 8-spored, measuring from 95—144 × 17—21 μ, paraphysate; paraphyses filiform minute. Ascospores hyaline, cylindrical or worm-like, often curved, transversely septate, septa 5—7, pointed at both ends, irregularly biseriate, measuring from 48—56 × 6—7 μ.

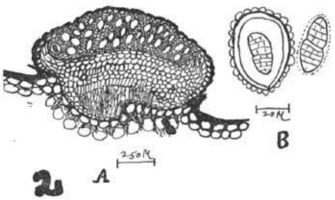

Fig. 2. *Myriangium parasiticum* sp. nov. — A. Vertical section of the fruit body. — B. Locule, ascus and ascospores

Collected on dead bark of *Acacia catechu* W. & A. at Ramling in the month of January 1968. Leg. S. B. Kale and deposited in the herbarium of Botany Department Marathawada University under sub No. MUH 223 (Tilak type).

The genus *Tubeufia* was originally established by Penzig & Saccardo (1897) with *T. javanica* as the type species. Besides being a new species the genus constitutes a new generic record for India.

67. **Myriangium parasiticum** sp. nov.

Stromata innata, mox erumpentia, postea quasi superficialia, pulvinata,superne applanata vel leniter concava, extus nigra, intus albida, loculis numerosis, irregulariter vel indistincte 2—4-stichis praedita, 750—1125 × 1125—1500 μ; loculi minuti, ovoidei vel ellipsoidei, interdum fere globosi, monasci, singulatim in parte stromatis superiore distributi; asci subglobosi vel late ellipsoidei, sessiles, crasse tunicati, 8-spori, 30—45 × 34—42 μ; sporae late ellipsoideae, hyalinae, transverse 8—10-longitudinaliter 6—8-septatae, medio plus minusve constrictae, utrinque obtusae, antice vix vel parum, postice saepe distincte attenuatae, 30—38 × 11—15 μ, muco tenui obvolutae.

Stroma innate-erumpent, or superficial, parasitic on the bark, cushion - shaped or with a basal cushion bearing crowded, obconical, tubercles with flat or concave tops which contain the fertile tissue, externally black, internally whitish, measuring from 750—1125 × 1125—1500 μ across, with basal foot — like attachment. Locules small, globular, monascos, irregularly destributed in the fertile layer, separated by the stromatic tissue. Asci globoid, small, 8-spored, destributed irregularly, sessile, bitunicate, measuring from 30—45 × 34—42 μ, separated by the stromatic tissue. Ascospores hyaline, muriform, often forming parenchymatous — like structure, with 6—8 longitudinal and 8—10 transverse septa, measuring from 30—38 × 11—15 μ, constricted in the middle, one end slightly tapering, with thin mucous sheath, broadly ellipsoid.

Collected on the living stem of *Grewia tiliaefolia* Vahl. at Ramaling in the month of January 1968. Leg. S. B. Kale and deposited in the herbarium of Botany Department, Marathawada University, under sub No. MUH 224 (Tilak type).

The genus *Myriangium* was originally erected by Montague & Berkely (1945) with *M. duriaei* as type species. The genus, however, remained unrepresented in the Indian flora until Rehm. (1908) firstly reported *M. cinchonae* on the bark of *Cinchona regia from* India. *Myriangium duriaei* Mont. & Berk. has been reported by Sydow & Butler (1911), Petch (1917) as saprophyte on dead branches, while Chona & Munjal (1950) reported it on insect scales. It may be mentioned that all earlier species reported are typically saprophytes, while the present species is distinct by its parasitic habit. With the addition of this species the number of species from India is now two.

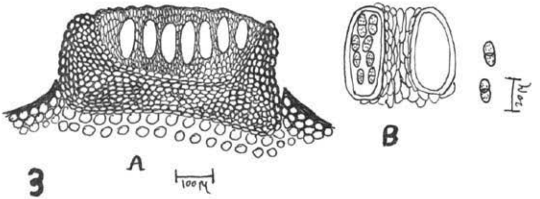

Fig. 3. *Allosoma indica* sp. nov. — A. Vertical section of fruit body. — B. Locule, ascus and ascospores

68. **Allosoma indica** sp. nov.

Stroma extus nigrum, intus obscure brunneum, pulvinatum, innato-erumpens, in superficie asperulum, centrum versus minutissime papillatum, contextu pseudoparenchymatico, 225—300 × 600—750; parte stromatis inferiore cupuliformi, sterili, parte superiore fertili, loculis numerosis, regulariter monostiche ordinatis praedita; asci ellipsoidei vel subovoidei, crasse tunicati, sessiles, 8-spori, 49—61 × 15—19 μ; sporae distichae, ellipsoideae, utrinque late rotundatae, vix vel parum attenuatae, tunc subfusoideae, medio septatae et constrictae, brunneae, 17—17 × 6—10 μ.

Stroma externally black, internally dark brown, cushion-shaped, innae-erumpent, surface rough, with papillae-like outgrowth in the central region, surrounded by wall, measuring from 225—300 × 600—750 μ, differentiated into lower cup-like sterile region which also encircles the fertile region by growing upright, fertile region above the sterile region, and includes the monascous locules; locules many, distributed regularly, in a single hymenium-like layer, separated by the stromatic tissue. Asci short, sessile, separated by stromatic tissue, in a single hymenium-like layer, 8-spored, measuring from 49—61 × 15—19 μ. Ascospores brown, -celled, ellipsoide to fusoid, biseriate, constricted in the middle, measuring from 13—17 × 6—10 μ.

Collected on the dead stem of *Meyna laxiflora* Robyns. at Ramling in the month of January 1968. Leg. S. B. Kale and deposited in the herbarium of Botany Department, Marathawada University under sub No. MUH 225 (Tilak type).

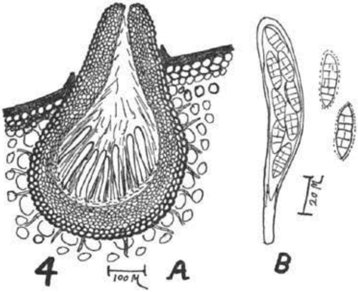

Fig. 4. *Peltosphaeria kamatii* sp. nov. — A. Vertical section of the perithecium. — B. Ascus and ascospores.

The *Allosoma* was originally erected by Sydow (1926) with *A. cestri*, as the type species. The genus *Allosoma* Syd. remained monotypic up till now, it is now represented by 2 species from the world, besides it constitutes a new generic record for India.

69. **Peltosphaeria kamatii** sp. nov.

Perithecia singularia, innata, clypeo tecta, ostiolo conico, antice truncato-rotundato intus periphysato, poro rotundato aperto erumpentia, 525—675 × 300—450 μ; pariete crassiusculo, pseudoparenchymatico, e cellulis extus atro-brunneis, crassiuscule tunicatis, intus pallidioribus, tenuiter tunicatis composito; asci cylindracei vel cylindraceo-clavati, stipitati, crasse tunicati, 8-spori, 152—171 × 21—25 μ; sporae distichae, ellipsoidea vel subfusoideae, hyalinae, transversae 4—8-longitudinaliter 3—6 - septatae, medio leniter, ceterum vix vel lenissime constrictae, 27—34 × 11—13 μ, muco tenui obvolutae; paraphyses filiformes.

Perithecia innate-erumpent, singly, clypeate, black, ostiolate, ostiole projecting out of the host tissue, slightly papillate, periphysate, measuring from 525—675 × 300—450 μ. The wall of perithecium is made up of the outer dark, thick-walled calls, 2—3 cells in thickness, and inner thin-walled cells, many cells in thickness. Wall of the perithecium gives out the minute hyphae in all directions. Asci cylindrical, stipitate, bitunicate, 8 spored, measuring from 152—171 × 21—25 μ, paraphysate; paraphyses filiform. Ascospores hyaline, typically muriform, biseriate, ellipsoid to fusoid, measuring from 27—34 × 11—13 μ, with 4—8 transverse and 3—6 vertical septa, forming a parenchymatous-like structure, with thin mucous sheath.

Collected on dead bark of *Capparis spinosa* L. at Ramling in the month of January 1968. Leg. S. B. Kale and deposited in the herbarium of Botany Department, Marathawada University under sub No. MUH 226 (Tilak type).

The species has be described after Prof. N. N. Kamat for his valued contribution to Indian Fungi.

70. **Pleomassaria anonae** sp. nov.

Perithecia singularia, cortici innata, ostiolo papilliformi punctiformiter erumpentia, extus hyphis brunneis, repentibus praedita,

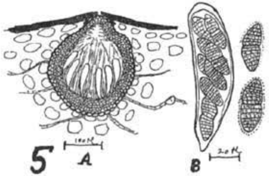

Fig. 5. *Pleomassaria anonae* sp. nov. — A. Vertical section of perithecium. — B. Ascus and ascospores

274—266 × 228—247 μ; asci cylindraceo-clavati, breviter stipitati, crassiuscule tunicati, 103—114 × 23—27 μ; sporae distichae, oblongo-fusoideae, utrinque plus minusve attenuatae, rectae vel inaequilaterae, aurantiaco-brunneae vel brunneae, transverse 10—20-longitudinaliter 15—25-septatae, 40—45 × 15—19 μ, muco hyalino obvolutae, paraphyses, filiformes, ascos superantes.

Perithecia singly, innate, immersed in bark, flattened, giving out the brown hyphae, ostiolate, slightly papillate, opening by a soit in the bark and the later becoming white, measuring from 247—266 × 228—247 μ. Asci cylindrical, bitunicate, 8-spored, stipitate, measuring from 103—114 × 23 —27 μ, paraphysate; paraphyses filiform and longer than the asci. Ascospores fusoid to clavate, muriform, golden brown to brown, biseriate, with 15—25 longitudinal and 10—20 transverse septa, measuring from 40—45 × 15—19 μ, with hyaline mucous sheath.

Collected on dead stem of*Anona squamosa* L. at Aspinga in the month of January 1968. Leg. S. B. Kale and deposited in the herbarium of Botany Department Marathawada University, Aurangabad under sub No. MUH 227 (Tilak type).

The genus *Pleomassaria* was originally erected by Spegazzini (1880) with *P. siparia* (B. & Br) Tul. as the type species.

Besides being a new species the genus constitutes a new generic record for India.

Acknowledgements

Grateful thanks are due to Marathawada University, Aurangabad for laboratory facilities, University Grants Commission New Delhi for the award of research fellowship to the junior author and to Dr. Petrak for the Latin diagnosis of the new species.

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Contribution to our Knowledge of Ascmycetes of India-XX

By Tilak S. T. & S. B. Kale

(Botany Department Marathawada University, Aurangabad) India

With 5 figures

In the earlier papers (1960—1967) 70 ascomycetes have been described from India. The present paper constitutes XX[th] in series in which, *Ophionectria* Sacc. on *Clerodendron inerme* Goetn., *Sillia* Karst. on *Gymnema montanum* Hook., *Ophioceras* Sacc. on *Vitex negundo* L., *Valsella* Fuck. on *Acacia arabica* Willd. and *Lentomita* Niessl. on *Jasminum auriculatum* constitute new generic records for India.

71. **Ophioceras petrakii** sp. nov.

Perithecia solitaria, innata, ostiolo cylindraceo, subelongato, antice fere truncato-rotundato, poro perforato punctiformiter erumpentia, ovoidea- atra, 600—750 × 555—675 μ, extus hyphis myceloideis praedita; asci cylindracei, antice late rotundati, postice in stipitem crassiusculum, brevem attenuati, tenuiter tunicati, 171—182 × 12—15 μ; sporae filiformes, utrinque obtusae, non vel lenissime attenuatae, fere ascorum longitudine, parallele ordinatae, raro rectae, plerumque varie curvulae, transverse multiseptatae, ad septa non constrictae, hyalinae, 152—171 × 3—4 μ; paraphyses breviter filiformes.

Perithecia singly, completely embedded in the wood, beaked, beak straight, without clypeus, ostiolate, flask-shaped, 600—750 × 555—675 μ, black, opening at the surface of the host by a pore. Myceloid hyphae given from the wall. Asci cylindrical, thin-walled, 8-spored, stipitate, 171—182 × 12—15 μ, paraphysate; paraphyses filiform, minute. Ascospores hyaline, acicular, long, extending the whole ascus, parallel, 152—171 × 3—4 μ, transversely septate; septa many. The arrangement of the ascospores is peculiar, one in the centre is surrounded by seven ascospores.

The present fungus is associated with *Boerlagella* Penzig & Sacc. which is hyperparasitic on this fungus.

Collected on the dead stem of *Vitex nugundo* L. at Awarad in the month of December 1967. Leg. S. B. Kale and deposited in the herbarium of Botany Department Marathwada University, under sub No. MUH 228 (Tilak type).

The present species have described after Dr. Petrak for his valuable contribution to the fungi.

The genus *Ophioceras* was originally established by Saccardo (1883) with *O. macrocarpum* as the type species.

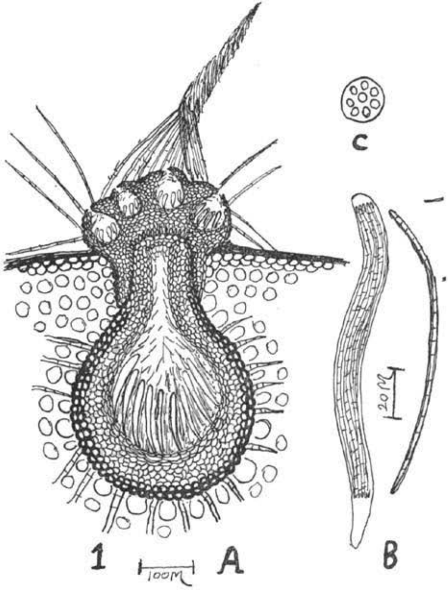

Fig. 1. *Ophioceras petrakii* sp. nov. — A. V. S. of perithecium. — B. Ascus and its T. S. and ascospores

72. **Sillia kamatii** sp. nov.

Perithecia solitaria vel gregaria, omnino innata, subglobosa vel ovoidea ostiolo truncato-conico, perforato punctiformiter erumpentia, 525—600 × 450—500 μ; pariete pseudoparenchymatico, contextu extus e cellulis atro-olivaceis, crassiuscule tunicatis, intus pallidioribus, tenuiter tunicatis composito; asci cylindracei, antice rotundati, postice in stipitem longiusculum attenuati, tenuiter tunicati, 8-spori, 220—228 × 11—15 μ;

sporae anguste fusoideae, utrinque paulatim attenuatae et subacuminatae, rectae vel leniter curvulae, transverse multiseptatae, ad septa non constrictae, in quaque cellula guttula oleosa praeditae, 45—50 × 6—8 μ; paraphyses numerosae, fibrosae, mox mucosae.

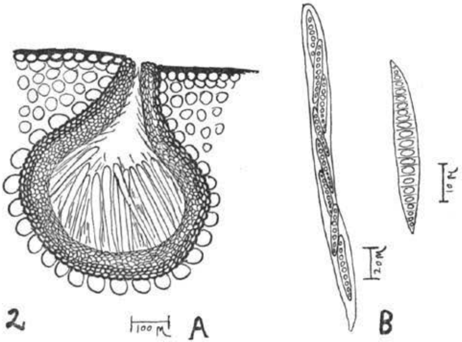

Fig. 2. *Sillia kamatii* sp. nov. — A. Vertical section of perithecium. — B. Ascus and ascospores

Perithecia singly or in groups, completely embedded, flask-shaped, black, beaked, ostiolate, 525—600 × 450—500 μ. The wall of the perithecium made up of the outer thick-walled and inner thin-walled cells, many cells in thickness. Asci cylindrical, long stipitate, thin-walled, 8-spored, 220—228 × 11—15 μ, paraphysate; paraphyses disintegrating soon and the asci detached soon. Ascospores hyaline, broadly elangated, pointed at both ends, transversely septate; each cell is having oil globule, ascospores measuring from 45—50 × 6—8 μ.

Colected on the dead stem of *Gymnema montanum* Hook. at Parli in the month of October 1967. Leg. S. B. Kale and deposited in the herbarium of Botany Department Marathwada University, under sub-No. MUH 229 (Tilak type).

The species has been described after Professor M. N. Kamat for his valuable contribution to the Indian fungi.

The genus *Sillia* was originally established by Karsten (1873) with *S. ferruginea* (Pers.) Karst. as the type species. Besides being new species the genus constitutes a new generic record for India.

73. **Ophionectria clerodendri** sp. nov.

Perithecia solitaria, greges minutos interdum formantia, primum coccinea, postea obscura, plus minusve globosa, collabascentia, innata, sed mox plus minusve erumpentia, ostiolo late depresso-conico, periphysato perforato praedita, 228—304 × 266—304 μ; asci numerosi, tenuiter tunicati, antice late rotundati, postice in stipitem crassiusculum attenuati, 8-spori, 114—133 × 19—22 μ; sporae plus minusve distichae, anguste fusoideae, utrinque paullatim attenuatae, obtusiusculae, rectae vel curvulae, transverse 8—12-septatae, 42—46 × 4—11 μ; paraphyses filiformes.

3

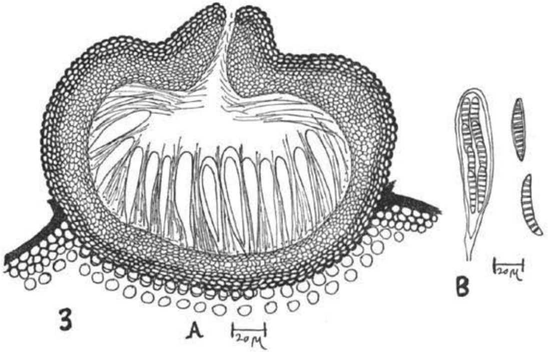

Fig. 3. *Ophionectria clerodendrae* sp. nov. — A. V. S. of perithecium. — B. Ascus and ascospores

Perithecia intially bright coloured, later becoming dark coloured at maturity, collapsing, singly, or in small groups, innate-erumpent, smooth, ostiolate; ostiole periphysate, perithecia 228—304 × 266—304 μ. Asci many, all over the inner surface, 8-spored, unitunicate, stipitate, 114—133 ×19—22 μ, paraphysate; paraphyses filiform, simple. Ascospores hyaline, elongated, transversely septate; septa 8—12 and thick, biseriate, slightly curved to elliptical to fusoid, 42—46 × 4—11 μ.

Collected on the dead stem of *Clerodendron inerme* Goetn. at Nizamabad and Amble- wadi in the month of October 1967. Leg. S. B. Kale & M. Bhim Rao and deposited in the herbarium of Botany Department Marathwada University under sub-No. MUH 230 (Tilak type).

The genus *Ophionectria* was originally erected by Saccardo (1878) with *O. trichospora* (B. & Br.) Sacc. as the type species. Besides being a new species the genus is an addition to the generic list of India.

74. **Valsella acaciae** sp. nov.

Stromata dispersa, cortici innata, late truncato-conica, vertice mox erumpentia, sed vix prominula, 1312—1575 × 2256—2915 μ, linea stromatica nigrescenti circumscripta, imprimis sub peritheciis pseudoparenchymatica, pallide brunnea; perithecia ellipsoidea vel ovoidea, superne in ostiola periphysata contracta, ostiolis anguste cylindraceis, plus minusve elongatis, in disco plano, primum albido, postea cinerascenti erumpentibus sed vix prominulis praedita, 750—937 × 225—375 μ; asci numerosi, crassiuscule clavati, antice late rotundati, postice plus minusve attenuati, sessiles vel brevissime stipitati, tenuiter tunicati, polyspori, 32—40 × 8—9 μ; sporae confertae, allantoideae, utrinque obtusae, vix vel leniter attenuatae, hyalinae vel subhyalinae, 6—8 × 1.6—2 μ; paraphyses filiformes.

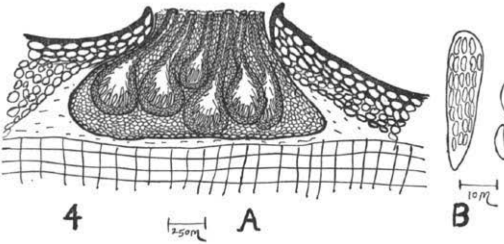

Fig. 4. *Valsella acaciae* sp. nov. — A. V. S. of Perithecia and stroma. — B. Ascus and ascospores

Stroma small, cushion-shaped, developed within the bark, and erumpent by raising it into small pustules, about 1312—1575 × 2256—2915 μ. Stroma outlined by a thin blackened layer, inner mass light brown, enclosing many perithecia, becoming erumpent through a slit in the bark and exposes the ostiolar white to grey disc, dotted with the black ostioles. Perithecia flask-shaped or conical, black, in valsoid groups, with long, black, narrow necks which do not extrude beyond the ostiolar disc. Perithecia measuring from 750—937 × 225—375 μ; asci broadly club-shaped to broadly-clavate sessile, to sub-sessile, polysporous, thin-walled, unitunicate, 32—40 × 8—9 μ, paraphysate; paraphyses filiform, minute. Ascospores allantoid, hyaline to sub-hyaline, irregularly or polyseriately arranged, 6—8 × 1.6—2 μ.

Collected on dead stem of *Acacia arabica* Willd. at Nizamabad & Awarad in the month of November 1967. Leg. S. B. Kale & Sou. V. S. Kale and deposited in the herbarium of Botany Department Marathwada University under sub-No. MUH 231 (Tilak type).

75. **Lentomita jasmini** sp. nov.

Perithecia solitaria vel in greges minutos disposita, superficialia, brunnea vel nigrescentia, levia, ostiolo minute papilliformi praedita, subglobosa vel ovoidea, 210—240 × 180—200 μ; asci numerosi cylindraceo-clavati, antice late rotundati, postice paulatim attenuati et stipitati, crasse tunicati, 8-spori, 56—64 × 11—13 μ; sporae ellipsoideae vel oblongae, utrinque late rotundatae, vix vel parum, interdum etiam distincte attenuatae, tunc oblongo-fusoideae, primum hyalinae, postea subhyalinae, medio septatae, non vel lenissime constrictae, 21—23 × 9—10 μ, episporio crassiusculo ornatae; paraphyses filiformes.

Perithecia astromatic, singly or in small groups, superficial, brown to black, smooth, ostiolate; ostiole slightly papillate, flask-shaped, 210—240 × 180—200μ. Asci many, cylindrical-clavate, stipitate, thick-walled, bitunicate, 8-spored, 56—64 × 11—13 μ, paraphysate; para-

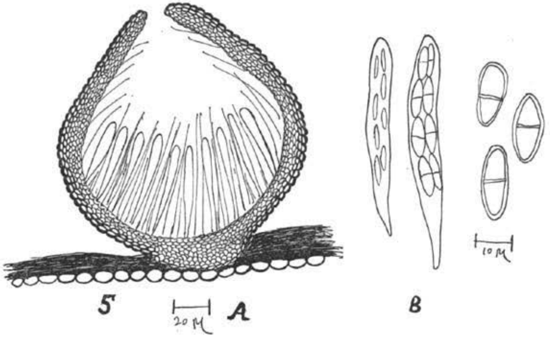

Fig. 5. *Lentomita jasmini* sp. nov. — A. V. S. of perithecium. — B. Ascus and ascospores

physes filiform. Ascospores initially hyaline, later becoming sub-hyaline, 2-celled, wall and septa thick, elliptical to oblong, but while developing, elongated, minute, later on becoming larger at maturity, 21—23 × 9—10 μ.

Collected on dead stem of *Jasminum auriculatum* Vahl. at Aurangabad in the month of November 1967. Leg. S. B. K a l e and deposited in the herbarium of Botany Department Marathwada University, under sub-No. MUH 232 (T i l a k type).

The genus was originally erected by N i e s s l (1876) with *L. brevi-*

collis as the type species. Besides being new species the genus is an addition to the generic list of India.

Acknowledgments

Grateful thanks are due to Marathwada University for Laboratory facilities, to University Grants Commission, New Delhi, for the award of Research Fellowship to the junior author and to Dr. Petrak for the Latin diagnosis of the new species.

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Contribution to our Knowledge of Ascomycetes of India-XXIII

By Tilak S. T. & S. B. Kale

In the earlier papers (1960—68) 82 ascomycetes have been described from India. The present paper deals with the description of *Dictyodothis acaciae* sp. nov. on *Acacia catechu* W. & A.; *Dictyodothis grewiae* sp. nov. on *Grewia* sp.; *Dothideopsella phyllanthae* sp. nov. on *Phyllanthus* sp.; *Metameris petrakii* sp .nov. on *Bougainvillea spectabilis* Willd. and *Microdothella caesalpinae* sp. nov. on *Caesalpinia bonducella* Fleming. These collections have been described as new to science on the basis of comparative morphological studies and host relationship.

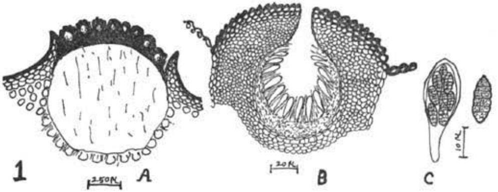

Fig. 1. *Dictyodothis acaciae* sp. nov. — A. V. S. of stroma, locules and host tissue. — B. Vertical section of locules Magnified. — C. Ascus and acrospores

83. **Dictyodothis acaciae** sp. nov.

Stroma erumpens, basi albida, pediformi innatum, superne hemisphaericum, nigrum, pluriloculatum, 600—800 μ diam.; loculi monostichi, globosi, in maturitate aperti, 76—95 × 76—83 μ; asci clavati, stipitati, crasse tunicati, 8-spori, 27—30 × 11—12 μ; sporae clavatae, brunneae, transverse 3—5-longitudinaliter 2—3-septata, medio valde constrictae, 14—16 × 4—6 μ; paraphyses numerosae, filiformes.

Stroma erumpent, black, differentiated into lower white sterile layer which forms the foot like structure and the upper circular to semicircular black fertile region, pluriloculate, 600—800 μ across, locules many surrounded by stromatic tissue, spherical or ball like, opening on the surface by a channel, locule polyascus, 76—95 ×76—83 μ. Asci club shape to clavate, bitunicate, stipitate, 8 spored, paraphysate, 27—30 × 11—12 μ. Paraphysis numerous filiform, Ascospores club shaped, brown, muriform strongly constricted in the middle, with 3—5 transverse septa and 2—3 longitudinal septa, 14—16 × 4—6 μ.

Collected on dead bark of *Acacia catechu* W. & A. at Ramling in the month of Jan. 1968. Leg. S. B. K a l e.

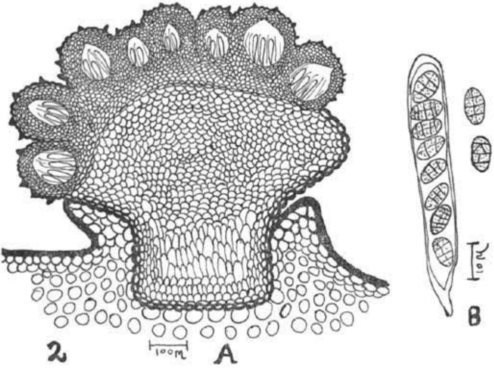

Fig. 2. *Dictyodothis grewiae* sp. nov. — A. Vertical section of stroma and locules. — B. Ascus and ascospores

84. **Dictyodothis grewiae** sp. nov.

Stroma erumpens, basi pediformi innatum, hemisphaericum, nigrum, 750—950 μ diam., in superficie ob verrucas minutissimas, dentiformes asperulum; loculi numerosi, globosi vel subglobosi, in maturitate aperti, 84—103 μ diam.; asci cylindraceo-clavati, crasse tunicati, 8-spori, breviter stipitati, 57—64 × 8—10 μ; sporae monostichae, olivaceae, oblongae vel ellipsoideae, transverse 3—6-longitudinaliter, 2—5-septatae, ad septa omnia constrictae, 9—10 × 6—8 μ; paraphyses filiformes.

Stroma erumpent, black, with upper fertile region and lower foot like structure, pluriloculate, 750—950 μ across, surface rough with teeth like outgrowths, locules many in single layer, globose to subglobose, pluriascus, opening by a channel 84—103 μ across. Asci cylindrical-clavate, 8 spored, bitunicate, short stalked 57—64 × 8—10 μ, paraphysate. Paraphysis filiform. Ascospores greenish brown, uniseriate, oblong to ellipsoid, muriform, 3—6 transverse septa and 2—5 longitudinal septa, constricted at each septum, 9—11 × 6—8 μ.

Collected on dead stem of *Grewia* sp. at Ramling in the month of Jan. 1968. Leg. S. B. K a l e.

The genus *Dictyodothis* was erected by Theissen & Sydow (1915) with *D. berberis* as the type species. The genus remained unrepresented in the Indian Flora and with the description of these two species is now represented by two species.

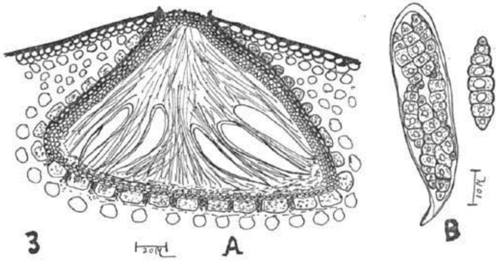

Fig. 3. *Dothideopsella phyllanthae* sp. nov. — A. V. S. of stroma and locules. — B. Ascus and ascospores

85. **Dothideopsella phyllanthae** sp. nov.

Stroma innatum, erumpens, nigrum, uniloculatum, perithecio simile sed sine pariete distincto, in maturitate poro apertum, 114—152 × 190—266 μ; asci clavati, stipitati, crasse tunicati, 8-spori, 60—75 × 15—19 μ; sporae irregulariter distichae, primum hyalinae, postea brunneae, ellipsoideae vel fusoideae, plerumque curvulae, transverse 5—7-septatae, 14—16 × 10—11 μ, in quaque cellula guttula oleosa praeditae; paraphyses filiformes.

Stroma innate, erumpent, black, uniloculate, locule perethecium like but lacks definite seperating wall, opening at maturity by a pore, each; locule pluriascus, 114—152 × 190—266 μ. Asci clavate, stipitate, 8 spored, bitunicate, paraphysate, 60—75 × 15—19 μ. Paraphysis filiform. Ascospores initially hyaline later turning brown, ellipsoid to fusoid, curved, transversely septate, septa 5—7 μ, irregularly biseriate, 14—16 × 10—11 μ, with oil drop in each cell.

Collected on dead stems of *Phyllanthus* sp. at Apsinga in the month of Jan. 1968. Leg. S. B. Kale.

The genus *Dothideopsella* was erected by Hoehnel (1915) with *D. agminalis* as the type species. Ainsworth (1961) considered it as synonym of *Leptosphaeria* Ces. & de Not. and treats it under the Sphaeriales probably considering it as true perethecium. The present studies, however, suggest the clear locular nature of the genus.

86. **Metameris petrakii** sp. nov.

Stroma innatum, erumpens, pluriloculatum, 450—750 × 250—365 μ; loculi globosi vel a latere plus minusve compressi, 114—155 × 112—160 μ, ostiolo breviter rostellato praediti; asci numerosi, clavato-cylindracei, stipitati, crasse tunicati, 8-spori, 72—80 × 13—14 μ; sporae distichae, fusiformi-ellipsoideae, transverse 3-septatae, medio constrictae, leniter curvulae, in quaque cellula guttula oleosa ornata, muco obvolutae, 21—22 × 5—6 μ; paraphyses filiformes, capitatae.

Stroma black, innate-erumpent, pluriloculate, 450—750 × 250—365 μ, locules globular or laterally compressed, polyascus, 114—155 ×

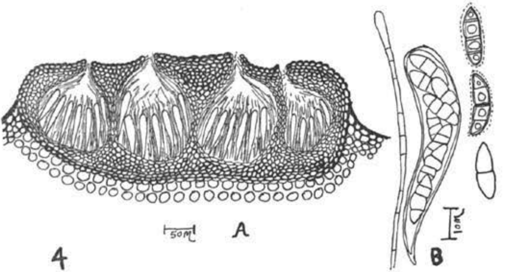

Fig. 4. *Metameris petrakii* sp. nov. — A. V. S. of Stroma and locules. — B. Paraphysis, ascus and ascospores

112—160 μ, opening by a neck like structure which forms a channel. Asci many, clavate, cylindrical, bitunicate, stitipate, 8 spored, paraphysate, 72—80 × 13—14 μ. Paraphysis filiform, capitate, numerous. Ascospores hyaline, fusiform, ellipsoid, transversely septate, septa 3, deeply constricted in the middle, slightly courved, thick walled, with oil globule in each cell, biseriate, 21—22 × 5—6 μ, with a mucous sheath.

Collected on dead stems of *Bougainvilles spectabilis* Willd. at Nizambad & Awarad in the month of Nov. 1967. Leg. S. B. Kale.

The genus *Metameris* was erected by Theissen & Sydow (1915) with *M. japonica* as the type species. The genus is an addition to the generic lists of India.

87. **Microdothella caesalpiniae** sp. nov.

Stromata late dispersa, subcuticularia, postea superficialia, mono- vel pluriloculria, 152—175 × 300—450 μ; loculi semiglobosi, in maturitate canali brevi aperti, 105—135 × 225—375 μ; asci ellipsoidei vel subglobosi crasse tunicati, stipitati, 8-spori, 57—68 × 19—23 μ; sporae irregulariter ordinatae, hyalinae, continuae, ellipsoideae vel rhomboidales, 11—15 × 9—13 μ; paraphysoides sat numerosae.

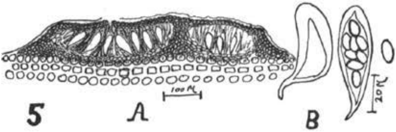

Fig. 5. *Microdothella caesalpiniae* sp. nov. — A. V. S. of stroma and locules. — B. Young and mature asci and ascospores

Stroma black, saprophytic on dead stem, subcuticular, later on superficial, wide spreading, shield shaped, mono- or plurocular, 152—175 × 300—450 μ, locules semicircular, poluascus, opening by a narrow channel, 105—135 × 225—375 μ. Asci many ellipsoid to globoid, thick walled, bitunicate, stipitate, 8 spored, 57—68 × 19—23 μ paraphysoids present. Ascospores hyaline, one celled, irregularly arranged, ellipsoid to rhomboidal 11—15 × 9—13 μ.

Collected on dead stems of *Caesalpinia bonducella* Fleming at Apsinga in the month of Jan. 1968. Leg. S. B. Kale.

The genus *Microdothella* was erected by Sydow (1914) with *M. culmicola* as the type species. The genus is an addition to the generic list of India.

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Beiträge zu einer Pilzfora des Attergaues und des Hausruckwaldes-III.

Von E. W. Ricek

St. Georgen im Attergau, O.Ö.

Latschenmoore

Rot- und Legföhren haben z. T. die gleichen Pilze als Mykorrhiza-Symbionten. Das gilt besonders für die streng baumgebundenen Suillus-Arten, von denen jede nur an ganz wenige nahe verwandte Baumarten gebunden ist. Der pH-Wert des Bodens ist in diesen Fällen von zweitrangiger Bedeutung oder sogar bedeutungslos.

Auch zahlreiche *Russula*- und *Lactarius*-Arten wachsen sowohl unter Rot- wie unter Legföhren. Sie sind jedoch je an einen bestimmten Bereich des pH-Wertes gebunden. Diese Abhängigkeit von der Azidität bzw. Basizität des Boden ist ist hier vor primärer Bedeutung, die Bindung an eine Baumart ist nicht so streng. Die meisten von ihnen wachsen nicht nur unter *Pinus*-Arten, sondern auch bei Fichten und sogar bei Tannen. Ähnlich liegen die Verhältnisse bei *Rozites caperata* und wohl auch bei *Amanitopsis fulva.* Rotföhrenwälder über Kalk, sauren Silikatschottern und Torf sowie Latschenbestände und stark bodensaure Fichtenwälder zeigen daher bei gewissen Pilzarten bzw. -gattungen eine gewisse Übereinstimmung, bei anderen ganz wesentliche Unterschiede. Die *Sphagnum*-Fichtenwälder haben jedoch eine eigene, sehr artenreiche Pilzflora und die mit den Föhrenwäldern gemeinsamen Arten spielen darin eine sehr untergeordnete Rolle.

Die 12 häufigsten Föhrenbegleiter verteilen sich in der Häufigkeit ihres Auftretens in folgender Weise auf Latschenmoore, Rotföhrenwälder über Kalk bzw. sauren Silikatschottern und stark saure Fichtenwälder.

Latschenfilze stehen auf dem Torf von Hochmooren und stark sauren Zwischenmooren. In der Moosschichte herrschen neben *Aulacomnium palustre, Dicranum bergeri* usw. auf weite Strecken hin die *Sphagnum*-Arten (*S. acutifolium, S. rubellum, S. russowii, S. recurvum, S. medium* etc.). Die Krautschichte — mit *Eriophorum vaginatum, Carex stellulata, Drosero rotundifolia* usw. — wird oft von Zwergsträuchern (*Vaccinium myrtillus, V. uliginosum, Oxycoccus, Calluna* etc.) beherrscht. Zu den 12 häufigsten Legföhrenbegleitern kommen als Torfbesiedler bzw. hydrophile Pilze noch *Nematoloma udum, N. elongatipes, Galerina* *tibiicystis, G. paludosa, Omphalina sphagnicola, Mycena concolor, M. fibula, M. swartzii, Lyophyllum palustre* u. a.

Lange Zeit habe ich vermutet, *Suillus bovinus* sei auf bodensaure Föhrenwälder beschränkt; dann habe ich ihn einige Male auf Kalk gefunden. 1968 war ein Jahr mit sehr reichlichem Auftreten von allen

	Latschenmoore	bodensaure Föhrenwälder	Kalk-Föhrenwälder	stark bodensaure Fichtenwälder
Suillus variegatus	—	2	2	—
Suillus bovinus	1—2	4	—	—
Suillus graulatus	3	4	2	—
Hygrophoropsis hypothejus	—	3	2	—
Tricholoma portentosum	—	3	2	—
Rozites caperata	3	4	—	4
Russula emetica	2	3	—	3
Amanitopsis fulva	2	3	—	3
Lactarius helvus	3	3	—	3
Lactarius rufus	3	4	—	4
Russula palludosa	2	2	—	2
Dermocybe paludosa	4	1	—	—

Häufigkeit: 1 = selten; 2 = mässig häufig; 3 = häufig; 4 = sehr häufig.

Suillus-Arten. Im August und September 1968 habe ich *Suillus bovinus* in mehreren Latschenmooren gefunden, ziemlich zahlreich z. B. in den Hochmooren aus der Moosalm zwischen Burgau und dem Schwarzensee.

Sind schon die bodensauren Rotföhrenwälder über Sand und Schotter in bezug auf die Pilzflora recht artenarm (im Gründberg bei Frankenburg habe ich in einem solchen Biotop etwa 25 Arten bodenbesiedelnder Großpilze festgestellt), so sind es erst recht die Latschenfilze der Hochmoore. Darüber hinaus sind sie auffallend individuenarm. Etwa 16—18 Arten höherer Pilze findet man mit einiger Regelmässigkeit in den Latschenbeständen der Moore.

Rotföhrenwälder über Kalk

In den Kalkalpen des Attergaues bildet die Rotföhre nur an wenigen Stellen Bestände von einiger Ausdehnung, z. B. an den SW-Abhängen des Höllengebirges zum Weissenbachtal. In der Flyschzone ist sie auf wenige kleinere Vorkommen in Tuffquellgebieten („Ackerling“ bei Innerlohen) bzw. in Hoch- und stark sauren Zwischenmooren (Föhramoos bei Straß i. A. und bei Oberaschau beschränkt. Die Geringfügigkeit ihres Auftretens macht eine pilzsoziologische Beurteilung in meinen Gebieten nicht möglich. Zudem sind die wenigen Kalk-Föhrenwälder meist mit einer sehr stark entwickelten Krautschichte bestanden (*Erica carnea, Sesleria caerulea, Polygala chamaebuxus, Buphthalmum salicifolium* etc.), demgemäss oft recht pilzarm. Im Vergleich zu den bodensauren *Calluna-* und Heidelbeerföhrenwäldern fehlen deren *Russula-* und *Lactarius*-Arten, also *R. decolorans, R. paludosa, L. helvus, L. rufus* usw. Bei diesen ist die Bindung an einen bestimmten pH-Wert stärker als die an eine bestimmte Baumart bzw. -gattung. Auffallenderweise habe ich alle *Suillus*-Arten bodensaurer Rotföhrenwälder auch über Kalk gefunden, wenn auch mit Ausnahme von *S. granulatus* hier recht spärlich. Auch *Hygrophorus hypothejus* und *Tricholoma portentosum* treten ab und zu in Kalk-Förhrenwäldern auf. Umgekehrt verhält es sich bei *Gomphidius rutilus*, der mit abnehmender Azidität häufiger wird, also ebenso wie *S. granulatus* über Kalk reichlicher auftritt als auf kalkfreien Unterlagen.

Pilze an lehmigen Böschungen

Flächen freiliegenden Lehmbodens werden in schattiger Lage, also innerhalb geschlossener Wälder, besonders von Moosgesellschaften besiedelt. Die Phanerogamenflora tritt hier den Kryptogamen gegenüber zurück. Dies und das Vorhandensein von Baumwurzeln im Boden bedingen eine oft auffallend reichhaltige Pilzvegetation an den Böschungen von Hohlwegen und Waldstrassen.

Sehr hohe Böschungen — etwa die Schluchten tief eingeschnittener Waldbäche — sind in ihrem unteren, von der baumbestandenen Böschungskrone entfernten Teil nicht durchwurzelt; demgemäss sind sie hier arm an höheren Pilzen. Da nackter Lehm nur sehr spärlich, oft nur spurenweise Humusteilchen enthält, treten die Sapophyten und Rohhumusbewohner weitgehend zurück. Viele der gewöhnlichen Waldbodenpilze — die Humuszehrer eben ausgenommen — treten gelegentlich auch an Lehmböschungen auf. Eine größere Anzahl von ihnen bevorzugt jedoch diese Standorte:

Xerocomus subtomentosus habe ich 1968 23mal auf nacktem Lehm (21mal über Silikatschotter, 2mal über Flysch) und nur 2mal auf Waldboden mit stärkerer Humusauflage gefunden. Er ist geradezu charakteristicsh für die Lehmböschungen der Waldwege und -strassen. Von *Tubiporus castaneus* habe ich 1967 zwar nur 7 Funde notiert, aber 6 davon waren an solchen Standorten. *Peziza aurantiaca* und *Sphaerospora trechispora* wachsen wohl ausschliesslich auf nacktem Lehm. *Coltricia perennis* und *Plicaria badia* siedeln auf Lehm und besonders auf stark lehmigem Sand. *Inocybe lacera, I. dulcamara, Clavaria argillacea* und bis zu einem gewissen Grad auch *I. terrigena* meiden die schweren Lehmböden, verlangen also schon echte Sandböden.

Der Lehm über Flysch ist mässig bis schwach sauer, sein Kalkgehalt ist gering; der über Silikatschotter ist mässig bis stark sauer und praktisch kalkfrei. Diese Unterschiede prägen sich in der Pilzflora der entsprechenden Standorte aus. In der folgenden Liste sind die wichtigsten Pilzarten aufgezählt, die mit einiger Regelmässigkeit an den lehmigen Böschungen der Waldwege und -strassen über Flysch und Silikatschotter auftreten.

	Silikatschotter	Flysch
Coltricia perennis	IV, 3	—
Russula violeipes	III, 2	—
Gyroporus castaneus	III, 2	—
Amanita junquillea	IV, 3	—
Plicaria badia	IV, 3	IV, 1
Xerocomus subtomentosus	III, 3	IV, 2
Strobilomyces floccopus	IV, 3	IV, 2
Clavaria rugosa	III, 3	IV, I
Boletus erythrophus	II, 3	I, 2
Cantharellus amethysteus	II, 3	I, 2
Cantharellus cibarius	II, 4	I, 3
Lactarius volemus	II, 3	I, 3
Laccaria laccata	II, 4	II, 4
Inocybe gausapata	I, 2	II, 3
Inocybe hypophaea	I, 2	II, 3
Inocybe friesii	—	II, 3
Sphaerospora trechispora	—	II, 3
Peziza aurantiaca	—	II, 3

Stetigkeit: I = vorwiegend auf Waldboden mit Humusauflage; II = ungefähr gleich häufig auf Lehm und Waldboden; III = vorwiegend auf Lehm; IV = ausschliesslich auf Lehm.
Häufigkeit: 1 = selten; 2 = mässig häufig; 3 = häufig; 4 = sehr häufig.

Artenverzeichnis

Plicaria badia Pers ex Fr. Auf saurem Sandboden und sandigem Lehm, besonders an den Böschungen der Waldwege und -strassen. Im Hausruckwald ziemlich häufig (z. B. in der Ramsau bei Fornach, im Litzinger Forst bei Neukirchen a. V., im Gründberg bei Frankenburg), seltener in der Flyschzone (westlich Parschallen a. A.). Im Spätsommer und Herbst.

Helotium fructigenum (Bull. ex Fr.) Fuck. An liegenden vorjährigen Eicheln: Seebergleiten bei Kammerl (Gebiet des Attersees), IX—X, selten.

Leptopodia atra (König ex Fr.) Boud. Im kurzgrasigen, moosigen Rasen bei einer Birke: Aufham bei Attersee. An einem Waldrand bei Rotbuchen: westlich Zell a. A.; IX—X, überall selten.

Scleroderma verrucosum Pers. Bei Eichen über Flysch (Südabhänge des Buchbergs) und sauren Silikatschottern (Hausruckwald), im Spätsommer und Herbst, nicht selten.

Lycoperdon mammaeforme Pers. In Rotbuchenwäldern über Flysch, z. B. an mehreren Stellen in der Umgebung von St. Georgen

i. A., westlich Zell und Dexelbach a. A.; im Sommer und Frühherbst, nicht häufig.

Clavulinopsis corniculata Fr. Im kurzrasigen, moosigen Rasen bei einer Birke über etwas kalkhaltigen alluvialen Schottern; bei Aufham nahe Attersee, IX—X, selten.

Clavulina rugosa (Fr.) Schroet. Auf Lehm über Flysch (z. B. westlich Dexelbach a. A.) und Silikatschotter (bei Tiefenbach nahe Redl-Zipf u. a. o., oft an der Böschung von Waldwegen und Wassergräben; im Spätsommer und Herbst, nicht selten.

Ramaria stricta (Fr.) Quel. Auf einem morschen Fichtenstumpf: Südabhänge des Buchbergs; selten.

— *stricta* (Fr.) Quel. *ssp. violaceo-tincta* Bourd. et Galz. An z. T. im Erdboden oder im Buchenfallaub versenkt liegenden Ästen der Rotbuche, besonders in deren morschem Zustand. Im Attergau (z. B. in der Umgebung von St. Georgen i. A., Abtsdorf usw.); im Spätsommer und Herbst, selten.

Clavariadelphus truncata (Quel.) Donk. In Nadelwäldern (bei Fichten und Tanen) über Flysch: Rossmoos westlich Nussdorf a. A., selten.

Calodon melaleucum Fr. Bei Fichten über sauren Silikatschottern; Hausruckwald, z. B. bei Stuhlleiten bei Hintersteining; selten.

— *nigrum* (Fr.) Quel. Im Nadelwald (bei Fichten beobachtet) über sauren Silikatschottern: Hausruckwald, z. B. auf der Stuhlleiten bei Hintersteining und in der Umgebung von Eberschwang; selten.

Sistotrema confluens Pers. Auf Buchenfallaub im Wäldchen neben dem Morganhof bei Attersee; selten, IX—X.

Phlebia aurantiaca (Sow.) Karst. Auf der Scheitelfläche fester Buchenstümpfe: Südabhänge des Buchbergs, Wälder um Wildenhag; nicht häufig. IX—X.

Hymenochaete tabacina (Sow. ex Fr.) Lev. An abgestorbenen Ästen und Zweigen von Weiden (Salix caprea, S. purpurea); im Hausruckwald (bei Eberschwang), im Gebiet des Attersees (bei Litzlberg); selten.

— *rubiginosa* (Dicks. ex Fr.) Lev. An Stümpfen von Eichen: Südbahänge des Buchbergs, Lohholz bei St. Georgen i. A., Eggenberger Forst bei Walsberg; nicht häufig.

Stereum chailettii Pers. An Stümpfen und liegenden Stämmen von Fichten und Tannen; in den Wäldern um den Attersee (z. B. westlich Dexelbach) und im Hausruck (Redlthal, Ottokönigen). Überall ziemlich selten.

— *abietinum* Pers. An Tannenstümpfen im Schatten der Wälder. Umgebung des Attersees; bei Frankenmarkt; im Hausruckwald (z. B. auf dem Hochlehen). Nicht häufig.

Polyporus osseus Kalchbr. An einem etwas morschen Lärchenstumpf in sonniger Lage: Eisenau am Fusse des Schafbergs; selten.

Polyporus ciliatus Fr. *f. lepideus* (Fr.) Kreisel. An Laubhölzern verschiedener Art (Rotbuche, Linde, Ahorn, Esche, Erle, Eiche), besonders im festen Stadium, aber auch noch bei fortgeschrittener Zersetzung des Holzes; an Baumstümpfen und an liegendem Holz. Allgemein verbreitet und überall häufig (Attergau, Hausruckwald).

Grifola umbellata (Pers. ex Fr.) Pilat. Bei einer Eiche (Quercus robur) am Südabhang des Buchbergs. Die Fruchtkörper erscheinen in der Zeit zwischen Mitte Juli und Ende August. Sie entspringen aus oberflächlich liegenden Sklerotien, die nach dem Fruchten bald vermodern bzw. durch Tierfrass zerstört werden.

Tyromyces ptychogaster (Ludw.) Donk = Ceriomyces albus Corda. An einem morschen Fichtenstumpf und aus dessen auslaufenden Wurzeln, zusammen und unmittelbar benachbart mit einem Pilzhut von Phaeolus schweinitzii. Im Litzinger Forst bei Neukirchen a. V., im September 1968, selten.

Bjerkandera fumosa (Pers. ex Fr.) Karst. An Stümpfen verschiedener schmalblättriger Weidenarten (Salix viminalis, S. purpurea). In den Auen an der Ager nördlich St. Georgen i. A. und in einer ebendort befindlichen Korbweidenpflanzung, hier lokal nicht selten.

Trametes zonata (Nees ex Fr.) Pilat. An festen Stümpfen von Hainbuchen (Limmoos bei Zell a. A.) und von Birken (Umgebung von Eberschwang, Hausruckwald), oft zusammen mit *T. versicolor* und *T. betulina*. Selten.

— *extenuata* Dur. et Mont. An festen Stümpfen von Rotbuche Bergahorn, Esche usw., besonders in sonniger Lage. Allgemein verbreitet (Südabhänge des Buchbergs, Bramhosenberg bei Steinbach a. A., Limberg a. A.), aber nicht häufig.

— *pubescens* (Schum. ex Fr.) Pilat. An Stümpfen und an toten Stämmen von Rotbuche, Birke, Bergahorn und wahrscheinlich noch an anderen Laubholzarten, besonders in montaner Lage. Im Attergau (u. a. bei Weissenbach, Burgau und Stockwinkel a. A., in der Eisenau am Fusse des Schafbergs), nicht gerade selten.

— *pubescens* (Schum. ex Fr.) Pilat. *f. velutina*. An liegenden Ästen und Zweigen der Rotbuche: Hausruckwald (Hobelsberg zwischen Fornach und Frankenburg), Eisenau; nicht gerade selten.

— *suaveolens* (L. ex Fr.). An Stümpfen und abgestorbenen Stämmen und Ästen verschiedener schmalblättriger Weiden (Salix purpurea, S. viminalis, S. fragilis). In den Auwäldern an der Ager nördlich von St. Georgen i. A. und in einer ebendort befindlichen Korbweidenpflanzung; lokal nicht selten.

Phellinus hartigii (Alescher u. Schnabel). Boud. Am Stammholz einer ca. 5 Jahre lang liegenden Tanne. Eisenau am Fusse des Schafbergs, selten.

Xerocomus rubellus (Krbh.) Mos. Bei Eichen in parkähnlichem Gelände im Gras. Es handelt sich nur um wenige Funde im

Hausruckwald auf mässig saurem Boden über Silikatschotter. VII—VIII; selten.

— *truncatus* Sing. Bei Fichten und Tannen über Silikrtschotter und Flysch; im Attergau (westlich Dexelbach a. A., Mondseeberg, Buchberg) und im Hausruckwald (Hochlehen, Redlthal); (VIII—)IX—X; mässig häufig.

Boletus queletii Schulz. Bei Rotbuchen über Flysch (Traschwand nahe Oberwang) und über Altmoränen (Reichentalham nahe Vöcklamarkt); gern über kalkhaltigem Lehm, auch noch an etwas versauerten Stellen, hier z. B. mit Heidelbeeren. VIII—X; selten.

Leccinum holopus (Rostk.) Watl. Bei Birken (Betula pubescens) im Zwischenmoor; lokal regelmässig und nicht selten: Egelsee bei Miesling (hier in blass grünlichen Formen), Wildmoos bei Mondsee (hier rein weiss). IX—X; selten.

— *duriusculum* (Kalchbr.) S. F. Gray. Bei Birken (*Betula pendula*) über Flysch (z. B. westlich Dexelbach und Parschallen a. A.) und über Silikatschotter (Hausruckwald, z. B. bei Fornach und Redlthal); VIII—X; nicht häufig.

Paxillus filamentosus Fr. Bei Schwarzerlen im Gras; über Kalk (an der See-Ache bei Unterach a. A.) und über Silikatschotter (Umgebung von Redlthal und Fornach); ziemlich selten.

— *panuoides* Fr. An modrigen Nadelholzstümpfen, z. B. bei der „Breiten Buche" in der Umgebung von Waldzell, bei Eberschwang; nicht häufig.

Hygrophorus poetarum Heim. Bei Rotbuchen über Flysch: Buchberg; Gahberg und Wachtberg bei Weyregg. IX—X; nicht selten.

Camarophyllus russocoriaceus Bk. & Br. Im kurzgrasigen Rasen von Flachmooren (Moosalm zwischen Burgau und dem Schwarzensee), aber auch von Trockenwiesen („in der Klaus" bei Thalham). Von Ende Juli bis in den Oktober; ziemlich selten.

— *colemannianus* (Block. ex Fr.) Rck. Im kurzgrasigen Rasen von Berg- und Waldwiesen, zusammen mit Hygrocybe-Arten; Kronberg bei St. Georgen i. A.; VIII—IX; selten.

Hygrocybe ovina (Bull. ex Fr.) Kühn. Im kurzgrasigen Rasen ungedüngter Wiesen (Saftlingswiesen); über Flysch und Jungmoränen: Attergau (bei Zell a. A., an den Südabhängen des Buchbergs, in der „Klaus" bei Thalham; IX—X(—XI); nicht selten.

— *murinacea* (Fr.) Mos. In kurzgrasigen Berg- und Waldwiesen über Kalk und Flysch; Leonsberg (hier auf den Almen in ca. 1000 bis 1200 m Meereshöhe), Südabhänge des Buchbergs, „in der Klaus" bei Thalham, bei Zell a. A.; IX—X, nicht selten.

— *nigrescens* (Quel.) Kühn. Im kurzgrasigen Rasen von Berg- und Waldwiesen; bisher nur über Flysch beobachtet, z. B. bei Limberg, bei Stockwinkel a. A.; IX—X, nicht selten.

— *acutoconica* (Clements) Sing. In gedüngten und ungedüngten Wiesen, meistens truppweise; über Silikatschotter (Lichtenegg bei Neukirchen a. V.) und Flysch (Attersee, Limberg, Zell a. A. usw.); VII—IX; nicht selten.

— *marchii* (Bres.) Sing. In ungedüngten, kurzgrasigen, moosigen Wiesen (Saftlingswiesen) über Flysch. Südabhänge des Buchbergs, hier lokal häufig. VIII—X.

— *coccineocrenata* (Orton) Mos. In nassen Schlenken von Zwischenmooren, oft im Rasen von Sphagnum subsecundum; Egelsee bei Miesling (Gebiet des Attersees); lokal häufig.

Laccaria bicolor (R. Mre.) Orton. Im kurzgrasigen Rasen moosiger Waldwiesen, z. B. zusammen mit den Moosen *Rhytidiadelphus squarrosus, Scleropodium purum, Pleurozium schreberi, Hylocomium splendens* etc., nahe bei Fichten, Zitterpappeln usw.; S- und W-Abhänge des Buchbergs, bei Pollhammeredt nahe Neukirchen a. V.; wohl verbreitet, aber oft übersehen.

Clitocybe vermicularis (Fr.) Quel. Bei Lärchen, einmal auch bei Fichten; Hausruckwald (z. B. auf der Stuhlleiten bei Hintersteining). (II—)III—IV; nicht häufig.

— *candicans* (Pers. ex Fr.) Kummer. Auf Buchenfallaub, gesellig, aber nicht häufig; Südseite des Buchbergs; VIII—IX, nicht häufig.

— *pithyophilla* (Secr.) Gill. Auf Fichtennadelstreu; Südabhänge des Buchbergs; nicht häufig.

— *metachroa* (Fr.) Kumm. Auf Föhrennadelstreu; Gründberg bei Frankenburg, lokal häufig.

Porpoloma pes caprae (Fr.) Sing. Auf kurzgrasigen, wenig oder nicht gedüngten Wiesen über Flysch; immer nur vereinzelt, oft zusammen mit *Hygocybe*-Arten. Gebiet des Attersees (z. B. bei Zell a. A.), „in der Klaus" bei Thalham. IX—X, selten, oft viele Jahre lang fehlend.

Tricholoma elytroides (Fr.) Karst. Im Gras eines Waldrandes bei Jungfichten, zusammen mit *Lactarius semisanguifluus* und *Cortinarius anomalus*; nur 1 Fund am S-Abhang des Buchbergs. IX 1968; sehr selten.

Melanoleuca evenosa (Sacc.) Konr. Auf Almen, oft fernab von Bäumen, immer in höheren Lagen über 1000 m Meereshöhe beobachtet und hier nicht selten. Leonsberg, Hochlecken usw., schon frühzeitig (ab Mai oder Juni).

— *strictipes* (Karst.) Murr. Auf gedüngten oder ungedüngten Wiesen, auch im höheren Gras, sogar in Obstgärten. Im Attergau („in der Klaus" bei Thalham, um Zell, Parschallen a. A. usw.; schon frühzeitig (ab Mai oder Juni); häufig.

— *arcuata* (Fr.) Sing. Auf Grasplätzen, in Buchenwäldern. Attergau (z. B. im Stetthamer Holz), Hausruckwald (um Frankenburg); im Sommer und Herbst, nicht selten.

Calocybe chrysenteron (Bull. ex Fr.) Sing. Auf Fichtennadelstreu. Im Gebiet des Hausruckwaldes, z. B. in der Umgebung von Frankenburg. VIII—IX, selten.

Lyophyllum infumatum (Bres.) Kühn. Bei Fichten und Rotbuchen über Kalk und Flysch. Buchberg, bei Weissenbach a. A. usw., nicht selten. Von der Mitte des Sommers bis in den Herbst.

Hohenbuehelia geogenia (DC. ex Fr.) Sing. Bei Rotbuchen an der lehmig-erdigen Böschung eines Waldweges. Buchberg, schon frühzeitig (IV, V). Selten.

— *atrocoerulea* (Fr.) Sing. An liegenden Ästen und Zweigen der Rotbuche. Hausruckwald (Umgebung von Frankenburg); ziemlich selten.

Collybia tuberosa (Bull. ex Fr.) Quel. Auf den verfaulten Resten von Blätterpilzen, ganz besonders auf denen von *Lactarius vellereus*, aber auch an *Nematoloma*. Allgemein verbreitet (Hausruckwald, z. B. im Gründberg bei Frankenburg, auf dem Hochlehen; Attergau, z. B. auf dem Buchberg, im Eggenberger Forst usw.) und überall häufig. Vom Sommer bis in den Spätherbst.

— *fuscopurpurea* (Pers. ex Fr.) Kumm. Auf Buchenfallaub in Feldgehölzen; Umgebung von Frankenburg. Im Spätsommer und Frühherbst. Selten.

Tephrocybe ambusta (Fr. ex Fr.) Donk. An Holzkohlenstückchen auf einer ca. 1½ Jahre alten Feuerstelle. W-Abhang des Buchbergs. IX—X; selten.

Panellus mitis (Pers. ex Fr.) Sing. An abgestorbenen, liegenden Zweigen der Tanne, selten. Rossmoos (bei der Limberg-Holzstube); spät im Jahr (XI, XII).

— *violaceofulvus* (Batsch ex Fr.) Sing. An abgestorbenen liegenden Zweigen der Tanne (Abies); selten. Dachsberg westl. Dexelbach a. A.; spät in Jahr (XI—XII).

Micromphale foetidus (Sow ex Fr.) Sing. An festen oder morschen Stümpfen der Purpurweide; in den Auen nördlich von St. Georgen i. A., auch hier nicht häufig.

Marasmius alliaceus (Jacq. ex Fr.) Fr. Im Buchenwald: Hobelsberg zwischen Frankenburg und Fornach; auf dem Rossmoos bei Limberg. VIII—X; selten.

Mycena fagetorum (Fr.) Gill. Auf Buchenfallaub. Hausruckwald (Hobelsberg zwischen Frankenburg und Fornach). Vom Spätsommer bis in den Herbst. Selten.

— *aetites* (Fr.) Quel. Im Gras der Waldränder, in sehr lichten Lärchenbeständen, im kurzgrasigen Rasen ungedüngter Wiesen („Saftlingswiesen“); über Flysch (bei Dexelbach a. A., an den S- und W-Abhängen des Buchbergs, „in der Klaus“ bei Thalham, auf dem Wachtberg bei Weyregg usw.). IX—X; häufig.

— *erubescens* v. H. = *M. fellea* ss. Lge. Im Moosbewuchs an der Basis lebender Bäume, an Nadel- und Laubholzstümpfen und im Buchenfallaub. Im Attergau, z. B. bei Stockwinkel a. A., bei Innerlohen, Wildenhag. (VIII—)IX—X, nicht häufig.

— *concolor*(Lge.) A. H. Smith. Im stark sauren Zwischenmoor zwischen Sphagnum rubellum; Egelsee bei Miesling. Im Herbst und Spätherbst; selten.

— *niveipes* Murr. An morschen Stümpfen der Schwarzerle. Umgebung von Eberschwang (Hausruckwald), ziemlich früh im Jahr (V), lokal nicht selten.

— *stylobates* (Pers. ex Fr.) Kumm. Auf Fallaub in einem Buchenstangenholz; Südabhänge des Buchbergs, lokal nicht selten. IX—X.

— *inclinata* (Fr.) Quel. Auf modrigen oder stark morschen Eichenstümpfen. Bisher nur an der Südseite des Buchbergs beobachtet und auch hier nicht häufig.

— *acicula* (Schff. ex Fr.) Kumm. Auf nährstoffreicher Erde, besonders unter Hochstauden; „in der Klaus" bei Thalham, Umgebung von Eberschwang (Hausruckwald); schon früh im Jahr (IV, V); im geeigneten Biotop nicht selten.

— *citrinomarginata* Gill. Meistens auf Buchenfallaub, manchmal auch auf Fichtennadelstreu. Attergau: S- und W-Abhänge des Buchbergs, Park des Morganhofs bei Aufham. IX—X; nicht häufig.

— *rorida* (Scop. ex Fr.) Quel. Auf Fichtennadeln im Moosrasen; bei der Aumühle nahe Reichenthalham, schon früh im Jahre (V, VI), nicht häufig.

Rhodophyllus cordae (Karst.) Lge. Im stark bodensauren Nadelwald über Silikatschottern bei Fichten. Litzinger Forst bei Neukirchen a. V., im Spätsommer und Herbst; nur lokal etwas häufiger.

— *costatus* (Fr.) Quel. Bei Rotbuchen über Flysch: Park des Morganhofes bei Aufham, Dachsberg westlich Dexelbach a. A.; im Spätsommer und Herbst, nicht häufig.

— *prunuloides* (Fr.) Quel. In ungedüngten oder wenig gedüngten Wiesen (Saftlingswiesen), oft zusammen mit *Rhodophyllus lazulinus*, *Hygrocybe*-Arten etc.), über Flysch und Silikatschotter. Südseite des Buchbergs, Lichtenegg bei Neukirchen a. V.; nicht häufig.

— *sericeus* (Bull. ex Fr.) Quel. Im kurzgrasigen Rasen, z. B. in Saftlingswiesen, auf Almen; beim Egelsee oberhalb Miesling, in der Eisenau am Fusse des Schafbergs, auf der Moosalm zwischen Burgau und dem Schwarzensee; besonders in der subalpinen Region recht häufig. IX—X.

— *janthinus* Romagn.-Fav. In Bulten von Sphagnum palustre bei Weiden (Salix cinerea); „im Moos" bei Attersee, VII. 1968, an einigen Stellen, aber selten.

— *linkei* (Fr.) Quel. ss. Bres. Auf schwarzem Humus im Buchenwald über Kalk. Aufstieg von Unterach zur Eisenau; im Herbst, selten.

Rodophyllus turci (Bres.) Romagn. Im kurzrasigen Rasen von Berg- und Waldwiesen (Saftlingswiesen) über Flysch. Attergau (z. B. an den S-Abhängen des Buchbergs); im Spätsommer und Herbst.

— *lampropus* (Fr.) Quel. Im kurzgrasigen Rasen von ungedüngten Wiesen (Saftlingswiesen) über Flysch. Südabhänge des Buchbergs, „in der Klaus“ bei Thalham; im Herbst, nicht selten.

— *querquedula* Romagn. Im Flachmoor: Kreuzerbauernmoor bei Fornach; Spätsommer und Herbst, selten.

— *lazulinus* (Fr.) Quel. Im kurzgrasigen Rasen ungedüngter Wiesen (Saftlingswiesen); Attergau: Limberg südwestlich von Nußdorf a. A., „in der Klaus“ bei Thalham, Südabhänge des Buchbergs usw., Spätsommer und Herbst, häufig.

— *coelestinus* (Fr.) Quel. Im kurzgrasigen Rasen ungedüngter Wiesen (Saftlingswiesen) über Flysch. Südabhänge des Buchbergs; bei Innerlohen; im Herbst, ziemlich selten.

— *mougeotii* Quel.. Im Flachmoor. Moosalm zwischen Burgau und dem Schwarzensee, Kreuzerbauernmoor bei Fornach. Im Sommer und Herbst, nicht selten.

— *pyrospilus* (Romagn. ex Orton) Mos. Im kurzgrasigen Rasen ungedüngter Wiesen. Südabhänge des Buchbergs; im Herbst, selten.

— *infula* (Fr.) Quel. Im kurzgrasigen Rasen ungedüngter Wiesen (Saftlingswiesen); Attergau (bei Limberg, „in der Klaus“ bei Thalham, Südabhänge des Buchbergs); häufig.

— *clandestinus* (Fr.) Quel. Bei Rotbuchen, Haseln usw., im Wald und im Gebüsch. Hausruckwald (Umgebung von Frankenburg), im Sommer und Herbst; nicht häufig.

— *viridulus* Herink. Bei Rotbuchen im Gebüsch des Waldrandes. Umgebung von Vöcklamarkt; selten.

Amanitopsis argentea Huijsman. Bei Rotbuchen, Eichen, aber auch bei Fichten, fast immer im Gras der Waldränder. Südabhänge des Buchbergs, bei Limberg usw., nicht selten. Im Sommer und Herbst.

— *umbrinolutea* Secr. Bei Fichten und Tannen über Flysch und Kalk, oft in vergrasten Wäldern und dann zusammen mit *Oxalis acetosella*; westlich von Parschallen a. A., oberhalb von Steinbach a. A.; im Sommer und Herbst; selten.

Pluteus nanus (Pers. ex Fr.) Quel. An modrigen Buchenstümpfen in schattiger Lage. Umgebung von St. Georgen i. A.; Spätsommer und Herbst, selten.

— *lutescens* (Fr.) Bres. An festen oder morschen Stümpfen verschiedener Laubhölzer (Rotbuche, Esche). Attergau (St. Georgen, Burgau), selten.

Agaricus comtulus Fr. In gedüngten Wiesen; bei Zell a. A., im Spätsommer und Herbst, selten.

Lepiota castanea Quel. Im Nadelwald auf Fichtennadelstreu, selten. Umgebung von Vöcklamarkt.

Phaeolepiota aurea (Matt. ex Fr.)R. Mre. Auf nährstoffreichen Böden, oft unter Hochstauden (z. B. *Chaerophyllum hirsutum, Petasites hybrida* etc.). Im Attergau (Park des Schlosses Kogl), im Gebiet des Hausruckwaldes (an der Redl bei Fornach); im Spätsommer und Herbst; selten.

Cystoderma granulosum (Batsch ex Fr.) Fr. Im Nadelwald auf Fichtennadelstreu: Buchberg; im Herbst, selten.

Coprinus narcoticus (Batsch ex Fr.) Fr. In einer gedüngten Wiese. Mühlreith bei Frankenmarkt; im Herbst, selten.

— *angulatus* Peck. An Holzkohlenstückchen auf einer ca. 1½ Jahre alten Feuerstelle. „In der Klaus" bei Thalham, früh im Jahr (IV, V), nicht häufig.

Psathyrella subatrata (Batsch ex Fr.) Gill. Auf angehäuftem Lehm am Rande eines Weges, zusammen mit Psathyrella velutina und Laccaria laccata; Traschwand bei Oberwang, VIII.

— *spadiceo-grisea* (Fr.) Mre. An einem morschen Buchenstumpf an der E-Seite des Dachsbergs westlich Dexelbach a. A., X—XI, nicht häufig.

Psilocybe turficola Fav. Auf nassem, torfigem Rohhumus, meistens zusammen mit Sphagnum unter Rotföhren. Gründberg bei Frankenburg, IX—X, lokal nicht selten.

Conocybe lactea (Lge.) Metr. Im Gras des Waldrandes; Ahberg bei Strass i. A., im Herbst, nicht häufig.

Panaeolina foeniseci (Pers. ex Fr.) R. Mre. Auf Grasplätzen, im Gartenland. Vöcklamarkt, Frankenburg, nicht selten.

Panaeolus acuminatus (Schff. ex Fr.) Quel. Im Gras des Waldrandes: Umgebung des Egelsees oberhalb Miesling, Kronberg bei St. Georgen i. A., im Herbst, nicht selten.

Bolbitius reticulatus (Pers. ex Fr.) Rick. An einem ca. 3—4 Jahre alten Buchenstumpf; bei Weyregg a. A. (1 Fund).

Agrocybe paludosa (Lge.) Kühn. & Romagn. In Sumpfwiesen und Flachmooren. Dienstberg bei Walsberg, „in der Klaus" bei Thalham, Gföhrat bei Gerlham usw. Vom Frühjahr bis zum Herbst, nicht selten.

Nematoloma polytrichi (Fr.) Rick. Im Moosrasen bodensaurer Wälder, fast immer zusammen mit Polytrichus formosum. Attergau (westlich Dexelbach a. A.), Hausruckwald (Hintersteining nahe Frankenburg); nicht häufig.

— *elongatipes* Peck. In mässig bis stark sauren Zwischenmooren, im Schwingrasen, meistens zwischen *Sphagnum*-Arten. Egelsee bei Miesling, Wildmoos bei Mondsee, in der „Frei" bei Eberschwang, Gründberg bei Frankenburg; in den entsprechenden Biotopen nicht selten.

Pholiota decussata (Fr.) Mos. An morschen Fichtenstümpfen in sonniger Lage. Lichtenberg, Kreuzbauernmoos bei Fornach; im Spätsommer und Herbst; selten.

— *scamba* (Fr.) Mos. An modrigen Nadelholzstümpfen in schattiger Lage. Wälder westlich von Dexelbach a. A., Tiefenbach bei Redl-Zipf; im Spätsommer und Herbst, selten.

— *lenta* (Pers. ex Fr.) Sing. An liegenden toten Ästen von Eichen, Birken usw., scheinbar dem Erdboden entspringend. Bei Alkersdorf nahe St. Georgen i. A., im Eggenberger Forst bei Walsberg, im Wald vor dem Wildmoos bei Mondsee; IX—X; nicht häufig.

— *lubrica* (Pers. ex Fr.) Sing. An Buchenästen und -zweigen, die im Fallaub versteckt liegen. Hobelsberg zwischen Frankenburg und Fornach; IX—X; nicht häufig.

Inocybe gausapata Kühn. = *I. flocculosa* ss. Lge. Bei Fichten über Flysch (westlich Dexelbach und Parschallen a. A., auf dem Mondseeberg) und Silikatschotter (z. B. bei Hintersteining und auf dem Hochlehen bei Fornach). Im Herbst und Spätherbst, nicht selten.

— *hypophaea* Furr. Bei Fichten auf schwach bis mässig saurem Lehmboden; über Flysch (an mehreren Stellen in den Wäldern am Westufer des Attersees) und Silikatschotter (Redlthal, Hausruckwald); VIII—X; nicht selten.

— *putilla* Bres. Bei Eichen über tonig-lehmigem Boden. Dienstberg bei Walsberg i. A.; im Spätsommer bis Herbst, selten.

— *umbrina* Bres. In schwach bis mittelmässig sauren Fichtenwäldern über Flysch (z. B. westlich Dexelbach a. A.) und Silikatschotter (z. B. Tiefenbach bei Redl-Zipf); im Herbst, mässig häufig.

— *acuta* Boud. = *I. umboninota* ss. Lge. In einem ca. 30jährigen Fichtenbestand auf dem Buchberggipfel (hier über Flysch), im Dienstberg bei Walsberg (über Altmoränen); im Spätsommer und Herbst, mässig häufig.

— *phaeosticta* Furr. Im Fichten-Tannenmischwald auf Lehm über Flysch) westlich Parschallen a. Attersee; im Spätsommer und Herbst, selten.

— *mixtilis* Britz. Bei Fichten und Rotbuchen, auch im Haselgebüsch; über Flysch und sauren Silikatschottern. Kronberg bei Sankt Georgen i. A.; Limberg (Attersee-Gebiet), am Rande des Gründberg-Waldes bei Frankenburg usw. Im Spätsommer und Herbst; nicht selten.

— *dulcamara* (A. & S. ex Fr.) Kumm. ssp. *squamoso-annulata* J. Fav. Auf dem etwas lehmigen Sandboden am Rande von Waldstrassen, zusammen mit *I. terrigena* und *Hebeloma versipelle:* Bergleiten und Gründberg, beide im Hausruckwald im Spätsommer und Herbst; bedeutend seltener als die Normalform.

Simocybe centuncula (Fr.) Sing. An stark modrigen Buchenstümpfen; Buchberg, selten.

Dermocybe palustris Mos. Bei Legföhren in Hoch- und Zwischenmooren, auch bei Rotföhren über Torf. Allgemein verbreitet

(Kreuzbauernmoos bei Fornach, Föhramoos bei Oberaschau, Wildmoos bei Mondsee, Hochmoore auf der Moosalm zwischen Burgau und dem Schwarzensee, um den Egelsee bei Miesling, im Gründberg bei Frankenburg usw.). An den entsprechenden Biotypen regelmässig vorhanden und vom Sommer bis in den Herbst hinein sehr häufig.

— *carpineti* Mos. Bei Rotbuchen und Hainbuchen über Flysch: Dachsberg westlich Dexelbach a. A., Südabhänge des Buchbergs, bei Stockwinkel a. A.; selten (innerhalb der letzten 25 Jahre nur wenige Funde).

— *cinnamomeoluteus* Orton. Bei Fichten (auch bei Jungfichten) über Flysch (Buchberg, bei Zell a. A. usw.) und Silikatschotter (Redlthal, Hausruckwald), VIII—X, nicht gerade selten.

Cortinarius orellanus (Fr.) Fr. Bei Rotbuchen über Flysch und Kalk: Westseite des Buchbergs, uei Unterach s. A.; selten.

— *speciosissimus* Kühn. & Romagn. In stark bodensauren Wäldern bei Fichten. Häufiger über Silikatschotter (im Hausruckwald verbreitet, z. B. auf der Stuhlleiten bei Hintersteining, im Gründberg bei Frankenburg), seltener über Altmoränen (z. B. im Eggenberger Forst) und über Flysch und hier besonders im Fichtengürtel um die Hochmoore (Wildmoos bei Mondsee, Egelsee bei Miessling); oft in den *Sphagnum*-Polstern, ab und zu auch auf modrigen Baumstümpfen. Im Sommer und Herbst, lokal nicht selten.

— *(Phleg.) fraudulosus* Britz. Bei Fichten und Rotbuchen über Flysch; Lohholz bei St. Georgen i. A., bei Traschwand nahe Oberwang; Spätsommer und Herbst, nicht häufig.

— *(Phleg.) caesiocanescens* Mos. Bei Fichten über Flysch; westlich Dexelbach und Parschallen a. A., „in der Klaus" bei Thalham usw., nicht selten.

— *(Phleg.) boudieri* R. Hry. Bei Rotbuchen und Linden über Flysch und kalkhaltigen Alluvionen; westlich Parschallen a. A., bei Aufham nahe Attersee; im Spätsommer und Herbst; sehr selten.

— *(Phleg.) spadiceus* Fr. Bei Fichten über Flysch; westlich Parschallen a. A., „in der Klaus" bei Thalham; im Sommer und Herbst (oft schon ziemlich früh), selten.

— *(Phleg.) porphyropus* Fr. Bei Eichen über Silikatschotter, jedoch im parkähnlichen Gelände auf wenig saurem Boden. Lichtenegg bei Neukirchen a. V., selten.

— *(Phleg.) fulmineus* Fr. Bei Rotbuchen über kalkhaltigen Jungmoränen. Stetthamer Holz nahe St. Georgen i. A., selten.

— *(Myx.) collinitus* Fr. Bei Fichten über sauren Silikatschottern (Litzinger Forst bei Neukirchen a. V., Hochlehen, vereinzelt auch an etwas versauerten Stellen in Nadelwäldern über Flysch (westlich Dexelbach a. A.); nicht häufig.

— *(Myx.) eburneus* (Vel.) Hry. Bei Rotbuchen über Flysch, aber auch an wenig versauerten Stellen über Silikatschotter; Spätsommer, Herbst; nicht häufig.

— *(Tel.) subferrugineus* (Batsch ex Fr.) Fr. In Buchenwäldern, oft an deren Rändern, über Flysch; im Herbst, mässig häufig: Traschwand bei Oberwang, Buchberg, Umgebung von Parschallen a. A.

— *(Tel.) scutulatus* (Fr.) Fr. Bei Fichten in Hochmooren, besonders an deren Rändern, oft zwischen Sphagnum; im Wildmoos bei Mondsee an mehreren Stellen. Im Spätsommer und Herbst, nicht häufig.

— *(Tel.) bibulus* Quel. Bei Erlen (Alnus glutinosus) auf feuchtem Boden, meist im Schatten. Wildmoos bei Mondsee (hier im Vorgelände des Hochmoores); Hausruckwald bei Eberschwang; im Herbst, selten.

— *(Tel.) crassifolius* (Vel.) Kühn. & Romagn. Im bodensauren Nadelwald, besonders bei Fichten; Hausruckwald, z. B. bei Ottokönigen nahe Frankenburg, bei Redlthal; im Spätsommer und Herbst; nicht häufig.

— *(Tel.) flexipes* Fr. Bei Fichten (besonders Jungfichten) und Birken über Flysch, Jung- und Altmoränen, westlich Dexelbach a. A., Dienstberg bei Walsberg usw.; im Herbst und Spätherbst, mässig häufig.

— *(Tel.) hoeftii* Weinm. ap. Fr. Bei Rotbuchen, besonders auf Mineralboden; Buchberg, an mehreren Stellen. IX—X, mässig häufig.

— *(Tel.) fuscoperonatus* Kühn. Bei Fichten über Kalk; Lassergraben bei Burgau a. A.; VIII. 1965, anscheinend sehr selten.

— *(Tel.) fagetorum* (Mos.) Mos. Im Moosbewuchs (Hypnum cupressiforme) an den Stämmen alter Buchen: Aufham bei Attersee, Ahberg bei Strass usw. IX—X (XI), mässig häufig.

— *(Tel.) fulvescens* Fr. Bei Fichten im bodensauren Nadelwald, besonders an feuchten Stellen im Fichtengürtel um die Moore; Egelsee bei Miesling, Umgebung des Wildmooses bei Mondsee. Spätsommer bis Herbst, auch lokal nur mässig häufig.

— *(Tel.) praesigiosus* (Fr.) Mos. Bei Jungfichten auf Lehm über Silikatschotter; bei Eberschwang (Hausruckwald); X. 1967, selten.

— *(Tel.) atrocaeruleus* (Mos.) Mos. Bei Fichten in mässig bis stark bodensaurem Nadelwald über Flysch und Silikatschotter. Tiefenbach bei Redl-Zipf, Buchberg bei Attersee; im Herbst, selten.

— *(Tel.) viridipes* Mos. Im schwach bodensauren Nadelwald über Flysch (z. B. auf dem Buchberg, iuf dem Rossmoos), ab und zu auch an modrigen Nadelholzstümpfen; im Herbst und Spätherbst; selten.

— *(Tel.) duracinus* Fr. var. *raphanicus* Mos. Im Fichtenwald über Flysch; Kronberg bei St. Georgen i. A., nur 1 Fundstelle. IX.

Gymnopilus microsporus Sing. Auf stark modrigen Nadelholzstümpfen: Hausruckwald (z. B. bei Redlthal), Attergau (westlich

Dexelbach; Leonsberg bei Wissenbach a. A., Kronberg); im Spätsommer und Herbst; mässig häufig.

— *subsphaerosporus* (Joss.) Kühn & Romagn. Auf stark modrigen Nadelholzstümpfen (Fichte, Tanne) in schattiger Lage; an einigen Stellen in den Wäldern westlich von Parschallen a. A., auf dem Höferlberg bei Schörfling a. A.; im Sommer und Frühherbst, selten.

Galerina calyptrata Orton. Auf stark modrigen Nadelholzstümpfen in schattiger oder wenigstens halbschattiger Lage, meistens in den Moosrasen von *Georgia pellucida, Dicranodontium denudatum* und *Hypnum cupressiforme,* aber auch zwischen *Leucobryum;* allgemein verbreitet (Attergau, Hausruckwald) und überall häufig. Vom Frühjahr bis in den Herbst.

— *pseudobadipes* Joss. An stark modrigen Nadelholzstümpfen in schattiger Lage. Allgemein verbreitet (Hausruckwald, Attergau), aber nirgends häufig und in manchen Jahren ganz ausbleibend. Vom Sommer bis in den Herbst.

Russula violeipes Quel. Bei Rotbuchen und Eichen über kalkfreiem Lehm; in den boden sauren Wäldern des Hausruck (z. B. auf dem Hobelsberg, dem Hörndl, im Redlthal) verbreitet, aber nicht häufig und in manchen Jahren ganz ausbleibend. Im Sommer.

— *mairei* Sing. In Buchenwäldern über Flysch, Moränen und alluvialen Aufschüttungen (Aufham bei Attersee, Buchberg, bei Dexelbach) sowie über Silikatschotter (Hobelsberg und Hörndl zwischen Frankenburg und Fornach); im Spätsommer und Herbst, häufig.

