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THE GENUS *MYROTHECIUM* TODE ex FR.

by

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The genus *Myrothecium* is revised. Thirteen species are described including two new species and three new combinations.

CONTENTS

I. INTRODUCTION

The genus *Myrothecium* was published by Tode in 1790. He described *Myrothecium* as a cup shaped fungus with spores becoming slowly viscous and included five species in the genus: *M. roridum*, *M. inundatum*, *M. stercoreum*, *M. hispidum* and *M. dubium*. None of his original material remains. In 1803, according to Fries (1829), Schumacher published a sixth species, *M. scybalorum*. Albertini & Schweinitz (1805) described a species *Peziza verrucaria* with green viscous spores and a white margin to the fructification, noting its resemblance

**Née* Fitton

to *Myrothecium*. Link (1809) based his generic description on *M. inundatum* considering Tode's other species to be very different. Ditmar (1813) described *Myrothecium* with two species, *M. inundatum* and *M. verrucaria*, the latter based on his own collection of *P. verrucaria* Albertini and Schweinitz.

Fries validated the name *Myrothecium* in the first part of the *Systema Mycologicum* (1821). Gray (1821) described *M. inundatum*, in what appears to be the first reference to one of Tode's species after 1 January 1821. This is the first description of a *Myrothecium* in the British flora; later Greville (1825) described *M. carmichaelii* as a new species from Scotland.

Fries (1829) described the genus and four species, validating *M. roridum*, *M. verrucaria* and *M. scybalorum*. He placed *M. carmichaelii* into synonomy with *M. roridum* and Tode's other species into ascomycete genera.

Saccardo (1886a) created a new genus *Hymenopsis* which he delimited from *Myrothecium* by the absence, in *Hymenopsis*, of a well defined margin around the fructification. He placed into *Hymenopsis* six species which he had previously included in *Myrothecium*. Höhnel (1905) compared *Myrothecium* with *Volutella* and *Amerosporium* and noted the confusion which had arisen in assigning genera to the Tuberculariaceae, Excipulaceae and Melanconiales.

In 1943 Preston published the first of a series of three articles on *Myrothecium*. In this he gave a description of the genus and three species, *M. roridum* including *M. carmichaelii* as a synonym, *M. verrucaria* and *M. inundatum*, and a historical survey as well as some physiological data. In 1948 he published a fuller description of *M. gramineum* Libert and described two new species, *M. jollymannii* and *M. striatisporum*. Pidoplichko (1953) compared *Myrothecium* with *Verticilliodochum* Bubák, *Chaetostroma* Corda, *Volutella* Tode ex Fr. and *Dendrodochium* Bonorden but did not reach any definite conclusions as to their separation. Preston (1961) collated his work on *Myrothecium* giving a more detailed historical survey, revising his conclusions on *M. carmichaelii* and proposing a neotype for *M. roridum*. Nicot & Olivry (1961) drew attention to the abundance in soils of *Myrothecium* species previously overlooked due to their slow growth on soil dilution plates. They also described a new species—*M. brachysporum*. In 1971 Pidoplichko & Kirilenko published a key to the genus including 11 species. They did not refer to type material. No species were excluded from the genus and no new species or combinations were described.

Since 1790 there have been 55 specific epithets used within the genus *Myrothecium*; of these, type material relating to 36 is available and has been examined by the author.

II. ECONOMIC IMPORTANCE

Because of their strong cellulolytic activity, isolates of *M. verrucaria* are widely used as standard test organisms in mould proofing textiles. This cellulolytic activity was described first by Pope (1944) in studies on an organism which he called *Metarhizium glutinosum*, later correctly assigned to *M. verrucaria* by White & Downing (1947). In the following year White and his co-workers, after testing many microfungi, reported that the isolates of *M. roridum* and *M.*

verrucaria they used were the strongest cellulose decomposers of those examined. The single isolate of *M. inundatum* tested showed weak cellulolytic activity. Bollenbacher & Fulton (1963) described strong cellulolytic activity in isolates of *M. striatisporum* (*M. cinctum*).

In 1946 Brian & McGowan reported the isolation of a strong but highly specific antifungal agent from *M. verrucaria*. In addition they isolated a dermatitic agent which they did not name. Further work (Brian, 1948) showed the presence of both these agents in isolates of *M. roridum* and (Brian, 1950) *M. jollymannii* (*M. leucotrichum*). Since then numerous antibiotics such as verrucarians, roridins, myrothecin, dehydroverrucarin and muconomycin have been isolated from *M. verrucaria* and *M. roridum* isolates. Sarkisov (1970) mentions a mycotoxicosis of sheep caused by *M. verrucaria* and considerable work in USSR has been centred on a serious mycotoxicosis of horses and, to a lesser extent, sheep and pigs, caused by *Dendrodochium toxicum* (Sarkisov, 1954), which from the published description appears to be *M. verrucaria*. Mortimer *et al.* (1971) described experimentally induced disease and death in rabbits, sheep and calves resulting from the administration of verrucarin A and roridin A isoated from 18 strains of *M. roridum* and *M. verrucaria*.

Only *M. roridum* can be considered a serious plant pathogen, usually causing a leaf spot which may sometimes result in shot hole and dieback. Serious outbreaks have occurred in *Antirrhinum*, *Coffea*, *Gossypium* and *Viola*. *M. roridum* is plurivorous and widespread in temperate and tropical regions.

Gams & Domsch (1970) give a detailed review of biochemical work on *M. roridum* and *M. verrucaria* and Fitton & Holliday (1970) of the pathogenic aspects of *M. roridum*.

III. MATERIALS AND METHODS

Cultures were grown for examination on potato dextrose agar at approximately 25°C in daylight and examined on and after 10 days. Cultures were also grown on PDA and lupin stem or wheat straw and parts of these stems bearing fructifications fixed in formalin proprionic acid fixative for 24 hours. These were then embedded in 5% tap water agar for at least ten days and then sectioned with a freezing microtome. Natural plant material was treated similarly.

Cultures were also grown comparatively on 4% cellulose agar (Eggins & Pugh, 1962). The ability to utilise cellulose as a carbon source in *Myrothecium* seems to vary between species. For instance, the best growth was made by isolates of *M. verrucaria*, *M. cinctum* and to a lesser extent *M. leucotrichum* but within these species there were isolates which made no growth at all. Similarly some isolates of *M. roridum* grew well on cellulose agar as did the only culture of *M. masonii* tested.

Slides were stained with cotton blue in lactophenol or with erythrosin in 10% ammonia solution. Slide cultures were made as described in the CMI Plant Pathologist's Pocketbook (1968). The colour standard used was Rayner's (1970).

IV. LOANS FROM OTHER HERBARIA AND ACKNOWLEDGEMENTS

I am grateful to the Directors of the following herbaria for the loan of exsiccata in their care:— Austria (W), Banaras (BAN), Beltsville (BPI), Edinburgh (E), Geneva (G), Iowa (IA), Kew (K), Leiden (L), New York State Museum (NYS), Padua (P), Paris (PC), Prague (PR), Spegazzini (LPS), Uppsala (UPS) and Madras; also to the curators of the following culture collections for kindly supplying me with cultures: American Type Culture Collection (ATCC), Centraal-bureau voor Schimmelcultures (CBS), US Army Natick Laboratories (QM), and the Commonwealth Institute of Biological Control.

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V. TAXONOMY

Myrothecium is interesting in the variation it shows in the appearance of the fructification. Synnematous development has been observed in all the accepted species except *M. atroviride* and *M. leucotrichum* and cupulate development in all but *M. prestonii*, *M. masonii* and *M. atrum*. Cupulate development is most marked in isolates of *M. gramineum*, *M. leucotrichum* and *M. atroviride*. In all fructifications, however, differentiated marginal hyphae are present and the spores are produced from phialides borne in whorls on the apices of branched conidiophores. Stolk (1963) describes a similar variation for *Chaetomella* although here, unlike *Myrothecium*, the fructification has a parenchymatous wall. Because of these variations between isolates of *Myrothecium* it becomes necessary to distinguish it from several genera which appear similar macroscopically. I have attempted to do this in the following paragraphs, having arrived at these distinctions from a study of type material or, where this has not been possible, of the type descriptions.

Several authors, particularly Höhnel (1905), Litvinov (1967) and Pidoplichko (1953), have noted the difficulty in delimiting *Myrothecium* from other genera. This difficulty arises from our inadequate knowledge of these genera, many of which were first described by Tode, and until a comprehensive study is undertaken in this area, the difficulty will not be completely resolved.