— *fragrans* Romagn. Bei Tannen über Flysch: auf dem Hollerberg bei Unterach in einem etwas verkrauteten Altholz; bei Traschwand nahe Oberwang, westlich Parschallen a. A.; im Spätsommer und Herbst, nur mässig häufig.

— *illota* Romagn. Bei Eichen und Rotbuchen über Flysch (Buchberg, Traschwand) und Silikatschotter (Fornach); verbreitet, aber bedeutend seltener als die ebenfalls an Laubhölzer gebundene R. foetens. Im Spätsommer und Herbst.

— *lepidicolor* Romagn. Rei Rotbuchen auf Lehmboden; bisher nur 1 Fund am Südabhang des Buchbergs. XI. 1968.

— *atropurpurea* Krbh. Bei Eichen über Silikatschotter im parkähnlichem Bestand; Lichtenegg bei Neukirchen a. V., im Spätsommer und Frühherbst.

— *pectinata* (Bull.) Fr. ss. Ck. Bei Eichen im Gras der Waldränder und in parkähnlichen Beständen an wenig versauerten Stellen, aber bisher nur über Silikatschotter beobachtet. Lichtenegg bei Neukirchen a. V., Umgebung von Frankenburg; im Spätsommer und Herbst, nicht häufig.

— *pulchella* Borscow = *R. depallens* (Pers.) Schaeff.) Bei Birken im Gras über etwas kalkhaltigen Jungmoränen. Aufham bei Attersee, selten.

Lactarius piperatus (L. ex Fr.) S. F. Gray = *L. glaucescens* Crossl. Bei Eichen auf tonig-lehmigem Boden über Altmoränen an einer etwas versauerten Stelle; Dienstberg bei Walsberg i. A., im Hochsommer; selten.

— *fuliginosus* Fr. Bei Eichen über kalkarmen Lehmböden; Dienstberg bei Walchen i. A., im Spätsommer und Herbst, nicht häufig.

— *repraesentaneus* Britz. Im bodensauren Fichtenwald über Silikatschottern; Hausruckwald, z. B. bei Ottokönigen, weiters zwischen Redlthal und Waldzell; im Sommer und Herbst, selten.

Additions to the Fungi of Raipur (Mathya Pradesh)-I*

By S. R. Chowdhury

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(With 2 figs.)

Efforts are afoot in Madhya Pradesh (India) to make a systematic collection and description of parasitic and saprophytic fungi of various groups occurring on wild as well as cultivated plants. A series of papers have been published (a few listed under reference) by the author to accomplish such studies at Raipur (M. P.).

The present paper — the first contribution of a new series — adds ten more species to the fungus flora of Raipur, of which a few are new species, others new to India and some familiar ones occur on new hosts.

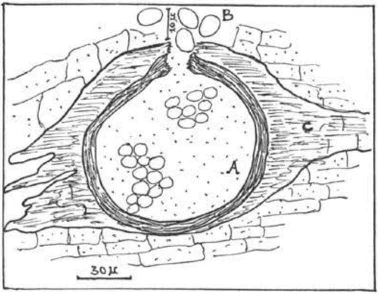

Fig. 1. *Protomyces najadis* Chowdhury. — A) Chlamydospore — B) Endospores — C) Surrounding, dark gal-tissues

1. **Protomyces najadis** Chowdhury sp. nov.

On the living leaves of *Najas graminea* Del. (Najadaceae), Dudadhari, December '65, leg. K. S. Ú n n i.

*) The paper was read in the 37th. annual session of the National Academy of Sciences, India, held at Ahmedabad (Gujrat) from 1st. to 4th. February, 1968. The research is financed by the University Grants Commission, New Delhi.

Symptoms of the disease: the disease starts with the appearance of minute dots on both the surfaces of leaves, involving the stem and leaf-sheaths as well. The dots get elongated into dark-brown to blackish-brown streaks; rendering the affected tissues necrotic, and extending along the length of the affected organs it gets converted ultimately into ill-defined, slightly upraised isolated galls, enclosed by dead dark-brown tissues. The chief veins are also traversed.

The causal organism: galls only on leaves and stems, upto 2 $\times$ 0.5 mm. in dimensions, brown to dark-brown in colour, elongated along the length of the organ, with dark-brown periphery at maturity, with rounded or pointed ends, slightly raised, light-brown when young; mycelial hyphae scanty or becoming evanescent, hyaline, with granulated protoplasm, uniformely wide, at times showing swellings, upto 2 μ wide, long slander thread-like or sometimes as thin, broken fragments dispersed in the gall, septate, branching sparse; Chlamydospores single, globose, 17 to 160 μ, average 120 μ in diam. or oval, 100—192 $\times$ 79—144 μ, average 154 $\times$ 97 μ, walls golden-brown, upto 15 μ thick, protoplasm highly dense and granular when young converting into spores at maturity; endospores non-motile, hyaline, of varying shaphes, thin-walled, 4.6—10.6 μ, average 7 μ when spherical or globose, 6.2—11.2 $\times$ 3.7—6.2 μ, average 8.2 $\times$ 5.2 μ when ovòid (Fig. 1).

So far no *Protomyces* has been described on any species belonging to Najadaceae nor it seems to match any of the recorded species of *Protomyces*. It is, therefore, being described here as a new species.

Protomyces najadis Chowdhury sp. nov.

Gallae solum in foliis et caulibus insidentes, usque ad 2 $\times$ 0.5 mm dimensione, colore brunneo ad fusco (atro-brunneo), secus longitudinem organ elongatae, finibus rotundatis aut acutis, leviter prominentes, pallidae-brunneae in juventute, fusca peripheria in maturitate; hyphae myceliales angustae aut evanescentes, hyalinae, protoplasmate granulato, uniformiter latae, interdum praebentes tumores, usque ad 2 μ latae, longae graciles, filiformes aut interdum quam rupta fragmenta tenua disperata in galla, septatae, sparsim ramificantes; chlamydosporae singulares, globosae, 17—160 μ, plus minusve 120 μ diametro, aut ovales 100—192 $\times$ 79—144 μ, plus minusve 154—97 μ, parietes aureobrunneae, usque ad 15 μ crassae, protoplasma maxime densum et granulatum in juventute, convertens ad sporae in maturitate; endosporae nonmobiles, hyalinae, forma variante, pariete tenui, 4.6—10.6 μ, plus minusve 7 μ si sphaericae, aut globosae, 6.2—11.2 $\times$ 3.7—6.2 μ, plus minusve 2.2—5.2 μ si ovoideae.

Super foliis et caulibus viventibus plantae *Najas graminea* Del., Dudadhari, Decembro '65, legit K. S. Ú n n i.

Holotypus depositus est in Herb. I. M. I. sub numero 118102.

2. *Colletotrichum capsici* (Syd.) Butl. & Bisby, in The

fungi of India, Imp. Coun. Agri. res., India, Sci. Monog. 1, *18:* 237, 1931.

(a) On leaves of *Jatropha glandulifera* Roxb. (Euphorbiaceae), College garden, December '66, leg. S. R. Chowdhury.

(b) On living stems of *Basella alba* L. (Chenopodiaceae), Katora Talab, December '66, leg. S. R. Chowdhury.

Symptoms of the disease: (a) on the leaves of *Jatropha glandulifera* discoloured specks first appear on upper surface later becoming muddy-brown delimited by brown margin followed by yellowish zone. At maturity spots attain ash-colour dotted with black fruiting bodies. Spots coalesce but midrib is untraversed.

b) on green stems of *Basella alba* discoloured streaks appear first which extend linearly aquiring ash-colour at maturity dotted by small black fructifications. The stems and leaves dry premature losing chlorophyll and are thus devalued economically.

The causal organism: acervuli dark-brown, confluent, superficial, upto 150 μ in width; setae brown, simple septate, scattered; conidia hyaline, single celled, falcate, 10.6—20 × 2—2.5 μ, average 15 × 2.3 μ.

Colletotrichum capsici has been found to parasitise on various host plants. Chowdhury (1966) reported it on leaves of Caladium sp. from Raipur. *Jatropha glandulifera* and *Basella alba* are new host records for the fungus. The specimens have been deposited in the Herb. I. M. I., Nos. 125191 a & 125196 a respectively.

3. *Glomerella cingulata* (Stonem.) Spauld. & Schr., in Syll. Fung. *XVII*, 573, 1905.

(a) On living leaves of *Artabotrys odoratissimus* Br. (Anonaceae)

(b) On living leaves of *Jatropha glandulifera* Roxb. (Euphorbiaceae), College garden, December '66, leg. S. R. Chowdhury,

(c) On living stems of *Basella alba* L. (Chenodiaceae), Katora Talab, December '66, leg. S. R. Chowdhury.

Symptoms of the disease: (a) discoloured patches appear on the leaves of *Artabotrys odoratissimus* first, which spreading irregularly attain muddy-brown central area with minute black dot-like fructifications enclosed by distinct thick blackish-brown halo, followed by yellow zone, spots coalesce rarely while midrib remains untraversed.

(b) on leaves of *Jatropha glandulifera,* water-soaked spots become muddy-brown with small black acervuli surrounded by irregular brown margin at the maturity.

(c) on *Basella alba* stems the initial light-brown patches turn into ash-colour at maturity bounded by irregular dark-brown, upraised halo. Usually lesions are elongated which coalesce.

The causal organism: acervuli dark-brown, discoid, setose, 90—160 μ wide with setae dark-brown, septate, erect; conidiophores hyaline, simple; conidia single-celled, hyaline, elliptical to ellipsoid-cylindrical with rounded ends, straight, 7.8—15.7 × 2.6—4 μ, average 12.6 × 3 μ.

Only the imperfect stage viz *Colletotrichum gloeosporioides* Penz. was present.

Chowdhury (1967) and Hasija (1963) have recorded this fungus on the leaves of *Plumeria acutifolia* and *Citrus medica* respectively.

Artabotrys odoratissimus, Jatropha glandulifera and *Basella alba* are new host records.

The specimens have been deposited in the Herb. I. M. I., Nos. 125186, 125191 b and 125196 b respectively.

4. *Alternaria tenuissima* (Nees) Wiltshire, in Trans. Brit. mycol. soc. *18:* 157, 1933.

(a) on inflorescence of *Sorghum vulgare* Pers., Ganj area, December '66, leg. Chowdhury.

(b) on leaves of *Tagetes* sp. (Compositae), Katono Talab, December 1966, leg. Chowdhury.

(c) on leaves of *Curcuma longa* L. (Zingiberaceae), Rampura, November 1966, leg. Chowdhury & Diwan.

Symptoms of the disease: (a) on the fruit-walls and glumes dark-brown powdery mass deposits. The grains get infected and remain undeveloped. The pedicels and peduncles are not affected.

(b) discoloured specks on leaves of *Tagetes sp.* get necrotic, at length converting into ash-coloured dotted spots which freely coalesce. The involucre and other floral parts are also attacked which ultimately, along with the leaves, are completely blighted.

(c) spots on leaves of *Curcuma longa* arise as small colourless structures, later becoming brownish bounded by brown, irregular margins. The fructifications appear as small black dots on both surfaces. Under severe conditions of the attack leaves turn brown and dry up.

The causal organism: conidiophores brown, single or in clusters septate, geniculate, simple or branched, amphigenous, 40—157 $\times$ 4—6 μ, average 130 $\times$ 4.5 μ; conidia brown, muriform, beaded, with 6—8 transverse and 4 longitudinal septa, 36—84 $\times$ 8—16 μ, average 57 $\times$ 14 μ.

Alternaria tenuissima has been reported by Chowdhury (1967) on leaves of *Cajanus indicus* from Raipur. *Sorghum vulgare, Tagetes sp.* and *Curcuma longa* are new host records for the fungus.

The specimens have been deposited in the Herb. I. M. I., Nos. 125189 a, 125192 b and 125194 respectively.

5. *Nigrospora sphaerica* (Sacc.) Mason, in Sacc. *XXII*, 1490 as *Epicoccum hyalopes* Miyake, 1913; in Trans. Brit. mycol. soc. *12;* 152, 1927.

On inflorescences of *Sorghum vulgare* Pers. (Graminae), Ganj area, December 1966, leg. Chowdhury.

The fungus was found associated with *Alternaria tenuissima,* described under serial No. 4.

The causal organism: conidiophores arise as lateral branches of the hyphae, sub-hyaline, with swollen jar-like terminal cells bearing solitary conidia, upto 3.8 μ in width; conidia spherical to sub-globose, dark brown to black, epispore smooth, 10.5—17.6 μ in diam., average 14 μ.

Nigrospora sphaerica was reported by Chowdhury (1967) on leaves of *Cajanus indicus* from Raipur *Sorghun vulgare* is a new host record for the fungus.

6. **Cladosporium sorghi** Chowdhury sp. nov.

On living inflorescences of *Sorghum vulgare* Pers. (Gramineae), Ganj area, December 1966, leg. S. R. Chowdhury.

Symptoms of the disease: disease first appears as dark-brown powdery mass deposited on the inflorescence giving false appearance of smuts. The whole of the ear gets ultimately blackened, crumpled and grains are not set in. The disease is confined to the floral parts.

The causal organism: conidiophores erect, unbranched, septate, with geniculations, usually in fascicles, with broader base, upto 158 × 5.2 μ in dimensions; conidia borne at the tips of the conidiophores in short chains, oval-elliptic to somewhat cylindrical, brown, one to two-celled, at times 4-celled, epispore smooth, 6.5—10.5 × 2.6—5.2 μ, average 7.9 × 3.7 μ (Fig. 2).

So far none of the species of *Cladosporium* has been reported to occur on any species of *Sorghum*. Moreover, this species of fungus does not seem to match with any of the recorded ones. Hence, it is being described here as a new species.

Conidiophora erecta, inramosa, septata, cum geniculationibus, vulgo in fasciculis, base latiore, usque ad 158 × 5.2 μ dimensiones; conidia portata ad apices conidiophorarum in catenis brevibus, ovalia-elliptica vel eliquentum cylindrica, brunnea, uni- vel bicellularia, nonnumquam tetracellularia, episporium laeve, 6.5—10.5 × 2.6—5.2 μ, plus minusve 7.9 × 3.7 μ.

Super viventibus inflorentiis plantae *Sorghum vulgare* Pers., Ganj regione, India, Decembero 1966, leg. S. R. Chowdhury.

Holotypus depositus est in Herb. I. M. I., No. 125190.

7. *Cercospora curcumae* Govindu & Thirum., in Sydowia *10:* 275, 1956.

On living leaves of *Curcuma longa* L. (Zingiberaceae), November 1966, Rampura, leg. Chowdhury.

Symptoms of the disease: the disease appears as small brown to blackish spots surrounded by irregular boundary. The affected tissues dry up. The spots coalesce.

The causal organism: stroma upto 45 μ in diam., amphigenous; conidiophores olivaceous-brown, rarely branched, septate, in fascicles, geniculate, 100—200 × 3—5.5 μ, average 155—4.5 μ; conidia hyaline, cylindric, septate, tapering toward tip, truncate at the base, 52—184 × 2—4 μ, average 134 × 2.8 μ.

Cercospora curcumae was first recorded by Govindu & Thirum. (1956) from Bangalore. This is the first record from the state of Madhya Pradesh. The specimen has been deposited in the Herb. I. M. I., No. 125195.

8. *Curvularia verruculosa* Tandon & Bilgrami, in Curr. Sci. *31*, 6: 254, 1962.

On inflorescences of *Sorghum vulgare* Pers. (Graminae), Ganj area, December 1966, leg. Chowdhury

Symptoms of the disease: on the inflorescence stalk and inside the grains blackish brown granular powdery mass appears which partly spoils the grains as they are covered with the mycelia and the fructifications of the fungus.

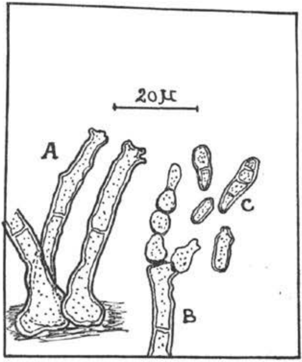

Fig. 2. *Cladosporium sorghi* Chowdhury — A) Conidiophores — B) Catenate conidia attached to conidiophore — C) Conidia

The causal organism: conidiophores light-brown, simple or rarely branched, geniculate usually near the tips, upto $142 \times 4.7\ \mu$ in dimensions; conidia straight or curved or fusiform, brown, 3-septate, not constricted at the septa, third cell from base larger and darker than others, basal cell hyaline, epispore verruculose, $21—26 \times 7—19\ \mu$, average $24 \times 12\ \mu$.

Curvularia verruculosa was first described by Tandon & Bilgrami (1962) on leaves of *Typha* sp. *Sorghum vulgare* is a new host record for the fungus and is also a first report from the state of Madhya Pradesh. The specimen has been deposited in the Herb. I. M. I., No. 125188.

9. *Cochliobolus lunatus* Nelson & Haasis, in Bull. Jard. Bot. Buitenz. 3 Ser. *13* (1) : 127, 1933.

On living leaves of *Curcuma longa* L. (Zingiberaceae), Rampura, December 1966, leg. Chowdhury & Diwan.

Symptoms of the disease: the disease starts as discoloured patches first on the upper surface of the leaves; later spreading irregularly aquires ash-coloured central region enclosed by brown margin. The lesions later freely coalesce and more than half of the lamina gets necrotic losing chlorophyll from margin and tip of the leaf inward.

Causal oroanism: stroma dark-brown, upto 250 μ in dimensions; conidiophores brown, amphigenous, septate, in fasciles, 110—171 × 5.2—6.6 μ, average 132 × 5.8 μ; conidia brown, straight or curved, smooth, 3-septate, third cell from the base larger and darker than others, end cells sub-hyaline, 26.3—36.8 × 10.5—15.8 μ, average 32.3 × 12.6 μ.

Only conidial stages of the fungus *Cochliobolus lunatus* was met with. *Curcuma longa* is a new host record for the fungus. The specimen has been deposited in the Herb. I. M. I., No. 125193.

10. *Pucciniopsis guaranitica* Speg., in Fungi guaranitici Pug. *2*, n. 202, p. 72, 1888.

On living leaves of *Cordyline sp.*, College garden, September 1966, leg. Chowdhury.

Symptoms of the disease: spots arise as discoloured irregular specks, which widely spread up having pale-brown central region surrounded by dark-brown margin on the spots, appearing as concentric, black, granular patches. Spots coalesce traversing the midrib.

The causal organism: sporodochia brown, cushion-like, spreading; conidiophores dark, septate, simple, compact, 23.7—29 × 7.9—10.5 μ, average 25.2 × 9.4 μ; conidia absent.

The specimen was examined by Dr. Ellis, who reported the fructifications of the fungus resembling those of *Pucciniopsis guaranitica* Speg., which is a new fungus record for India. The specimen has been deposited in the Herb. I. M. I., No. 123387.

Acknowledgements

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Tryblidiella rufula in artificial Culture[1]

By B. N. Muthappa[2])

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(With plate)

Introduction

In studies of collections of *Tryblidiella rufula* on diverse host substrate Muthappa (1967) discussed the taxonomic position of this fungus. In the same collections a pycnidial fungus belonging to *Haplosporella* was observed in association with the developing ascocarps. Seshadri (1967) reported an association of *Haplosporella* pycnidium with ascocarps of *T. rufula* but without proof of their relationship.

Earlier, Shear (1933) and Voorhees (1939) reported the development in culture of *Diplodia*-like conidia in association with microconidia of unknown origin produced in pycnidia followed by the production of an ascigerous stage typical of *Tryblidiella*. Baumeister (1957) on the other hand reported the development of a phoma-type of pycnidial locules in cultures of *Eutryblidiella hysterina*. Occurrence and association of species of *Haplosporella* and *Diplodia* were not uncommon in hosts naturally infected by *T. rufula*.

It was thus clear that no definite information was available on the conidial status of *Tryblidiella rufula* as the results so far reported were widely variable and often conflicting. It was, therefore, decided to undertake cultural studies to determine the conidial status of this fungus, if any.

Materials and Methods

Fresh ascocarps of *T. rufula* growing on dead branches of *Citrus sinensis* Osbeck., were softened under water. A dilute suspension of ascospores was obtained in blanks of sterile water, 10 ml of which was poured on 2% water agar in petri plates. The ascospores germinated in less than 24 hours (Fig. 1). Single germinating ascospores were marked out under microscope, lifted, and planted in fresh plates containing various media. Mono-ascospore cultures thus obtained were grown on the following media in petri plates of uniform diameter with uniform

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1) Part of the thesis submitted by the author for Ph. D. degree of the University of Poona, India, 1967.

2) Present address: Central Coffee Research Institute, Coffee Research Station P. O. Chikmaglur Dist. India.

quantity of the medium. The various media employed in this study were (1) potato dextrose agar, (2) potato dextrose agar with bark extract, (3) potato agar, (4) dextrose agar, (5) cornmealagar, (6) M_2 agar : NaCl — 20 grams, yeast extract — 10 g, glycerine — 12 ml, glucose — 10 g, KH_2PO_4 — 0.1 g, $MgSO_4$ — 0.12 g, $FeSO_4 7H_2O$ — trace, $CuSO_4$ — trace, $CaSO_4$ — 0.5 g, bacto-agar — 50 g, distilled water — 2000 ml.

The mono-ascospore cultures of this fungus made good growth on all of the media used except potato agar and dextrose agar. PDA, cornmeal agar and M_2 agar supported good growth as well as sporulation. M_2 agar was found to be particularly favorable for the development of pycnidia and ascocarps probably because of the B-complex vitamin contents of this medium in the form of yeast extract.

Formation of Pycnidia

Submerged formation of pycnidia was obtained in all the six media used, at the end of ten days, pycnidial development was, particularly, profuse along the margins of the colony. In M_2 agar, however, pycnidia developed uniformly throughout the medium (Fig. 2). Sections of such pycnidia revealed, under the microscope, production of profuse conidiophores lining the entire wall layer (Fig. 3). Pycnidia measured 160—220 × 128—192 μ. Conidiophores were 7.2—12.6 × 1.8 μ. Microconidia were hyaline, round to oval, thin-walled and borne on simple as well as branched conidiophores in wall layers (Fig. 4). Repeated attemps to germinate these microconidia failed indicating that the microconidial locules were in the nature of spermogonia. Periodic observations of these cultures for a period of over two months did not reveal the development of any conidial stages.

Ascigerous Stage

Of the six different media employed in these experiments the production of well developed ascocarp of *T. rufula* was obtained in cornmeal agar and M_2 agar at the end of sixty days under laboratory conditions. The ascocarps produced mature ascospores characteristic of the original fungus. The production of ascocarps was, however, scanty in these media as compared to the microconidial locules. The mature ascocarps, asci and ascospores produced in culture were, however, smaller than those obtained from the host as could be seen from the following table.

Comparative dimensions of Tryblidiella rufula obtained from host and artificial culture

Substrate	Ascocarp	Asci	Ascospores
1. Host	1—2 × 0.5—1 mm	126—150 × 10—12 μ	25—28.5 × 9—10.5 μ
2. Culture	0.75—1 × 0.5	120—140 × 10 μ	20—24 × 8—8.5 μ

Except for the smaller dimensions of ascocarps, asci and ascospores obtained in culture the other characters such as shape, color and septation of ascospores, bitunicate nature of asci, discoid form of ascocarps and numerous pseudoparaphyses were typical of the original fungus on host.

Discussion

T. rufula was successfully grown in single ascospore cultures accompanied by the production of microconidial locules containing microconidia in young cultures followed by the development of well developed ascigerous stage of the fungus. Production of conidia of *Diplodia* sp. was not observed as reported earlier by Shear (1933) in *T. hysterina* and Voorhees (1939) in *T. rufula* and *T. fusca*. The constant association of *Haplosporella* with *T. rufula* under natural conditions as observed by Seshadry (1967) appears to be of an accidental nature without any specific genetic relationship. The occurrence of microconidial locules in culture is suggestive of spermatisation as a possible mode of sexual reproduction in this fungus. The production of ascigerous stage in single ascospore cultures proves this fungus to be homothallic.

Summary

Tryblidiella rufula was successfully grown in single ascospore cultures with the production of microconidial locules followed by the development of mature ascocarps typical of the fungus. No conidial stage was obtained in culture. The fungus is homothallic.

Acknowledgements

I wish to express my gratitude to Professor M. N. Kamat for his valuable advice and guidance during the period of this research, and also to Dr. E. S. Luttrell, University of Georgia, Athens, Georgia, for critically reading this manuscript.

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Explanation of Plate

Fig. 1. Germinating ascospores. — Fig. 2. Mature asci and ascospores in culture. — Fig. 3. Cross section of a pycnidium in culture: A = pycnidium, B = conidiophores, C = conidia.

Ascomycetes of Coorrg (India)-VII

By K. H. Anahosur

M. A. C. S. Research Institute, Poona — 4 (India)

With 5 Fig. in the text

This is the 7th contribution from this Laboratory in the series and presents an account of five species of Ascomycetes collected by the writer in the forests of Coorg, Mysore State, India, which are considered new to science on the basis of critical and comparative studies and host relationship.

The type materials of the above fungi are deposited at M. A. C. S. Herbarium, Herb. Orientalis, New Delhi and C. M. I., Kew, England.

1. **Gnomonia grewiae** sp. nov. Anahosur (**Fig. 1**).

Maculae ellipticae vel orbiculares, plerumque marginales, solitariae, obscure brunneae, 2—3 mm diam.; perithecia epiphylla, innata, aggregata, globosa 190—220 $\times$ 100—125 μ, ostiolo elongato cylindraceo, periphysibus numerosis ornato plus minusve prominulo, 140—160 μ longo,

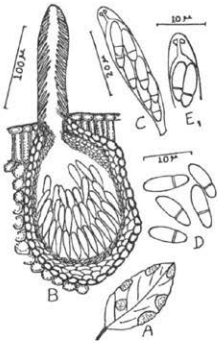

Fig. 1. Gnomonia grewiae. — A. Habit. — B. Section through the perithecium. — C. Asci. — D. Ascospores. — E. Apical apparatus

20—32 μ crasso; asci clavati, subsessiles vel brevissime stipitati, tenuiter tunicati, 8-spori, 42—50 × 8—10 μ, aparaphysati; sporae plus minusve distichae, oblongae, hyalinae, inaequaliter biloculares, antice vix vel parum, postice distincte attenuatae, rectae, raro inaequilaterae, 8—10 × 2—4 μ.

Infection spots ellipsoid to spherical, mostly marginal, isolated, dark brown, 2—3 mm. Perithecia dark brown, epiphyllous, innate, aggregated, globose to spherical, with a long beak projecting outside the host, 190—220 × 100—125 μ. Beak cylindrical, ostiolate, periphysate, 140—160 × 28—32 μ. Asci clavate, pedicellate, gelatinizing at maturity, with apical apparatus (Canal & Pore), unitunicate, octosporous, in basal layers, 42—50 × 8—10 μ. Ascospores oblong, hyaline, unequally 2-celled, rounded at the tip, biseriate 8—10 × 2—4 μ. Paraphyses lacking, ostiolar periphyses abundant.

Incites necrotic spots on the living leaves of *Grewia pilosa*, collected by Anahosur, K. H. at Coorg, India on 27. 2. 1968, M. A. C. S. Herb. No. 619 (type).

The Coorg fungus is collected on an unreported host and therefore merits a new taxon on the basis of morphology, dimensions and host relationship.

2. **Irene indica** sp. nov. Anahosur (Fig. 2).

Plagulae hypophyllae, densiuscule dispersae, aterrimae, 1.5—3.4 mm diam.; mycelium ex hyphis obscure brunneis, septatis, 5—7 μ crassis compositum; hyphopodia capitata bilocularia, alternata vel irregulariter disposita, 14—18 × 10—16 μ; perithecia crassiuscule tunicata, omnino clausa 110—135 μ diam., setis obscure brunneis, septatis, superne attenuatis, usque ad 100 μ longis praedita; asci oblongo-ellipsoidei vel oblongo-ovoidei, tenuiter tunicati, 2—3-spori, subsessiles vel brevissime stipitati, 60—72 × 31.4—41.4 μ; sporae ellipsoideae, obscure brunneae, 4-septatae, ad septa plus minusve constrictae, 44—46 × 10—16 μ.

Colonies black, dense, hypophyllous, scattered, 1.5—3.4 mm. Mycelium dark-brown, septate, superficial, hyphopodiate, 5—7 μ diam. Hyphopodia capitate, 2-celled, dark-brown, alternate to irregular, 14—18 × 10—16 μ. Perithecia superficial, setose, dark brown, thick-walled, non-ostiolate, 110—135 μ diam. Setae dark-brown, septate, tapering at the tip, upto 100 μ long. Asci clavato-cylindrical, in the wall layers, hyaline, unitunicate 2 to 3 spored, pedicellate, 60—72 × 31.4—41.4 μ. Ascospores elliptical, 5-celled, dark-brown, thick-walled, highly constricted, arranged irregularly, 44—46 × 10—16 μ. Paraphyses and periphyses abundant, filiform, hyaline.

Parasitic on the leaves of *Amoora rohituka* W. & A. collected by Anahosur, K. H. at Coorg (India) on 17-10-1967. M. A. C. S. Herb. No. 620 (type).

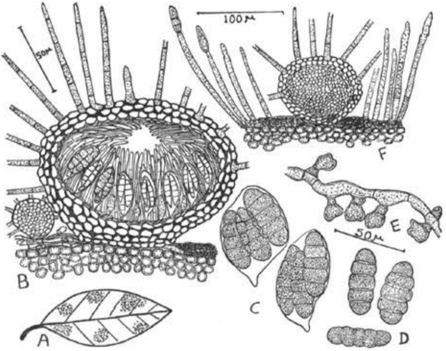

Fig. 2. Irene indica. — A. Habit. — B. Section through the perithecium. — C. Asci. — D. Ascopores. — E. Hyphopodia. — F. Association of conidial fungus (*Exosporium tiliae*) with perithecium

The Coorg collection has reported on a new host and host family and is therefore described as a new species. This genus is a new generic record to Indian fungi.

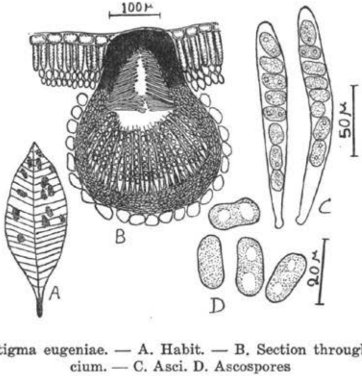

Fig. 3. Polystigma eugeniae. — A. Habit. — B. Section through the perithecium. — C. Asci. D. Ascospores

3. **Polystigma eugeniae** sp. nov. Anahosur (Fig. 3).

Perithecia solitaria, innata, pallide colorata, ostiolata, clypeo bene evoluto tecta, globosa, 250—300 μ diam., asci clavati, stipitati, 8-spori, crassiuscule tunicati, 160—180 × 16—18; sporae monostichae, oblongo-ellipsoideae vel breviter et crasse cylindraceae, continuae, hyalinae, medio interdum leniter contractae, oleoso-guttulatae, 16—20 × 8—10 μ; paraphyses et periphyses filiformes, numerosae.

Perithecia light coloured, separate, innate, ostiolate with a highly developed clypeus, globose, 250—300 μ diam. Asci clavate, pedicellate, in basal layers, octosporous, hyaline, thick-walled, 160—180 × 16—18 μ. Ascospores cylindrical, 1-celled, hyaline, slight constriction in the centre, with oil globules, uniseriate 16—20 × 8—10 μ. Paraphyses and periphyses, filiform, slender, hyaline abundant.

Parasitic on the leaves of *Eugenia jambolana* Lam. collected by Anahosur, K. H. at Coorg, India on 7-2-1967, M. A. C. S. Herb. No. 621 (type).

It is clear that the Coorg collection differs from the type in all respects having perithecia with well developed clypeus and much bigger asci and ascospores besides being collected on an unreported host, on the basis of which it is decribed as a new species.

4. **Rosselinia punicae** sp. nov. Anahosur (Fig. 4).

Stromata nigra, erumpentia, globosa, aggregata, 0.6 — 1.2 × 0.6—0.8 mm; perithecia 1—2 in quoque stromate, globosa, ostiolata, 316—411.8 μ diam.; asci cylindracei, tenuiter tunicati, breviter stipitati, 8-spori, antice rotundati, leniter incrassati, 120.8—151.4 × 8—10 μ; sporae monostichae, ellipsoideae vel lenticulares, continuae, obscure brunneae, linea longitudinali hyalina praeditae, 16—18 × 6—9 μ; paraphyses et periphyses numerosae, filiformes.

Stroma black, erumpent, globose, aggregated, 0.6—1.2 × 0.6—0.8 mm. Perithecia globose to spherical, 1—2 in each stroma, ostiolate black, 316—411.8 μ diam. Asci clavate, unitunicate, pedicellate, in wall-layers, octosporous, apex thickened, with apical apparatus, 120.8—151.4 × 8—10 μ. Ascospores ellipsoidal to lenticular, dark brown, with a longitudinal hyaline streak, 1-celled, uniseriate 16—18 × 6—9 μ. Paraphyses and periphyses abundant, filiform, hyaline.

Saprophytic on the twigs of *Punica granatum*, collected by Anahosur, K. H. at Coorg, India on 17-10-67. M. A. C. S. Herb. No. 622 (type).

As no species of *Rosseliana* have been reported on *Punica granatum*, the Coorg fungus was compared to the type and found to be distinct in respect of stroma, perithecia & asci besides being collected on a hitherto unreported host, on the basis of which it is offered as a new species.

5. **Xylaria azadirachtae** sp. nov. Anahosur. (Fig, 5).

Stroma obscure brunneum, globosum, longiuscule stipitatum, 1.1—2 mm diam.; stipite obscure brunneo, simplici, flexuoso, chordaeformi, 20—40 × 0.2—0.4 mm; perithecia globosa, ostiolata, in stromate peripherice ordinata, 350—460 μ diam.; asci cylindracei, tenuiter tunicati, breviter stipitati, 8-spori, 160—200 × 5—6 μ; sporae monostichae,

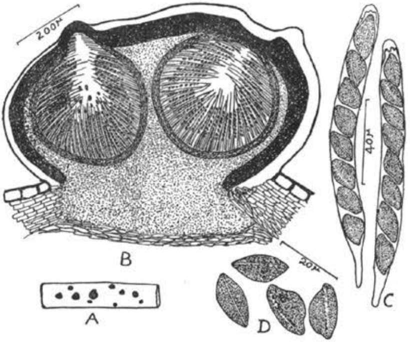

Fig. 4. *Rossellinia punicae*. — A. Habit. — B. Section through the stroma. — C. Asci. — D. Ascospores

obscure brunneae, continuae, guttula oleosa, majuscula praeditae, late fusoideae, utrinque plus minusve attenuatae, rectae vel inaequilaterae, 16—18 × 4—6 μ, episporio crassiusculo; paraphyses et periphyses numerosae, tenuiter filiformes.

Stroma dark-brown, spherical to capitate, bourne singly at the tip of stipes, 1.1—2.0 mm. diam. Stipe dark brown, simple, flexuous, cordlike, 20—40 × 0,2—0.4 mm. Perithecia globose, ostiolate, arranged along the periphery of the stroma 350—460 μ diam. Asci cylindrical, pedicellate in wall-layers, octosporous, unitunicate, papillate, 160—200 × 5—6 μ. Ascospores dark-brown, 1-celled, thick-walled, with a prominent oil globule, fusoid to inequilaterally ellipsoid, obliquely uniseriate, 16—18 × 4—6 μ, paraphyses and periphyses abundant, filiform, hyaline, slender.

Sapophytic on the seeds of *Azadirachta indica* collected by Anahosur, K. H. at Coorg, India on 18-10-67. M. A. C. S. Herb. No. 623 (type).

The Coorg fungus is significantly distinct in having small stromatic heads produced singly over long cord-like stipes, much bigger perithecia, asci and ascospores and needs accommodation in a new Taxon.

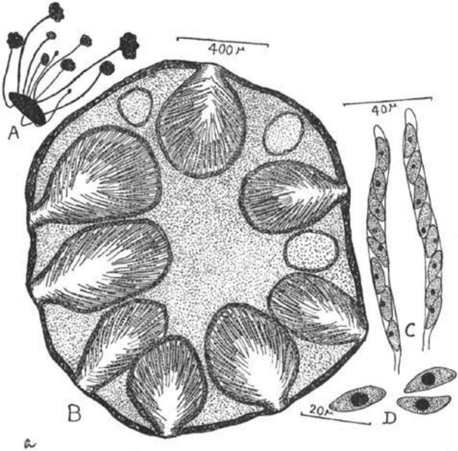

Fig. 5. Xyl~~o~~aria azadirachtae. — A. Habit. — B. Section trough the stroma. — C. Asci. — D. Ascospores

Acknowledgements

My sincere thanks are offered to Prof. M. N. Kamat for his keen interest and valuable guidance. The writer is thankful to Dr. F. Petrak for Latin rendering and to Dr. Pirozynski formerly of C. M. I. Kew, England, for helpful suggestions on the identity of the fungi.

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Some note-worthy Ascomycetes from Maharashtra, India

By K. H. Anahosur

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This paper presents an account of 4 new species and 3 new host records of Ascomycetes collected by the writer in the vicinity of Poona (India).

1. **Bagnisiella acaciae** sp. nov. Anahosur (Fig. 1).

Stromata subepidermalia, mox erumpentia, denique quasi superficialia nigra, elongata, rectangularia, interdum orbicularia, multiloculata, inferne sterilia, pseudoparenchymatica, 1—1.5 × 1—1.2 mm; loculi rectangulares, clausi, usque 8 in quoque stromate, quoad magnitudinem variabiles, 150—480 μ lati, 120—160 μ crassi; asci cylindraceo-clavati,

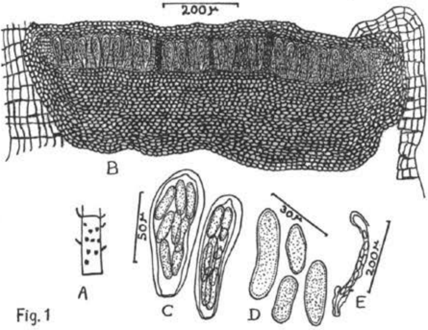

Fig. 1. Bagnisiella acaciae. — A. Habit. B. Section through the Stroma. C. Asci. D. Spores. E. Ascus dehiscenc

crasse tunicati, sessiles, apice perforati, 84—96 × 30—40 μ; sporae distichae, ellipsoideae vel breviter cylindraceae, utrinque late rotundatae, vix vel parum attenuatae, hyalinae vel subhyalinae, continuae, 28—38

$\times$ 8—12 μ, episporio crassiusculo, paraphysoides fibrosae, breviter articulatae.

Ascostromata black, elongated, subepidermal, becoming erumpent and finally completely exposed, rectangular, sometimes circular, shrunken in the centre, multioculate, upper portion fertile and lower sterile, 1—1.5 $\times$ 1—1.2 mm. Locules rectangular, nonostiolate, upto 8 in each stroma, 150—480 μ broad and 120—150 μ high. Asci cylindro-clavatis, bitunicate, sessile, with apical pore, in basal layers, parallel, 84—96 $\times$ 30—40 μ. Ascospores ellipsoid to cylindrical, thick-walled, hyaline to subhyaline, biseriate, 1-celled, 28—38 $\times$ 8—12 μ. Pseudoparaphyses and paraphyses lacking. Interthecial tissues present.

Saprophytic on the twigs of *Acacia arabica* Willd. collected by Anahosur K. H. at Poona (India) on 12-12-1967. M. A. C. S. Herb. No. 680 (type).

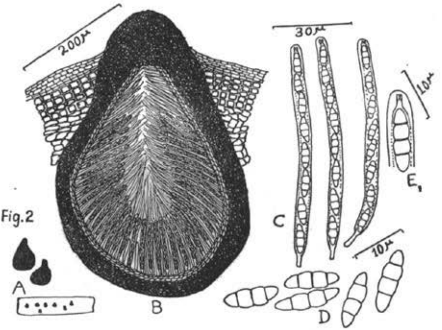

Fig. 2. Calospora lantanae. — A. Habit, B. Section through the Perithecium. C. Asci. D. Spores. E. Apical apparatus

The genus *Bagnisiella* Speg. was established by Spegazzini in 1880 with *Bagnisiella australis* as the type found on *Acacia bonariensis*. *Acacia arabica* is a new host for *Bagnisiella*.

It is quite clear that the writer's collection differs from the type in having bigger ascostroma, smaller asci and bigger ascospores and also collected on a new host and hence needs accommodation in a new taxon.

A species of *Haplosporella* Speg. with subhyaline, cylindrical to ellipsoid conidia, was found in association with this ascomycete. The cultural studies are under progress to prove their true relationship which will be published in due course.

2. **Calospora lantanae** Anahosur sp. nov. (Fig. 2).

Perithecia singularia, innata, globosa, 320—568 μ diam., 400—570 μ alta, ostiolo crasse conico, in apice late rotundato, 50—60 × 36—40 μ punctiformiter erumpentia; asci numerosi, cylindracei, breviter stipitati, crassiuscule tunicati, 8-spori, 80—96 × 4—6 μ; sporae monostichae, fusoideae, triseptatae, ad septa constrictae, hyalinae, 12—16 × 2—4 μ; paraphyses et periphyses numerosae, tenuiter filiformes.

Perithecia stromatic, separate, innate, beaked, ostiolate, globose, 320—568 μ broad and 400—570 μ high. Beak short, projecting outside the host, 50—60 × 36—40 μ. Asci cylindrical, thick-walled, pedicellate, in wall-layers, with apical apparatus, octosporous, unitunicate, paraphysate, 80—96 × 4—6 μ. Ascospores fusoid, hyaline, 3 septate, constricted at the septum, uniseriate 12—16 × 2—4 μ. Paraphyses and periphyses abundant, filiform, slender and hyaline.

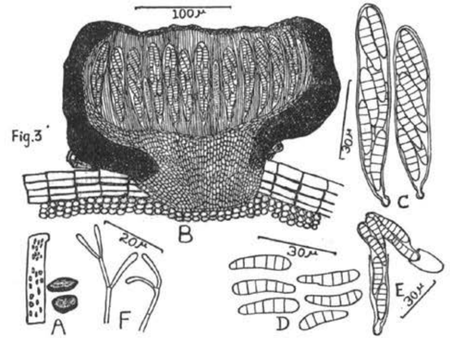

Fig. 3. Patellaria caesalpinae. — A. Habit. B. Section through the apothecium. D. Spores. E. Ascus dehiscenc

Saprophytic on the twigs of *Lantana camara* L. collected by Anahosur, K. H. at Poona (India) an 2-8-1968. M. A. C. S. Herb. No. 683 (type).

The genus *Calospora* Sacc. was established by Saccardo in 1883 with the type *Calospora platanoides* (Pers.) Niessl. The writer's collection of *Calospora* Sacc. differs from the type in having uniloculate stromata, cylindrical narrow asci and much smaller ascospores which are arranged uniseriately in the ascos besides being collected on a new host.

3. **Patellaria caesalpiniae** Anahosur sp. nov. (Fig. 3).

Apothecia aggregata, nigrescentia, erumpentia, 240—400 μ longa, 192—240 μ lata, disco cupuliformi, 320—400 μ lato, 190—240 μ alto; asci clavati, stipitati, crasse tunicati, 8-spori, 64—90 × 12—16 μ; sporae distichae, oblongae, hyalinae, 5-plerumque, 7-raro etiam 8-septatae, 20—26 × 2—4 μ; pseudoparaphyses septatae, hyalinae, superne ramulosae.

Discothecia black, with a wide cleft, aggregated, discoid, sessile, erumpent, 240—400 μ long and 192—240 μ broad. Locule cup-shaped, 320—400 μ broad and 190—240 μ high. Asci clavate, pedicellate, in basal layers, bitunicate, octosporous, 64—90 × 12—16 μ. Ascospores oblong, hyaline, 5 to 8-celled, 8-celled rare, 7-celled abundant, biseriate, 20—26 × 2—4 μ. Pseudoparaphyses branched at the tips, septate, hyaline and slender.

Saprophytic on the twigs of *Caesalpinia pulcherima*, collected by Ahanosur, K. H. at Poona (India) on 16. 7. 1968 M. A. C. S. Herb. No. 684 (type).

The writer's collection of *Patellaria* was compared with some species of *Patellaria* parasitizing the host family Leguminosae and was found to be different.

4. **Tryblidaria maharastrensis** Anahosur sp. nov. (Fig. 4).

Apothecia dispersa vel aggregata, erumpentia, nigrescentia, margine subelevato; disco subhemisphaerico, usque ad 1.2 mm diam.; asci clavati, breviter stipitati, crasse tunicati, 8-spori, 140—160 × 38—46 μ; sporae ellipsoideae vel oblongae, brunneae, muriformes, distichae, 40—50 × 8—12 μ; pseudoparaphyses numerosae, hyalinae, superne ramulosae.

Ascostromata (Discothecia) black to slightly pinkish, erumpent, scattered to aggregated, discoid, margin raised, centre bulged, uniloculate, up to 1.2 mm. diam. Asci clavate, bitunicate, pedicellate, octosporous, in basal layers, 140—160 × 38—46 μ. Ascospores ellipsoid to oblong, muriform, brown, biseriate, 40—50 × 8—12 μ. Pseudoparaphyses abundant, branched at the apex, septate, and hyaline.

Saprophytic on the twigs of *Lantana camara* L. and *Rivia* sp. collected by Anahosur, K. H. on 2. 2. 1967. M. A. C. S. Herb. No. 685 & 686 (type).

The genus *Tryblidaria* Sacc. was established by Saccardo (1889) with *Tryblidaria fenestratum* (C. & E.) Rehm as type and was revised by Rehm in 1904. As the writer has collected the fungus on a new host it was compared with the type and was found to be significantly different in morphological characters and dimensions.

T i l a k (1966) and Ramachandra R a o (1966) have described the ascocarp of this genus as an apothecium, interthecial threads as paraphyses and the remnents of stroma at the apex as epithecium. The recent investigations carried out by M u t h a p p a (1967) and S e s h a d r i & M u t h a p p a (1968) on a closely allied fungus *Tryblidiella rufula*

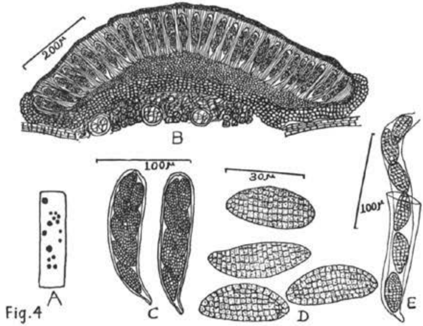

Fig. 4. Tryblidaria maharastrensis. — A. Habit. B. Section through the apothecium. C. Asci. D. Spores. E. Ascus dehiscenc

(Spreng.) Sacc. belonging to the family Patellariaceae prove very conclusively that the ascocarp in this family is in the nature of a Discothecium, as originally described by K o r f (1962) and the interthecial threads as pseudoparaphyses continuous from top to the bottom with a 'pleospora' type of development. The stroma at the apex of the ascocarp is not a true epithecium but a thin layer made up of remnents of the stromatic cells along with the tips of the pseudoparaphyses termed as epistroma by M u t h a p p a (1967).

New host records

1. *B a g n i s i e l l a a c a c i a e* Ahanosur — Host: *Glyricidia* sp. M. A. C. S. Herb. No. 681.
2. *B a g n i s i e l l a a u s t r a l i s* Speg. — Ref. Ann. Mycol. *13*: 561, 1915. M. A. C. S. Herb. No. 682. Host.: *Lantana camara* L.
3. *V a l s a c e r a t o p h o r a* Tul. — Ref: Syll. Fung. *1*: 108, 1882. M. A. C. S. Herb. No. 687. Host: *Ceasalpinia pulcherrima.*

The materials of the new species are deposited at Herb. Orientalis, New Delhi, C. M. I., Kew, England and M. A. C. S.

Acknowledgements

The writer is grateful to Prof. M. N. Kamat for his invaluable guidance and constant interest. My thanks are due to Dr. F. Petrak for Latin rendering.

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Contribution to the Taxonomy of the genus Helminthosporium II

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While studying the mycoflora of this region, the authors have isolated four members of the genus *Helminthosporium* from various sources. When these isolates were compared among themselves and with other species previously recorded they were found to be new species.

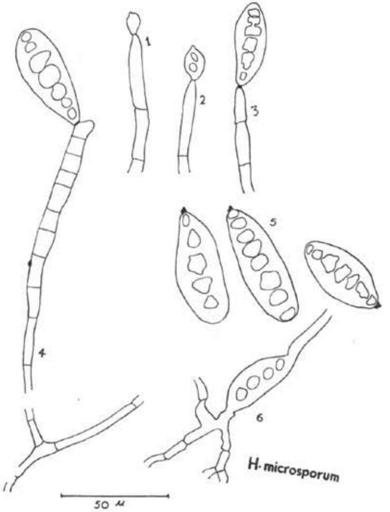

Fig. I. *H. microsporum.* 1, 2 and 3. Stages in the development of the conidium. — 4. Conidiophore with an acrogenous conidium. — 5. Mature conidia. — 6. A germinating conidium

Two of them have already been reported in an earlier communication from this laboratory (Deshpande and Deshpande 1966). The remaining two species have been described in this paper.

Material and methods

Dilution plate method was used to obtain isolate from soil. Soil samples (Black cotton soil) were plated on PDA at 1 : 1000 dilutions. The pH of the medium was adjusted to 4.5 to avoid bacterial contamination. Plates were incubated at 26 ± 3 C. When the fungus appeared along with other fungi, it was transferred to other petriplates and after obtaining pure culture it was maintained on PDA slants.

In the case of grass isolate, portions of the leaf spots on leaves of *Cynodon dactylon* Pers. were surface sterilized with alcohol-dipped cotton swab and cut into small pieces by sterilized scalpel. PDA plates were inoculated with 4—5 infected pieces each and after 24 hours' growth the colonies were lifted and inoculated into PDA slants. Cultures of fungi obtained from diseased material and from the soil were called the primary isolates and were used for describing their morphological characters.

Morpology of the species

Isolate from soil.

Colony on PDA: The fungus grew well on PDA and reached a diameter of 90 mm on 6th day. The colony was round, olivaceous with slight bluish tinge and sporulated on 5th day. Aerial mycelium was abundant and the colony had a wooly texture. *Morphology:* The vegetative hyphae were profusely branched, septate, yellow to brown, darkened with age and measured 4.6—6.9 μ in width; conidiophores lateral or terminal, narrower, paler and distantly septate at base, gradually broadened into darker, closely septate tip; the tip produced percurrent, sterile, proliferations; conidiophores were 1—16 septate and measured 234—468 × 10.8 μ; conidia were porogenous, distoseptate, borne acrogenously or rarely pleurogenously, brown, fusoid, widest at the middle, 2—7 septate, 26—41 × 22 μ; conidial germ tubes were percurrent, conidial scar a simple pore, and hilum a protuberent peglike structure (Fig. 1).

Development of the conidium

The first conidium arose as a globular protrusion through the pore at the tip of the conidiophore. This conidium initial maintained its contact with the conidiophore through this pore. A septum soon developed at about the middle of the developing conidium and successive septa were laid down. Simultaneously the point of contact darkened and the hilum in the form of peg like protrusion appeared. The conidial scar was seen as a simple pore after the abstriction of the conidium.

Already about six species have been described from soil. The present isolate was compared morphologically with them (Table 1). It is clear that the conidiophores in this isolate are never fasciculate and are the longest of all. In these two characters conidiophores differed from all species isolated from soil. Conidia also showed certain differences with those of other species in their small size and in their shape, which is fusoid with both ends roughly pointed or one bluntly hemispherical. This fungus possesses smallest conidium so far recorded for species of *Helminthosporium* from soil. In view of these differences this has been described here as a new species.

Helminthosporium microsporum Deshpande and Deshpande sp. nov.

Colony on PDA round, olivaceous with slight bluish tinge, wooly textured; aerial mycelium abundant; hyphae profusely branched, septate, yellow to brown, 4.6—6.9 μ; conidiophores lateral or terminal, narrower, pale brown and distantly septate at base, gradually broaden towards the dark, close septate tip; sometimes producing sterile proliferations through the tip, 10—16 septate, 234—468 × 10.8 μ; conidia porogenous, distoseptate, borne acrogenously or rarely pleurogenously, brown, fusoid, widest at the middle, 2—7 septate, 26—41 × 22 μ; conidial germ tubes percurrent; conidial scar a simple pore and hilum a protuberent peg like structure.

Caespites in PDA orbiculares, olivacei, lenissime coerulescentes, lanuginosi; mycelium aereum bene evolutum; hyphae profuse ramosae, septatae, luteae vel brunneae, 4.6—6.9 μ; conidiophora lateralia vel terminalia, pallide brunnea et ad basim remote septata, sursum gradatim latiora, in apice obscura, densiuscule septata, septis 10—16 praedita, 234—468 × 10.8 μ; conidia acrogena, raro pleurogena, fusoidae, 2—7-septata, 26—41 × 22 μ.

Isolate from grass leaves

This isolate was obtained from the leaves of the grass, *Cynodon dactylon* Pers. The leaves were collected in the vicinity of Millind College, Aurangabad. The spots were ashgray green with brown margin which in turn was surrounded by yellow halo. Dark brown specks with yellow halo were also present on leaves from old plants.

Colony on PDA: The fungus grew fast on PDA and attained a diameter of 85 mm on 6th day. The colony was spreading, round, olivaceous, with inconspicuous advancing white margin, and sporulated on 3rd day. Aerial growth was abundant and the colony had a wooly texture.

Morphology (Fig. 2 and 3)

The vegetative hyphae were profusely branched, septate, pale olive, darkened with age and measured 2.3—4.6 μ in width; conidiophores arose as lateral branches, usually unbranched, they were of two types; determinate conidiophores were uniform, olivaceous, 1—3 septate, mostly bearing a single terminal conidium, represented about 5% of the total number of conidiophores per microscopic field and measured $182 \times 5.2\ \mu$; Indeterminate conidiophores were 5—20 septate, narrower, paler and distantly septate at base, gradually broadened into a darker close septate tip and measured $208—520 \times 7.8\ \mu$; the conidiophores proliferated between successive conidia; the conidia were porogenous distoseptate, mostly pseudopleurogenous, at time acrogenous or pleurogenous, olivaceous, darkened at maturity, cylindrical to clavate and measured $20.8—152 \times 7.8\ \mu$; conidial germ tubes percurrent, conidial scar a simple pore and hilum a cylindrical protuberance. The conidia did not show any definite pattern of arrangement; when acrogenous, tip bore single conidium or a cluster of two or three conidia; when pseudopleurogenous, conidia were uniparous, or alternate.

Development of the conidium

The first conidium arose as a globular protoplasmic protrusion through a pore at the tip of the conidiophore; it enlarged and a septum developed at about the middle of the conidium; successive septa were soon laid down. The tip of the conidiophore elongated pushing aside the first formed conidium and other conidia were formed in a similar manner giving an appearance of pleurogenous arrangement. The point of contact at the base of the conidium darkened and a cylindrical short protuberence (hilum) developed. The conidial scar was seen as a flat ringed pore after the abstriction of the conidium.

Thirtytwo species of *Helminthosporium* have been known so far parasitizing different types of grasses. The present isolate differs from all these species in having two types of conidiophres. Species approaching the dimensions of either conidiophores or conidia of the grass isolate were compared with it (Table 2). It is clear that species with longer conidiophores (*H. siccans*, *H. triseptatum* and *H. monoceros*) differ from grass isolate in septation, size or mode of germination of conidia, whereas species attaining dimensions of conidia differ either in size of conidiophores, arrgangement of conidia or in mode of germination. Thus the comparison justifies its description as a new species and hence owing to the lack of definite pattern of conidial arrangement, it has been designated as *H. appaternae*.

H. apatternae Deshpande and Deshpande sp. nov.

Colony on PDA round, ovilaveous, spreading with white advancing margin, wooly textured; aerial mycelium abundant; hyphae profusely branched, septate, pale olive, $2.3—4.6\ \mu$; conidiophores lateral, usually unbranched, of two types; determinate conidiophores uniform, olivaceous, 1—3 septate, mostly bearing single apical conidium, 182 × 5.2 μ; indeterminante conidiophores narrower, paler and distantly septate at base, gradually broadened into a darker, close septate, tip, 208—520 × 7.8 μ; the conidiophores proliferated between successive conidia; conidia porogenous, distoseptate, conidial arrangement pseudopleurogenous, acrogenous or pleurogenous, 20.8—152.0 × 7.8 μ, 6—18 septate; conidial germ tubes percurrent, conidial scar a simple pore and hilum a cilyndrical protuberence.

Caespites in PDA olivacei, albido-marginati, lanuginosi; mycelium aereum bene evolutum; hyphae profuse ramoe, septatae, pallide olivaceae, 2.3—4.6 μ; conidiophora lateralia, plerumque simplicia, biformia:

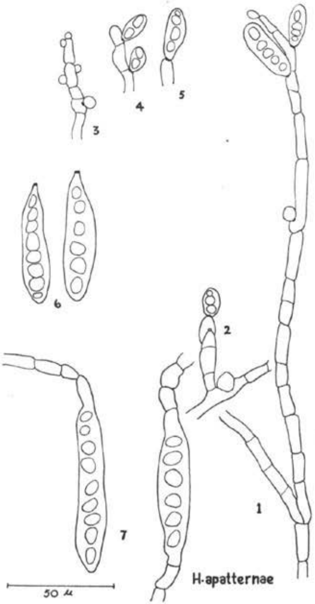

Fig. II. *H. apatternae*. 1. Indeterminante conidiophore with conidia. — 2. A determinate conidiophore with conidium. — 3, 4 and 5. Stages n the development of conidia. — 6. Mature conidia. — 7. Germinating conidia conidiophora determinata uniformia, olivacea, 1—3-septata, conidium unicum terminale gignentia, 182 $\times$ 5.2 μ; conidiophora indeterminata pallidiora, ad basim remonte septata, sursum paulatim latiora, in apice obscuriora, densiuscule septata, 208—520 $\times$ 7.8 μ; conidia pseudopleurogena, acrogena vel pleurogena, 6—18-septata, 20.8—152 $\times$ 7—8 μ.

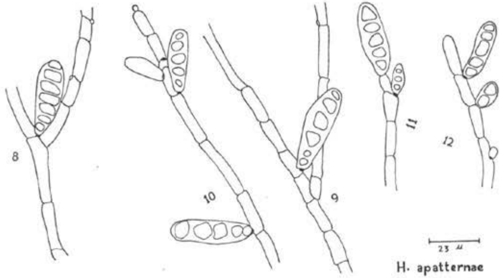

Fig. III. 8—12. Conidiophores with conidia showing different patterns of arrangement

Summary

Two new species of *Helminthosporium*, *H. microsporium* and *H. apatternae* isolated from black cotton soil and grass leaf spots respectively have been described here.

Acknowledgements

Our sincere thanks are due to Dr. F. Petrak, Austria, for kindly rendering the latin diagnosis of the species.

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Table 1

Comparison between the species of *Helminthosporum* isolated from soil

Name of the species	Conidiophores	Conidia
H. sativum PK and B.	Fasciculate, 150—180 × 6—10 μ, dark reddish brown	Straight or curved, ends rounded, olivaceous, 90—130 × 15—20 μ, 7—14 celled
H. anomalum	bent, long, brown, 105—400 μ	Elongate, straight, rounded at both ends, 5—12 septate, 40—90 × 10—15 μ
H. microsorum	—	Cylindrical
H. victoriae Meeham and Murphy	Erect, single or in clusters, olive, 6—8 septate, 60—280 × 6.8—10 μ	Dark olive, thin walled, slightly curved, 40—130 × 11—25 μ
H. microsporum	Single, Brown, proliferating through the tip. 234—468 × 10.8 μ 10—16 septate	Olivaceous to brown, tapering at both ends, widest at the middle, 26—41 × 22 μ

Table 2

Comparison between the species of *Helminthosporium* isolated from different grasses

Sr. No.	Name of the species	Host.	Conidiophores	Conidia
1.	*H. siccans* Drechs.	*Lolium multiflorum*	Olivaceous, single or in pairs, 50—300 × 7—9 μ	Yellow to brown, 35—130 × 14—20 μ, germination bipolar or lateral

Sr. No.	Name of the species	Host.	Conidiophores	Conidia
2.	*H. triseptatum* Drechs.	*Holcus lanatus*	Dark olive, single or in pairs, 200—400 × 9—12 μ	Dark olive, ellipsoidal or cylindrical, 2—3 septate, 30—50 × 15—21 μ, Germination bipolar or lateral
3.	*H. monoceros* Drechs.	*Echinochloea Crus-alli*	Dark brown or olivaceous, 120—325 × 6—9 μ	Yellowish to dark olive, 40—150 × 15—22 μ, Germination bipolar
4.	*H. Panici* Von Overeem	*Panicum maximum*	Grey brown, Single, 250 × 5—7 μ	Pale brown, acrogenous, 70—140 × 13—16 μ, Germination bipolar
5.	*H. sachhari*	*Sachharum Officinarum*	Deep gray brown, 70—200 × 5.5—7.5 μ	32—120 × 11—17 μ, 3—10 septate
6.	*H. Stenacrum*	*Agrostis stolonifera*	Dark olive, 80—250 × 7—10 μ	53—135 × 15—23 μ, Germination from any segment
7.	*H. vagans* Drechs.	*Poa pratensis*	Dark olive, branched, 50—280 × 8—10 μ	Dark olive
8.	*H. rostratum* Drechs.	*Eragrostis major*	Dark olive, Single or in groups of 3—5, 40—180 × 6—8 μ	Dark olive, rostrate, 32—184 × 14—22 μ
9.	*H. bromi* Diedicke	*Bromus inermis*	Single or clustered 100—150 × 7—10 μ	108—150 × 13—20 μ, hilum inconspicuous, Germination unipolar or lateral
10.	*H. dictyoides* Drechs.	*Festuca elatior*	Dark brown or olive, single or in groups, 70—150 × 6—8 μ	Subhyaline to yellow, 23—115 × 14—17 μ, Germination bipolar
11.	*H. turcicum* Passerini	*Eleusine indica*	In clusters of 2—6, 150—264 μ	45—132 × 15—25μ
12.	*H. cynodontis* Marignoni	*Cynodon dactylon* Pers.	80—150 × 6—7 μ	Olivaceous, 27—80 × 11—14 μ, Germination bipolar
13.	*H. apatternae*	— do —	Olivaceous, single; Determinate: 182 × 5.2; indeterminate: 208—520 × 7.8 μ	Olivaceous, cylindrical to clavate, 20.8—152 × 10.4 μ

* only those species approaching dimension of either conidiophores or conidia of *H. apatternae* are compared.

Notes on some interesting Ascomycetous Fungi from India

By C. G. Dharne and Emil Müller

(From Cryptogamic Unit, Botanical Survey of India, Calcutta (India) and Department of Special Botany, Swiss Federal Institute of Technology, Zürich (Switzerland))

With 2 figures

In the course of taxonomic studies on the ascomycetous fungi from India the authors have come across three noteworthy fungi which are not so far been reported from India. The collections described in this paper have been deposited in Central National Herbarium (Cryptogamic Unit), Botanical Survey of India, Calcutta (CAL) and in the Herbarium of Swiss Federal Institute of Technology, Zürich (ZT).

1. **Thaxteriella indica** nov. spec.

Perithecia globosa, 360—500 μ diam., brunnea vel atra, superficialia, subiculo insidentia. Subiculum ex hyphis fuscis, 6 μ crassis compositus. Asci bitunicati, longe stipitati, clavati, 270—300 × 25—30 μ. Ascosporae fusoideae, 15—20 septatae, hyalinae, demum pallide flavae, 60—100 × 9—12 μ. Paraphysoides filiformes, hyalinae.

Hab. in ramis emortuis — India: Maharasthra, Dist. Satara, Mahabeleshwar, aprillum 1965, C. G. Dharne.

The black globose ascocarps measuring 360—500 μ in diameter are immersed in a subiculum which forms thick mat on the surface of the substratum. This is formed of smooth, dark brown, thick walled hyphae, measuring 6—7 μ in diameter. The wall of the ascocarp is composed of polygonal cells; it is rather solid when young, becoming brittle at maturity. The clavate bitunicate asci, 270—300 × 25—30 μ, have long flexuous stipes and are accompanied by hyaline, filiform paraphysoids. Each contains eight elongate fusiform, 15- to 20- septate ascospores with bluntly rounded ends and range 60—100 × 9—12 μ in size. The ascospores are hyaline at first, becoming yellow at maturity.

The genus *Thaxteriella* was proposed by Petrak (1924) with *Thaxteriella corticola* as its type species. It is a rather unknown genus. The type species was reported from Central America (Vega baja, Porto Rico) but the material has been misplaced during the second world war (Petrak 1953). Petrak's (1924) diagnosis for the genus can briefly stated as: "The small black perithecia generally form larger or compact groups, superficially developped on the basal stroma or slightly embedded in it. The perithecia are completely closed but often possess smaller apical papillae which breaks open in an iregular fashion exposing the key shaped apical portion. Perithecial membrane is rather solid when young becoming brittle at maturity. The wall of the fructification is composed of dark brown parenchymatous tissue. The clavate thick walled asci have short stalks or are almost sessile. Each ascus contains eight cylindrical, slightly curved, many celled, hyaline to subhyaline ascospores. The paraphysoids are filiform and branched".

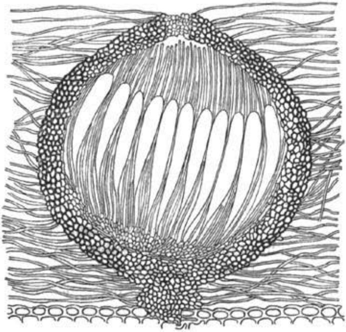

Fig. 1. Section through a perithecium of *Thaxteriella* indica 130 ×

Our material closely agrees with the above description. Some of the characters of *Thaxteriella* Petr., namely globose, black ascocarps, a subiculum formed of smooth, thick walled hyphae and bitunicate asci resemble *Herpotrichi*a Fuck. (as treated by Bose 1961). However it can be distinctly distinguished from the latter by the profuse development of the subiculum, by the sunken perithecia and the shape and septation of the ascospores. On the same basis Petrak (1953) has justly referred *Sphaeria pezizula* Berk. et Curt. to *Thaxteriella* and proposed the new combination *Thaxteriella pezizula* (Berk. et Curt) Petr. to which *Thaxteriella corticola* is synonymous.

Thaxteriella indica Dharne et Müller differs from the type species by its profusely developed subiculum and the larger size of the asci and the ascospores.

2. *Lophiotrema praemorsum* (Lasch) Sacc.

Michelia *1:* 513 (1879)

Material examined: On dead fallen twigs — India, Maharashtra, Poona, Febr. 1965, leg. C. G. Dharne.

The small dark coloured fructifications, measuring 400—500 μ which are at first sunken in the substratum, becoming superficial at maturity. The fruitbody is marked by narrow cleft. Its wall is composed of dark brown isodiametric cells. The bitunicate, stalked asci arise among numerous filiform paraphysoids. The size of the asci ranges from 80 to 95 μ in the length and from 12 to 15 μ in the thickness. The spindle

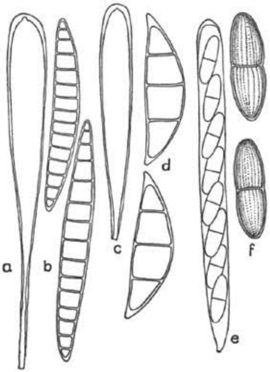

Fig. 2. *Thaxteriella indica* a) Ascus (250 ×) b) Ascospores (500 ×). *Lophiotrema praemorsum* c) Ascus (500 ×) d) Ascospores (1000 ×). *Valsaria spartii* e) Ascus (500 ×) f) Ascospores (1000 ×)

shaped, 38—45 ×1 0—12 μ hyaline ascospores with a medium septum bear hyaline appendages at each end. At maturity they become three septate.

Lophiotrema praemorsum has up to now only been reported from Europe. The Indian collection shows little variation from the European material but it has slightly larger ascospores and asci.

3. *Valsaria spartii* Maubl.

Bull. Soc. Mycol. France *21:* 88 (1905)

Material examined: Dead branches of leguminose host — India: West Bengal 24 paraganas, Diamond harbour, Jan. 1966, leg. C. G. Dharne.

The black flask shaped pseudothecia with long cylindrical necks are clustered within a pulvinate, dark stroma, imbedded in the bark. The stroma extends 1 to 6 mm across. The long cylindrical neck of the perithecium is lined all along inside with periphyses. The cylindrical, short stalked asci measure 125—160 $\times$ 10—12 μ and contain eight brown, 17—23 $\times$ 6—8 μ measuring, broadly elliptical, uniseriately arranged ascospores. These show a clear constriction at the single median septum and they are verrucose. The paraphyses are hyaline and filiform.

This fungs can hardly been separated from *Valsaria spartii* Maubl. found mostly on *Spartium junceum* L. in Southern Europe. It differs slightly in the size of ascospores and asci.

The authors are very much thankful to Dr. Rev. Father H. Santapau, Director, Botanical Survey of India, Calcutta and Dr. K. Subramanyam, Joint Director, Botanical Survey of India for giving facilities and encouragements.

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Some new Reports of Ascomycetes from Allahabad*

By Brij Rani Mehrotra

(Botany Department, University of Allahabad, Allahabad, India)

During the course of isolations of soil fungi from soil samples collected from various localities of Allahabad, rhizosphere soils and from the excreta of various animals, the author came across ten genera of Ascomycetes, viz., *Arachniotus, Carpenteles, Talaromyces, Eurotium, Sortorya, Emericella, Chaetomium, Pseudoplea, Sordaria,* and *Neocosmospora* comprising of 11 species. Out of which *Leptosphaerulina trifolii* (E. Rostr.) Petr. was recorded for the first time from India and a new variety of *Chaetomium nigricolor* Ames var. *simplex* was also isolated.

Arachniotus terrestris Raillo (Figs. 1—3, Plate I).

Colonies on Czapek's medium, and potato-dextrose agar yellowish; reserve dull yellow; mycelium delicate effuse and white. Cleistothecia globose, 135—260 μ in diameter, peridium formed of white, delicate interlacing hyphae; asci globose to oval, 13—16 μ in diameter, eight-spored; ascospores hyaline, oval, 4.5—8.9 × 3—4.8 μ.

The present species was isolated from soil, pH 8.2, of Allahabad University agricultural farm. From India it has been reported by Thirumalachar (1950) from the rhizomes of *Psilotum flaccidum*, Bangalore, (Mysore). It is being reported here for the first time from soil.

The culture has been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS—32.

Carpenteles javanicum (van Beyma) Shear.

Colonies on Czapek's solution agar, malt-extract agar, and on potato-dextrose agar white when young, later becoming grayish white with abundant perithecial structures, floccose, raised up in the centre on P. D. A.; reverse white at first, later becoming yellow from the margin of the colony. Penicilli monoverticillate, with convergent parallel chains of conidia, unbranched, green in colour; conidiophores upto 100 μ in length, 1.5—2.5 μ in diameter. Sterigmata long and thin, usually 3—4 but upto 6 in number, 6.6—13.3 × 1.65—2.5 μ in diameter. Perithecia globose to oval in shape, pseudoparenchymatous without ostiole and without appendages, 90.4—621.5 μ, average 339 μ in dia-

*) Part of author's D. Phil. Thesis, University of Allahabad, Allahabad, India.

meter; asci globose to oval, eightspored, 5.5—8.5 μ in diameter, oval mostly 10 μ in length, average 6.6 μ; ascospores oval in shape wall finely roughened, 2.2—3.6 × 2.2—2.8 μ.

The present organism resembles with the description given by Raper and Thom (1949) for *C. javanicum* van Beyma. The isolate was found from soil, pH 8, of Allahabad University agricultural farm. From India it has been reported by Dwivedi (1962) from soil; Roy and Gupta (1962) from soil of grass plots, Varanasi. It is being reported for the first time from soil, Allahabad.

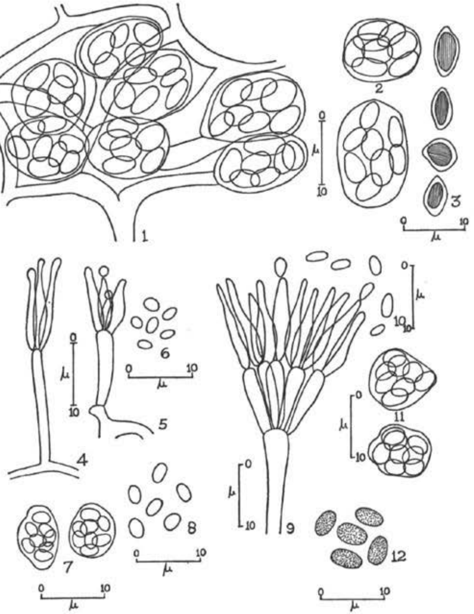

Fig. I. — 1—3 *Arachniotus terrestris* Raillo. 1. A portion of a cleistothecium with asci. 2. Asci. 3. Ascospores. — 4—8 *Carpentales javanicum* (van Beyma) Shear. 4, 5. Penicilli. 6. Conidia. 7. Asci. 8. Ascospores. — 9—12 *Talaromyces wortmannii* (Klöcker) Benjamin. 9. Penicillus. 10. Conidia. 11. Asci. 12. Ascospores

The culture has been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS 33.

Talaromyces wortmannii (Klöcker) Benjamin (Figs. 9—12, Platte I).

Colonies on Czapek's solution agar growing restrictedly, about 1.5 to 2.5 cm. in 10 days at 25° C, consisting of a tough mycelial felt, floccose, more or less zonate, and with central area showing zones of yellow mycelium and bluegreen conidial heads, colony yellow green in shades near tea green to pea green (Ridgway, Pl. XLVII); exsudate lacking; odor suggestive of mushrooms; reverse in deep orange to tawny shades (R., Pl. XV); penicilli typicalli biverticillate and symmetrical, borne on conidiophores arising primarily from the substratum, upto 200 μ × 3.3—4.4 μ smooth walled; metulae in compact verticils of 5—7, in size, 7.7—13.2 × 2—2.65 μ; sterigmata in very compact clusters, parallel, usually 5—8 in each verticil and measuring 7.7—13.2 × 1.65—2.2 μ, with the terminal portion characteristically tapered; conidia elliptical, 3.3—3.8 × 1.65—2.75 μ. Perithecia on malt-extract agar and Czapek's agar produced in limited numbers, 100—300 μ in diameter without definite walls and in crowded areas tending to merge and loose their identity, surrounded by loose mentles of heavily encrusted and strongly pigmented hyphae; asci abundantly produced throughout a loose hyphal network borne in short chains, subglobose to oval, 7.7—9.9 μ in diameter, eight spored; ascospores oval, very finely spinulate over their entire surface, mostly 4—4.7 × 3—3.3 μ, colourless.

Colonies on malt extract agar growing restrictedly but somewhat more rapidly than on Czapek, about 3—4.5 cm. in two weeks, typically consisting of a heavy development of perithecia with an admixture of conidial structures, yellow green the development of abundant conidial heads among the perithecia; conidial structures as on Czapek's medium. Perithecia varying greatly in size, commonly 100—300 μ in diameter without definite walls, other details as on Czapek's medium.

The description of this isolate closely resembles with the type description in Manual of Penicillia by Raper and Thom (1949). The fungus was isolated from soil, pH 8, of Allahabad University agricultural farm. From India it was reported by Basu (1951) from the rooting jute, Calcutta (West Bengal). Later on, Basu and Bhattacharya (1961) again reported it from Calcutta. It is being reported for the first time from Allahabad. The culture has been deposited, in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS — 34.

Eurotium amstelodami Mangin (Figs. 1—7, Plate II).

Colonies upon Czapek's solution agar (3% Sucrose) restricted, 3 to 5 cm. in diameter in two weeks at 25° C, yellow gray in colour; reverse dark brown in colour.

Conidial heads dirty green, scattered all over the colony, radiate to columnar, splitting into columns an old age mostly 100—145 μ in diameter. Conidiophores smooth, 102—360 × 6—8 μ broadening to 10—12 μ in diameter below the vesicle; vesicle subglobose, 15—25 μ in

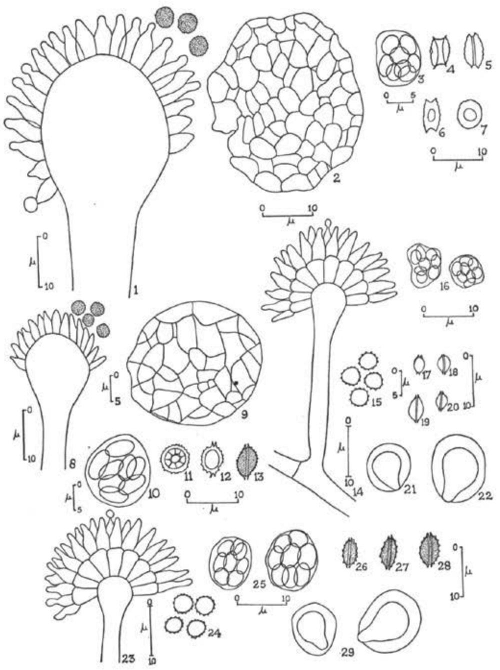

Fig. II. — 1—7 *Eurotium amstelodami* Mangin. 1. A conidial head with three conidia. 2. Young cleistothecium. 3. Ascus. 4—7. Four ascospores in various view. — 8—13 *Sartorya fumigata* Vuillemin. 8. A conidial head, with four conidia at the tip. 9. Young cleistothecium. 10. Ascus. 11—13. Three ascospores in three different views. — 14—22 *Emerciella nidulans* (Eidam) Vuill. 14. A conidial head. 15. Four conidia. 16. Asci. 17—20. Ascospores, 21, 22. Hülle cells. — 23—29. *Emericella rugulosa* (Thom and Raper) Benjamin. 23. A conidial head. 24. Conidia. 25. Asci. 26—28 Ascospores. 29. Hülle cells diameter; sterigmata in one series, 5—8.8 × 2—3.5 μ, averaging 6 × 3.2 μ; conidia green in mass, subglobose, echinulate, 3.5—4.8 μ in diameter.

Perithecia globose, 100—150 μ suspended in a net work of hyphae which are yellow in colour; asci subglobose; ascospores 10—12 μ in diam., yellowish, lenticular with deep equatorial furrow and ridges, 4.5—5.5 × 3.0—3.8 μ.

Colonies on 20% sucrose growing luxuriantly and attaining a diameter of 7 to 10 cm. in 10 to 12 days; perithecia develop on the agar surface in abundance, yellow in colour imparting the colour of the colony.

The present organism was isolated from the soil, pH 8.2, of Allahabad University agricultural farm, pH 7.2, of the Botanical garden, and the rhizosphere soil of *Daucus carota.* From India it was reported by Mohanty (1948) as a common laboratory contaminant, Mycological Laboratory, I. A. R. I., New Delhi. Later on, Agnihothrudu (1957, 1958) reported it from soil and rhizosphere of pigeon pea (*Cajanus cajan*) at Madras and Mehrotra and Agnihotri (1961) from soil, Allahabad.

The culture has been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS—35.

Sartorya fumigata Vuillemin.

Colonies growing well upon Czapek's solution agar with conidial heads sparingly produced at 25° C, but more abundantly at 37° C. Conidial heads frequently small and generally of a lighter green colour than those of typical *A. fumigatus;* sterigmata smaller, 4—6.6 × 1.65—2.2 μ; conidia also smaller than those of typical *A. fumigatus*, 2.5—3 μ in diam. Perithecia quickly and abundantly produced, 124—339 μ in diam., commonly upto 300 μ in diameter, uncoloured, with walls scarcely coloured consisting of a single layer of cells, crushing easily, covered by a loose network of uncoloured sterile hyphae; asci abundant, 8-spored, globose to sub-globose, mostly sub-globose, 8—15 × 8—11 μ, breaking down quickly to leave the perithecium full of the ripe ascospores; ascospores biconvex, uncoloured usually about 5.5 × 4.4 μ or 5.5 × 3.3 μ with two frilled equatorial bands about 1 μ, roughened with echinulations on each convex surface.

The fungus closely agrees with the description given by Thom and Raper (1945), and was isolated from soil, pH 8.2, of Allahabad University agricultural farm. It is regarded as world-wide in distribution but seemingly not abundant anywhere. From India it was reported by Agnihothrudu (1957, 1958) from soil, and rhizosphere of pigeon pea (*Cajanus cajan*), Madras. It is being reported for the first time from Allahabad.

The culture has been deposited in the Culture Collection, Botany

Department, University of Allahabad, as Culture No. AS—36.
Emericella nidulans (Eidam) Vuill.

Colonies on Czapek's solution agar growing well at room temperature attaining a diameter of 3 to 4 cm. in 10 to 12 days at 25° C, velvety, dark cress green with age. Heads short, globose, ranging from 60—70 × 30—35 μ. Conidiophores commonly sinuous, smooth-walled, with bluish tinge, 51—128 × 4.2—5.6 μ, average 70 × 4 μ. No pitting in the wall; vesicle hemispherical, 6—15.4 μ in diameter, fertile over the upper half; sterigmata in two series, primary 4.2—7 × 2.8 μ, secondary 5—7 × 2.5 μ; conidia globose, rugulose, green in mass, 2.8—3.3 μ in diameter.

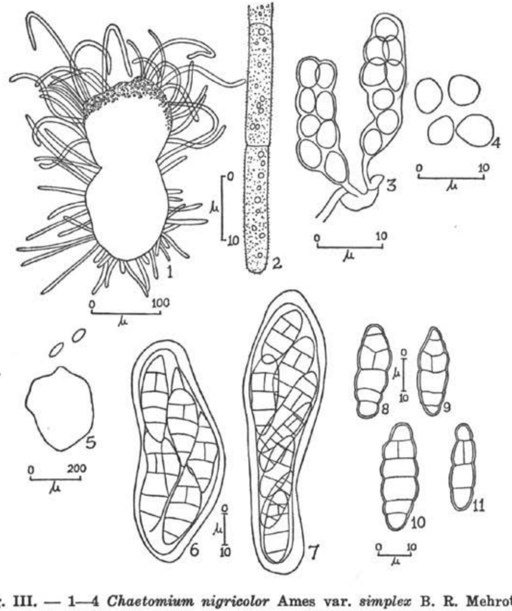

Fig. III. — 1—4 *Chaetomium nigricolor* Ames var. *simplex* B. R. Mehrotra var. nov. 1. Perithecium. Note the presence of unbranched appendages. 2. A portion of hair much magnified. 3. Two asci. 4. Ascospores. — 5—11 *Leptosphaerulina trifolii* (E. Rostr.) Petr. 5. A perithecium. 6, 7. Asci. 8. Ascospores

Perithecia abundant, dark-pink, ranging from 90—165 μ in diameter, perithecial wall many layered when young but at maturity single layered in thickness. Hülle cells globose, thick-walled usually 16—22 μ in diameter; asci globose, 7—10 μ in diameter, 8 ascospores in each ascus; ascospores purple red, lenticular, smooth-walled with two equa-

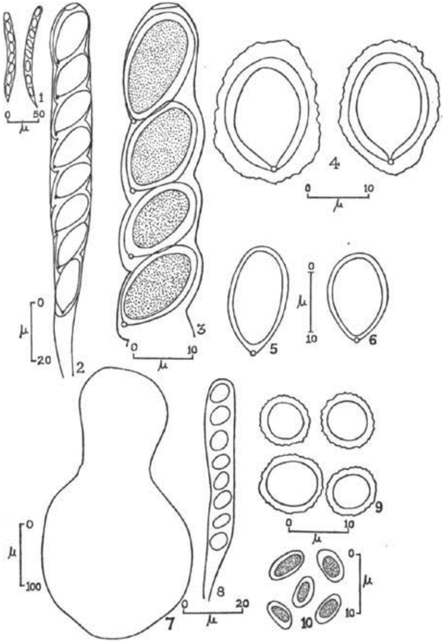

Fig. IV. — 1—6 *Sordaria fimicola* (Rob.) Ces. and De Not. 1. Two asci under low magnification. 2. An ascus slightly enlarged. 3. Upper portion of an enlarged ascus. Note the perforation at the apex. 4. Two ascospores each surrounded by a gelatinous sheath. Note the presence of a small circular germ pore at the base of each ascospore. 5, 6. Two ascospores without the gelatinous sheath (after the dissolution of gelatinous sheath). — 7—10 *Neocosmospora vasinfecta* Smith. 7. Perithecium. 8. Ascus. 9. Ascosporus. 10. Conidia torial crests, ranging 3.8—4.5 μ in length by 3.5—4 μ in breadth. Equatorial ridges two in number, 0.5—0.7 μ in diameter.

The fungus closely agrees with the description given by Thom and Raper (1945). The present organism was isolated from the rhizosphere soil of *Daucus carota, Raphanus sativus* and soil of Allahabad University agricultural farm, pH 8.2. From India it has earlier been reported by Thakur and Norris (1928), Chaudhuri and Sachar (1934), Galloway (1936), Chaudhuri and Umar (1938), Mohanty (1948), Saksena and Mehrotra (1952), Prakash and Saksena (1952), Saksena and Shetye (1956), Agnihothrudu (1957), Agnihotri (1961) and others.

The culture hes been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS—37.

Emericella rugulosa (Thom and Raper) Benjamin.

Colonies upon Czapek's solution agar growing restrictedly and attaing a diameter of 2.5—3 cm. in 8 to 10 days at 25° C. Conidial heads green, short, columnar, 70—100 × 30—40 μ. Conidiophores sinuous, smooth-walled with brownish tinge 50—102 μ long 4.2—5.6 μ in width, gradually enlarging toward the vesicle, 8—10 μ in diameter; sterigmata in two series, primary sterigmata 7—8 × 3—3.5 μ, secondary 6—7 × 2.5—3.4 μ; conidia green in mass, rugulose, 3—4 μ in diameter.

Perithecia in abundance, brown in colour, becoming purple-gray to purple-brown with age, globose, 208—374 μ in diameter, full of asci; asci 10—12.6 μ in long axis; ascospores purple-red, wall rugulose, lenticular, 4.2—5.6 × 3.5—4.2 μ and with two pleated equatorial crests.

The present species was isolated from soil, pH 8, of Allahabad University agricultural farm, and from the rhizosphere soil of *Trigonella foenum-graecum*, and *Raphanus savitus*.

In India this species was reported for the first time by Galloway (1936). He reported that *A. nidulans* has both rough and smooth walled ascospores. His culture having rough walled ascospores was probably *A. rugulosus* which was not recognised then as a separate species. Thom and Raper (1945) have treated it as a separate species distinct from *A. nidulans* (Eidam) Wint. Mohanty (1948) reported it as an air contaminant; Agnihothrudu (1958, 1961) from rhizosphere of pigeon pea (*Cajanus cajan*) in Madras and tea in Cinnamara (Assam) and Agnihotri (1961) from soils in Allahabad.

The culture has been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS—38.

Chaetomium nigricolor Ames var. **simplex** B. R. Mehrotra var. nov.

Perithecia globosa vel subglobosa, 79.1—271 × 79—203 μ; setae laterales rectae vel undulatae, regulariter septatae, 2.2—4.4 μ, inferne 3—5 μ crasae, atro-brunneae, superne pallidiores; setae terminales numerosae, nigrescentes, prominentiis minutissimis, subinde etiam majoribus, nigrescentibus irregulariter obtectae, undulatae vel spiraliter curvulae nec ramulosae; asci clavati, 8-spori, 16.8—25 $\times$ 5.2—8.8 μ; sporae brunneae, late obovoideae, inferne distincte apiculatae, 5.5—6.6 $\times$ 4.4—5 μ.

Perithecia globose to subglobose, 79.1—271 $\times$ 79—203 μ; lateral hairs straight or undulate, regularly septate, 2.2—4.4 μ in diameter, and 3—5 μ in diameter at the base, rounded, blackish brown with faded tips; terminal hairs numerous, black, irregularly and thickly covered with little black projections, with larger crystals or projections appearing at random, undulating or with occasional spirally unbranched coils; asci clavate, eight spored. 16.5—25 $\times$ 5.3—8.8 μ; ascospores brown, broadly obovate, slightly apiculate at one end, 5.5—6.6 $\times$ 4.4—5 μ.

The present organism was isolated from soil, pH 8, of Allahabad University agricultural farm, and the culture has been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS—39.

This isolate resembles largely with *Chaetomium nigricolor* Ames, a species isolated in India and reported by Ames in 1950. However, the appendages in *Chaetomium nigricolor* have been described to be frequently branched while in this isolate they have been seen to be unbranched. During the course of three years this culture has been kept under frequent examination. Dr. Grover who had kindly examined this isolate in 1961, has been of the opinion that it resembles *Chaetomium nigricolor* Ames. In view of the fact the appandages have remained unbranched during those three years on the different media it seems appropriate to give this isolate a new varietal name to distinguish it from the species which has frequently branched appendages.

Leptosphaerulina trifolii (E. Restr.) Petr.

Hyphae 7—13 μ thick and has irregular angles, olive brown in colour. Perithecia black, long, papillate, 219—400 $\times$ 131.4—189.8 μ; asci 2—5, broad, ellipsoidal, sometimes globular, thick walled, 70.5—100 $\times$ 28—38.5 μ, containing 8 rarely 6 ascospores in each ascus, ascospores more or less long, spindle shaped, some ellipsoidal, dark honey-yellow in colour, thick-walled, with 3—5 transverse septa and one longitudinal septum in between the 1st and the 3rd transverse septa, i. e., in the second transverse cell of the ascospore, 28—35.5 $\times$ 9.9—14 μ.

The present species was isolated from the rhizosphere soil of *Trigonella foenum-graecum*, Allahabad.

This is being reported for the first time from India.

The culture has been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS—40.

Sordaria fimicola (Rob.) Ces. & De Not.

Perithecia bare, strongly narrowed upward into the conical neck, 325—919.5 × 259—357 μ, average 660 × 259 μ; asci 8-spored, cylindrical, perforate at the apex, spore part 35.6—147 (stalk 56.6 μ × 11.5—17.5 μ; no paraphyses; ascospores obliquely uniseriate, 19—22 × 10—15 μ, elliptical, with a small circular germpore at the base, surrounded by a distinct gelatinous sheath.

The present organism was isolated from horse dung. From India this species was reported for the first time by Agnihothrudu (1961) from rhizsphere of tea (*Camellia sinensis*) Cinnamara, Assam. It is being reported for the first time from Allahabad.

The culture has been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. SA—41.

Neocosmospora vasinfecta Smith (Figs. 7—10).

Colonies on P. D. A. and Czapek's solution agar flocculent, white. Perithecia at first ocraceous-buff, antimony yellow to red, flask shaped, 250—350 × 200—300 μ but generally less than 300 μ in breadth. Wall pseudoparenchymatous. Neck upto 80 μ in length and 30 μ in breadth; asci nearly cylindrical, eight-spored 60—100 × 7.4—15 μ, spore part dissolve as to liberate the spores within the perithecium when over ripe. Eight ascospores in each ascus, arranged in, one row globose to oval, viewed in surface focus the wall appears pitted, surface wrinkled; ascospores mostly globose but oval ones also not rare 7—10 μ, at first hyaline, becoming brown, mostly 10 μ in diameter. Conidia (Cephalosporium stage) oval to elliptical, 5.2—10 × 2—4 μ.

The present organism was isolated from soil, pH 8, of Allahabad University agricultural farm. From India, it has been reported by Butler (1910, 1911 and 1918) from roots of several plants: *Cajanus indica*, Pusa (Bihar), Coimbatore (Madras); *Crotolaria juncea*, Pusa (Bihar) and Samalkota (Madras); *Cyamopsis psoroloides*, Pusa (Bihar); *Dolichos biflorus*, Pusa (Bihar); *D. lablab*, Pusa (Bihar); *Gossypium* sp. Nagpur (M. P.); *Indigofera arrecta* and *I. sumatrana*, Pusa (Bihar); *Saccharum officinarum*, Pusa (Bihar); Saksena and Mehrotra (1952) from soil, Allahabad; Agnihothrudu (1958, 1961), from rhizospheres of pigeon pea (*Cajanus cajan*) Madras and tea (*Camellia sinensis*), Assam.

The culture has been deposited in the Culture Collection, Botany Department, University of Allahabad, as Culture No. AS—42.

Acknowledgements

Thanks are due to Dr. B. S. Mehrotra for guidance and help in the preparation of this paper, to Dr. R. N. Tandon for providing the laboratory facilities, and also to Dr. F. Petrak for the Latin diagnosis of the new variety.

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* Originals not seen.

An interesting new Species of Syncephalis from India

By B. S. Mehrotra and R. Prasad
Botany Department, University of Allahabad, India

Figs. 1—32

Fourteen species of *Syncephalis* have so far been reported from India, mostly from this laboratory (Mehrotra, 1959; Mehrotra and Prasad, 1967; Mehrotra and Prasad, 1967; the present species has some outstanding features not yet reported in any species of the genus. One of them is that the merosporangial fundaments are not of uniform size, they may form a single conidium, 2 conidia or upto 5 conidia in a chain. The conidiophores are of two size range, the smaller ones usually sinuate and vary from 60—180 μ in length, the longer ones erect and range 160—375 μ in length. The most astonishing thing is that the conidia germinate most readily even while they are attached at the apex of the conidiophore. It may also be noted that this species is the only one we have found in nature to parasitise a species of *Cunninghamella*, others were mostly found to parasitise *Mucor spp.* and rarely a species of *Mortierella*. The species is named *S. vivipera* because of the viviparous nature of the conidia.

Sincephalis vivipara sp. nov.

Hyphae vegetae tenuissimae, hyalinae, numerosae, rhizoideis male evolutis matricis hyphas penetrantes vel ambientes; conidiophora plerumque simplicia, raro etiam subramulosa, pallide lutea, brevia, interdum parum longiora; conidiophora breviora ad basim curvula, 60—180 μ longa, inferne 6—13.5 μ, superne 2.2—4.5 μ lata, longiora recta, tenuiter tunicata, 160—375 μ longa, in apice subito in vesiculam subglobosam vel obovoideam, 5.2—12 × 7.5—13.5 μ vel 10—19.5 × 10.5—21 μ dilatata; initia merosporangialia 22.5—45 × 2.2—3.2 μ, plerumque 20—40 μ in superiore dimidio vesiculae dispersa vel in annulo disposita, quoad forman in quaque vesicula variabilia, breviora conidium unum, longiora 3—5 conidia catenata gerentia; conidia tenuiter tunicata, levia, pallide lutea, in cumulo ochracea, cylindracea, oblongo-ovoidea, raro reniformia, 6—12 × 2.2—3.2 μ; germinatio bipolaris; zygosporae ignotae.

Fungus growing luxuriantly as a parasite on *Cunninghamella sp.*, vegetative hyphae thin delicate, colourless and forming numerous, poorly developed rhizoids either penetrating or encircling the host hyphae; conidiophores developing above the rhizoids, rarely parasitising each other, mostly simple, occasionally showing a tendency to branch, light yellow, small, sometimes a bit longer also; smaller conidiophores sinuate near base, 60—180 μ in length, 6.0—13.5 μ broad near base and 2.2—4.5 μ near apex, longer conidiophores straight, thin walled 160—375 μ in length; tip of conidiophores finally enlarging into a subglobose to obconical vesicle, vesicles of smaller conidiophores 5.2—12 × 7.5—13.5 μ while that of longer conidiophores 10.0—19.5 × 10.5—21 μ; merosporangial fundaments 22.5—45.0 × 2.2—3.3 μ, mostly 20—40 in number, developing directly either in a ring or scattered over the upper half of visicle, variable in size over the same vesicle, smallest forming a single conidium only, some fragmenting into 2 conidia and others forming 3—5 conidia in a chain; often the longer conidiophores having conidial chains with 3—5 conidia; conidia 6—12 × 2.2—3.2 μ, thin and smooth walled, light yellow to ochraceous in mass, cylindrical oblong-oval to somewhat kidney-shaped, immersed under water drops at maturity, conidia germinating even while attached to the vesicle, germination bipolar. Zygospores not seen.

Type: M—41, deposited in BSM Culture Collection, Botany Department, University of Allahabad. A culture of the same will also be deposited at CBS, Baarn, Holland.

Isolated from the soil, pH 7.0 of Sarnath (India).

Acknowledgements

Thanks are due to Dr. F. Petrak for the Latin diagnosis of the new species.

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Legends

Figs. 1—20: *Syncephalis vivipara* (camera lucida drawings).

1—6: Developmental stages of a short conidiophore, × 580. 7: A mature short and sinuate conidiophore, × 580. 8—9: Vesicles of short conidiophores with wart like projections arranged in a ring and scattered over its upper half showing the attached of conidia, × 1450. 10: A young long and erect conidiophore, × 580. 11—12: Young and mature heads of a long conidiophore,

× 1450. 13—14: Mode of conidial germination over the vesicle, × 1450. 15: A young conidiophore parasiting another conidiophore, × 145. 16: Short conidiophore with unequal merosporangial fundaments over its vesicle, × 1450. 17: An old head of a long conidiophore with warts scattered and few attached conidia, × 1450. 18: A mature merosporangial fundament with five conidia in a chain, × 1450. 19: Conidia, × 1450. 20: Stages in germination of conidia, × 1450.

Figs. 21—32: *Syncephalis vivipara* (photomicrographs).

21—22: Young and mature short conidiophores with merosporangial fundaments arranged in a ring, × 640. 23: Upper portion of a long conidiophore with merosporangial fundaments arranged over the upper half of vesicle, × 640. 24: An old short conidiophore with vesicle showing minute warts where chains of conidia were attached, × 640. 25: Three smallest merosporangial fundaments, each forming a single conidium over the vesicle, × 1600. 26: Unequal merosporangial fundaments over the vesicle, × 1600. 27: Conidia germinating while attached to the vesicle, × 1600. 28: Tip of a conidiophore showing tendency of branching and germinating conidia, × 1600. 29—30. Stages in the germination of conidia, × 1600. 31: A mature merosporangial fundament with 4 conidia in a chain, × 1600. 32: Development of a conidiophore above the rhizoid, × 640.

Some Fungi-Imperfecti from Maharashtra

By P. G. Patwardhan & A. K. Pande

M. A. C. S. — Poona — 4 — India

In course of their survey for the fungi of Maharashtra the writers collected several fungi Imperfecti. Critical survey of the literature and comparative studies revealed the 7 species to be new to Science.

1) **Robillarda matheranensis** sp. nov.

Infection spots irregular in outline, dark brown, necrotic. Pycnidia brown black in necrotic spots, subepidermal to deeply embedded, lenticular to globose, ostiolate; 64—160 × 144—320 μ. Conidiophores simple, hyaline; 14—18 μ. Conidia 2-celled, hyaline, cylindrical with 3—4 hyaline setae at one end; 14.8—18.5 × 3.7 μ.

Maculae irregulares, obscure brunneae; pycnidia atrobrunnea, subepidermalia vel profunde immersa, lenticularia vel globosa, ostiolata, 64—160 × 144—320 μ; conidiophora simplicia, hyalina, 14—18 μ; conidia bilocularia, hyalina, cylindracea, setis 3—4 hyalinis praedita, 14.8—18.5 × 3.7 μ.

On living leaves of *Randia dumetorum*, Lam. (Rubiaceae) collected by P. G. Patwardhan at Matheran on 26th Sept., 65, M. A. C. S. Myco. Herb. No. 289.

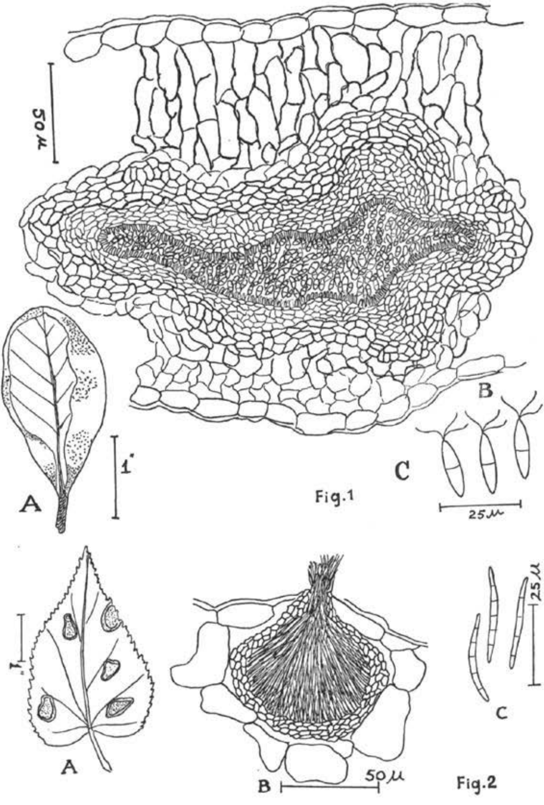
Remarks: So far only 4 species of this rare fungus — *Robillarda* — have been described from India.

2) **Septoria peucedani** sp. nov.

Spots amphigenous, necrotic with brown to black margin, circular to irregular. Pycnidia dark, separate, amphigenous, globose, subepidermal to erumpent ostiolate; 70—85 × 63—97 μ. Conidiophores short hyaline. Conidia narrowly elongate to filiforum, straight or slightly curved, multiseptate, hyaline to olivaceous in colour; 18—29.5 × 3.4 μ.

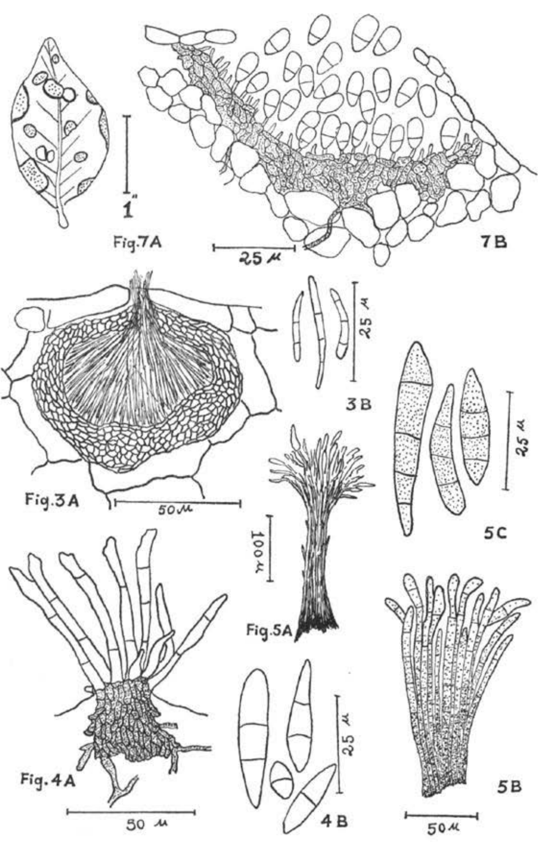
Maculae amphigenae, orbiculares vel irregulares, obscure brunneo — vel atro-marginatae; pycnidia amphigena, obscura, globosa, ostiolata, 70—85 × 62—97 μ; conidiophora brevia, hyalina, conidia filiformia recta vel leniter curvula, multiseptata, hyalina vel olivacea, 18—29.5 × 3.4 μ.

On living leaves of *Peucedanum grande*, Clke. (Umbelliferae) collected by P. G. Patwardhan at Purandar on 16th Sept., 64, M. A. C. S. Myco. Herb. No. 290.



3) **Septoria singhagadensis** sp. nov.

Infection spots small yellow, scattered, amphigenous. Pycnidia dark, separate, globose, subepidermal ostiolate; 37—74 × 26—63 μ. Conidiophores short hyaline. Conidia filiform, slightly curved, hyaline, 3—4 septate; 19—33 × 3.7 μ.



Maculae dispersae, amphigenae, parvae, luteolae; pycnidia obscura, globosa, subepidermalia, ostiolata, 27—74 × 26—69 μ; conidiophora brevia, hyalina; conidia filiformia, leniter curvula, hyalina, 2—4septata, 19—33 × 3.7 μ.

On living leaves of *Polygala persicarifolia,* DC. (Polygalaceae) collected by P. G. Patwardhan at Sinhagad on 13th August, 65, M. A. C. S. Myco. Herb. No. 291.

The present species is characterised by the presence ob abundant, scattered pycnidia on the lower surface of leaves without showing distinct infection spots.

4) **Ramularia khandalensis** sp. nov.

Infection typically causing leaf spots, mostly hypogenous. Stroma dark brown many celled; 7—26 μ. Conidiophores emerging through the stomata in fascicles hyaline, simple, septate, geniculate; 37—103 × 7.4 μ. Conidia, hyaline, cylindrical to spindle shaped, 1—2 septate with distinct basal scar; 11—40 × 7.4—11 μ.

Maculae plerumque hypophyllae; hypostroma brunneum, pseudoparenchymaticum, 7—26 μ diam.; conidiophora fasciculata, hyalina, simplicia, geniculata, 37—103 × 7.4 μ; conidia cylindracea vel subfusoidea, 1—2-septata, hyalina, postice distincte truncata, 11—40 × 7.4—11 μ.

On living leaves of *Vitis glauca* (Ampelidaceae) collected by P. G. Patwardhan at Khandala on 6th Oct., 1965, M. A. C. S. Myco. Herb. No. 292.

5) **Dendrographium calycoptericola** sp. nov.

Infection spots hypophyllous, small & brown in colour. Synnemata erect, straight, separate or crowded, each having a distinct cylindrical stalk, a swollen base and expanded apical head composed of radiating free conidiophores. Stalk composed of closely aggregated, simple, dark brown, septate parallel hyphae 230—272 × 32—48 μ. Conidiophores are free ends of the hyphae of the synnema, brown in colour, septate. Conidia cylindrical to oblong, mostly 3 septate, pale brown in colour; 29.6—51.8 μ long and 7.4—11.1 μ wide.

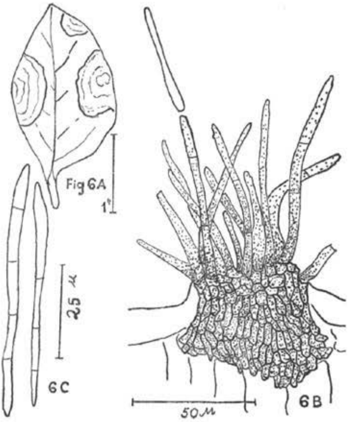
Maculae hypophyllae, minutae, brunneae; synnemata erecta, singularia vel complura aggregata, distincte stipitata, ad basim turgida, capitulo apicali e conidiophoris liberis formato terminata; stipite ex hyphis parallele stipatis simplicibus, obscure brunneis, septatis composito, 230—272 × 32—48 μ; conidiophora brunnea, septata; conidia cylindracea vel oblonga, plerumque 2-septata, pallide brunnea, 29.6—51.8 × 7.4—11.1 μ.

On the living leaves of *Calycopteris floribunda,* Lam. (Combretaceae), collected by P. G. Patwardhan at Amboli on 26th Dec., 65, M. A. C. S. Myco. Herb. No. 293.

6) **Cercospora pupalae** sp. nov.

Leaf spots circular to irregular, grey to dirty brown in colour, margin brown to black, mostly epiphyllous. Stroma dark brown, many celled, 11—30 μ. Conidiophores in fascicles of 4—10, divergent, pale to dark brown at base, paler or subhyaline towards the tip, septate, simple; 18.5—96.6 × 3.7 μ. Conidia hyaline to olivaceous, acicular, straight, multiseptate, tip acute; 51.8—70 × 3.7 μ.

Maculae plerumque epiphyllae, orbiculares vel irregulares, griseae vel obscure brunneae, brunneo- vel atro-marginatae; hypostromate obscure brunneo, pseudoparenchymatico, 11—30 μ diam.; conidiophora 4—10 fasciculata, divergentia, ad basim pallide vel obscure brunnea,



antice pallidiora vel subhyalina, septata, simplicia, 18.5—96.6 × 3.7 μ; conidia hyalina vel olivacea, acicularia, recta, multiseptata, antice acuminata, 51.8—70 × 3.7 μ.

	Host	Stromata	Conidiophores	Conidia
Cercospora	*Achyranthus*	25 μ	15—80 × 4—4.5 μ	35—130 × 2.5—5 μ
achyranthina,	*aspera* L.			
Cercospora	*Pupalia*	11—30 μ	18.5—96.6 × 3.7 μ	51.8—70 × 3.7 μ
	orbiculata Wt.			

Collected on *Pupalia orbiculata* Wt (Amarantaceae) by P. G. Patwardhan at Poona on 23rd August 66, M. A. C. S. Myco. Herb. No. 294.

This species is compared with *Cercospora achyranthina* Thirum + Chupp. on *Achyranthus aspera* L.

Careful comparison of the present species with. *C. achyranthina* parasitising *Achyranthus aspera* L. a very close and allied host of the same family Amarantaceae showed distinctively smaller conidia in the present species.

7) **Marssonina poonensis** sp. nov.

Infection spots dark brown, circular, with dark black margin, epiphyllous, spreading and coalescing, 3—8 mm. broad. Acervuli subepidermal, depressed globose when young but become flat and lenticular at maturity, 70—130 μ. Conidia hyaline, 2-celled, ovoid to broadly conical, broader at apex, asymmetral produced on hyaline, simple, short-conidiophores, 6—16 × 3—5 μ.

Maculae epiphyllae, orbiculares, atro-marginatae, dispersae, interdum confluentes, 3—8 mm diam.; acervuli subepidermales, primum depresso-globosi, postea lenticulares, 70—130 μ diam.; conidiophora hyalina, simplicia, brevia; conidia hyalina, bilocularia, ovoidea vel late conoidea, 6—16 × 3—5 μ.

On living leaves of *Anogeissus latifolia* Wall. (Combretaceae) leg. P. G. Patwardhan at Poona on 17th July, 1963 M. A. C. S. Myco. Herb. No. 295.

This is the second species of *Marssonina* reported from India.

Acknowledgement

Our sincere thanks are due to Prof. M. N. Kamat for his keen interest and guidance, and to the Director, M. A. C. S. for laboratory facilities and to Dr. F. Petrak for Latin rendering of the new species.

Explanation of Figures

1) *Robillarda matheranensis* sp. nov. — A Habit — B T. S. of leaf through Pycnidium. — C Conidia.
2) *Septoria Peucedanae* sp. nov. — A Habit — B T. S. through Pycnidium — C Conidia.
3) *Septoria sinhagadensis* sp. nov. — A T. S. of Pycnidium — B Conidia.
4) *Ramularia khandalensis* sp. nov. — A Conidiophores — B Conidia.
5) *Dendrographium calycoptericola* sp. nov. — A Synnema — B Apical portion of synnema enlarged. — C Conidia.
6) *Cercospora pupalae* sp. nov. — A Habit — B Conidiophores — C Conidia.
7) *Marssonina poonensis* sp. nov. — A Habit — B T. S. through acervulus.

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Mode of Development of the Sorus and Spores in Jamesdicksonia obesa inciting smut of Dicanthium annulatum

By T. Raghunath

(Maharashtra Association for the Cultivation of Science, Poona 4)

With Plate V

Thre writer collected leaves of *Dicanthium annulatum* Stapf. badly affected by a smut fungus from Daulatabad (Maharashtra) in January 1966, which was identified as *Jamesdicksonia obesa* belonging to the monotypic genus *Jamesdicksonia* (Tilletiaceae) established by Thirumalachar et al. (1960). The smut was first collected by Butler in India and described by Sydow (1911) as *Entyloma obesum*. Zundel (1930) transferred the smut fungus to the genus *Tolyposporella* on account of tar spot like sori produced on the leaves and agglutinated spore masses resembling spore balls. Thirumalachar et al. (1960) established the new genus *Jamesdicksonia* to accomodate this smut fungus on the basis of the developmental pattern of the sorus and germination of the teliospores. The writer's observations on the morphology and mode of development of this smut sorus and spores differed markedly from the description of Thirumalachar et al. (1960) as well as earlier workers.

Material and Methods: Fresh material was fixed in Carony's fluid and then in F. A. A., embedded in wax and microtone sections of 10—15 μ thickness were stained with hematoxylin and counterstained with light green. Hand sections were mounted in lactophenol with cotton blue.

Symptoms: Infection appears as minute hypophyllous tarlike lesions which increase in diameter, coalesce with the neighbouring lesions and become black, slightly raised encrustations in the form of long stripes (Fig. 1) upto 5 mm. broad and variable in length with corresponding brown discoloured regions on the upper surface of the leaves. In the early morning dew, which is characteristic of the season, the sori appear raised and hemispherical. As the day advances, with the loss of moisture, the sori appear flat and closely appressed to the leaf surface and such sori obtained from old herbarium material (more than an year old) when soaked in water, swell up and regain their hemispherical appearance.

Development and morphology: Hyphal strands aggregate in the parenchymatous layer just below the lower epidermis tightly filling the intercellular spaces. The individual cells of these hyphae swell up and initiate sporogenesis. The intervening host cells collapse and disintegrate with the space above lower epidermis occupied by the developing spores. As the sporogenesis is in progress, the sorus increases in size through the aggregation of hyphae in the periphery of the sorus. Following the rapid growth of the hyphal mass and the differentiation of the individual spores, the epidermis is pushed upwards and ruptured resulting in the exposure of the black spore mass. The spores in this layer mature in basipetal succession, the entire stroma being converted into a spore mass (Fig. 2). Spores adhere en masse in virtue of their gelatinous outer layer of the epispore and firm adpression. The spores are brown, subglobose to ellipsoidal and measure 14.3 to 34.7 μ in diameter. The epispore is made up of two layers. The inner layer is hyaline and thin and the outer, brown, thick and gelatinous and shows a lamellated structure with the absorption of moisture swelling upto almost twice its thickness. With the maturation of the spores in progress, the spores already mature germinate in situ aided by the dew deposited over the leaves.

Identity: Thirumalachar et al. (1960) described the new genus mainly on the mode of soral development. According to them "in a young sorus strands of hyphae aggregate and develop into stromata beneath the epidermis at two or three places. The hyphae emerge at each site, coalesce with the neighbouring groups forming a small umbonate to spherical structure. Following the rapid growth of the hyphal mass and the differentiation of the spores from the outer layer of cells, a flabelliform crust soon develops. The outer layers of hyphae soon gelatinize and successively differentiate spores in basipetal succession so that the spore crust appears similar to that observed in the rust genus *Dasturella*. In a mature sorus strands of hyphae emerging from stomata at several points appear as foot-like connections burried in the host and supporting the flabelliform crust above the epidermis. Only the upper portion is sporiferous, while the remaining tissues gelatinize and collapse following the germination of spores and subsequent disintegration of the sori". The writer was unable to observe any such mode of development at any stage in the smut material collected by him. On the other hand the entire development of the sorus was typically subpedimermal in origin (Fig. 3). Sections of even mature sori show the remnets of epidermal layer covering and adhering above the outermost layer of spores (Fig. 4). While according to Thirumalachar et al. only the upper layers of the sorus are sporiferous, it is evident from Fig. 2, that the entire sorus is sporiferous even with the lower most layer of the sorus capable of forming fertile spores. Such a mode of subepidermal development of the sorus and the habit of forming flabelliform crusts on the leaf producing firmly cemented spores provided with thick hygroscopic epispore are characters which belong to the genus *Tolyposporella*. The mode of germination of the teliospores of this fungus which strictly conforms to that of Tilletiaceae however compels its segregation from the genus *Tolyposporella*. It is thus clear that the evidence obtained by the writer through a detailed study in fixed microtome sections of the developmental pattern of sori and spores would warrant a drastic redefinition and revision of the genus *Jamesdicksonia* as originally defined by Thirumalachar et al. (1960). The fungus is thus maintained in the genus *Jamesdicksoni* with *J. obesa* Thirum. Pavgi and Payak as type with the following amended and revised description.

Jamesdicksonia Thirumalachar, Pavgi & Payak emend. Raghunath.

Sori occurring as crusts on the leaves, subepidermal in origin, erumpent, rupturing through the epidermis at maturity, teliospores mature in basipetal succession and occur in firmly agglutinated masses. Teliospores brown, with thick concentrically lamellated epispore (which swells up in water). Germination is by a single celled or rarely two celled promycelium with a terminal whorl of 2—4 sporidia.

Type *Jamesdicksonia obesa* Thirumalachar, Pavgi & Payak emend. Raghunath.

Sori in liniar, erumpent, flabelliform hyphophyllous, tar-like encrustations formed by the coalescing of numerous lesions. Subepidermal sori rupture the epidermis at maturity exposing masses of spores which are firmly agglutinated. Teliospores brown, subglobose to ellipsoidal, mature in basipetal succession in the sorus and measure 14.3 to 34.7 μ. The epispore is of two layers. The outer layer is gelatinous and swells up to almost twice its thickness in water and reveals a lamellated structure. Germination is by a single celled or rarely two celled promycelium with 2 to 4 sporidia which copulate in situ.

Summary: The morphology and development of the sorus and spores of *Jamesdicksonia obesa* belonging to the monotypic genus *Jamesdicksonia* Thirum. Pavgi & Payak is described. The writer's observations revealed that the original diagnostic characters of the new genus were inadequate leading to drastic revision and redefinition of the genus.

Grateful thanks are offered to Prof. M. N. Kamat, Head of the Dept. of Mycology and Plant Pathology, M. A. C. S., Poona for his deep interest and guidance and to the Director for laboratory facilities.

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Explanation of Plate IV

1. Hypophyllous encrustations on the leves of X 5. the host.
2. Transverse section of the sorus showing the spores X 280.
3. Transection of the young sorus demonstrating the subepidermal development of the spores X 370.
4. Transection of mature sori showing the host epidermis still adhering above 9 115.

New phytopathogenic Fungi Imperfecti from Maharashtra (India)

By Miss Alaka Chiplonkar

(M. A. C. S. Labs., Poona 4, India)

In the course of her routine Mycological survey for new fungi in and around Poona, the writer made several collections of Phytopathogenic Fungi-Imperfecti during the year 1966. None of these fungi herein described have been previously reported on the respective host plants and are therefore presented here as new to science, based on comparative studies and host relationship, along with latin diagnosis.

1. **Phyllosticta flacourtiae** sp. nov. Chiplonkar (Fig. 1).

Infection spots necrotic white, iregular in outline, with brown margin, 1—2 cm broad. Pycnidia dark, scattered, epiphyllous, ostiolate, subepidermal, round to flattened; 68—120 × 50—60 μ. Pycnidiospores oval, one celled, hyaline; 5.1—8.5 × 1.8—2.4 μ.

Maculae irregulares, albidae, brunneo-marginatae, 1—2 cm diam.; pycnidia epiphylla, subepidermalia, nigrescentia, dispersa, globosa, plus minusve depressa, 68—120 × 50—60 μ; conidia ovoidea, continua, hyalina, 5.1—8.5 × 1.8—2.4 μ.

Leg. Alaka Chiplonkar on living as well as dried leaves of *Flacourtia sepiaria* Roxb. at Sinhagad (Poona, India) on 18th September 1966. M. A. C. S. No. 296 (Type).

2. **Bispora muehlenbeckiae** sp. nv. Chiplonkar (Fig. 2).

Infection spots shaning black especially when fresh, turning to dirty brown in exicattae; 1 mm. to 1 cm. long. Mycelium brown, septate, branched, superficial but only occasionally with a few simple peg like haustoria into the epidermal cells, 2—3 μ broad. Conidiophores small peg like, brown and measure 2—3.7 × 1 μ. Conidia 2-celled, thick-walled, dark brown, faintly serrated, produced in basipetal chains of 2—4 spores, youngest being at the base; 7.4—11.1 × 5.5 μ.

Maculae nigrescentes vel obscure brunneae, 1—10 mm diam.; mycelii hyphae septatae, ramulosae, superficiales, haustoriis 2—3 μ latis tantum in epidermidis cellulas penetrantibus preditae; conidiophora brevissima, continua, brunnea 2—3.7 × 1 μ; conidia ellipsoidea vel ovoidea, medio septata, vix vel lenissime constricta, minutissime verruculose, concatenata, 7.4—11.1 × 5.5 μ; episporio circumcirca aequaliter crassiusculo.

Leg. Alaka Chiplonkar, on dried phylloclades of *Muehlenbeckia* *platyclados* Meissn. at Mahabaleshwar (India) on 30th October 1966. M. A. C. S. No. 297 (Type).

Table I. Comparison of Bispora Species

Species	Conidiophores	Conidia	Authority
Bispora monilioides (Type species)	Sub-Conical, Stout.	20—22 × 6—7 μ	Corda,
Bispora sp. (Mahabaleshwar)	Peg like to slightly curved 2—3.7 × 1 μ.	7—12 × 5.5 μ	—

Comparison of this collection of *Bispora* with the type species shows significant differences in conidial dimensions and is therefore described as new species.

3. **Colletotrichum cryptostegiae** *sp.* nov. Chiplonkar (Fig. 3).

Infection spots dark black, scattered in porcelin white necrotic, marginal, irregular patches. Acervuli sub-cuticular, elongated, with basal layer of pseudoparenchyma, 112—256 μ.

Setae arise from the basal pseudoparenchymatous layer, scattered, 3 to 10 or more in one acervulus, light brown, rounded at the apex; 27—37 × 3.4 μ. Conidiophores simple, hyaline, non-septate, in parallel layers. Conidia one-celled, hyaline, oval; 11—15 × 3.7 μ.

Maculae dispersae, irregulares, obscure brunneae; acervuli subcuticulares, elongati, strato basali pseudoparenchymatico praediti, 112—256 μ diam.; setae marginales, e strato basali ortae, dispersae, plerumque 3—10 in quoque acervulo, pallide brunneae, 27—37 × 3.4 μ; conidiophora simplicia, hyalina, continua dense parallele stipata; conidia hyalina, continua, ovoidea, 11—15 × 3.7 μ.

Leg. Alaka Chiplonkar on leaves of *Cryptostegia grandiflora* Br. at Katraj (Near Poona, India) n 8th September 1966. M. A. C. S. No. 298 (Type).

This fungus has not been reported on this host previously and was found to be associated with an ascomycetous genus provisionally identified as species of *Didymella*.

Plants of *Cassia fistula* L., a common road-side and flowering tree, were found to exhibit severe type of follicular infection spots, brown in colour, during the monsoon of 1966 at Sinhagad (ht. approximately 4400 ft. above m. s. l.) near Poona (India). Diseased lesions revealed the presence of abundant acervuli with filiform to bent, hyaline, septate conidia, characteristic of the genus *Cylindrosporium*. Literature revealed that no species of *Cylindrosporium* has been reported on the host genus

Cassia. This species is compared with *C. padi* Karst., the type species, infecting leaves of *Prunus padi*, with the following result:

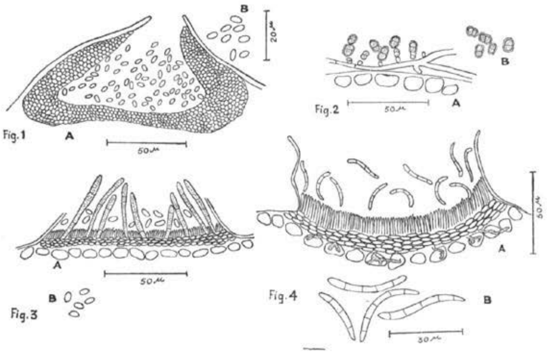

Fig. 1. *Phyllostica flacourtiae* Chiplonkar. A. Pycnidia. B. Conidia
Fig. 2. *Bispora muchlenbeckiae* Chiplonkar. A. Mycelium with conidia. B. Conidiophores and Conidia
Fig. 3. *Colletotrichum cryptostegia* Chiplonkar. A. Acervulus. B. Conidia
Fig. 4. *Cylindrosporium cassiae* Chiplonkar. A. Acervulus. B. Conidia.

Table II. Comparison of Cylindrosporium Species

Species	Host	Acervuli	Conidia	Authority
Cylindrosporium padi	*Prunus padi*	Hypophyllous.	Filiform 48—66 × 2 μ	Karst
Cylindrosporium sp. (Sinhagad)	*Cassia fistula*	Amphigenous. 160 × 160 μ (113—160 × 128—240 μ)	3—6 celled, bent, 23.8 × 3.4 (16—34 × 3.4 μ)	—

It is evident from the comparative table, that the Poona collection of *Cylindrosporium* is significantly distinct in morphological characters as well as dimensions from the type species, and is therefore described as new to science with Latin diagnosis.

4. **Cylindrosporium cassiae** sp. nov. Chiplonkar (Fig. 4).

Infection spots pale brown, necrotic. Acervuli dark brown to black, scattered sub - cuticular to sub - epidermal, amphigenous; 113—16 × 128—240 (mostly 160 × 160) μ in diameters. Conidia hyaline, septate, 3—6 celled, straight to bent, filiform, 16—34 × 3.4 (mostly 23.8 × 3.4 μ).

Maculae pallide brunneae, arescentes; acervuli obscure brunnei vel nigrescentes, amphigeni, subcuticulares vel subepidermales, 113—160 × 128 × 240 μ, plerumque 160 μ diam.; conidia hyalina, 3—6-septata, recte vel curvula filiformia, 16—34 × 3.4 μ, plerumque 23.8 × 3.4 μ.

Leg. Alaka Chiplonkar on the living leaves of *Cassia fistula* L. at Sinhagad (near Poona, India) on 18th Sept. 1866, M. A. C. S. No. 299 (Type).

The type material of all the four fungi has been deposited at C. M. I., Kew, Surrey; and I. A. R. I., New Delhi.

Acknowledgements

The writer wishes to express her deep sense of gratitude to Prof. N. M. Kamat for his guidance and encouragement. She also thanks Dr. G. B. Deodikar for providing laboratory facilities and to U. G. C. for the financial aid and to Dr. F. Petrak for Latin rendering of the new species.

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Fungi of Mysore-IV

By T. R. Nag Raj *) & H. C. Govindu **)

With 2 Fig. in the Text

The accompanying accounts of some interesting fungi forms the fourth paper in the series of which the first three papers appeared under the title: 'New records of fungi of Mysore'. It has now been felt desirable to widen the scope of this series of papers to include detailed accounts of such fungi information concerning which has been scant from a few earlier gatherings from this country or where our collections are at variance from those recorded earlier. The title of this series is, therefore, now changed to fulfil this objective. Unless otherwise stated, the herbarium specimens and/or cultures of the fungi mentioned herein are deposited in the Mycological Herbarium of Agricultural College, University of Agricultural Sciences, Hebbal, Bangalore (Herb. MYSP) and in the Herbarium of the Commonwealth Mycological Institute, England (Herb. IMI).

1. *Amphichaetella echinata* (Kleb.) Höhnel, in S. B. Akad. Wiss. Wien, 125, 92, 1916. — Fig. 1.

On rotting leaves of *Artocarpus integrifolia* L., Coffee Research Station, Balehonnur, 22. 11. 1959, leg. T. R. Nag Raj, Herb. MYSP ⧺ 822; Herb. IMI ⧺ 95827 & 95828.

Sporodochia amphigenous, superficial, scattered, pulvinate, white or cream white when moist and brownish yellow when dry, up to 430 μ high and 590 μ in diam. Conidiophores hyaline, septate, cylindrical; conidia acrogenous and solitary, hyaline, continuous, elliptic, elliptic-fusiform, sometimes irregular, 14—24 × 5—9 μ in size, with bullate, thin-walled and smooth vesicles at both ends 2—3 μ in diam., spore wall thickened at the middle and strongly echinulate or denticulate, with appendages arising from the vesicles at both ends. Appendages, 2—4, mostly 3, at each end, filiform, flexuous or straight, terminating in a slight swelling, hyaline, 11—24 μ long.

The fungus is prevalent during the incessant rainy days of August-September. The conidia are violently scattered when dry sporodochia are brought in contact with a drop of water.

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**) Professor of Plant Pathology, University of Agricultural Sciences, Hebbal, Bangalore 24.

2. *Chaetomella terricola Rama* Rao var. **mysorensis** var. nov. Nag Raj & Govindu. Fig. 2.

Pycnidia superficial, amber brown to dark brown, stipitate, oval, triangular to irregular with a well-defined raphe, setose, 205—304 μ long, 142—204 μ wide and 75—209 μ high. Long setae brown to dark brown and thick-walled at base, hyaline to subhyaline with 1—2 circinate coils at tip, up to 4-septate, 114—161 μ long, 3.5—8.5 μ wide at base and 3.5—4.5 μ wide at tip. Short setae erect, brown and thick-walled at base, subhyaline to hyaline and sligthly dilated at apex, up to 2-septate, 33—56 μ long, 3.5—4.5 μ wide at base and 2.5—4.5 μ wide at tip. Conidiophores branched, up to 48 μ long and 1.5—2.5 μ wide, terminating in sterile filament up to 98 μ long. Conidia hyaline, continuous, fusiform, slightly curved or naviculate, 5.5—7.5 × 2—2.5 μ in size, bearing mucus caps at each end.

Pycnidia superficialia, pallide vel obscure brunnea, distincte ovoidea, triangularia vel irregularia, distincte sulcata, 205—305 μ longa, 142—204 μ lata, 75—209 μ alta; setae longiores brunneae, inferne crasse tunicatae, in apice hyalinae vel subhyalinae, usque ad 4-septatae, 114—161 μ longae, inferne 3.5—8.5 μ, in apice 3.5—4.5 latae; setae breviores erectae, inferne crasse tunicatae et brunneae superne subhyalinae vel hyalinae, in apice leniter dilatatae, usque ad 2-septatae, 35—57 μ longae, inferne 3.5—4.5 μ, superne 2.5—4.5 μ latae; conidiophora ramulosa, usque ad 48 μ longa, 1.5—2.5 μ lata; conidia hyalina, continua leniter allantoidea vel navicularia, 5.5—7.5 × 2—2.5 μ, utrinque mucoso-papillatae.

Isolated in pure culture from contaminant in plate cultures made during attempts to culture aquatic Hyphomycetes, July 1963, Coffee Research Station, Balehonnur. Type consisting of dried agar culture in Herb. MYSP ‡ 1022.

Colonies on potato-dextrose agar grow fairly rapidly manifesting as moist appressed growth devoid of aerial mycelium. The submerged mycelium is composed of hyaline, septate, much branched 2.5 μ wide hyphae. In the early stages of growth, the fruiting bodies are cream coloured, excipulate, covered by slimy mass of spores. Setae are always present on these pycnidia and are mostly of the short type described above. Typical pycnidia are produced as the culture ages. The stipes of pycnidia are 33—70.5 × 47.5—95 μ and composed of hyaline, parenchymatous cells. The apices are somewhat dilated in the short setae while up to 2 coils are present in the long setae. The short setae decribed may well represent the development stages of the long setae. The conidiophores are irregularly verticillately branched and bear conidia at the tips of the branches and terminate in a long sterile filament. The conidia are released by the rupture or dissulution of the pycnidial wall along the raphe and aggregate in a cream coloured slimy mass, the slimy character of which may be attributed to the presence of mucus caps at each end of the spore. The mucus caps are easily discernible when the spores are stained with dilute aqueous solution of methylene blue.

This fungus is closely similar to *Chaetomella terricola* Rama Rao (Mycopath. et Mycol. appl. 19: 255—256, 1963), but differs from it in possessing apically circinately coiled, septate, long setae, with as many as 4-septa, short setae with fewer septa and somewhat wider conidia. It is, therefore, desirable to treat this isolate as a variety of *C. terricola*.

3. *Nectria flavo-lanata* Berk. & Br. in Journ. Linn. Soc. Bot. (Lond.), 1873, 114.

On dead twigs of *Coffea arabica* L., Coffee Research Station, Balehonnur, leg. T. R. Nag Raj. Herb. IMI 89194—89196.

The fungus occurs on dead twigs and is most predominant during the wet spells of South-West monsoon. Besides coffee twigs, it was also noticed to occur on lopped and fallen branches of *Albizzia lebbek* Benth., on dead branches of *Citrus* sp., and *Erythrina* sp. The fungus was easily brought into culture, wherein it developed either solely as a conidial form followed by the ascigerous stage. The conidial stage of this fungus is identical with *Kutilakesiopsis macalpineae* Agnih. & Barua (Journ. Ind. Bot. Soc. XXXVI, 306—311, 1957). The fungus was first described from Ceylon and is of widespread occurrence in several parts of the world. It is being recorded here for the first time from India.

4. **Penicilliopsis bambusae** sp. nov. Nag Raj & Govindu — Fig. 3.

Synnemata erect or variously curled, coralloid, at first white later turning buff brown, pulverulent over the entire surface, up to 10 mm. long and 2 mm. in diam., composed of a network of branched, hyaline to subhyaline, septate hyphae, 2—2.5 μ in diam. giving rise to a palisade layer of phialides over the entire surface of the synnemata. Phialides hyaline to ubhyaline, obclavate, thickened at the apex and terminating in a papilla or beak, 16—32 × 3.5—5 μ (average: 25.3 × 4.4 μ). Conidia acrogenous, catenate, continuous, elliptic, elliptic-fusiform, hyaline to subhyaline, with polar scars denoting the point of attachment, 5.5—10.5 × 3.5—5 μ (average: 7.7 × 4.2 μ) in size. Ascigerous stage not known.

Synnemata erecta vel varie curvula, coralloidea, primum albida, postea obscure brunnea, in superficie pulverulenta, usque ad 10 mm longa et ad 2 mm crassa, ex hyphis reticulato-ramosis, hyalinis vel subhyalinis, septatis 2—2.5 μ crassis superne in phialides transeuntibus composita; phialides hyalinae vel subhyalinae, obclavatae, superne incrassatae et papillatae vel rostro brevi, 16—32 × 3.5—5 μ, plerumque 25.3 × 4.4 μ metiente terminatae; conidia acrogena, catenata, continua, ellipsoidea vel crasse fusoidea, hyalina vel subhyalina, cicatricibus ornata, 5.5—10.5 × 3.5—5 μ, plerumque 7.7 × 4.2 μ metienta; status ascophorus ignotus.

On living shoots of *Bambusa* sp. in association with Sphacelial stage of an unknown fungus (*Claviceps* ?), Balehonnur, 18. 5. 1961, leg. T. R. Nag R a j. Type in Herb. IMI ≠ 89197. Similar collection made on 14. 9. 1960 in Herb. MYSP ≠ 821.

The fungus is usually seen after the appearance of the Sphacelial stage of an unknowm fungus (*Claviceps* ?) on young shoots of bamboo, normally growing on the galls incited by the latter. Such 'galls', bearing *Penicilliopsis bambusae,* when cut open, are found to contain viable spores of '*Claviceps* ? sp.'. No attempt has been made by us to ascertain the nature of the association between the two fungi. The ascigerous stage has not been encountered in spite of intensive search.

5. *Scolecobasidium constrictum* Abbott in Mycologia 19: 29—31, 1927 — Fig. 4.

Isolated in pure culture from contaminant in plate cultures during attempts at culturing aquatic Hyphomycetes, July 1963 at Coffee Research Station, Balehonnur. Culture deposited in Herb. MYSP.

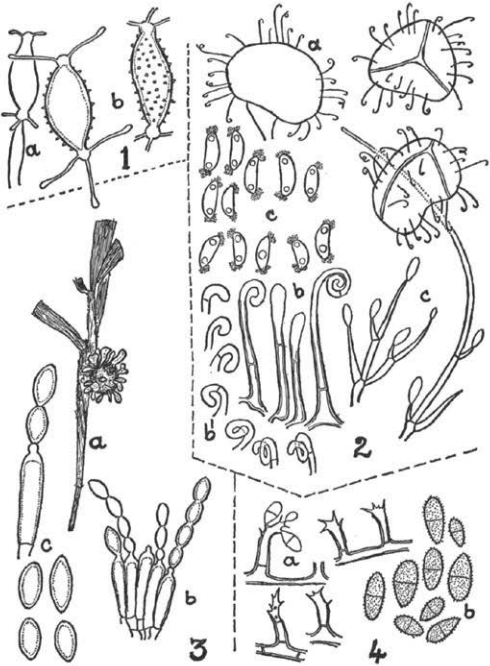
Hyphae brown, slightly thick-walled, septate, 2—2.5 μ wide bearing conidiophores. Conidiophores simple very rarely branched, continuous to few-septate, brown and thick-walled at the basal part, pale brown to subhyaline and thin-walled at the apex, cylindrical to irregular, straight or twisted, 7.5—16.5 × 2—3 μ. Conidia borne singly or in clusters on short connectives on the conidiophores, verrucose, obovate to elliptic, continuous, more often two-celled with occasional constrictions at the septa, light brown, 4.5—10.5 × 2.5—4 μ. Occasional phragmospores are seen in very old cultures. Chlamydiospores are absent.

D w i v e d i (Curr. Sci. 28: 374—375, 1959) has described this fungus previously based on an isolate obtained from grassland soils in Varanasi. His isolate is different from ours having shorter (3.6—7.2 × 2—2.7 μ), rounded as well as angular conidiophores and smooth, olivaceous to almost hyaline conidia 5.4—14.4 × 2.7—3.6 μ in size.

6. *S. terreum* Abbott in Mycologia 19: 29—31, 1927. — Fig. 5.

Isolated in pure culture from contaminant in plate cultures during attempts at culturing aquatic Hyphomycetes, July 1963 at Coffee Research Station, Balehonnur. Culture in Herb. MYSP.

This fungus has previously been known from Varanasi in this country (D w i v e d i, loc. cit.). The Varanasi isolate had mostly two-celled and occasionally three-celled conidia which measured 4.8—12.6 × 2.4—3.2 μ. Chlamydospores were not reported. Our isolate differs from the above in having both conidia and chlamydospores. The dimensions of the various structures are as follows: Conidiophores: 3.5—9.5 × 2—2.5 μ; Conidia: 7.5—11 μ long, 1.5—2.5 μ wide at the basal end and ut to 7.4 μ wide between the arms at the apex; Chlamydospores: 3.5—7.5 μ in diam. The Chlamydospores are formed abundantly in old cultures, terminally on the conidiophores or on short lateral branches.



Occasional intercalary chlamydospores are also seen. They are globose, subglobose, obovate to oblong elliptic, brown and thick-walled.

7. *S. variabile* Barron & Busch in Canad. J. Bot. 40: 77—84, 1962. — Fig. 6.

Isolated in pure culture from contaminant in plate cultures during attempts at culturing aquatic Hyphomycetes, July 1963 at Coffee Research Station, Balehonnur. Culture in Herb. MYSP.

Hyphae septate, branched olivaceous green, about 1.86 μ wide. Conidiophores are simple or branched, obovate or irregular, twisted or bent, continuous to 1-septate, at first hyaline later olivaceous green, 10—16.5 × 2—3 μ, bearing conidia on short connectives. Conidia acrogenous, solitary or in groups, olivaceous green, 1- to 3-septate, occassionally constricted at the septa, walls verrucose, 10—15 × 3—4 μ in size.

Proliferations may occur originating from the connectives on the conidiophores or from conidia still remaining attached to the conidiophores, resulting in the formation of secondary conidiophores and conidia. No chlamydospores were seen.

This is a new record for India.

8. **Sphaerulina trapae-bispinosae** sp. nov. Nag Raj & Govindu. — Fig. 7.

Foliicolous, inciting necrotic leaf spots. Perithecia epiphyllous, subepidermal, innate - erumpent, subglobose to oval, brown with a dark coloured region at the neck, ostiolate, aparaphysate, 80.5—109 × 76—114.5 μ. Asci hyaline clavate with a short basal stalk, bitunicate, octosporous, 44.5—78 × 13—16.5 μ. Ascospores fusiform-elliptic to naviculate, with slightly rounded ends, 3-septate, slightly constricted at the septa, subhyaline to brown, 22.5—28 × 5.5—7.5 μ, distichous to irregularly arranged in the ascus.

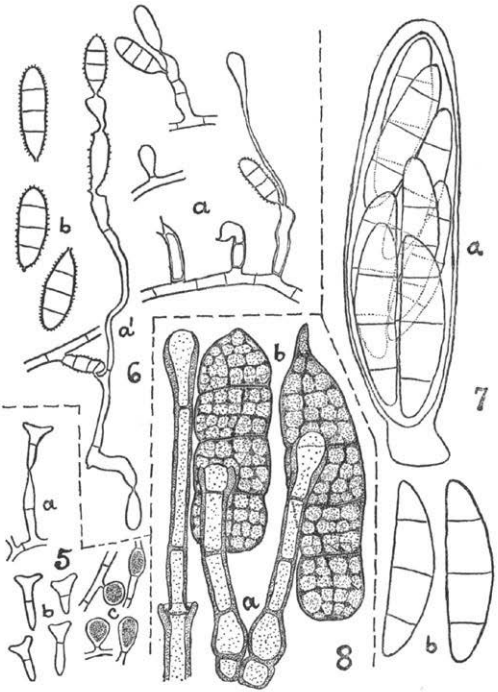
Maculae irregulares, indistincte marginatae, usque ad 15 mm diam., interdum confluentes et tunc plus minusve majores; perithecia epiphylla, numerosa, subepidermalia, innato-erumpentia, subglobosa vel ovoidea, ostiolata, brunnea, in vertice obscure brunnea, 80.5—109 × 76—114.5 μ; asci clavati, breviter stipitati, crasse tunicati, octospori 44.5—78 × 13—16.5 μ; sporae distichae vel irregulariter conglobatae, ovoideo-ellipsoideae, utrinque rotundatae, triseptatae, ad septa leniter constrictae, subhyalinae, postea brunneae, 20.5—28 × 5—7.5 μ.

On living leaves of *Trapa bispinosa*, Lalbagh Gardens, Bangalore, 24. 12. 1965, T. R. Nag Raj. Type in Herb. MYSP ⌗ 824.

The fungus incites necrotis leafspots which are irregulare in shape with indistinct margins, up to 15 mm. in diam., studded with numerous, minute, black fruiting bodies on the upper surface. Several spots may coalesce to form a large irregular patch. Due to decay of the necrosed tissues, shot-hole symptoms are common. This fungus is described here as a new species, since it differs from other members of the genus so far known to science. There has been no prior record of the fungus on *Trapa*.

9. *Stemphylium floridanum* Hanon & Weber var. **euphorbiae** var. nov. Nag Raj & Govindu. — Fig. 8.

Foliclous, associated with small leaf spots. Hyphae hyaline to subhyaline, septate branched. Fruiting effuse, greyish brown. Conidiophores solitary or in groups of 2—4, erect or slightly curved, cylindrical with nodular swellings at base, frequently along the length and at the apex (about 5.5—9.5 μ in diam.), olivaceous brown, septate, 41—122.5 × 3.5—5.5 μ, with only a single proliferation through the apex in the older conidiophores. Conidia formed singly through a wide pore at the apex of each conidiophore, pale to olivaceous brown, oblong, cylindrical or subangular, rounded or acutely pointed at the apex, often with a beak, base truncate or rounded with a prominant basal scar, 3—4 major horizontal septa at which the walls are constricted and many secondary septa,



walls verrucose, 41—69 × 14—19 μ in size, usually three times longer than broad. Ascigerous stage not seen.

Maculae minutae; hyphae hyalinae vel subhyalinae, septatae, ramulosae; caespituli effusi, griseo-brunnei; conidiophora solitaria vel 2—4 congesta, erecta vel parum curvula, cylindracea, inferne nodosa, olivaceobrunnea, septata 41—122.5 $\times$ 3.5—5.5 μ; conidia singulatim evoluta, pallide vel obscure olivacea, oblonga, cylindracea vel subangularia, in apice rotundata vel acuminata, ad basim truncata vel rotundata, transverse 2—4-septata, plus minusve constricta et nonnullis septis secundariis praedita 41—69 $\times$ 14—19 μ; status ascigerus ignotus.

On living leaf of *Euphorbia* sp., Hebbal, Bangalore, 2. 5. 1966, T. R. Nag Raj. Type in Herb. MYSP ⌗ 823. Culture derived from type also deposited in Herb. MYSP.

The fungus could be readily grown in pure culture on potato-dextrose agar on which it produces a good amount of sporulation. In young cultures a faint yellow pigment diffuses into the medium from the margins of the fungal colony. Gradually the colour of the pigment darkens and in 12—15 days turns red.

In the shape of the conidia, marked constrictions of the conidial wall at all the major transverse septa, verrucose wall of the conidia and growth with pigment production on potato-dextrose agar, the fungus resembles very closely *Stemphylium floridanum* Hanon & Weber (Phytopath. 45: 11—16, 1955), from which it differs in the shorter conidiophores with fewer nodular swellings and bigger conidia. *Deightoniella jabalpurensis* Agarwal & Hasija described on *Euphorbia geniculata* (J. Ind. Bot. Soc. XL: 542—547, 1961) is distinct from our collection. Hence we are disposing this fungus as a new variety of *S. floridanum*.

The senior author is indebted to Dr. B. C. Sutton, Dr. C. Booth, and Mr. J. J. Elphik, Commoiwealth Mycological Institute, England, for help in identifying *Amphichaetella echinata, Nectria flavo-lanata,* and *Penicilliopsis bambusae.* Our grateful thanks are also due to Dr. Franz Petrak, Vienna, for kindly rendering into Latin the diagnosis of new species and varieties described in this paper.

Explanation of figures

Fig. 1. *Amphichaetella echinata.* a. Developing conidium; b. Two conidia (setae in one of the conidia are not shown completely) $\times$ 1450.

Fig. 2. *Chaetomella terricola* var. *mysorensis.* a. Pycnidia $\times$ 130; b. Setae, b[1]. Developmental stages of coils on the long setae $\times$ 560; c. Conidiophores and conidia $\times$ 1450

Fig. 3. *Penicilliopsis bambusae.* a. Habit; b. Arrangement of the conidial apparatus. $\times$ 1100; c. Phialide and conidia $\times$ 1800.

Fig. 4. *Scolecobasidium constrictum;* Fig. 5: *S. terreum;* Fig. 6. *S. variabile.* a. Conidiophore; a[1]. Proliferating conidiophore; b. Conidia; c. Chlamydospores. All $\times$ 1500

Fig. 7. *Sphaerulina trapae-bispinosae.* a. Ascus; b. Ascospores. both $\times$ 2100.

Fig. 8. *Stemphylium floridanum* var. *euphorbiae.* a. Conidiophores; b. Conidia. both $\times$ 1500

A new Species of Colletotrichum on Gomphrena celosioides Mart

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During the course of autecological studies on *Gomphrena celosioides* Mart. the author encountered fungal infection on leaves and stems of the plants growing in nature in Varanasi. The infected spots first appear as minute red circles enclosing black dots on the stems and leaves. At maturity these spots spread, with red coloured margins which are circular to irregular, enclosing a central ash coloured region which

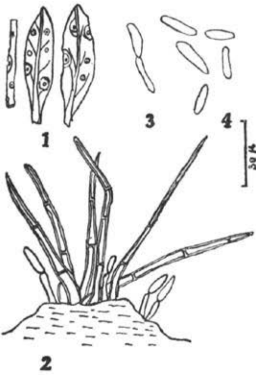

Fig. I. 1. Infected leaves and stem of *Gomphrena celosioides*. — 2. Transverse section of an acervulus showing setae, conidia and conidiophores. — 3 & 4. Individual conidia and conidiophore

bears acervuli as black dot-like structures. Spots often coalesce. At maturity they measure 2—8 × 1.5—3 mm (Fig. 1). When examined under the microscope the pathogen is found to be a species of *Colletotrichum* which has not been reported so far on this host.

As the characters of this fungus do not tally with any of the previously described species (Saccardo, 1931; Butler & Bisby, 1960), a new species is being created after the generic name of the host. The diagnostic characters of the fungus along with the Latin translation has been given below:

Colletotrichum gomphrenae sp. nov.

Maculae dispersae, minutae, orbisculares vel irregulares, in centro cinerascentes et acervulis nigro-punctatae; acervuli superficiales, 32—112 $\times$ 24—96 μ, setis plerumque 4—12 nigro-virescentibus vel nigrescentibus, simplicibus, sursum paulatim attenuatis et plus minusve acuminatis, 46.62—106.56 μ longis praediti; conidiophora hyalina, setis intermixtis, 9.99—23.31 μ longa; conidia ocrogena, cylindracea, continua, recta vel lenissime curvula, 17.5—24.5 $\times$ 3.5—4.2 μ.

Acervuli broad, superficial, varying from 32—112 $\times$ 24—96 μ. Setae greenish black to black, simple, septate, tapering at the tip, 4—12 in one acervulus, measuring 46.62—106.56 μ in length, conidiophores hyaline, simple, short, straight interspersed with setae, varying from 9.99—23.31 μ in length, bearing single conidium at their tips, conidia hyaline, single celled, cylindrical, rarely slightly curved, measuring 17.5—24.5 $\times$ 3.5—4.2 μ.

Type specimen collected by A. K. Srivastava in Banaras Hindu University campus in September 1963 and is deposited in Crypt. Herb. Orient accession No. 28202, I.A.R.I.

Acknowledgements

My grateful thanks are due to Prof. R. Misra, Dr. K. C. Misra and Dr. R. Y. Roy for their valuable suggestions and encouragement and to Dr. F. Petrak for the Latin diagnosis.

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Ascomycetes of Maharashtra — II

By A. K. Pande,

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With 4 Figs. in the text

The writer collected several Ascomycetes in and around Poona, many of which were found to be saprophytic occuring on dead stems and woods. Critical study revealed, some of them to be new species based on detailed morphological comparisons and host relationships. The genus *Teichospora* has been reported for the fourth time and *Physalosporella* a new addition to India.

1. **Pleospora wehmeyerii** sp. nov. Pande.

Perithecia superficialia, dispersa, globosa vel piriformia, ostiolata, 120—220 × 128—180 μ, setis obscure brunneis, septatis, simplicibus, 80—300 × 3—12 μ praedita; asci cylindracei, crasse tunicati, 8-spori, 64—84 × 8—12 μ; paraphysoides adsunt; sporae monostichae, oblongae, brunneae, transverse 3- longitudinaliter 1—2-septatae, 12—16 × 8 μ.

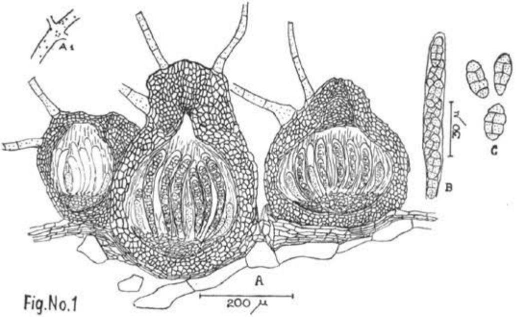

Fig. 1. *Pleospora wehmeyerii* sp. nov. Pande. — A_1 Habit. — A Perithecium. — B Ascus. — C Ascospores

Infection spots superficial, black, hairy, minute. Perithecia black, superficial, scattered, globose to pyriform, setose, ostiolate, 120—220 $\times$ 128—180 μ, setae, dark brown, septate, unbranched; 80—300 $\times$ 3—12 μ. Asci cylindrical, hyaline, bitunicate, octosporous, 64—84 $\times$ 8—12 μ, paraphysoids present. Ascospores brown, oblong, uniseriate, muriform with distinct 3-transverse septa and 1 or 2 vertical septa; 12—16 $\times$ 8 μ.

Collected on dead stems of *Lantana camara* L. (Verbenaceae) by A. K. Pande at Poona (India) on 3rd Oct. 1967, M. A. C. S. Herb. No. 637 (Type).

This genus has been reported previously from Maharashtra on *Lantana camara* L. by Rao (1966) as *P. herbarum* Rab. which is a type species for the genus. Critical and detailed comparison of the

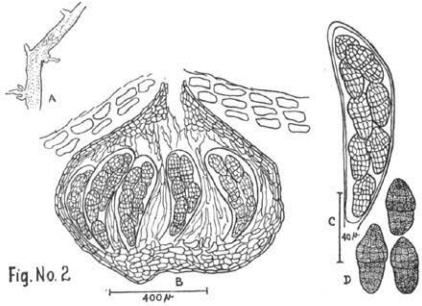

Fig. 2. *Pleospora dalbergiae* sp. nov. Pande. — A Habit. — B Perithecium. — C Ascus. — D Ascospores

writer's collection with the type species and Rao's (1966) collection on *Lantana camara* revealed the writer's collection to be significantly distinct in having setose and smaller ascocarps, smaller asci and ascospores and uniformly septate ascospores, on the basis of which it is considered as a new species.

The fungus is described after Dr. L. E. Wehmeyer in recognition of his pioneer contributions to this genus.

2. **Pleospora dalbergiae** sp. nov. Pande.

Perithecia innata, dispersa, globosa, interdum depressa, ostiolata, 160—448 $\times$ 160—560 μ asci crasse clavati, crasse tunicati, 8-spori, 80—120 × 24—32 μ; paraphysoides adsunt; sporae oblongo-ellipsoideae, luteae, muriformes, 32—40 × 16 μ.

Infection spots black, minute, bursting through narrow slits in the cork. Perithecia black, embedded, scattered, globose to somewhat flattened, ostiolate; 160—448 × 160—560 μ. Asci broadly clavate, hyaline, bitunicate, 8-spored, 80—120 × 24—32 μ. Paraphysoids present. Ascospores oblong-ellipsoid, yellow, biseriate, muriform, X-septate; 32—40 × 16 μ.

Collected on dried stems of *Dalbergia melanoxylon*, G. P. (Papilionaceae), by A. K. Pande at Poona (India) on 26th Sept. 1967, M. A. C. S. Herb. No. 638 (type).

As there was no previous report of a *Pleospora* on this host or

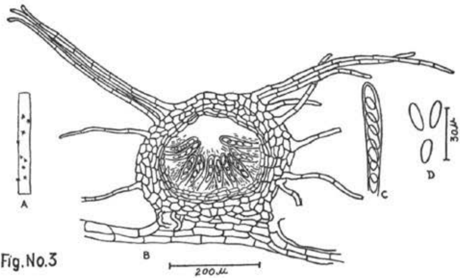

Fig. No.3

Fig. 3. *Physalosporella indica* sp. nov. Pande. — A Habit. — B Perithecia. — C Ascus. — D Ascospores

family, this collection was compared with morphologically similar species of *Pleospora* and found to be distinct in having smaller asci and ascospores, which are light yellow in colour.

3. **Physalosporella indica** sp. nov. Pande.

Maculae minutae nigrescentes, dispersae; perithecia solitaria, primum innata, postea erumpentia, globosa, ostiolata, 240—400 μ diam., setis obscure brunneis, septatis, 192—480 × 4 μ praedita; asci cylindracei, paraphysati, tenuiter tunicati, 8-spori, 60—84 × 8 μ; sporae monostichae, fusoideae, continuae, hyalinae 12—16 × 8 μ.

Infection spots minute, black, hairy and scattered. Perithecia dark, separate, at first-embedded, later erumpent, globose, ostiolate, setose, 240—400 μ, setae dark-brown septate, 192—480 × 4 μ. Asci cylindrical, paraphysate, hyaline, unitunicate, octosporous, 60—84 × 8 μ. Ascospores fusiform, hyaline, uniseriate, 1-celled, 12—16 × 8 μ.

On dead branches of *Cestrum nocturnum,* (Solanaceae) collected by A. K. Pande at Mahabaleshwar (India) on 15th Oct. 1967, M. A. C. S. Herb. No. 639 (Type).

This genus is a new addition to Indian Fungi and was therefore compared with the type species *P. chilensis,* Speg. and found to be new to Science. *Cestrum nocturnum* constitutes a new host record for this genus.

4. *Teichospora obducens* (Fr.) Fuck.

Infections spots black, minute, scattered. Perithecia embedded, black globose, separate, ostiolate, 180—320 × 200—340 μ. Asci long, cylindrical,

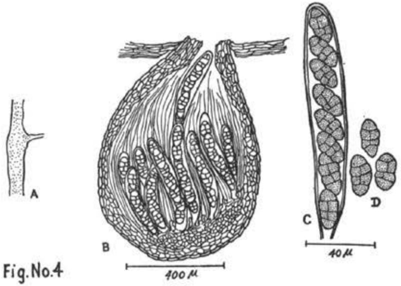

Fig. 4. *Teichospora obducens* (Fr.) Fuck. — A Habti. — B Perithecium. — C Ascus. — D Ascospores

hyaline, paraphysate, bitunicate, 8-spored, 132—140 × 20 μ. Ascospores dark brown, uniseriate, muriform, oblong, with 3 transverse and 1—2 longitudinal septa, 20 × 12 μ.

Collected on dead stems of *Dalbergia melanoxylon,* G. & P. (Papilionaceae) by A. K. Pande at Poona on 26th Sept. 1967. M. A. C. S. Herb. No. 640 (Type).

Likhite (1937) reported the genus for the first time from India on *Pennisetum typhoideum,* followed by another report of *T. indica* on *Cycas revoluta* by Tandon & Bilgrami (1960) and *T. lantanae* on *Lantana camara* by R. Rao (1960) but none on this host. On the basis of comparative studies, the writer's collection agrees with the type species of the genus and forms a new host record.

Material of the above species is being deposited in Herb. Indiae Orient. New Delhi, India, Herbarium, C. M. I., Kew, Surrey, England; besides Mycological Herbarium M. A. C. S., Poona 4, India.

Acknowledgement

My sincere thanks are due to Prof. M. N. Kamat for his interest and guidance and Dr. F. Petrak for Latin diagnosis.

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Fungi of Haiti

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The Republic of Haiti comprises the western third of Hispaniola, a tropical island of the West Indies shared with the Dominican Republic. Bordered on the East by the Dominican Republic and bounded on the North and South by the Atlantic Ocean and Caribbean Sea, respectively, Haiti consists largely of two main peninsulas jutting West into the Windward Passage. Four-fifths of its 10,700 square miles is mountainous and elevations extend from sea level to almost 8,800 feet. It has a normal tropical climate with little seasonal change and temperatures in the lowlands range between 70° and 85° F.

The topography and climate of Haiti are conducive to the occurrence of a wide variety of fungi, but its mycoflora is far less well known than that of its neighbor, the Dominican Republic. Pierre-Louis (50) in 1955 published a brief manual covering the important diseases of economic plants of Haiti, a treatment that included approximately 70 fungus pathogens. More recently, Ciferri (15) included report of 93 Haitian fungi in his comprehensive volume listing more than 2,000 Dominican fungi. Although these two works overlap somewhat, they have heretofore comprised the most extensive listings available for Haitian fungi.

While it is true that fungi know no political boundaries, it is also true that an enumeration of the fungi known to occur in a particular country can be very useful to mycologists, plant pathologists and other workers interested in plant diseases and mycofloristics. Also, the fungi known from any region depend largely upon the specific interests of the collectors and work done even in adjacent countries can contribute equally to a more comprehensive knowledge of the overall mycoflora. The present account of Haitian fungi, for example, lists 51 Myxomycetes and Phycomycetes, 32 of which were not reported by Ciferri (15) for either the Dominican Republic or Haiti. As might be expected, only 9 of the 51 were treated by Piere-Louis (50) as economic pathogens.

The present work was begun to bring together some of the scattered

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reports of Haitian fungi and to report the unpublished Haitian specimens present in our National Fungus Collections at Beltsville. For many years the National Fungus Collections staff has had a special interest in the fungi of countries of Tropical America and has maintened geographical records of acquisitions from these countries. These records were utilized by Cifferi (15) for his comprehensive Dominican account, but 48 Haitian species now present in the herbarium seem unreported. These and 16 other fungi identified only to genus are indicated as new records for Haiti by marking each with an asterisk (*). New host records are included but are not specifically pointed out. The total number of Haitian fungi enumerated here is more than 375 and includes the approximately 180 species represented in the National Fungus Collections (designated "BPI") and numerous reports found in the literature. In addition to the works of Ciferri (15) and Pierre-Louis (50), particularly useful references for the present account were the distribution maps published by the Commonwealth Mycological Institute (17) and the Plant Quarantine interception lists of the U. S. Department of Agriculture (60).

Since both herbarium specimens and literature reports included many that employed fungus names not currently acceptable, an attempt has been made to modernize the nomenclature used for these fungi. No attempt has been made, however, to list complete synonymy and no new taxa have been employed. The original publications for species' names are cited, together with such synonyms as seemed needed or appropriate. Species are arranged alphabetically within the major Classes of fungi with the one exception of the Uredinales which, for logistic reasons, are listed alphabetically within the Order at the beginning of the Class Basidiomycetes. Available collection data are included as feasible and sources of previous reports utilized are given for each entry by numbers in parentheses that refer to corresponding numbers of the "Literature Cited" section which follows the plant and insect hosts lists.

Mycomycetes

Arcyria cinerea (Bull.) Pers., Syn. Meth. Fung., p. 184. 1801. Concot, 21 III, 1938, leg. O. F. Cook, det. J. A. Stevenson. BPI, (15), (20).

A. incarnata (Pers.) Pers., Obs. Myc. *1*: 58. 1896. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr (No. 1687). (20).

Ceratiomyxa fruticulosa (Müll.) MacBr., N. Amer. Slime-Moulds, p. 18. 1899. Vic. Savane-Zombie, on decaying log, 8 VI, 1955, leg. & det. M. L. Farr (No. 1683). (20).

Comatricha elegans (Racib.) List., Guide Brit. Mycet. ed. 3. p. 31. 1909. Vic. Savane-Zombie, on decaying log, 8 VI, 1955, leg. & det. M. L. Farr (No. 1674). (20).

**Cribraria tenella* Schrad., Nov. Gen. Pl., p. 6. 1797. On *Spondias* sp., 26 VI, 1927, leg. O. F. Cook, det. M. L. Farr. BPI.

Diderma hemisphaericum (Bull.) Hornem., Fl. Dan. *33*: 13. 1829. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr (No. 1693). (20).

Didymium clavus (Alb. & Schw.) Rab., Deutsch. Krypt.-Fl. *1*: 280. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr. (20).

D. ? difforme (Pers.) S. F. Gray, Nat. Arr. Brit. Pl. *1*: 571. 1821. Vic. Savane-Zombie, on decaying log in pine forest, 8 VI, 1955, leg. & det. M. L. Farr (No. 1684). (20).

D. iridis (Ditm.) Fr., Syst. Myc. *3*: 120. 1829. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr (Nos. 1694, 1698). (20).

D. nigripes (Lk.) Fr., Syst. Myc. *3*: 119. 1829. Vic. Savone-Zombie, on decaying log, 8 VI, 1955, leg. & det. M. L. Farr (No. 1678). (20).

D. squamulosum (Alb. & Schw.) Fr., Symb. Gast., p. 19. 1818. Agric. College, Damiens; vic. Savane-Zombie. On decaying debris & log, 6—8, VI, 1955, leg. & det. M. L. Farr (Nos. 1682, 1686). (20).

Lamproderma arcyrionema Rost., Monogr., p. 208. 1874. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr (Nos. 1691, 1697). (20).

L. scintillans (Berk. & Br.) Morg., Jour. Cincinnati Soc. Nat. Hist. *16*: 131. 1894. Vic. Savane-Zombie, on decaying log in pine forest, 8 VI, 1955, leg. & det. M. L. Farr (No. 1676). (20).

**Physarum* sp., Thor, on rotten trunk of *Carica* sp., 25 VIII, 1927, leg. O. F. Cook. BPI.

P. cinereum (Batsch) Pers., Neues Mag. Bot. *1*: 89. 1794. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr (No. 1694). (20).

P. compressum Alb. & Schw., Consp. Fung., p. 97. 1805. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr (No. 1688). (20).

P. nicaraguense MacBr., Bull. Nat. Hist. Univ. Iowa *2*: 382. 1893. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr (No. 1689). (20).

P. pusillum (Berk. & Curt.) G. List. in List., Mycet. ed. 2, p. 64. 1911. Thor; Agric. College, Damiens. On decaying debris, 25 VIII, 1927, 6 VI, 1955, leg. O. F. Cook, M. L. Farr, det. M. L. Farr. BPI, (20).

**P. superbum* Hagelst., Mycologia *32*: 385. 1940. Font de Negre, 27 VI, 1927, leg. O. F. Cook, det. M. L. Farr.

Stemonitis axifera (Bull.) MacBr., N. Amer. Slime-Moulds, p. 120. 1899. Agric. College, Damiens, on decaying debris, 6 VI, 1955, leg. & det. M. L. Farr (No. 1695). (20).

Phycomycetes

Albugo ipomoeae-panduranae (Schw.) Swing, Jour. Myc. *7*: 112. 1892. On *Ipomoea batatas* (L.) Lam. (50).

Albugo platensis (Speg.) Swing. Jour. Myc. *7*: 113. 1892. Port-au-Prince, on *Commicarpus scandens* Standley, XI, 1918, leg. J. N. Rose *23981*, det. W. W. Diehl. BPI. Also (15).

Allomyces anomalus Emerson, Lloydia *4*: 133. 1941. Font Parisien, isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott; Central Haiti, isol. ex water from the Coupe à l'Inde and Estère Rivers, 15 XII, 1939, leg. A. Haspil, det. F. T. Wolf. (52), (63).

A. arbuscula Butl., Ann. Bot. London *25*: 1027. 1911. Northern, Southern and Western Haiti, isol. ex water from the Guinte, Cavaillon and Momanee Rivers, XII, 1939, leg. A. Haspil, det. F. T. Wolf. (63).

Aphanomyces laevis De By., Jahrb. wiss. Bot. *2*: 179. 1860. Furcy, isol. ex laterite soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

Brevilegnia diclina Harvey, Jour. Elisha Mitchell Sci. Soc. *42*: 243. 1927. Refuge, isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

B. linearis Coker & Braxton, in Coker, Jour. Elisha Mitchell Sci. Soc. *42*: 214. 1927. Refuge, isol. ex laterite soil of pine forest, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

Cladochytrium replicatum Karling, Amer. Jour. Bot. *18*: 538. 1931. Cabaret, isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

Dictyuchus sp. Poste Terre Rouge, isol. H 8 ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott as near *D. monosporus* Leitgeb. but possibly a new species. (52).

Haplosporangium decipiens Thaxt., Bot. Gaz. *58*: 364. 1914. Type locality: Haiti, on dung of *Selenodon paradoxus*. Quoted also by Ciferri (15).

Leptolegniella keratinophilum Huneycutt, Jour. Elisha Mitchell Sci. Soc. *68*: 110. 1952. Cul-de-Sac, Furcy, and Poste Terre Rouge, isol. ex soil, summer, 1958, leg. K. W. King, det W. W. Scott. (52).