It has been found most convenient to distinguish many of these genera from *Myrothecium* on the basis of the light colour of their spores in mass. This may be thought arbitrary or superficial in the light of modern taxonomy. To include light spored forms in a genus with *Myrothecium*, however, would involve a study of *Dendrodochium*, *Hymenella*, *Dendrostilbella*, *Stilbella*, *Volutella*, and possibly other light slimy spored genera such as *Hainesia*. From these genera it is possible that a light coloured series closely allied to *Myrothecium* could be described and it is interesting that Matsushima (1971) has described a *Stilbella*

sp. (*Stilbum buloloense* Matsushima, which has distinct marginal hyphae and light coloured spores in mass. There have been at least 300 species described in these genera and in my view the ease of identification of *Myrothecium* species is not served by their inclusion in this genus; of course, later studies may disprove this.

Myrothecium has a species described as the conidial state of a *Nectria*. The fact that the form genera *Gliocladium*, *Stilbella*, *Dendrodochium* and *Volutella* also have species described as the conidial state of *Nectria* species underlines the relationships that may exist between them. It is open to argument how far these relationships may be used as evidence for the inclusion of these genera in one genus. It is possible to distinguish these genera on morphological grounds and, especially since the majority of *Myrothecium* species have not, as yet, had perfect states described, I consider it best to retain these distinctions as far as they help towards the identification of these imperfect fungi.

In the species check list it has been necessary to remove some species from *Myrothecium* without making any new combinations or identifications but by referring them to a species within the genera *Cryptomera* Sacc., *Hymenopsis* Sacc., or *Phaeopolynema* Speg. These isolates show what appear to be annellated conidiogenous cells, borne on a stroma often partially immersed in the substrate and with varying degrees of marginal development. Some of these isolates have dark setae. A study of these three genera, and possibly several species described by various authors in the genus *Chaetostroma* Corda, will, I am confident, produce a satisfactory generic epithet for these isolates. Until such a study is made I do not propose to make any new combinations.

Dendrodochium Bonorden, Handbuch der Allgemeinen Mykologie, p. 135, 1851
Type species: *D. aurantiacum* Bon., Handbuch der Allgemeinen Mykologie, p. 135, 1851.

Bonorden's material is no longer available. His drawings and description are of light coloured sporodochia composed of irregularly branched conidiophores, which he describes as 'twig like', producing spores at their apices. The mode of sporulation was not described. Since 1851 about 60 species have been described by various authors but no comprehensive generic diagnosis has been provided. Most of the species described have been light coloured and Saccardo (1886) includes this character in his generic description. However, in 1947 and 1950 Pidoplichko and Bilai described two species, *D. toxicum* and *D. caucasicum*, both having spores dark green to black in mass. In 1953 Pidoplichko distinguished *Myrothecium* and *Dendrodochium* on the basis of their branching. He said "in *Dendrodochium* the branching of the conidiophores is dendrate-verticillate, in *Myrothecium* verticillate branching is absent, the phialides are closely packed and diverge from short massive usually compact branches of the conidiophores." Verticillate branching, as exemplified by *Verticillium* in which branches occur in whorls at nodes along a main axis, does not occur in any species of *Myrothecium* I have examined, in Bonorden's original drawing of *Dendrodochium* or in Pidoplichko's drawing of *D. toxicum* and *D. caucasicum*. The term dendrate could be applied to the branching shown by these fungi; the

main axes become repeatedly divided, several branches occurring at one node and these usually being subsequently divided. In *Myrothecium* these branches are compacted together, particularly if sporodochia from a plant host are examined, but in culture or slide culture the branches spread out and the type of branching can be seen clearly. I do not think that *Myrothecium* and *Dendrodochium* can be separated on their modes of branching.

Type material of several species of *Dendrodochium* was examined without an adequate concept of the genus emerging. In some the sporodochia appear to be made up of a group of *Gliocladium* conidiophores showing the typical apical penicillus, which separate regularly on mounting. In others the sporodochia appear to be formed from a group of repeatedly branched conidiophores closely compacted together and surrounded by a differentiated margin. Further work on *Dendrodochium* and these species in particular may result in an extension of the present concept of *Myrothecium* to include them but until then it is considered most convenient to distinguish *Dendrodochium* from *Myrothecium* by the light colour of its spores in mass.

Gliocladium Corda, Icon. Fung. **4**:30, 1840.

Type species: *Gliocladium penicilloides* Corda, Icon. Fung. **4**:31, 1840.

Type material of *G. penicilloides* is not available. Corda's drawing shows clearly an erect single conidiophore bearing a distinct apical penicillus. Green *Gliocladium* species in culture may appear superficially similar to *Myrothecium* because of the wet green to black spore masses produced, but in *Gliocladium* the single conidiophore distinct from and often wider than the branches of the apical penicillus is apparent on microscopic examination whereas even in slide culture in *Myrothecium* species the conidiophores are grouped and branched near to the base.

Graphium Corda, Icon. Fung. **1**:18, 1837.

Type species: *Graphium penicilloides* Corda, Icon. Fung. **1**:18, 1837.

Graphium is similar to *Myrothecium* in the production of darkened synnemata but type material of *G. penicilloides* shows the conidiogenous cell to be regularly annellated.

Hymenella Fr., Syst. mycol. **3**:233, 1823.

Type species: *Hymenella vulgaris* Fr., Syst. mycol. **3**:234, 1823.

This genus was later incorrectly published as *Hymenula* by Fries (1828) and other authors. The exsiccatum of *H. ebuli* cited by Fries in his original description of *H. vulgaris* was examined. The pale coloured sporodochia are non-marginate and consist of a basal stromatic layer bearing branched conidiophores. The phialides are borne, one or more together, beneath a septum at various levels on the conidiophore and at the apex. There have been over 50 species described in this genus. The few species, type material of which I have examined, appear to belong to many different genera. The lack of a margin and the arrangement of the phialides in the type species, however, distinguish this genus from *Myrothecium*.

Metarhizium (Metsch.) Sorokin, Plant Parasites of Man and Animals as causes of Infectious Diseases (in Russian) **2**:267, 1882.
Type species: *Metarhizium anisopliae* (Metsch.) Sorokin, Plant Parasites of Man and Animals as causes of Infectious Diseases (in Russian) **2**:268, 1882.

I have not seen type material of this species, originally described by Sorokin as causing the green muscardine disease of insects. Numerous isolates causing a similar disease to that described by Sorokin, and with a morphology similar to that of the fungus in his drawings, are available. Their morphology is similar to *Myrothecium* in that a group of branched conidiophores is produced, bearing phialides in whorls, but no differentiated margin can be observed and the spores are dry and adhere in chains.

Conidial state of *Nectria pityrodes* Mont. var. *saccharina* Berk. & Br., *J. Linn. Soc.* (Bot.) **14**:117, 1873 = *Hymenula socia* Sacc., *Bull. Orto. Bot. Nap.* **6**:65, 1921. Conidial state of *Nectria ralfsii* Berk. & Br., *Ann. Mag. nat. Hist.* ser. 2, **13**:467, 1854.

Both these species produce olivaceous to olivaceous black, wet spored sporodochia. Unlike *Myrothecium* these are non-marginate. Their spores are produced successively from open ended phialides borne singly or in whorls on branched conidiophores, but unlike *Myrothecium* these spores adhere in chains.

Koorchaloma Subram., *J. Indian bot. Soc.* **32**:124, 1953.
Type species: *Koorchaloma madreeya* Subram., *J. Indian bot. Soc.* **32**:124, 1953.

This genus has light coloured sporodochia and dark setae. The spores have a fantailed appendage similar to that found in *M. verrucaria* but the colour of the sporodochia distinguishes this genus from *Myrothecium*.

Stilbella Lindau in Engler & Prantl, Nat. Pflanzenfam. **1** (1**): 489, 1900.
Type species: *Stilbella erythrocephala* (Ditm. ex Fr.) Lindau in Engler & Prantl, Nat. Pflanzenfam. **1** (1**): 489, 1900.
Dendrostilbella Höhnel, Öst. bot. Z. **55**: 22, 1905.
Type species: *Dendrostilbella prasinula* Höhnel, Öst. bot. Z. **55**:22, 1905.

Benjamin (1958) has discussed the nomenclatural status of *Stilbum and Stilbella*. The name *Stilbum* should be reserved for a genus in the Auriculariales and *Stilbella* should be used for the synnematous imperfect genus. Lindau described *Stilbella* as a light coloured fungus in his group Hyalostilbae. Höhnel differentiated *Dendrostilbella* from *Stilbella* only on the basis of its branched conidiophores. Therefore both these genera can be distinguished from *Myrothecium* on the basis of the light colour of their spores in mass. Type material of several *Stilbella* species shows branched conidiophores and, according to Benjamin, Saccardo's material of *S. erythrocephala* has branched conidiophores. Lindau's material has been destroyed. A study of these two genera may result in their clearer definition.

Tubercularia Tode ex Fr., Syst. mycol. **3**:463, 1832.
Type species *Tubercularia vulgaris* Tode ex Fr., Syst. mycol. **3**:464, 1832.
Conidial state of *Nectria cinnabarina* (Tode ex Fr.) Fr.