Peronospora parasitica ([Pers.] Fr.) Fr., Summa Veg. Scand., p. 493. 1849. Mont des Commissaires, Kenscoff, rare in the plains, on *Brassica oleracea* L. (50).

Phytophthora cinnamomi Rands, Meded. Inst. Plantenz. Buitenz. *54*: 41. 1922. On *Ananas comosus* (L.) Merr. Uncertain identification reported by (40) as "heart rot." Included by (17, map 302, 1955) but not (17, map 302, revised to 1963).

P. citrophthora (Sm. & Sm.) Leonian, Amer. Jour. Bot. *12*: 445. 1925. On *Citrus* sp. (50).

P. infestans (Mont.) D By., Jour. Roy. Agric. Soc. II *12*: 240. 1876. On *Lycopersicon esculentum* Mill., *Solanum tuberosum* L. (50).

P. palmivora (Butl.) Butl., Sci. Rep. Agric. Res. Inst. Pusa 1918—19, p. 82. 1919. (Syn. *P. faberi* Maubl.). On *Theobroma cacao* L. (48), (50).

P. parasitica Dast., Mem. Dep. Agric. India Bot. *5* (4): 226. 1913. [= *P. nicotianae* B. de Haan var. *parasitica* (Dast.) Waterh., Commonw. Myc. Inst. Myc. Paper 92, p. 14. 1963]. On *Citrus* sp. (50).

Plasmopara viticola (Berk. & Curt.) Berl. & de T. in Sacc., Syll. Fung. *7*: 239. 1888. On *Vitis vinifera* L. (50).

Pseudoperonospora cubensis (Berk. & Curt.) Rostow, Ann. Inst. Agron. Mosc. *9*: 47. 1903. (Syn. *Peronoplasmopara cubensis* Clint.). On *Cucumis melo* L. (50).

Pythium sp. On *Citrullus vulgaris* Schrad. (50).

P. afertile Kanouse & T. Humph., Pap. Mich. Acad. Sci. Arts Lett. *8*: 137. 1927. Cabaret, Damiens, and Refuge, isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

P. catenulatum Matthews, Stud. Gen. Pythium, p. 47. 1931. Poste Terre Rouge, isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

P. debaryanum Hesse, Inaugr. Dissert., Halle. 1874. General distribution, isol. ex soil from 9 diff. sites, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

P. intermedium D By., Bot. Zeit. *39*: 553—558. 1881. Isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

P. mamillatum Meurs, Wortelrot Verrorz. Schim. Ges. *Pythium* Pringsh. *Aphanomyces* D By. 1928. Font Parisien, isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

P. ultimum Trow, Ann. Bot. *15*: 269—312. 1901. Cul-de-Sac, isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

P. undulatum Petersen, Bot. Tidssk. *29*: 345—440. 1909. Isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

P. vexans, D By., Jour. Bot. *14*: 105—126. 1876. Cul-de-Sac, isol. ex soil, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

Rhizophlyctis rosea (D By. & Wor.) Fisch., Rabenh. Krypt.-Fl. *1*: 122, 1892. General distribution, isol. ex soil from approx. 20 sites, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

R. spp. Forms indeterminable to species because of scanty material were isolated ex soil from 8 sites, summer, 1958, leg. K. W. King, det. W. W. Scott. (52).

Rhizopus stolonifer (Ehrenb. ex Fr.) Vuill., Rev. Mycol. *24*: 54. 1902. (Syn. *R. nigricans* Ehrenb.). On *Capsicum annuum* L., *Citrus aurantifolia* (Christm.) Swing. *Ipomoea batatas* (L.) Lam. (60, lists for 1931, 1930, 1929, respectively).

Ascomycetes

Acrospermum maxoni Farl., in Riddle, Mycologia *12*: 179. 1920. On *Polypodium induens* Maxon. (15).

Antennnospora caribbea Meyers, Mycologia *49*: 503. 1957. Port-au-Prince, on *Pinus* sp. submerged off shore, May, 1954, leg. et det. S. P. Meyers. (38).

**Anthostomella* sp. Morne Sel, on *Acrista* sp., 23 VIII, 1924, leg. O. F. Cook. BPI.

Cantharomyces haytiensis Thaxt., Mem. Amer. Acad. Arts Sci. *16* (1): 23. 1931. Diquini, on the elytra and head of the insect *Trogophloeus fulvipes* Er., leg. Mann No. 2764, det. et descr. as n. sp. R. Thaxter (l. c.). Listed by (15).

Capnodium sp. General distribution, but most prevalent in the Bion region of Northwest Haiti, on *Coffea arabica* L. (50).

C. citri Berk. & Desm., Jour. Roy. Hort. Soc. *4*: 243. 1849. On *Citrus* spp. (50).

**Caudella psidii* Ryan, Mycologia *16*: 179. 1924. Limbe, on *Psidium guajava* L., 4 VII, 1931, leg. M. Kisliuk & C. E. Cooley, det. J. A. Stevenson. BPI.

Ceratocystis fimbriata Ell. & Halst., New Jersey Agric. Exp. Sta. Bull. *76*: 14. 1890. [Syn. *Ceratostomella fimbriata* (Ell. & Halst.) J. A. Elliott]. General distribution, on *Ipomoea batatas* (L.) Lam. (50), on *Cocos, Hevea, Ipomoea, Theobroma cacao* L. 1959. (17, map no. 91, revised to 1959).

C. paradoxa (Dade) C. Moreau, Rev. Mycol. Suppl. Colonial *17*: 22. 1952. [Imperfect state = *Thielaviopsis paradoxa* (De Seyn.) Höhn.]. On *Ananas, Musa, Saccharum*. (17, map no. 142, revised to 1958).

**Coccomyces limitatus* (Berk. & Curt.) Sacc., Sylloge Fung. *8*: 747. 1889. St. Michel de l'Atalaye, on *Clusia rosea* Jacq., 15 XI, 1925, leg. E. C. Leonard, det. W. W. Diehl. BPI. Also (15).

**Cookeina sulcipes* (Berk.) Kuntze, Rev. Gen. Pl. *2*: 849. 1891. La Vallée, Tortue Island, on dead stem, 28 XII, 1928—91, 1929, leg. E. C. & G. M. Leonard, det. E. K. Cash. BPI, also (15, as *Trichoscypha sulcipes* Berk. apud Hook.).

Diaporthe citri Wolf, Jour. Agric. Res. *33*: 625. 1926. On *Citrus* sp. 1947. (17, map. no. 126, 1966).

D. vexans Gratz: See *Phomopsis vexans* (Sacc. & Syd.) Harter.

Didymella pinodes (Berk. & Blox.) Petr., Ann. Myc. *22*: 17—18. 1924. Cited in assoc. with *Ascochyta pisi* Lib. & *A. pinodella* L. K. Jones as causing necrosis of *Pisum sativum* L. (50).

Dimerina jacquiniae Garman, Mycologia *7*: 337. 1915. (Syn. *D. monensis* F. L. Stevens). Gros Morne, Artibonite, on *Jacquinia linearis* Jacq., 18 II, 1926, leg. E. C. Leonard, det. W. W. Diehl. BPI. Also (15).

Diplocarpon rosae Wolf, Bot. Gaz. *54:* 231. 1912. [Imperfect state: *Actinonema rosae* (Lib.) Fr., syn. *Marssonina rosae* (Lib. Lind.] General distribution, on *Rosa* spp. (50) and (60, lists for 1934, 1935).

Dothidella basirufa (Berk. & Curt.) Sacc., Syll. Fung. *2*: 631. 1883. Mission, Fonds Varettes, on *Asplenium dentatum* L., 17 IV—4 V, 1920, leg. E. C. Leonard, det. W. W. Diehl (?). BPI. Also (15).

Elsinoë ampelina Shear, Phytopath. *19:* 677. 1929. [Imperfect state: *Sphaceloma ampelinum* D By., syn. *Gloeosporium ampelophagum* (Pass.) Sacc.]. General distribution, on *Vitis vinifera* L. (50).

E. fawcettii Bitanc. & Jenkins, Phytopath. *26*: 395. 1936. (Imperfect stage: *Sphaceloma fawcettii* Jenkins). General distribution, on *Citrus* sp. (17, map no. 125, 1966), (50).

E. mangiferae Bitanc. & Jenkins, Arq. Inst. Biol. São Paulo *17*: 218. 1946. General distribution, on *Mangifera indica* L. (60, lists for 1959, 1964, 1965, 1966).

E. puertoricensis Jenkins & Bitanc., Mycologia *38:* 65. 1946. Vic. Port. de Paix, on *Randia parvifolia* Lam., 22 XII, 1928, leg. E. C. Leonard 1103 (PARATYPE), det. A. E. Jenkins. BPI, also (26).

E. sacchari Lo, Proc. Biol. Soc. Washington *77*: 1. 1964. (Imperfect state: *Sphaceloma sacchari* Lo). On *Saccharum officinarum* L. (22).

**Encoelia heteromera* (Mont.) Nannf. Trans. Brit. Myc. Soc. *23*: 239. 1939 [Syn. *Dermatea aureo-tincta* Rehm, *Peziza heteromera* Mont., *Midotis heteromera* (Mont.) Sacc.] Bayeux, on *Funtumia elastica* Stapf, 18 I, 1925, leg. J. R. Weir, det. E. K. Cash. BPI.

Erysiphe cichoracearum DC. ex Mérat, Nouv. Fl. Env. Paris, ed 2, *1*: 132. 1821. General distribution, on *Citrullus vulgaris* Schrad., *Cucumis melo* L., *Cucurbita moschata* Dcne., *Nicotiana tabacum* L. (15, as *Oidium tabaci* Thuem., since no perfect state was produced), (50).

E. polygoni DC. ex Mérat, Nouv. Fl. Env. Paris, ed. 2, *1*: 132. 1821. General distribution, on *Phaseolus vulgaris* L., *Vigna sinensis* (Torner) Savi. (50).

Eudarluca australis Speg., Fungi Paulist., p. 22, 1908. On rust on *Eleocharis* sp., IX, 1926, leg. R. Ciferri, det. ed distrib. F. Petrak, *Mycotheca generalis* 639. (49). [Erroneously listed for Haiti — should be Dominican Republic].

**Eutypa* sp. Bayeux, on *Funtumia elastica* Stapf, 19 I, 1925, leg. J. R. Weir, det. C. L. Shear & W. W. Diehl. BPI.

E. diantherae (Lewis) Petr., Ann. Myc. *32*: 356. 1934. (Syn. *Bagnisiella eutypoides* Ell. & Ev.). Vic. of Bassin-Blue, on *Dianthera americana* L., 25 IV, 1929, leg. E. C. & G. M. Leonard, det. W. W. Diehl. BPI. Also (15).

Gibberella fujikuroi (Saw.) Wr., Zeitschr. Parasitenk. *3*: 514. 1931. (Conidial state: *Fusarium moniliforme* Sheldon). On *Saccharum officinarum* L. (17, map no. 102, 1963), (36).

Glomerella cingulata (Ston.) Spauld. & Schrenk, U. S. Dept. Agr. Bur. Pl. Ind. Bull. *44*: 29. 1903. [Syn. *G. gossypii* Edgerton, ***G. manihotis*** (Sacc.) Petr.; conidial state = *Colletotrichum gloeosporioides* Penz.].

General distribution, on *Gossypium barbadense* L., *Manihot esculenta* Crantz, *M. glaziovii* Müll.-Argov. (15), (50).

G. tucumanensis (Speg.) Arx & Müller, Beitr. Krypt.-Fl. Schweiz *11* (1): 195. 1954. On *Saccharum officinarum* L. (17 map no. 186. 1962), (36).

Godronia parasitica Seaver, Mycologia *24*: 353. 1932. Marmelade, on *Tetrazygia longicollis* Urb. & Cogn., 25 VIII, 1903, leg. G. V. Nash (No. 793), det. F. J. Seaver. (54), (55), (56).

Guignardia bidwellii (Ell.) Viala & Rav., Bull. Soc. Myc. Fr. *8*: 63. 1892. General distribution, on *Vitis vinifera* L. (50).

G. clusiae F. L. Stevens, Trans. Ill. Acad. Sci. *10*: 183. 1917. Vic. St. Michel de l'Atalaya, Department du Nord, on *Clusia rosea* Jacq., 15 et 18, XI, 1925, leg. E. C. Leonard (Nos. 7020, 7160), det. W. W. Diehl. BPI, also (15).

**G. manihoti* Sacc., Ann. Myc. *12*: 304. 1914. Bayeux, on *Manihot glaziovii* Müll.-Argov., 18 I, 1925, leg. J. R. Weir, det. V. K. Charles. BPI.

**Hypoxylon nummularium* (Bull. ex Fr.) Fr. var. *pseudopachyloma* (Speg.) J. H. Miller, Monogr. World Spec. Hypoxylon, p. 125. 1961. (Syn. *H. pseudopachyloma* Speg.). Bayeux, on *Hevea brasiliensis* Müll.-Argov., 18 I, 1925, leg. J. R. Weir, det. J. H. Miller. BPI.

H. rubiginosum (Pers. ex Fr.) Fr., Summa Veg. Scand. p. 384. 1849. Bayeux, on *Hevea brasiliensis* Müll.-Argov., *Theobroma cacao* L., 18 I, 1925, leg. J. R. Weir (Nos. 66624, 66625), det. W. W. Diehl [redet. — at least as on *Hevea* — by J. H. Miller as *H. rubiginosum* var. *tropica* J. H. Miller]. BPI, also (15), (39).

H. stygium (Lév.) Sacc., Syll. Fung. *1*: 379. 1882. Bayeux, on *Castilla elastica* Cerv., *Mimusops globosa* Gaertn., 18 I, 1925, leg. J. R. Weir (Nos. 66626, 66627, 66628), det. J. H. Miller, BPI, also (39), and (15), *H. polyspermum* Mont. and *H. rubiginosum* (Pers. ex Fr.) Fr.

Hysterostomina palmae F. L. Stevens, Ill. Biol. Monogr. *8* (3): 10. 1923. St. Michel, on *Coccothrinax* sp., 21 VIII, 1924, leg. O. F. Cook (No. 413), det. W. W. Diehl. BPI, also (9), (15).

**Irenopsis mölleriana* (Wint.) F. L. Stevens, Ann. Myc. *25:* 437. 1927. Vic. Ennery, Dept. l'Artibonite, on *Sida urens* L., 20 I, 1926, leg. E. C. Leonard (No. 903a), det. W. W. Diehl. BPI.

Isariopsis griseola Sacc., Michelia *1*: 273. 1878. Vallée de Jacmel, on *Phaseolus vulgaris* L., IV, 1954. (50).

**Kretzschmaria clavus* (Fr.) Fr., Summa Veg. Scand. pt. 2. p. 409. 1849. Vic. Marmelade, Dept. du Nord, on tree, 19 XII, 1925, leg. E. C. Leonard (No. 8132 b), det. W. W. Diehl. BPI.

Laboulbenia fuliginosa Thaxt., Proc. Amer. Acad. Arts Sci. *50*: 28. 1914. Ennery, on *Haltica jamaicensis* Fab., 1911, leg. W. M. Mann, det. R. Thaxter (No. 2491). On *H. plebeia* Oliv., det. R. Thaxter (No. 1785). (15).

L. idiostoma Thaxt., Proc. Amer. Acad. Arts Sci. *50*: 28. 1914. Ennery, on *Haltica jamaicensis* Fab., 1911, leg. W. M. Mann, det. R. Thaxter (No. 2491 TYPE). (15).

Leptosphaeria sacchari B. de Haan, Mededel. Proefst. Sulk W-Java, p. 25. 1892. La Mourriere, on *Saccharum officinarum* L., 22 III, 1922, leg. et det. V. K. Charles (No. 1500). BPI, also (57).

Meliola sp. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Clusia rosea* Jacq., 15 XI, 1925, leg. E. C. Leonard (No. 7020). BPI, also (15).

**M. capsicola* F. L. Stevens, Ill. Biol. Mongr. *2*: 509. 1916. Vic Pilate, Dept. du Nord, on *Capsicum frutescens* L., 10 II, 1926, leg. E. C. Leonard (No. 9664 a), det. J. A. Stevenson. BPI.

M. lippiae Maubl., Bull. Soc. Myc. France *19*: 291. 1903. Vic. Port-au-Prince, on *Phyla nodiflora* (L.) Greene (Syn. *Lippia nodiflora* Michx.), 15—18 VII, 192(0?), leg. E. C. Leonard (No. 3436 b), det. J. A. Stevenson. BPI, also (15).

**M. trichostroma* (Kunze) Toro, Jour. Dept. Agr. Univ. Porto Rico *36*: 62. 1952. (Syn. *M. psidii*Fr.). Limbe, on *Psidium guajava* L., 4 VII, 1931, leg. M. Kislink & C. E. Cooley (No. 53), det. J. A. Stevenson. BPI.

Mycosphaerella brassicicola (Duby) Johans. ex Oud., Rev. Champ. Pays-Bas *2*: 210. 1897. On *Brassica* spp. (17, map 189, 1960).

M. citrullina (C. O. Sm.) Gross., Tech. Bull. New York Agr. Exp. Rec. No. 9, p. 226. 1909. On *Cucumis sativus* L., *Sechium edule* (Jacq.) Sw. (60, lists for 1941, 1949).

**M. clusiae* F. L. Stevens, Trans. Ill. Acad. Sci. *10*: 181. 1917. St. Michel, on *Clusia* sp., 25 VIII, 1924, leg. O. F. Cook (No. 6415), det. W. W. Diehl. BPI.

M. musicola Leach, Trop. Agr. (Trinidad) *18*: 92. 1941. (Imperfect state: *Cercospora musae* Zimm.). On *Musa* sp., *M. paradisiaca* L. subsp. *sapientum* (L.) Kuntze. (17, map 7, 1963), (50).

M. pinodes (Berk. & Blox.) Vest.: See *Didymella pinodes* (Berk. & Blox.) Petr.

Myxotrichum thaxteri Kuehn, Mycologia *47*: 878. 1955. Cult. isol. ex *Solenodon* (opossum-shrew) dung by R. Thaxter, det. H. H. Kuehn. Type strain: NRRL 1714. (31).

Naetrocymbe scoriadea Bat. & Cif., Saccardoa, No. 2, p. 164. 1963. Bayeux, near Port Magot, on *Jambosa jambos* (L.) Mill. (Syn. *Eugenia jambosa* L.), VIII, 1903, leg. G. V. Nash (No. 65), det. A. C. Batista & R. Ciferri. (8).

Nectria diploa Berk. & Curt., Jour. Linn. Soc. *10*: 378. 1869. On *Citrus sinensis* (L.) Osbeck. (60, list for 1940).

Nummularia broomeiana (Berk. & Curt.) J. H. Miller, Mycologia *33*: 77. 1941. (Syn. *Hypoxylon broomeianum* Berk. & Curt.). Bayeux, on *Hevea brasiliensis* Müll.-Argov., 18 I, 1925, leg. J. R. Weir, det.

J. H. Miller (Nos. 66621, 66622). BPI, and (15, reported as *N. anthracodes* (Fr.) Cke. and *N. cincta* Ferd. & Winge).

Ophiobolus heveae P. Henn., Hedwigia *43:* 243. 1904. Bayeux, on *Hevea brasiliensis* Müll.-Argov., 1 XII, 1925, leg. (?) Jenkins, det. V. K. Charles (No. 72543). BPI, also (15).

Phaeochaetia woronichinii Cif. & Bat., Sydowia, Beih. *3:* 77. 1962. (Syn. *Aithaloderma hederae* (Pat.) Woron. var. *caucasicum* Woron.). Bayeux, near Port Margot, on *Jambosa jambos* (L.) Mill., VIII, 1903, leg. G. V. Nash (No. 65), det. R. Ciferri & A. C. Batista. (8).

**Phaeosphaerella* sp., vic. Ennery, Dept. de l'Artibonite, on *Mimosa leonardii* Britt. & Rose, 22 I, 1926, leg. E. C. Leonard (No. 9105 a), det. W. W. Diehl. BPI.

Phyllachora fusicarpa Seaver in Britt. & Millsp., The Bahama Flora, p. 633. 1920. Vic. St. Michel de l'Atalaye, Dept. de Nord, on *Duranta erecta* L., 7 XII, 1925, leg. E. C. Leonard (No. 7871 a), det. W. W. Diehl. BPI, also (15). This specimen must also be the basis for Ciferri's (15) listing of "*P. brevicarpa* Seaver (Ubi?)" which seems not to exist.

P. randiae Rehm., Hedwigia *36*: 371. 1897. (Syn. *Trabutia randiae* Theiss. & Syd.). On *Randia aculeata* L. (Syn. *R. mitis* L.). (53).

P. verrucosa Chardon, Jour. Dept. Agr. Puerto Rico *16*: 186. 1932. Vic. Cap-Haitien, on *Eugenia maleolens* Poir. [Syn. *E. buxifolia* (Sw.) Willd.], 4 IX, 1903, leg. G. V. Nash (No. 956 — TYPE), det. C. E. Chardon. BPI, also (12).

Physalospora rhodina (Berk. & Curt.) Cke.: See *Botryodiplodia theobromae* Pat.

P. tucumanensis Speg.: See *Glomerella tucumanensis* (Speg.) Arx & Müller.

Rickia depauperata Thaxt., Proc. Amer. Acad. Arts & Sci. *52:* 22. 1916. Haiti or Dominican Republic (?), on *Celaenopsis* sp. (15).

R. dichotoma Thaxt., Proc. Amer. Acad. Arts & Sci. *52*: 20. 1916. Haiti or Dominican Republic (?), on *Euzecornis* sp. (15).

**Rosellinia* sp., Port au Prince, on dead hardwood, 14 I, 1925, leg. et det. J. R. Weir. BPI. Also, ? *Rosellinia* sp. (reported as black rot of roots), on *Theobroma cacao* L., *Coffea arabica* L. (50).

Sclerotinia sp., on *Annona muricata* L. (60, list for 1935).

Sphaerotheca pannosa (Wallr. ex Fr.) Lév., Ann. Sci. Nat. III, *15:* 138. 1851. On *Rosa* sp. (50).

Sphaerulina coffeicola Speg. An. Mus. Nac. Hist. Nat. *31*: 412. 1922. Vic. Kalacroix, Dept. de L'Artibonite, on *Coffea arabica* L., 11 XII, 1925, leg. E. C. Leonard (No. 7898), det. W. W. Diehl. BPI, also (15).

Taphrina deformans (Berk.) Tul., Ann. Sci. Nat. Bot. 5e Ser. *5:* 128. 1866. On *Prunus persica* (L.) Batsch. (50).

Torrubiella confragosa Mains, Mycologia *41*: 305. 1949. Bayeux, on Coccidae (scale-insects) on *Hevea brasiliensis* Müll.-Argov., 1925, leg. J. R. Weir, det. E. B. Mains. BPI, MICH, also (15, as *T. rubra* Pat. & Lagerh.), (35).

**Trabutia* sp., Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Brya buxifolia* Urb., 17 XI, 1925, leg E. C. Leonard (as No. 7103 a), det. W. W. Diehl (as a n. sp., but with material too scanty for basis of description). BPI.

Tryblidiella sp., Bayeux, on *Theobroma cacao* L., 18 I, 1925, leg. J. R. Weir. BPI, also (15).

**T. rufula* (Spreng.) Sacc., Bayeux, on *Theobroma cacao* L., 18—19 I, 1925, leg. J. R. Weir, det. W. W. Diehl. BPI (as Nos. 66616, 66619).

**Xylaria arbuscula* Sacc., Michelia *1*: 249. 1878. Bayeux, on *Theobroma cacao* L., 18 I, 1925, leg. J. R. Weir, det. J. H. Miller, BPI.

**X. dichotoma* (Mont.) Mont., Syll. Plant. Crypt. p. 204, 1856. Bayeux, on Palm, 18 I, 1925, leg. J. R. Weir, det. J. H. Miller. BPI.

**X. fastigiata* Fr., Nova Acta Soc. Sci. Upsal. Ser. 3, *1*: 127. 1855 (1851). Bayeux, on *Hevea brasiliensis* Müll.-Argov., 18 I, 1925, leg. J. R. Weir, det. J. H. Miller. BPI.

**X. multiplex* (Kunze ex Fr.) Fr., Nova Acta Soc. Sci. Upsal. Ser. 3, *1*: 127. 1855 (1851). Bayeux; vic. La Vallée, Tortue Island; vic. Pikini, Gonave Island; on *Hevea brasiliensis* Müll.-Argov. and indet. dead wood; 6 VII, 1920; 18 I, 1925; 28 XII, 1928 — 9 I, 1929; leg. E. C. Leonard; J. R. Weir; E. C. & G. M. Leonard (as No. 11358); det. J. H. Miller. BPI.

X. poitei (Lév.) Fr., Nova Acta Soc. Sci. Upsal. Ser. 3, *1*: 125. 1855 (1851). Vic. St. Michel de l'Atalaye, Dept. du Nord, on rotten log, 15 XII, 1925, leg. E. C. Leonard (as No. 8030), det. C. L. Shear & W. W. Diehl, confirmed J. H. Miller. BPI, also (15).

Basidiomycetes

Uredinales

Aecidium cordiae P. Henn., in Bres., P. Henn. & Magn.; Bot. Jahrb. *17*: 491. 1893. On *Cordia* spp., incl. Type on *C. bullata* L. [Syn. *Varronia bullata* (L.) Jacq.]. (2), (10), (24), (59).

A. rumicis Schlecht., Flora Berolin., Part II, p. 114. 1824. Vic. Port-au-Prince, on *Rumex obtusifolius* L., 1927, leg. R. Duvivier, det. R. Ciferri (Mycofl. Dom. Exs. No. 385). BPI, also (15).

A. wedeliae Earle: See *Endophyllum wedeliae* (Earle) Whetz. & Olive.

Cerotelium desmium Arth.: See *Phakopsora gossypii* (Arth.) Hirat. f.

Coleosporium ipomoeae (Schw.) Burr., Bull. Ill. Lab. Nat. Hist. *2*: 217. 1885. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Ipomoea nil* (L.) Roth, 17 XI, 1925, leg. E. C. Leonard (No. 7084 a), det W. W. Diehl; Vic. Vallée de Jacmel, on *I. batatas* (L.) Lam., IV, 1954, leg. & det. F. Pierre-Louis. BPI, (50).

Dicaeoma polygoni-amphibii (Pers.) Arth.: See *Puccinia polygoni-amphibii* Pers.

D. purpureum Kuntze: See *Puccinia purpurea* Cke.

Endophyllum wedeliae (Earle) Whetz. & Olive, Amer. Jour. Bot. *4*: 49. 1917. (Syn. *Aecidium wedeliae* Earle). Les Cayes, on *Wedelia trilobata* (L.) Hitchc. (Syn. *W. carnosa* Rich.), 17 VII, 1910, leg. et det. E. Mayor (No. 135). (37).

Kuehneola gossypii Arth.: See *Phakopsora gossypii* (Arth.) Hirat. f.

**Mainsia tenella* Jacks. & Holw. in Jacks., Mycologia *23*: 111. 1931. Vic. Mission, Fonds Varettes, on *Rubus eggersii* (Focke) Rydb., IV, 1920, leg. E. C. Leonard (No. 3816), det G. B. Cummins. BPI. Cummins (Illustrated Genera Rust Fungi, p. 69, 1959) now refers *Mainsia* Jacks. to *Gerwasia* Rac.

Micropuccinia heterospora (Berk. & Curt.) Arth. & Jacks.: See *Puccinia heterospora* Berk. & Curt.

M. lantanae (Farl.) Arth. & Jacks.: See *Puccinia lantanae* Farl.

M. lateritia (Berk. & Curt.) Arth. & Jacks.: See *Puccinia lateritia* Berk. & Curt.

M. melampodii (Diet. & Holw.) Arth. & Jacks.: See *Puccinia melampodii* Diet. & Holw.

Nigredo appendiculata Arth.: See *Uromyces phaseoli* (Reb.) Wint.

Phakopsora gossypii (Arth.) Hirat. f., Uredin. Studies, p. 266. 1955. (Syn. *Kuehneola gossypii* Arth., *Cerotelium desmium* Arth., *Uredo gossypii* Lagerh.). Vic. Pont-au-Prince & Bayeux, on *Gossypium barbadense* L., *G.* sp., I, 1925, IV, 1926, *et seq.*, leg. J. R. Weir, O. F. Cook, *et al.*, det. G. B. Cummins *et al.* BPI, (50), (60, lists for 1962, 1965).

P. jatrophicola Cumm., Mycologia *48*: 604. 1956. Intercepted on *Jatropha gossypifolia* L., 5 X, 1962, leg. & det. H. L. Rubin (Miami No. 21636), ver. G. B. Cummins. BPI, also (60, lists for 1965, 1966).

Prospodium elegans (Schroet.) Cumm., Lloydia *3*: 67. 1940. (Syn. *Puccinia elegans* Schroet.). Vic. Pont-au-Prince, on *Tecoma stans* (L.) Juss., 1 III, 1926, leg. E. C. Leonard, det. H. S. Jackson. BPI, also (15) as *Puccinia elegans.*

P. transformans (Ell. & Ev.) Cumm., Lloydia *3:* 66. 1940. [Syn. *Nephlyctis transformans* (Ell. & Ev.) Arth.]. Vic. Port-au-Prince, on *Tecoma stans* (L.) Juss., 1 III 1926 & V, 1929, leg. E. C. Leonard (No. 10121), E. C. & G. M. Leonard (No. 15840), det. H. S. Jackson, R. W. Davidson, ver. G. B. Cummins. BPI, also (15).

Puccinia arachidis Speg., Anal. Soc. Ciem. Argent. *17*: 90. 1884. On *Arachis hypogaea* L. (50).

P. bomareae P. Henn., Hedwigia *35*: 242. 1896. Vic. Ennery Dept. de l'Artibonite, on *Bomarea ovata* Mirb., 23 I, 1926, leg. E. C. Leonard (No. 9119 b), det. H. S. Jackson. BPI, also (15).

P. elegans Schroet.: See *Prospodium elegans* (Schroet.) Cumm.

P. heterospora Bark. & Curt., Jour. Linn. Soc. *10*: 356. 1868. [Syn.

Micropuccinia heterospora (Berk. & Curt.) Arth. & Jacks.]. Vic. Mission, Fonds Varettess & Marmelade, Dept. du Nord, on *Sidia acuta* Burm. f., *S. pyramidata* Cav., IV, 1920, 19 XII, 1925, leg. E. C. Leonard (Nos. 3621 a, 8134 a), det. J. A. Stevenson, H. S. Jackson. BPI, also (2) as *Micropuccinia* on *S. acuta*.

P. iridis Rab., Deutsch. Krypt.-Fl. *1*: 23. 1844. Interception on *Iris* sp. (60, list for 1962).

P. lantanae Farl., Proc. Amer. Acad. Sci. *18*: 83. 1883. [Syn. *Micro-Puccinia lantanae* (Farl.) Arth. & Jacks.]. Vic. Port-au-Prince, on *Phyla nodiflora* (L.) Greene (Syn. *Lippia nodiflora* L.), IV—VI, 1920, leg. E. C. Leonard (Nos. 3436, 3436 a), det. J. A. Stevenson, R. W. Davidson. BPI, also (2) as *Micropuccinia*, (60, list for 1966).

P. lateritia Berk. & Curt., Jour. Acad. Nat. Sci. Phil., II, *2*: 281. 1853. [Syn. *Micropuccinia lateritia* (Berk. & Curt.) Arth. & Jacks.]. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Diodia rigida* C. & S. [Syn. *Diodella rigida* (C. & S.) Small], 17 XI, 1925, 1 I, 1926, leg. E. C. Leonard (Nos. 7131 a, 8501 b), det. H. S. Jackson. BPI, (2) as *Micropuccinia* on *Diodella*.

**P. liberta* Kern. Mycologia *11*: 412. 1919. Interception on *Eleocharis interstincta* R. Br., 1 V, 1966, leg. E. Y. Okasako, det. G. B. Cummins. BPI.

**P. malvacearum* Bert. ex Mont. in C. Gay Hist. Fis. Polit. Chile *8*: 43. 1852. Vic. Mission, Fonds Varettes; Dondon & Plaisance, Dept. du Nord. On *Malvastrum spicatum* (L.) A. Gray, *M. tricuspidatum* A. Gray (Syn. *M. coromandelianum* Garcke), IV, 1920, I, 1926, leg. E. C. Leonard (Nos. 3678, 8558 a, 9411 a), det. J. A. Stevenson, H. S. Jackson. BPI.

P. melampodii Diet. & Holw. in Holw., Bot. Gaz. *24:* 32. 1897. [Syn. *Micropuccinia melampodii* (Diet. & Holw.) Arth. & Jacks., *Puccinia tetranthi* Syd.]. General distribution, on *Synedrella nodiflora* (L.) Gaertn., *Tetranthus hirsutus* Spreng., *T. litoralis* Sw., 1908, 1925, 1927, leg. & det. various workers. (2) as *Micropuccinia*, (23), (58) as *Puccinia tetranthi*.

**P. obtecta* Pk., Bull. Buffalo Soc. Nat. Sci. *1*: 66. 1873. Interception, on *Scirpus* sp., 2 V, 1963, leg. J. I. Mason, det. A. J. Watson. BPI.

P. polygoni-amphibii Pers., Syn. Meth. Fung., p. 227. 1801. [Syn. *Dicaeoma polygoni-amphibii* (Pers.) Arth.]. Cosmopolitan, on *Polygonum punctatum* Ell. [Syn. *Persicaria punctata* (Ell.) Small, *Polygonum acre* H., B., & K.]. (2) as *Dicaeoma* on *Persicaria*, (5), (37).

P. porophylli P. Henn., Hedwigia *39* (Beibl.): 153. 1900. Vic. Anse Galette, Gonave Isl., on *Porophyllum ruderle* (Jacq.) Cass., III, 1920, leg. E. C. Leonard (No. 3220), det. R. W. Davidson. BPI, also (15).

P. pruni-spinosae Pers.: See *Tranzschelia pruni-spinosae* (Pers.) Diet.

P. purpurea Cke., Grevillea *5*: 15. 1876. (Syn. *Dicaeoma purpureum* Kuntze). General distribution, on *Sorghum vulgare* Pers., III, 1920, *et seq.*, leg. & det. various workers. BPI, also (8) as *Dicaeoma purpureum* on *Holcus sorghum,* (17, Map 212, 1962), (50), (60, list for 1939).

P. raunkaerii Ferd. & Winge, Bot. Tidsskr. *29*: 8. 1908. [Syn. *P. rivinae* (Berk. & Curt.) Speg., *Aecidium rivinae* Berk. & Curt.]. Vic. Fonds des Negres; La Vallee, Tortue Isl. On *Trichostigma octandrum* (L.) H. Walt., *Rivina humilis* L., III, 1928, V. 1929, leg. C. H. Arndt, E. C. & G. M. Leonard (No. 15499), det. J. A. Stevenson, G. B. Cummins. BPI, also (15) as *Puccinia rivinae.*

P. recondita Rob. ex Desm., Bull. Soc. Bot. France *4*: 798. 1857. (Syn. *P. rubigo-vera* Wint.). [See Cummins & Caldwell (Phytopath. *46*: 81—82. 1956) for a nomenclatural discussion of this species]. PQ interception, on *Triticum aestivum* L. (60, list for 1936) as *P. rubigo-vera* var. *tritici.*

P. rivinae (Berk. & Curt.) Speg.: See *P. raunkaerii* Ferd. & Winge.

P. rubigo-vera Wint.: See *P. recondita* Rob. ex Desm.

P. sorghi Schw., Trans. Amer. Phil. Soc., II, *4*: 295. 1832. Cosmopolitan, on *Zea mays* L. (50).

P. superior Jacks. in Jacks. & Whetz., Trans. Brit. Myc. Soc. *13*: 20. 1928. (Syn. *Uredo superior* Arth., *Dicaeoma superius* Arth.). On *Fimbristylis ferruginea* (L.) Vahl, *F. spadicea* (L.) Vahl. (4) as *Uredo,* (15), (37) as *Uredo.*

P. tetranthi Syd.; See *P. melampodii* Diet. & Holw.

P. urbaniana P. Henn., Hedwigia *37*: 278. 1898. PQ interceptions, on *Stachytarpheta jamaicensis* (L.) Vahl, 4 III & 14 VI, 1964 leg. & det. W. D. McLellan, H. L. Rubin, ver. G. B. Cummins. BPI, also (60, lists for 1964, 1965).

P. xanthii Schw., Schr. Nat. Ges. Leipzig, *1*: 73. 1822. Vic. Les Cayes, on *Xanthium strumarium* L., 17 VII, 1910, leg. & det. E. Mayor, BPI, also (37).

Ravenelia arthurii Long, Jour. Myc. *12:* 234. 1906. Syn. *R. portoricensis* Arth.). San Michel, on *Cassia emarginata* L., 5 VIII, 1905, leg. G. V. Nash & N. Taylor (No. 1393), det. (or ver.?) J. C. Arthur. (2), (5), (30), all as *R. portoricensis.*

R. portoricensis Arth.: See *R. arthurii* Long.

Sphenospora kevorkianii Linder, Mycologia *36*: 464. 1944. PQ interceptions, on *Epidendrum* sp., *Ionopsis* sp., *Oncidium pulchellum* Hook, *O.* sp., 1960—1963, leg. various, det A. J. Watson, G. B. Cummins. BPI, also (60, lists for 1961, 1962).

S. saphena Cumm., Bull. Torrey Bot. Club *87*: 40. 1960. PQ interceptions, on *Oncidium pulchellum* Hook., indet. orchid, 24 V, 1960, 20 III, 1961, leg. B. P. Stewart, C. E. Stegmaier, det. A. S. Mills, G. B. Cummins. BPI, also (60, list for 1961).

*Tranzschelia pruni-spinosae (*Pers.) Diet., Ann. Myc. *20*: 212. 1922.

(Syn. *Puccinia prun-spinosae* (Pers.) On *Prunus persica* (L.) Batsch, *P.* sp. (17, Map 223, 1962), (50) as *Puccinia pruni-spinosae.*

Uredo epidendri P. Henn., Hedwigia *35*: 254. 1896. PQ interception, reported on undetermined orchid. (60, list for 1959).

U. haitiensis Jorst., Ark. f. Bot., ser 2, *4* (5): 75. 1959. On *Bauhinia divaricata* L., leg. E. L. Ekman (No. 706), det. I. Jorstad.

U. incomposita Kern, Mycologia *11*: 143. 1919. PQ interception, on *Eleocharis interstincta* (Vahl) R. & S. (60, list for 1941).

U. nigropuncta P. Henn., Hedwigia *35*: 254. 1896. On *Bletia purpurea* (Lam.) DC., VIII, 1903, leg. G. V. Nash (No. 706), det. J. C. Arthur. (2), (3), (5), (15), (59). Fungus species name given as "*nigropunctata*" by (3) and (5).

U. oncidii P. Henn., Hedwigia *41*: 15. 1902. PQ interception on unspecified orchid. (60, list for 1960).

U. superior Arth.: See *Puccinia superior* Jacks.

U. toroiana Kern, Mycologia *20*: 76. 1928. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Vernonia cinerea* (L.) Less., XII, 1925, leg. E. C. Leonard (No. 7452), det. F. D. Kern. (29), (59).

Uromyces appendiculatus (Pers.) Lk.: See *Uromyces phaseoli* (Pers.) Wint.

**U. bidenticola* Arth., Mycologia *9*: 71. 1917. Vic. Mission, Fonds Varettes, on *Bidens pilosa* L., IV, 1920, leg. E. C. Leonard (No. 3651), det. J. A. Stevenson. BPI.

U. columbianus Mayor, Mem. Soc. Neuch. Sci. Nat. *5*: 467. 1913. Vic. Mission, Fonds Varettes; St. Michel de l'Atalaye, Dept. du Nord. On *Melanthera buchii* Urban, IV, 1920, XII, 1925, leg. E. C. Leonard (Nos. 3614, 7737), det. F. D. Kern. (29).

**U. dolicholi* Arth., Bull. Torrey Bot. Club *33*: 27. 1906. Thor, on *Cajanus cajan* (L.) Millsp. (Syn. *Cajanus indicus* Spreng.), 16 V, 1925, leg. O. F. Cook, det. J. A. Stevenson & A. J. Watson. BPI.

**U. euphorbiae* Cke. & Pk. in Pk., Ann. Rept. N. Y. State Mus. *25*: 90. 1873. [Syn. *Uromyces proeminens* Pass.] Vic. St. Marc; vic. St. Michel de l'Atalaye, Dept. du Nord. On *Euphorbia prostrata* Ait., *E. hirta* L., *E. hyssopifolia* L., II, 1920, XI, 1925, I, 1926, leg. E. C. Leonard (Nos. 2858, 7085 a, 8501 a), det. H. S. Jackson, J. A. Stevenson. BPI.

U. geranii (DC) Lév., Ann. Sci. Nat. Bot. III, *8*: 371. 1847. On *Geranium* sp., 1927, leg. R. Duvivier, det. R. Ciferri (Myc. Dom. Exs. No. 401). BPI, also (15).

U. phaseoli (Reb.) Wint., in Rab. Krypt.-Fl. *1*: 157. 1881. [Syn. *Uromyces appendiculatus* (Pers.) Lk., *Nigredo appendiculata* Arth., *Puccinia phaseoli* Reb.] Vic. Mission, Fonds Varettes, and elsewhere, on *Phaseolus lunatus* L., *P. vulgaris* L., IV, 1920, *et seq.*, leg. E. C. Leonard (No. 3676). BPI, (2), (50).

U. proeminens (DC.) Pass.: See *Uromyces euphorbiae* Cke. & Pk.

Auricularia auricula (L. ex Hook.) Underw., Mem. Torr. Bot. Club *12*: 15. 1902. The specimen reported under this name by (15) is now referred to *A. delicata* (Fr.) P. Henn.

**A. delicata* (Fr.) P. Henn., Engler's Bot. Jahrb, *17*: 492. 1893. Bayeux, on dead wood, 18 I, 1925, leg. J. R. Weir, originally det. J. R. Weir & reported (15) as *A. auricula* (L. ex Hook.) Underw., redet. B. Lowy; vic. St. Raphael, Dept. du Nord, on rotten log, 3 XII, 1925, leg. E. C. Leonard (as No. 7678), det. B. Lowy. BPI.

A. mesenterica Pers., Myc. Eur. *1*: 97. 1822. Vic. La Vallee, Tortue Island, on rotten log, 28 XII, 1928 — 9 I, 1929, leg. E. C. & G. M. Leonard (as No. 11483), det. W. W. Diehl. BPI, also (15).

A. polytricha (Mont.) Sacc., Atti R. Inst. Ven. Ser. 6, *3*: 732. 1885. Bayeux, on rotten log, 18 I, 1925, leg. & det. J. R. Weir. BPI, also (15).

**Calocera cornea* (Fr.) Loudon, Encycl. Pl. 1012. 1829. Bayeux, on *Ficus* sp., 18 I, 1925, leg. J. R. Weir, det. B. Lowy. BPI.

**Cantharellus* sp., Ile à Vache, on soil, VII, 1928, leg. C. R. Orcutt (as No. 9235), det. V. K. Charles. BPI.

Coriolus arenicolor (Berk. & Curt.) Murr.: See *Polyporus pavonius* (Hook.) Fr.

Corticium koleroga (Cke.) Hoehn.: See *Pellicularia koleroga* Cke.

C. vagum Berk. & Curt.: See *Pellicularia filamentosa* (Pat.) Rogers.

Cyathus intermedius (Mont.) Tul., Ann. Sci. Nat., Ser. 3, *1*: 72. 1844. Morne Cebut, on *Pseudophoenix insignis* O. F. Cook, 29 VIII, 1924, leg. O. F. Cook, det. J. A. Stevenson. BPI, also (15).

Dacryopinax spathularia (Schw.) Martin, Lloydia *11*: 116. 1948. Bayeux, on *Castilla elastica* Cerv., I, 1925, leg. J. R. Weir, det. J. A. Stevenson. BPI, also (15) as *Guepinia spathularia* (Schw.) Fr.

Daedalea elegans Spreng. ex Fr., Syst. Myc. *1*: 335. 1821. Leg. G. V. Nash (as Nos. 234, 240) probably in 1903, det. and reported by W. A. Murrill as „*Agaricus deplanatus* (Fr.) Murr." (43).

D. microsticta Cke., Grevillea *10*: 122. 1882. Vic. Bombardopolis, 22 II, 1929, leg. E. C. & G. M. Leonard (as No. 13487), det. J. A. Stevenson. BPI, also (15).

Exobasidium vaccinii (Fckl.) Wor., Verh. Nat. Gesell. Freiburg *4*: 397. 1867. Unconfirmed, questionable citation by (15).

Favolus brasiliensis (Fr.) Fr., Elench. Fung., p. 44. 1828. Vic. Basse Terre, Tortue Isl., on rotten log, 25 III, 1929, leg. E. C. & G. M. Leonard (as No. 12430), det. J. A. Stevenson. BPI, also (15).

Fomes applanatus (Pers. ex S. F. Gray): See *Ganoderma applanatum* (Pers. ex S. F. Gray) Pat.

F. australis (Fr.) Cke.: See *Ganoderma applanatum* (Pers. ex S. F. Gray). Pat.

F. dependens (Murr.) Sacc. & Trott. in Sacc., Syll. Fung. *21*: 292.

1912. Anse Galette, Gonave Isl., 7 III, 1920, leg. E. C. Leonard (as No. 3127), det. J. R. Weir. BPI (as *F. pseudosenex*), also (15).

F. extensus (Lév.) Cke., Grevillea *14*: 18. 1885. Bayeux, on *Funtumia elastica* (Preuss) Stapf., 19 I, 1925, leg. & det. J. R. Weir. BPI, also (15), (32).

F. feei (Fr.) Lowe, Mycologia *47*: 217. 1955. Vic. Jean Rabel, on rotten log, 4 II, 1929, leg. E. C. & G. M. Leonard (as No. 12845), det. J. A. Stevenson. BPI, also (15) as *Trametes feei* Fr.

F. hemileucus Berk. & Curt.: See *Polyporus supinus* Sw. ex Fr.

F. licnoides (Mont.)?: See *Polyporus licnoides* Mont.

F. marmoratus (Berk. & Curt.) Cke.: See *Fomes sclerodermeus* (Lév.) Cke.

F. melanoporus (Mont.) Cke., Grevillea *14*: 20. 1885. Bayeux, on *Mimusops globosa* Gaertn., 18 I, 1925, leg. J. R. Weir, det. J. L. Lowe. BPI, also (32).

F. pinicola (Sw. ex Fr.) Cke., Grevillea *14*: 17. 1885. Forêt les Pines and elsewhere, on dead *Pinus* spp.; V—VI, 1920, leg. E. C. Leonard (as Nos. 3906, 4448, 4541, 4745, 5362), det. V. K. Charles; 26 II, 1953, leg. G. Hepting, det. J. L. Lowe. BPI, also (15), (32).

F. rimosus (Berk.) Cke.: See *Fomes robiniae* (Murr.) Sacc. & D. Sacc.

F. robiniae (Murr.) Sacc. & D. Sacc., Syll. Fung. *17*: 117. 1905. Vic. Bassin Bleu, on trunk of "Bayahón" tree [= *Prosopis juliflora* L.], 21 IV, 1929, leg. E. C. & G. M. Leonard (as No. 14937), det. J. A. Stevenson [as *F. rimosus* (Berk.) Cke.]; Vic. Port-au-Prince, causing heartrot of living leguminous trees ["Barahon" = ? *Prosopis juliflora* L.], 14 I, 1925, leg. & det. J. R. Weir [as *F. rimosus* (Berk.) Cke.]. BPI, also (15) as *F. rimosus* Fr.

F. sclerodermeus (Lév.) Cke., Grevillea *14:* 18. 1885. [Syn.: *Polyporus sclerodermeus* Lév., *P. marmoratus* Berk. & Curt., *Fomes marmoratus* (Berk. & Curt.) Cke.]. Ford des Negis, 9 VI, 1929, leg. C. R. Orcutt (as No. 9282), det. J. A. Stevenson; Bayeux, on *Castilla elastica* Cerv., 18 I, 1925, leg. & det. J. R. Weir. BPI, also (15) as *F. marmoratus* (Berk. & Curt.) Cke.

**Ganoderma* sp., Beyeux, on *Manihot glaziovii* Müll.-Argov., 18 I, 1925, leg. & det. J. R. Weir. BPI.

G. applanatum (Pers. ex S. F. Gray) Pat., Bull. Soc. Myc. France *5*: 67. 1889. [Syn.: *Boletus applanatus* Pers. ex S. F. Gray, *Polyporus australis* Fr., *Fomes applanatus* (Pers. ex S. F. Gray) Gill., *Fomes australis* (Fr.) Cke., *Ganoderma testaceum* (Lév.) Pat., *Ganoderma australe* (Fr.) Pat.]. Marmalade, on tree in coffee plantation, 19 XII, 1925, leg. E. C. Leonard (as No. 8124), det. J. A. Stevenson; Bayeux, on *Mimusops globosa* Gaertn., 18 I, 1925, leg. & det. J. R. Weir. BPI, also (15) as *Fomes australis* (Fr.) Cke. and as *Ganoderma testaceum* (Lév.) Pat.

G. coffeatum (Berk.) Furtado, Persoonia *4*: 383. 1967. Vic. Jean-Rabel, on dead wood, 4 II, 1929, leg. E. C. & G. L. Leonard (as No. 12783), det. J. S. Furtado. BPI, also (21).

G. colossum (Fr.) Torrend, Brot. (Bot.) *18*: 38. 1920. Anse Galette, Gonave Isl., on rotten stump, 9 III, 1920, leg. E. C. Leonard (as No. 3168), det. V. K. Charles. BPI also (15) as *Polyporus colossus* Fr.

**G. lucidum* (Leyss. ex Fr.) Karst., Rev. Myc. *3* (9): 17. 1881. Vic. Port de Paix, on dead wood, 1929, leg. E. C. & G. M. Leonard (as No. 15887 a), det. J. A. Stevenson. BPI.

G. testaceum (Lév.) Pat.: See *G. applanatum* (Pers. ex S. F. Gray) Pat.

Glenospora melioloides Berk. & Curt.: See *Septobasidium curtisii* (Berk. & Desm.) Boedijin & Steinmann.

Guepinia spathularia (Schw.) Fr.: See *Dacryopinax spathularia* (Schw.) Martin.

Gymnopilus nashii Murr., Mycologia *5*: 23. 1913. Port Margot, on old logs, 4 VIII, 1903, leg. G. V. Nash (as No. 79, TYPE), det. W. A. Murrill. (46), (47).

Gymnopus tenuipes (Schw.) Murr.: See *Xeromphalina tenuipes* (Schw.) A. H. Sm.

Hymenochaete tenuissima Berk., Linn. Soc. Jour. Bot. (London) *10*: 333. 1868. Vic. Ennery, Dept. de l'Artibonite, on rotten limb, 5 II, 1926, leg. E. C. Leonard (as No. 9541), det. J. R. Weir. BPI, also (15).

Hypochnus rubrocinctus Ehr., Horae Phys. Berol., p. 84. 1820. Vic. Mission, Fonds Varettes; Furcy; St. Louis du Nord; on tree bark & rock, 1920—1929, leg. E. C. Leonard, E. C. & G. M. Leonard, det. J. A. Stevenson. BPI, also (15). This species is the basidiolichen *Chiodecton sanguineum* Wainio.

Lachnocladium brasiliensis Lév., Ann. Sci. Nat. Bot. Ser. 3, *5*: 159. 1846 [as *Eriocladus*]; Orbigny, Dict. Nat. Hist. *8*: 487. 1849. Vic. La Vallée, Tortue Isl., on log, 28 XII, 1928 — 9 I, 1929, leg. E. C. & G. M. Leonard (as No. 11723), det. J. A. Stevenson. BPI, also (15).

Laternea triscapa Turpin, Dict. Sci. Nat. *25*: 248. 1822. Tortue Isl. fide De Toni in Sacc., Syll. Fung. *7*: 18. 1888. (15).

**Lentinus* sp. Vic. St. Michel de l'Atalaye, Dept. du Nord, 20 XI, 1925, leg. E. C. Leonard (as No. 7241), det. V. K. Charles. BPI.

L. crinitus (L. ex Fr.) Fr.: See *Panus crinitus* (L. ex Fr.) Sing.

L. hirtus (Fr.) Murr.: See *Pleurotus hirtus* (Fr.) Sing.

**Lenzites saepiaria* Wulf. ex Fr., Epicrisis, p. 407. 1838. Mt. Butler, on dead wood, 20 III, 1922, leg. & det. V. K. Charles. BPI.

**L. striata* (Sw. ex Fr.) Fr., Epicrisis, p. 406. 1838. Vic. St. Michel de l'Atalaye, Dept. du Nord, on rotten stump, 18 XI, 1925, leg. E. C. Leonard (as No. 7178), det. J. R. Weir; Lamouriere, on *Tamarindus indica* L., III, 1922, leg. & det. V. K. Charles. BPI.

Lycoperdon perlatum Pers., Syn. Meth. Fung., p. 145. 1801. (Syn. *L. gemmatum* Batsch ex Fr.). Vic. St. Louis du Nord, on ground, 3 IV, 1929, leg. E. C. & G. M. Leonard (as No. 14331), det. J. A. Stevenson. BPI, also (15) as *L. gemmatum* Batsch.

Marasmiellus inoderma (Berk.) Sing., Sydowia *9*: 385. 1955. (Syn.: *Marasmius semiustus* Berk. & Curt.). On *Musa* sp. (61).

M. stenophyllus (Mont.) Sing., Sydowia *15*: 58. 1961 [1962]. (Syn. *Marasmius stenophyllus* Mont.). On *Musa* sp. (61).

Marasmius sacchari Wakk., Centrbl. Bakt. Parasit. Infek. *2*: 44. 1896. On *Saccharum officinarum* L. (36).

M. semiustus Berk. & Curt.: See *Marasmiellus inoderma* (Berk.) Sing.

M. stenophyllus Mont.: See *Marasmiellus stenophyllus* (Mont.) Sing.

Mycena sp. Baliverne & La Vallette, on *Theobroma cacao* L., 14—28 I, 1956, sporophores obtained in moist chamber by F. Pierre-Louis, det. R. G. Orellana & reported causing a minor "brooming disease". (48).

M. citricolor (Berk. & Curt.) Sacc., Syll. Fung. *5*: 263. 1887. [Syn. *Stibella flavida* (Cke.) P. Henn., *Omphalia flavida* (Cke.) Maubl. & Rangel]. On *Coffea arabica* L. BPI, also (50).

Mykosyrinx cissi (DC.) G. Beck, Ann. Nat. Hofmus. Wien *9*: 123. 1894. Vic. Etroite, Gonave Isl., on *Cissus sicyoides* L., 15—21 III, 1920, leg. E. C. Leonard (as No. 3305), det. J. A. Stevenson. BPI, also on Vitaceae (16).

Panus crinitus (L. ex Fr.) Sing., Lilloa *22*: 275. 1951. [Syn. *Lentinus crinitus* (L. ex Fr.) Fr.]. Vic. Mission, Fonds Varettes; Dodon, Dept. du Nord; Camp Perrin; on dead wood; 1920, 1926, 1941; leg. E. C. Leonard (as Nos. 4031, 8619), R. C. Lorenz (as No. 3180), det. V. K. Charles. BPI, also (15) as *Lentinus crinitus* (L.) Fr.

Pellicularia spp. On *Theobroma cacao L.*, causing a "thread blight" disease. (48).

P. filamentosa (Pat.) Rogers, Farlowia *1*: 113. 1943. (Syn. *Corticium vagum* Berk. & Curt.; Imperfect stage, *Rhizoctonia solani* Kuehn). On *Brassica oleracea* L. (50).

P. koleroga Cke., Grevillea *4*: 116, 134. 1876. [Syn. *Corticium koleroga* (Cke.) Hoehn.]. On *Coffea arabica* L. (50).

**Pleurotus* sp. Vic. Basse Terre, Tortue Isl., on tree trunk and rotten log, 25—28 III, 1929, leg. E. C. & G. M. Leonard (as Nos. 12425, 12541), det. V. K. Charles. BPI.

P. hirtus (Fr.) Sing., Lilloa *22*: 271. 1951. [Syn. *Lentinus hirtus* (Fr.) Murr.]. Vic. Ennery, Dept. de Artibonite, and elsewhere; on rotten wood; 1903, 29 I, 1926; leg. G. V. Nash (as No. 148), E. C. Leonard (as No. 9427); det. W. H. Murrill, V. K. Charles. BPI, also (45).

Pogonomyces hydnoides (Sw. ex Fr.) Murr.: See *Trametes hydnoides* (Sw. ex Fr.) Fr.

Polyporus australis Fr.: See *Ganoderma applanatum* (Pers. ex S. F. Gray) Pat.

P. colossus Fr.: See *Ganoderma colossum* (Fr.) Torrend.

**P. corrosus* (Murr.) Sacc. & Trott., Syll. Fung. *21*: 275. 1912. Port de Paix, on *Borreria* sp., 22 XII, 1928, leg. E. C. & G. M. Leonard (as No. 11075), det. J. A. Stevenson. BPI.

P. gilvus (Schw.) Fr., Elench. Fung., p. 104. 1828. Vic. Port-au-Prince; vic. Dondon, Dept. du Nord; or rotten wood and stump of tree; 15 I, 1925, 8 I, 1926; leg. J. R. Weir, E. C. Leonard (as No. 8723); det. J. R. Weir. BPI, and (15).

P. licnoides Mont., Ann. Sci. Nat. (Bot.), 2nd Ser., *13*: 204. 1840. Bayeux, on *Mimusops globosa* Gaertn., 18 I, 1925, leg. & det. J. R. Weir. BPI, also (15) as *Fomes licnoides* (Mont.)? According to J. L. Lowe (32), *P. licnoides* Mont. is the annual form of *Fomes taxodii* Murr.

P. maximus (Mont.) Overh., Sci. Surv. P. R. and Virg. Isl. *8*: 164. 1926. Vic. Bayeux, Port-au-Prince, Jeremie, Jean Rabel, Jacmel, and elsewhere, on dead wood, 1917—1941, leg. various, det. J. A. Stevenson. BPI, also (15).

**P. occidentalis* Klotzsch, Linnaea *8*: 486. 1833. Vic. Anse Galette, Gonave Isl., on rotten log, 3—4 III, 1920, leg. E. C. Leonard (as No. 3059), det. J. A. Stevenson. BPI.

P. pavonius (Hook.) Fr., Epicrisis, p. 477. 1838. General distribution on hardwood logs, 1905—1929, leg. & det. by various workers. BPI, also (15), reported by (44) as *Coriolus arenicolor* (Berk. & Curt.) Murr.

P. pinsitus Fr., Elench. Fung., p. 95. 1828. Vic. Mole St. Nicolas, on rotten stick, 13—19 II, 1929, leg. E. C. & G. M. Leonard (as No. 13136), det. J. A. Stevenson. BPI, also (15).

P. sanguineus L. ex Fr., Syst. Myc. *1*: 371. 1821. Vic. Gros Morne, Dept. Artibonite, on rotten log, 17 II, 1926, leg. E. C. Leonard (as No. 9754), det. J. R. Weir. BPI. This species was previously leg. by G. V. Nash in 1903 and reported by (41) as *Pycnoporus sanguineus* (L. ex Fr.) Murr.

P. supinus Sw. ex Fr., Syst. Myc. *1*: 376. 1821. Vic. Marmelade, Dept. du Nord, on tree, 19 XII, 1925, leg. E. C. Leonard (as No. 8183), det. J. R. Weir. BPI, also (15) as both *P. supinus* and its synonym *Fomes hemileucus* Berk. & Curt. [sic].

P. versatilis (Berk.) Rom., Handl. Svenska Vat.-Akad. *26*: 35. 1901 [Syn. *Trametes versatilis* Berk., *Polystictus versatilis* (Berk.) Sacc.]. Vic. Port-au-Prince, on rotten wood, 14 I, 1924, leg. & det. J. R. Weir. BPI, also (15) as *Polystictus versatilis*.

P. zonalis Berk., Ann. Mag. Nat. Hist. *10*: suppl. 375. 1843. Bayeux, on *Mimusops globosa* Gaertn., 19 I, 1925, leg. & det. J. R. Weir. BPI, also (15).

Poria epimiltina (Berk. & Br.) Bres., Studi Trent. *2* (7): 75. 1926. (Syn. *Poria borbonica* Pat.). Bayeux, on *Funtumia elastica* (Preuss)

Stapf., *Hevea brasiliensis* Müll.-Agrov., 18 I, 1925, leg. & det. J. R. W e i r. BPI, also (15), (33) as *P. borbonica.*

P. punctata (Fr.) Karst., Bidr. känn. Finl. Nat. Folk *37*: 83. 1882. [Syn. *Polyporus punctatus* Fr., *Fomitiporia maxoni* Murr., *F. jamaicensis* Murr., *Poria jamaicensis* (Murr.) Sacc. & Trott.]. Bayeux, on *Mimusops globosa* Gaertn., 18. I, 1925, leg. J. R. W e i r, det. J. L. L o w e. BPI, also (15) as *P. jamaicensis*, (33), (34).

P. umbrinella Bres., Hedwigia *35*: 282. 1896. [Syn. *P. floridana* (Murr.) Sacc.]. Bayeux, on *Hevea brasiliensis* Müll.-Argov., 18 I, 1925, leg. J. R. W e i r, det. J. L. L o w e. BPI, also (15) as *P. floridana*, (33), (34).

Ptychogaster cubensis Pat., Bull. Soc. Myc. France *12*: 133. 1896. [Syn. *Ceriomyces cubensis* (Pat.) Sacc., *Ptychogaster lucidus* Lloyd]. Vic. La Vallée, Tortue Isl., and elsewhere, from base of tree & on living *Tamarindus indica* L., 1 I, 1929, et III, 1921, leg. E. C. & G. M. L e o n a r d, V. K. C h a r l e s, det. R. W. D a v i d s o n *et al.* BPI, also (19). According to Davidson *et al.*, *Ptychogaster* is the imperfect stage of *Polyporus.*

Pycnoporus sanguineus (L. ex Fr.) Murr.: See *Polyporus sanguineus* L. ex Fr.

Schizophyllum commune Fr. ex Fr., Syst. Myc. *1*: 330. 1821. General distribution, on rotten sticks & *Saccharum officinarum* L., 1922—1935, leg. various, det. V. K. C h a r l e s, W. B. C o o k e. BPI, (18), (36), (57).

S. fasciatum Pat., Jour. Bot. *1*: 170. 1887. Vic. La Vallée, vic. Jean Rabel, on rotten log & sticks, XII, 1928—I, 1929, leg. E. C. & G. M. L e o n a r d (as Nos. 11684, 12703), det. W. B. C o o k e. BPI, also (18).

S. umbrinum Berk., in Hook. Jour. Bot. *3*: 15. 1851. Bayeux, on *Hevea brasiliensis* Müll.-Argov., 10 V, 1925, leg. O. F. C o o k, det. W. B. C o o k e. BPI, also (15), (18).

Septobasidium curtisii (Berk. & Desm.) Boedijn & Steinmann, Arch. Theecult. *5* (1): 36. 1931. (Syn. *Glenospora melioloides* Berk. & Curt.). Vic. Ennery, Dept. de l'Artibonite, on shrubs, 18 I, 1926, leg. E. C. L e o n a r d (as No. 8925), det. W. W. D i e h l, ver. J. N. C o u c h. BPI, also (15) as *Glenospora melioloides.*

**S. lepidosaphis* Couch, Jour. Elisha Mitchell Sci. Soc. *51*: 35. 1935. On *Lepidosaphes beckii* (purple scale insect) on *Citrus aurantium* L., 12 II, 1933, PQ Interception comm. A. B. W e l l s (No. 17003), det. J. N. C o u c h. BPI.

S. spongium (Berk. & Curt.) Pat., Bull. Soc. Myc. France *16*: 181. 1900. On Coccidae (scale insects) on *Citrus sinensis* (L.) Osbeck, 1932, PQ Interception. (60, list for 1933).

Sphacelotheca cordobensis (Speg.) Jacks. in Chardon & Toro, Jour. Dept. Agr. Puerto Rico *14*: 298. 1930. [Syn. *Sphacelotheca panici-leucophaei* (Bref.) Clint.]. Vic. La Mouriere, on *Trichachne insularis* (L.) Nees [Syn. *Digitaria insularis* (L.) Mez; *Panicum leucophaeum* H., B.,

& K.; *Valota insularis* (L.) Chase], 16 III, 1922, leg. & det. V. K. Charles (No. 1956). BPI. (14), (65).

S. cruenta (Kuehn) Potter, Phytopath. *2*: 98. 1912. (Syn. *Ustilago cruenta* Kuehn). Vic. Anse Galette, Gonave Isl.; St. Michel de l'Atalaye, Dept. du Nord; on *Sorghum vulgare* Pers. [Syn. *Holcus sorghum* L., *Andropogon sorghum* (L.) Brot.]; 3—14 III, 1920; 5. XII, 1925. Leg. E. C. Leonard (Nos. 3141 a, 7760), det. G. P. Clinton & G. L. Zundel, J. A. Stevenson. BPI. (17, Map 408, 1965), (50), (64), (65).

S. occidentalis (Seym.) Clint., Jour. Myc. *8*: 141. 1902. On *Sorghum vulgare* Pers. (65).

S. panici-leucophaei (Bref.) Clint.: See *Sphacelotheca cordobensis* (Speg.) Jacks.

S. sorghi (Lk.) Clint., Jour. Myc. *8*: 140. 1902. On *Sorghum vulgare* Pers. (6), (14), (17, Map 220, 1965), (50).

Stereum ostrea (Blume & Nees ex Fr.) Fr., Epicrisis, p. 547. 1838. (Syn. *S. lobatum* Kunze ex Fr.). Vic. St. Raphael, Dept. du Nord, on rotten log, 3 XII, 1925, leg. E. C. Leonard (No. 7679), det. J. R. Weir. BPI, also (15) as *S. lobatum*.

S. papyrinum Mont., Pl. Cell. Cuba, p. 374. 1842. Vic. Gros Morne, Dept. de l'Artibonite, on rotten sticks, 18 II, 1926, leg. E. C. Leonard (No. 9991), det. J. R. Weir. BPI, also (15).

Trametes cubense (Mont.) Sacc., Syll. Fung. *9*: 198. 1891. Vic. Plaisance, Dept. du Nord, on rotten log, 17 I, 1926, leg. E. C. Leonard (No. 9305), det. J. R. Weir. BPI, also (15).

T. feei Fr.: See *Fomes feei* (Fr.) Lowe.

T. hydnoides (Sw. ex Fr.) Fr., Epicrisis, p. 490. 1838. [Syn. *Pogonomyces hydnoides* (Sw. ex Fr.) Murr.]. Vic. Mt. Butler; vic. St. Michel de l'Atalaye, Dept. du Nord; vic. Bombardopolis; on rotten logs, 1903—1929, leg. G. V. Nash (No. 24), V. K. Charles, E. C. Leonard (No. 7633), E. C. & G. M. Leonard (No. 13443), det. W. A. Murrill, V. K. Charles, J. R. Weir, J. A. Stevenson. BPI, (42 — report of Nash's No. 24 as *Pogonomyces*).

T. subserpens Murr., Mycologia *12*: 108. 1920. Port-au-Prince, on rotten wood, 15 I, 1925, leg. & det. J. R. Weir. BPI, also (15) as *Poria subserpens*?

Ustilago maydis (DC.) Cda., Icones Fung. *5*: 3. 1842. [Syn. *U. zeae* (Beckm.) Ung.]. General distrib., on *Zea mays* L. (50) as *U. zeae*.

Xeromphalina tenuipes (Schw.) A. H. Sm., Pap. Mich. Acad. Sci. *38*: 84. 1953. [Syn. *Agaricus tenuipes* Schw., *Collybia tenuipes* (Schw.) Sacc., *Gymnopus tenuipes* (Schw.) Murr.]. On dead wood. (15) as *Gymnopus tenuipes*.

Fungi Imperfecti

Alternaria brassicae (Berk.) Sacc., Michelia *2*: 172. 1880. On *Brassica oleracea* L. (50).

A. cucumerina (Ell. & Ev.) J. A. Elliott, Amer. Jour. Bot. *4*: 472. 1917. [Syn. *Macrosporium cucumerinum* Ell. & Ev.]. On *Cucumis melo* L. (50, as *M. cucumerinum*).

A. dauci (Kuehn) Groves & Skolko, Can. Jour. Sci. (Sec. C) *22*: 222. 1944. (Syn. *Macrosporium carotae* Ell. & Langl.). On *Daucus carota* L. (50).

A. longipes (Ell. & Ev.) Mason, Myc. Pap. Imper. Myc. Inst. No. 2, p. 19. 1928. On *Nicotiana tabacum* L. (50).

**A. porri* (Ell.) Cif., Jour. Dept. Agr. Puerto Rico *14*: 31. 1930. Port-au-Prince, on *Allium* sp., 1951, leg. H. W. Schneck, det. L. C. Cash. BPI.

**Aposphaeria* sp. Port-au-Prince; Bayeux. On *Hevea brasiliensis* Müll.-Argov., 15 I & XI, 1925, leg. & det. J. R. Weir. BPI.

Asbolisia citrina Bat. & Cif., Quaderno Inst. Bot. Univ. Pavia *31*: 38. 1963. Bayeux, on *Theobroma cacao* L., 19 I, 1925, leg. J. R. Weir, det. A. C. Batista (as No. 11081 *Type*). BPI, IMUR, also (7).

Ascochyta lycopersici (Cke.) Brun., Bull. Soc. Bot. France *34*: 430. 1887. (Syn. *Phoma destructiva* Plowr.). On *Lycopersicon esculentum* L. (60, list for 1931 as *Phoma destructiva*).

A. pinodella L. K. Jones, N. Y. State Agr. Exp. Sta. Bull. 547, p. 10. 1927. On *Pisum sativum* L. (50).

A. pisi Lib., Exsic. No. 12, Cent. I, Plantae Crypt. 1830. On *Pisum sativum* L. (50). Cited together with *A. pinodella* L. K. Jones & *Mycosphaerella pinodes* (Berk. & Blox.) R. E. Stone [= *M. pinodes* (Berk. & Blox.) Vest. = *Didymella pinodes* (Berk. & Blox.) Petr., Ann. Myc. *22*: 17—18. 1924] as causing necrosis.

Aspergillus flavipes (Bain. & Sart.) Thom & Church, The Aspergilli, p. 155. 1926. Jean Rabel, cult. isol. ex soil, 1960. (51).

Asperisporium caricae (Speg.) Maubl., Bull. Soc. Myc. France *29*: 357. 1913. On *Carica papaya* L. (50).

Botryodiplodia minor Berl. & Bres., Micromyc. Trident., p. 72. 1889. Bayeux, on *Manihot glaziovii* Müll.-Argov., 18 I, 1925, leg. & det. J. R. Weir. BPI, also (15).

B. theobromae Pat., Bull. Soc. Myc. France *8*: 136. 1892. [Syn. *Lasiodiplodia theobromae* (Pat.) Griff. & Maubl., *Diplodia theobromae* (Pat.) Nowell, *D. cacaoicola* P. Henn., *D. natalensis* P. Evans, *D. tubericola* (Ell. & Ev.) Taub]. Thor Farm, Marfranc, St. Marks, & elsewhere, on *Citrus aurantifolia* (Christm.) Swingle, *Hevea brasiliensis* Müll.-Argov., *Ipomoea batatas* (L.) Lam., *Mangifera indica* L., *Persea americana* Mill., & *Theobroma cacao* L., 1922—1955, leg. & det. by various workers. BPI, also (6), (48), (50), (60, lists for 1935, 1936). *Botryodiplodia theobromae* Pat. may not be the valid name for the imperfect fungi cited here, but is one that is widely known. It and all listed synonyms have appeared separately in the literature reporting specimens of Haiti. Additional synonyms are listed by R. K. Voorhees

(Univ. Florida Agr. Exp. Sta. Bull. 371, p. 79, 1942) and all are referred to the perfect state name *Physalospora rhodina* (Berk. & Curt.) Cke., which is in turn referred to *Botryosphaeria quercuum* (Schw.) Sacc. by J. A. von Arx & E. Müller (Beitr. Krypt.-Fl. Schweiz *11* (1): 33. 1954.

**Cercospora* sp. Vic. Anse Galette, Gonave Isl.; vic. Etang, Etang Saumatre; vic. Port-au-Prince; vic. St. Michel de l'Atalaye, Dept. du Nord. On *Commicarpus scandens* Standley, *Echinodorus berteroi* (Spreng.) Fassett, *Ipomoea pes-caprae* (L.) Roth, *Haematoxylon campechianum* L., 1920—1925, leg. E. C. Leonard (as No. 3032, 3516, 7048), V. K. Charles, det. W. W. Diehl, V. K. Charles. BPI.

C. antirrhini Muller & Chupp, Ceiba *1*: 171. 1950. PQ Interception on *Antirrhinum majus* L. (60, list for 1966).

C. bataticola Cif. & Bruner, Phytopath. *21*: 93. 1931. On *Ipomoea batatas* (L.) Lam. (50).

C. beticola Sacc., Nuov. Giorn. Bot. Ital. *8*: 189. 1876. On *Beta vulgaris* L. (50).

C. brachiata Ell. & Ev., J. Mycol. *4*: 5. 1888. PQ Interception, on *Amaranthus* sp., 2 VI, 1963. BPI, also (60, list for 1966).

**C. calotropidis* Ell. & Ev., Missouri Bot. Gard. Ann. Rept. *9*: 120. 1898. Vic. Port-au-Prince, on *Calotropis procera* (Ait.) R. Br., II, 1922, leg. & det. V. K. Charles. BPI.

C. canescens Ell. & G. Martin, Amer. Nat. *16*: 1003. 1882. On *Vigna sinensis* (L.) Endl., *Phaseolus vulgaris* L. (50), who reported *C. canescens* as probably identical to *C. cruenta* Sacc. Chupp (13), however, recognizes both species.

C. capsici Heald & Wolf, Mycologic *3*: 15. 1911. On *Capsicum frutescens* L. (50).

C. carbonacea Miles, Trans. Illinois Acad. Sci. *10*: 255. 1917. On *Dioscorea alata* L. (50).

C. catenospora Atk., Jour. Elisha Mitchell Sci. Soc. *8*: 66. 1892. Vic. Furcy, on *Sambucus caerulea* Raf. var. *neomexicana* Rehd. [as *S. intermedia* var. *insularis* Schwerin], 15 VI, 1920, leg. E. C. Leonard (No. 4358), det. V. K. Charles. BPI, also (15).

C. coffeicola Berk. & Cke., Grevillea *9*: 99. 1881. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Coffea* sp., *C. arabica* L., 1925—1955, leg. E. C. Leonard (No. 7361), others ?, det. W. W. Diehl, others ? BPI, (1), (50).

C. echinodori Chupp, Monogr. Cercospora, p. 28. 1953. Vic. Etang, Etang Saumatre, on *Echinodorus berteroi* (Spreng.) Fassett, 12 IV, 1920, leg. E. C. Leonard (No. 3516), det. C. Chupp. BPI-TYPE. (13).

**C. furfurella* Speg., Anal. Soc. Cient. Argentina *26*: 72. 1888. Vic. Anse Galette, Gonave Isl., on *Commicarpus scandens* (L.) Standley (Syn.

Boerhaavea scandens L.), 3—14 III, 1920, leg. E. C. Leonard (No. 3032), det. C. Chupp. BPI.

**C. gossypina* Cke., Grevillea *12*: 31. 1883. Acul du Nord, on *Gossypium* sp., 18 VIII, 1924, leg. O. F. Cook, det. J. A. Stevenson & A. J. Watson. BPI.

C. henningsii Allesch. in Engler's Pflanzenwelt Ost-Afr., Teil C, p. 35. 1895. On *Manihot utilissima* Pohl. (50).

**C. heveae* Vincens, Bull. Soc. Path. Veget. France *2*: 25. 1915. Bayeux, on *Hevea* sp., I, 1925, leg. J. R. Weir, det. V. K. Charles. BPI.

C. insulana Sacc., Nuov. Giorn. Bot. Ital. n. s. *22*: 74. 1915. On *Limonium sinuatum* (L.) Mill., 20 XII, 1962, PQ Interception by J. C. Buff & H. L. Rubin (No. 21787), det. H. L. Rubin & D. Dody, ver. A. J. Watson. BPI. (60, list for 1966).

**C. mangiferae* Koord., Verh. K. Akad. Wetensch. II. *13*: 236. 1907. Vic. St. Marc, on *Mangifera indica* L., 25—28 II, 1920, leg. E. C. Leonard (No. 2979), det. V. K. Charles. BPI.

C. morindicola Jenkins & Chupp, Mycologia *35*: 480. 1943. Vic. La Table Arise Galette, Gonave Isl., on *Morinda umbellata* L. *(M. roioc* L.), 3—14 III, 1920, leg. E. C. Leonard (No. 3195), det. A. E. Jenkins & C. Chupp. BPI, also (13), (15), (27).

**C. mucunae* H. & P. Sydow, Hedwigia *42*: (Beiblatt 3). 106. 1903. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Mucuna pruriens* (L.) DC., 17 XI, 1925, leg. E. C. Leonard (No. 7067), det. W. W. Diehl. BPI.

C. musae Zimm., Centralb. f. Bakt. II. *8*: 219. 1902. On *Musa* sp., *M. paradisiaca* L. subsp. *sapientum* (L.) Kuntze. (60, lists for 1940, 1942, 1950).

C. nicotianae Ell. & Ev., Proc. Acad. Sci. Phila. *45*: 170. 1893. Vic. St. Michel de l'Atalaye, Dept. du Nord, and elsewhere, on *Nicotiana tabacum* L., 27 XI, 1925, *et seq.*, leg. E. C. Leonard (No. 7522) *et al.*, det. W. W. Diehl *et al.* BPI. (17, Map 172, 1961), (50), (60, list for 1937).

C. oryzae Miyake, Jour. Coll. Agr. Imp. Univ. Tokyo *2*: 263. 1910. On *Oryza sativa* L. (50).

C. personata (Berk. & Curt.) Ell. & Ev., Jour. Myc. *1*: 63. 1885. (Syn. *Cladosporium personata* Berk. & Curt., *Septogloeum arachidis* Rac., *Cercospora arachidis* P. Henn.). On *Arachis hypogaea* L. (50).

C. ricinella Sacc. & Berl., Atti R. Ist. Ven. Sci. Lett. Arti. VI. *3*: 721. 1885. Vic. Anse Galette, Gonave Isl., on *Ricinus communis* L., 3—14 III, 1920, leg. E. C. Leonard (No. 3058), det. J. A. Stevenson. BPI, also (15).

C. vaginae Krueger, Ber. Vers. Stat. Zuckerr. West Java *1*: 64. 1890. General distrib., incl. La Mourière, on *Saccharum officinarum* L., 15 III, 1922, *et seq.*, leg. & det. V. K. Charles *et al.* BPI, (17, Map 251. 1952), (36), (57).

**C. zinniae* Ell. & G. Martin, Jour. Myc. *1*: 20. 1885. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Zinnia peruviana* L. (Syn. *Z. multiflora* L.), 25 XI, 1925, leg. E. C. Leonard (No. 7459 a), det. W. W. Diehl. BPI.

**Cladosporium* sp. Vic. Ennery, Dept. de l'Artibonite, on *Sorghum vulgare* Pers. (Syn. *Holcus sorghum* L.), 19 I, 1926, leg. E. C. Leonard (No. 8991), det. G. P. Clinton. BPI.

C. fulvum Cke., Grevillea *12*: 32. 1883. Widespread and common, on *Lycopersicon esculentum* Mill. (50).

C. spongiosum Berk. & Curt., Jour. Linn. Soc. (London) *10*: 362. 1869. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Setaria setosa* (Swartz) Beauv. (Syn. *Chaetochloa setosa* Swartz), 5 XII, 1925, leg. E. C. Leonard (No. 7759), det. G. P. Clinton. BPI, also (15).

Chloridium musae Stahel, Trop. Agr. *14*: 43. 1937. On *Musa* sp. (61).

Colletotrichum sp. On *Citrus sinensis* (L.) Osbeck, *Epidendrum* sp., *Hevea brasiliensis* Müll.-Argov., *Theobroma cacao* L. BPI. (48), (60, lists for 1933, 1935).

C. agaves Cav.: See *C. gloeosporioides* (Penz.) Sacc.

C. coffeanum Noack: See *C. gloesporioides* (Penz.) Sacc.

C. falcatum Went: See *C. graminicola* (Ces.) G. W. Wils.

C. funtumiae Petch: See *C. gloesporioides* (Penz.) Sacc.

C. gloeosporioides (Penz.) Sacc., Syll. Fung. *3*: 735. 1884. [Syn. *C. agaves* Cav., *C. coffeanum* Noack, *C. funtumiae* Petch., *C. heveae* Petch., *C. papayae* P. Henn., *C. phomoides* Chester *non* Sacc., *Gloeosporium albo-rubrum* Petch, *G. bidgoodii* Cke., *G. limetticola* Clausen, *G. mangiferae* P. Henn., *G. melongenae* Ell. & Halst., *G. piperatum* Ell. & Ev., *Vermicularia capsici* Syd., *V. gloeosporioides* Penz.]. General distribution, specif. incl. Bayeux, Port-au-Prince, & Thor, on various hosts, incl. *Agave* sp., *A. sisalana* Perrine, *Capsicum annuum* L., *C. frutescens* L., *Carica papaya* L., *Citrus* sp., *C. aurantifolia* (Christm.) Swing., *Coffea arabica* L., *Funtumia elastica* (Preuss) Stapf., *Hevea brasiliensis* Müll.-Argov., *Lycopersicon esculentum* (L.) Mill., *Mangifera indica* L., *Oncidium* sp., *Persea americana* Mill., *Solanum melongena* L., & *Theobroma cacao* L., 1922—1956, leg. & det. various. BPI. (15), (48), (50), (60, lists for 1931, 1936, 1939, 1941, 1944). Reports of this common parasite were for the most part made under one or more of the listed synonyms which comprise an abridgment of the list recognized by von Arx (Phytopath. Zeitschr. *29* (4): 413—468. (1957). *C. gloeosporioides* is the imperfect state of *Glomerella cingulata* (Stonem.) Spauld. & Schrenk.

C. graminicola (Ces.) G. W. Wils., Phytopath. *4*: 110. 1914. (Syn.

Colletotrichum falcatum Went, *Dicladium graminicola* Ces.). On *Saccharum officinarum* L. (50), (57), (60, lists for 1929, 1937, 1939, 1950).

C. heveae Petch: See *C. gloeosporioides* (Penz.) Sacc.

C. lagenarium (Pass.) Ell. & Halst.: See *C. orbiculare* (Berk. & Mont.) v. Arx.

C. lindemuthianum (Sacc. & Magn.) Scribner, Rept. Sect. Vet. Path. U. S. Dept. Agr. 1887, p. 364. 1888. On *Phaseolus lunatus* L. (50).