A genus characterised by the production of non-marginate sporodochia made up of irregularly branched conidiophores producing spores in gloeoid masses. Unlike *Myrothecium* these spores are produced from what appear to be short phialides borne singly beneath a septum at various levels on the conidiophore.

Volutella Fr. (nom. cons. prop.), Syst. mycol. **3**:466, 1832.
Type species prop. *Volutella ciliata* Alb. & Schw. ex Fr., Syst. mycol. **3**:467, 1832.
Volutella Fr. has been proposed as a nomen conservandum by Hawksworth & Tulloch (1972). *V. ciliata*, the proposed type species, has light coloured ciliate sporodochia. This light colour is included by Fries in his generic diagnosis and distinguishes this genus from *Myrothecium*.

MYROTHECIUM

Myrothecium Tode ex Fr., Syst. mycol. 1:XLV, 1821
= *Myxormia* Berk. & Br., *Ann. Mag. nat. Hist.* Ser **2**, 5:457, 1850
= *Myrotheciella* Speg., *An. Mus. nac. Hist. nat. B. Aires* **20**:460, 1910
= *Exotrichum* Syd., *Annls mycol.* **12**:571, 1914
= *Starkeyomyces* Agnihothrudu, *J. Indian bot. Soc.* **35**(1): 41, 1956
Type species: *Myrothecium inundatum* Tode ex Gray

Fructification cupulate, sporodochial or synnematous, formed from closely compacted conidiophores arising from a more or less developed stroma and bearing a mass of slimy green to black spores which becomes hard on drying. Fructification surrounded by differentiated marginal hyphae which may be free or laterally compacted into a plectenchymatous wall. Hyaline or darkened setae sometimes present arising from the basal stroma. Conidiophores hyaline, olivaceous or slightly darkened, macronematous, irregularly and repeatedly branched forming several branches at each node, the ultimate branches bearing the conidiogenous cells (phialides) in whorls. Phialides hyaline or darkened at the apex, occasionally percurrent sometimes with a flared collarette, compacted into a dense parallel layer. Spores unicellular, hyaline or dilute olivaceous, black in mass, slimy.

VI. KEY TO THE SPECIES OF MYROTHECIUM DESCRIBED

1. Setae found .. .. 2.
   Setae not found .. .. 5.
2. Spores less than 6μ long .. .. 3.
   Spores more than 6μ long .. .. 4.
3. Spores 2·5–4μ long, phialides tapering towards the apex, and usually less than 1·5μ wide .. .. *M. inundatum* p. 9
   Spores 4·5–6μ long, phialides mostly cylindrical, and usually more than 1·5μ wide .. .. *M. prestonii* p. 12
4. Setae many septate, thin walled .. .. *M. leucotrichum* p. 12
   Setae up to 2 septate, usually nonseptate, thick walled *M. gramineum* p. 16

5. Spores striate .. .. *M. cinctum* p. 8
   Spores not striate .. .. 6.
6. Phialides long usually not less than 20μ, strongly tapered towards the apex, often phialides of different length in one whorl
   M. state of *Nectria bactridioides* p. 21
   Phialides cylindrical, similar length in one whorl .. .. .. 7.
7. Marginal hyphae terminating with a characteristic bulbous verrucose cell .. .. *M. masonii* p. 21
   Marginal hyphae without verrucose bulbous cell at apex .. .. 8.
8. Spores less than 10μ long .. .. 9.
   Spores mostly more than 10μ long .. .. 10.
9. Spores rod-shaped or narrowly ellipsoid .. *M. roridum* p. 23
   Spores fusiform .. .. *M. verrucaria* p. 27
10. Spores rod shaped .. .. 11.
    Spores narrowly fusiform .. .. 12.
11. Spores mostly less than 15μ long .. .. *M. carmichaelii* p. 30
    Spores mostly more than 20μ long .. .. *M. lachastrae* p. 30
12. Stipitate in specimens seen, marginal hyphae tapered at the apex
    M. atrum p. 31
    Cupulate in specimens seen, marginal hyphae blunt at the apex
    M. atroviride p. 34

VII. THE SPECIES

1. **Myrothecium inundatum** Tode ex Gray, Nat. Arr. Br. Pl. **1**:569, 1821
   = *Myrothecium fungicola* Peck, *Rep. St. Mus. N.Y.* **26**:79, 1872
   = *Myrothecium viride* Pers., in herb.

Type: (of *M. inundatum*) on and ex decaying pileus of *Russula nigricans*, Wheatfen, Norfolk, England, 29.7.1971, E. A. Ellis, IMI 158855 (neotype).

On host: sporodochial, sporodochia polymorphic often rounded or sometimes elongated along the stipe or gills of a decaying agaric, sometimes coalesced rarely slightly stipitate, 150–900μ diam., 30–150μ deep. Spore mass slimy, flattened or convex, black to olivaceous black, olivaceous when young. Margin white, floccose, well defined. Setae usually few sometimes enough to influence the appearance of the sporodochium, usually marginal sometimes arising through the spore mass. *Colony* reaching 40–60 mm on PDA at 25°C after 14 days. Surface white to rosy buff, some cultures with sparse aerial mycelium, some floccose. Reverse rosy buff. Sporing areas olivaceous black either with small spore drops giving a diffuse appearance to the colony or these drops coalesced into sporodochia with a white margin and setae. *Hyphae* hyaline, smooth walled, rarely branched, septate, cells 10–25 × 2μ. *Stroma* formed from irregular to isodiametric hyaline cells, 4·5–10μ diam. closely packed, stromatic layer usually thin but sometimes well developed. *Marginal hyphae* arising from the stroma, straight or slightly curled, thin walled and irregularly branched forming a weft around the sporodochium; hyaline, smooth walled or rarely verrucose; septate, cells 9–14·5 × 1·5–2·5μ. *Setae* also arising in the stroma,

150–350μ long, tapering from 2–3·5μ wide at the base to 0·5–2μ wide at the blunt apex, thin smooth walled, walls 0·2–1μ thick, wider at the base, septate with septa every 20–30μ. *Conidiophores* closely interwoven, hyaline with walls occasionally darkened beneath the phialides, usually smooth walled sometimes slightly roughened at the base, branched repeatedly, usually forming 2 to 3 branches at each node, up to 5 found, ultimate branches bearing phialides; septate, cells 9–13·5 × 1·5–2·5μ. *Phialides* in whorls of 2–6, usually 4–5, closely packed in a parallel layer, tapering towards the apex and slightly towards the base, rarely cylindrical, hyaline or rarely darkened towards the base, 9–18 × 1–1·5μ. *Spores* short rod shaped or ellipsoid, usually both ends rounded or rarely one truncate, hyaline, black in mass, up to 2 guttules seen, 0·5–4 × 1–1·5μ.

Distribution: Britain, North America, Germany, France.

Hosts: decayed agarics particularly *Russula* spp., leaf litter.

As Preston explained in 1943 and 1961 the spores of *M. inundatum*, not described or figured by Tode, were reported as globose by Link (1809) and later writers. As a result Berkeley (1836) assigned a British collection of *M. inundatum* to *M. roridum* as he noticed that the spores were cylindrical. Höhnel (1905) was the first to describe the spores as oblong-rod shaped, and to describe the long white setae.

SPECIMENS EXAMINED

In Herb. P.
Lowen Apotheke in Spandau " as *M. inundatum*".
In Herb. PC.
On *Agaricus adustus* Herb. M.L.R. Tulasne, given in Feb. 1873 as *M. inundatum.*
In Herb. L.
On decaying agaric, ex Herb. Persoon Herb. Lujd. Bat no. 192. L2527 no. 2B; ex Herb. Persoon no. 296, L3527 no. 3, both as *M. viride.*
In Herb. NYS.
On unidentified dried agaric, Greenbush. C.H. Peck. T.; from Lake Pleasant, C. H. Peck and on fungi, Lake Placid, August, C. H. Peck no. 291, all as *M. fungicola.*
In Herb. K. (*M. roridum* folder)
On Agaric pileus, Ascot, 31.10.1879 labelled *M. carmichaelii*, scripsit Berkeley, collected by Rev. G. H. Sawyer; on *Russula adusta*, August 1876, C.B.P. Herb Mycol. M. C. Cooke 1885, Fungi Britannici Exsiccati, 2.6.628; Herb. Berk. 1879, labelled *M. carmichaelii*, Herb. Schwein, *M. inundatum* scripsit E. W. Mason.
In Herb. K. (*M. verrucaria* folder).
Ex Herb. Schwein, scripsit Berkeley.
In Herb. K. (*M. inundatum* folder).
Labelled Carm.3 " praesidia cylindrica am varietarum *Myrothecium roridi*"; on stipe of decayed agaric no. 217, New York, ex Herb. M. C. Cooke 1885, W. R. Gerard Poughkeepsie, N.Y.; ad *Agaricos putridos* varo autumno in Sylvia Hostrichiensis, Fuckel's Fungi Rhenani 165, ex herb. C. E. Broome; Ad *Cantherellum cibarium* aliosque fungos putridos autumno pr Bockenorst Dr. The Sprée; Rabenhorst Fungi Europaiei no. 571; ex Herb. R. J. Shuttleworth, rec'd 1877; ex *Russula adusta*, Swanage Nov. 1857, Rev. M. J. Berkeley ex Herb. Berk. 1879; on *Russula adusta*, The Grange, Wareham, Nov. 1857, C. E. Broome; on *Russula nigricans*, Salingham Wood, Wheatfen Broad, 27.7.1946, E. A. Ellis; on *Russula* sp. near Ascot, 23.9.1968, R. W. G. Dennis; in *Agaricus* et *Russulis* pulvescentibus prope gratz Austriae leg G. ae Niessl, Rabenhorst's Fungi Europaei no. 679.
In Herb. IMI.
On *Russula adusta*, Britain, 5607 and 8983 (culture from QM 7988); on and ex *Russula nigricans*, Britain, 158855, T; ex aspen forest litter, Canada, 145686.