C. musae (Berk. & Curt.) v. Arx, Verh. Koninkl. Ned. Akad. Wetensch. Natuurk. Ser. 2, *51* (3): 107. 1957. On *Musa* sp., *M. paradisiaca* L. subsp. *sapientum* (L.) Kuntze. (50), (60, list for 1935). Both reports were as the synonym *Gloeosporium musarum* Cke. & Mass.

C. orbiculare (Berk. & Mont.) v. Arx, Phytopath. Zeitschr. *29* (4): 445. 1957. [Syn. *Colletotrichum lagenarium* (Pass.) Ell. & Halst.]. On *Citrullus vulgaris* Schrad. (50) as *C. lagenarium*.

C. papayae P. Henn: See *C. gloeosporioides* (Penz.) Sacc.

C. phomoides Chester, *non* Sacc.: See *C. gloeosporioides* (Penz.) Sacc.

Coniothyrium sp. Port-au-Prince, on *Saccharum officinarum* L., 15 I, 1925, leg. & det. J. R. Weir. BPI, (57).

**C. coffeae* Zimm., Centralb. Bakt. II, *8*: 216. 1902. Vic. Kalacroix, Dept. de l'Artibonite, on *Coffea arabica* L., 11 XII, 1925, leg. E. C. Leonard (No. 7898), det. W. W. Diehl. BPI.

C. gastoni (Roum.) Berl. & Vogl. in Sacc., Syll. Fung. *10*: 266. 1892. [Syn. *Phyllosticta gastoni* Roum., *Phyllostictella gastonis* (Roum.) Tassi]. This species was reported as *Phyllostictella gastonis* by Ciferri (15) who questioned its validity as a Haitian species. The report apparently was based on Roumeguère's original publication [Rev. Mycol. *8* (29): 19. 1886]or his Fungi Gallici Exsiccati No. 3553, both of which give "Haiti (Oceanie)" as the locality where Gaston Brunaud collected it. Since other G. Brunaud collections were reported about the same time as from "Tahiti (Oceanie)", there seems little doubt that *C. gastoni* is not Haitian. Most likely the specimen originated from the island "Hiti" of the Tuamotu (Low) Archipelago located in the Pacific Ocean east of Tahiti and considered a part of "French Oceania."

Cordana musae (Zimm.) Hoehn., Centralbl. Bact. II, *60*: 7. 1923. (Syn. *Scolecotrichum musae* Zimm.). On *Musa* sp., *M. paradisiaca* L. (*M. sapientum* L.) (17, Map 168, 1963), (61).

**Curvularia* sp. Port-au-Prince, on *Sorghum* sp., 14 X, 1957, leg. F. Pierre-Louis, det. J. A. Stevenson. BPI.

Deightoniella torulosa (Syd.) M. B. Ell., Commonw. Myc. Inst. Myc. Pap. No. 66, p. 7. 1957. [Syn. *Helminthosporium torulosum* (Syd.) Ashby]. On *Musa* sp., *M. paradisiaca* L. Reported as *Helminthosporium torulosum* by (17, Map 175, 1949), (50), as *Deightoniella* by (17, Map 175, revised to 1964).

Diplodia sp. On *Cocos nucifera* L. (60, list for 1936).

D. cacaociola P. Henn.: See *Botryodiplodia theobramae* Pat.

D. manihoti Sacc., Ann. Myc. *12*: 310. 1914. Bayeux, on *Manihot glaziovii* Müll.-Argov., 18 I, 1925, leg. J. R. Weir, det. V. K. Charles. BPI, also (15).

D. natalensis P. Evans: See *Botryodiplodia theobromae* Pat.

D. theobromae (Pat.) Nowell: See *Botryodiplodia theobromae* Pat.

D. tubericola (Ell. & Ev.) Taub.: See *Botryodiplodia theobromae* Pat.

**Diplodina* sp., Acul du Nord, on *Coffea* sp., 18 VIII, 1924, leg. O. F. Cook, det. W. W. Diehl. BPI.

**Drepanospora pannosa* Berk. & Curt., Grevillea *3*: 105. 1875. St. Michel de l'Atalaye, Dept. du Nord, on *Crossopetalum rhacoma* (L.) Crantz (Syn. *Rhacoma crossopetalum* L.), 5 XII, 1925, leg. E. C. Leonard (No. 7763 a), det. W. W. Diehl. BPI.

**Epicoccum* sp. Vic. Ennery, Dept. de l'Artibonite, on *Cordia globosa* H., B., & K., 3 II, 1926, leg. E. C. Leonard (No. 9428 a), det. W. W. Diehl. BPI.

Fusarium sp. Lamouriere, on *Gossypium* sp., *Lycopersicon esculentum* (L.) Mill., III, 1922, let. & det. V. K. Charles (on cotton). (60, list for 1931, on tomato).

F. annuum Leonian, New Mexico Agr. Exp. Sta. Bull. 121, p. 9. 1919. [? = *F. vasinfectum* Atk. = *F. oxysporum* Schlecht. f. sp. *vasinfectum* (Atk.) Snyd. & Hans.]. On *Capsicum annuum* L., *C. frutescens* L. (50).

F. cubense E. F. Sm.: See *F. oxysporum* Schlecht. f. sp. *cubense* (E. F. Sm.) Snyd. & Hans.

F. lunatum (Ell. & Ev.) Arx, Verh. Koninkl. Nederl. Akad. Wetensch. Natuurk. Ser. II, *51* (3): 101. 1957. (Syn. *Gloeosporium lunatum* Ell. & Ev.). Vic. Anse Galette, Gonave Isl., on *Opuntia dillenii* (Ker.-Gawl.) Haw., 3—14 III, 1920, leg. E. C. Leonard (No. 3127), det. G. H. Martin. BPI, also (15).

F. martii App. & Wr.: See *F. solani* (Mart.) App. & Wr.

F. moniliforme Sheldon, Ann. Rept. Nebr. Agr. Exp. Sta. *17*: 30. 1904. On *Saccharum officinarum* L. (36).

F. oxysporum Schlecht., Fl. Berol. *2*: 139. 1824. On *Solanum tuberosum* L. (50).

F. oxysporum Schlecht. f. sp. *cubense* (E. F. Sm.) Snyd. & Hans., Amer. Jour. Bot. *27*: 66. 1940. (Syn. *F. cubense* E. F. Sm.). On *Musa paradisiaca* L. (Syn. *M. sapientum* L.). (17, Map No. 31, 1966), (50, as *F. cubense*).

F. oxysporum Schlecht. f. sp. *lycopersici* (Sacc.) Snyd. & Hans., Amer. Jour. Bot. *27*: 66. 1940. On *Lycopersicon esculentum* L. (50).

F. oxysporum Schlecht. f. sp. *pisi* (Linford) Snyd. & Hans., Amer. Jour. Bot. *27*: 67. 1940. On *Pisum sativum* L. (50).

F. solani (Mart.) Sacc., Michelia *2*: 296. 1881. General distribution, on *Coffea arabica* L. in association with *Chremon repentinus* Rehn (Coffee tree cricket). (1).

Gloeocercospora sorghi Bain & Edgerton, Phytopath. *33*: 225. 1943. On *Sorghum* sp. & other Gramineae. (17, Map. No. 339, 1957).

Gloeosporium sp. On orchid. (60, list for 1933).

G. albo-rubrum Petch: See *Colletotrichum gloeosporioides* (Penz.) Sacc.

G. bidgoodii Cke.: See *Colletotrichum gleoesporioides* (Penz.) Sacc.

G. limetticola Clausen: See *Colletotrichum gloeosporioides* (Penz.) Sacc.

G. lunatum Ell. & Ev.: See *Fusarium lunatum* (Ell. & Ev.) Arx.

G. mangiferae P. Henn.: See *Colletotrichum gloeosporioides* (Penz.) Sacc.

G. melongenae Ell. & Halst.: See *Colletotrichum gloeosporioides* (Penz.) Sacc.

G. musarum Cke. & Mass.: See *Colletotrichum musae* (Berk. & Curt.) Arx.

G. piperatum Ell. & Ev.: See *Colletotrichum gloeosporioides* (Penz.) Sacc.

Helminthosporium sp. On *Musa paradisiaca* L. (60, list for 1936).

H. carposaprum Pollack, Phytopath. *36*: 991. 1946. On *Lycopersicon esculentum* (L.) Mill., 18 I, 1938, 8 III, 1945, leg. Ortiz, G. P. Daley, det. F. G. Pollack. BPI, also orig. publ. & (15).

**H. ravenellii* Curt., Grevillea *3*: 102. 1874. Vic. Jean Rabel, vic. Bois Raque Mediantes Morus Comm., on *Sporobolus* sp., *S. poiretti* (Roem. & Schult.) Hitchcock, 27 I, 1929, 28 IX, 1943, leg. E. C. & G. M. Leonard (No. 13053 a), L. R. Holridge (No. 1724 a), det. W. W. Diehl, J. A. Stevenson. BPI. The species has been referred to *Bipolaris ravenellii* (Curt.) Shoemaker in Can. Jour. Bot. *37*: 884. 1959.

H. sacchari (B. de Haan) Butl., Mem. Dept. Agric. India, Bot. Ser. *6*: 207. 1913. On *Saccharum officinarum* L. (17, Map. 349, 1957), (36), (57), (60, list for 1966).

H. torulosum (Syd.) Ashby: See *Deightoniella torulosa* (Syd.) M. B. Ell.

**Macrophomina phaseoli* (Maubl.) Ashby, Trans. Brit. Myc. Soc. *12*: 145. 1927. [Syn. *Macrophoma phaseoli* Maubl., *Sclerotium bataticola* Taub., *Rhizoctonia bataticola* (Taub.) Butl.]. Vic. St. Marks, on *Ipomoea batatas* (L.) Lam., 27 IX, 1921, leg. C. O. Davis, det. J. A. Stevenson. BPI.

Macrosporium cucumerinum Ell. & Ev.: See *Alternaria cucumerina* (Ell. & Ev.) J. A. Elliott.

Melanconium sacchari Mass.: See *Phaeocytostroma sacchari* (Ell. & Ev.) Sutton.

Oidium tabaci Thuem., Rev. Cient. Lit. Ist. Coimbra, Ser. 2, *28*: 24. 1880. Vic. Port-au-Prince, on *Nicotiana tabacum* L., 1927, leg. R. Du-v i v i e r, det. & distrib. R. C i f e r r i (Myc. Dom. Exs. 387). BPI, also (15). The species is discussed in Sydowia *10*: 174. 1956. No perfect stages has been reported from Haiti for this fungus, but it often is attributed to *Erysiphe cichoracearum* DC.

Oospora citri-aurantii (Ferr.) Sacc. & Syd., in Sacc., Syll. Fung. *16*: 1024. 1902. (Syn. *Oidium citri-aurantii* Ferr.). On *Citrus aurantifolia* (Christm.) Swing., *C. sinensis* (L.) Osbeck, *C.* sp. (17, Map 124, 1946), (60, lists for 1940, 1941).

**Periconia byssoides* Pers. ex Schw., Schrift Naturf. Ges. Leipzig *1*: 125. 1822. (Syn. *Periconia pycnospora* Fres.). Bayeux, on *Hevea brasiliensis* Müll.-Argov., 1 XII, 1925, leg. A. E. J e n k i n s, det. V. K. C h a r l e s. BPI.

Pestalotia sp. On *Cocos mucifera* L. (60, list for 1936).

P. cinnamomi B. de Haan, Bull. Inst. Bot. Buitenzorg *6*: 12. 1900. Bayeux, on *Cinnamomum zeylanicum* Blume, 18 I, 1925, leg. J. R. W e i r, (No. 72541), det. V. K. C h a r l e s. BPI, also (15), as on *Cinnamomum* sp.

P. palmarum Cke., Grevillea *4*: 115. 1875. On *Cocos mucifera* L. (50).

**P. versicolor* Speg., Michelia *1*: 479. 1889. On leaves of *Coccoloba uvifera* L., 15 III, 1922, leg. & det. V. K. C h a r l e s (see *P. coccolobae* Ell. & Ev.). BPI.

Phaeocytostroma sacchari (Ell. & Ev.) Sutton, Commonw. Myc. Inst. Myc. Paper 97, p. 26. 1964. [Syn. *Melanconium sacchari* Mass., *Pleocyta sacchari* (Mass.) Petr. & Syd.]. General distribution, on *Saccharum officinarum* L. Specimen from Le Frow, III, 1922, leg. & det. V. K. C h a r l e s. BPI, also (17, Map 255, 1952), (36).

Phoma sp. Vic. St. Michel de l'Atalaye, Dept. du Nord, on *Epidendrum olivaceum* Cogn., *Lycopersicon esculentum* (L.) Mill., 17 XI, 1925, leg. E. C. L e o n a r d (No. 7108 a), det W. W. D i e h l. BPI, also (60, list for 1931).

P. destructiva Plowr.: See *Ascochyta lycopersici* (Cke.) Brun.

P. insidiosa Tassi, Bull. Lab. Ort. Bot. Univ. Siena, I, p. 8. 1898. On *Sorghum vulgare* Pers. var. *caffrorum* (Thunb.) Hubb. & Rehder, V, 1942, intercepted J. L u c i a n o, det. J. A. S t e v e n s o n. BPI, also (60, list for 1942).

Phomopsis citri Fawc., Phytopath. *2*: 109. 1912. On *Citrus sinensis* (L.) Osbeck. (60, list for 1931).

P. vexans (Sacc. & Syd.) Harter, Jour. Agric. Res. *2*: 338. 1914. (Syn. *Phoma vexans* Sacc. & Syd.). On *Solanum melongena* L. (50). The ascigerous stage, *Diaporthe vexans* Gratz, is known only in cultures.

Phyllosticta sp. On *Mangifera indica* L. (60, list for 1936).

P. batatas (Thuem.) Cke., Grevillea 7: 35. 1898. (Syn. *Depazea batatas* Thuem.). On *Ipomoea batatas* (L.) Lam. (50).

P. heveae Zimm., Bull. Inst. Bot. Buitenzorg *10*: 21. 1901. Bayeux, on *Hevea brasiliensis* Müll.-Argov. 1925. leg. Jenkins, O. F. Cook, J. R. Weir, det. V. K. Charles, J. R. Weir. BPI, also (15).

P. mortoni Fairm., Mycologia *5*: 247. 1913. On *Mangifera indica* L., 29 VIII, 1951, intercepted J. Freedland, det. W. S. Fields. BPI, also (15), (60, lists for 1947, 1952).

Phyllostictella gastonis (Roum.) Tassi: See *Coniothyrium gastonis* (Roum.) Berl. & Vogl.

Phyllostictina pyriformis Cash & Watson, Mycologia *47*: 737—738. 1955. Vic. Port-au-Prince, on *Dendrobium* sp. (leaves), 4 X, 1944, intercepted E. Kostal, det. E. K. Cash & A. J. Watson. BPI, also (11).

Piricularia grisea (Cke.) Sacc., Michelia 2: 148. 1880. (Syn. *Trichothecium griseum* Cke.) On *Musa* sp. (62).

Pleocyta sacchari (Mass.) Petr. & Syd.: See *Phaeocytostroma sacchari* (Ell. & Ev.) Sutton.

(?)*Rhizoctonia* sp. On *Coffea arabica* L., *Theobroma cacao* L. Reported by (50) as propable cause of a "black rot of roots" in both hosts.

R. solani Kuehn, Krankh. Kulturg. p. 224. 1858. Cosmopolitan, on *Solanum tuberosum* L. (50). Sterile state of Basidiomycete usually referred to *Pellicularia filamentosa* (Pat.) Rogers.

Sclerotium bataticola Taub.: See *Macrophomina phaseoli* (Maubl.) Ashby.

Scolecotrichum musae Zimm.: See *Cordana musae* (Zimm.) Hoehn.

Septoria fructigena Berk. & Curt., Grevillea *3*: 10. 1874. PQ Interception, on *Passiflora quadrangularis* L. (60, list for 1966).

S. lycopersici Speg., Ann. Soc. Cien. Argentina *12*: 115. 1881. General distribution, on *Lycopersicon esculentum* (L.) Mill. (50).

Sphaceloma fawcettii Jenkins, Phytopath. *15*: 101. 1925. (Syn. *Cladosporium citri* Fawc.). Imperfect state of *Elsinoë fawcettii* Bitanc. & Jenkins. On *Citrus sinensis* (L.) Osbeck. (60, list for 1931).

S. perseae Jenkins, Phytopath. *24*: 84—85. 1934. On *Persea americana* Mill. (17, Map 232, 1951), (25), (60, list for 1931).

Stachylidium theobromae Turconi, Atti Ist. Bot. Univ. Pavia, ser. 2, *17*: 7. 1920. On *Musa paradisiaca* L. [including subsp. *sapientum* (L.) Kuntze]. (17, Map. 146, 1948), (60, lists for 1942, 1948).

Stemphylium botryosum Wallr., Flora Crypt. Germ. *2*: 300. 1833. [*Macrosporium parasiticum* Thuem., *Thyrospora parasitica* (Thuem.) Angell]. On *Allium cepa* L. (50).

Stilbella flavida (Cke.) P. Henn.: See *Mycena citricolor* (Berk. & Curt.) Sacc.

Thielaviopsis sp. On *Theobroma cacao* L. (48).

T. basicola (Berk. & Br.) Ferr., Flora Ital. Crypt. *1*, part 1, fasc. 8, p. 233. 1912. On *Nicotiana tabacum* L. (50).

T. paradoxa (de Seynes) Hoehn., Hedwigia *43*: 295. 1904. On *Saccharum officinarum* L. (60, lists for 1934, 1935, 1936).

Triposporium sp. Bayeux, on *Jambosa jambos* (L.) Mill. (Syn. *Euge-*

nia jambosa L.), VIII, 1903, leg. G. V. Nash (No. 65), det. C. A. Batista & R. Ciferri. (8).

Vermicularia capsici Syd.: See *Colletotrichum gloeosporioides* (Penz.) Sacc.

Verticillium sp. On *Musa paradisiaca* L. (60, list for 1936).

Zygosporium oscheoides Mont., Ann. Sci. Nat. 2 Sér., *17*: 121. 1842. (Syn. *Z. paraense* Vincens). Bayeux, on *Hevea brasiliensis* Müll.-Argov., 19 I, 1925, leg. J. R. Weir, det. V. K. Charles. BPI, also (15).

Host List (Plants)

Acrista sp.
Anthostomella sp.
Agave sisalana
Colletotrichum gloeosporioides
Agave sp.
Colletotrichum gloeosporioides
Allium cepa
Stemphylium botryosum
Allium sp.
Alternaria porri
Amaranthus sp.
Cercospora brachiata
Ananas comosus
Phytophthora cinnamomi (?)
Ananas sp.
Ceratocystis paradoxa
Antirrhinum majus
Cercospora antirrhini
Arachis hypogaea
Cercospora personata
Puccinia arachidis
Asplenium dentatum
Dothidella basirufa
Bauhinia divaricata
Uredo haitiensis
Beta vulgaris
Cercospora beticola
Bidens pilosa
Uromyces bidenticola
Bletia purpurea
Uredo nigropuncta
Bomarea ovata
Puccinia bomareae
Borreria sp.
Polyporus corrosus
Brassica oleracea
Alternaria brassicae
Pellicularia filamentosa [stat. imperf. = *Rhizoctonia solani*]
Peronospora parasitica
Brassica spp.
Mycosphaerella brassicicola
Brya buxifolia
Trabutia sp.
Cajanus cajan
Uromyces dolicholi
Calotropis procera
Cercospora calotropidis
Capsicum annuum
Colletotrichum gloeosporioides
Fusarium annuum
Rhizopus stolonifer
Capsicum frutescens
Cercospora capsici
Colletotrichum gloeosporioides
Fusarium annuum
Meliola capsicola
Carica papaya
Asperisporium caricae
Colletotrichum gloeosporioides
Carica sp.
Physarum sp.
Cassia emarginata
Ravenelia arthurii
Castilla elastica
Dacryopinax spathularia
Fomes sclerodermeus
Hypoxylon stygium
Cinnamomum zeylanicum
Pestalotia cinnamomi
Cissus sicyoides
Mykosyrinx cissi
Citrullus vulgaris
Colletotrichum orbiculare
Erysiphe cichoracearum
Pythium sp.
Citrus aurantifolia
Botryodiplodia theobromae
Colletotrichum gloeosporioides
Oospora citri-aurantii
Rhizopus stolonifer
Citrus aurantium

Septobasidium lepidosaphis [on scale: *Lepidosaphes beckii*]
Citrus sinensis
Colletotrichum sp.
Nectria diploa
Oospora citri-aurantii
Phomopsis citri
Septobasidium spongium [on scale: *Coccidae*]
Sphaceloma fawcettii
Citrus sp.
Capnodium citri
Colletotrichum gloesporioides
Diaporthe citri
Elsinoë fawcettii
Oospora citri-aurantii
Phytophthora citrophthora
Phytophthora parasitica
Clusia rosea
Coccomyces limitatus
Guignardia clusiae
Meliola sp.
Clusia sp.
Mycosphaerella clusiae
Coccoloba uvifera
Pestalotia versicolor
Coccothrinax sp.
Hysterostomina palmae
Cocos nucifera
Diplodia sp.
Pestalotia palmarum
Pestalotia sp.
Cocos sp.
Ceratocystis fimbriata
Coffea arabica
Capnodium sp.
Cercospora coffeicola
Colletotrichum gloeosporioides
Coniothyrium coffeae
Fusarium solani
Mycena citricolor
Pellicularia koleroga
? *Rhizoctonia* sp.
? *Rosellinia* sp.
Sphaerulina coffeicola
Coffea sp.
Cercospora coffeicola
Diplodina sp.
Commicarpus scandens
Albugo platensis
Cercospora furfurella
Cercospora sp.
Cordia bullata
Aecidium cordiae
Cordia globosa
Epicoccum sp.
Crossopetalum rhacoma
Drepanospora pannosa
Cucumis melo
Alternaria cucumerina
Erysiphe cichoracearum
Pseudoperonospora cubensis
Cucumis sativus
Mycosphaerella citrullina
Cucurbita moschata
Erysiphe cichoracearum
Daucus carota
Alternaria dauci
Dendrobium sp.
Phyllostictina pyriformis
Dianthera americana
Eutypa diantherae
Diodia rigida
Puccinia lateritia
Dioscorea alata
Cercospora carbonacea
Duranta erecta
Phyllachora fusicarpa
Echinodorus berteroi
Cercospora echinodori
Cercospora sp.
Eleocharis interstincta
Puccinia liberta
Uredo incomposita
Epidendrum olivaceum
Phoma sp.
Epidendrum sp.
Colletotrichum sp.
Sphenospora kevorkianii
Eugenia maleolens
Phyllachora verrucosa
Euphorbia hirta
Uromyces euphorbiae
Euphorbia hyssopifolia
Uromyces euphorbiae
Euphorbia prostata
Uromyces euphorbiae
Ficus sp.
Calocera cornea
Fimbrystilis ferruginea
Puccinia superior
Fimbrystylis spadicea
Puccinia superior
Funtumia elastica
Colletotrichum gloeosporioides
Encoelia heteromera
Eutypa sp.
Fomes extensus

Poria epimiltina
Geranium sp.
Uromyces geranii
Gossypium barbadense
Glomerella cingulata [stat. imperf. = *Colletotrichum gloeosporioides*]
Phakopsora gossypii
Gossypium sp.
Cercospora gossypina
Fusarium sp.
Haematoxylon campechianum
Cercospora sp.
Hevea brasiliensis
Aposphaeria sp.
Botryodiplodia theobromae
Colletotrichum gloeosporioides
Colletotrichum sp.
Hypoxylon nummularium
Hypoxylon rubiginosum
Nummularia broomeiana
Ophiobolus heveae
Periconia byssoides
Phyllosticta heveae
Poria epimiltina
Poria umbrinella
Schizophyllum umbrinum
Torrubiella confragosa
Xylaria fastigiata
Xylaria multiplex
Zygosporium oscheoides
Hevea sp.
Ceratocystis fimbriata
Cercospora heveae
Ionopsis sp.
Sphenospora kevorkianii
Ipomoea batatas
Albugo ipomoeae-panduranae
Botryodiplodia theobromae
Ceratocystis fimbriata
Cercospora bataticola
Coleosporium ipomoeae
Macrophomina phaseoli
Phyllosticta batatas
Rhizopus stolonifer
Ipomoea nil
Coleosporium ipomoeae
Ipomoea pes-caprae
Cercospora sp.
Ipomoea sp.
Ceratocystis fimbriata
Iris sp.
Puccinia iridis
Jacquinia linearis
Dimerina jacquiniae
Jambosa jambos
Naetrocymbe scoriadea
Phaeochaetia woronichinii
Triposporium sp.
Jatropha gossypifolia
Phakopsora jatrophicola
Limonium sinuatum
Cercospora insulana
Lycopersicon esculentum
Ascochyta lycopersici
Cladosporium fulvum
Colletotrichum gloeosporioides
Fusarium oxysporum f. sp. *lycopersici*
Fusarium sp.
Helminthosporium carposaprum
Phoma sp.
Phytophthora infestans
Septoria lycopersici
Malvastrum spicatum
Puccinia malvacearum
Malvastrum tricuspidatun
Puccinia malvacearum
Mangifera indica
Botryodiplodia theobromae
Cercospora mangiferae
Colletotrichum gloeosporioides
Elsinoë mangiferae
Phyllosticta mortoni
Phyllosticta sp.
Manihot esculenta
Glomerella cingulata [stat. imperf. = *Colletotrichum gloeosporioides*]
Manihot glaziovii
Botryodiplodia minor
Diplodia manihoti
Ganoderma sp.
Glomerella cingulata [stat. imperf. = *Colletotrichum gloeosporioides*]
Guignardia manihoti
Manihot utilissima
Cercospora henningsii
Melanthera buchii
Uromyes columbianus
Mimosa leonardii
Phaeosphaerella sp.
Mimusops globosa
Fomes melanoporus
Ganoderma applanatum
Hypoxylon stygium
Polyporus linoides
Polyporus zonalis
Poria punctata
Morinda umbellata

Cercospora morindicola
Mucana pruriens
Cercospora mucunae
Musa paradisiaca
[incl. subsp. *sapientum*]
Colletotrichum musae
Cordana musae
Deightoniella torulosa
Fusarium oxysporum f. sp. *cubense*
Helminthosporium sp.
Mycosphaerella musicola [& stat. imperf. *Cercospora musae*]
Stachylidium theobromae
Verticillium sp.
Musa sp.
Ceratocystis paradoxa
Chloridium musae
Colletotrichum musae
Cordana musae
Deightoniella torulosa
Marasmiellus inoderma
Marasmiellus stenophyllus
Mycosphaerella musicola [& stat. imperf. *Cercospora musae*]
Piricularia grisea
Nicotiana tabacum
Alternaria longipes
Cercospora nicotianae
Erysiphe cichoracearum [stat. imperf. = *Oidium tabaci*]
Thielaviopsis basicola
Oncidium pulchellum
Sphenospora kevorkianii
Sphenospora saphena
Oncidium sp.
Colletotrichum gloeosporioides
Opuntia dillenii
Fusarium lunatum
Oryza sativa
Cercospora oryzae
Passiflora quadrangularis
Septoria fructigena
Persea americana
Botryodiplodia theobromae
Colletotrichum gloeosporioides
Sphaceloma perseae
Phaseolus lunatus
Colletotrichum lindemuthianum
Uromyces phaseoli
Phaseolus vulgaris
Cercospora canescens
Erysiphe polygoni
Isariopsis griseola
Uromyces phaseoli
Phyla nodiflora
Meliola lippiae
Puccinia lantanae
Pinus sp.
Antennospora caribaea
Fomes pinicola
Pisum sativum
Ascochyta pinodella
Ascochyta pisi
Didymella pinodes
Fusarium oxysporum f. sp. *pisi*
Polygonum punctatum
Puccinia polygoni-amphibii
Polypodium induens
Acrospermum maxoni
Porophyllum ruderle
Puccinia porophylli
Prosopis juliflora
Fomes robiniae
Prunus persica
Taphrina deformans
Tranzschelia pruni-spinosae
Pseudophoenix insignis
Cyathus intermedius
Psidium guajava
Caudella psidii
Meliola trichostroma
Randia aculeata
Phyllachora randiae
Randia parvifolia
Elsinoë puertoricensis
Ricinus communis
Cercospora ricinella
Rivina humilis
Puccinia raunkaerii
Rosa sp.
Diplocarpon rosae
Sphaerotheca pannosa
Rubus eggersii
Mainsia tenella
Rumex obtusifolius
Aecidium rumicis
Saccharum officinarum
Cercospora vaginae
Colletotrichum graminicola
Coniothyrium sp.
Elsinoë sacchari
Giberella fujikuroi [& stat. imperf. *Fusarium moniliforme*]
Glomerella tucumanensis
Helminthosporium sacchari
Leptosphaeria sacchari
Marasmius sacchari

Phaeocytostroma sacchari
Schizophyllum commune
Thielaviopsis paradoxa
Saccharum sp.
Ceratocystis paradoxa
Sambucus caerulea var. *neomexicana*
Cercospora catenospora
Scirpus sp.
Puccinia obtecta
Sechium edule
Mycosphaerella citrullina
Setaria setosa
Cladosporium spongiosum
Sida acuta
Puccinia heterospora
Sida pyramidata
Puccinia heterospora
Sida urens
Irenopsis mölleriana
Solanum melongena
Colletotrichum gloeosporioides
Phomopsis vexans
Solanum tuberosum
Fusarium oxysporum
Pellicularia filamentosa [& stat. imperf. *Rhizoctonia solani*]
Phytophthora infestans
Sorghum vulgare (incl. var. *caffrorum*)
Cladasporium sp.
Phoma insidiosa
Puccinia purpurea
Sphacelotheca cruenta
Sphacelotheca occidentalis
Sphacelotheca sorghi
Sorghum sp.
Curvularia sp.
Gloeocercospora sorghi
Spondias sp.
Cribraria tenella
Sporobolus poiretii
Helminthosporium ravenelii
Sporobolus sp.
Helminthosporium ravenelii
Stachytarpheta jamaicensis
Puccinia urbaniana
Synedrella nodiflora
Puccinia melampodii
Tamarindus indica
Ptychogaster cubensis
Tecoma stans
Prospodium elegans
Prospodium transformans
Tetranthus hirsutus
Puccinia melampodii
Tetranthus litoralis
Puccinia melampodii
Tetrazygia longicollis
Godronia parasitica
Theobroma cacao
Asbolisia citrina
Botryodiplodia theobromae
Ceratoycstis fimbriata
Colletotrichum gloeosporioides
Colletotrichum sp.
Hypoxylon rubiginosum
Mycena sp.
Pellicularia spp.
Phytophthora palmivora
? *Rhizoctonia* sp.
? *Rosellinia* sp.
Thielaviopsis sp.
Tryblidiella rufula
Tryblidiella sp.
Xylaria arbuscula
Trichachne insularis
Sphacelotheca cordobensis
Trichostigma octandrum
Puccinia raunkaerii
Triticum aestivum
Puccinia recondita
Veronia cinerea
Uredo toroiana
Vigna sinensis
Cercospora canescens
Erysiphe polygoni
Vitis vinifera
Elsinoë ampelina
Guignardia bidwellii
Plasmopara viticola
Wedelia trilobata
Endophyllum wedeliae
Xanthium strumarium
Puccinia xanthii
Zea mays
Puccinia sorghi
Ustilago maydis
Zinnia peruviana
Cercospora zinniae

Host List (Insects)

Celaenopsis sp.
Richia depauperata
Coccidae (undesignated)
Septobasidium spongium
Euzecornis sp.

Richia dichotoma
Haltica jamaicensis
Laboulbenia fuliginosa
Laboulbenia indiostoma
Haltica plebeia

Laboulbenia fuliginosa
Lepidosaphes beckii
Septobasidium lepidosaphis
Trogophloeus fulvipes
Cantharomyces haytiensis

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Effect of Temperature and Hydrogen ion Concentration on thro pathogenie Fungi

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Introduction

Most important environmental factors governing the growth and sporulation of fungi are temperature and hydrogen-ion concentration. A little variation in these factors may induce marked differences in their morphological characters, growth and sporulation. It is an established fact that for each fungus there is a minimum, optimum and maximum temperature for growth and sporulation. Wolf and Wolf (1947) stated that the growth of most of the fungi stops at 0° C, and only a few fungi are active beyond 40° C, whereas the optimum temperature lies somewhere between the two. Singh and Khanna (1966) working on *Alternaria tenuis* found best growth and sporulation of the fungus at 24—25° C. Tandon and Varma (1962) reported 25—27° C to be the optimum temperature for the growth and sporulation of *Colletotrichum gloeosporioides* and *Chaetostylum* showed best growth at 20° C. This shows that the fungi are highly sensitive to the temperature of the medium.

Fungi differ considerably in their tolerance to different pH values. The growth of fungi may be completely inhibited in media, which are either too acidic or too alkaline. Most of the fungi, however, tend to grow better on the acidic side. Cochrane (1958) states that many fungi, with few exceptions, grow best on media with an initial pH of 5.0 to 6.5. Tandon and Chaturvedi (1963) working on *Alternaria tenuis*, found the optimum growth at pH 5.5. Grewal (1954) observed that *Colletotrichum papayae* and *Gloeosporium musarum* grew fairly well even at pH 2. Mathur et al. (1950) reported a bimodal type of curve showing the two peaks at pH 3.4 and 5.4 for *C. lindemuthianum*. Sattar and Malik (1939) reported that *C. gloeosporioides* showed best growth at pH 7.5. This variation in environmental conditions initiated the author to study the effect of various temperature and pH on the growth and sporulation of three different pathogenic fungi isolated by him.

Materials and Methods

Three leaf spot fungi, viz; *Alternaria tenuis* from *Ixora sp.*, *Alternaria solani* from *Barleria sp.*, and *Colletotrichum gloeosporioides* from

Gardenia sp., were purified by hyphal tip methods and grown on Asthana and Hawker's Medium A.*). Extra pure chemicals (B. D. H. or E. Merck) were used. For cultural work 25 ml. of the liquid medium was poured in 150 ml. Erlenmeyer Pyrex flasks; five replicates were used in each treatment. After autoclaving (at 15 lbs. pressure for 15 minutes) the flasks were kept at various temperatures at which the growth was to be observed for at least twenty four hours before inoculation to remove the lag effect. The various temperatures tried were 0, 15, 15, 20, 25, 30, 35, and 40° C. Inoculated flasks were incubated for fifteen days at respective temperatures. For pH experiment the fungi were grown at 21 different pH values viz; 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.5, 9.0, 9.5, 10.0, 10.5, 11.0, 11.5, and 12.0. The pH was adjusted with the help of Beckman's pH meter so that it gives the desired pH after autoclaving. The cultural procedures were the same as above. These flasks were incubated for 15 days at 25° C (± 1). After the incubation period, the sporulation and dry weight were recorded. Degree of sporulation was classified by microscopic examination, using eye piece 15 × and objective 40 ×, on the following basis: 1—10 spores per field of the microscope, poor; 11—30, fair; 31—70; good, 71 and above very good. For obtaining dry weight the contents of the flasks were filtered through Whatman's filter paper No. 42. The mycelial mat was subsequently dried at 70° C in an electric oven for two days and then weighed on an electrical balance.

Table I

Showing growth (in mg), and sporulation of *Alternaria tenuis, Alternaria solani* and *Colletotrichum gloeosporioides* at different temperatures

No.	Temp. in Centi-grade.	*Alternaria tenuis* Dry wt. in mg.	sporula-tion.	*Alternaria solani* Dry wt. in mg.	sporula-tion.	*Colletotrichum gloeosporioides* Dry wt. in mg.	sporula-tion.
1.	0° C	—	—	—	—	—	—
2.	10° C	8.3	—	10.1	—	4.1	—
3.	15° C	19.5	—	22.7	+	16.6	—
4.	20° C	49.2	+++	56.2	++++	39.7	+++
5.	25° C	59.2	++++	69.3	++++	47.9	++++
6.	30° C	28.6	+	42.2	+	16.8	—
7.	35° C	20.4	—	28.7	—	8.9	—
8.	40° C	—	—	—	—	—	—
Average Mean:-		30.9		41.5		22.3	

++++ = Very Good; +++ = Good; ++ = Fair; + = Poor; — = Nil.

*) Glucose, 5 g; KNO_3, 3.5 g; KH_2PO_4, 1.75 g; $MgSO_4 . 7H_2O$, 0.75 g; distilled water, 1 l.

Results and Discussion

It is evident from Table I that all the three species showed no growth below 10° C. The optimum temperature for the growth of all the species under present investigation was found to be 25° C. The growth of these three fungi, however, ceased at 40° C. Their sporulation was best at 20—25° C. Similarly Green (1927) working on *Zygorhynchus moelleri* reported that the growth of the fungus increased with rise of temperature up to 26° C but above 26° it decreased and later ceased at 32° C.

Hydrogen-ion concentration of the medium can affect the growth of the fungus in two ways. Externally, it can control the degree of dissociation of the inorganic ions in the culture solution. Since dissociation plays a part in the movement of ions in the fungus, degree of dissociation will affect fungus growth. Internally it can cause changes in pH in the mycelium. It is clear from Table II that all the three fungi grew well within a pH range of 4.5—8.5. None could grow at pH 2.

Table II

Showing the effect of different pH on the growth and sporulation of *Alternaria tenuis*, *Alternaria solani* and *Colletotrichum gloeosporioides*

No.	pH	*Alternaria tenuis* Dry wt. in mg.	sporulation.	*Alternaria solani* Dry wt. in mg.	sporulation.	*Colletotrichum gloeosporioides* Dry wt. in mg.	sporulation.
1.	2	—	—	—	—	—	—
2.	2.5	7.2	—	8.9	—	4.1	—
3.	3	13.7	—	15.6	—	9.3	—
4.	3.5	19.2	+	21.4	+	17.2	+
5.	4	25.3	+	30.0	+++	24.4	+
6.	4.5	36.0	+++	38.6	+++	29.3	+++
7.	5	44.5	+++	50.2	+++	35.7	+++
8.	5.5	49.9	+++	55.1	+++	44.0	++++
9.	6	56.5	++++	62.5	++++	51.1	++++
10.	6.5	59.8	++++	69.7	++++	50.1	++++
11.	7	58.2	++++	67.8	++++	49.1	++++
12.	7.5	49.4	+++	57.0	++++	43.0	+++
13.	8	38.6	+++	49.1	+++	38.0	++
14.	8.5	32.0	+++	39.9	+++	28.7	+
15.	9	25.1	++	33.6	+++	22.3	+
16.	9.5	18.6	++	26.5	++	19.5	+
17.	10	17.0	++	23.0	++	16.5	+
18.	10.5	14.9	—	19.2	—	13.6	+
19.	11	12.1	—	16.9	—	10.2	—
20.	11.5	8.9	—	11.3	—	6.9	—
21.	12	6.9	—	11.2	—	5.2	—
Average Mean		29.69		35.38		25.91	

++++ = Very Good; +++ = Good; ++ = Fair; + = Poor; — = Nil.

Maximum growth of *A. tenuis* and *A. solani* was recorded at pH 6.5 while *C. gloeosporioides* showed best growth at pH 6. Generally alkaline media were not favourable for growth and sporulation of these three pathogenic fungi. Similarly Johnson (1923), Brancato and Golding (1953), Agnihotri (1964) and Sarbhoy (1965) also found that the growth of fungi investigated by them was more on the acidic media than on the alkaline.

In the present case a single optimum peak of the pH was recorded far all the three pathogens, which agrees with the behaviour of fungi studied by Mehrotra (1964) and Sarbhoy (1965). On the other hand Webb (1924), Saksena (1936), Mathur et al. (1950), Mehrotra and Mehrotra (1962) and Tandon & Varma (1962) found a bimodal type of curve in the fungi investigated by them.

In the present study there was always a correlation between growth and sporulation of the three fungi.

Summary

The effect of two environmental factors, temperature and hydrogen-ion concentration on the growth and sporulation of *A. tenuis*, *A. solani*, and *C. gloeosporioides* was studied. It was found that 25° C was the optimum temperature for growth and sporulation of the three fungi. It was also found that pH of the medium had a marked effect on the growth and sporulation of the fungi. The best growth in case of *A. tenuis* and *A. solani* was observed at pH 6.5 while *C. gloeosporioides* has best growth at pH 6.

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The Effect of Carbohydrates on Growth and Sporulation of Aspergillus flavus and their carry over for subsequent Spore Germination

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The great differences in the ability of fungal spores to germinate when obtained from various sporulation media indicated the importance of judicious selection of culture media for raising the cultures for any specific work (Darby and Mandels, 1955; Grover, 1964; Allen, 1965; Kumar and Grover, 1967). Cochrane et al. (1963) suggested that the insufficiency of carbon reserves in the fungal spores is accomponied by a requirement of specific respiratory intermediate not available in the spore reserve.Whereas Caltrider, Ramachandran and Gottlieb (1963) and Caltrider and Gottlieb (1966) pointed out that the endogenous substrates are preferentially utilized during the spore germination in case of rust and smut fungi. Obviously, the spore reserves are a critical factor in their future metabolic activity.

Basic physiological and biochemical data concerning the formation of spore reserves are sparse (Sussman and Halvorson, 1966). The importance of sporulation medium upon subsequent behaviour in germination and metabolic activity of spores has been emphasized by Cochrane (1960) and Allen (1965). In an earlier study data concerning the role of amino acids in the substrate media on subsequent spore germination of *Aspergillus flavus* Link ex Fries indicated the essentiality of atleast five amino acids, whose presence in the basal medium was thought to be essential for normal metabolism of spore germination (Grover, 1964). The present account describes the effect of some of the carbon sources on growth sporulation and their carry-over for subsequent spore germination of *A. flavus*.

Materials and Methods

The isolate of *Aspergillus flavus* was the same as used earlier (Grover, 1964). The basal medium consisted of KH_2PO_4 5 g; $MgSO_4 \cdot 7H_2O$ 2.5 g; KNO_3 10 g; $FeCl_3$ 0.01 g; and distilled water to make 1 litre. The carbon sources were added to the basal medium in amounts calculated to give equivalent concentration of carbon. The carbon compounds were sterilized separately and then added to the already sterilized basal medium. The pH of all the media was adjusted to 6.0. The inoculum used

(1 ml containing 1×10^3 spores from 8—10-day-old cultures) was made from cultures growing on the basal medium containing 20 g sucrose/l (= 8.42 mg C/ml). Unless otherwise stated, the cultures were incubated for 8 days at 24—26° C, after which the mycelia from each flask of each treatment was separately filtered, washed, dried in hot-air oven and finally weighed. The dry weight of the mycelium was taken as an index of growth.

For spore germination tests, the method used was the same as described earlier (Grover, 1964). Unwashed spores collected with the help of camel hair brush were used in all cases. Two dimensional paper chromatography was used for the determination of carbohydrates in the hydrolysates of mycelium and spores. The solvents used were n-butanol-acetic-acid-water (4 : 1 : 5 v/v/v) and 80% phenol, and the carbohydrates were detected by spraying the chromatograms with Partridge's ammonical silver nitrate (Block et al., 1958). The hydrolysates of spores and mycelium were prepared by the method described by Crossan and Lynch (1958). The identity of carbohydrates on chromatograms was compared with standard compounds on another chromatogram run simultaneously. Estimation of total residual carbohydrates in the culture filtrates was made by phenol-sulphuric acid method (Snell, Snell and Snell, 1961) using Carl Zeiss USU-1 (Jena) Spectrophotometer at 490 μ wave-length.

The chemicals used were of reagent grade supplied by B. D. H., London, or E. Merck & Co., Germany. All culture vessels used were of Pyrex glass.

The evaluation for spore colour and sporulation were subjective, but as far as possible all the data were subjected to statistical analysis.

Results

The Effect of Different Carbon Concentrations:

With sucrose as a carbon source, a continuous increase in growth was obtained uptil 12.5—15% concentration, after which it descreased gradually (Fig. 1). Residual carbohydrates in the filtrate began to appear when the initial sucrose concentration was 5.0% or more in the medium. Sporulation increased uptil a concentration of 2.0% sucrose, after which it became constant. The colour of the spores en masse changed from light olive green to green to deep green with the increase in sucrose concentration in the medium.

When the spores harvested from above cultures were germinated in distilled water, their germination was optimum (36.0%) when the spores were obtained from cultures having 30 ± 5 g/l of sucrose, while the spores obtained from media containing higher or lower sucrose concentrations gave poor germination (Fig. 1).

With glucose as carbon source, almost similar results were obtained. It was seen that with the increase in incubation period upto 20 days, a corresponding increase in mycelial dry weight was obtained at different glucose concentrations. But spores harvested from media containing 2.0% glucose and incubated for 8 days gave optimum spore germination as compared to other treatments.

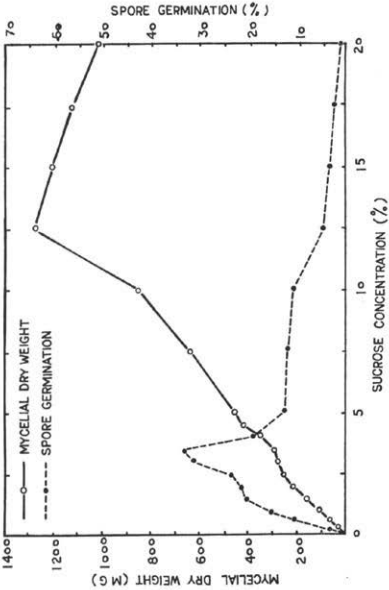

Fig. 1. Mycelial growth of *Aspergillus flavus* on different concentrations of sucrose and subsequent germination of spores in distilled water

The Effect of Different Carbohydrates:

Growth, Sporulation and Subsequent Spore Germination: *A. flavus* grew on all the 18 different carbohydrates when used individually as the sole carbon source in the basal medium. Presence of fructose, glucose, maltose, sucrose or raffinose as the sole carbon source in the basal medium increased the growth significantly, while lactose or sorbose yielded very poor growth (Table 1). Some increase in mycelial dry weigths were obtained in the latter cases when the cultures were incubated for longer durations of 16 days or more. In most other cases there was reduction in growth with the increase in the incubation period. Very little or no residual carbohydrates were seen after 8 days incubation period in the media containing ribose, xylose, arabinose, fructose, mannose, sucrose, cellobiose, melibiose, or melizitose; while abundant residues were found when galactose, lactose, or starch were the sole carbon sources in the media, though with the increase in incubation period, the residues decreased.

Table 1. Effect of various carbohydrates on the growth, sporulation and subsequent spore germination of *Aspergillus flavus*
Index of sporulation: + poor; ++ fair; +++ good; ++++ abundant. Each carbohydrate added at the rate of 8.42 mg C/ml. All observations as average of three replications

Carbon source	Sporulation	% spore germination	Mycelial dry wt. (mg)	Carbohydrate residue (mg C/ml)
D (—) ribose	++	21.3	437	0
L (+) rhamnose	+++	6.7	660	1.85
D (+) xylose	++++	32.2	642	0
L (+) arabinose	++++	31.4	509	0
D (—) glucose	++++	36.2	772	0.63
D (—) fructose	++++	6.2	861	0.12
D (—)galactose	++	7.9	565	4.0
D (+) mannose	++++	22.6	649	0
L (—) sorbose	+	15.1	176	0.87
Sucrose	++++	31.6	637	0
Lactose	+	23.9	66	3.6
Maltose	++++	5.0	768	1.1
Cellobiose	++++	17.8	633	0
Melibiose	++++	23.9	456	0
Raffinose	++++	33.7	756	0.98
Melizitose	+++	26.6	511	0
Inulin	++++	23.9	615	1.87
Starch	++++	15.8	688	2.5
L. S. D. at 5% level		5.6	38	

Most of the carbohydrates supported abundant sporulation. Poor sporulation was obtained on media containing lactose or sorbose, and fair sporulation was with ribose and galactose. Considerable variation was seen when the spores harvested from these media were germinated in distilled water. Spores harvested from media containing xylose, arabinose, glucose, sucrose, or raffinose gave normal germination (31.4—36.2%), while spores harvested from media containing fructose, galactose, maltose, or starch gave poor germination. Increase in age of spores reduced spore germination in most cases.

Spore Germination: Spores grown on the basal medium containing sucrose as the carbon source were germinated in each of the 18 different carbohydrates at 3 different concentrations. The spore germination was greatly influenced by the different carbohydrates when compared with the normal (germination in distilled water (32.6 ± 1.4%) (Table 2). Spore germination in the presence of ribose, glucose, fructose, or sucrose was significantly higher at all the concentrations, while no spore germination was obtained in the presence of cellobiose, raffinose, melizitose, maltose, or inulin. Very poor germination of spores was recorded in rhamnose, arabinose, or mannose. Increased concentration of carbohydrates increased spore germination but when fructose, galactose, sorbose or sucrose were used, the percentage germination decreased with the increase in their concentration. However, the 8.4 mg C/ml concentration of carbohydrates gave a satisfactory indication of these carbohydrates on germinability of spores of *A. flavus*.

Tab. 2. Germination of spores of *Aspergillus flavus* obtained from medium containing sucrose (8.42 mg C/ml) in different concentrations of carbohydrates

Carbon concentration as mg C/ml. Spore germination as average of three replicates. L. S. D. at 5% level = 8.6
Germination in distilled water = 32.6 ± 1.4%

Carbon source	Percentage spore germination at carbon concentration (mg C/ml)		
	4.2	8.4	21.0
D (—) ribose	27.1	48.9	66.0
L (+) rhamnose	5.3	6.4	8.9
D (+) xylose	11.1	14.3	35.5
L (+) arabinose	0	5.4	31.9
D (—) glucose	41.5	56.5	71.8
D (—) fructose	47.7	75.9	57.9
D (—) galactose	24.8	26.8	28.5
D (+) mannose	2.8	7.1	21.3
L (—) sorbose	25.7	36.8	28.4
Sucrose	24.5	54.6	22.6
Lactose	10.4	17.4	38.1
Maltose	0	10.4	26.9
Cellobiose	0	0	0
Melibiose	0	0	30.2
Raffinose	0	0	0
Melizitose	0	0	0
Inulin	0	0	0
Starch	0	16.5	35.5

Effect of Carbohydrates in Mixture

It was seen in the previous studies that six carbohydrates viz., galactose, glucose, maltose, fructose, sucrose and xylose were conspicuous for their role as good growth supporters or for increasing spore germination of *A. flavus* (Table 1 & 2). Besides, it was assumed that there might be a difference in the way a carbohydrate affected growth, sporulation and subsequent spore germination of the organism in the presence of other carbohydrates in the basal medium. To test this hypothesis these six carbohydrates were incorporated in equal proportions in the basal medium to give a total of 8.42 mg C/ml concentration. From these six carbohydrates in the basal medium one was omitted at a time, keeping the total carbon concentration the same, and the differences in the growth, sporulation and subsequent spore germination in different media were attributed to the missing carbohydrate.

It was observed that the absence of fructose from the basal medium did not affect the mycelial yield when compared with the medium containing all the six carbohydrates (Table 3). In other cases when one of the six carbohydrates were omitted from the mixture, the growth was slightly less than the complete medium and least growth being in case when sucrose was omitted.

The sporulation was not affected in any case. When spores were germinated in distilled water, significantly higher germination was obtained in those harvested from media devoid of xylose or maltose. While considerable decrease in spore germination was seen in case of those harvested from media devoid of fructose, glucose, sucrose or galactose. If the spores obtained from the latter 4 media were germinated separately in the respective carbohydrate that was lacking in the original medium the germination was restored to normal.

Effect of Substrate Carbon Sources on Spore Germination in different Carbon Compounds

Since the exogenous supply of carbohydrates greatly influenced the spore reserves, it was intended to see if there was any specific exogenous requirement of spores for increased germination. For this the spores obtained from media containing xylose, glucose, fructose, galactose, sucrose and maltose were germinated in distilled water and also in the above mentioned carbohydrates (8.42 mg C/ml).

As also pointed out earlier that spores harvested from media containing fructose, galactose or maltose germinated poorly in distilled water, but their germination was considerably increased when supplied with an exogenous carbon source (Table 4). Maltose when provided exogenously proved inhibitory to spore germination, irrespective of the spore source. On the other hand, exogenous supply of glucose and less so of sucrose increased spore germination when obtained from different sources.

Table 3. Dry weight of mycelium, sporulation and subsequent spore germination of *Aspergillus flavus* containing different combination of six carbohydrates

The complete medium consisted of the six carbohydrates, each in equal proportion to make a total of 8.42 mg C/ml in the medium

Medium	Sporulation	% spore germination	Mycelial dry weight (mg)
Complete	++++	30.7	624
Glucose omitted	++++	2.1	566
Fructose omitted	++++	12.4	620
Xylose omitted	++++	68.8	543
Galactose omitted	++++	13.2	532
Maltose omitted	++++	70.4	548
Sucrose omitted	++++	3.1	526
L. S. D. at 5% level		5.8	27

The highest germination induced by these chemicals was in case of spores obtained from the medium containing fructose and supplied exogenously with xylose, and those obtained from medium containing glucose and supplied with fructose or vice versa. Increased germination was also seen when spores were from medium containing xylose and germinated in xylose. No other similar case was noted.

Endogenous Carbon Sources in Spores

The reducing sugars present in the spores and mycelium of *A. flavus* when grown on media containing six different carbon sources either alone or in combination were tested chromatographically for their internal reserves. Results were evaluated qualitatively only and presented in Table 5.

It was seen that the spores obtained from media containing different carbon sources had in them both glucose and fructose, while maltose was present in addition to these in case of spores obtained from media containing fructose and maltose. Similarly, in the mycelium fructose was present in all cases and in addition to glucose and/or maltose were present in case of mycelia obtained from media containing glucose, fructose and sucrose. Xylose was also detected in mycelium from media containing sucrose, xylose and galactose.

Discussion

Carbon sources that favour abundant mycelial growth may or may not favour abundant sporulation and consequently the spores formed on media containing different carbohydrates germinated differently irrespective of the fact that a carbon source was good for growth and spore production. Fructose and maltose are the sugars which yielded maximum mycelial growth and sporulation in *Aspergillus flavus* but spores produced on these media germinated poorly. In contrast, the media containing glucose, sucrose or raffinose yielded abundant mycelial growth, sporulation and their spores germinated well. Obviously, the latter carbon sources contributed to suitable spore reserves which enabled these to germinate properly.

Perlman (1965) pointed out that most of the fungi, if not all, degrade carbon compounds added to the substrate medium and form vegetative and reproductive structures from the metabolic products. There is no positive report to show that the carbon sources added to the medium are incorporated directly into the mycelial carbohydrates, lipids or proteins. Our study shows that the incorporation of specific carbon sources in the medium definitely affects the spore reserves. Besides, the carbon residues left in the culture filtrates after the growth of *A. flavus* on media containing different carbon sources are not always related to mycelial growth, for, in case of media containing ribose, arabinose, melibiose, or melizitose no carbon residues are seen after 8 days growth of the organism and the mycelial growth by far is not abundant in these. Total utilization of carbon sources of diverse configuration may be indicative of the versitality and adaptive nature of the organism (Wilson and Lilly, 1958; Allen, 1965).

Table 4. Effect of substrate carbohydrates on spore germination of *Aspergillus flavus* in different carbohydrates
Cultures grown on medium containing carbohydrates at the rate of 8.42 mg C/ml
Germination of spores was in different carbohydrates having 8.42 mg C/ml concentration

Source of spores grown on media	percent spore germination in different carbohydrates						
	Water	Glucose	Fructose	Xylose	Maltose	Galactose	Sucrose
Xylose	14.3	39.1	26.3	24.4	0	24.8	29.2
Glucose	35.5	38.6	64.0	49.6	0	1.8	30.7
Fructose	6.8	56.4	17.0	58.9	2.7	20.1	25.9
Galactose	7.8	20.7	15.2	29.5	0	10.7	37.5
Sucrose	32.2	55.4	74.2	16.0	10.8	25.9	53.7
Maltose	5.0	41.5	43.2	53.0	0	0.6	41.2

Several carbon sources like fructose, maltose, glucose, sucrose or ribose when supplied exogenously to the spores produced on media containing sucrose increased their germination; others like rhamnose, arabinose, mannose or starch reduced the germination, while in the presence of cellobiose, melibiose, raffinose, melizitose or inulin there was complete inhibition of germination. The initiation of spore germination process results in the increase in the respiration and utilization of spore reserves (Cochrane et al., 1964; Allen, 1965). Eilers and Sussman (1964) reported that if a carbohydrate is added exogenously for the germination of *Neurospora tetrasperma* spores, its uptake begins only after 2 hours following activation. In other words, the exogenous supply of carbohydrates that increase spore germination act after spore activation in a complementary way in the metabolic process of spore germination. Cochrane et al. (1963) found that in case of chlamydospores of *Fusarium solani* germination of spores is accompanied by an increase in the oxidation of only those sugars which can be utilized for germination and sugars which support germination are oxidized more rapidly than those which do not. But Caltrider and Gottlieb (1966) are of the opinion that althuogh exogenously supplied carbohydrates are hydrolyzed during the process of smut spore germination, yet there is no relationship between oxygen consumption with carbon source and their effectiveness for germination. Lipids are thought to be acted upon first during the process of spore germination but there is now evidence that most spores require simultaneous utilization of lipids and carbohydrates (Sussman and Halvorson, 1966). Allen (1965) reported that the carbon source used for germination is taken up and converted to some temporary reserve and is later drawn upon again as the synthesizing capacity of spores increased. The inhibitory effect of certain carbohydrates, therefore, may be assumed to be due interference by these chemicals in the metabolic pathways leading to spore germination.

The fact that in a medium a mixture of six carbohydrates were essential for the growth, sporulation and normal subsequent spore germination is indicative of their specificity for these different processes. Sporuation and growth is not much affected if any of these carbohydrates are omitted from the substrate medium. Subsequent spore germination, however, is much affected, since for instance, ommission of maltose or xylose from the mixture in a medium produced spores which germinated better while whereas when any of the other carbohydrates are omitted in the medium the spores germinated poorly. In other words, presence of glucose, fructose, sucrose and galactose is essential for developing spores having normal reserves in them, whereas presence of maltose or xylose in a sugar mixture influences the spore reserve formation which inhibit their proper germination. Furthermore, the exogenous supply of maltose to the spores produced on media having different carbohydrates result in their germination inhibition, which is not the case with xylose. This suggest a different effect of maltose than that of xylose on *A. flavus*.

Although it is not expected that the spore reserves will include the carbohydrates on which these have been grown, yet it becomes apparent that the spore reserves contained glucose, fructose and/or maltose, irrespective of the substrate carbon source. Galactose is found in case of spores obtained from media containing galactose, or the mixture of six carbohydrates. The mycelia obtained from different media showed some variations in their carbohydrate contents. In case of conidia of *Erysiphe hordei*, Malca, Murray and Zscheille (1962) found free reducing sugars upto the extent of 1.5% of spore weight, while Edwards and Allen (1966) found large quantities of mannitol and less so of arabitol and other soluble sugars in the conidia. No sugar alcohols have been detected in the spores of *A. flavus*. The presence of free sugars like glucose, fructose, maltose or galactose in the spores of *A. flavus* in no case indicate that these are directly involved in the process of spore germination, though these could serve as good substrate materials for their respiration. It is clear that the exact nature of biochemical transformations undergone at the time of spore germination in relation to their reserves still need further investigations.

Summary

Aspergillus flavus utilized large amounts of sucrose (12.5—15.0%) for its optimum growth. The sporulation was optimum at 2.0% sucrose concentration, while the spores formed at media containing 3.0% sucrose germinated best. With glucose increased growth was obtained upto 20 days incubation period, though spores formed on 8th day germinated best. Among the 18 carbohydrates tried as individual carbon sources, best growth and sporulation was obtained on media containing fructose, glucose, raffinose and maltose, while least growth and sporulation was in media containing lactose and sorbose. No carbon residues were left in media containing ribose, xylose, arabinose, mannose, sucrose, cellobiose, melibiose or melizitose, while maximum residues were in case of galactose, lactose or starch. Absence of residue in the culture filtrates was not always related to good growth of the organism.

Spores harvested from media containing rhamnose, fructose, galactose, sorbose, maltose, cellobiose, inulin or starch germinated very poorly. The spores obtained from media containing sucrose when supplied with ribose, glucose, fructose, galactose, maltose or sucrose germinated better than in water, whereas in the presence of rhamnose, xylose, arabinose, mannose or lactose, the germination was poorer and there was no germination in cellobiose, melibiose, raffinose, melizitose or inulin. Presence of galactose, glucose, fructose or sucrose in a mixture gave good growth and sporulation and produced spores which germinated normally. Extreneous supply of glucose to spores produced on media containing different carbon sources increased their germination while maltose inhibited their germination. Spores obtained from media containing different carbohydrate sources had in their reserve glucose, fructose and/or maltose and galactose as identifiable carbohydrates, while the constituents of the mycelium varied greatly with the substrate carbon source.

Table 5. Endogenous carbohydrates in the spores and mycelium of *Aspergillus flavus* when grown on different carbohydrate substrates
All carbohydrates used at a concentration of 8.42 mg C/ml in the basal medium

Subtrate carbohydrate in the medium	Organ	Endogenous carbohydrates
Xylose	Mycelium	Glucose, fructose, maltose, galactose, xylose
	Spores	Glucose, fructose
Fructose	Mycelium	Glucose, fructose, maltose
	Spores	Glucose, fructose, maltose
Glucose	Mycelium	Glucose, fructose, maltose
	Spores	Glucose, fructose
Maltose	Mycelium	Fructose, maltose
	Spores	Glucose, fructose, maltose
Sucrose	Mycelium	Glucose, fructose, maltose, xylose
	Spores	Glucose, fructose
Galactose	Mycelium	Glucose, fructose, galactose, xylose
	Spores	Glucose, fructose, galactose
Mixture of 6 carbohydrates	Mycelium	Glucose, fructose, galactose
	Spores	Glucose, fructose, galactose, xylose

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Identity and Taxonomy of Phyllachora mahabaleshwarensis affecting Embelia viridiflora

By Alaka Chiplonkar

(M. A. C. S., Poona 4)

During her mycological survey carried out at Mahabaleshwar (elevation 4,500 ft.) near Poona (India) the writer came across plants of *Embelia viridiflora* Scheff. showing circular, orange-yellow coloured spots on the leaves. Microscopic examination of these spots revealed the ascomycetous nature of the fungus with the following characteristics.

Perithecia non-stromatic, pear-shaped, innate, ostiolate, wall-comprised of 2—4 layers of thin walled cells, clypeus absent 345—480 μ. Asci hyaline, cylindrical, paraphysate, wall gelatinising in water; 172—202 × 8.5—13 μ. Ascospores 8, hyaline, monostichous, elliptical to oblong, one-celled; 13—16 × 5.5—8.5 μ.

On the basis of these characters the fungus was indentified as a species of *Physalospora*.

Ananthanarayanan (1964) described *Phyllachora mahabaleshwarensis* parasitizing *E. viridiflora* collected by him from Mahabaleshwar from where also the writer's collection was made. Examination of type material of *Phyllachora mahabaleshwarensis* Ananth. obtained from M. A. C. S. Herbarium (M. A. C. S. No. 156) revealed the presence of infection spots studded with many black dots representing perithecia. The characteristic stromatic tarspots were absent. In section the perithecia were found to be innate, non-stromatic, with absence of clypeus, thus confirming the position of the type material under the genus *Physalospora* and not under *Phyllachora* as earlier determined by Ananthanarayanan (1964). The writer's collection was also found to agree in all respects with the type material. These two fungi are often liable to be confused but absence of stroma and clypeus and the innate character of the perithecia together with absence of tar-spots clearly differentiate this fungus from the genus *Phyllachora*.

In this connection it may be significant to note that a species of *Physalospora* has been described from Madras (India) by Ramakrishnan T. S. & K. Ramakrishnan (1951) under the name *Physalospora anamalaiensis* Ramk. T. S. & K. parasitizing a closely related host *Embelia ribies* Burm. Comparison of the writer's collection on *E. viridiflora* with the Madras species gave the following results.

The figures presented in the table show that the writer's collection

Fungus	Host	Perithecia	Asci	Ascospores
Physalospora anamalaiensis (Madras)	*E. ribies*	—	82—128 × 10—17 μ	10—17 × 7—14 μ
Mahabaleshwar collection	*E. viridiflora*	345—480 μ	172—202 × 8.5—13 μ	13—16 × 5.5—8.5 μ

differs from *P. anamalaiensis* Ramk. in having significantly bigger and thinner asci. On the basis of these distinctive characters, it is proposed to describe the writer's collection as a new variety of *Physalospora anamalaiensis* viz. *Ph. anamalaiensis* var. *mahabaleshwarensis* Var. nom. nov. Chiplonkar and that *Phyllachora mahabaleshwarensis* Ananth. (1964) as a synonym of *Physalospora anamalaiensis* Ramk. var. *mahabaleshwarensis*. Chiplonkar.

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Two new species of Mucor from India — IV.

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With Plate V

During the course of isolations of soil fungi we encountered two new species of *Mucor*, which posses characters not reported in any of the known species.

Mucor aligarensis sp. nov. (Fig. 1, Plate VI)

Caespites in SMA et PDA humiles, obscure brunnei; sporangiophora e mycelio intramatricali nata, sympodialiter ramosa, levia, 15—20 μ crassa, septo subapice ramulorum praedita; sporangia globosa, brunnea, 20.5—120 μ, plerumque ca. 75 μ diam.; pariete spinuloso et persistente; columella globosa vel nodosa, 15—52.5 μ, plerumque 35 μ diam. sporangiosporae subglobosae vel ovoideae, leves, 7.7—18.7 × 7.7—14.3 μ, plerumque 11 × 7.7 μ in SMA, 6.6—15.4 × 5.5—11 μ, plerumque 8.8 × 7.7 μ in PDA.; chlamydosporae terminales vel intercalares, singulatim vel concatenatae, ovoideae vel elongatae, 15—30 μ; zygosporae ignotae.

Colonies on SMA on PDA very low and dark brown; Sporangiophores arising from the substrate mycelium, branched sympodially, smooth walled, 15—20 μ in diam., provided with a septum just above the point of branching; sporangia globose, brown, 20.5—120 μ, mostly 75 μ in diam., wall spiny and persistent; columella globose to button-shaped, 15—52.5 μ, mostly 35 μ in diam.; sporangiospores subglobose to oval, smooth walled, 7.7—18.7 × 7.7—14.3 μ, mostly 11 × 7.7 μ on SMA., 6.6—15.4 × 5.5—11 μ, mostly 8.8 × 7.7 μ on PDA. Chlamydospores terminal or intercalary single or in chains, oval to elongate, 15—30 μ. Zygospores were not observed.

This fungus has been isolated for the first time from the garden soil, pH 7.5, of Aligarh.

Description based on culture MX—18, deposited in BSM culture collection, Botany Department, University of Allahabad, and at NRRL, Peoria, Illinois, U.S.A., under No. A-12626.

This species can be placed in the section *Fragilis* because of the presence of sporangia less than 100 μ in diameter, with fragile wall and richly branched sporangiophores. In this section it comes close to two species *Mucor ramosissimus* Samutsewitsch and *M. ambiguus* Vuillemin, which also have low (1—3 mm.) colonies. But both the known species have smaller sporangiospores and columellae are also of different size and shape. The isolate has, therefore, been named a new species, the name has been given after the place of its origin.

Mucor assamensis sp. nov. (Figs. 2—9, Plate VI)

Caespites in SMA, "Oat meal agar" et PDA elata, primum albidae, postea in centro ob sporangia copiosa caeruleo-nigrescentia; sporangiophora septata, cymose ramulosa, usque ad 20 μ diam., primum hyalina, postea pallide brunnea, ramulis plerumque curvulis, interdum etiam rectiusculis; sporangia globosa vel piriformia, brunnea, 11—49.5 μ SMA, 30—70 μ in "Oat meal agar"; pariete incrustato, diffluente; sporangia nonnulla abortiva, tunc in ramulis lateralibus sessilia; columella nodosa vel conica, brunnea, 2.45—24 × 9.8—34.3 μ; sporangiosporae globosae, leves, 3.3—5.5 μ, plerumque 4.4 μ; chlamydosporae in mycelio intramatricali singulatim ortae, 19.6—39.4 × 7.35—17.15 μ.

Colonies on SMA, oat meal agar and PDA high, nearly touching the lid, at first white, later, the central portion becomes bluish black due to abundance of sporangia. Sporangiophores septate, cymosely branched, upto 20 μ in diameter, at first hyaline later light brown, branches of the sporangiophores mostly curved some times straight; sporangia globose to pyriform, brown in colour, 11—49.5 μ on SMA, 30—70 μ on oat meal agar, wall incrusted and diffluent, few sporangia abortive, mostly subsessile on side branches; columellae button-shaped to conical often with protuberances at the tips, brown in colour, 2.45—24 × 9.8—34.3 μ, often the branches of the sporangiophores swell just below the columella thus giving them a funnel shaped appearance; sporangiospores globose, smooth, 3.3—5.5 μ, mostly 4.4 μ; chlamydospores single, intercalary in the substrate mycelium as well as in the sporangiophores, 19.6—39.4 × 7.35—17.15 μ.

Type M - 99 deposited in BSM culture collection, Botany Deptt., University of Allahabad, and at Northern Regional Research & Development Division, Peoria, Illinois.

This species has been isolated from the forest soil, of Tezpur, Assam, and is named after the place where it was first collected.

The presence of spherical sporangiophores in this isolate places it in the section Sphaerosporous of the key to the genus *Mucor* (Hesseltine, 1954). In this section it comes near *Mucor jansseni* Lendner by its high, bluish black colony and by the size of the sporangiospores, but it differs from this species by important characters such as the diffluent nature of the sporangial wall, peculiar small brown button-shaped to conical columella often with protuberances at their tips; small globose to pyriform sporangia, presence of abortive sporangia and some times subsessile sporangia on side branches. Highly branched sporangiophores have mostly curved branches and a septum is always present just below each branch and often the branches of the sporangiophores swell just below the columella thus giving them funnel shaped appearance.

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Explanation of Plate V

Mucor aligarensis sp. nov. — Fig. 1. Photomicrograph showing dehiscing terminal and lateral sporangia, $\times 800$.

Mucor assamensis sp. nov. Figs. 2—9. — 2. Photomicrograph showing the branching pattern of a sporangiophore, $\times 113$. — 3—7. Photomicrographs showing various type of columellae i. e. button-shaped to conical with a protuberance, 3—5: $\times 250$; 6—7: $\times 340$. — 8. Photomicrograph showing a columella with the sporangiophore constricted just below the apex, $\times 280$. — 9. Photomicrograph showing sporangiospores, $\times 200$.

The effect of Oligosaccharides and their hydrolytic products on growth, sporulation and subsequent spore germination of Aspergillus flavus

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Introduction

Oligosaccharides are complex carbohydrates composed of two or more monosaccharide units united by glycosidic linkages that may differ in types (alpha, beta or mixed) and the carbon involved in the linkages. Most fungi first hydrolyze the oligosaccharides into simpler sugars before they are utilized by the micro-organisms. The ability of hydrolysis by the micro-organisms is linked with the formation of hydrolytic enzymes (Lilly and Barnett, 1953; Cochrane, 1958). A few fungi, however, are reported to utilize some oligosaccharides directly (Mandels, 1954; Lilly and Barnett, 1953; Wilson and Lilly, 1958), while in other cases, certain oligosaccharides appear to be utilized only if a second monosaccharide or other source of carbon is also present (Waters et al. 1953; Sistrom and Machlis, 1955; Machlis, 1957).

In an earlier study, it was found that *Aspergillus flavus* Link ex Fries yielded good growth and sporulation when the media contained different oligosaccharides as the carbon source (Grover and Bansal, 1968). In the present studies effort has been made to investigate whether *A. flavus* utilized the oligosaccharides directly or utilized their hydrolytic products. Besides, growth and spore germination of the organism was also observed.

Material and Methods

The isolate of *Aspergillus flavus* was the same as used by Grover (1964) and Grover and Bansal (1968). The basal medium consisted of KH_2PO_4 5 g; $MgSO_4 . 7H_2O$ 2.5 g; KNO_3 10 g; $FeCl_3$ 0.01 g; and distilled water to make 1 litre. The carbon sources were added to the basal medium in amounts calculated to give equivalent concentration of carbon. The methods for sterilization, inoculation, growth measurements and spore germination were the same as described by Grover and Bansal (1968). The residual carbon in the cultural filtrates was determined colorimetrically by the method described by Snell et al. (1961).

Results

Sucrose, lactose and raffinose were selected as the three oligosaccharides which were tested along with their hydrolytic products for the growth, sporulation and subsequent spore germination of *A. flavus*. The chromatographic analysis of the residual carbohydrates in the cultural filtrates containing different sugars after the growth of *A. flavus* have been given earlier (Grover and Bansal, 1968).

Sucrose and its Hydrolytic Products: — Sucrose, glucose, fructose and mixture of glucose and fructose (equal proportion) were added to the basal medium as the carbon sources and *A. flavus* was inoculated. The results are given in Table 1.

Table 1. Effect of hydrolytic products of Sucrose on growth, sporulation and subsequent spore germination of *Aspergillus flavus*

Carbon source [1]	Sporulation	Color of spores	Mycelial dry wt. (mg.) [2]	% spore germination	Carbon residue (mg. C/ml)
Sucrose	Abundant	Yellowish green	588	20.1	0
Glucose	Abundant	Deep green	748	36.2	0.63
Fructose	Abundant	Deep green	800	5.9	0.12
Glucose + Fructose	Abundant	Green	614	4.9	0.38

[1]) Each flask of the set contained a total of 842 mg/100 ml. of carbon. The mixture of the carbon sources as well as individual carbon sources added in equel proportion.

[2]) Average of three flasks containing 25 ml. of medium in each flask.

In all cases, the mycelial dry weight of the organism was good, though in case of media containing glucose or fructose it was better. While in the media containing sucrose alone or glucose + fructose, the growth was approximately equal (Table 1). The sporulation was abundant in all cases, though the mass coloration varied from yelowish green (sucrose), green (glucose + fructose) to deep green (glucose, fructose). Spores harvested from these different media, when germinated in water gave different responses. Germination was best in case of spores obtained from media containing glucose, while it was poor in case of fructose or glucose + fructose.

Lactose and its Hydrolytic Products: Lactose, glucose, galactose and mixture of glucose and galactose (equal proportion) were added to the basal medium as the carbon sources and the results are given in Table 2.

Table 2. Effect of hydrolytic products of Lactose on growth, sporulation and subsequent spore germination of *Aspergillus flavus*

Carbon source 1)	Sporulation	Color of spores	Mycelial dry wt (mg.) 2)	% spore germination	Carbon residue (mg. C/ml)
Lactose	Poor	White	54	32.3	3.6
Glucose	Abundant	Deep green	748	36.2	—
Galactose	Fair	Green	553	6.8	4.0
Glucose + Galactose	Abundant	Deep green	596	5.7	2.32

1) Each flask of the set contained a total of 842 mg/100 ml of carbon. The mixture of the carbon sources as well as individual carbon sources added in equal proportion.

2) Average of three flasks containing 25 ml. of medium in each flask.

Very good growth was obtained when the media contained glucose, galactose or mixture of glucose and galactose, but very poor growth of the fungus was observed in case of lactose alone (Table 2). The sporulation was almost equal in all cases except in case of media containing lactose, where it was very poor. The mass spore coloration varied from white (lactose), green (galactose) to deep green (glucose and glucose + galactose). Spores harvested from these different media when germinated in water, gave different responses. Germination was best in case of spores obtained from media containing glucose or lactose, while it was very poor in case of galactose or glucose + galactose. With the increase in incubation period to 16 days the mycelial yield of the fungus was slightly increased and correspondingly the carbon residue in cultural filtrate decreased slightly.

Raffinose and its Hydrolytic Products: — The raffinose molecule contains the disaccharide structures of sucrose and melibiose. Complete hydrolysis yields equal amounts of glucose, fructose and galactose. All these sugars were used alone and in different combinations in the basal medium and the results are given in Table 3.

Very good growth was obtained when the media contained raffinose or fructose, followed by glucose or melibiose + sucrose (Table 3). Sucrose or galactose alone gave slightly better growth than melibiose alone. Sporulation, however, was very good in all cases except in case of media containing galactose, where it was relatively poor. The color of the spores varied from yellowish green to olive green. Subsequent

Table 3. Effect of hydrolytic products of Raffinose on growth, sporulation and subsequent spore germination of *Aspergillus flavus*

Carbon sources [1]	Sporulation	Color of spores	Mycelial dry wt. (mg.) [2]	% spore germination	Carbon residue (mg. C/ml)
Raffinose	Abundant	Olive green	859	29.5	0.98
Glucose	Abundant	Deep green	748	36.2	—
Fructose	Abundant	Deep green	800	5.9	—
Galactose	Fair	Green	533	6.8	—
Galactose + fructose + glucose	Abundant	Olive green	582	12.7	1.58
Sucrose	Abundant	Yellowish green	588	20.1	—
Melibiose	Abundant	Yellowish green	456	23.9	0
Melibiose + sucrose	Abundant	Yellowish green	662	9.6	0

[1]) Each flask of the set contained a total of 842 mg/100 ml of carbon. The mixtures of the carbon sources and the individual carbon sources added in equal proportion.

[2]) Average of three flasks containing 25 ml. of medium in each flask.

spore germination was best in case of glucose followed by raffinose, melibiose and sucrose. Germination was poor when spores were obtained from media containing fructose, galactose, melibiose + sucrose or glucose + galactose + fructose.

Discussion

The experimental evidence obtained in this study indicates that sucrose and raffinose are hydrolyzed by *Aspergillus flavus* during its gowth. Some of the sugars, especially sucrose, appeared to be completely hydrolyzed. Satisfactory evidence of the partial hydrolysis of raffinose was also obtained. Similar results have been reported by Govindarajan (1953) with yeast and Wilson and Lilly (1958) with *Ceratocystis coerulescens* and *Thielaviopsis basicola*. The low yield of mycelium obtained when the organism was cultured in melibiose and sucrose in the medium suggests that the chief source of utilizable carbon was fructose. On the other hand, higher yields of mycelium in the hydrolytic products of lactose both individually or in combination and poor mycelial growth in lactose, indicate that lactose was not hydrolyzed by *A. flavus*. What-ever little growth was obtained in the presence of lactose is a result of its direct assimilation. Lilly and Barnett (1953) pointed out that many fungi which grew poorly on lactose, would grow better, if incubated for longer period. With *A. flavus*, the increase in incubation period did increase the mycelial dry weight slightly and correspondingly the residue in cultural filtrate also decreased sligthly. This probably means that synthesis of lactose is a limiting factor in the rate of growth of this fungus. The residual lactose and galactose individually in the cultural filtrates after 8 days incubation was found to be very high, whereas in case of glucose and fructose it was the least. The cultural filtrate of media containing raffinose had very little residue indicating thereby that it was not completely hydrolyzed. Cultural filtrate of media containing sucrose showed no carbon residue thus showing its complete hydrolysis.

The constituents of the medium influence directly internal reserves of the spores in fungi (Darby and Mandels, 1955; Grover, 1964; Allen, 1965; Sussman and Halvorson, 1966; Grover and Bansal 1968). The present findings reveal that when the substrate medium contained sucrose or raffinose, the spore reserves were normal. While when lactose was the carbon source in the medium, the reserves were slightly low as indicated by the germination of the spores. On media containing fructose or galactose, the spore germination was very poor indicating the lack of proper nutritional reserves. In case of mixture of glucose + fructose, glucose + galactose, melibiose + sucrose and glucose + galactose + fructose, the spore germination was rather poor. Sporulation, however, was not always related to growth rate or subsequent spore germination, since in the case of media containing lactose, although the fungal growth was low and sporulation was poor, yet the spore germination was normal. Whereas in contrast, in case of media containing fructose, the growth and sporulation was abundant, but spore germination was poor. The precise biochemical role of these sugars in influencing the internal reserves of the spores still needs to be determined.

Summary

Sucrose was completely hydrolyzed, raffinose was partly hydrolyzed, whereas lactose was not hydrolyzed by *Aspergillus flavus* during its growth. The hydrolysed products of these oligosaccharides, however, gave better growth and sporulation. Presence of lactose in the basal medium resulted in poor growth and poor sporulation. Spores harvested from media containing lactose, sucrose and raffinose gave normal germination in distilled water, whereas when the media contained simpler sugars like fructose or galactose, the spore germination was poor. Obviously the internal reserves of the spores remained insufficient in metabolites leading to the normal spore germination process.

Acknowledgements

Grateful thanks are du to Prof. P. N. Mehra of the Panjab University, Chandigarh for providing necessary facilities to undertake these investigations.

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Two new leaf spot Diseases of Economic plants from India

By Vasant Gurunath Rao*)

The paper deals with two new leaf spot diseases of *Phaseolus mungo* L. and *Celosia cristata* L. from India.

(1) Leaf spot Disease of *Phaseolus mungo* L.

Phaseolus mungo L., locally known as '*Mung*' is an important pulse crop grown extensively in this country, which fetches good profit. During the monsoon months of 1961 and 1962, a wide-spread and severe leaf spot disease of this valuable crop was noticed in many agricultural farms at Poona (India) causing great damage. An examination of the diseased lesions revealed the presence of abundant pycnidia with filiform septate hyaline pycnidiospores, characteristic of the genus *Septoria* Sacc.

In early stages the symptoms are characterised by the appearance of numerous small, pale-brown, circular to angular spots (generally two to eight mm. in diameter), on both the surfaces of the leaves, Whit age, these spots increase in size and the colour changes to brick-red with a typical pale purple central zone. These areas later on develop minute, black, scattered, fruiting bodies of the causal fungus i. e., the pycnidial mass. In severe case of attack together with high humidity of the atmosphere, the leaves show innumerable spotting by the causal organism. As such, they shrivell and gradually dry up, resulting in reduced vigour and out-turn of the yield. In general, the crop exhibits a blighted appearance finally.

Hyphae light brown, branched, septate, slightly constricted at septa, measure 2.5—7 μ in thickness. Pycnidia typically dark, deep-seated in the host tissue, epiphyllous, scattered to gregarious, sub-erumpent, thick-walled, spherical to globose with a broad ostiole, ostiole being deeply marked with dark band of tissue, measure 88.2—151.2 μ in diameter. Pycnidiospores hyaline, 2—4 septate (mostly 4-septate), filiform, straight to slightly curved, flexous, rounded at both the ends, measure 19—54.6 μ in length and 2.2—3.2 μ in breadth.

On the basis of the above general morphological characters, dimensions of pycnidia and pycnidiospores including the host relationship (the present host being a legume plant), the fungus was identified as *Septoria leguminum* Desm. (Sacc. 1884). The disease herein reported constitutes a new record not previously described.

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(2) Leaf spot Disease of *Celosia cristata* L.

Celosia cristata L. popularly known as 'Cock's-comb' is a favourite garden plant for its brilliant-coloured feathery, delicate plumules and is commonly grown in many gardens of India. A severe leaf spot disease of this valuable horticultural plant was encountered by the writer during the monsoon months of 1962 and 1963 at Poona (India). The infection was noticed mostly on the lower leaves compared to the upper ones. Laboratory examination of such diseased lesions revealed the presence of abundant black acervuli with long setae and sickle-shaped conidia, which determined the pathogen to be a sp. of *Colletotrichum* Corda. The infection was subsequently found passing on to a number of valuable horticultural varieties.