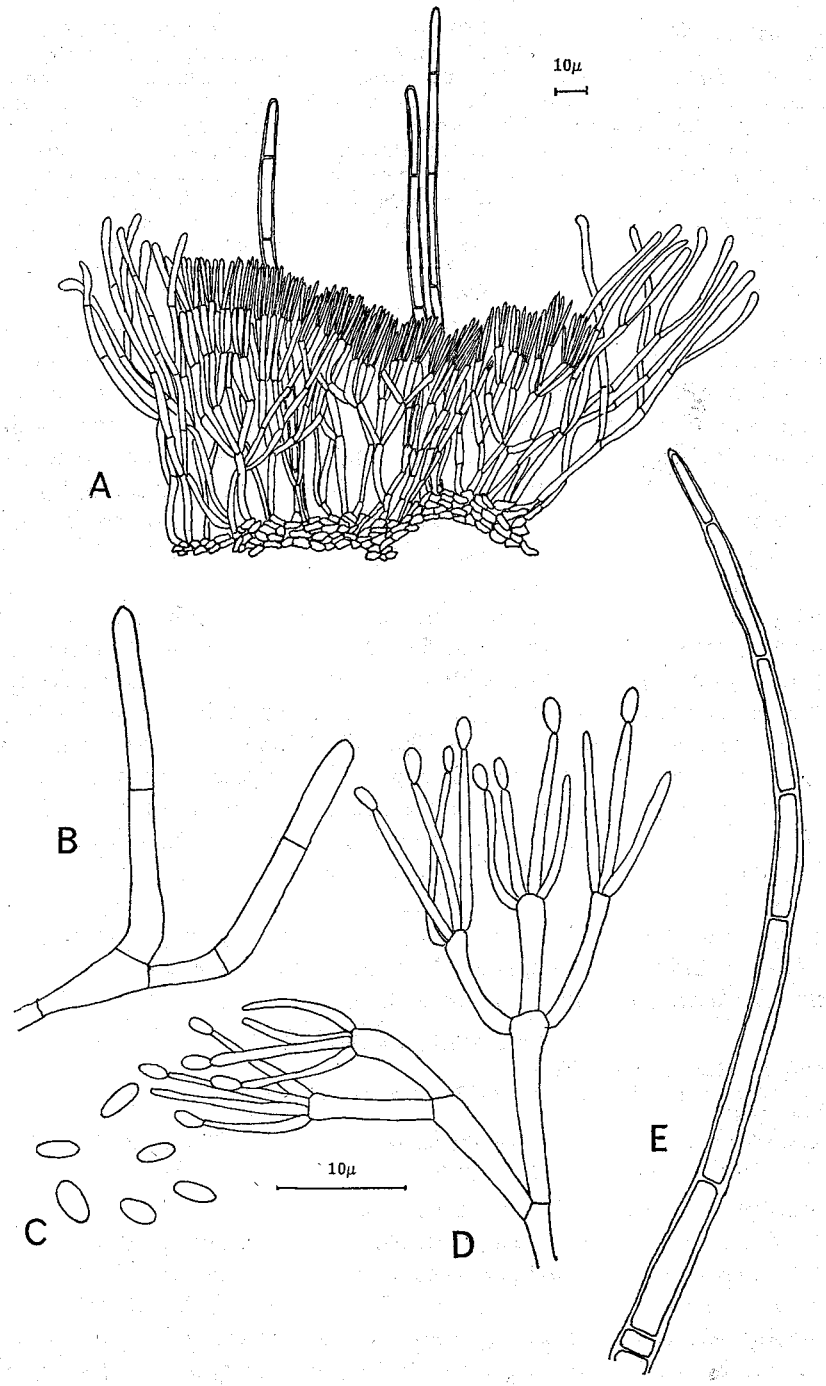

Fig. 1. *Myrothecium inundatum.* A, sporodochium; B, marginal hypha; C, conidia; D, conidiophore and phialides; E, seta.