The disease starts in the form of small, brown, circular to irregular necrotic areas on any part of the leaf lamina, more commonly on its margins or tips. The spots gradually increase in size and cover an appreciable area of the leaves. These spots later on turn dark brown with a slight ash-coloured centre, bearing few minute black dot-like fruiting bodies of the fungus i. e., the acervuli. Sometimes, spotted areas at later stage drop off leaving perforations or shot-holes.

Hyphae slender, cream-coloured, branched, septate, both inter and intra-cellular, measure 3.2—6 μ in width. Acervuli sub-erumpent, dark-brown, circular to globoid, scattered or gregarious over the surface, covered with few setae, measure 50.6—184 μ in width. Setae pale-brown, thick-walled, unbranched, septate (2—4), slightly pointed at the tips, few gently curved, measure 42—190 μ in length and 5.3—7.4 μ in breadth. Conidiophores short, simple, cylindrical, hyaline, packed in rows. Conidia falcate, hyaline, pointed at both ends, granular, non-septate, produced abundantly in gelatinous mass, measure 16.5—27.3 $\times$ 4—5.4 μ.

The fungus under study was identified as *Colletotrichum capsici* (Syd.) Butler & Bisby, on the basis of gross morphological characters, dimensions of acervuli, setae and conidia. The disease appears to be a new one.

Acknowledgements

The writer is deeply indebted to Professor M. N. Kamat, for his kind guidance and helpful suggestions, to the Director, M. A. C. S. Biological Labs., Poona for granting the facilities and finally to the Government of India, Indian Council of Agricultural Research and University Grants Commission, New Delhi for the financial assistance.

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The Genus Valsaria in India

By S. B. Kale

(Botany Department Marathwada University, Aurangabad, India)

With 2 figures

The genus *Valsaria* was originally erected by Cesati & de Notaris (1863) with *V. insitiva* as the type species. Hovewer, it remained unrepresented in the Indian flora until Mundkur and S. Ahmad (1946) reported two species i. e. *V. salvadorina* Mundkur and S. Ahmad on *Salvadora oleoides* Dcne. and *V. tamaricis* Mundkur and S. Ahmad on *Tamarix articulate* Vahl. Recently Kapoor and Gill (1961) reported *Valsaria bambusae* Kapoor and Gill on *Bambusa* sp.

The genus is characterised by the black valsoid or pulvinate stroma in which perithecia are clustered, asci cylindrical, 8-spored, ascospores brown to almost black, 1-septate, uniseriate to biseriate.

During the investigation of different genera of ascomycetes from India the authors collected dried stems of *Acacia melanoxylon* Br. and *Bambusa* sp., hevily infected with some black fungus. A careful study revealed that these belong to the genus *Valsaria* Ces. & De Not. The fungus on *Bambusa* sp. was found to be *Valsaria bambusae* Kapoor & Gill. and is also compared with the type material. The fungus on *Acacia melanoxylon* Br., however, has been described as a new species on the basis of comparative morphology, besides being reported on a hitherto unreported host.

1. **Valsaria indica** sp. nov.

Stroma nigrum, valsoideum, disco obscure griseo vel nigrescente, ostiolis minute papillato erumpens, 675—1200 $\times$ 1350 μ; perithecia densiuscule stipata, in ostiola cylindracea, intus dense periphysata paulatim attenuata, 180—375 $\times$ 180—225 μ; asci cylindracei, breviter stipitati, 88—96 $\times$ 8—8.8 μ, paraphysibus filiformibus superati; sporae monostichae, ellipsoideae, medio septatae et valde constrictae, brunneae vel obscure brunneae, 13.6—15.2 $\times$ 5.6—7.2 μ.

Stroma black, valsoid, erumpent by a dark grey or black disc on which the clusters of ostioles appear as minute papillae, measuring from 675—1200 $\times$ 1350 μ, perithecia blask-shaped with long necks, black, measuring from 180—375 $\times$ 180—225 μ, in small groups clustered within a valsoid black stroma, with a thin limiting layer; asci cylindrical, short-stalked, measuring from 88—96 $\times$ 8—8.8 μ, 8-spored, paraphysate,

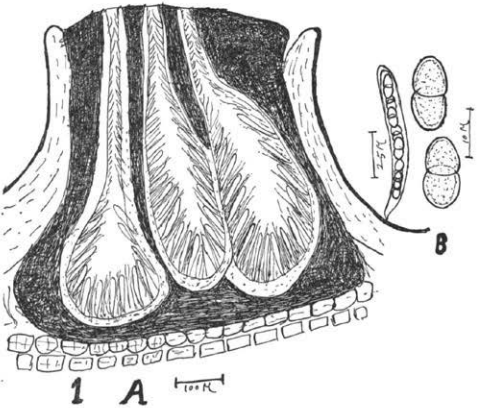

Fig. 1: *Valsaria indica* sp. nov. A. Section through the ascocarp. — B. Ascus and ascospores

Comparative table of the Indian species of Valsaria

	Species	Perithecia	Asci	Ascospores	Remarks
1.	*V. indica* sp. nov. on *Acacia melanoxylon* Br.	180—375 = 180—225 μ	88—96 × 8—8.8 μ	13.6—15.2 × 5.6—7.,6 μ	No longitudinal striations, broadly elliptical
2.	*V. bambusae* K. & G. on *Bambusa* sp.	—	119—144 × 14 μ	22—22 × 10—11 μ	Longitudinal striations present, smoky brown
3.	*V. salvadorina* Mundkur & S. Ahmad on *Salvadore oleoides* Dcne.	350—450 μ	140 μ	16.5—24.5 × 9—11 μ	Biseriate to irregularly biseriate
4.	*V. tamaricis* Mundkur & S. Ahmad on *Tamarix articulata* Vahl.	—	87.5 × 9.5 μ	12.5—14.5 × 6—7 μ	Not deeply constricted, uniseriate

paraphysis filiform, longer than the asci; ascospores uniseriate, broadly elliptical, 2-celled, strongly constricted at the septum, brown to dark brown, measuring from 13.6—15.2 $\times$ 5.6—7.2 μ; perishyses present in the neck.

Collected on the dead stem of *Acacia melanoxylon* Br. at Kadai Kanal in the month of October 1964. Leg. Tilak S. T. & S. B. Kale and deposited in the herbarium of Marthwada University, Aurangabad.

2. *Valsaria bambusae* Kapoor & Gill. (1961). Ind. Phytopath. 14: 149—153.

On the stem of *Bambusa* sp. from Dharwar. The type material from I. A. R. I. New Delhi as well as our own collections on the same host collected at Aurangabad in the month of November 1964 and January 1968, have been critically studied. Both the materials showed the typical

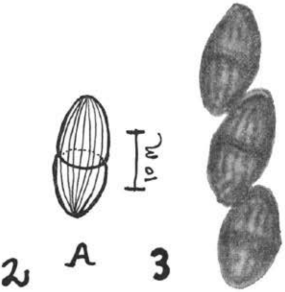

Fig. 2: *Valsaria bambusae* Kapoor & Gill. — Ascospore, showing the longitudinal strations

ascospores which are brown to dark brown but with longitudinal striations on the wall and this character has not been mentioned earlier.

3. *Valsaria salvadorina* Mundkur & S. Ahmad (1946). Mycol. Pap. Imp. Mycol. Inst. 18: 1—11.
   on *Salvadora oleoides* Dcne.

4. *Valsaria tamaricis* Mundkur & S. Ahmad (1946). Mycol. Pap. Imp. Mycol. Inst. 18: 1—11.
   On *Tamarix articulata* Vahl.

Key to the Indian species of *Valsaria*.

A. Stroma pulvinate wide spread initially innate, but later on superficial, black to grey.
   1. Ascospores with longitudinal striations *V. bambusae.*

2. Ascospores without longitudinal striations.

i) Ascospores uniseriate *V. tamaricis.*

ii) Ascospores biseriate to irregularly biseriate *V. salvadorina.*

B. Stroma innate-erumpent by a black to grey disc by rupturing the bark valsoid. Ascospores broadly elliptical, srongly constricted in the middle *V. indica.*

The type materials have been deposited in the herbarium of Marathwada University, Aurangabad and Cryptogamie Indiae Orientalis, New Delhi (India).

Acknowledgements

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A note on an interesting isolate of Thamnidium from India

By Brij Rani Mehrotra & R. K. Kakkar
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With 1 Fig. in the text

Amongst the various phycomycetes which have figured prominently in the isolates from soil, dungs of animals and other debris the genus *Thamnidium* is the one that always catches the taxonomist's eye. The genus is characterised by various types of sporangiophores that ultimately terminate after dichotomous branching into a conspicuous structure designated as sporangiola.

Although the present isolate was only once isolated during the course of investigation by Rugmini 1956, and only casually mentioned in the acompanying report but the present report is the first detailed investigation into the Morphology and Taxonomy of the isolate in question.

Thamnidium elegans Link ex Gray.

Colonies on SMA growing fast at 25° C, at first pale olive gray, later olive buff, reverse colonial buff (Pl. xxx); odor yeasty; sporangiophores of three types, some large terminating into a sporangium, some small dichotomously branched and bearing sporangiola only, others large (length upto 990 μ) with a terminal sporangium and sporangiola borne on dichotomous branches arising from several points from sporangiophore; sporangia at first white, later brown, spherical, wall incrusted, 45—140 μ in diam.; rapidly deliquescing, collar very small; columella globose to oval, hyaline, 25—66 $\times$ 45—754 μ; sporangiola globose or slightly flattened, light gray in colour, decidous, wall hyaline breaking, lacking columella, 2—6 spored, 10.5—24 μ, occasionally as small as 7.7 μ, mostly 14 μ in diam.; sporangiospores from sporangia and sporangiola of the same shape and size, subglobose to ellipsoidal, smooth, hyaline or faintly yellow; zygospores not observed.

MX — 10 isolated from soil pH 7.5 of Rewa (M. P.). Culture deposited in the culture collection of Botany Department, University of Allahabad.

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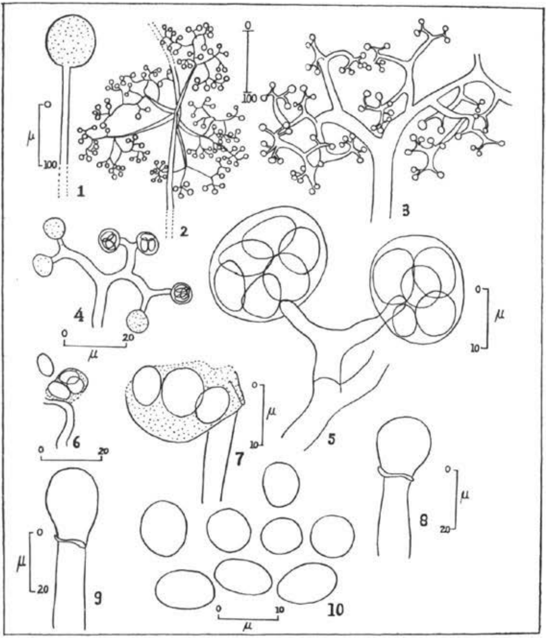

Fig. 1. *Thamnidium elegans* Link ex Gray. — 1. Apical part of a sporangiophore bearing sporangium. 2. Middle portion of the sporangiophore branched dichotomously and bearing sporangiola. 3. Apical part of the sporangiophore branched dichotomously and bearing sporangiola only. 4. Portion of dichotomous branching enlarged. 5. Sporangiola enlarged. 6, 7. Bursting sporangiola. 8, 9. Columellae. 10. Sporangiospores

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A new variety of Piptocephalis from Allahabad

By Brij Rani Mehrotra & R. K. Kakkar

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With 1 Fig. in the Text

During the course of isolations of fungi from soil the authors encountered a new and hitherto unrecorded variety of *Piptocephalis*. This variety is of the species *P. indica* Mehrotra & Baijal.

The heart-shaped head cells which characterize this new variety are known only in three other species, viz., *P. xenophila* Dobbs and English (1954), *P. microcephala* van Tieghem (1875) and in a recently described species *P. indica* Mehrotra, (B. S.) and Baijal (1964). Out of these three species this isolate comes nearest to *P. indica* in all the essential characters excepting the number of spores per chain which are upto 10 as against the 7 in *P. indica*. Furthermore, in this isolate, zygospores have been observed which have never been previously seen in *P. indica*. Hence it has been decided in view of these divergent characters to designate this isolate as a new variety has been named after the place, the soil of which yielded this fungus.

Piptocephalis indica var. **shantiniketna** var. nov. Fig. I.

Caespituli primum albidi, postea cinerascentes; mycelium ex hyphis valde ramosis compositum; sporophora plerumque errecta, brunneola, ad basim rhizoideis praedita, 2.2—5.5 μ, in apice 5.5—7.7 μ crassa, longitudinaliter striata, septata, iterum atque iterum dichotome ramosa, ramulis ultimis 2.2—11 × 1.65—3.3 μ, plerumque 3.3 × 2.2 μ; cellulae apicales 3.3—4.4 μ diam., 4—5-lobatae, merosporangiis 3—4 praeditae; sporangiosporae oblongae 3.3—6.6 × 2.2—2.7 μ, plerumque 4.4—2.2 μ, hyalinae; zygosporae globosae, aurantiaco-brunneae, 25—45 μ, plerumque 35 μ diam.; suspensoribus levibus; gametangia subinaequalia.

Colonies on Mucor species growing on hay and oat media at first white, later turning grayish; vegetative mycelium becoming septate, much branched; sporophore mostly erect, brownish with rhizoids at the base, main stalks, 2.2—5.5 μ at the base and 5.5—7.7 μ at the tip; longitudinal striations present, septate, septa simple, branched dichotomously, mostly with whorls of 2—5 primary branches, the latter again branching into 3 or 4 successive dichotomies; ultimate branches, 2.2—11 × 1.65—3.3 μ, mostly 3.3 × 2.2 μ; head cells small, 3.3—4.4 μ in diam., heart-shaped in surface view, 4—5 lobed, each lobe with 3—4 merosporangia, the latter about 11.5—40 μ, mostly 35 μ long with spore 4—10 (usually 10), Sporangiospores oblong, 3.3—6.6 × 2.2—2.7 μ, mostly 4.4 × 2.2 μ, and colourless. Zygospores globose, orange-brown, 25—45 μ, average 35 μ in diam., formed as bud like enlargements from the fused apices of slightly unequal gametangia borne terminally or apposed progametangia; suspensors smooth, erospore wall reticulate. Zygospores produced as a bud formed around the point of fusion of the two gametangia as seen in *Piptocephalis cylindrospora*. The gametangia are slightly unequal.

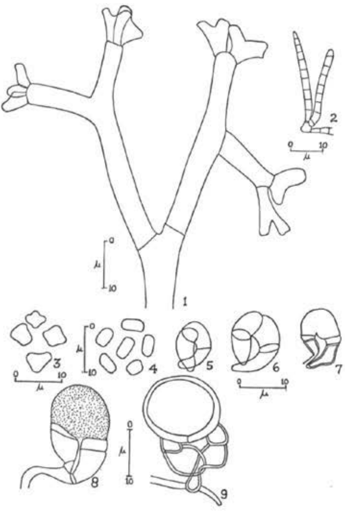

Fig. I. Piptocephalis indica var. shantiniketna. — 1. Upper portion of the sporangiophore showing the branching pattern. — 2. The merosporangia attached from a head cell at the base. Note the number of merospores in them. — 3. Head cells in different views. — 4. Merospores. — 5—8. Different developmental stages of zygospore formation. — 9. A mature zygospore.
Figs. 10—13. plate II

Type: M-33, isolated from loam soil pH 7.5 of Shantiniketan. Culture deposited in the Culture collection of Botany Department, University of Allahabad, and at NRRL, Peoria, Illionois, U.S.A.

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The author's acknowledge with appreciation the inspiring guidance of Dr. B. S. Mehrotra and tender their sincere thanks to Prof. R. N. Tandon for the laboratory facilities. We would like to proffer our sincere thanks to Dr. F. Petrak for the Latin diagnosis of the new variety.

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Selenophoma Kamatii sp. nov. from India

By Miss I. K. Kalani

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Young trees of *Eugenia jambolana* Lam. locally known as "*jambol*" growing in Poona were found ecxessively shedding their leaves during August—September 1962. Such affected leaves were brick red in colour with irregular, large necrotic areas, which, subsequently developed abundant pycnidia. Under the binocular the pycnidia were found to release glisening spore-masses through their ostioles in the form of whitish ooze. This interesting pycnidial fungus was later identified as a species of *Selenophoma*. Since this genus has been reported from India but only once a detailed study was made of the Pona collection of the fungus which appeared to be parasitic unlike most of the previously reported species.

The genus *Selenophoma* was established by Maire (1906) with *S. catananches* Maire as type, for a pycnidial fungus with allantoid to fusoid hyaline 1-celled pycnidiospores. Since then a large number of species of this genus have been described mainly from grass hosts, particularly by Petrak (1920—1955) and Sprague & Johnson (1940—45). Vanterpool (1947) has reported *Selenophoma linicola* Venterpool from Saskatchewan on *Linum usitatissimum*. The genus has been considered a synonym of such varied genera as *Septoria, Falcispora, Rhabdospora, Macrophoma, Phoma, Lunospora* and *Phyllosticta* by various workers.

The original description of the fungus genus made by Maire (1906) is inadequate in respect of the internal structure of the pycnidium and the manner of spore-formation. Recently Chona & Munjal (1956) have reported *Selenophoma eugeniae* Chona & Munjal as a saprophyte on *Eugenia operculata* Roxb. from New Delhi, India. This is thus the only record on *Eugenia* sp. No detailed description is available regarding the internal structure of the pycnidium and manner of formation of the pycnidiospores. No conidiophores were observed.

In view of the lack of adequate description of the fungus genus, its interesting nature, and a solitary Indian record, the Poona species was carefully studied in respect of its morphological characters, dimensions, internal structure of the pycnidium and cultural behaviour, a brief account of which is presented below.

Pycnidia have a broad central ostiole, through which spores were seen to ooze out in the form of glissening drops and when in contact with water in a cirrus they are typically flask-shaped, provided with a prominent dark coloured neck, opening to exterior by a broad ostiole. Pycnidiospores are formed in whorls over short bulbous conidiophores arising in tufts over a basal typically cushion-shaped "mound" of hymenial tissue, very similar in appearance to the structure described for the genus *Anthasthoopa* Subr. (Fig. 1, C).

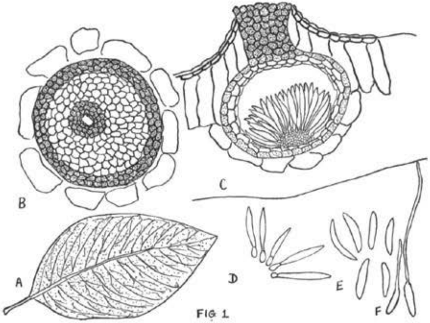

Fig. 1: *Selenophoma kamatii.* — A Habit. — B Pycnidium in surface view × 264. — C L. S. of Pycnidium × 264. — D Conidiophores and Conidia × 440. — E Conidia × 440. — F Germinating conidia × 440

The fungus was readily brought in culture through dilution technique and made good and rapid growth on P. D. A. producing a colony of 1½—2 mms. in 2—3 days.

Mycelium submerged to sub-aerial, scanty, usually radial ashy-white. Pycnidial fomation was rapid and fairly good at end of 48 hours and profuse at the end of 7 days. They are in characteristic concentric rings, typically flask-shaped morphologically similar to those from host, but were almost twice as big as on host (190—357 μ). Fresh conidia germinated very capriciously without developing any septation as was observed by Vanterpool (1947) in old spores.

It is very clear from the morphological characters of the pycnidium and its internal structures and above all non-development of septa during germination of spores that the Poona fungus is a typical species of *Selenophoma* Maire. A detailed comparison was therefore, undertaken in respect of pycnidial and conidial dimensions between the Poona species of *Selenophoma* obtained from *Eugenia jambolana* Lam. and *Selenophoma eugeniae* Chona & Munjal, the results of which are tabulated below:

Species	Pycnidal characters	Pycnidia μ	Pycnidio-spores μ	Neck μ	Authority
Selenophoma eugeniae	Globose to pitcher shape with a protruding ostiole	98—182 × 98—210 μ	15—19 × 3 μ	—	Chona & Munjal (1956)
Selenophoma sp.	Flask-shaped with a prominent neck, opening to exterior	92—148 × 182—260 μ	21—30 × 3.5 μ	42—71.4 × 37—63 μ	Author

The measurements of the Poona species given above are from host. In culture the pycnidia and the pycnidial neck are much bigger than those obtained from host viz. 190—357 μ and 63—84 × 68—126 μ respectively.

The morphological characters of the Poona species described above, the typical flask-shaped pycnidia, the presence of a prominent neck opening to exterior through the host, the significally bigger dimensions of pycnidia and pycnidiospores and the characteristic manner of formation of conidiophores and conidia clearly justify a separate taxon to the Poona species which is therefore, described as a new species with Latin diagnosis:

Selenophoma kamatii sp. nov. Kalani.

Maculae dispersae, irregulares, indeterminatae, amphigenae, coccineae, pycnidia plerumque hypophylla, dispersa, subepidermalia, depresso-globosa, 92—148 × 180—260 μ, ostiolo breviter cylindraceo, apice plus minusve truncato, 42—71 μ longo, 38—63 μ crasso, poro rotundato perforato punctiformiter erumpentia; pariete carbonaceo, pseudoparenchymatico, crassiusculo; conidia fusoidea, plus minusve allantoidea vel lenissime curvula, utrinque plus minusve attenuata, obtusiuscula vel subacuminata, hyalina, continua, 21—30 × 3.5 μ; conidiophora stratum basale pseudoparchymaticum obtegentia, bevissime cylindraceo-bulbosa, continua.

Infection spots indefinite, amphigenous, brick-red, Pycnidia dark brown to black, chiefly hypophyllous, scattered, profuse, flask-shaped, provided with a prominent neck opening through host tissue by a broad ostiole, subepidermal, carbonaceous, leathery, thick-walled, 92—148 × 182—260 μ. Neck dark-coloured, 42—71 × 38—63 μ, ostiole broad, protruding out, 16.2 × 21 μ.

Conidiophores bulbous, hyaline, 1-celled, arising in tufts from a cushion-shaped, basal "mound" of tissue. Conidia 1-celled, hyaline, allantoid to fusoid, slighly curved, 21—30 $\times$ 3.5 μ, released in a cirrus through ostiole.

Incites defoliation in *Eugenia jambolana* Lam. collected by Miss I. K. Kalani in Aug.—Sept. 1962 at Poona, India, M. A. C. S, Herb. No. 133.

Selenophoma kamatii is thus a 2nd record from India and the genus an addition to the fungi of Bombay, Maharashtra. The type is being deposited at C. M. I., Kew, England and Herb. Orientalis, New Delhi, India.

Graeful thanks are due to Prof. M. N. Kamat for his keen interest and guidance and to Director, M. A. C. S., Poona 4, for Laboratory facilities, to Dr. B. C. Sutton of C. M. I., Kew, for helpful suggestions and to Dr. F. Petrak for Latin rendering of the new species.

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Fungal Collectious from Rajasthan State of India
I. Collections from Udaipur Region

By V. N. Pathak, S. R. Ahmed, P. C. Lodha and B. S. Saruparia

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Rajasthan is one of the biggest states of India. Surprisingly enough, there is no information available about the mycoflora of the state. To obtain this, mycological survey was undertaken and Udaipur region was selected at the outset, because of its interesting geological and meteriological aspects. This region is marked by big lakes surrounded by chain of mountains. Udaipur, from where the survey started is located at a height of 4315 ft above M. S. L. The place receives about 62 cm rainfall annually. In this region, where the temperature fluctuates from 13 to 35° C, maize, wheat, barley, sugarcane and groundnut are grown as important field crops. Many kinds of fruits and vegetables are also grown here.

Most of the isolations or collections listed below were identified or confirmed by the staff of Commonwealth Mycological Institute, U. K.

1. *Pythium aphanidermatum (Edson)* Fitzpatrick. From stem of *Carica papaya*. From Horticulture Orchard of Agriculture College. 14. Aug. 1967.
2. *Physoderma echinochloae* Thirum. & Whitehead. On leaves of *Echinochloa* sp. From College Farm 1. Oct. 1967.
3. — *maydis* Miyabe. On the leaves of *Zea maydis* from College Farm. 10. Oct. 1967; (IMI 129810).
4. — *pancratii* sp. nov. Pathak & Prasad. On leaves of *Pancratium* sp. From Sahelion ki Bari. 15. Sept. 1967; (IMI 127416).
5. *Albugo ipomoeae* (Schw.) Swing. On leaves of *Ipomoea batatas*. From Goverdhan Vilas, a village near Udaipur. 15. Dec. 1967.
6. *Phytophthora colocasiae* Rac. On leaves of *Colocasia* sp. From a farm near Ahar. 2. Oct. 1967.
7. — *infestans* (Mont.) De Bary. On leaves of *Solanumtuberosum*. From personal garden of Dean of Agriculture College. 20. Feb. 1968.
8. *Sphacelotheca sorghi* (Link) Clinton. On cobs of *Sorghum vulgare*.
9. *Tilletia caries* (DC) Tul. On ears of *Triticum vulgare*. From College Farm. 8. Jan. 1967.
10. *Tolyposorium penicillariae* Brefeld. On ears of *Pennisetum typhoides*. From College Farm. 7. Oct. 1967.
11. *Ustilago kolleri* Wille. On ears of *Avena sativa*. From College Farm. 17. Feb. 1966.

12. *U s t i l a g o m a y d i s* (DC) Cda. On stem of *Zea maydis*. From College Farm. 15. Nov. 1967.
13. — *h o r d e i* (Pers.) Lagerh. On ears of *Hordium vulgare*. From College Farm. 20. Mar. 1967.
14. — *t r i t i c i* (Pers.) Rorstr. On ears of *Triticum vulgare*. From College Farm. 20. Feb. 1967.
15. *C o r t i c i u m s o l a n i* (Drill. & Delaor) Bourd. & Galz. From decaying stem of *Pothos* sp. From Botanical Garden. 9. June 1967; (IMI 128317).
16. *M e l a m p s o r a l i n i* (Pers.) Lev. On leaves of *Linum usitatissimum*. From College Farm. 6. Feb. 1966.
17. *P u c c i n i a c y n o d o n t i s* (Sacc.) Niessl. On leaves of *Cynodon dactylon*. From College Farm. 2. Feb. 1967.
18. — *g r a m i n i s* var. *t r i t i c i* (Pers.) Erikss. and Henn. On stem of *Triticum vulgare*. From College Farm. 1. Mar. 1967.
19. — *p u r p u r e a* Cke. On leaves of *Sorghum vulgare*. From College Farm. 5. Nov. 1967.
20. *T a p h r i n a m a c u l a n s* Butler. On leaves of *Curcuma longa*. From a personal Farm near Ahar.
21. *C o c h l i o b o l u s h e t e r o s t r o p h u s* (Dreschl.) Dreschl. — Conidial stage. On leaves of *Zea maydis*. From Ahar Farm. 5. Oct. 1967; (IMI 129811).
22. *E r y s i p h e p o l y g o n i* DC. On leaves of *Pisum sativum*. From Botanical Garden. 4. Feb. 1967. — On leaves of *Vicia faba*. From College Farm. 1. Feb. 1967.
23. *G l o m e r e l l a c i n g u l a t a* (Stonem.) Spauld. & Schrenk. On leaves of *Nerium indicum*. From Samore Bagh. 1. Feb. 1968; (IMI 130985). — On leaves of *Alocasia lowii*. From Gulab Gardens. 27. Nov. 1966; (IMI 123880). — On leaves of *Aralia* sp. From Sahelion ki Bari. 1. Feb. 1968); (IMI 131476).
24. *P h y l l a c h o r a c y n o d o n t i s* (Sacc.) Niessl. On leaves of *Cynodon dactylon*. From College Farm. 27. Feb. 1967.
25. *P h y l l a c t i n i a c o r y l e a* (Pers.) Karst. On leaves of *Delbergia sissu*. From Gulab Gardens. 3. Jan. 1967.
26. *P h y s a l o s p o r a o b t u s a*. Conidial stage. On leaves of *Malus* sp. From a personal garden near Vidhya Bhawan. 10. Oct. 1967.
27. *S p h a e r o t h e c a p a n n o s a* (Wallroth.) Lev. On pedicels of *Rosa indica*. From Botanical Garden. 5. Jan. 1967; (IMI 125089).
28. *U n c i n u l a n e c a t o r* (Schow) Burr. On leaves of *Vitis vinifera*. From a personal Vine Yard near Agriculture College. 30. July 1968.
29, *A s c o c h y t a* sp. On leaves of *Cannabis sativa*. From Botanical Garden, College of Agriculture. 8. Nov. 1966; (IMI 118269).
30. — *j a s m i n i c o l a* Canonaco. Oo leaves of *Jasminium pubsescence*. FromGulab Garden. 15. Aug. 1966; (IMI 118272).
31. *B a r t a l i n a r o b i l l a r d o i d e s* Tassi. On leaves of *Mimusops elengi*. Personal orchard of His Highness. 28. Nov. 1967; (IMI 123876).
32. *B o t r y o d i p l o d i a t h e o b r o m a e* Pat. On leaves of *Monstrea deliciosa*. From personal orchard of Hig Highness. 27. Nov. 1966; (IMI 123881).
33. *C o l l e t o t r i c h u m c a p s i c i* (Syd.) Butler & Bisby. On *Capsicum annum*. From a farm near Banswara. 6. Nov. 1967. — On fruits of *Cannabis sativa*. From Botanical Gard. 8. Nov. 1966; (IMI 128315).
34. *C o l l e t o t r i c h u m f a l c a t u m* Went. On leaves of *Saccharum officinarum*. From College Farm. 17. Nov. 1967.

35. *Diplodia natalensis* Pole Evans. On fruits of *Mangifera indica*. From Khushhal Bagh. 4. Juhy 1967. — On fruits of *Citrus sinensis*. *From local markets. 5. May 1967.*

36. *Macrophoma flaccida* (Vial & Rav.) Cavara. On stem of *Vitis vinifera*. From a personal orchard near Agriculture College, Udaipur. 12. Mar. 1967; (IMI 132404 & IMI 132405).

37. *Microdiplodia* sp. On leaves of *Nephelium litchi*. From Gulab Gardens. 1. Feb. 1968; (IMI 130984).

38. — *microspora* (Otth.) Allesch. On leaves of *Sapindus emarginatus*. From a personal orchari of His Highness. 27. Nov. 1967.

39. *Phoma phyllantia* Fl. Tassi. On stem of *Phyllanthus emblica*. From a personal orchard near Agriculture College, Udaipur. 28. Feb. 1967; (IMI 132411).

40. *Phomopsis* sp. On leaves of *Jasminum pubescence*. From Botanical Garden. 18. Sep. 1966; (IMI 118270).

41. *Phyllosticta* sp. On leaves of *Dactyloctenium* sp. From College Farm. 10. Apr. 1967; (IMI 128314).

42. *Phyllostictina* sp. on *Phoenix rupicola*. From a personal Orchard of His Highness. 28. Nov. 1967; (IMI 123877). — On leaves of *Santalum album*. From personal orchard of His Hnghness. 26. Nov. 1966; (IMI 123883).

43. — *murrayae* Syd. On leaves of *Murraya koenigii*. From Gulab Gardens. 28. Nov. 1966; (IMI 123882).

44. — *tabernae montanae*. On leaves of *Taberna montana*. From College Garden. 10. Mar. 1966; (IMI 118271).

45. *Alternaria solani* Soranev. On fruit of *Lycopersicon esculentum*. From the personal garden of Dean, Agriculture College. 10. Jan. 1968; (IMI 131475).

46. — *tenius* Nees ex Pers. On leaves of *Lycopersocon esculantum*. From the personal garden of Dean, Agriculture College. 10. Jan. 1968; (IMI 131474). — On seeds of *Triticum vulgare*. From a local Grain Shops. 5. April 1967; (IMI 125874).

47. *Aspergillus flavus* Link ex Fr. From seeds of *Triticum vulgare*. From local Grain Shops. 8. April 1967; (IMI 125874).

48. — *niger* van Tiegh. From the soils of College Farm. 2. May 1967; (IMI 127586).

49. *Cephalosporium* sp. From the soils of Botanical Garden. 2. May 1967; (IMI 127582).

50. *Cercospora subsessilis* Syd. On leaves of *Melia azadirichta*. From Gulab Garden. 9. Sep. 1966; (IMI 123878). — On leaves of *Melia azadirichta*. From a personal orchard of His Highness. 28. Nov. 1967; (IMI 123878).

51. — *arachidicola* Horn. On leaves of *Arachis hypogea*. From College Farm. 8. Dec. 1967.

52. — *personata* (Berk. & Curt) Ell. & Ever. On leaves of *Arachis hypogea*. From College Farm. 10. Dec. 1967.

53. — *zinniae* Ell & Mart. On leaves of *Zinnia* sp. From Botanical Garden. 18. Sep. 1967; (IMI 129812).

54. — *traversiana* Sacc. On *Trigonella f. graceum*. From College Farm. 3. Mar. 1968; (IMI 131478).

55. *Gladosporium oxysporum* Berk. & Curt. From the soils of College Farm. 2. May 1967; (IMI 127597).

56. *Dactylium fusarioides* De Vries. From seeds of *Triticum vulgare*. From the local Grain Shops. 8. Apr. 1967; (IMI 125873).

57. *Fumago* sp. On leaves of *Musa* sp. From Gulab Gardens. 1. Jan. 1968; (IMI 130986).
58. *Fusarium monilifor mae* Sheld. On seeds of*Sorghum vulgare*. From local grain shops. 5. Feb. 1967; (IMI 132410).
59. — *moniliforme* v. *subglutinans*. Wr. & Rg. From the soils of College Farm. 2. May 1967; (IMI 127577).
60. — *dimerium* Penzig. From the soils of a local farm. 2. May 1967; (IMI 127581).
61. — *solani* (Mart.) Sacc. From the soils of College Farm. 2. May 1967; (IMI 127575).
62. — *semitectum* Berk. & Rav. From the soils of College Farm. 2. May 1967; (IMI 127576).
63, *Gliocladium roseum* Bainier. From the soils of College Farm. 2. May 1967; (IMI 127587).
64. *Memnoniella levispora* Subram. On stem of *Sanchezia* sp. From Gulab Gardens. 6. Mar. 1968; (IMI 131477).
65. *Oidium lini* Skorik. On leaves of *Linum usitatissimum*. From the Botanical Garden. 10. Jan. 1967.
66. — *mangiferae* Berthet. On inflorescence of *Mangifera indica*. From Mehta ki Bari. 8. Mar. 1968.
67, *Paecilomyces persicinus* Nicot. From the soils of College Farm. 2. May 1967; (IMI 127571).
68. — *variotii* Bainier. From seeds of *Triticum vulgare*. From local grain shops. 8. Apr. 1967; (IMI 125875).
69. *Penicillium variabile Sopp.* From the seeds of *Triticum vulgare*. From local Grain Shops. 8. April 1967; (IMI 125879).
70. *Rhizoctonia* sp. On tubers of *Solanum tuberosum*. From local markets. 2. Mar. 1968.
71. *Trichoderma viride* Pers. ex S. F. Grey. From the soils of Botanical Garden. 2. May 1967; (IMI 127567).
72. — *polykporum* (Link ex Fr.) Rifai. From the soils of College Farm. 2. May 1967; (IMI 127573).

Fungi on Caesalpinia crista L

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(With figs. 3)

Caesalpinia crista L, belonging to family Leguminosae, is an extensively growing climber of this region with branches armed with hooked and straight hard prickles.

During recent mycolgical investigations of saprophytic fungi from Manthwada region, the author came across with dead stems and branches of the plant being associated with some peculiar black fungus. On

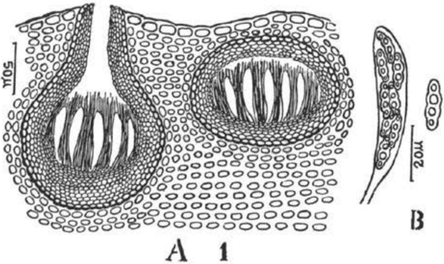

Fig. 1. *Clypeothecium caesalpiniae.* A. Section through perithecium. B. Ascus and spores

detailed examination they were found to be new to science on the basis of host specificity and comparative morphological studies besides being reported on hitherto unreported host.

1. **Clypeothecium caesalpiniae** spec. nov.

Perithecia omnino innata, clypeo epidermali tecta, globosa vel lageniformia, 180—300 × 150—200 μ; pariete pseudoparenchymatico, e cellulis extus crassiuscule, intus tenuiter tunicatis composito; asci cylindracei vel clavati, antice late rotundati, postice in stipitem crassiusculum attenuati, crasse tunicati, 8-spori, 41—45.6 × 9.5—11.4 μ, paraphysati; sporae primum distichae, postea irregulariter ordinatae, fusiformes vel ellipsoideae, utrinque leniter attenuatae, 2—3-septatae, vix vel leniter constrictae, hyalinae, 16—19.2 × 5 μ.

Perithecia completely embedded in the host tissue, ostiolate, forming clypeus with the epidermis, globular to flask shaped and measuring from 180—300 × 150—200 μ. The wall of the ascocarp heavily thickened from outside while inner cells are thin walled. Asci originate from the basal layer, hyaline, bitunicate, cylindrical or club shaped, paraphysate, 8 spored, 41—45.6 × 9.5—11.4 μ. Ascospores fusoid, elliptic, 2—3 transversely septate, hyaline, slightly tapering at ends 16—19.2 × 5 μ. Ascospores primarily biseriate later irregular.

2 A B

Fig. 2. *Didymosphaeria caesalpiniae*. A. Section through the perithecium. B. Ascus and spores

Collected on dead stems of *Caesalpinia crista* L, in the month of April, 1965 at Aurangabad, Leg. Ramchandra Rao and deposited in the herbarium of Marathwada University under number MUH. 206 (Rao type).

3. Didymosphaeria caesalpiniae spec. nov.

Perithecia omnino innata, ostiolata, clypeo epidermali tecta, globosa vel ovoidea, 345—570 × 255—480 μ; pariete pseudoparenchymatico, e cellulis extus crassiuscule, intus tenuiter tunicatis composito; asci cylindracei vel cylindraceo-clavati, antice late rotundati, postice paulatim attenuati, breviter et crassiuscule stipitati, crasse tunicati, 8-spori, 60—74 × 9 μ; paraphysati; sporae monostichae, ellipsoideae, utrinque rotundatae, brunneae, medio septatae, plus minusve constrictae, 9.6—12.8 × 5—6.4 μ.

Perithecia completely embedded in the host tissue, ostiolate, forming clypeus with the epidermis, globular to ovoid and measuring from 345—570 × 255—480 μ. The wall consists of thick walled outer cells and thin walled inner cells. Asci cylindrical or club shaped, hyaline, bitunicate, paraphysate, 8 spored, 60—74 × 9—11.2 μ. Ascospores fusoid, bicelled, brown to dark brown, constricted at the septum, ellipsoid, uniseriate, 9.6—12.8 × 5—6.4 μ.

Collected on dead stems of *Caesalpinia crista* L, in the month of May 1965 at Aurangabad, Leg. Ramchandra Rao and deposited in the herbarium of Marathwada University under number MUH. 207 (Rao type).

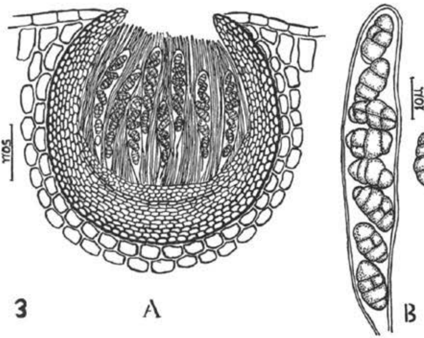

Fig. 3. *Pleospora caesalpiniae*. A. Section through perithecium. B. Ascus and spores

3. **Pleospora caesalpiniae** spec. nov.

Perithecia omnino innata, globosa, 195—250 × 190—210 μ, in maturitate poro rotundato aperta; pariete pseudoparenchymatico, e cellulis extus crassiuscule, intus tenuiter tunicatis composito; asci cylindracei vel cylindraceo-clavati, antice late rotundati, postice attenuati, breviter et crassiuscule stipitati, crasse tunicati, 8-spori, 89—96 × 4.8—11.2 μ; paraphysoides filiformes; sporae mono- vel incomplete distichae, transverse 3-longitudinaliter 1—2- et saepe incomplete septatae, aurantiaco-brunneae, 12—16 × 6—7.5 μ.

Ascocarp dark, completely embedded, unilocular, globose, 195—250

× 190—210 μ, breaking at maturity with a round pore. Stroma consists of outer layers of cells with thick walls and inner layers somewhat thin walled. Asci in basal layers, numerous, cylindrical to clavate, bitunicate, 8 spored, 89—96 × 9.8—11.2 μ. Paraphysoids filiform. Ascospores somewhat biseriate, muriform with 3 transverse septa and 2—3 vertical septa, golden brown, 5—7 celled, thick walled, 12—16 × 6—7.5 μ.

Collected on dead stems of *Caesalpinia crista* L, in the month of Dec. 1965, at Aurangabad, Leg. Ramchandra Rao and deposited in the herbarium of Marathwada University under number 208 (Rao type).

Acknowledgements

Thanks are due to Dr. S. T. Tilak for guidance and encouragement and to Dr. F. Petrak for rendering the latin diagnosis of new species.

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Fungi on Citrus from India

By Vasant Gurunath Rao

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Next to Mango and Banana, *Citrus* represents the third largest fruit industry of India and ranks 6th among the *Citrus* growing countries of the world. The principal regions of citrus cultivation in India lie in Madras, Madhya Pradesh, Maharashtra, Assam and Mysore.

Citrus fruits are esteemed primarily as articles of diet. They also provide a large number of commercial products such as essential and fatty oils (orange oil, lemon oil, lime oil etc.), citric acid, malic acid, minerals (Calcium, phosphorus and iron), glycosides, pectins, anthocyanins, B-carotine, Vitamin C & B, sucrose and other reducing sugars etc. Fruits are converted into beverages (juices, squashes etc.) and also some canned commercial products.

Oranges are the most refreshing delicious, wholesome and growth promoting juicy fruits. Limes and lemons are rich in vitamins, minerals and salts but are highly acidic. Their juice is mixed with sugar for the popular summer drink "the sherbat". They are also largely used for making pickles and thus preserved throughout the year. Oils obtained from orange, lemon and lime are used for flavouring purposes and also have some medicinal properties.

Citrus trees and fruits are subject to a number of diseases in the field as well as storage incited by fungi, bacteria and viruses of which the fungal diseases predominate. As a result, heavy crop losses are experienced by the orchard owners and also by the 'Fruit Canning Industries'. A number of fungi have been reported on various citrus species from India, an account of which has been published from time to time. A perusal to the 'Indian Literature' shows the scattered nature of this information. Attempt has been made to bring all this information in a single publication, which will serve as useful reference work for future investigators.

The present paper aims to give an up-to-date list of "Fungi" reported on various *Citrus* spp. from India so far, together with nature of diseases incited by them and relevant literature on the subject.

It is hoped that a publication of this nature would be of great value to the mycologists, plant pathologists, horticulturists and also to the plant protection and quarantaine authorities.

The *Citrus* species as well as the Fungi affecting them are arranged alphabetically.

Acknowledgements

The writer is deeply indebted to Professor M. N. Kamat, Head of the Division of Mycology and Plant Pathology, M. A. C. S. Research Institute, Poona-4, (India) for his absorbing interest and direction, to Dr. G. B. Deodikar, Director, for library facilities. He is also highly grateful to Prof. Dr. F. Petrak (Wien, Austria) for kindly going through the manuscript.

A statement showiig different Fungi responsible for diseases of Citrus in India

1. Causal Fungi	2. Nature and Type of Disease. — Remarks	
I. *Citrus acida* var. *variegata* L.		
Colletotrichum gloeosporioides Penzig	Leaf blight	Rai (1956) reported from Lucknow (U. P.)
II. *Citrus assamensis* Bhattacharya & Datta.		
Septobasidium pseudopedicellatum Burt.	'Felt' disease	Common and widespread in Assam, Chowdhury (1951).
III. *Citrus aurantifolia* (Christm.) Swingle		
Aschersonia raciborskii Zimm.	—	On *Aleyrodes* infecting the leaves, Banares (U. P.) and also reported by Uppal et al (1935).
Diplodia citrina Diedike	Twig blight	Reported by Uppal et al (1935).
Diplodia natalensis Evans	Twig blight & Fruit rot	General.
Fusarium solani f. sp. *aurantifoliae* (Bhat. & Prasad)	Wilt	Also, a twig disease in Rajasthan, Bhatnagar & Prasad (1966).
Gloeosporium limetticolum Clausen	Anthracnose & Fruit-fall	Studied in detail by Agarwala & Tandon (1957) from Allahabad (U. P.).
Meliola butleri Syd.	Sooty mould	Covers the leaves and fruits, General.
Phyllosticta aurantiicola (Berk. & Cke.) Sacc.	Leaf spot	Lele et al (1968) reported from Delhi in a severe form.
Pleosphaeria citri Arnaud	Leaf spot	Recorded from Poona, Uppal et al (1935).
Trametes cervina (Schw.) Bres.	Limb-break	From North Arcot & Cuddappah (Ramakrishnan, 1955).
Tryblidiella rufula (Spreng.) Sacc.	Canker & Die-back.	An Ascomycete on dead twigs, Cuttack (Orissa), Also reported causing canker & die-back in Rajasthan (Bhatnagar & Prasad, 1966).
IV. *Citrus aurantium* L. (Sour, Bitter orange)		
Alternaria tenuis Auct.	Fruit rot	General.

A statement showiig different Fungi responsible for diseases of Citrus in India

1. Causal Fungi	2. Nature and Type of Disease. — Remarks	
Botryodiplodia theobromae Pat.	Soft rot & twig blight.	General.
Cephalosporium sp.	Fruit rot	Reported rarely in literature.
Colletotrichum gloeosporioides Penz.	Anthracnose & Die-back.	General throughout India.
Daldinia eschscholzii (Ehrenb.) Rehm.	Charcoal rot	On wood, reported from Nagpur.
Diplodia indica Diedicke	Saprophyte	Reported on bark (Poona).
Haplosporella hesperidica Speg.	Saprophyte	Reported from Coorg (Mysore) on dead branches.
Illosporium citri Muthappa.	Saprophyte	On dead twigs, Coorg Forests (Mysore), Muthappa (1966 a).
Meliola butleri Syd.	Sooty mould	General distribution.
Meliola camelliae (Catt.) Sacc.	Sooty mould	Reported from Dehra Dun, Pusa etc.
Nigrospora oryzae (Berk. & Br.) Petch.	Saprophyte	Reported by Srivastava et al (1964) in storage.
Oidium tingitanium Carter	Powdery mildew.	Reported from Kotagiri & Shevroy hills of S. India. The fungus covers leaves, twigs and fruits and causes drying.
Oospora citri-aurantii (Ferrar) Sacc. & Syd.	Slimy fruit rot	General in storage.
Pellicularia alba (Dast.) Dastur (Syn = *Corticium album* Dastur)	Pink disease	On living stems, Burhanpur (M. P.), Dastur (1940).
Pellicularia salmonicolor (Berk. & Br.) Dastur (Syn = *Corticium salmonicolor* Berk. & Br.)	Pink disease	Severe in high rainfall tracts of Assam, Balanghat (M. P.), as reported by Dastur (1941) and also at North Arcot & Chittoor Districts of Madras.
Phytophthora palmivora Butler	Fruit decay, Gummosis.	General.
Phytophthora parasitica Dastur	Fruit decay	General.
Penicillium fellutanum Biourage	Fruit decay	General.
Sphaceloma fawcetti Jenkins	Scab (Ashy)	On leaves and fruits, general, first recorded by Patel, Kamat & Bhide (1949), Poona.

A statement showiig different Fungi responsible for diseases of Citrus in India

1. Causal Fungi	2. Nature and Type of Disease. — Remarks	
V. *Citrus crysocarpa* Lushington		
Alternaria citri Pierce	Leaf spot	Reported from Kalimpong (W. Bengal).
Aspergillus niger van Tiegh.	Fruit rot	Reported from Kalimpong (W. Bengal).
Botrytis cinerea Pers.	Fruit rot	Reported from Kalimpong (W. Bengal).
Cladosporium herbarum Lk. var. *citricola* Fawcett & Burger	Fruit rot	Reported from Kalimpong (W. Bengal).
Fusarium moniliforme Sheldon	Fruit rot	Reported from Calcutta (W. Bengal)
Penicillium digitatum Sacc.	Fruit rot	Reported from Kalimpong (W. Bengal).
Penicillium expansum Link.	Fruit rot	Reported from Kalimpong (W. Bengal)
Penicillium italicum Wehmer	Fruit rot	Reported from Kalimpong and Allahabad.
Stysanus monilioides (Alb. et Schw.) Corda	Fruit rot	Reported from Kalimpong, Darjeeling (W. Bengal) by Roy (1941).
Trichoderma lingorum (Tode) Herz.	Fruit rot	Reported from Kalimpong (W. Bengal).
VI. *Citrus limonia* Risso		
Calosphaeria fici Kale	Saprophyte	On dead branches, Bhir (Maharasthra), Kale (1967).
Curvularia tuberculata Jain.	Die-back	Serious disease, reported recently from Delhi (Lele et al 1968).
Alternaria citri Pierce	Leaf spot	General, Agarwal & Hasija, reported from Jabalpur (1961).
VII. *Citrus limonum* (L.) Brum.		
Alternaria citri Ell. & Pierce.	Leaf spot & fruit rot	General.
Fusarium limonis Briosi	Seedling disease	Rare occurrence.
Fusarium lateritium Nees.	Root & Stem rot	Allahabad and Dehra Dun (U. P.)
Phyllosticta desciformis Penz.	Leaf spot	Reported by Roy (1968) from Borbheta (Assam).
Hysterium citricola Tilak & R. Rao.	Saprophyte	An Ascomycete on dried stems (Tilak & R. Rao, 1966) described this from Aurangabad (Maharashtra).

A statement showiig different Fungi responsible for diseases of Citrus in India

1. Causal Fungi	2. Nature and Type of Disease. — Remarks	
VIII. *Citrus maderaspatana* Hort. ex Tanaka		
Diplodia sp.	Saprophyte	Recorded on the branches.
Sporocybe hybrida Mason	—	Isolated from the roots, Madras.
IX. *Citrus maxima* (Burm.) Merrill (Shaddock) (= *Citrus decumana* L. = *C. grandis* (L.) Osbeck)		
Diplodia natalensis Pole Evans	Twig blight & Fruit rot	General.
Helminthosporium sp.	Fruit spots	Rare, Tandon & Varma (1964).
Hypoxylon deustum (Hoff. ex Fr.) Grev.	Charcoal Stump-rot	Reported by Agnihothrudu (1964) from Toklai (Assam).
Pestalotia citri Mundk. & Kheswalla	Leaf spot	Recorded from Kirkee, Poona.
Phoma nainiensis Bilgrami	Leaf spot	Reported from Naini (Allahabad), described by Bilgrami (1963).
Pleospora herbarum (Pers.) Rabenh.	Leaf spot	Reported from Allahabad by Bilgrami (1963).
Phomopsis citri Fawcett	Melanose	Widespread in Assam with high rainfall (Chowdhury 1955).
Sclerotium rolfsii Sacc.	Die-back	Reported from Kottayam (Kerala), attack branches.
Septobasidium pseudopedicellatum Burt.	Felt disease	First reported by Chowdhury (1951) from Assam.
Sphaceloma fawcetti Jenkins	Scab	General.
X. *Citrus medica* L.		
Alternaria citri Ell. & Pierce.	Black rot	General in storage. Recently reported by Agarwal & Hasija (1967) from Jabalpur.
Ascochyta citri Penz.	Leaf spot	Reported from Kumaon (U. P.)
Chaetomium orientum Saha	Saprophyte	On wood (Saha 1964).
Colletotrichum gloeosporioides Penzig.	Anthracnose & wither tip or die-back	Throughout India.

A statement showiig different Fungi responsible for diseases of Citrus in India

1. Causal Fungi	2. Nature and Type of Disease. — Remarks	
Diplodia citrina Died.	Root rot	Reported from Sholapur (Maharasthtra), rare.
Fusarium semitectum Berk. & Rav.	Fruit rot	Allahabad (U. P.)
Gloeosporium spegazzinii Sacc.	Anthracnose	Allahabad (U. P.)
Melanomma citricola Syd. & Butler	Black bark spot	Barnihat (Assam)
Mycosphaerella citricola Tilak	Leaf-blight	First described by Tilak (1963) from Poona.
Septoria cattanei Thuem.	Leaf spot	Kanara (Mysore).
Tryblidiella rufula var. *microspora* Ell. & Ev.	Saprophyte	An Ascomycete on dead twigs, Varanasi (U. P.)
XI. *Citrus medica* var. *acida* L. (Lemon, Nimbu)		
Aspergillus niger v. Tiegh.	Soft rot	General on fruits, in storage.
Botryodiplodia theobromae Pat.	Fruit rot	General on fruits.
Cladosporium herbarum (Pers.) Link	Fruit spot	Tandon & Varma from Allahabad (1964).
Curvularia lunata (Wakker) Boedijn	Fruit spot	Tandon & Varma from Allahabad (1964).
Fusarium semitectum Berk. & Rav.	Soft rot (Fruits)	General.
Geotrichum candidum Link.	Waxy rot	General, first report by Rao (1966) from Poona.
Glomerella cingulata (Stonem.) Spauld. & Shrenk.	Anthracnose	General.
Memnoniella echinata (Riv.) Galloway	Soft rot	On fruits in storage.
Meliola amphitricha Fr.	Sooty mould.	On leaves, Calcutta.
Phoma macrophoma McAlp.	Wither-tip.	On twigs and branches, with dark pustules.
Phyllostica limonum Lucas & Da Camara.	Leaf blight	First reported by Rao (1964) from India.
Sphaeropsis tumefasciens Hedges & Tenny.	Leaf spot, tumors or branch knots.	First discovered by Prasad & Bhatnagar (1961), from Ajitgarh (Rajasthan), also at Jabalpur (M. P.).
XII. *Citrus nobilis* Lour. var. *deliciosa* Sw.		
Diplodia natalensis Pole Evans.	Fruit rot	General.
Phytophthora palmivora Butler	Fruit rot	General.

A statement showiig different Fungi responsible for diseases of Citrus in India

1. Causal Fungi	2. Nature and Type of Disease. — Remarks	
XIII. *Citrus paradisi* Macf. (Grape Fruit) or *Papnas.*		
Elsinoë fawcetti Bitanc. & Jenkins.	Leaf spots	Reported from Kallar (Madras).
Geotrichum candidum Link.	Waxy rot in storage.	General on fruits.
Gloeosporium citri Cke. & Mass.	Fruit rot	General.
Pythium debaryanum Hesse	Seedling rot.	Kanpur (U. P.).
Rhizoctonia solani Kuehn.	Seedling rot.	Kanpur (U. P.)
Uredo citri Cooke	Rust.	Alisagar (Hyderabad Dn.), Reported by Vaheeduddin (1955).
XIV. *Citrus reticulata* Blanco (Mandarin orange) (= *C. nobilis* Lour.)		
Alternaria tenuis Auct.	Black core rot.	General, detailed studies by Singh & Khanna (1966).
Meliola butleri Syd.	Sooty mould.	General.
Penicillium digitatum Sacc. (Green mould)	Fruit rot	General.
Penicillium italicum Wehmer (Blue mould)	Fruit rot	General.
Phomopsis citri Fawcett	Melanose	Widespread in Jorhat, Burnihot (Assam), Chowdhury (1955).
Phytophthora palmivora Butler	Leaf fall & fruit rot	Serious at moist zones of Wynad & Coorg, (S. India).
Septobasidium pseudopedicellatum Burt.	'Felt' disease	Wide-spread in Assam. (Chowdhury 1951).
Uromyces nilagiricus Ramakr. T. S. & K.	Rust.	On leaves of Loranthus sp. parasitic on *Citrus reticulata*, Kotagiri (Madras).
Rhizoctonia bataticola (Taub.) Butler.	Fruit rot	First reported by Parashar & Chohan (1966) from Ludhiana (Punjab).
XV. *Citrus sinensis* (L.) Osbeck. (*Musambi*) (Lemon, Sweet orange)		
Alternaria citri Pierce	Leaf spot & fruit rot.	General. First recorded by Uppal, Patel & Kamat from Poona (1935).

A statement showiig different Fungi responsible for dieases of Citrus in India

1. Causal Fungi	2. Naure and Type of Disease. — Remarks	
Aspergillus fumigatus Fres.	Fruit	Sinha (1964).
Botryodiplodia theobromae Pat.	Leaf spot & fruit rot	General.
Colletotrichum gloeosporioides Penz.	Anthracnose	Common.
Diplodia indica Died.	Bark infection.	Poona. (Uppal, Patel, Kamat, 1935).
Diatrypella verruciformis (Ehr.) Nke.	Saprophyte	On dead branches, Muthappa (1966).
Fusarium moniliforme Sheldon	Fruit rot.	General, first recorded by Ghatak (1938).
Fusarium solani (Mart.) App. & Wollenw.	Twig blight.	Darjeeling and Sikkim (Chatopadhyay & Sen Gupta 1967).
Gloeosporium citri Cke. & Mass.	Anthracnose	General.
Haplosporella cosmopolitus Muthappa	Saprophyte	On dead branches at Coorg, Muthappa (1966).
Illosporium citri Muthappa	Saprophyte	On dead twigs at Coorg, Mysore, Muthappa (1966).
Meliola citricola Syd.	Sooty mould	General.
Nectria heterosperma Kalchbr. & Cooke.	Cankers (Orange)	On branches causing die-back. Bombay (Uppal et al, 1935).
Phomopsis citri Fawcett (Perfect = *Diaporthe citri* (Fawcett) Wolf)	Melanose	Widespread in Assam (Chowdhury 1955 b).
Phytophthora palmivora Butler	Gummosis.	Detailed study by Uppal & Kamat (1936), a leaf fall disease by Devarajan & Aiyappa 1945) from Coorg.
Rhizoctonia bataticola (Taub.) Butler	Fruit rot	General.
Rhizopus stolonifer (Fr.) Linder	Fruit rot	General.
Rosselinia bunodes (Berk. & Br.) Sacc.	—	Recorded by Uppal, Patel & Kamat (1935), Bombay.
Septobasidium citricolum Sawada	Black felt.	General.
Trametes cervina (Schw.) Bres. (Agaricales)	Limb breakage	Reported from N. Arcot & Cuddapah (Andhra) by Ramakrishnan (1955).
Trichurus gorgonifer Bain.	Fruit infection	Calcutta (West Bengal).
Tryblidiella rufula (Spreng.) Sacc.	Saprophyte	An ascomycete on dry twigs, at Coorg (Mysore).

A statement showiig different Fungi responsible for dieases of Citrus in India

1. Causal Fungi	2. Naure and Type of Disease. — Remarks	
XVI. *Citrus* sp.		
Aspergillus fumigatus Fres.	Damping-off.	A seedling disease, recently reported by Lele et al. (1967) from New Delhi.
Botrytis cinerea Pers.	Gray-gummosis.	A serious disease in Assam.
Capnodium citri Berk. & Desm.	Sooty mould	On leaves and fruits, General.
Cercospora penzigii Sacc.	Leaf spot.	Pusa (Bihar).
Chaetomium sp.	Saprophyte	Rarely reported.
Cladosporium herbarum Link.	Black mould.	On leaves and fruits, common in Assam.
Colletotrichum capsici (Syd.) Butler.	Anthracnose	On leaves and fruits, reported from Bihar.
Curvularia lunata (Wakker) Boedijn.	Leaf spot	Chaudhuri (1936) from Punjab.
Cytospora citri Died.	Leaf spot	On fading leaves, Pusa (Bihar).
Macrophoma paraphysata	—	Reported by Lal (1960) from Bombay.
Dothiorella phaseoli (Maubl.) Petr.	Root rot	From Poona (Uppal, Patel & Kamat, 1935).
Phoma macrophoma McAlp.	Twig blight	From Poona (Uppal, Patel & Kamat, 1935).
Pleospora herbarum (Pers.) Rabenh.	Leaf spot	General.
Pythium debaryanum Hesse	Damping-off	Seedling disease in nursery (Srivastava & Singh, 1954).
Rhizoctonia solani Kuhn.	Damping-off	Seedling disease in nursery (Srivastava & Singh, (1954).
Rhizopus sp.	Fruit rot	General.
Rhynchodiplodia citri Briosi & Farnetti	Fruit rot	Reported by Uppal, Patel & Kamat (1935), from Poona.
Rhytidhysterium rufulum (Spreng.) Petrak.	Saprophyte	An Ascomycete, rare.
Sporocybe hybrida Mason.	Root infection	Reported from Madras.
Tryblidiella rufula (Spreng) Sacc.	Saprophyte	An Ascomycete on dead branches, Pulliyanur (Travancore-Cochin).

Puccinia buxi DC. eine neue Uredinee der österreichischen Flora und ein Beweis für das spontane Vorkommen des Buchsbaums im oberösterreichischen Ennstal.

Von F. Petrak, (Wien)

Schon vor mehreren Jahren wurde ich durch Janchen's Catalogus Florae Austriae auf das Vorkommen des Buchsbaums in Oberösterreich und Salzburg aufmerksam gemacht. Über das Vorkommen des Buchsbaums im Ennstal wurde schon oft von verschiedenen Autoren berichtet. Zuerst erwähnt wurde es von Sauter (1842), später von Brittinger (1862), nach welchem Buchs „in Baumform ganz verwildert bei Trattenbach unweit Steyr“ vorkommen soll, was von Sauter (1864) bestritten und angegeben wird, dass Buchs am Schoberstein einen grossen Bestand bilden soll. Diese Angabe wurde von Duftschmid (1870—85), Pehersdorfer (1907), Hegi (1924) und Gams (1931) übernommen, konnte aber von Rohrhofer (1934) trotz eifrigen Suchens nicht bestätigt werden. Eine genaue Beschreibung des Buchsvorkommens an der Beisteinmauer bei Trattenbach hat zuerst Herget (1910) mitgeteilt und behauptet, dass dort auch *Philadelphus coronarius* vorkommt. Diese Angabe hat auch Seidl (1925) übernommen, obwohl sie weder von ihm noch von anderen Forschern bestätigt werden konnte. Zuletzt hat Rohrhofer (1934) die Buchsstandorte im oberösterreichischen Ennstal mit Angaben über Bodenbeschaffenheit, Klima, Höhenlage und Begleitpflanzen ausführlich beschrieben und auf folgende Weise näher bezeichnet: „a) Trattenbach, Beisteinmauer nächst dem Gute Unter-Permess. — b) Ternberg, Talergraben nächst dem Gute Matthiestal. — c) Trattenbach, beim Gute Hinterweimayr am Wege auf den Hochbuchberg. — d) Trattenbach beim Gute Sulzstein. — e) Trattenbach beim Gute Auf der Point. — f) Ternberg, im Felsgelände des rechten Ennsufers nächst der Ennsbrücke.

Aus Rohrhofer's (1934) ausführlicher Schilderung dieser Standorte, für die auch die Begleitflora angegeben wird, soll hier zunächst das Wichtigste mitgeteilt werden. Am Südfuss der Beisteinmauer befindet sich ein Streifen dichten Mischwaldes, in dem Buchs an lichteren Stellen als Unterholz vorkommt, im Schatten jedoch nur ein kümmerliches Dasein zu fristen scheint. Die Neigung dieses Standortes ist ziemlich gleichmässig und nicht besonders stark. Weiter oben wechseln dann kleine, steile, oft fast senkrechte Felspartien mit weniger geneigten Flächen. Die Bäume stehen verstreut, so dass oft kleine, offene Lichtungen entstehen. Die Vegetation der steilen Felsen ist verschieden und hängt davon ab, ob sie durch Bäume oder Sträucher beschattet werden oder der prallen Sonne ausgesetzt sind. Hier tritt Buchs reichlich auf, entweder als Unterholz oder in einheitlichen, dichten Beständen. Weiter oben bis zum Gipfel ist die Neigung wieder geringer. Hier gibt es fast nur einen Buchenwald, in welchem Buchs nur am unteren Rande noch zahlreicher als Unterholz auftritt, weiter oben aber spärlicher und unansehnlicher wird.

Der Buchs kommt hier in allen Altersstufen vor, vom Keimling bis zu Stämmen von 3 m Höhe und mehr als 10 cm Durchmesser am Boden.

Eine sehr ausführliche Studie über das Vorkommen des Buchsbaumes wurde von Christ (1913) mitgeteilt und genaue Angaben über die Grenzen seiner Verbreitung angegeben. Dieser Autor bezeichnet den Buchs als „tertiäre Holzpflanze", deren Verbreitungsareal aus einem westlichen und einem östlichen Teil besteht. Im Westen ist der Buchs im nördlichen Spanien und, mit Ausnahme des atlantischen Küstengebietes, im südlichen und mittleren Frankreich weit verbreitet und häufig. Auch in der westlichen Schweiz ist Buchs noch häufig anzutreffen, wird aber gegen Osten seltener und kommt in Vorarlberg nicht mehr vor. In Deutschland ist Buchs hauptsächlich auf den südwestlichen Teil beschränkt. Weiter östlich kommt Buchs nur spärlich in Südtirol und auf den oben genannten Standorten in Salzburg und Oberösterreich vor. Die österreichischen Standorte hält Christ (1913) für „vollends zweifelhaft". Auf Korsika und Sardinien kommt Buchs auch vor. Die Standorte im nördlichen und mittleren Italien werden aber von Christ (1913 Karte!) als subspontan bezeichnet. Nach Dalla-Torre und Sarntheim kommt Buchs auf felsigen, heissen Hängen in der Umgebung von Bozen und im Gebiet des Garda-Sees vor. Im ehemaligen Küstenland ist Buchs nach Pospichal (1897) nur verwildert anzutreffen, unzweifelhaft spontan wurde er dort noch nicht gefunden.

Das östliche Verbreitungsareal umfasst den mittleren Teil der Balkanhalbinsel bis zum Bosporus und den gegenüberliegenden westlichen Teil Kleinasiens. Dann folgt wieder eine Lücke bis in die Gegend von Trapezunt, wo man nach Handel-Mazzetti (1910) von einer besonderen *Buxus*-Region über der unteren, südpontischen Buschzone sprechen kann, während Buchs in den Küstengebieten vollständig fehlt. Weiter östlich tritt der Buchs dann wieder in den die Küste des Schwarzen Meeres umgebenden Gebirgen auf. Dann folgt wieder eine Lücke bis zum südwestlichen Küstengebiet des Kaspisees. Nach Ledebour (1846—51) kommt Buchs noch im Ural, in Turkestan und in Talysch vor.

Im nordwestlichen Persien wurde Buchs auch von Bornmüller und Rechinger gefunden und gesammelt.

Buchs wird schon seit langer Zeit viel kultiviert und wurde früher oft, heute wohl nur noch selten auch als Bindegrün verwendet. Während ich auf dem in Parkanlagen, Gärten und Friedhöfen kultivierten Buchs niemals irgendwelche Pilze finden konnte, waren auf alten Kränzen in Friedhöfen verschiedene Pilze anzutreffen, die das abgestorbene Laub des als Bindegrün verwendeten Buchsbaums massenhaft besiedelt hatten. Am häufigsten habe ich *Verticillium buxi* (Link) Auersw. et Fleischh. und *Volutella buxi* (Corda) Berk. gefunden, die oft auch gemeinsam anzutreffen sind. *Sarcophoma Miribelii* (Fr.) v. Höhn. und *Dothiorella Candollei* (Berk. et Br.) Petr. sind seltener und meist auch nur spärlich entwickelt. Am seltensten scheint *Hyponectria buxi* zu sein, die nur einmal von meinem Vater massenhaft auf abgestorbenen Buchsblättern eines alten Kranzes im Friedhof der Mil.-Oberschule in Mähr. Weisskirchen angetroffen und gesammelt wurde. Dieses Material wurde von mir in meiner Flora Bohemiae et Moraviae exsiccata, II. Serie, 1. Abt. Pilze unter Nr. 1231 ausgegeben.

Weil in Westeuropa, wo Buchs weit verbreitet und häufig ist, verschiedene parasitische Pilze auf den lebenden Blättern auftreten, vermutete ich, dass der eine oder andere dieser Parasiten auch auf den österreichischen Standorten vorkommen könnte. Deshalb wollte ich den Standort im oberösterreichischen Ennstal aufsuchen, bin aber durch Zeitmangel, Krankheit und andere widrige Umstände daran gehindert worden. Im Mai 1968 hat aber mein junger Freund Doz. Dr. J. Weindlmayr meiner Bitte entsprochen, den Standort auf der Beisteinmauer bei Trattenbach aufgesucht, dort ein zahlreiches Auftreten der *Puccinia buxi* D. C. festgestellt und mir reichliches Material mitgebracht.

Nach Sydow (1903) wurde *Puccinia buxi* in der Schweiz, in Deutschland, Österreich, Italien, Portugal, Belgien, England, Russland und Persien gefunden. Die Angabe über ein Vorkommen in Österreich bezieht sich wohl auf den von Magnus (1905) angeführten Standort in Riva, wo der Pilz von Pazschke im Garten eines Hotels gefunden wurde. Aus dem Gebiete der Flora des heutigen Österreich war *P. buxi* bisher noch nicht bekannt. In Frankreich und im angrenzenden Spanien ist dieser Pilz wohl häufig und verbreitet. Für die Pyrenäen werden von Durrieu (1966) zahlreiche Standorte angegeben. Auch Rechinger hat den Pilz in Südwestfrankreich zweimal gefunden. Für die französische Schweiz gibt Fischer (1904) zahlreiche Standorte an; im Baseler Jura und im Kanton Solothurn tritt *P. buxi* seltener auf. Der östlichste Standort dieses Pilzes im westlichen Verbreitungsareal des Buchsbaums dürfte Lindau sein, von wo der Pilz in Rabenhorst-Winter, Fungi europaei unter Nr. 3710 angegeben wurde.

Im östlichen Verbreitungsareal tritt *P. buxi* dem Anschein nach seltener auf, wurde aber von Handel-Mazzetti bei Trapezunt gefunden. Tranzschel und Serebrianikow haben den Pilz aus Cirkassien in der Mycotheca rossica unter Nr. 60 ausgegeben. Bornmüller hat den Pilz in Persien bei Rescht gesammelt und ihn sowohl unter Nr. 4391 in seinem Exsikkatenwerke „Iter persicum" als auch in Rabenhorst-Pazschke Fungi europaei et extraeuropaei unter Nr. 4216 verteilt.

Auf kultiviertem Buchs habe ich *P. buxi* nicht gefunden und auch in der Literatur keine diesbezügliche Angabe getroffen. Das Vorkommen des Pilzes bei Trattenbach ist meines Erachtens ein unwiderlegbarer Beweis dafür, dass es sich hier um ein spontanes Vorkommen des Buchsbaumes handelt, als ein Relikt aus einer Zeit, in der sich ein zusammenhängendes Gesamtareal des Buchsbaums von Westeuropa über Österreich bis nach Osteuropa und Westasien erstreckt hat.

Man sollte jetzt auch die beiden Standorte in Salzburg aufsuchen und nachforschen, ob und welche Pilze dort auf Buchs vorkommen. Vielleicht wäre dort auch die nach v. Arx (1949) in der Schweiz häufige *Mycosphaerella limbalis* (Pers.) v. Arx anzutreffen.

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Vorstudien zu einer Revision der Gattung Arthopyrenia MASS. sensu amplo II.

von H a r a l d R i e d l, Wien

A. D e r a n a t o m i s c h e B a u d e r F r u c h t k ö r p e r

Im Laufe meiner Untersuchungen an *Arthopyrenia*-Arten ergab sich immer dringender die Notwendigkeit, gewisse anatomische Details des Fruchtkörperbaues mit verbesserten Methoden zu klären, um die Unterscheidung der Arten wie auch höherer Einheiten auf eine solidere Basis zu stellen und eine eindeutigere beschreibende Terminologie zu erreichen.

M e t h o d i k

Bei zahlreichen Arten ergeben sich Schwierigkeiten aus der optischen Undurchdringlichkeit der dunklen Aussenkruste an den Fruchtkörpern und durch die Unmöglichkeit, ohne besondere Hilfsmittel Zellgrenzen im hyalinen Innenraum zu erkennen. Für den ersteren Fall galt es ein Aufhellungsmittel zu finden, das die dunklen Exkrete (Melanine) entfernt, für den zweiten standen die Anwendung des Phasenkontrastverfahrens und Färbemittel zur Verfügung. Aufhellungsversuche wurden mit einem von B e r s i e r und B o c q u e t (1960) an Phanerogamenkarpellen erprobten Gemisch von Chloral-Lactophenol nach A m m a n n (1899) unternommen. Dieses Gemisch führte zu einer für die Beobachtung hinreichenden, wenn auch nicht vollständigen Bleichung der Melanine. Die Schnitte sind nach Entfärbung in ein Gemisch von gleichen Teilen Milchsäure und Glyzerin zu bringen, keinesfalls aber in Wasser! Eine bessere, vor allem auch spezifischere Methode für die Auflösung von Melaninsubstanzen wurde von E. O. S p e e r (1968) inzwischen ausgearbeitet, doch liegt die Durchführung eines grossen Teils der hier mitgeteilten Untersuchungen schon mehrere Jahre zurück.

Weiters wurden Versuche angestellt, ob die Färbung mit Anilinblau-Milchsäure nach M o s e r (1943) oder Untersuchung im Phasenkontrast bessere Resultate lieferten. Besonders dort, wo der genaue Verlauf von Paraphysen oder Paraphysoiden festgestellt werden sollte, zeigte sich die Färbemethode weit überlegen, da sie den gesamten Hyphenverlauf verfolgen lässt, während das Phasenkontrastverfahren gleichsam an den Quersepten das Kontinuum völlig zerhackt und dadurch mehr die Grenzen als die Verbindungen deutlich macht. Es muss betont werden, dass auch ältestes Herbarmaterial unverändert gut auf Anilinblau-Milchsäure anspricht.

Allgemeines über den Fruchtkörperbau

a) Hyaliner oder heller Anteil

Der dunklen Aussenkruste, bzw. der vom Substrat gebildeten Basis liegt ein aus parallelverlaufenden Hyphen gebildetes Geflecht an, dessen Zellen in der Längsrichtung meist gestreckt sind. Ist das Geflecht des Innenraumes pseudoparenchymatisch, so sind auch die Zellen dieser Schicht meist kürzer und dicker, doch ist noch immer der prosoplektenchymatische Charakter zu erkennen. Von diesem Geflecht werden Hyphen oder Hyphenzweige ins Innere abgegeben, und zwar entweder nur an der Fruchtkörperbasis oder an der Basis und um die Mündung. Diese Hyphen können recht verschieden entwickelt sein, doch gibt es zwei Grundtypen:

1. Die Hyphen sind fein fädig und unverzweigt oder verzweigt. Sie verschleimen auch im Alter nicht. Man kann sie als echte Paraphysen ansprechen, die von der Basis des Fruchtkörpers ausgehen. Mitunter ist zwischen Paraphysen und Prosoplektechym der Fruchtkörperwand an der Basis ein flach gewölbtes Pseudoparenchym als Hypothecium (= Verzweigungszone) eingeschoben.

2. Die Hyphen sind aus ± kugeligen, bei dichterer Lage gegeneinander abgeplatteten und dann ± polyedrischen Zellen aufgebaut, scheinbar meist mit kurzen Verzweigungen. Vermutlich sind sie basalen Ursprungs, doch hängen sie auch apikal zusammen. Vor der Ascusbildung ist dann der Innenraum von einem Pseudoparenchym erfüllt, das von den Asci zur Seite gedrängt wird und gewöhnlich früher oder später verschleimt.

Diese beiden Gegensätze stehen sich nicht abrupt gegenüber. Luttrell (1965) dürfte aber für unseren Fall durchaus im Recht sein, wenn er behauptet, dass fädige Paraphysoiden nicht durch Zusammenpressen von Pseudoparenchym entstehen können, sondern von vornherein einer anderen Kategorie von Hyphen angehören. Zwischenformen zeigen recht aufschlussreiche Verhältnisse: so können basal entspringende, stark verzweigte und anastomosierende Interthezialfasern (Paraphysen oder Paraphysoiden) apikal zu einem Prosoplektenchym verbunden sein, das der dunkel gefärbten Aussenkruste angepresst ist und einen Teil der Wand bildet.

Gelegentlich gibt das prosoplektenchymatische Wandgeflecht nach aussen hyaline oder hell gefärbte, relativ dicke Hyphen ab, die ein in kleinere Gruppen aufgeteiltes Pseudoparenchym bilden, das an den von mir untersuchten Arten niemals ein geschlossenes, allseitig entwickeltes Geflecht darstellte. Es kommt vor allem dort vor, wo die Aussenkruste überwiegend von Substratteilen gebildet wird und unregelmässig nach innen vorstösst. Hier werden Einbuchtungen mit Pseudoparenchym ausgefüllt.

Die Deutung dieser verschiedenen Geflechte ist nicht schwer, wenn man ihr die Ergebnisse Corner's (1929) an Apothezien von Discomyzeten zugrundelegt. Die prosoplektenchymatische Wandschicht entspricht der Medulla Corner's, die das springbrunnenartige Wachstums- und Bildungsgeflecht der Ascophore darstellt. Nach innen zu kann ein Hypothezium als Verzweigungszone der paraphysogenen Hyphen und jener Hyphen, welche die Asci bilden — ich vermeide den Ausdruck „ascogene Hyphen", da die zytologischen Verhältnisse unbekannt sind — folgen. Bei den mitunter auftretenden Gruppen von Pseudoparenchym ausserhalb der Medulla Corner's dürfte es sich um ein reduziertes Deckgeflecht handeln, doch sind die Gruppen meist zu klein, um Näheres erkennen zu lassen.

b. dunkle Aussenkruste.

Wo die Fruchtkörper in der Borke der Wirtspflanze angelegt werden, übernehmen meist veränderte Anteile derselben die Behüllung. Sie werden von einzelnen torulösen oder seltener dünnen, fädigen Hyphen durchwachsen, die Melaninsubstanzen abscheiden und dadurch eine Verfärbung herbeiführen. Je dichter derartige Hyphen vorhanden sind, desto reichlicher sind auch die Ausscheidungen, sodass es schliesslich zu einer weitgehenden Ausfüllung der Wirtszellen kommt. Dadurch wird die Schicht optisch nahezu undurchdringlich. In den meisten Fällen ist die Aussenkruste als ein deckendes Schild entwickelt und fehlt an der Basis (Plakodium nach Ruhland, 1900). An der Richtung der Hyphen erkennt man, dass es sich um Teile des vegetativen Myzels und nicht des Fruchtkörpers handelt. Wir haben also ein echtes Pseudostroma vor uns. Oft ragt es an den Seiten über den eigentlichen Fruchtkörper hinaus. Es wird vor den übrigen Teilen des Fruchtkörpers gebildet und durch deren Entwicklung vom Substrat abgehoben. Manchmal wird auch das Substrat von dunklen, nicht torulösen Hyphen dicht durchwachsen, die von der Medulla Corner's kommen und die Wirtszellen ähnlich mit Exkreten anfüllen wie die torulösen Hyphen des vegetativen Myzels.

Wo eine Bedeckung durch das Substrat nicht möglich ist, wachsen die Hyphen, die von der Medulla abzweigen, in ähnlicher Weise wie bei der Entwicklung der unregelmässig verteilten Gruppen von Pseudoparenchym geschildert wurde, weiter und bilden ein pseudoparenchymatisches Deckgeflecht, dessen verzweigte Hyphen überwiegend parallel zur Medulla verlaufen. Dies ist vor allem bei steinbewohnenden Arten der Fall. Ich werde auf die etwas problematischen Verhältnisse bei der Besprechung von *A. saxicola* zurückkomen.

Ascogone oder ascogene Hyphen, die sich mit Anilinblau-Milchsäure intensiver anfärben, konnten nicht nachgewiesen werden. Sie könnten bereits durch die Ascusbildung von Plasma entleert sein, doch ist wahrscheinlicher, dass der Sexualapparat überhaupt völlig rückgebildet wurde und es sich bei den Fruchtkörpern um typische Pseudothezien (Ascostromata nach Chadefaud 1960) handelt.

Spezielle Untersuchungen an einigen Grundtypen von *Arthopyrenia*-Fruchtkörpern

1. *Lejophloea punctiformis* (Pers.) S. Gray (= *Arthropyrenia punctiformis* Mass.)

Die plakodial entwickelte dunkle Aussenkruste der Fruchtkörper ist pseudostromatischer Natur, d. h., sie wird aus geschwärzten Substratteilen gebildet, die von torulösen Pilzhyphen aus dem vegetativen Myzel locker durchwachsen sind. Der Anteil der Hyphen und des Substrats kann dabei je nach dessen Beschaffenheit schwanken. Dementsprechend ist auch eine echte Mündung vorhanden. Wie für fast alle Arten der Gruppe ist auch hier ein Abbrechen der oberen Hälfte der Fruchtkörper bald nach der Sporenreife charakteristisch. Die Medulla Corner's wird von hyalinen, longitudinal etwas gestreckten, ellipsoidischen Zellen gebildet. Die Hyphen sind an den Quersepten meist eingeschnürt. Man kann dabei keinesfalls von einem Prosoplektenchym sprechen, der Charakter ist eher pseudoparenchymatisch. Von der Medulla gehen perlschnurartige, kurz verzweigte Hyphen in den Innenraum aus, die im Jugendstadium aneinander schliessen und ein Pseudoparenchym bilden, durch die Asci aber auseinandergedrängt werden. Ob Anastomosen möglich sind, konnte ich nicht feststellen, da zur Zeit der Sporenentwicklung, wenn also eine Bestimmung durchgeführt werden kann, diese Paraphysoiden vom Zentrum her grösstenteils verschleimt sind. Wo zwischen Aussenkruste und Medulla durch die Beschaffenheit des Substrats Lücken entstünden, gibt die Medulla auch nach aussen Hyphen ab, die ein hyalines oder hell gefärbtes Pseudoparenchym bilden, das als reduziertes Deckgeflecht anzusehen ist. Ascogone oder ascogene Hyphen konnten nicht nachgewiesen werden. Die Asci sind besonders im oberen Teil sehr dickwandig und von breit sackförmiger Gestalt. Die zweizelligen Sporen liegen darin unregelmässig mehrreihig.

Der Artname *punctiformis* kann wahrscheinlich aus nomenklatorischen Gründen nicht beibehalten werden und dürfte als nomen ambiguum, das nicht mehr aufgeklärt werden kann, zu verwerfen sein. Da es mir aber bis jetzt nicht gelungen ist, zu ermitteln, ob Typusmaterial davon existiert, oder solches für andere, eventuell an seine Stelle zu setzende Namen zu erhalten, möge eine Diskussion der nomenklatorischen Probleme einer späteren Revision vorbehalten bleiben.

2. **Lejophloea saxicola** (Mass.) H. Riedl, comb. n.
Syn.: *Arthopyrenia saxicola* Mass., Symmicta Lichenol. 107 (1855)

Abweichend von *L. punctiformis* ist bei dieser Art nur ein dem Fruchtkörper selbst angehörendes Deckgeflecht entwickelt. Es leitet sich von der pseudoparenchymatischen oder angedeutet prosoplektenchymatischen Medulla Corner's ab, da ja das Substrat — Kalkstein — kaum als Hauptanteil an einem Fruchtkörperstroma fungieren könnte. Die am Aufbau des Deckgeflechtes beteiligten Hyphen zweigen in einem sehr stumpfen Winkel von der Medulla ab und bilden der Richtung nach praktisch deren tangentiale Fortsetzung. Es handelt sich also um eine Trichocutis nach K. Lohwag (1940). Als solche werden Geflechte mit erst antiklinem, dann periklinem Hyphenverlauf bezeichnet. Sie hat bei unserer Art stets pseudoparenchymatischen Charakter. Ihre Zellen sind polyedrisch, entweder fast isodiametrisch oder häufiger etwas in der Richtung des Hyphenverlaufs gestreckt, mit dunkelbraunen Wänden. Dabei kommen oft Verzweigungen vor; die Zweige liegen aneinandergepresst. In der äussersten Wandschicht ist der Hyphenverlauf kaum geordnet orientiert, weil er von körnigen Substratbeimengungen bestimmt wird, die allerdings einen recht geringfügigen Anteil am Aufbau der Fruchtkörperwand haben. Ein deutlicher Mündungsporus ist nicht entwickelt.

3. **Lejophloea fallax** (Nyl.) H. Riedl, comb. n.
Syn.: *Verrucaria epidermidis* var. *fallax Nyl.*, Botan. Notiser 178 (1852),
Arthopyrenia fallax (Nyl.) Arnold, Verhandl. zool. bot. Ges. Wien 25; 505 (1873).

Die Entwicklung dieses Pilzes wurde kürzlich von Janex-Favre (1969) im Detail studiert. Die Ergebnisse unterstreichen die Deutungen, die mit rein anatomischen Methoden am adulten Fruchtkörper gewonnen wurden. Vom anatomischen Standpunkt aus lassen sich folgende kleine Ergänzungen vornehmen: Im dunkel gefärbten Deckschild sind die Substratzellen sehr dicht von Pilzhyphen durchwachsen, die vor allem gegen den deutlich erkennbaren Mündungsporus hin stärker gestreckte, schmälere Kammern besitzen, sodass ihre Struktur nahezu prosoplektenchymatisch wird. Basal ist eine gleichfalls prosoplektenchymatische Medulla recht wenig mächtig, aber doch deutlich erkennbar entwickelt, die nach innen ein hypothezienartiges Geflecht abgibt. Von hier gehen auch die im unteren Teil lockeren Paraphysoiden (oder Paraphysen?) aus, die sich nach oben zu sehr stark verzweigen und netzig anastomosieren. Dabei ist folgendes zu beachten: Die am weitesten aussen gelegengen Paraphysoiden (Pseudoparaphysen nach Janex-Favre) legen sich der Wand des Deckschildes an und verbinden sich durch Anastomosen in der Apikalregion mit den aus der Zentralhöhle kommenden. Um die Mündung legen sich alle Paraphyssoiden, die länger als die Höhe der Zentralhöhle sind, aneinander und bilden ein ± rudimentäres Prosoplektenchym, dessen Grenzen gegen die Hyphen des pseudostromatischen Deckschildes nicht deutlich erkennbar sind.

In einem Punkt kann ich mich allerdings den Auffassungen der französischen Autorin nicht anschliessen: Die von ihr vermuteten Beziehungen zu *Microthyrium* scheinen mit dem anatomischen Aufbau des Deckschildes schwer vereinbar; bekanntlich ist das „Thyriothezium", wie Fruchtkörper dieser Gruppe gelegentlich genannt werden, besonders durch den radikalen Hyphenverlauf im Plakodium charakterisiert. Wie Speer und Riedl (1970) an *Microthyrium disjunctum* Rehm zeigen konnten, haben auch die Asci und Paraphysen einen anderen Ort der Entstehung wie bei *Lejophloea*, doch steht nicht fest, wie weit sich die dort beschriebenen Verhältnisse verallgemeinern lassen. *Lejophloea* ist ein typisch dothideal gebauter Pilz, dessen intertheziale Hyphen im vorliegenden Fall zwar nicht oben und unten mit der Wand verbunden sind, wie dies Munk (1953) für echte Pseudothezien fordert, dafür aber die Eigenwand des von einem als stromatisches Plakodium ausgebildeten Deckschild überwölbten Fruchtkörpers erzeugen. Vermutlich ist das auch sonst gelegentlich der Fall.

4. *Arthopyrenia cerasi* (Schrader) Mass.

Die Deckschicht ist ein plakodial entwickeltes Pseudostroma, an dem Pilzhyphen nur relativ geringen Anteil haben. Die deutliche, prosoplektenchymatisch ausgebildete Medulla Corners verläuft als geschlossener Mantel innerhalb dieses Plakodiums und gibt nach aussen keine Geflechte, nach innen von der Basis her die fädigen, verzweigten Paraphysen und die Asci ab. Die Unterschiede gegenüber Lejophloea fallax beziehen sich somit im wesentlichen nur auf die auch für die Gattungscharakteristik herangezogenen Sporen und reichen keinesfalls zur Aufstellung einer eigenen Gattung Pseudosagedia, wie sie zuletzt von Oskner (1956) anerkannt wurde.

5. *Acrocordia alba* (Schrader) Bouly de Lesd.

Die Fruchtkörper dieser Art weichen völlig von den bisher beschriebenen ab. Auffallend ist vor allem die relativ mächtig entwickelte Medulla Corner's aus dünnen, langzelligen Hyphen, die eindeutig prosoplektenchymatisch gebaut ist. Von ihr gehen nach aussen gleichfalls sehr dünne, dunkel gefärbte Hyphen aus, die in die abgestorbenen Wirtszellen oberhalb, seitlich und oft auch unterhalb des Fruchtkörpers hineinwachsen, sodass eine sehr lockere Trichocutis im Wirtsgewebe gebildet wird. Keissler's (1938) Beschreibung ist in mehrfacher Hinsicht unrichtig. Die Fruchtkörper sind nicht halbiert.

Auch kann man nicht, wie es bei der nahe verwandten *A. conoidea* tut, zwischen einem Excipulum und einem Involukrellum unterscheiden, weil diese beiden Begriffe nirgends für derartige Ascophore einwandfrei definiert wurden und sie als Bezeichnungen bestimmter anatomisch genau definierter Geflechte demnach auch nicht eindeutig sind. Eine in der oben geschilderten Weise aufgebaute dunkle Aussenkruste ist bei *A. alba* bald ringsherum, bald mit einer dünneren Stelle an der Basis, bald auch nur in den oberen zwei Dritteln oder drei Vierteln der Fruchtkörper in völlig einheitlicher Weise entwickelt. Nirgends verläuft die Grenze gegen das ungefärbte Substrat unregelmässig, wie das bei den durch Infiltration von Melaninen geschwärzten pseudostromatischen Plakodien der Fall ist, sondern sie bleibt immer streng innerhalb der Oberfläche einer Kugel. Basal folgt nach innen eine mächtige hyaline Schicht, die sich nicht mit Anilinblau anfärbt und auch keine Zellwände erkennen lässt. Es handelt sich um eine körnige Masse, die offenbar als Folgeerscheinung des Verschleimens in der Jugend vorhandener hypothezialer Geflechte entstanden zu denken ist. Aus diesem „Polster“ gehen die Asci und die relativ steifen, fädigen, verzweigten, oben freien Paraphysen hervor, die nicht verschleimen. Die Asci selbst sind zylindrisch, auch apikal relativ dünnwandig, gestielt. Die Sporen liegen darin schräg einreihig. Ascogone oder ascogene Hyphen waren nicht erkennbar.

Als Vertreter von *Arthopyrenia* Mass. sect. *Arthopyrenia* untersuchte ich *A. persoonii* Mass., die keine prinzipiellen Unterschiede gegenüber *Lejophloea punctiformis* aufweist. Gleichfalls vollkommen übereinstimmend ist *Sporoschizon petrakianum* H. Riedl gebaut.

Es muss nochmals für die Mehrzahl der behandelten Flechtenpilze betont werden, dass der Bau der dunkel gefärbten Aussenkruste weitgehend vom Substrat abhängig ist und bei ein und derselben Art nicht völlig konstant sein muss. Als prinzipiellen Unterschied muss man aber den verschiedenen Ursprung der das Substrat durchwachsenden und verfärbenden Hyphen betrachten. Im Aufbau der hyalinen Anteile im Zentrum der Fruchtkörper sind die Verschiedenheiten fast ausschliesslich solche des Durchmessers und der Septierung der Hyphen, von denen sie abgebildet werden.

Systematische Folgerungen

Wie bereits früher dargelegt wurde (Riedl 1961), sind die beiden Gattungen *Lejophloea* S. Gray und *Arthopyrenia* Mass. als parallele Entwicklungslinien aufzufassen, die sich in der Septierung der Sporen unterscheiden. Falls die Fruchtkörper vom Substrakt bedeckt sind, bilden gemeinsam mit diesem vom vegetativen Myzel abstammende, häufig torulöse Hyphen eine pseudostromatische Hülle, die meist als Plakodium im Sinne von Ruhland (1900) ausgebildet ist. Fehlt diese Behüllung durch das Substrat, so wird von der Medulla Corner's her eine dichte Trichocutis entwickelt, in die gelegentlich kleinste Splitter der Unterlage eingeschlossen sein können. Dadurch erscheint der systematische Wert des Vorhandenseins oder Fehlens ektostromatischer Geflechte äusserst zweifelhaft. Nach der Ausbildung der Sporen, die in diesem Falle mit der Form der hyalinen Geflechte im Inneren der Fruchtkörper parallel geht, lassen sich bei *Arthopyrenia* zwei Sektionen unterscheiden:

Arthopyrenia Mass. sect. *Arthopyrenia:* Bau des Fruchtkörperzentrums wie bei *Lejophloea punctiformis* aus pseudoparenchymatischen Paraphysoiden, die bald verschleimen. Sporen beidendig abgerundet.

Arthopyrenia Mass. sect. *Polymeridium* Müll. Arg.: Bau wie bei *Lejophloea fallax* mit fädigen, verzweigten, bleibenden Paraphysoiden. Sporen beidendig oft stark verschmälert.

Demgegenüber ist *Lejophloea* als einheitlich zu betrachten, da die Unterschiede zwischen der Typussektion und Sektion *Mesopyrenia* Müll. Arg. nur in der Gestalt der Zellen der Paraphysoiden und in deren frühzeitigem Verschleimen bei jener bestehen, also kaum als Einteilungsprinzip ausreichen. In ähnlichem Sinn habe ich mich bereits früher (Riedl 1963) geäussert.

Von diesen beiden Gattungen verschieden ist die Gattung *Acrocordia* Mass. Folgende Differentialmerkmale lassen sich feststellen:

1. Die Fruchtkörper sind im Durchschnitt grösser.
2. Die Fruchtkörper entstehen bei den auf Borke wachsenden Arten im Substrat, in dessen Zellen eine von der Medulla Corner's ausgehende lockere Trichocutis aus dünnen, dunklen Hyphen gebildet wird. Es muss im Verlaufe einer vollständigen Revision noch festgestellt werden, ob dieses Merkmal tatsächlich durchgehend zu erkennen ist.
3. Medulla und Hypothezium sind sehr mächtig entwickelt.
4. Die verzweigten Paraphysen sind verhältnismässig steif und oben frei.
5. Die Asci sind schmal zylindrisch und enthalten acht schräg einreihig liegende Sporen. Ihre Wand ist apikal nur schwach verdickt.

Die von Luttrell (1955) als Unterschied zwischen Pseudosphaeriales und Pleosporales genannten Verschiedenheiten der Paraphysen oder ihrer funktionellen Äquivalente kommen innerhalb von *Arthopyrenia* und *Lejophloea* nebeneinander vor und sind somit für die Systematik höherer Kategorien nicht brauchbar (pseudoparenchymatischer Bau bei Pseudospaeriales, apikale oder Pseudoparaphysen bei Pleosporales).

B. *Arthopyrenia elachistotera* (Nyl.) H. Riedl

Die Untersuchungen von *Mycoporum elachistoterum* Nyl. führte zu folgenden Resultaten: die durch relativ flache Fruchtkörper ausgezeichnete Art weicht von anderen *Arthopyrenia*-Arten — aber keineswegs von allen — nur durch das Fehlen eines präformierten Mündungsporus ab. Wie schon mehrfach gezeigt werden konnte, ist aber gerade dieses Merkmal von sehr untergeordneter Bedeutung, weitgehend auch durch das Substrat und die Lage der Fruchtkörper darin bestimmt. Darauf eine eigene Gattung zu begründen halte ich für verfehlt, werde aber noch kurz auf diese Möglichkeit zurückkommen.

Der nomenklatorische Status ist somit eindeutig:

Arthopyrenia elachistotera (Nyl.) H. Riedl, comb. n.

Syn.: *Mycoporum elachistoterum* Nyl., Lich. Scand. 292 (1861).

Cyrtidium elachistoterum (Nyl.) Vain., Acta Soc. Fauna et Flora Fenn. 49, no. 2: 227 (1921).

Von einem vegetativen Lager ist nichts mehr oder nur wenig zu sehen. Es besteht aus verschieden gestalteten Hyphen, die das Substrat durchdringen, aber meist sehr locker angeordnet sind. Algen sind in geringer Zahl vorhanden. Soweit ich dies an dem alten Material, das mir zur Verfügung steht, beurteilen kann, sind sie ausschliesslich oder fast ausschliesslich zu Knäueln zusammengeballt, die aus palmelloiden Stadien hervorgegangen sind und scheinbar von einer Gallerthülle umschlossen sind. Diese Knäuel sind entweder einseitig oder allseitig in wechselnder Menge von dunkel gefärbten, torulösen Hyphen umgeben, denen ähnlich, die im pseudostromatischen Deckschild der Fruchtkörper beobachtet werden können. Es handelt sich um jene Gebilde, die Minks (1876) in einer seltsamen, mit völlig untauglichen Mitteln als Widerlegung von Schwendener's Lehre von der Doppelnatur der Flechten gedachten Arbeit als Gonangien bezeichnet und durchaus richtig beschrieben und abgebildet hat. Ähnliche Gebilde wurden später von verschiedenen Autoren beobachtet und richtig gedeutet, siehe etwa Bachmann (1931): Goniocysten; Geitler (1933) bildet sie dann unter der Bezeichnung „Halbflechte" ab, die bestenfalls für den gesamten Organismus gebraucht werden könnte, wenn man diesen Ausdruck nicht lieber fallen lässt oder im ursprünglichen Sinne Zukal's (1891) verwendet. Es scheint sich um einen von höher organisierten Formen verlassenen Weg der Lichenisierung zu handeln, doch ist eine sichere Klärung der Funktion meines Wissens bisher ausständig. Auffallend ist, dass bei dieser Art wie bei anderen ähnlich organisierten, die ich untersuchen konnte, die an Grösse den Fruchtkörpern fast ebenbürtigen Gebilde am häufigsten in deren Nachbarschaft auftraten. Es wird der Eindruck erweckt, dass es sich bei ihrer Bildung um einen der Stromabildung um das junge Carpozentrum analogen Prozess handelt und dass manchmal auch tatsächlich Fruchtkörper aus dem Pilzanteil entstehen können.

Der Bau der Fruchtkörper erinnert stark an den von *Lejophloea punctiformis*. Die Fruchtkörper sind sehr klein, oft nur 70—80 μ im Durchmesser, selten mehr als 100 μ, niedergedrückt, 30—40 μ hoch, im Substrat selbst entwickelt und von diesem unvollkommen behüllt. Vermutlich kommen aber Unterschiede vor, je nachdem, ob das deckende Substrat leichter abbröckelt oder erhalten bleibt. In den von mir beobachteten Fällen bestand die Deckschicht fast ausschliesslich aus torulösen Hyphen, doch dürfte in anderen Fällen auch ein Pseudostroma mit geringerem Anteil an Hyphen gebildet werden können, wie ich das für *Arthopyrenia naevia* (Vain.) H. Riedl (1963) beschrieben habe. Das hyaline Geflecht innerhalb bzw. unterhalb der Deckschicht und an der Basis der Fruchtkörper und die Paraphysoiden sind bis zur Unkenntlichkeit verquollen und zu einer die Asci umhüllenden Schleimmasse geworden. Um Details studieren zu können, müsste man jüngere Stadien zur Verfügung haben. Die Asci sind unregelmässig sackförmig, je nach der Lage der stets mehrreihigen Sporen länger und schmäler oder kürzer und breiter und stehen ± schräg nach innen zu gewandt. Ihre Länge überschreitet selten 20—25 μ, die Breite erreicht etwa 12 μ. Die Sporen sind länglich oder gegen das eine Ende zu breiter als gegen das andere und besitzen 1—3, an meinem Material am häufigsten 2 Querwände. Zur Zeit der Sporenreife bricht das Geflecht am Scheitel ähnlich wie bei *Arthonia* ein, mit der schon Minks (1891) seine Gattung *Cyrtidula* vergleicht. Will man diesem Merkmal, das von v. Arx und Müller (1954) sogar zur Aufstellung der Ordnung *Dothiorales* verwendet wurde, tatsächlich entgegen meiner Ansicht grössere Bedeutung beimessen, so wäre die Art zur Gattung *Cyrtidium* Vain. (1921) zu stellen. Einstweilen halte ich aber ihre Einreihung bei *Arthopyrenia* für die den verwandtschaftlichen Verhältnissen am ehesten entsprechende Lösung.

Summary

The fruiting body of the fungi concerned consists of a dark outer layer formed either by blackened host tissue with a few mostly torulous hyphae from the vegetative mycelium, or by dark hyphae arising from the medulla of Corner (1929) to form what is called a trichocutis by K. Lohwag (1940), of the prosenchymous or pseudoparenchymous medullary layer or Medulla of Corner, sometimes also a hypothecium and of the paraphyses or paraphysoids together with the asci in the centre. What looks like a parenchymous central tissue is formed by paraphysoids with short and thick, often nearly globular cells, while in other cases the paraphysoids (or true paraphyses?) are filiform. The fruiting bodies of *Lejophloea punctiformis* (Pers.) S. Gray, *L. saxicola*

(Mass.) H. Riedl, comb. n., *L. fallax* (Nyl.) H. Riedl, comb. n., *Arthopyrenia cerasi* (Schrad.) Mass. and *Acrocordia alba* (Schrad.) Bouly de Lesd. are described as examples. *Arthopyrenia* has two well defined sections. The genus *Acrocordia* Mass. is newly defined with the help of anatomical characteristics.

Mycoporum elachistoterum Nyl. is a typical *Arthopyrenia* without an ostiolum the covering layer of the wall breaking up at maturity. Its right name is *Arthopyrenia elachistotera* (Nyl.) H. Riedl, comb. n. It is described including anatomical features and vegetative pecularities, and some older opinions referring to its taxonomical position are discussed.

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Studies on Elsinoë and Sphaceloma diseases of plants in Maharasthtra (India)-II

M. J. Narasimhan, D. D. Wani, and M. J. Thirumalachar

(Pimpri, Poona-18, India)

In an earlier paper (Part-I in Indian Phytopathology 1968) an account of the *Elsinoe* and *Sphaceloma* diseases of some euphorbiaceous plants collected in Maharashtra was presented. Further collections were made on different hosts, some of which have been presented here. Cultural studies have been carried out in case of *Sphaceloma flacourtiae* and *S. ichnocarpi*, and the type cultures have been deposited in ATCC, Rockville, Maryland, CMI, Kew, England, Centraalbureau voor Schimmelcultures, and IARI, New Delhi. The types of the new species (herbarium material) have been deposited in the Bureau of Plant Industry, Beltsville, Md., Instituto do Biologico Sao Paulo, Brazil, Herb. CMI, Kew, England, and Herb. Crypt. Ind. Orient., New Delhi.

The authors wish to acknowledge their indebtedness to Dr. Anna E. Jenkins, and Dr. A. A. Bitancourt for several valuable suggestions and help in writing the paper.

Scab disease of *Cryptolepis buchanani* R. & S.

Cryptolepis buchanani R. & S., a large twining shrub is distributed in Deccan. Scab of this suscept was discovered in several localities from Maharashtra State. It affects leaves, and fruits, sometimes severely. Severe infection due to the fungus results in the early defoliation and sometimes premature dropping of the fruits. A spotted anthracnose of this new host genus has not been reported previously. The pathogen *Sphacelomma*, of the disease is presented as new species. The description follows.

Sphaceloma cryptolepidis Thirum. & Nasarimhan sp. nov.

Maculae anthracnosae in foliis, culmis et fructibus in foliis quidem infectionis maculae plures, amphigenae, dispersae, calcareoalbae, in fructibus et surculis maculae plures, efformantes crustam griseoalbam. Maculae singulae circularis vel polygonales, paulum elevatae, 0.5—2 mm diam. Acervuli alti brunnei, oblongi vel elliptici, intraepidermales, erumpentes, 10—22 μ alti et 13—38 μ lati. Conidiophori pallide brunnei, acervuli in textibus vallribus erecti, une septo transverso ornati. 6—9 μ longi, 4.5—6 μ lati. Conidia non visa.

Habit: On leaves and fruits of *Cryptolepis buchanani* R. & S. Pimpri, February 2, 1958 (Type) -eg. M. J. Thirumalachar. Vitthalwadi, December 20, 1959; Katraj, January 10, 1962 Leg. D. D. Wani.

Anthracnose spots on leaves, stems and fruits; on leaves the spots are numerous, epiphyllous in the earlier stages later appearing amphigenous, scattered or more often grouped along the leaf margin, forming greyish-white crusts. Individual spots are circular to polygonal, slightly raised with 'Zanzibar brown' margin and 'Peach blossom' centre, measuring 0.5—2 mm. in diameter. Acervuli macroscopically visible as dark raised blunt bodies, numerous, deep-brown, oblong to elliptic, intraepidermal, erumpent, 10—22 μ high and 13—38 μ broad. Conidiosphores produced from basal hyphae, light brown, crowded in groups, erect with one transverse septum, 6—9 μ long and 4.5—6 μ broad. Conidia not seen.

* Colours as per Dictionary of colours by Mearz & Paul.

Scab disease of *Flacourtia* (*Flacourtia idica* (Burm. f.) Merr.

Flacourtia indica (Burm. f.) Merr., widely distributed in Maharashtra State, is a thorny shrub. The scab disease was first discovered severely attacking leaves and tender shoots of the suscept in localities near Poona. A subsequent detailed survey revealed its presence in various other places from Maharashtra State. The pathogen in association with the leaf rust *Kuehneola uguressae* (Petch.) Thirum. causes considerable damage to the host. The disease produces small chalky-white spots with purplish margin on the host parts. The pathogen of the newly discovered disease, is described as follows.

Spahceloma flacourtiae Thirum. & Narasimhan sp. nov.

Infectionis maculae in foliis plures, dispersae, ut plurimum aggregatae ad efformandes maculas ampliores fuscas, vulgo epiphyllae; maculae minutae, polygonales vel irregulariter angulares, 0.5—3 mm. diam., margin 'Corsair blue' colore, centro calcaveoalbo. Acervuli apparentes macroscopice ut puncta fusca accum brunnea, plures, circulares vel elliptici, intraepidermales, erumpentes, 18—37 μ alti, 37—78 μ lati. Conidiophori producti ex stromatae basali pallide luteo, erecti compactae aggregatti, non septati, 4.5—6 μ longi, 3—4.5 μ lait producentes conidia spherica unicellularia, hyalina. Conidia 1.5—3 μ.

Habit. — On leaves and tender shoots of *Flacourtia indica* (Burm. f.) Merr. Pimpri Jan. 1, 1959 (type) leg. M. J. Thirumalachar. Law College hill Jan. 12, 1960, Leg. D. D. Wani on leaves of *Flacourtia ramontchi* D. & G., Khandala Jan. 14, 1961 Leg. D. D. Wani.

Infection spots on leaves and young shoots. On leaves infection spots are numerous, small, scattered all over lamina or grouped to form larger patches, epiphyllous at first but later become amphigenous. On young shoots they are small, elongated, closely grouped to form crusts by coalescence. Individual spots polygonal to irregularly angular with 'Corsair blue' raised margin and 'chalky-white' slightly depressed centre, measuring 18—37 μ high and 37—78 μ broad.Conidiophores prodeced from the hyphae of the basal stroma, erect, grouped to form crowded mass, non-septate, 4.5—6 μ long and 3—4.5 μ broad; bearing conidia at the apices. Conidia unicellular, oval to oblong, hyaline, 1.5—3 μ.

Pathogen when isolated in pure culture on potato dextrose agar medium, shows a characteristic heaped up, crustose type of growth, with deep fawn coloured margin and reddishbrown colour on the reverse side, bearing ashy white mycelium on the top. The mycelium is profusely branched and produces large number of chalmydospores and few fruiting bodies of *Sphaceloma* stage. ATCC. 14654.

Scab disease of *Gymnosporia*

Gymnosporia montana Benth., is commonly found in deciduous forests of South India. Scab of the suscept was first noticed in October on plants from Pimpro. Subsequently it was observed in various other localities, indicating its probable widespread distribution in Maharashtra State. Numerous greyish-white spots was the noticable symptoms of the pathogen. This disease on a new host genus for *E'sinoe* or *Sphaceloma* has not been reported hertofore. It is described as a new species of *Sphaceloma* as follows.

Spaecloma gymnosporiae Thirum. & Narasimhan sp. nov.

Infectionis maculae foliicolae, dispersae, vulgo, aggregatae ad margines foliorum, amphigenae, coalescentes, inter se ad foliorum, margines. Singulae maculae circulares vel ovales, margine paulum elevato, 'Catawba' colore, et centro 'Chantilly pink', 0.5—2 mm diam. Acervuli pallide brunnei, circulares vel elliptici, intra-epidermales vel subcuticulares cum erumpentes 15—39 μ alti et 30—47 μ lati, stromat basali hyalino producente conidiophores, verticales, pallide brunneos, compacte aggregatis apiflibus festigatis 6—9 μ×4—3.5 μ. Conidia non observata.

Habbit. — On leaves of *Gymnosporia montana* Benth. Pimpri, January 19, 1959; (Zype), Leg. M. J. Thirumalachar. Tamaswadi, October 30, 1961, Katraj, November 11, 1962 Leg. D. D. Wani.

Infection spots are foliicolous, scattered, chiefly grouped along leaf margins, amphigenous, coalescing with one another to form larger patches. Incividual spots are circular to oval, slightly elevated with 'Catawba brown' margin and 'Chantilly pink' centre, measuring 0.5—2 mm. in diameter. Acervuli macroscopically visible in individual spots as also in the areas of coalescence, numerous, circular to elliptic, intraepidermal, seeming subcuticular after becoming erumpent, 15—39 μ high and 30—47 μ broad with basal hyaline stroma giving rise to compactly grouped light-brown conidiophores. Conidiophores non-septate with tapering apices, 6—9 μ long and 3—4.5 μ broad. Conidia not noticed.

Scab disease of *Ichnocarpus frutescens* Ait.

Ichnocarpus frutescens Ait. is a woody climber, distributed in evergreen forests of Maharashtra State. The bark yields fibre of commercial importance. Anthracnose spotting of leaves was first discoverd from neighbourhood of Poona. A noticable leaf symptom is, small greyish spots. This spotted anthracnose, the first to have been recorded on *Ichnocarpus*, is described as new species of *Sphaceloma* as follows.

Spaceloma ichnocarpi Thirum. & Narasimhan sp. nov.

Infectionis maculae in foliis, petiolii, apparantes ut crusta griseo-alba secundum nervum medium et nervos laterales, paulum elevatae, prodecentes depressionem in pagina inferiore foliorum, circulares vel polygonales, 0.5—1 mm. diam. Acerculi plures, fuscae brunnei, elongati, intra-epidermales, erumpentes, 15—31 μ alti, 30—60 μ lati. Conidiophori evoluti ex stormatae pallide luteo, erecti, non septati, aggregati in textibus vallaribus, apice conico, 4.5—6 μ longi, 3—4.5 μ lati. Conidia non visa.

Habit. — On leaves and petioles of *Ichnocarpus frutescens* Ait., Pimpri (Nr. Poona), November 17, 1958 (Type) Leg. M. J. Thirumalachar. Law College hill, January 10, 1960, Pimpri, December 24, 1962 Leg. D. D. Wani.

Infection on leaves and petioles appearing as greyish-white crusts along midrib and lateral veins. Individual spots slightly raised,

Infection on leaves and petioles appearing as greyish-white crusts along midrib and lateral veins. Individual spots slightly raised, leaving depression on the lower leaf surface, circular to polygonal, greyish-white in the centre with dark brown margin, intra-epidermal subcuticular when erumpent, elongate to elliptic, 15—31 μ high and 30—60 μ broad. Conidiophores develop from basal stroma, erect, greyish-white in the centre with dark brown margin, intra-epiderma subcuticular when erumpent, elongate to elliptic, 15—31 μ high and

30—60 μ broad. Conidiophores develop from basal stroma, erect, non-septate, grouped in palisade, conical at apex, 4.5—6 μ long and 3—4.5 μ broad. Conidia not seen.

The pathogen has been isolated in pure culture on potato dextrose agar. Well grown culture of the organism is fluffy, spreading with radiating furrows. It is 'Heliotrope grey' at margin, 'blood red' on the reverse side and produces ashy-white aerial mycelium. Microconidia were not noticed, however chains of chlamydospores were quite common. ATCC. 14655.

Explanation of plate VI.

Fig. 1. Leaf of *Cryptolepis buchanani* R & S (Natural size). — Fig. 2. Drawing of acervulus of *Sphaceloma Cryptolepidis* × 1000. — Fig. 3. Spotted portion of leaf of *Flacourtia indica* × 20. — Fig. 4. Artificial culture of *S. flacourtiae* ×2. — Fig. 5. Infected leaf of *Ichnocarpus frutescens* — Natural size. — Fig. 6. Two month old culture of *Sphaceloma ichnocarpii* Natural size.

Studies on Elsinoë and Sphaceloma diseases of plants in Maharashtra (India) — III

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In the previous paper (Sydowia 1968 in press), the authors gave accounts of several new or unrecorded species of *Sphaceloma* from Maharashtra State. Studies on further collections made are presented in this paper. Type cultures of *S. ixorae* and *Elsinoë zizyphi* have been deposited in ATCC, Rockville, Maryland, Centraalbureau Schimmelcultures Baarn, CMI, Kew, England, and IARI, New Delhi. The herbarium types have been deposited in Herb. Crypt. Ind. Orient, New Delhi, Mycological Collections, Bureau of Plant Industry, Beltsville, Maryland, Instituto Biologico, Sao Paulo, Brazil and Herb. C. M. I., Kew, England.

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1) Spotted anthracnose disease of *Ixora* species. (Fig. 1—3).

Ixora arborea Roxb. ex. Sm. occurs in deciduous forests and hilly tracts of Maharashtra State. *Ixora coccinea* L. has similar habit to the above species but has got reddish flowers.

Species of *Sphaceloma* causing anthracnose spotting of leaves and tender shoots of both the host species was collected first from Mahabaleshwar and subsequently from various other localities from Maharashtra State. Detailed studies of the pathogen have indicated that the species is undescribed. The description of the pathogen is given below.

Sphaceloma ixorae Thirum. and Narasimhan. sp. nov.

Foliorum maculae parvae, plures, griseo-albae, dispersae, circulares vel irregulariter angulares, laxae vel aggregatae ad efformadas maculas largiores, vulgo epiphyllae, saepe producentes in pagina inferiore aream fuscam conspicuam, paulum elevatae, circulares vel ovatae, 0.5—2 mm. diam. Acervuli macroscopice apparent in medio macularum singularum ut fusca accum puncta elevata, intraepidermales, erumpentes, 14—28 μ alti, 21—52 μ lati, stromatae hyalino basali producente conidiophoros erectos compacte aggregatos. Conidiophori non septati, fusce rubrobrunnei, 3—4.5 μ longi 1.5—3 mm lati. Conidia non visa.

In follis *Ixorae arboreae* Roxb. ex. Sm. Mahabaleshwar October 19, 1958 (Typus) Leg. M. J. Thirumalachar. In foliis *I. coccineae* L. Koyana valley February 17, 1959, Leg. D. D. Wani, Lonavala February 10, 1962, Leg. D. D. Wani. B. P. I. No. 91563 and 91565 S. P. I. B. No. 10120 and 10122.

Leaf spots small, numerous, greyish-white, scattered all over the lamina, circular to irregularly angular, sparse or aggregated to form patches, chiefly epiphyllous, often showing on the back side as conspicuous dark area. Individual spots slightly raised circular to oval, with 'Iris mauve' centre and dark brown margin, 0.5—2 mm. in diameter. Acervuli visible in the centre of the individual spots as dark raised pin heads, microscopically they are intraepidermal, erumpent, 14—28 μ high and 21—52 μ broad, with hyaline basal stroma giving rise to erect crowded conidiophores. Conidiophores, non-septate, dark reddish-brown. 3—4.5 μ long and 1.5—3 μ broad. Conidia not seen. The organism has been isolated in pure culture from diseased host tissue. Well grown culture of the organism is of raised crustose type, 'Fawn coloured' from above and deep red from the reverse side. The mycelium is branched, producing mumerous, hyaline, oval or spherical microconidia. Occurence of chlamydospores in old cultures is quite frequent. A. T. C. C. Cul. No. 14653.

2) Anthracnose disease of *Balanites roxburghii* Planch.

Balanites roxburghii Planch., is widely distributed in Deccan (India) and produces yellow oil of medicinal importance.

Anthracnose disease inciting severe spotting of the leaves was collected from Law College Hills near Poona (India). The disease incites slight curling of the leaves. Laboratory studies have revealed that the diseases is incited by an undescribed species of *Sphaceloma* for which the name *Sphaceloma balanitidis* has been proposed.

Sphaceloma balanitidis Thirum. and Narasimhan Sp. nov. (**Fig.** 4 & 5).

Infectionis maculae in foliis et surculis, calcareoalbae, parvae, plures, dispersae, laxae vel aggregatae, amphigenae, secundum nervos; maculae singulae distinctae, circulares vel. oblongae, Zephyr pink colore, centro depresso, 0.5—1 mm. diam. Acervuli macroscopice distincti in maculis singulis, pallide brunnei, elliptici vel oblongi, intraepidermale, 14—27 μ alti, 25—38 μ lati. Conidiophori erecti, compacte aggregati, cylindrici, non-septate pallide brunnei, hebetes ad apices, 3—6 μ × 1.5—3 μ. Conidia non visa.

In foliis et surculis *Balanitidis roxburghii* Planch. August 13th 1957 (Typus), Leg. M. J. Thirumalachar, Poona 14-10-1958; Parvati Hill 25-12-1960; Katraj 27-11-1962. Leg. D. D. Wani.

Numerous, chalky-white leaf spots appear as specks. The spots are small, often restricted along veins and veinlets, epiphyllous at first but later become amphigenous, scattered or aggregated to form crusts by coalescing with each other. Individual spots are distinct, circular to oblong, chalky-white to Zephyr-pink, with depressed centre, measuring 0.5—1 mm. in diameter. Acervuli macrospopically visible in the centre of the individual spots or in areas of aggregation, numerous, dark-brown, elliptic to oblong, intraepidermal, 14—27 μ high and 25—38 μ broad, producing numerous conidiophores from the basal stroma. Conidiophores pale yellow, compactly grouped, cylindrical, non-septate with blunt apices, and measuring 3—6 μ × 1.5—3 μ. Conidia not seen. B. P. I. No. 91548 S. P. I. B. 10105.

3) Scab disease of *Zizyphus*.

Zizyphus rotundifolia (Burm.) W. & A. is common throughout the state of Maharashtra and yields acid flavoured fruits which are eaten on large scale. Scab disease of the fruits, shoots and the leaves was observed and collected in Poona. Subsequently the disease was collected from number of other localities from the state. Detailed examination of the disease revealed that the causal organism is a species of *Elsinoë* for which there is no record in literature. The name *Elsinoë zizyphi* has been proposed. The organism under study in association with *Cladosporium zizyphi* Karst. incites severe damage to the host resulting in early defoliation of its leaves. On fruits *Sphaceloma* stages form hard scabby crusts reducing their market value.

Elsinoë zizyphi Thirum. and Narasimhan Sp. nov. (Fig. 6 to 8).

Infectionis maculae in foliis, caulibus et fructibus. In foliis quidem plures, vulgo ad nervos et nervulos limitatae, circulares vel ovales 0.1 to 1 mm. diam. Maculae singulae ornatae margine elevato nigro-brunneo et centro griseo-roseo depresso, primo epiphyllae, tum acetate maturantae epidermis inferior et mesophyllum decidunt, relicta epidermide superiore tenuissima in qua ascomata fungi notantur. In surculis et fructibus maculae sunt parvae, plures, paulum elevatae, arcte congestae ad efformandas crustas. Ascomata intraepidermalia, erumpentia, insidentia parenchymati vallari folii, constantiae pseudoparenchymate pallide luteo operto seris fusce brunnea cellularum epithecalium. 60—90 × 23—42 μ continente plures ascos irregulariter descributos. Asci globosi, hyalini, ascosporis 4—8 pallide luteis 2—4 cellularibus 6—15 × 3—6 μ, muriformis, utrinque rotandatae. Acervuli status condialis fusce brunnei, intraepidermales, erumpentes, ovales vel elliptici, 18—33 μ lati et 21—28 μ alti ornati stromatae basali pseudoparenchymatico quod conidiophora producit. Conidiophori acte aggregata pyriformia, 4.5—11 μ alti, et 3—6 μ lati, ex quibus producente conidia unicellularia, hyalina, ovalia vel sphaerica, 1.5—3 × 1.5—2.5 μ.

In foliis et surculis et fructibus *Zizyphi rotundifoliae* (Burm.) W. & A. Poona 15th October, 1958 (Typus) leg. M. J. Thirumalachar. — In foliis et surculis et fructibus *Zizphi jujuba* Lam. Ganeshkhind January 10, 1959, Katraj November 30, 1959. Parola November 12, 1960. Tamsawadi December 25, 1962 Leg. D. D. Wani. B. P. I. No. 91584 and S. P. I. B. No. 15141. *Zizyphus vulgaris*, Ganeshkhind (Poona) Dec. 18, 1959. Leg. D. D. Wani, B. I. P. 91582, and S. P. I. B. 10139.

Infections spots on leaves, tender shoots and fruits; on leaves the spots are numerous, generally restricted along veins and veinlets, circular to oval, 0.1 to 1 mm. in diameter with raised blackish-brown margin and greyish-pink depressed centre; epiphyllous at first, but later as the spots mature, the lower epidermis and mesophyll peal off leaving thin membranous upper epidermis on which are seen ascomata of the fungus. On tender shoots and fruits the infections spots are very small, numeros, closely grouped, forming crusts. Ascomata intraepidermal to subepidermal occurring on the top of loose palisade parenchyma and is made of pale yellow pseudoparenchyma covered with dark-brown epithecial cells, 60—90 μ × 23—42 μ, containing number of globose asci. Ascospores, hyaline, 2 to 4 celled, muriform, broader at one end and blunt and rounded on both sides 6—15 μ long and 3—6 μ broad. Acervuli of the conidial stage intraepidermal, erumpent, ovate to elliptic, 18—33 μ broad and 21—48 μ high with basal stroma giving rise to conidiophores. Conidiophores pear shaped, unicellular, pale yellow, 4.5 to 11 μ long and 3 to 6 μ broad, producing spherical to oval, unicellular conidia, measuring 1.5 to 3 μ × 1.5 to 2.5 μ.

The pathogen was isolated in pure cultre on potato dextrose agar medium. Well-grown culture os the organism showed raised cerebriform type of growth. It is salmon red in colour on reserve side and brownish-red on the upper side.

4) Anthracnose disease of cultivated roses.

Several varieties of rose with flowers of different shades and sizes are cultivated in gardens. Essential oil is often obtained by distillation of flowers and is used in perfumory.

An anthracnose disease of roses is very common and severe in South India, specially on imported rose varieties by means of which the disease might have got introduced into this country. The disease generally appears soon after the outbreak of rains and become epiphytotic by about November. Infection spots occur on leaves and stems causing numerous lesions, resulting in their weakening and poor flower bearing. The fungus is being reported for the first time from India and is identical to *Elsinoë rosarum* Jenkins and Bitance. (1) described by the authors on the same host. However only the conidial stage *Sphaceloma rosarum* (Pass.) Jenkins (2) has been observed.

The fungus was isolated in pure cultree oi potato dextrose agar. It produce an aised cerebriform type of growth. Colonies appear 'Fawn' to red coloured from above and 'Salmon' red' on reverse side. The mycelium is branched septate and produces large number of chlamydospores. *Sphaceloma* stage or microconidia were not seen. A. T. C. No. 15031.

On leaves and stems of *Rosa* sp. Mahabaleshver February 1959, Poona December 10, 1962. Leg. D. D. Wani.

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Explanation of Plates VII—VIII

Fig. 1: Leaf of *Ixora arborea* showing leaf spotting natural size. — Fig. 2: Camera lucida drawing of the acervulus × 800. — Fig. 3: Growth in artificial culture. Natural size. — Fig. 4: Leaf of *Balanitis roxburghii* showing infection × natural size. — Fig. 5: Camera lucida drawing of acervulus × 800. Fig. 6: Leaf of *Zizyphus rotundifolia* showing numerous lesions × 2. — Fig. 7: Camera lucida drawing of ascomata × 800. — Fig. 8: Growth of the pathogin in artificial culture. Natural size. — Fig. 9: Infected leaf of *Rosa* sp. natural size. — Fig. 10: Growth in artificial culture. Natural size.

Studies on Elsinoë and Sphaceloma diseases of Plants in Maharashtra (India)-IV

By D. D. Wani & M. J. Thirumalachar

(Hindustan Antibiotics Research Centre, Pimpri, Poona. India).

Several tropical members of the Anacardiaceae are of great economic importance since they yield valuable fruits and other commercial products. In India, particularly in Maharashtra, the following trees are widely grown either in plantations or conserved in the forest areas; *Mangifera indica* L. or the mango tree, *Anacardium occidentale* L. or the cashew nut, *Semecarpus anacardium* L. or the marking nut, *Spondias mangifera* Wild, etc. The scab and spot anthracnose diseases of the plants are of considerable economic importance since they may incite early defoliation, scabbing of the fruits or uneven expansion of the maturing fruits and nuts. *Elsinoë mangiferae* Bitanc. & Jenkins has already been reported by Bitancourt & Jenkins (1943) from Brazil, and this disease is prevalent in epiphytotic condition in restricted areas in India. *Sphaceloma spondiadis* Bitanc. & Jenkins was first recorded from Brazil on *Spondias purpurea* L. (Bitanc. & Jenkins 1942) and this was later recorded in India by Thirumalachar (1946) on *S. mangifera*, the fruits of which are used for pickles in India. The *Sphaceloma* species on *Anacardium occidentale* and *Semecarpus anacardium* have been added up in the present studies, both of them being new to science. Cultural studies have been made in case of *Sphaceloma* on *A. occidentale* and *S. anacardium* and detailed accounts of the nutritional requirements, etc. of several *Sphaceloma* species including these ones are being published separately. The type cultures have been deposited in ATCC, Rockville, Maryland, CMI, Kew, England, Centraalbureau voor Schimmelcultures, Baarn and IARI, New Delhi. The herbarium types have been deposited in Herb. Crypt. Ind. Orient., New Delhi, Mycological Collections, Bureau of Plant Industry, Beltsville, Maryland, and Herb. CMI, Kew, England.

The authors wish to record their gratitude to Dr. Anna Jenkins and Dr. A. A. Bitancourt for the benefit of valuable suggestions and advice in preparing this paper.

(1) Spotted anthracnose disease of cashew-nut.

Anacardium occidentale L. popularly known as cashew is a native of tropical America. In India, it is cultivated as well as naturalized in coastal regions of Maharashtra State. It is one of the most important export crop of India. Scab disease of cashew was discovered and collected from many localities from State of Maharashtra. It affects leaves, young shoots and fruits. Severe infection may cause premature defoliation, checking normal expansion of peduncles and development of fruits. The species under study differs from *S. semecarpi* Wani and Thirum. on *Semecarpus anacardium* L. and *E. mangiferae* Bitanc. and Jenkins on *Mangifera indica* L. and *S. spondiadis* Bitanc. & Jenkins on *Spondias purpurea* L. both in its type of symptoms produced, and measurement of fruiting bodies. The description of the pathogen *Sphaceloma* as a new species follows.

Sphaceloma anacardii Wani and Thirum. sp. nov.

Maculae anthracnose in foliis, surculis teneribus et pedunculis carnosis; in foliis infectionis maculae plures, griseo-albae, vulgo epiphyllae, producentes, aream fuscam in pagina inferiore, dispersae. Infectio in serculis et pedunculis griseo-alba crustosa. Maculae singulae parvae paulum depressae, polygonales, vel irregulariter angulares, 0.5 to 2 mm. diam. Acervuli plures, circulares vel oblongi, fusce rubro-brunnei, intra-epidermales, 19—31 μ alti, 26—67 μ lati. Conidiophori evoluti ex stromate basali hyalino, erecti, septati, constricti ad parietes transversales, compacte aggregati, apice rotundato 6—12 μ longi et 3—6 μ lati. Conidia non visa.

In foliis, surculis et pedunculis *Anacardii occientalis* L. Malavali September 18, 1958 (Typus). Leg. D. D. W a n i; Lonavala November 1, 1959, Khandala January 14, 1962. Leg. D. D. W a n i.

Anthracnose spots on leaves, tender shoots and fleshy peduncles; on leaves the infection spots are numerous greyish-white specks, chiefly epiphyllous leaving dark area on the lower leaf surface, scattered all over the lamina, more often aggregated near lateral veins; showing coalescence with one another. Infection spots on shoots and peduncles greyish-white, elongated, closer showing more tendency fo coalescence and forming scabby lesions. Individual spots small, slightly depressed, polygonal to irregularly angular, 0.5 to 2 mm. in diameter; acervuli numerous, dark reddish-brown, circular to oblong, intraepidermal, appearing subcuticular when erumpent, 19 to 31μ high and 26 to 67 μ broad. Conidiophores erect, two to three septate with slight constriction at cross walls, crowded in heaped up masses, with rounded apices, 6 to 12 μ long and 3 to 6 μ broad. Conidia not seen.

The fungus has been isolated in pure culture on potato dextrose agar medium from diseased host tissues. Well grown culture is of raised convolute type and produces cottony white aerial mycelium. It has 'Killarny green' margin and 'Fairly green' colour on the reverse side. Mycelium is branched and septate. Production of microconidia has not been noted but in old cultures typical *Sphaceloma* stage is of common occurrence.

*) Colours as per 'Dictionary of colours' by Maerz & Paul.

(2) Anthracnoses disease of mango.

In India, regarded as home of mango, a large number of varieties grown in different parts of the country. In Maharashtra State alone, the culture comprises about one lakh (100.000) acres. Varieties grown in this state are classified by B u r n s and P r a y a g in three groups; long fruited, round fruited and indefinite shaped. The most popular commercial varieties are 'Alfonso' and 'Pairi'.

In surveying for mango scab in Maharashtra State, it was discovered that the disease is wide-spread in the state. Commercial varieties, often affected are 'Alfonso'. 'Neelam', 'Pairi' and 'Rajapuri'. Through its attack on tender shoots, fruits and leaves, the scab causes appreciable damage. Associated with the leaf scab damage is caused by *Cercospora mangiferae* Koord. and *Pseudomonas mangiferae* Patel & Moniz. This is the first report of mango scab from India. The disease has been known for some time in tropical America. Only *Sphaceloma* stage of the pathogen of mango scab was observed on the representative specimes collected in Maharashtra State.
S p h a c e l o m a   m a n g i f e r a e Bitanc. & Jenkins, the description of which follows:

On leaves the spots are small, round to oval, slightly elevated, greyish-pink, 0.5—2 mm in diam. On young shoots the spots are small, closely grouped to form larger patches of crusts. Individual spots circular to oval, isolated or more often concentrated along midrib and lateral veinlets, 1—2 mm. in diam. Acervuli macroscopically visible in the centre of indvidual spots or in areas of aggregation in the form of dark raised pin heads, intraepidermal, in immature stage but later appear subcuticular due to erumpence, dark-reddish-brown, elliptic to lenicular, measuring 15—30 μ in hight and 23—52 μ in breadth. Conidiophores produced from basal stroma erect, crowded in heaped up form, producing conidia at apices, 4.5—9 $\mu \times$ 3—4.5 μ Conidia small, hyaline, spherical to elliptic, 1.5—3 $\mu \times 3 \mu$. Ascigerous stage not seen.

Habit — On leaves, shoots and fruits of *Mangifera indica* L. College of Agriculture, Poona, December 1960. Ratnagiri January 1961, Nandgaon Febuary 10, 1962. Leg. D. D. W a n i.

(3) Scab disease of *Semecarpus anacardium* (Marking nut).

Semecarpus anacardium commonly known as marking nut is distributed in dry forests of Maharashtra State. The moderate sized tree bears ovate-oblong leaves whith rounded apices. The drupaceous fruits are seated on fleshy receptacles. The numerous uses of the fruit indicate the high economic importance of this plant. Juice of the pericarp is used in marking clothes. An acrid juice, obtained from the pericarp yields a high percentage of an oil that blackens upon exponsure to air. This is used in coating floors and rafters. A kernel oil, remarkably sweet, edible and wholesome, it used in pharmaceutical preparations.

The scab disease was first noticed in January, on plants growing in Poona. Subsequently it was observed in various other localities, indicating its probable widespread distribution in Maharashtra State. Leaves, stems and fruit are affected. Severely attacked leaves become malformed and distorted. The pathogen is described as a new species of *Sphaceloma:*

Sphaceloma semecarpi Wani and Thirum. Sp. nov.

Infecto in foliis apparens ut crustae griseo-albae secundum nervum medium et nervos laterales, crustosa apparentia acervationis, paulum elevata, producens depressionem in pagina inferiore foliorum. In surculis teneribus infectio et in fructibus griseo-alba crustosa. Acervuli plures, dispersi, intra-epidermales, erumpentes, 10—24 μ alti, 18—39 μ lati, cellulis basalibus stromatis compacte aggregatis, conidiophoris clavato-cylindricis ordinatis in textibus vallaribus, 4—9 μ long, 3—4.5 μ lati. Conidia non visa.

In foliis et surculis teneribus et fructibus *Semecarpi anacardii* L. Law College Hill, Poona. Die Januarii 1 anni 1959 (Typus). Leg. D. D. Wani. Pimpri 22-11-1960. Khandala 10-1-1961. Satpuras 26-12-1962. Leg. D. D. Wani.

Infection spots on leaves appearing as greyish-white crusts, often occurring along midrib and lateral veins or in between lateral veins. Along midrib the spots are crustose with heaped up appearance, slightly raised leaving depression on the back side. In beween lateral veins the spots are sparse to aggregate mostly occurring along leaf margin. Infection on tender shoots and fruits, greyish-white crustose. Individual spots small, raised, whith greyish-white centre and 'Beryl blue' margin, 0.5 to 5 mm. in diameter. Acervuli numerous, epiphyllous, reddish-brown, intra-epidermal, scattered, erumpent, 10—24 μ high and 18—39 μ broad, basal cells of the stroma compactly grouped, conidiophores clavate-cylindrical, arranged in palisade layer, 4—9 μ $\times$ 3—4.5 μ. Conidia not seen.

The fungus was isolated in pure culture from diseased host tissue. Colonies after 15 days incubation period are raised, crustose, fawn coloured from above and salmon red on the reverse side. In younger cultures numerous hyaline micro-conidia are seen while in older cultures large number of chlamydospores and typical *Sphaceloma* stage are formed.

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Plate IX: Fig. 1. Leaf *Anacardium occidentale* showing anthracnose spotting. Natural size. — Fig. 2. Enlarged view of the same × 3. — Fig. 3. Artificial culture of *Sphaceloma anacardii*. Natural size. — Fig. 4. Part of *Mangifera indica* leaf showing anthracnose spotting. Natural size. — Fig. 5. Enlarged view of anthracnose spots. × 25. — Fig. 6. Drawing of the acervulus of *S. magniferae* × 800.

Plate X: Fig. 7. Leaf of *Semecarpus anacardium* showing infection spots. ½ Natural size. — Fig. 8. Enlarged view of infection spots. × 5. — Fig. 9. Fruit of *S. anacardium* showing infection. × Natural size. — Fig. 10. Acervulus of *S. semecarpii*. × 800. — Fig. 11. Growth of *S. semecarpi* in artificial culture. Natural size.

Studies on Elsinoë and Sphaceloma diseases of Plants in Mahsrashtra (India)-V

By D. D. Wani & M. J. Thirumalachar

(Hindustan Antibiotics Research Centre, Pimpri, Poona)

*) Studies on *Elsinoë* and *Sphaceloma* diseases of plants in Maharashtra — IV. Sydowia (in press).

In the previous paper *) studies on *Elsinoë* and *Sphaceloma* diseases of plants in Maharashtra State with reference to their morphology of spore forms and characters in artificial cultures in a few cases were given. The present work is a continuation of those studies on three new *Sphaceloma* species and a new host record for *Sphaceloma terminaliae* Bitanc. The type material of new *Sphaceloma* species have been deposited in Mycological collections of Bureau of Plant Industry, Beltsville, Maryland, U.S.A.; Instituto Biologico, S'ao Paulo, Brazil and Herb. Crypt. Ind. Orient., New Delhi.

1) Scab disease of *Barleria gibsonii*.

Barleria gibsonii Dalz. is an ornamental shrub with large violet-pink flowers. It is distributed in Western Ghats and is also common in hilly places. Scab disease of this suscept was discovered from several localities. It affects leaves and stems, sometimes severely. A noticeable leaf symptom is the large chalky-white patches developed from initial small localised lesions. A spotted anthracnose or scab of *Barleria* or any other member of Acanthaceae has not been reported previously.

Sphaceloma barlericola Wani & Thirum. Sp. nov.

Infectionis maculae 2—5 cms. constantes a punctis foliicolis minutis, apparentes in forma seriei amplae calcareo-albae, saepe occurrentes in locis inter nervos laterales, vulgo epiphyllae, circulares vel irregulariter angulares, paulum depressae, producentes elevationem in pagina inferiore foliorum, 1—2 mm. diam. Acervuli apparentes up puncta accum fusca in infectionis maculis, plures, elliptici vel pyriformes, fusce brunnei vel brunneo-rubri, intra-epidermales, compacte aggregati, bicellares constrictione tenui ad septa transversa, rotundata ad apicum. 3—9 μ longi, 1.5—3 μ lati. Conidia non visa.

In foliis et caule *Barleriae gibsonii* Dalz., Mahabaleshar, 14 mensis martii anni 1958 (Typus). Leg. D. D. Wani. Lingamala fall mensis Januarii 1960, Leg. D. D. Wani.

Infection patches on leaves 2 to 5 cms., composed of numerous, small spots, appearing in form of chalky-white layers, often occurring in areas between lateral veins, epiphyllous in initial stages, later leaving dark areas on the back side. On stems spots are small, numerous, closely grouped forming crusts. Individual spots small, circular to angular, slightly depressed producing elevation on the lower side to the leaf, 1—2 mm. in diameter. Acervulli when viewed from above appear as dark raised pin heads, scattered over the infection patches, when seen in transverse section they are numerous, dark brown to brownish-red, elliptic to pyriform, intraepidermal, erumpent, 10—24 μ high and 30—62 μ broad. Conidiophores generally develop from basal stroma, light brown, compactly grouped like palisade, erect, 1 septate with slight constriction at the cross septum and rounded at apex, 3—9μ long and 1.5—3 μ broad. Conidia not seen.

The pathogen when isolated on potato dextrose agar medium, showed raised, crustose type of growth. The surface of the colony is fluffy due to the production of cottony white aerial mycelium. Colonies appear deep red from above and reddish-brown from the reverse side. In early stages micro-conidia are produced while in aged colonies typical *Sphaceloma* stage and numerous chlamydospores are formed. B. P. I. No. 51549; S. P. I. B. No. 10106.

2) *Spotted anthracnose of Silk Cotton tree.*

Bombax malabaricum DC., a tall tree, has got prickly trunk and bright red flowers. It is distributed throughout the state and it produces number of products of commercial importance.

Anthracnose spotting of leaves incited by a *Sphaceloma* species was discovered first on plants from Khandala and subsequently from many different localities. *Sphaceloma* or *Elsinoë* species, inciting disease on this host genus has not been reported heretofore.

Sphaceloma bombacis Wani & Thirum. Sp. nov.

Infectionis maculae ut plurimum epiphyllae, plures, dispersae vel vulgo aggregatae secundum foliorum margines coalescentes inter se; maculae singulae paulum elevatae, circulares vel polygonales, marginibus 'Briar-wood' colore, centro cereo-albo, 0.5—2 mm. diam. Acervuli macroscopice distincti ut puncta elevata fusca, ovati vel ellipsoidei, intraepidermales, erumpentes, 18—35 μ alti, 30—75 μ lati, conidiophoris compacte aggregatis, paulum divergentibus ad apicem, non septatis, brunneo-rubris, 4.5—7 × 3—4.5 μ. Conidia non visa.

In foliis et petiolis *Bombax malbaricum* DC. = *Salmaliae malabaricae* Sch. & Endl. Mahabaleshwar 24 Septembris anni 1959 (Typus); Leg. D. D. Wani, Khandala 25, Novemberis — 1961; Vitthaldwadi 15, Decemberis — 1962, Leg. D. D. Wani.

Infection spots chiefly epiphyllous, numerous, scattered, often grouped along leaf margin, coalescent with one another in severe stages of infection. Individual spots slightly raised, circular to polygonal with 'Briar-wood' margin and wax-white centre, 0.5—2 mm. in diameter. Acervuli appearing macroscopically as dark raised pin-heads, ovate, ellipsoid, intraepidermal, erumpent, 18—35 μ high and 30—75 μ broad. Conidiophores compactly grouped, slightly divergent at apex and measuring 4.5—7 × 3—4.5 μ. Conidia not seen. B. P. I. No. 91550, S. P. I. B. No. 10107.

3) Leaf scab disease of *Homonoia riparia.*

Homonoia riparia Lour., occurs along the river beds. It is evergreen shrub producing dioecious flowers in axillary spikes. Scabbing of the leaves of the suscept was discovered on plants from Vitthalwadi in 1960. Subsequent survey for the disease has shown its occurence in many different localities from Maharashtra State.

Sphaceloma homonoiae Wani & Thirum. Sp. nov.

Infectionis maculae calcareo-albae, dispersae vel secundum nervum medium, polygonales vel irregulariter angulares, coalescentes inter se secundum nervum medium, 0.5—4 mm. diam. Acervuli plures, cinnamomeo-brunnei, intraepidermales, erumpentes 10—25 μ alti, 27—39 μ lati, constantes ex stromate basali quod producit conidiophoros, erectos, compacte aggregatos, paulum divergentes, pallide brunneos, non-septatos, 4.5—6 μ longos, 1.5—3 μ latos. Conidia non visa.

In foliis *Homonoiae ripariae* Lour. In Mutha fluminis alvo, Vitthalwadi 5, Mai 1960 (Typus). Leg. D. D. W a n i; Khandala 15, Martii 1961; Phaltan 26, Martii 1963. Leg. D. D. W a n i.

Infection spots appearing as 'chalky white' specks, scattered, more often running along midrib and veinlets forming scabby lesions by coalescence, epiphyllous, leaving dark areas on the lower surface of the leaf. 0.5—4 mm. in diameter, polygonal to irregularly angular. Conidial stroma acervular, intraepidermal in origin but later due to erumpence appear subcuticular, scattered largely over the surface of the scab, elliptic to oblong, 10—25 μ high and 27—39 μ broad, basal stroma giving rise to erect, compactly grouped conidiophores. Conidiophores slightly divergent at apex, light-brown non-septate, 4.5—6 μ long und 1.5—3 μ broad. Conidia not observed. B. P. I. No. 91562, S. P. I. B. No. 10119.

4) *Anthracnose disease of Terminalia arjuna.*

Terminalia arjuna W. & A., a large tree with dull-yellow flowers is widespread along river banks in hilly parts of Maharashtra State. The bark of the plant contains 20—25% of tanin. Anthracnose spotting of the leaves of the suscept was discovered on plants from Khandala and other localities from State. Laboratory studies of the pathogen have revealed it to be identical with *Sphaceloma terminaliae* Bitanc. described on *T. catappa* from Brazil. Thirumalachar recorded it on *T. bellerica* (Gaertn.) Roxb. from Mysore. However, it is not recorded on this species.

Sphaceloma terminaliae Bitanc.

Anthracnose spots on petioles, leaves and stems. On leaves the infection spots are small, numerous, mostly restricted to veins and veinlets, closely grouped to form larger patches. On petioles and stems spots are elongated, closely grouped giving crustose appearance. Individual spots, small, raised, circular to polygonal, ashy-pink, 0.25—2 mm. in diam. Acervuli numerous in centre of indvidual spots or irregularly destributed in areas of grouping, intra-epidermal to subcuticular, erumpent, dark-brown, elliptic to pyriform, 24—36 μ high and 40—75 μ broad, composed of basal stroma and erect, cylindrical conidiophores, produced in closely appressed form, 4.5—9 μ long and 3—4.5 μ broad. Conidia and the ascigerous stage described by Reid on the suscept genus were not detected.

On leaves, petioles and stems of *Terminalia arjuna* W. & A. Khandala, 24 September, 1960, Khopoli, 17 December, 1961, Bombay, 24 December, 1962, Leg. D. D. Wani. B. P. I. No. 91580, S. P. I. No. 10138.

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Explanation of Plate XI

Fig. 1. Infection spots of *S. barlericola* × nat. size. — Fig. 2. Acervulus × 1000. — Fig. 3. Growth in artificial culture × 5. — Fig. 4. Infection spots of *S. bombacis* × ½ nat. size. — Fig. 5. Acervulus × 1000. — Fig. 6. Infection spots of *S. homonoiae* × nat. size.

Studies on Elsinoë and Sphaceloma diseases of plants in Maharashtra (India)-VI

By D. D. Wani and M. J. Thirumalachar

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Spotted anthracnose and scab diseases of trees in the tropics are of considerable importance since they cause premature defoliation and open out the canopy and thus affect the plantations. In the present studies *Sphaceloma* diseases of some of the important forest trees like teak (*Tectona grandis* L.) and others which yield minor forest products of economic importance were studied and a brief account presented. The type material of the new species has been deposited in the Bureau of Plant Industry, Beltsville, Md., U.S.A., Instituto Biologico, Sao Paulo, Brazil, and Herb. Crypt. Ind. Orient, New Delhi.

1) Scab disease of *Asclepias curassavica.*

Aslcepias curassavica L., native of West-Indies and naturalized in many parts of India, is a undershrub with orange red coloured flowers. Scabbed leaves of the succept were first collected from Poona. Detailed studies of the pathogen have shown it to be similar to *Sphaceloma asclepiadis* Bitanc. & Jenkins, described on the same host from Brazil. However, it is a new record for India.

Sphaceloma asclepiadis Bitanc. & Jenkins.

Infection spots on leaves, numerous, small scattered all over lamina or running along the midrib, epiphyllous leaving dark areas on the lower surface of the leaf, sparse to aggregate forming large scabby lesion by coalescing with one another. On the fruits the spots are small, raised, numerous, closely grouped to form crusts. Individual spots circular to polygonal, chalkywhite, with thin brownish ring, 0.5—3 mm. in diameter. Acervuli numerous, oblong to obconical, brownish-red, intraepidermal, erumpent, 9—21 μ high and 20—30 μ broad. Conidiophores produced from basal pseudoparenchymatous stroma, cylindrical, compactly grouped, light-brown, 4.5—9 μ long and 3—6 μ broad. Conidia in the acervuli of the specimen material were not detected. Habit. — On leaves, shoots and fruits of *Asclepias crussavica* L. Fergusson canal Poona, November 11, 1958, Khandala, December 25, 1961, Leg. D. D. Wani. B. P. I. No. 91545, S. P. I. B. No. 10102.

2) Scab disease of *Cordia myxa.*

Cordia myxa L., a small tree with white flowers, is distributed in deciduous forests of Maharashtra State. Plants (*Cordia myxa*) in neighbourhood of Poona were found to be infected by Scab disease. Detailed studies of the pathogen have shown it to be identical to *Sphaceloma* stage of *Elsinoë mayaguensis* Bitanc. & Jenkins, described on *Cordia* species from South America. The fungus has been observed to produce only the conidial stage and *Elsinoë* stage was not detected. The species has not be recorded from India heretofore. The description of the same follows:

Elsinoë mayaguensis Bitanc. & Jenkins.

Infection spots on leaves, numerous, scattered, less often grouped to form larger spots, circular to polygonal, slightly depressed leaving elevation on the back surface of leaf- wax-white to buff in colour, measuring 1—4 mm. in diameter. Conidial fruit bodies acervular and are prominently in the centre of the infection spots in form of dark-brown raised pin heads. Acervuli numerous, epiphyllous elliptic to lenticular, intraepidermal, reddish-brown, 24—60 μ broad and 17—42 μ high. Conidiophores produced from basal stroma, erect, septate, with single transverse septum, grouped in heaped up form, 3—7.5 μ broad and 4.5—12 μ long. Conidia and the ascigerous stage, not detected.

The pathogen was isolated in pure culture on potato dextrose agar medium, on which it develops convolute type of growth, whith radial striations. It is greyish-pink in colour from above and reddish-brown from the reverse side. The hyphae are closely septate, branched and produced large number of chalmydospores in aged cultures.

On leaves of *Cordia myxa* L. Vitthalvadi November 7, 1958; Pimpri December 20, 1960; Law College hill October 12, 1962. Leg. D. D. Wani, B. P. I. 91552, S. P. I. B. No. 10109.

3) Scab of *Heterophragma roxburghii.*

Heterophragma roxburghii A. DC., is a large tree with tomentose leaves and fragrant white flowers. Scabbing of the leaves of this plant was discovered in many localities from Maharashtra State. Numerous greyish-white spots were produced by the pathogen. Description of the same as new species of *Sphaceloma* follows.

Sphaceloma heterophragmae Wani & Thirum. Sp. nov.

Infectionis maculae in follis, griseo-albidae, ut plurimum epiphyllae, parvae, numerosae, dispersae, vel aggregatae ad margines foliorum, Maculae singulae circulares vel ovales, paulum elevatae, areas fuscas in inferiore pagina foliorum producentes, 0.25—1 m.. diam. Acervuli rari, obconici vel oblongi, rubri-brunnei, intra-epidermales, 11—24 μ alti, 26—39 μ lati. Conidiophori producti ex stromatae hyalino basali, erecti, cylindrici, ornati — uno transverso septo et apice conico, 6—10.5 μ longi — et 3—4.5 lati. Conidia non observanta.

Habit: On leaves of *Heterophragma roxburghii* A. DC. = *H. quadrilocularis* (Roxb.) K. Schum. Pimpri (Poona), November 17, 1959 (Type) Leg. D. D. Wani, Khandala, January 9, 1961, Katraj, February 5, 1962. Leg. D. D. Wani.

Infection spots greyish-white, numerous, scattered or aggregated along leaf margin, chiefly epiphyllous leaving dark areas on the back surface of the leaf. Individual spots circular to oval, slightly raised, 0.25—1 mm. in diameter. Acervuli few, obconical to oblong, reddish-brown, intraepidermal, 11—24 μ high and 26—39 μ broad. Conidiophores develop from basal pseudoparenchyma, erect, cylindrical with single transverse septum and conical apex, 6—10.5 μ long and 3—4.5 μ broad. Conidia not seen, in the specimen material. B. P. I. No. 91586, S. P. I. B. No. 10143.

*) Colours as per 'Dictionary of colours' by Mearz and Paul.

4) Spoted anthracnose disease of *Tectona grandis* L.

Tectona grandis L. is a large decidous tree, grows abundantly along the slopes of Western Ghats and monsoon and mixed decidous forests of South India. Teak is one of the most valuable timbers. The leaves and young shoots infected with the new species of *Sphaceloma* were collected from Katraj Ghats near Poona in 1958. Subsequent dates of collections indicate that the disease appears in July—August and becomes epiphytotic by about December. The fungus under study in association whith the leaf rust *Olivea tectonae* (Racib.) Thirum. incites severe damage to the host plant by hastening the defoliation of leaves and in case of seedlings it leads to the suppression of their initial growth vigor. The description of the pathogen as a new species of *Sphaceloma* is given below:

Sphaceloma tectonae Wani & Thirum. Sp. nov.

Infectionis maculae infoliis et surculis teneribus, plures, minutae, saepius aggregatae in locis inter nervos laterales, conspicuae in pagina inferiore ut maculae fusce brunneae, ovatae vel polygonales, marginibus castaneobruneis, centro paulum depresso et colore 'French-grey' 1—3 mm. diam. Acervuli plures, fusce brunnei, elliptici vel circulares, intra-epidermales, erumpentes, 22—45 μ alti, 30—60 μ lati, Conidiophori evoluti ex stromate basali pallide lueto, erecti, compacte aggregati, bis tervi septati, paulum divergentes ad apices, 6—9 μ longi, 1.5—3 μ lati. Conidia non visa.

In foliis et surculis teneribus *Tectonae grandis* L. Katraj Ghat October 15, 1958 (Typus). Leg. D. D. Wani, Law College Hill, — December 25, 1960; Bhor August 14, 1961; Kasara September 14, 1962. Leg. D. D. Wani.

Infection spots on leaves and young shoots are numerous, small, more often grouped in areas between lateral veins or sometimes involving them, epiphyllous and conspicuous on the lower surface as dark brown areas. On shoots spots are many, small, elongated, closely grouped, coalescing with one another forming crusts. Individual spots ovate to polygonal with 'Walnut-brown' margin and slightly depressed 'French-grey' centre, measuring 1—3 mm, in diameter. Acervuli macrospocically visible in areas of grouping in form of raised pin heads, numerous, dark-brown, elliptic to circular, intraepidermal, erumpent, 22—45 μ high and 30—60 μ broad. Conidiophores produced from basal stroma, erect compactly grouped in palisade layers, 2—3 septate, slightly divergent at apex. 6—9 μ long and 1.5—3 μ broad. Conidia were not noticed in the specimen material. B. P. I. No. 91578, S. P. I. B. No. 10135.

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2. — — 1949—50. Estudos Sobre as Myriangiales I. Dez. novas especies de Elsinoaceaes descobertas do Brazil. Ar. Inst. Biol. S. Paulo, 19: 93—109.

Explanation of Plate XII

Fig. 1. Infection spots of *S. mayaguensis* × 5. — Fig. 2. Growth in artificial culture × 2. — Fig. 3. Infection spots of *S. heterophragmae* × nat. size. — Fig. 4. Acervulus × 1000. — Fig. 5. Acervulus of *S. tectonae* × 800. — Fig. 6. Infection spots of *S. tectonae* enlarged × 20.

Ergebnisse einer Revision der Grundtypen verschiedener Gattungen der Ascomyceten und Fungi imperfecti.

Von F. Petrak, Wien

131. **Valsella** Fuck.

Die Gattung *Valsella* wurde von Fuckel in Symb. myc. p. 303 (1869) aufgestellt und mit den Worten „Ut Valsae incusae, sed asci multispori". In Annal. mycol. XVII. p. 60 (1919) berichtete ich über eine *Valsella*-Form, die ich in den Wäldern bei Koniuchow nächst Stryj und in Czarny las bei Stanislau gefunden habe. In Gesellschaft eines dritten von meinem Vater im Park der Mil. Oberrealschule in Mähr.-Weisskirchen gesammelten Exemplares kommt neben der Schlauchform auch die zugehörige *Cytospora* vor, die sicher mit *C. personata* Fr. identisch ist. Bei Koniuchow wurde der von mir als *Valsella polyspora* Nke. bestimmte Pilz in Gesellschaft von *Valsa Auerswaldii* gefunden. Im Czarny las wurde diese *Valsella* in Gesellschaft einer zweiten Form angetroffen, die offenbar mit *Valsella adhaerens* Fuck. identisch ist. Die Untersuchung zahlreicher Stromata dieser Pilze zeigte mir, dass die Länge der Sporen ziemlich veränderlich ist und offenbar davon abhängt, wie viele Sporen in den Schläuchen gebildet werden. Auch eine Abhängigkeit von der Beschaffenheit des Standortes dürfte vorhanden sein. Die *Polyspora*-Form wurde auf noch hängenden Ästen, die *Adhaerens*-Form auf feucht liegenden abgefallenen Ästen gefunden. Weil ich damals zahlreiche Ästchen untersuchte, auf denen *V. polyspora* zusammen mit der 4- und 8-sporigen Form von *Valsa Auerswaldii* vorhanden waren, habe ich die Vermutung ausgesprochen, dass *V. polyspora* und *V. adhaerens* nur Formen von *Valsa Auerswaldii* mit vielsporigen Schläuchen sind. In den folgenden Jahren hatte ich Gelegenheit auf *Salix*-Ästen vorkommende *Valsella*-Arten kennen zu lernen, die teils nur in geringer Menge, teils zahlreich angetroffen wurden. Diesbezüglich habe ich in Annal. Mycol. XXI. p. 227—229 (1923) ausführlich berichtet und darauf hingewiesen, dass ich auf Grund meiner Beobachtungen erkannt habe, daß *Valsella fertilis* (Nts.) Sacc. und *V. nigro-annulata* Fuck. miteinander identisch und Formen der *Valsa translucens* (De Not.) Ces. et De Not. mit vielsporigen Schläuchen sind. Meine diesbezüglichen Mitteilungen l. c. p. 229 sollen hier wörtlich wiedergegeben werden. Sie beziehen sich auf einen grossen Haufen dürrer *Salix*-Äste, den ich bei Austy nächst Wsetin in Mähren gefunden habe:

„Weitaus die meisten Exemplare erwiesen sich bei der Prüfung als *Valsa translucens* mit 8-sporigen Schläuchen; selten und stets, oft durch kleine, ringförmige die Ästchen umgebende Zwischenräume getrennt waren auf grössere oder kleinere Strecken meist etwas grössere und wohl auch stärker vorspringende Stromata vorhanden, die auch durchschnittlich etwas grössere Perithecien mit 4-sporigen Schläuchen enthielten. Viel häufiger als diese Form, stets auch deutlich getrennte Partien des Substrates bewohnend, äusserlich schon durch die sehr dicht gedrängt stehenden, flachen, fast scheibigen, ringsum von einer mehr oder weniger erhabenen Randlinie scharf begrenzten Stromata kenntlich, waren grössere oder kleinere Strecken der Äste von einer *Valsella* bewohnt, deren Sporen ich je nach dem, ob viel mehr als 8 im Schlauche gebildet wurden, 6—15/1,25—2 μ gross gefunden habe."

Diese Beobachtungen sind ein sicherer Beweis dafür, dass die auf *Salix* beschriebenen Arten *V. salicis* Fuck., *V. fertilis* und *V. nigro-annulata* nur Formen der *Valsa translucens* mit vielsporigen Schläuchen sind.

Ich habe auch später immer wieder Gelegenheit gehabt, *Valsella*-Arten auf *Salix* zu beobachten. Besonders lehrreich waren für mich wiederholte Funde auf Weidenruten zwischen Usti und Skalička bei Mähr. Weisskirchen, die durch ein in ihrer Nähe angezündetes Feuer zum Absterben gebracht wurden. Sehr häufig war auf den noch stehenden unten angekohlten Ruten *Valsa translucens* zur Entwicklung gelangt, die grössere oder kleinere Strecken der Ruten gleichmässig überzogen, nicht selten aber auch von grösseren oder kleineren Horden der zugehörigen *Valsella*-Form abgelöst, beziehungsweise unterbrochen wurde. Auf manchen Ruten waren 8-sporige, 4-sporige und eine vielsporige Form gleichzeitig zur Entwicklung gelangt.

Auch diese Beobachtungen sind ein sicherer Beweis dafür, dass die *Valsella*-Arten auf *Salix* miteinander identisch und Formen der *V. translucens* sein müssen. Eine der Beschreibung entsprechende Gattung *Valsella* Fuck. existiert daher nicht, weil als *Valsella* nur Formen von *Valsa*-Arten der Gattung *Valsa* subgen. *Leucostoma* beschrieben wurden.

Die von mir schon vor 47 Jahren veröffentlichten Beobachtungen scheinen von den Autoren bisher völlig unbeachtet geblieben zu sein, weil bis in die neueste Zeit immer wieder neue „*Valsella*-Arten" beschrieben wurden. Das beweist wohl auch der Umstand, dass Urban in einer Revision der tschechoslowakischen Gattungen *Valsa Leucostoma* und *Valsella* die Gattung *Valsella* anführt und sogar einen Bestimmungsschlüssel für 5 *Valsella*-Arten mitteilt.

*) Rozpravi Ceskoslovenské Akademie věd, Rada matematickych a přírodnich věd, Rocnik 68, 1958, sesic 12.

132. Ahmadinula

Die Gattung *Ahmadinula* Petr. wurde in Sydowia VII. p. 375 (1953) aufgestellt und auf folgende Weise charakterisiert.

„Fruchtkörper zerstreut, borstenförmig oder sehr dünn zylindrisch, nach oben oft etwas verjüngt, zur Zeit der Reife auf der trichterförmig geöffneten Spitze ein kleines kugeliges, schwärzliches aus den schleimig verklebt zusammenhängenden Konidien bestehendes Köpfchen tragend, mit der hyalinen oder subhyalinen pseudoparenchymatischen Basis dem Substrat ziemlich tief eingewachsen, oben in einen langen, röhrenförmigen, auf der Innenfläche ziemlich dicht mit den fädigen Trägern bedeckten Teil übergehend, von ziemlich weichhäutiger Beschaffenheit, aus senkrecht parallelen, aussen schwarzbraunen, innen sehr hell gelbbräunlichen oder subhyalinen, sich an der Spitze in freie, ziemlich lange, hyaline Enden auflösenden Hyphen bestehend. Konidien länglich spindelförmig, meist ungleichseitig oder schwach gekrümmt, mit 3 Querwänden, die Mittelzellen schwarzbraun, die sehr kleinen, papillen- oder ziemlich spitz kegelförmigen Endstellen hyalin, 18/7,5 μ unten durch den fest anhaftenden Träger geschwänzt, oben mit einer sehr langen, fädigen, Zilie versehen."

Wie aus dieser Beschreibung hervorgeht, ist *Ahmadinula* durch die aufrecht stehenden, borstenförmigen oder sehr dünn zylindrischen, oben oft etwas verjüngten, sich an der Spitze trichterförmig öffnenden, aus einer hyalinen oder subhyalinen, ziemlich tief eingewachsenen pseudoparenchymatischen Basis entspringenden weichhäutig-fleischigen, aus senkrecht parallelen aussen schwarzbraunen, innen heller gefärbten sich an der Spitze in ziemlich lange hyaline Enden auflösenden Hyphen bestehenden, röhrenförmigen innen ziemlich dicht mit den Trägern überzogenen bis ca. 2,5 mm hohen, 200 bis 300 μ dicken Fruchtkörper sehr ausgezeichnet und leicht kenntlich. Die mit 3 Querwänden versehenen länglich spindelförmigen, meist ungleichseitigen oder schwach gekrümmten Konidien haben schwarzbraune Mittelzellen und sehr kleine, papillen- oder spitzkonische Endzellen, die unten durch den lange anhaftenden Träger geschwänzt und oben mit einer langen Zilie versehen sind.

Mit Rücksicht auf den eigenartigen Bau der Fruchtkörper habe ich den Pilz l. c. mit *Hoehneliella* Bres. et Sacc., *Pseudographium* Jacz., *Subulariella* v. Hoehn. und *Cornucopiella* v. Hoehn. als einen Vertreter der con Hoehnel aufgestellten Familie der Pseudographiaceen bezeichnet.

S h o e m a k e r und M ü l l e r haben in Can. Journ. of Bot. XXXXI (1963) *Ahmadinula* mit *Pestalozzia* identifiziert und deren Typus l. c. p. 1235 als *Pestalozzia excelsa* (Petr.) Shoem. et Müll. comb. nov. bezeichnet. Selbst wenn man annimmt, dass *Ahmadinula* mit Rücksicht auf Form, Farbe und Bau der Konidien der Gattung *Pestalozzia* nahe steht, kann von einer Identifizierung von *Ahmadinula* mit *Pestalozzia* keine Rede sein, weil Bau und Beschaffenheit der Fruchtkörper beider Gattungen ganz verschieden sind. Die typischen *Pestalozzia*-Arten sind melanconioid gebaut und haben mehr oder weniger tief eingewachsene Fruchtkörper mit flacher Basalschicht, die von den Trägern überzogen ist. Bei einzelnen Arten kommen auch rundliche, erst völlig geschlossene, bei der Reife unregelmässig aufreissende Fruchtkörper vor, nie aber solche, die dem *Ahmandinula*-Typus entsprechen.

Würde man so verschiedene, nur im bezug auf die Konidien übereinstimmende Gattungen wie *Pestalozzia* und *Ahmadinula* miteinander vereinigen, dann könnte man ja auch *Phyllosticta, Phoma, Asteromella* und andere Gattungen mit einzelligen, hyalinen Konidien als identisch erklären, wenn man auf andere, für die generische Unterscheidung wichtige Merkmale nicht achten will.

Noch eine Bemerkung über die Schreibweise des Namens *Pestalozzia* soll hier folgen. De Notaris hat die Gattung als *Pestalotia* bezeichnet. Sie wurde nach dem italienischen Arzt und Botaniker Pestalozza benannt. Weil die Gattung nach Pestalozza und nicht nach Pestalota benannt wurde, ist die Bezeichnung *Pestalotia* als unrichtig und unzutreffend zu bezeichnen. Gattungsnamen, die nach Personen benannt werden, dürfen doch nicht so gebildet werden, dass der betreffende Personenname ganz verändert wird. Artikel 72 des International Cod. of Botanical Nomenclature wäre daher entsprechend zu ändern.

133. **Unamunoa**

Die Typusart der Gattung *Unamunoa* wurde von Urries y Azara in Bol. Soc. Hist. nat. XXXIII, p. 93 (1933) zuerst als *Amphisphaeria verrucosa* Urries y Azara beschrieben. Später erkannte der Autor dass dieser Pilz mit *Amphisphaeria* nichts zu tun hat und von den typischen Arten der Gattung als ganz verschieden erachtet werden muss. Deshalb hat er dann in Anal. Jard. Bot. Madrid II (1941), p. 158 (1942) für *A. verrucosa* die neue Gattung *Unamunoa* n. gen. aufgestellt und den Pilz *Unamunoa verrucosa* Urries y Azara genannt.

Ich habe schon in Sydowia I, p. 61 (1947) darauf hingewiesen, dass die Stellung dieser Gattung im bezug auf *Zopfia* Rabh. und *Rechingeriella* Petr. noch näher geprüft werden muss. Dass *Unamunoa* beiden Gattungen sehr nahe steht, kann keinem Zweifel unterliegen. Aus dem von mir untersuchten, leider nur sehr spärlichem Material der Typus-Art von *Rechingeriella* habe ich inner- und ausserhalb der Aszi nur einzellige Sporen gesehen und in der Gattungsbeschreibung die Sporen auch einzellig benannt. Kürzlich hat Lundquist die neue Gattung *Copromyces* beschrieben, deren Typusart Aszi mit 1—3 mehr oder weniger kugeligen, 12—15,5/11—12,5 μ grossen mit breiten, oft zusammenfliessenden Warzen bedeckte Sporen besitzt. Da an der Identität von *Copromyces* mit *Rechingeriella* nicht gezweifelt werden kann, habe ich die Typusart in Sydowia XXI, p. 241 (1967) als *Rechingeriella bispora*

(Lungqu.) Petr. bezeichnet und darauf hingewiesen, dass dieser Pilz von *R. insignis* Petr. durch kleinere, mit breiten, flachen Warzen besetzte Sporen zu unterscheiden ist. Ich möchte hier auf einen Widerspruch hinweisen, der mir bei der Betrachtung der Abbildung aufgefallen ist, die der Autor seiner Beschreibung von *Copromyces* beigefügt hat. Dort wird nämlich ein Stück Kot in natürlicher Grösse dargestellt. Darauf sind zahlreiche *Copromyces*-Gehäuse vorhanden, die einen Durchmesser von ca. 2 bis fast 3,5 mm haben. Nach der Beschreibung haben die Gehäuse aber einen Durchmesser von 280—385 μ. Auf der Abbildung werden sie daher ungefähr 10 mal grösser dargestellt.

Bei *Unamunoa verrucoka* sind die Sporen nach der Beschreibung und Abbildung des Autors in jüngerem Zustande zweizellig („in statu juvenili phaeodidymae"), länglich ellipsoidisch oder länglich eiförmig, ziemlich dicht mit Warzen besetzt und zerfallen bei der Reife in die zwei ziemlich regelmässig kugelig werdenden Zellen („in maturitate in duabus articulis sphaeroideis et opacis seccedentibus").

Bei *Unamunoa verrucosa* und anderen sich ähnlich verhaltenden Pilzen könnte man im Zweifel sein, ob ihre Sporen als zwei- oder als einzellig zu bezeichnen sind. Weil man aber in den Beschreibungen stets die Beschaffenheit völlig reifer Sporen angeben soll, glaube ich, dass *Unamunoa* als eine Gattung mit einzelligen Sporen aufzufassen ist. Da es durchaus nicht sicher ist, ob bei *Rechingeriella insignis* und *R. bispora* in den Schläuchen zuweilen nicht auch junge zweizellige Sporen gebildet werden, muss *Unamunoa* als mit *Rechingeriella* identisch erachtet und ihre Typusart als **Rechingeriella verrucosa** (Urries y Azara) Petr. comb. nov. bezeichnet werden. In bezug auf die Grösse der Sporen nimmt *R. verrucosa* eine Mittelstellung zwischen *R. bispora* und R. insignis ein.

134. Gemmamyces.

In Phythopat. Zschft. LXVI, p. 119 (1969) berichtet F. Cassagrande über 3 dothideale auf Koniferen parasitisch lebende Pilze, nämlich über *Cucurbidothis* pithyophila (Fr.) Petr., *Cucurbitaria piceae* Borth. und *Müllerites juniperi* (Müller et Arx) Holm, deren nahe Verwandtschaft durch den charakteristischen Bau des Stromas deutlich zu erkennen ist. Für *Cucurbitaria piceae* hat zuerst Naumov die Gattung *Megalospora* aufgestellt, die aber ungiltig ist, weil es schon zwei ältere Gattungen gleichen Namens gibt, nämlich *Megalospora* Mey. et Fw. (1843) und *Megalospora* Massal. (1852). Auch Vassilkow's Name *Cucurbitariopsis* (1960) ist ungiltig, weil Massalongo schon 1889 eine Gattung des gleichen Namens aufgestellt hat.

Cassagrande schliesst sich Naumov's Ansicht an, ersetzt daher den ungiltigen Namen *Megalospora* durch *Gemmamyces* nov. nom. und bezeichnet die Typusart als *Gemmamyces piceae* (Borthw.) Cassagr. nov. comb. Der genannte Autor hat seiner Arbeit zahlreiche, sehr schöne und zutreffend gezeichnete Abbildungen beigefügt, auf denen alle charakteristischen, zur generischen Unterscheidung in Betracht kommenden Merkmale klar zu erkennen sind. Eine Gattungsdiagnose teilt der genannte Autor nicht mit und gibt auch nicht an, durch welche Merkmale sich *Gemmamyces* von der ihr jedenfalls sehr nahestehenden Gattung *Cucurbidothis* unterscheiden lässt. Tatsächlich ist nur ein einziges, relativ geringfügiges Merkmal zu finden, durch welches sich die beiden Gattungen unterscheiden liessen. Bei *Cucurbidothis* ist das Basalstroma offenzellig pseudoparenchymatisch, bei *Gemmamyces* besteht es aus einem sehr dichten Plektenchym, das weiter oben allmählich pseudoparenchymatisch werdend in die Wand der Lokuli übergeht. Die Konidienformen dieser Pilze sind zwar verschieden, spielen aber bei der generischen Beurteilung nur eine untergeordnete Rolle. Deshalb glaube ich, das *Gemmamyces* als von *Cucurbidothis* nicht generisch verschieden aufgefasst und die Typusart **Cucurbidothis piceae** (Borthw.) Petr. nov. comb. genannt werden muss.

Noch eine kurze nomenklatorische Bemerkung sei hier gestattet. Es ist heute mit Rücksicht auf die vielen tausend Pflanzennamen gewiss nicht leicht, halbwegs passende, neue Gattungsnamen zu finden. Dennoch glaube ich, dass so merkwürdig, um nicht zu sagen komisch klingende Namen, wie *Gemmamyces* vermieden werden sollten. Im vorliegenden Falle wäre es wohl besser gewesen, die Gattung Mycogemma zu nennen, obwohl auch dieser Name, weil er aus einem griechischen und einem lateinischen Teil besteht, als nicht ganz korrekt bezeichnet werden müsste.

135. **Allescheriella.**

Die Gattung *Allescheriella* wurde von P. Hennings in Hedwigia XXXVI, p. 244 (1897) mit *A. uredinoides* P. Henn. als Typus aufgestellt. Diese wurde auf folgende Weise beschrieben: „Caespitulis pulvinatis, rotundatis vel confluentibus, late effusis, cinnamomeis vel laete ochraceo-subvelutinis. Hyphis tenuibus, ramosis, septatis interdum inflatis, hyalino-subflavescentibus usque ad 20 μ crassis, ramulis conidiophoris 4—6 μ crassis, conidiis subglobosis, ovoideis, piriformibus, vel oblongis, aurantiaco-brunneolis, intus guttulatis, laevibus, 12—25/10—19 μ."

Unter einer Kollektion verschiedener Mikromyzeten, die ich von Herrn Dr. R. Singer erhielt, war auch ein mit folgender Standort- und Substratbezeichnung versehener Pilz: On dicot log. Carmen

Pampa, Prov. Nor-Yungas, Dept. La Paz. Bolivia, 2000 m alt., 26. 2. 1956, leg. R. Singer, Nr. B 1515. Nicht ohne Schwierigkeiten konnte ich diesen Pilz mit *Alleschériella uredinoides* identifizieren und mich von der Richtigkeit meiner Bestimmung durch einen Vergleich mit einer von E. Ule im Appendix Mycoth. Brasil. unter Nr. 36 als *Alleschériella uredinoides* P. Henn. ausgegebenen, zweifellos von P. Hennings bestimmten Kollektion überzeugen. Nach diesem Material habe ich die folgende Beschreibung entworfen: Rasen mehr oder weniger locker zerstreut, dann meist ganz vereinzelt, im Umriss rundlich oder elliptisch, am Rande ziemlich scharf begrenzt, 1—2 mm, selten bis ca 3 mm Durchmesser, oft jedoch dicht gehäuft, dann meist in deutlichen, parallelen Längsreihen hintereinander stehend und mehr oder weniger zusammenfliessend, ganz unregelmässig und grösser werdend, ziemlich dunkel orangebraun, flache, durch die Konidienmassen pulverig erscheinende Polster bildend. Diese Rasen entwickeln sich auf einem hyalinen Subiculum, das aus reich verzweigten und septierten, am vorliegenden Material schon stark verschrumpften, 4—6 μ breiten, hyalinen Hyphen besteht. Dieses Subiculum ragt bei den Rasen etwas vor, und bildet einen weisslichen, schmalen, ziemlich scharf begrenzten Rand. Konidienträger aufrecht, ca 5 μ dick, fast ganz verschrumpft und nicht mehr deutlich zu erkennen. Konidien mehr oder weniger kugelig, dann ca 11—15 μ im Durchmesser, seltener breit ellipsoidisch oder eiförmig, hell kastanien- oder ziemlich dunkel orangebraun, mit deutlich sichtbarem, ca 0,5 μ breitem, glattem Epispor und einem ziemlich grossen zentralen oder mit mehreren kleineren Öltröpfchen, 12—22 μ lang, 10—18 μ breit, vereinzelt auch mehr oder weniger birnförmig, nämlich am unteren Ende in einen kurzen, fast stielartigen, deutlich abgestutzten Fortsatz verjüngt.

Die Gattung *Alleschériella* wäre daher etwa auf folgende Weise zu charakterisieren:

Rasen zerstreut oder mehr oder weniger dicht beisammen stehend, polsterförmig, sich auf einem hyalinen, aus reich verzweigten, septierten Hyphen bestehenden, ein zartes Häutchen bildenden Subiculum entwickelnd. Konidien einzeln, akrogen, kugelig, eiförmig oder breit ellipsoidisch, selten fast birnförmig, lebhaft orangebraun gefärbt, einzellig.

Nach Clements und Shear Genera of Fungi, p. 400 (1931) soll *Alleschériella* mit *Coccospora* Wallr. Crypt. Flora II, p. 176 (1833) identisch sein. Auch *Bactridiopsis* P. Henn. Hedwigia XXXXIII, p. 397 (1904) und *Sphaerosporium* Schwein. Syn. Amer. Fungi, p. 303 (1834) sollen davon nicht verschieden sein. Was *Coccospora* Wallr. ist, lässt sich nach der knappen unvollständigen Beschreibung nicht sagen. Ob ein von Saccardo in Syll. Fung. IV, p. 9 (1886) mit *Coccospora aurantiaca* Wallr. identifizierter Pilz identisch ist, muss als sehr zweifelhaft bezeichnet werden. Dieser Pilz soll bis 70/40 μ grosse

Konidien haben und ist von *Alleschériella* sicher verschieden. *Sphaerosporium* lässt sich nach der Beschreibung auch nicht sicher beurteilen, könnte aber, weil ein Original der Typusart *Sph. lignalite* Schw. wohl vorhanden sein dürfte, vielleicht noch aufgeklärt werden. *Bactridiopsis Ulei* P. Henn. in Hedwigia XXXXIII, p. 397 (1906) hat 60—90/30—50 grosse blassgelbe Konidien und ist Typus der Gattung *Bactridiopsis*, die mit *Alleschériella* wohl auch nicht identifiziert werden kann. Clements und Shear haben bei der Beurteilung der Gattung *Coccospora* Wallr. offenbar von Hoehnel's Auffassung in Sitzbe. Akad. Wiss. Wien, Math. Nat. Kl. CXX, Abt. I., p. 404 (1911) akzeptiert, nach welcher *Sphaerosporium* Schw. *Bactridiopsis* P. Henn. und *Alleschériella* P. Henn, mit *Coccospora* identisch sein sollen. Von Hoehnel wiederspricht sich aber mit dieser Auffassung selbst, wenn er auf p. 403 1. c. sagt: „Es ist aber auch sehr wahrscheinlich, dass *Bactridiopsis* von *Coccospora* nicht verschieden ist. Da das Wallroth'sche Originalexemplar kaum noch existiert, lässt sich diese Frage nicht entscheiden."

Coccospora Wallr. muss daher wohl als ganz zweifelhafte Gattung erachtet werden, weshalb, man sich darüber wundern muss, dass von Hoehnel sie 1. c. nicht nur anerkennt, sondern 3 andere Gattungen damit identifiziert. Das sind Fragen, die noch näher geprüft werden müssen. Ich glaube aber, dass *Alleschériella* vorläufig aufrecht zu halten ist.

Über Dothidea Pringlei Peck und die Gattung Sphaerodothis

Von F. Petrak, Wien

Dothidea Pringlei Peck wurde in Bot. Gaz. VII, p. 57 (1882) nur sehr kurz und unvollständig beschrieben. Eine ausführliche Beschreibung findet sich in Ellis und Everhart, The North American. Pyrenomycetes, p. 610 (1892). Das Originalexemplar wurde von C. G. Pringle in den St. Rita Mts., Arizona, auf lebenden Blättern von *Yucca macrocarpa* gesammelt. Der Pilz kommt im Südwesten der Vereinigten Staaten, besonders in Kalifornien und Arizona, aber auch in New Mexiko auf verschiedenen *Yucca*-Arten häufig vor. Seymour führt in seinem Host index of the Fungi of North America, p. 174—175 (1929) ausser *Yucca macrocarpa* noch *Y. aloifolia* und *Y. baccata* als Nährpflanzen an. Der Pilz kommt aber, wie mir vorliegende Kollektionen beweisen, auch auf *Y. Schottii*, *Y. mohavensis* und *Y. Whipplei* vor.

In Syll. Fung. II., p. 626 (1882) hat Saccardo die Gattung *Auerwaldia* aufgestellt, deren Typus *A. examinans* (M. et B.) Sacc. auf Rinden und faulendem Holz vorkommt, gleichzeitig aber auch 3 andere, ursprünglich als *Dothidea*-Arten beschriebene auf lebenden Blättern wachsende Pilze in seine neue Gattung eingereiht, nämlich *A. chanaeropis* (Cke.) Sacc., *A. scabies* (K. et C.) Sacc. und *A. Pringlei* (Peck) Sacc. Mit Rücksicht auf diese grosse Verschiedenheit der Nährpflanzen kann schon mit Sicherheit angenommen werden, dass diese vier *Auerswaldia*-Arten Saccardo's wenigstens teilweise verschiedenen generischen Typen entsprechen müssen.

In Sitzb. Ak. Wiss., Wien Mat. Nat. Kl., Bd CXVIII, Abt. I, p. 1510—1514 (Nov. 1909) hat sich v. Höhnel mit der Gattung *Auerswaldia* beschäftigt. Er hat eine Anzahl der als *Auerswaldia* beschriebenen Pilze untersucht und feststellen können, dass dieselben „abgesehen von den irrtümlich bisher bei *Auerswaldia* eingereihten Arten in dieser Gattung Formen stehen, die im Bau und in der Entwicklung der Stromata von einander ganz verschieden sind.“ V. Höhnel verteilt dann die *Auerswaldia*-Arten auf zwei Gruppen, von denen die eine durch ein dothideoides, die zweite durch ein phyllachoroides Stroma charakterisier ist. In die erste Gruppe stellt er die Typusart und drei auf lebenden Blättern parasitierende Arten, nämlich *A. puccinioides*, *A. disciformis* Wint. und *A. palmicola* Speg. Es ist klar, dass dies auch ein Irrtum ist, weil die auf Blättern parasitierenden Arten dem *Auers-*

waldia-Typus gewiss nicht entsprechen. In die Gruppe mit phyllachoroidem Stroma werden vier Arten gestellt, die ebenso vielen verschiedenen, neu aufgestellten Gattungen angehören, nämlich *Sphaerodothis arengae* (Rac.), *Hysterodothis rimosa* (Speg.) v. H., *Phaechora chamaeropis* (Cke.) v. H. und *Coccochora quercicola* (P. H.) v. H. Vor der oben zitierten Publikation v. Höhnel's, die im November 1909 erschienen ist, hat C. L. Shear in Mycologia I, p. 161—163 (Juli 1909) einen Artikel veröffentlicht, in dem er *Sphaerodothis* (Sacc. ex Syd.) Shear als neue Gattung aufstellt und sagt, dass *Auerswaldia arengae* Rac. Paras. Algen und Pilze Javas III, p. 27 (1900) als ihr Typus anzusehen sei. Er beschreibt dort die neue Art *Sph. neowashingtoniae* Shear, die aber vom Gattungstypus in mehrfacher Hinsicht abweicht und von Thessen und Sydow in Annal. Mycol. XIII, p. 405 (1915) bei *Phaeochora* eingereiht wurde, vom Typus dieser Gattung aber ganz verschieden ist und bezüglich ihrer generischen Zugehörigkeit noch näher geprüft werden muss. Shear hat l. c. noch die fünf Arten *Sph. chamaeropis* (Cke.) Shear, *Sph. palmicola* (Speg.) Shear, *Sph. rimosa* (Speg.) Shear, *Sph. densa* (Bomm. et Rouss.) Shear und *Sph. guilielae* (P. H.) Shear als neue Kombinationen aufgestellt, die aber wie aus den oben zitierten Arbeiten v. Höhnel's und Theissen und Sydow's hervorgeht, dem *Sphaerodothis*-Typus nicht entsprechen und von den genannten Autoren daher auch in andere Gattungen eingereiht wurden.

Theissen und Sydow führen l. c. p. 577—580 ausser *Sph. arengae* (Rac.) Shear noch sechs andere Arten an, die auf ganz heterogenen Nährpflanzen, nämlich auf *Freycinetia, Eugenia, Yucca, Vaccinium, Dactylis* und *Verbesina* vorkommen und daher schon aus diesem Grunde wenigstens teilweise in generischer Hinsicht nicht als übereinstimmend erachtet werden können. Hier soll ausdrücklich darauf hingewiesen werden, dass die meisten älteren mehr oder weniger schematisch auf ein oder zwei teilweise sogar ziemlich nebensächliche Merkmale begründeten Askomyceten-Gattungen in die nur parasitische auf ganz heterogenen Nährpflanzen lebende Arten eingereiht wurden, in generischer Hinsicht meist nicht zusammengehören können, besonders dann, wenn sie auch in ganz verschiedenen Florengebieten vorkommen. Solche Pilze, wie die von Theissen und Sydow angeführten *Sphaerodothis*-Arten sind jedoch sehr schwierig zu beurteilen, weil nur sehr genaue Untersuchungen an gut entwickelten Exemplaren zeigen können, ob und welche zusätzlichen Merkmale für die generische Beurteilung in Betracht kommen können. Ein zahlreiches mir von *Sph. Pringlei* auf verschiedenen *Yucca*-Arten vorliegendes Material hat mich veranlasst, die Zugehörigkeit der genannten *Sphaerodotis*-Art zu untersuchen. Hier soll daher zuerst eine ausführliche Beschreibung dieses Pilzes mitgeteilt werden:

Stromata im bezug auf Form, Grösse und Dicke sehr veränderlich und von der Beschaffenheit des Blattes abhängig, locker oder ziemlich dicht zerstreut, rundlich, 1—5 mm, seltener bis ca. 9 mm im Durchmesser, meit jedoch in der Längsrichtung des Blattes mehr oder weniger gestreckt, elliptisch oder ziemlich unregelmässig im Umriss, dann meist 1,5—5 mm lang, 1—4 mm breit, bisweilen in kürzeren oder längeren Längsreihen dicht hintereinander stehend, mehr oder weniger, oft vollständig zusammenfliessend und bis ca. 2 cm lange, 1,5—3 mm breite Streifen bildend, meist die ganze Blattdicke einnehmend und beiderseits durch einen, je nach der *Yucca*-Art bald glänzenden, bald mattschwarzen, sich in und unter der Epidermis entwickelnden Klypeus scharf begrenzt, meist ohne Fleckenbildung, sich zuweilen aber auch in einem ziemlich dunkelbraunen, durch einen etwas erhabenen Rand scharf begrenzten, das zentrale Stroma kreisringförmig als schmalen nur ca. 0,5—1 mm breiten Saum umgebenden Flecken entwickelnd. Auf dickeren Blättern fehlt der Klypeus auf der unteren Seite oft ganz. Es wird dann ein hellgeblicher, scharf begrenzter Flecken gebildet, in welchem die Mündungen der Gehäuse zuweilen kleine schwärzliche Punkte bilden. Epiphyll fliessen die Flecken oft zusammen und sind durch die oft kreisförmig angeordneten Mündungen schwarz punktiert, während in der Mitte oft auch ein kleiner, meist ganz unregelmässiger Klypeus gebildet wird. Habituell ganz verschieden liegt mir der Pilz auf *Yucca Schotti* vor. Er verursacht hier in der Längsrichtung mehr oder weniger gestreckte, bis ca. 10 mm lange, 2—5 mm breite, unregelmässige oder elliptische, ziemlich dunkelbraune, von einer erhabenen Saumlinie scharf begrenzte Flecken, in denen die zahlreichen, ziemlich dicht stehenden Mündungen von kleinen schwärzlichen, meist ziemlich unscharf begrenzten Klypei umgeben werden.

Das intramatrikale Stroma besteht selten und meist nur auf jüngeren Blättern aus einer zusammenhängenden, epiphyll und hypophyll in der Epidermis einen meist glänzenden, zuweilen aber auch matt schwarzen Klypeus bildenden, beiderseits konvex vorgewölbten Schicht von spröder, brüchig-kohliger Beschaffenheit. Auf dickeren Blättern besteht das Stroma aber immer aus zwei oder mehreren, ca. 80—200 μ dicken, durch Faserschichten des Substrates oder durch schmale in der Längsrichtung verlaufende Hohlräume getrennten Schichten. Das Stromagewebe ist pseudoparenchymatisch und besteht aus sehr kleinen, 3—4 μ, seltener bis 4,5 μ grossen, fast opak schwarzen, relativ dickwandigen Zellen. Perithezien dem Stroma vollständig und tief eingesenkt, meist 3—6, ganz unregelmässig und oft undeutlich zweischichtig angeordnet, rundlich, breit eiförmig oder ellipsoidisch und meist mehr oder weniger unregelmässig, ca. 300—450 μ im Durchmesser, bisweilen zusammenfliessend, dann grösser und ganz unregelmässig werdend, durch ein dem Stroma eingewachsenes Ostiolum punktförmig nach aussen mündend. Aszi nicht besonders zahlreich, zylindrisch, oben breit abgerundet, unten in einem sehr kurzen Stiel verjüngt, dünn und ziemlich zartwandig, 8-sporig, p. sp. 170—220 μ lang, 15—18 μ breit. Sporen einreihig, länglich ellipsoidisch oder kurz und dick zylindrisch, beidendig breit abgerundet, nicht selten und auch nur an einem Ende sehr schwach verjüngt, gerade, selten etwas ungleichseitig, einzellig, lange hyalin, sich zuletzt ziemlich hell olivbraun färbend, mit homogenem, sehr feinkörnigem Plasma, 25—36 μ lang, 10—14 μ breit. Paraphysen ausserordentlich zahlreich, aus reich verzweigten, ziemlich derben, ca. 1,5—2 μ dicken Fäden bestehend.

Zu diesem Pilz gehört eine Konidienform, die in der von mir durchgesehenen Literatur nicht erwähnt wird, daher entweder noch nicht beobachtet oder gar nicht beachtet wurde. Sie bildet im ganz jungen Stroma grössere oder kleinere, meist ganz unregelmässige Lokuli, deren Wand aus einem sehr inhaltreichen Gewebe von rundlich eckigen, ca. 3—6 μ grossen Zellen besteht. Darin entstehen auf kurzfädigen Trägern stäbchenförmige, beidendig stumpfe, oft ganz schwach verjüngte, dann sehr schmal spindelige, ganz gerade, selten etwas ungleichseitige, einzellige, hyaline Konidien, die 9—12 μ, selten bis ca. 15 μ lang und 1,5—2 μ breit sind.

Vergleicht man die hier mitgeteilte Beschreibung mit der von *Sph. arenge* bei v. Arx und Müller, Beitr. Krypt. Fl. Schweiz. XI/1, p. 244, Abb. 72 (1954), so wird man sofort erkennen, dass *Sph. Pringlei* vom Typus dieser Gattung ganz verschieden ist. Das Stromagewebe ist sehr spröde, brüchig kohlig, lässt sich kaum schneiden und besteht aus sehr kleinen, opak schwarzen Zellen. Der Klypeus ist oft nur auf einer Seite gut entwickelt, kann zuweilen auch ganz fehlen. Die Perithezien sind ganz unregelmässig angeordnet, ihre Wand ist relativ dick, weichhäutig-fleischig, hyalin und besteht aus vielen Lagen von rundlich eckigen Zellen. Die Sporen sind ziemlich gross, gestreckt ellipsoidisch oder kurz und dick zylindrisch. Besonders auffällig sind die ausserordentlich zahlreichen, relativ derbfädigen, sehr reich ästigen Paraphysen. *Sph. Pringlei* muss daher als Typus einer neuen sphaerialen Gattung aufgefasst werden, die auf folgende Weise zu charakterisieren wäre:

Apodothina Petr. nov. gen.

Stroma foliicolum, omnino innatum, utrinque, raro in epiphyllo tantum clypeo intraepidermali praeditum, continuum vel saepe plus minusve interruptum; contextu fragilissimo, carbonaceo, minute pseudoparenchymatico, aterrimo; perithecia pauca, irregulariter disposita, omnino immersa; ostiola stromati omnino innata, conoidea, punctiformiter erumpentia, sed non prominula; pariete carnoso-membranaceo, minute pseudoparenchymatico, hyalino; asci subnumerosi, cylindracei, 8-spori, tenuiter tunicati, subsessiles vel breviter stipitati; sporae oblongo-ellipsoidae vel crasse zylindraceae, diu hyalinae, postea pellucide olivaceae, continuae, rectae, raro inaequilaterae, majusculae; paraphyses numerosissimae, fibrosae, valde ramosae, sero mucosae.

Apodothina Pringlei (Peck) Petr. nov. comb.
Syn.: *Dothidea Pringlei* Peck in Bot. Gaz. VII, p. 57 (1882).
Auerswaldea Pringlei Sacc. Syll. Fung. II, p. 626 (1883).
Sphaerodothis Pringlei Theiss. et Syd. in Annal. Mycol. XIII, p. 579 (1915).

Über Trichosphaeria pulchriseta (Peck) Ellis et Everhart.

Von F. Petrak, Wien

Auf einem ganz morschen Baumstrunk habe ich während meines Aufenthaltes in den Vereinigten Staaten einen sehr kleinen, zierlichen Pyrenomyzeten gesammelt, der schematisch beurteilt eine *Trichosphaeria*-Art zu sein schien. Gewisse auffällige Merkmale des Pilzes veranlassten mich aber, an seiner generischen Zugehörigkeit zu *Trichosphaeria* zu zweifeln, weshalb ich mich entschloss, diesen Umstand einer genauen Prüfung zu unterziehen, vor allem *Trichosphaeria pilosa* Fuck., die Typus-Art der Gattung zu untersuchen und mit dem von mir gefundenen Pilz zu vergleichen. Nach dem von Fuckel in Fungi rhenani unter Nr. 946 ausgegebenen Originalexemplar habe ich die folgende Beschreibung entworfen:

Perithezien sich ganz oberflächlich entwickelnd, unregelmässig locker oder ziemlich dicht zerstreut, oft auch in kleineren oder grösseren Herden dicht gehäuft beisammen oder in der Faserrichtung des Holzes folgenden Längsreihen hintereinander stehend, dann oft am Grunde etwas miteinander verwachsen, einzeln mehr oder weniger rundlich oder breit eiförmig, 150—180 μ seltener bis ca. 200 μ im Durchmesser, wenn dicht gehäuft in senkrechter Richtung oft etwas gestreckt, dann fast stumpf kegelförmig, durch gegenseitigen Druck oft abgeplattet und ziemlich unregelmässig werdend, 150—200 μ hoch, 100—140 μ breit, mit papillenförmigem, von einem rundlichen ziemlich unscharf begrenzten, ca. 20 μ weiten Porus durchbohrtem Ostiolum, zerstreut mit aufrecht oder fast abstehenden, schwarzbraunen, wohl immer nur einzelligen, oben allmählich verjüngten und stumpf zugespitzten, meist ca. 12—30 μ, seltener bis 40 μ langen, unten 3—5 μ breiten Borsten besetzt, vereinzelt auch fast kahl. Peritheziummembran derbhäutig, im Alter ziemlich brüchig werdend, 12—18 μ dick, aus mehreren Lagen von ca. 4—6 μ, selten bis zu 8 μ grossen, kaum oder nur schwach zusammengepressten, ziemlich dünnwandigen, durchscheinend schwarzbraunen Zellen bestehend, innen plötzlich in eine subhyaline oder nur sehr hell gelbbräunlich gefärbte, konzentrisch faserige Schicht übergehend. Aszi ziemlich zahlreich, zylindrisch, oben fast gestutzt abgerundet, unten in einen kurzen Stiel verjüngt, dünnwandig, 8-sporig, p. sp. 50—65 μ lang, 4,5—5 μ breit. Sporen schräg einreihig, ellipsoidisch oder länglich eiförmig, beidendig abgerundet, kaum oder nur sehr schwach verjüngt, gerade, selten etwas ungleichseitig, hyalin, einzellig, mit undeutlich feinkörnigem Plasma, 5—8 μ, vereinzelt bis ca. 10 μ lang, 3—4 μ breit. Paraphysen ziemlich zahlreich, fädig, schon stark verschleimt und nicht mehr deutlich erkennbar.

Den oben erwähnten, von mir in Amerika gesammelten Pilz konnte ich mit *Trichosphaeria pulchriseta* (Pek) Ellis et Everhart identifizieren und mich durch einen Vergleich mit der von in Ellis und Everhart in North American Fungi II, Ser. unter Nr. 3218 ausgegebenen Kollektion von der Richtigkeit meiner Bestimmung überzeugen. Schon eine flüchtige Untersuchung zeigte mir aber, dass dieser, in der mir zur Verfügung stehenden Literatur nur sehr kurz und unvollständig beschriebene Pilz vom *Trichosphaeria*-Typus wesentlich verschieden ist. Nach dem von mir gesammelten, reichlichen, gut entwickelten, aber wohl noch etwas jungen Material teile ich hier zunächst eine ausführliche Beschreibung mit.

Perithezien sich ganz oberflächlich entwickelnd, weitläufig und ziemlich gleichmässig locker oder dicht zerstreut, zuweilen auch in ganz kleinen, unregelmässigen Herden mehr oder weniger dicht gehäuft beisammenstehend aber stets von einander getrennt und niemals verwachsen, regelmässig kugelig, meist ca. 50—70 μ, selten bis ca. 90 μ im Durchmesser, völlig geschlossen, ohne Ostiolum, in der Mitte des Scheitels nur eine ganz unscharf begrenzte, etwas hellere Stelle zeigend, in trockenem Zustande meist etwas zusammenfallend, aussen bald nur mit 3—6, bald mit ca. 10—20 oder noch etwas zahlreicheren, steifen, meist auf der oberen Hälfte des Gehäuses entspringenden, aufrecht oder fast senkrecht abstehenden, fast opak schwarzbraunen, einzelligen, seltener mit 1—2 Querwänden versehenen, oben allmählich verjüngten, stumpf zugespitzten, ganz geraden oder nur schwach bogig gekrümmten, fast opak schwarzbraunen, an der Spitze etwas heller gefärbten, 25—35 μ, selten bis ca. 40 μ langen, unten 3—4,5 μ breiten Borsten besetzt. Peritheziummembran häutig, wahrscheinlich nur aus ein bis zwei Lagen von rundlich oder ganz unregelmässig eckigen, dunkel oliv- oder schwarzbraunen, ziemlich dünnwandigen, ca. 4—6 μ, selten bis ca. 8 μ grossen Zellen bestehend. Aszi nicht besonders zahlreich, zylindrisch, beidendig zuweilen etwas verjüngt, dann oft etwas spindelig, fast sitzend oder sehr kurz gestielt, dünnwandig, 8-sporig, ca. 20—30 μ lang, 4,5—6 μ breit. Sporen ein- oder unvollständig zweireihig, länglich spindelig oder etwas keulig, beidendig abgerundet und meist schwach, unten zuweilen auch etwas stärker verjüngt, gerade, selten ungleichseitig oder sehr schwach gebogen, hyalin, einzellig, 5—6 μ, seltener bis 7 μ lang, 2—3 μ breit, meist mit 2—3 sehr kleinen Öltröpfchen versehen. Paraphysen spärlich, undeutlich senkrecht faserig, miteinander verklebt und nicht deutlich erkennbar.

Zerdrückt man in einem Präparat die Gehäuse unter dem Deckglas, so springen sie mit einem Spalt auf, aus welchem der ganze „Nukleus" in der Form einer hyalinen Kugel herausspringt, was ein Beweis dafür ist, dass die Fruchtschicht mit der Wand des Peritheziums nicht fest verwachsen ist.

Vom *Trichosphaeria*-Typus weicht der zierliche, prächtige Pilz durch die sehr kleinen regelmässig rundlichen, nie über 100 μ grossen, völlig geschlossenen, keine Spur eines Ostiolums zeigenden, bei der Reife wahrscheinlich am Scheitel unregelmässig aufreissenden oder ganz zerfallenden Perithezien wesentlich ab. Er ist mit *Trichosphaeria pilosa* Fuck. gewiss nicht näher verwandt und muss als Typus einer neuen, gut charakterisierten Gattung aufgefasst werden, die ich dem Andenken meines lieben, allzu früh verstrobenen Freundes, Professor Dr. Kurt Lohwag widme und *Lohwagiella* Petr. nov. gen. nenne. Dieselbe wird auf die folgende Weise zu charakterisieren sein.

Lohwagiella Petr. nov. gen.

Perithecia late dispersa, superficialia, regulariter globosa, minuta, 100 μ diam. non excedentia, pilis paucis vel subnumerosis, simplicibus, atro-olivaceis, continuis vel parce septatis praedita, omnino clausa, nec ostiolata; pariete membranaceo, pseudoparenchymatico, atro-oliovaceo; asci subnumerosi, cylindracei vel subfusoidei tenuiter tunicati, subsessiles vel breviter stipitati, 8-spori; sporae oblongae, subfusoideae, vel subclavatae, hyalinae, continuae, 6/2,5 μ; paraphyses paucae, mox mucosae.

Perithezien meist sehr weitläufig und locker, selten dicht zerstreut oder kleine Herden bildend, sich ganz oberflächlich entwickelnd, regelmässig kugelig, nicht über 100 μ im Durchmesser, bald nur mit wenigen, bald mit mehr oder weniger zahlreichen, steifen, stumpf zugespitzten, fast opak schwarzbraunen, an der Spitze etwas heller gefärbten, einzelligen oder mit ein bis zwei Querwänden versehenen, aufrecht oder fast senkrecht abstehenden Borsten besetzt, völlig geschlossen, ohne Ostiolum. Peritheziummebran dünnhäutig, pseudoparenchymatisch, schwarzbraun, am Scheitel etwas heller gefärbt. Aszi nicht besonders zahlreich, zylindrisch, oft etwas spindelig, fast sitzend oder kurz gestielt, zartwandig, 8-sporig. Sporen länglich, oft etwas spindelig oder keulig, meist gerade, hyalin, einzellig, 6/2,5 μ. Paraphysen spärlich, fädig, bald stark verschleimend und nicht mehr deutlich zu erkennen.

Der Gattungstypus wird jetzt als *Lohwagiella pulchriseta* (Peck) Petr. nov. comb. einzureihen sein und folgende Synonyme haben:

Lohwagiella pulchriseta (Peck) Petr. comb. nov.

Syn.: *Sphaeria puchriseta* (Peck 31. Rep. New York State Museum 1877, p. 50 (1879).

Acanthostigma pulchrisetum Sacc. Syl. Fung. II, p. 208 (1883).

Trichosphaeria pulchriseta Ellis et Everhart North Amer. Fungi, p. 151 (1892).

Literatur:

Arx, J. A. v. und E. Müller, Die Gattungen der Amerosporen Pyrenomyzeten. Beitr. Krypt. Fl. Schweiz, XI/1, p. 269 (1954).
Winter, G,, in Rabh. Krypt. Fl. ed. 2., II, p. 204 (1887).

Neue Literatur.

The Commonwealth Mycological Institue Kew, Surrey. — Mycological Papers

Nr. 118. Deighton, F. C., Microfungi. VI: Some hyperparasitic Hyphomycetes and a note on *Cercosporella uredinophila* Sacc. 1969, 41 pp., 2 Taf., 23 Fig. . . . . 15 s, —.

Zuerst wird die von Ciferri aufgestellte Gattung *Acremoniula* besprochen und *A. sarcinellae* (Pat. & Har.) Deight. comb. nov. ausführlich beschrieben. 5 neue monotypische Gattungen, nämlich *Spermosporella, Stenospora, Irpicomyces, Pseudofusidium* und *Annellodochium* auf Grund ihrer ebenfalls neuen Typusarten beschrieben. Die neuen Gattungen *Eriocercospora* und *Elletevera* werden für *Helminthosporium balladynae* Hansf. und *Piricularia parasitica* aufgestellt. Dann werden noch zwei neue *Cladosporium*- und zwei neue *Cladosporiella*-Arten beschrieben. Von *Cercosporella uredinophila* Sacc. wird eine ausführliche und verbesserte Beschreibung mitgeteilt und darauf hingewiesen, dass dieser Pilz nicht auf einer Uredinee sondern auf Blättern von *Scirpus* parasitiert. Alle angeführten Arten werden abgebildet.

F. Petrak

Nr. 120. Chesters, C. G. C., and Bell, A. Studies in the Lophiostomataceae Sacc. 1970, 55 pp., 16 Fig. . . . 25 s.

In der Einleitung wird eine historische Übersicht mitgeteilt und darauf hingewiesen, dass Tode als erster Autor eine Lophiostomatacee, nämlich *Sphaeria macrostoma* beschrieben hat. Im systematischen Teil wird zuerst ein Bestimmungsschlüssel für die von den Autoren angenommenen Gruppen der Gattung *Lophiostoma* vorangestellt, die nach ihren typischen Vertretern benannt werden. Jeder Gruppe wird ein Bestimmungsschlüssel für die zu ihr gehörigen Arten beigefügt. Jede Art wird ausführlich beschrieben, die zugehörigen Synonyme und das untersuchte Material werden genau zitiert. Die durch zweizellige Sporen ausgezeichnete Gattung *Schizstoma* Sacc. wird mit *Lophiostoma* vereinigt, was wohl nicht gutgeheissen werden kann. Den Schluss bildet die Gattung *Platystomum* von der vier Arten und zwei Varietäten angeführt werden.

F. Petrak

Nr. 121. Cooke, W. B.: A Preliminary List of the families proposed for fungi (including the lichens). 1970, 86 pp., . . . £ 2,—,—.

In der Einleitung weist Verf. darauf hin, dass mit der besseren Kenntnis der Flora eines bestimmten Gebietes die Tendenz zur Unterscheidung infra- und supraspezifischer Einheiten ansteigt. Viele Arten werden besser in kleinere Gattungen geteilt, was zur Folge hat, dass das Bedürfnis entsteht, diese in supragenerische Einheiten, nämlich in Unterfamilien, Familien und Ordnungen unterzubringen. Die meisten Autoren, die sich mit Pilzen oder anderen Pflanzengruppen beschäftigen, ignorieren meist den Ursprung der Familiennamen, die sie gebrauchen. Verf. hat sich dazu entschlossen, eine Liste aller bisher eingeführten Familien der Flechten und Pilze zusammenzustellen. Im zweiten Kapitel werden alle jene Artikel der botanischen Nomenklaturregeln angeführt, die für die Familien zu berücksichtigen sind. Im speziellen Teile werden in alphabetischer Reihenfolge alle Flechten- und Pilzfamilien aufgezählt, die bisher veröffentlicht wurden. Bei jeder Familie wird ihr Autor mit dem Zitat der Veröffentlichung angeführt, der Gattungstypus angegeben und in kurzen Notizen auf verschiedene Schreibweisen, nicht den Nomenklaturregeln entsprechende Veröffentlichungen und andere zu berücksichtigende Daten hingewiesen. Den Schluss bildet ein ausführliches Literaturverzeichnis.

F. Petrak

Rayner, R. W.: A Mycological Colour Chart. 1970. 34 pp., 17 Taf. ... £ 2,—,—.

Auf einer Versammlung der British Mycological Society im Frühjahr 1960 wurde auf die Schwierigkeiten hingewiesen, mit denen die Mykologen durch die in der einschlägigen Literatur sehr verschieden bezeichneten Farben zu kämpfen haben. Die Prüfung der verschiedenen Tafelwerke und der Nomenklatur der verschiedenen Farben wurde von einem Unterausschuss der genannten Gesellschaft besorgt, Munsell's System für die korrekte Darstellung der Farben und für die Nomenklatur, die von H. Dade in seiner Colour Terminology in Biology angewendeten Bezeichnungen zu gebrauchen empfohlen. Verf. gibt dann eine Anleitung für die Benützung der Tafeln und bespricht die verschiedenen Tönungen, die eine Farbe haben kann. Ein Verzeichnis der einschlägigen Literatur beschliesst den allgemeinen Teil.

Es folgen dann 3 Tabellen, von denen die erste ein alphabetisches Verzeichnis der auf den vorliegenden Tafeln angewendeten Farbenbezeichnungen mit Angabe der lateinischen, der vom Inter-Society Colour Council of America, der vom National Bureau of Standards und der von Munsell angewendeten Namen bringen. Auf Tabelle 2 werden die lateinischen Namen mit den zugehörigen englischen Bezeichnungen angeführt. Tabelle 3 ist ein alphabetisches Verzeichnis der von Ridgeway angewendeten Farbennamen mit den entsprechenden Namen von Munsell.

F. Petrak

Domsch, K. H. und Gams, W.: Pilze aus Agrarböden. 1970, 217 Seiten, 140 Abb,- Gustav Fischer Verlag, Stuttgart, Ganzleinen DM 48.—.

Im letzten Jahrzehnt haben die bodenbiologischen Arbeiten im Vergleich zu bodenphysikalischen und bodenchemischen Untersuchungen stark zugenommen. Damit ist auch das Interesse an der Mykocönose des Bodens gestiegen, wodurch das Schwergewicht auf Bestandsaufnahmen zu ökologischen Problemen verlagert wird. Die Bodenmykologie hat sich daher mit Isolierung, Bestimmung und quantitativer Feststellung von Bodenpilzen zu befassen und deren Bedeutung im edaphischen Ökosystem zu deuten. In einer weit zerstreuten zahlreichen Literatur sind bereits viele diesbezügliche Informationen enthalten. In den bisher erschienenen zusammenfassenden Darstellungen der Bodenmikrobiologie und Bodenmykologie sind jedoch bisher nur wenige bodenbiologische Details aufgenommen worden. Die vorliegende Kompilation ist ein Versuch, ökologische und physiologische Einzelheiten von Bodenpilzen zusammenzufassen.

Berücksichtigt wurden nur Arten, die aus Ackerböden bei Kiel und Kiel-Kitzeberg isoliert wurden. Pilze, die sich nicht sicher bestimmen liessen, wurden nicht aufgenommen. Das untersuchte Material umfasste mehr als

23.000 Pilzstämme, die als sichere Bodenpilze festgestellt werden konnten. Es kann als sicher angenommen werden, dass dadurch ein hoher Prozentsatz aller in Ackerböden der gemässigten Zone als Bestandteile der Mykoflora festgestellten Arten erfasst wurde. Die Literatur wurde unter der Voraussetzung ausgewertet, dass die Artbestimmungen der Autoren als richtig angesprochen werden konnten. Die Charakterisierung der einzelnen Arten erfolgt nach systematischen, ökologischen und physiologischen Gesichtspunkten. Die systematischen Angaben beschränken sich meist auf eine kurze Darstellung des gültigen Namens und der wichtigsten Synonyme. Auf Bestimmungsschlüssel und morphologische Einzelheiten wurde verzichtet. Als Bestimmungshilfe können die den meisten Arten beigefügten Abbildungen und die angeführten Differentialmerkmale verwendet werden. Die ökologischen Daten bringen Mitteilungen über Vorkommen, Einfluss von Umweltsfaktoren und Wechselbeziehungen. Dabei erwiesen sich immer mehr Bodenpilze als Ubiquisten von weltweiter Verbreitung. Die Angaben über die Physiologie der Bodenpilze betreffen vor allem Reproduktion, Wachstum und Leistungen. Weil sich die Umsatz- und Reproduktionsleistungen vor allem auf Ergebnisse an Reinkulturen beziehen, kann vom Nachweis biochemischer Tatsachen nicht mit Sicherheit auf die Verwirklichung im Boden geschlossen werden.

Die Ergebnisse von 209 aus Ackerböden isolierten, den verschiedensten Gattungen angehörigen Pilzen werden in alphabetisch geordneten Einzeldarstellungen angeführt. Die Arten werden durch Differentialdiagnosen charakterisiert und durch Zeichnungen oder Mikrophotographien erkenntlich gemacht.

Das Literaturverzeichnis am Schluss des Werkes umfasst 1.600 Titel und kann den Benützern das Auffinden von Einzelformationen zeigen. Die Anschaffung des vom Verlag vorzüglich ausgestatteten, reich und trefflich illustrierten Werkes kann nicht nur den sich mit den Fragen der Bodenpilzflora beschäftigenden Forschern, sondern auch allen Mykologen und Mikrobiologen wärmstens empfohlen werden und wird gewiss auch Interessenten zu weiteren bodenbiologischen Untersuchungen anregen können. F. Petrak

Flechtvensymposium 1969. Herausgegeben von der Deutschen Bot. Gesell. 1970, 198 Seiten, zahlreiche Abb., Gustav Fischer Verlag Stuttgart, Ganzleinen DM 42.—.

Das von der Deutschen Botanischen Gesellschaft veranstaltete Flechtensymposium 1969 sollte verschiedene Teilgebiete der Lichenologie berücksichtigen und sich vor allem auf mitteleuropäische Autoren stützen. Dabei konnte festgestellt werden, dass die verschiedenen Probleme der Lichenologie heute auch in Mitteleuropa wieder viele Interessenten gefunden haben, die sich mit ihnen erfolgreich beschäftigen. Nachstehend werden die Titel der in den einzelnen Teilgebieten behandelten Arbeiten angeführt:

Chemie und Chemotaxonomie: J. Santesson, Neuere Probleme der Flechtenchemie — M. Steiner und G. Hauschild, Die Anthrachinone von Caloplacaceae und Telochistaceae (Lichenes) — B. Feige, Untersuchungen zur Wechselstoffphysiologie der Flechten unter Verwendung radioaktiver Isotope — C. Leuckert, J. Poelt und G. Schulz, Chemotaxonomische Probleme in der Flechtengattung *Pertussaria*.

Ökologie: L. Kappen und O. L. Lange, Kälteresistenz von Flechten aus verschiedenen Klimagebieten — O. Noeske, A. Läuchli, O. L. Lange, G. H. Vieweg und H. Ziegler, Konzentration und Lokalisierung von Schwermetallen in Flechten der Erzschlackenhalden des Harzes — V. Varesch, Lichenologische Beiträge zu Eiszeitproblemen in den Anden.

Morphologie und Entwicklungsgeschichte: E. Peveling, Die Darstellung der Oberflächenstrukturen von Flechten mit den Raster-Elektronenmikroskop — A. Henssen, Die Apothecienentwicklung bei *Umbilicaria* Hoffm. emend. Frey — H. Jahns, Untersuchungen zur Entwicklungsgeschichte der Cladoniaceen unter besonderer Berücksichtigung des Podetien-Problems — siehe Nova Hedwigia 20 (1970), 1—177.

F. Petrak

Hartz, P.: Die Anfälligkeit verschiedener Gramineen gegen *Cercosporella herpotrichoides* Fron im Hinblick auf die Fruchtfolgezusammenhänge bei der Halmbruchkrankheit des Weizens. Mitteil. Biol. Bund.-Anst. f. Land- u. Forstwirtsch. Berlin-Dahlem, Heft 135, 1969, 38 Seiten, 11 Abb. . . . DM 12.—.

Verf. hat verschiedene Gräser, nämlich *Agropyrum repens, Alopecurus myosuroides, Apera spica venti, Avena fatua, A. sativa, Bromus inermis, Dactylis glomerata, Lolium multiflorum, L. perenne, Poa annua* und *P. pratensis* auf ihre Anfälligkeit durch *Cerosporella herpotrichoides*, den Erreger der Halmbruchkrankheit des Weizens untersucht und gefunden, dass Weizen den stärksten Befall zeigte. Bei allen anderen Gramineen waren die Befallswerte mehr oder weniger kleiner. Die Fähigkeit, Konidien an befallenen Stoppeln zu bilden, sind bei Weizen auch stärker ausgeprägt als bei Hafer und anderen Gramineen. Es wurde auch festgestellt, dass schwach befallene Weizenstoppeln nach einiger Zeit mehr Konidien bilden können als stark befallene. In der zeitlichen Verteilung der Konidien besteht ein wesentlicher Unterschied, weil Weizenstoppeln im Herbst und Frühjahr ein Maximum in der Konidienproduktion zeigen, Hafer und die übrigen Gräser aber nur im Frühjahr. Für ein epidemisches Auftreten der Krankheit dürfte ein sehr hoher Infektionsdruck erforderlich sein. Weil die Sporenbildung bei Hafer und anderen Gräsern schwächer ist, darf angenommen werden, dass hier die Infektionsschwelle nicht erreicht wird.

F. Petrak

Nienhaus, F., Phytopathologisches Praktikum, Versuchsanleitungen und Laborathoriumsmethoden für Studium und Praxis. 1969, 167 Seiten, 61 Abb., Paul Parey Verlag, Berlin-Hamburg, Ganzleinen DM 26.—.

In den Institution der Universitäten und Hochschulen für Bodenkultur werden den Studierenden für praktische Übungen mit pathogenen Pilzen der Kulturpflanzen meist nur in Form von vervielfältigten Maschinenschreibseiten hergestellte Skripten zur Verfügung gestellt, die sich meist nur mit sehr wenigen Fragen der Phytopathologie beschäftigen. In neuerer Zeit sind in Amerika Übungsbücher für phytopathologische Versuche erschienen, die für europäische Verhältnisse nur wenig Wert haben, weil sie mit Krankheitserregern durchzuführen sind, die an europäischen Hochschulen nicht verwendet werden.

Das vorliegende pathologische Praktikum des Verf. beruht auf jahrelangen Erfahrungen, die er in Kursen machen konnte, bei welchen er Studierende auf Grund einfacher Übungen und Versuche in phytopathologische Probleme einzuführen hatte. Es werden 114 Übungen angeführt, die sich mit Differentialdiagnosen von Krankheiten und Schäden, mit Pilz- und Bakterienerkrankungen, Viruskrankheiten, Nematoden, Schmarotzerpflanzen und Unkräutern sowie mit Beschädigungen durch nicht parasitäre Ursachen beschäftigen. Entomologische Übungen werden nicht in Betracht gezogen, weil diese an den meisten Hochschulen in besonderen Kursen behandelt werden. Die Arbeitsanweisungen wurden absichtlich sehr kurz verfasst, um die Studenten zu einer weitgehenden, selbständigen Durchführung der Versuche anzuregen. Die Literaturangaben sollen helfen, das Wissen phytopathologischer Probleme zu vertiefen. Die vorgeschlagenen Übungen überschreiten bei weitem den Rahmen eines Praktikums, sollen aber dem Dozenten, die Möglichkeit bieten, nach seinem Ermessen die ihm am geeignetsten erscheinenden Übungen auszusuchen.

Das vorliegende Werk des Verf. füllt eine Lücke in der deutschsprachigen phytopathologischen Literatur aus, das nicht nur für Studierende der Phytopathologie und Botanik, sondern auch für das technische Personal dieses Fachgebietes und für junge Wissenschaftler in Forschung und Praxis bestimmt ist, die sich in ein neues Spezialgebiet einarbeiten wollen. Zahlreiche einfache Übungen könnten wohl auch im Biologieunterricht an höheren Schulen durchgeführt werden und bei manchen Schülern das Interesse für dieses wichtige Arbeitsgebiet wecken. Aus Übungen, die das Vorhandensein vieler, wohl auch teuerer Apparate im Laboratorium voraussetzen, wurde verzichtet. Durch einfache Zeichnungen des Verf. wird das Verständnis der Arbeitsvorschrift erleichtert.

Das vom Verlag vortrefflich ausgestattete Werk wird von allen Interessenten gewiss mit grosser Freude begrüsst werden und vor allem den Studierenden der Phytopathologie wertvolle Hilfe leisten.

F. Petrak.

Henderson, D. M., Orton, P. D. and Watling, R.: British Fungus Flora. Agrics and Boleti: Introduction. 1969, 58 pp., 50 Fig., 1 Farbtaf., Her Majesty's Stationery Office, Edinburgh . . . 5s.

Mit der vorliegenden ersten Lieferung ersheint eine Flora der Agaricales und Boletaceen Grossbritanniens, in welcher die zahlreichen, in den letzten Jahren erschienenen systematischen Arbeiten über diese Pilze berücksichtigt werden sollen. In der Einleitung geben die Verff. eine historische Übersicht über die Erforschung der Grosspilzflora Grossbritanniens und weisen auf die für die Systematik dieser Pilze erschienenen wichtigen Werke von Singer, Kühner, Romagnesi und Moser hin, die bisher in der englischen Literatur nur teilweise berücksichtigt werden konnten. Ausser populären Werken sind in England während der letzten Zeit nur detailierte Studien über Boleten, *Lactarius* und *Russula* von Pearson, über *Inocybe* und *Mycena* von Dennis und über *Panaeolus* von Hora erschienen. Eine, die neuesten Forschungen berücksichtigende Flora der genannten Pilzgruppen dürfte daher vor allem den Pilzfreunden und Studenten willkommen sein.

In dieser neuen Flora werden nur die für die Nomenklatur in Betracht kommenden und die in den britischen Werken vorkommenden Synonyme zitiert. Um Platz zu sparen werden die Beschreibungen ziemlich kurz gefasst, aber alle wichtigen Merkmale berücksichtigt. Für die systematische Anordnung wurde, von einigen kleinen Abweichungen abgesehen, das von Singer aufgestellte System zu Grunde gelegt. Diese neue Grosspilzflora wird ca 2000 Arten umfassen und soll zu weiteren Studien zweifelhafter Probleme anregen.

Das erste Kapitel enthält eine Anleitung für das Sammeln und für die Untersuchung der Pilze. Die Verff. weisen mit Recht darauf hin, dass von jeder Art verschiedene Entwicklungsstadien eingesammelt und alle für die Identifikation oft wichtigen Angaben über Beschaffenheit des Standortes beigefügt werden sollen. Bei der Untersuchung des gesammelten Materials sind zuerst alle makroskopisch erkennbaren Merkmale, vor allem Farbe, Konsistenz, eventuell vorhandene Klebrigkeit der Hutoberfläche, Form, Geruch und Geschmack, Beschaffenheit des Stieles, Farbe der Lamellen, Sporen und Eigenschaften des Hutfleisches festzustellen. Zuletzt sind auch eventuell auftretende Farbänderungen auf Schnitten zu prüfen und Farbreaktionen durch die gebräuchlichen Reagentien, die bei vielen Pilzen zu beobachten und für die Identifizierung oft wichtig sind, zu untersuchen. Angeführt werden fünf Reagentien, deren Zusammensetzung genau angegeben wird. Zur mikroskopischen Untersuchung sind vor allem die Sporen, aber auch Bau und Beschaffenheit der Huthaut, senkrechte Schnitte durch die Lamellen zur Feststellung der Zystiden und der Zahl der auf den Basidien gebildeten Sporen, ferner die Eigenschaften des Stiel- und Hutfleisches festzustellen. Es folgt dann ein alphabethisches Verzeichnis der Familien mit den zu ihnen gehörigen Gattungen. Zuletzt werden noch vier Familien der „agaricoides"-Aphyllophorales mit den dazugehörigen Gattungen angeführt. Es folgen zwei Bestimmungsschlüssel für die Familien, von denen der eine die natürliche Verwandtschaft berücksichtigt, während der andere auf Grund der von Fries zur Unterscheidung verwendeten Merkmale entworfen wurde. Den Schluss bildet ein künstlicher Bestimmungsschlüssel für alle Gattungen, die in der vorliegenden Flora behandelt werden sollen. Zuletzt werden, alphabetisch nach Autoren geordnet, die angewendeten Abkürzungen der Abbildungswerke, eine Erklärung zu der beigegebenen Farbtafel, ein alphabetisches Verzeichnis der Fachausdrücke und eine Liste der wichtigsten Literatur angeführt.

Dieses im Erscheinen begriffene Werk wird, weil die Grosspilzflora der britischen Inseln von der Europas nicht wesentlich verschieden ist, nicht nur bei Pilzfreunden, sondern auch bei Mykologen das gebührende Interesse finden. Es ist nur zu hoffen, dass die weiteren Lieferungen nicht in zu grossen Intervallen, sondern bald erscheinen mögen.

F. Petrak.

Revue Roumaine de Biologie. Série de Botanique Tome 15, No. 1—6, 408 pp., Illustr. 1970.

Aus dem reichen, die verschiedensten Teilgebiete der Botanik berücksichtigenden Inhalt des vorliegenden Bandes werden hier die Titel der mykologischen und phytopathologischen, hauptsächlich parasitische Pilze berücksichtigenden Arbeiten und Artikel angeführt:

Dumitras, L., Becerescu, D. and Savauescu, A., Imporance of elektronmicroscopic characters of teliospore surface markings in the delimination of some species of Ustilaginales — Constantinescu, O., *Cercospora ailathi* and *Spermospora impatientis* as synonyms of *Centrospora acerina* — Puscasu, A. Méthode de laboratoire pour la détermination de la résistance de la pomme de terre à l'infection par galle verruqueuse *(Synchytrium endobioticum* (Schilb.) Pers. — Nicolaescu, M., Experimental investigations concerning applie mosaic virus in Romania — Dumitras, L., Infections expérimentales avec l'agent pathogène de la carie commune du blé sur quelques graminées sauvages — Beceresc u, D., *Ustilago haynaldiae* sp. nov. — Toma, N. *Dictyuchus missouriensis* Couch, a new species in the European Flora and the description of a new variety — Lazar, I., and Graham D. G., Comparative studies on *Corynebacterium poinsettiae*, *C. flaccumfaciens* and *C. flaccumfaciens* var. *aurantiacum* — Puscasu, A., *Spondylocladium atrovirens* Harz, un nouveau parasite de la pomme de terre en Roumaine — Constantinescu, O., Colony characteristics of some *Cercospora* spezies.

F. Petrak.

Robyns, W., Flore Iconographique des Champignons du Congo. Illustrée en couleurs par Mme. M. Goossens-Fontana. — Jardin Botanique de l'Etat Bruxelles. Rue Royael 236.

Fasc. XVII. *Hydnum* par R. A. Maas Geesteranus — *Macrolepiota* par P. Heinemann, p. 325—338. Planche LIII-LV. 1970.

Die vorliegende Lieferung dieser in der Sydowia schon oft besprochenen, prächtigen Ikonographie tropischer Pilze behandelt die Gattungen *Hydnum* und *Macrolepiota*. Für die fünf Gattungen der Hydnaceen wird ein Bestimmungsschlüssel mitgeteilt. Von diesen sind *Beenkia* und *Irpex* durch je eine *Steccheridium*, *Sarcodon* und *Donkia* durch je zwei Arten vertreten. Der Gattung *Macrolepiota* wird ein Bestimmungsschlüssel vorangestellt, in welchem auch einige mit den angeführten Arten verwandte, aber nicht im Kongo-Gebiet gefundene Species aufgenommen wurden. Ausführlich beschrieben und abgebildet werden acht Arten.

F. Petrak.

Schimitschek, E., Grundzüge der Waldhygiene. Wege zur ökologischen Regelung. Ein Leitfaden. 1969, 167 pp., 44 Abb., 24 Tab., Verlag Paul Barey, Berlin/Hamburg, Ganzleinen DM 36.—.

Die bedenkliche Einstellung der heutigen Forstwirtschaft, eine möglichst hohe Holzernte zu erzielen, verleitet zu rücksichtslosen Eingriffen in die Einheit des Waldes, gefährdet die Produktivität, verursacht hohe Forstschutzkosten und andere Nachteile. Deshalb kommt heute einer richtigen, die natürlichen Bedingungen berücksichtigenden Waldhygiene eine besondere Bedeutung zu. Ähnliche Ziele hat auch der Landschaftsschutz, die Raumplanung und der Gewässerschutz zu verfolgen, die mit verschiedenen, teilweise sogar ähnlichen Schäden wie die Waldhygiene zu kämpfen haben. Nicht nur die Gewinnung grosser Holzernten, sondern die Erzielung grösster Holzgüte wird eine Zukunftsaufgabe der Forstwirtschaft sein. Mittelpunkt der Erörterungen ist für den Verf. nicht der Schädling, sondern der von ihm befallene Wald. Man muss sich stets fragen, wodurch die Befallsbereitschaft ausgelöst wurde und wie sie beseitigt oder vermieden werden kann. Wie Verf. nachweist, wird die Befallsbereitschaft vor allem durch standortsfremde Monokulturen, Brandwirtschaft, Weide, Grundwassersenkung, Bodenverdichtung, zuweilen aber auch durch die Einführung und Kultur ausländischer Baumarten verursacht. Für die zuletzt genannte Ursache führt der Verf. ein Beispiel an, über das hier kurz berichtet werden soll.

Der Blasenrost, *Cronartium ribicola* J. C. Fisch. trat ursprünglich in der Heimat von *Pinus strobus* nicht auf. Diese Kieferart wurde zuerst in England, später auch in Europa eingeführt und seit Ende des 18. Jahrh. in Deutschland, Österreich, Schweiz, Skandinavien, später auch in den Ostsee-Ländern angepflanzt, wo sie mit dem Verbreitungsgebiet der Zirbe in Berührung kam, deren Areal in Ostrussland, Nord- und Zentralasien liegt. Auf der Zirbe ist *Cronartium ribicola* endemisch, tritt aber spärlich und nirgends epidemisch auf, weil diese Kiefer gegen den Pilz resistent ist. Zwischen 1870—1880 wurde Blasenrost zuerst in Skandinavien und in den Ostsee-Ländern beobachtet; er breitete sich rasch aus, weil *Ribes*-Arten die Wirte der Hauptfruchtform überall reichlich vorhanden waren und die

Weymouthskiefer sich gegen diesen Pilz als nicht resistent erwies. Durch die sich in Europa rasch ausbreitenden Epidemien wurden Millionenwerte vernichtet. Im Jahre 1909 wurde der Blasenrost mit Bäumchen, die aus einer französischen Baumschule zur Aufforstung nach Amerika eingeführt wurden, in die Nordost-Staaten der Union eingeschleppt und gelangte auf diese Weise in die Heimat der Weymouthskiefer, wo er bald auch verheerende Epidemien verursachte. Durch das Fällen aller befallenen Bäume und durch Beseitigung aller *Ribes*-Sträucher wird jetzt versucht die Krankheit einzudämmen. Dieser Fall ist vom Standpunkt der Waldhygiene sehr lehrreich. Die aus Amerika eingeführte Weymouthskiefer erkrankte in Europa an Blasenrost, der später von hier aus auch in ihre Heimat eingeschleppt wurde. Es zeigt sich also, dass nicht nur der Import fremder Pflanzen, sondern auch der Export hiesiger Pflanzen nur unter entsprechenden Vorsichtsmassregeln erfolgen darf.

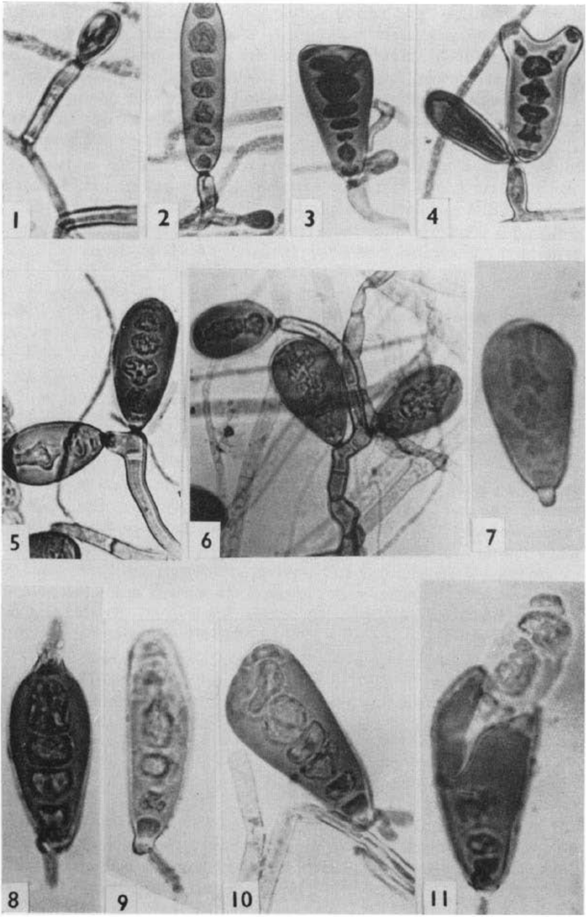
Ein wesentlicher Teil der Waldhygiene ist auch die biologische Regelung durch Erhaltung der Schlupfwespen und Raupenfliegen, wobei die ökologischen Verhältnisse besonders zu berücksichtigen sind.

Den Schluss des Buches bilden Erörterungen übere die richtige Durchführung der Waldhygiene durch Zusammenfügen der erworbenen Kenntnisse zu einem Ganzen. Alle Arbeiten im Walde dürfen die Bedürfnisse der Wirtschaft nur unter Berücksichtigung der natürlichen Standortsverhältnisse befriedigen.. Verf. bespricht daher die Organisationsgrundlagen, welche die Ausübung der Waldhygiene im vollen Umfang gewährleisten.

Verf. hat hier seine in mehr als 40 Jahren gewonnenen Erfahrungen und Forschungsergebnisse sowie die einschlägige Literatur bis in die jüngste Zeit verarbeitet. Zu bedauern ist, dass er fast nur die durch tierische Schädlinge verursachten Schäden berücksichtigt, die nicht weniger wichtigen, weil oft auch gefährliche Krankheiten verursachenden Pilzparasiten, jedoch weniger gründlich und ausführlich berücksichtigt hat.

Das eine Lücke in der phytopathologischen Literatur füllende, vom Verlag vorzüglich ausgestattete Werk wird nicht nur Forstwirte, Waldbesitzer, Biologen, Pflanzensoziologen, Zoologen und Phytopathologen, sondern auch weite sich für die Erhaltung der Reste der noch vorhandenen natürlichen Landschaft und der Wälder interessierende Kreise, vor allem aber auch Studierende aller biologischen Richtungen ansprechen und die ihm gebührende Verbreitung finden.

F. Petrak.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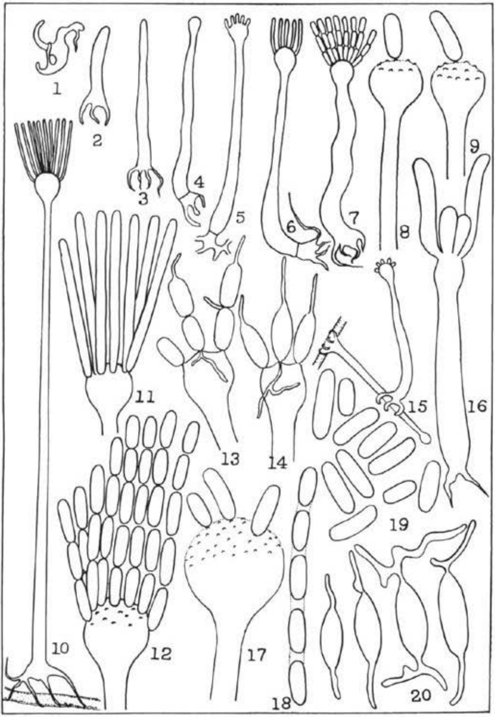
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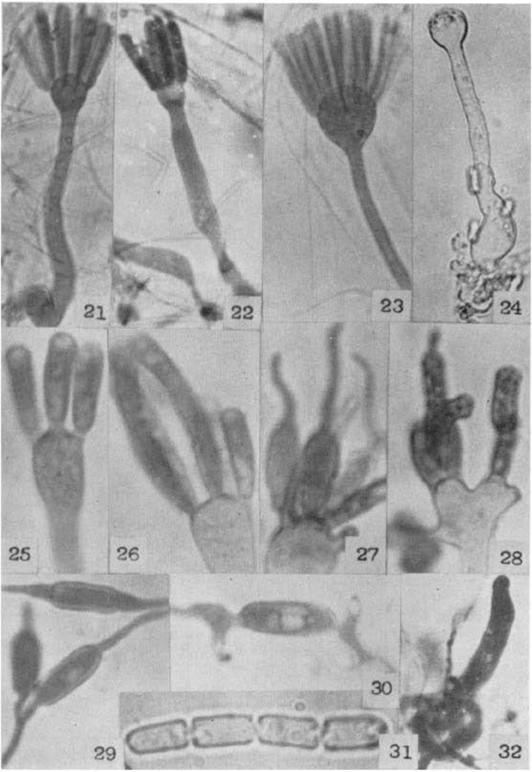
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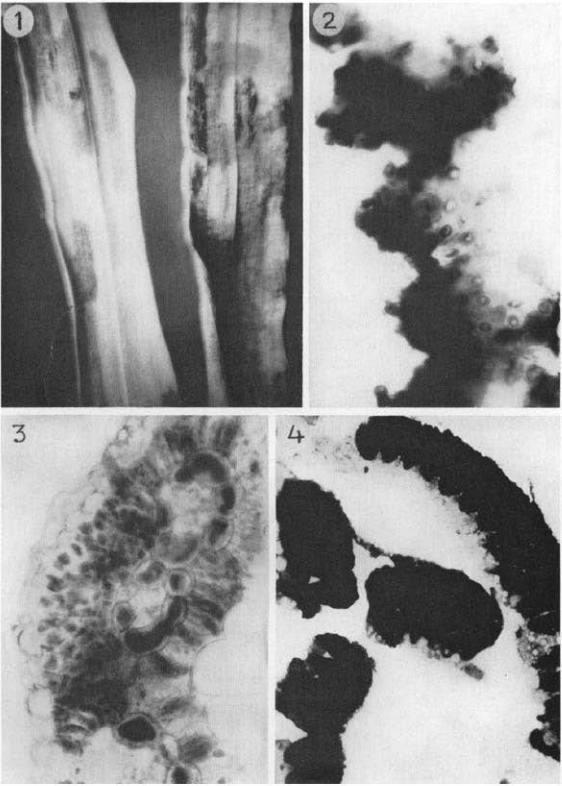
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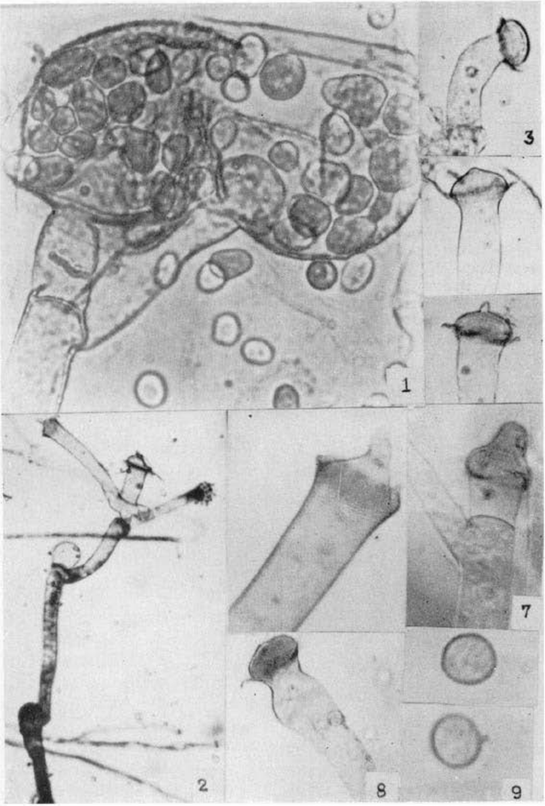
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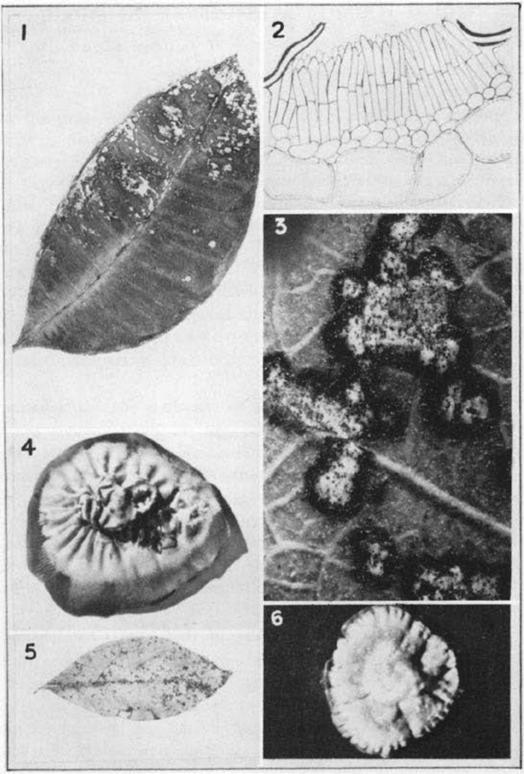
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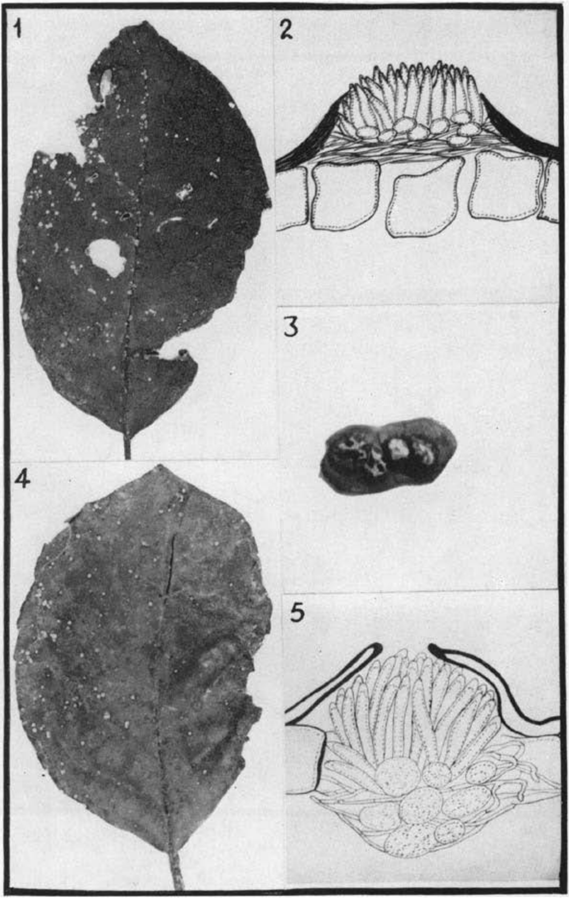
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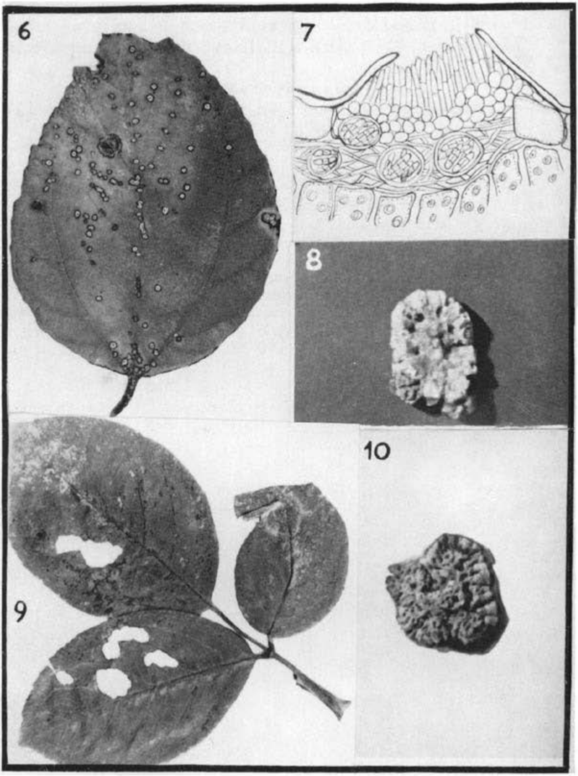
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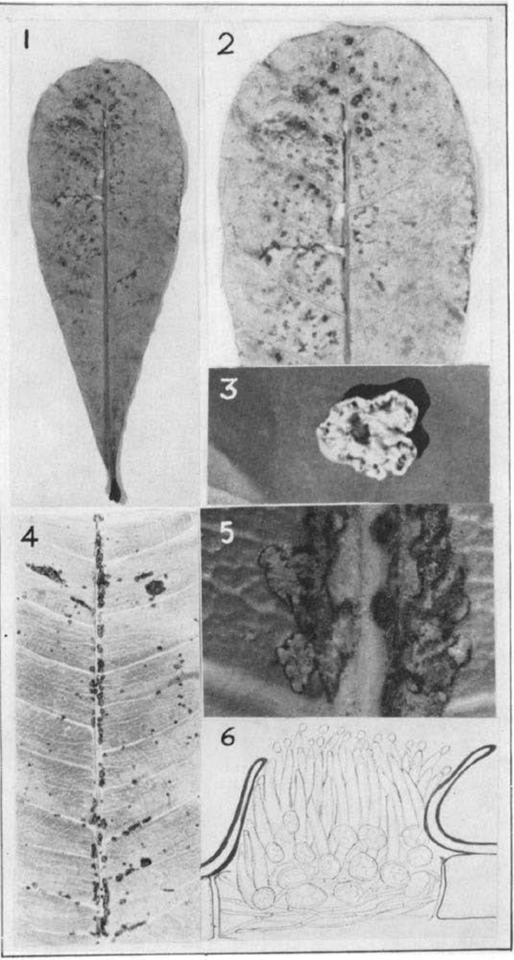
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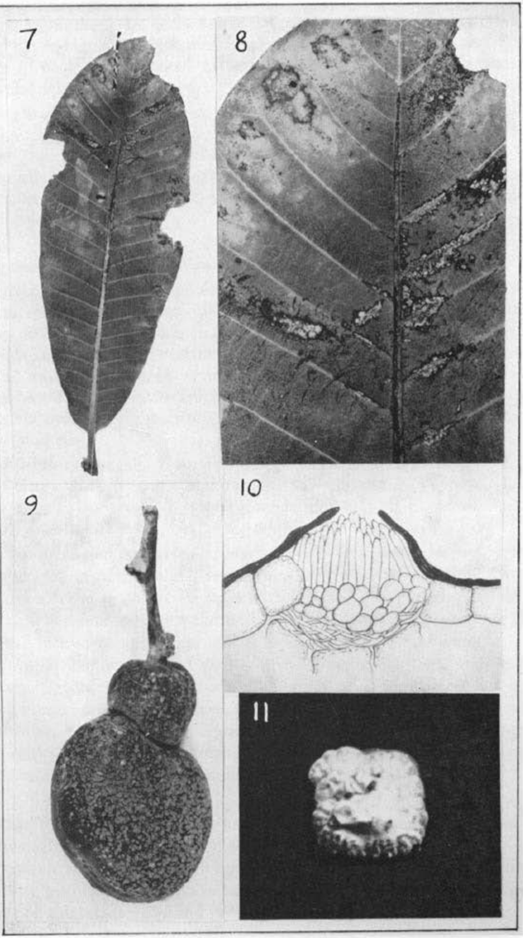
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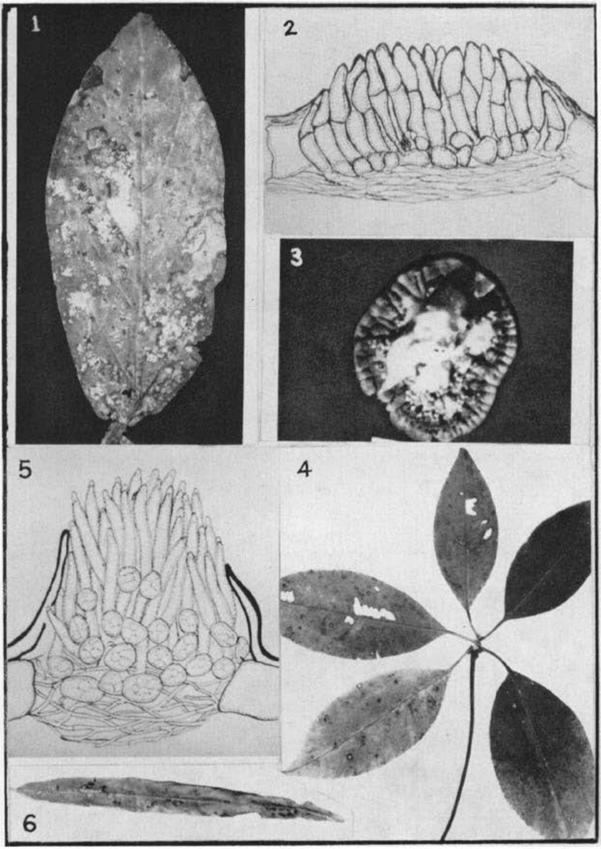
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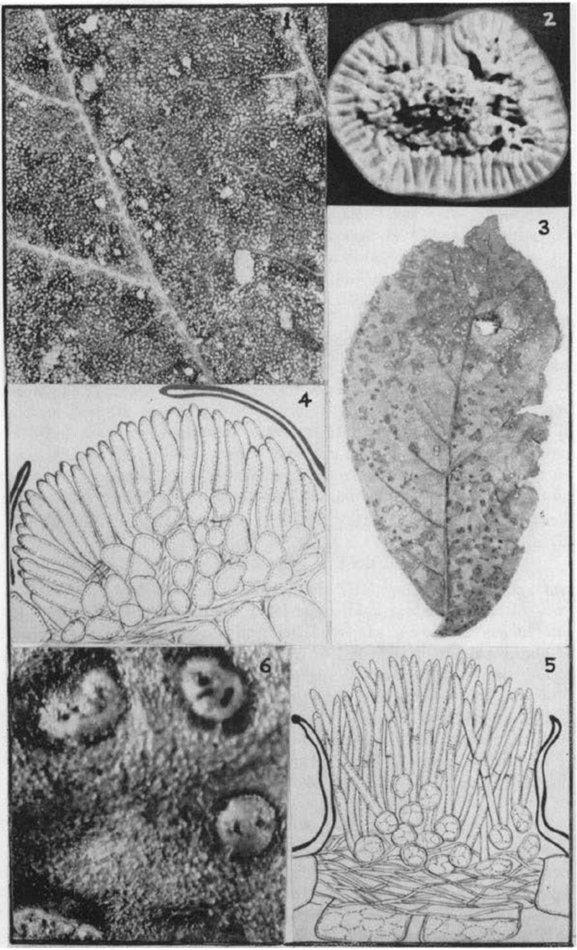
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