2. **Myrothecium prestonii** sp. nov.

Type: ex soil, Malaysia, July–August 1971, Wong Heng Tong, G.6, IMI 160372 (holotype).

Sporodochia vel *synnemata* 50–150μ longa, 45–105μ lata, mucosa, nigra, hyphis marginalibus, albis fimbriata. *Coloniae* floccosae, albae vel roseo-bubalinae, massa sporarum mucosa, olivaceo-nigra. *Hyphae* hyalinae cellulis 9–25μ longis × 2–2·5μ latis. *Stroma* cellulis irregularibus ad isodiametricis laxe confertis, 4·5–6μ diam. *Hyphae marginales* rectae vel crispae, hyalinae vel paululum fuscae, ramosae, cellulis 10–15μ longis, 2–2·5μ latis. *Setae* hyaline vel paululum fuscae, 100–200μ longae, 4–6μ basi, 2–2·5μ apice latae, septatae. *Conidiophora* hyalina, ramosa, cellulis 8–13·5μ longis, 2–2·5μ latis. *Phialides* 2–6 verticillatae arcte confertae, cylindracae vel paululum contractae, hyalinae, 11–16μ longae, 1·5–2μ latae. *Sporae* ellipsoideae vel allantoideae, uno extremo paululum contracto, altero truncato, sub olivaceae in mass nigrae, 4·5–6μ longae, 2–2·5μ latae. *Habitat* in solo, Malaysia, July–Aug. 1971, Wong Heng Tong, G6, IMI 160372, (cultura exsiccata) holotypus.

On host: sporodochial or synnematous, 50–150μ deep, spore mass slimy olivaceous black 45–105μ wide and surrounded by a white weft of marginal hyphae; setae arising from the base usually few; stipe in synnematous forms white 60–75μ wide. *Colony* reaching 60–70 mm on PDA at 25°C after 14 days, mycelium floccose white. Reverse rosy buff. Sporing areas coalesced, wet, olivaceous black, white margined. *Hyphae* hyaline, thin-walled, rarely branched, septate 9–25 × 1–2·5μ. *Stroma* of irregular to isodiametric hyaline cells 4·5–6μ diam. loosely packed, or irregular knot of short celled hyphae. *Marginal hyphae* arising from the stroma, straight or curly at the apex, repeatedly branched, hyaline or sometimes dark walled, smooth walled or slightly verrucose, septate cells 10–15 × 2–2·5μ. *Setae* arising from the stroma, 100–200μ long, tapering from 4–6μ wide at the base to 2–2·5μ wide at the apex; hyaline or sometimes dark walled, walls 1–1·5μ thick at the base and 0·5–1μ at the apex; septate with septa every 15–30μ. *Conidiophores* in synnemata closely compacted, branched repeatedly forming 2–4 branches at each node, ultimate branches bearing phialides; hyaline, septate cells 8–13·5 × 2–2·5μ. *Phialides* 2–6 in a whorl closely compacted in a dense parallel row, cylindrical or slightly tapered, rarely septate, hyaline sometimes darkened around the apex, 11–16 × 1·5–2μ. *Spores* ellipsoid or allantoid, one end slightly tapered, the other truncate, dilute olivaceous, black in mass, uni- or biguttulate, 4·5–6 × 2–2·5μ.

Distribution: India, Malaysia, New Hebrides, Sierra Leone.

Hosts: Erythrina, Newbouldia, Oryza, soil.

SPECIMENS EXAMINED

In Herb. K. (*Chaetostroma* folder)
On tea, " Moolaya," May 1922, No. 6433 as *Chaetostroma* sp.
In Herb. IMI.
On *Erythrina* sp., New Hebrides, 88728; on *Newbouldia laevis*, Sierra Leone, 51710(e); ex *Oryza sativa*, Malaysia, 34466; ex soil, India, 78650, Malaysia, 160372, T.

3. **Myrothecium leucotrichum** (Peck) comb. nov.

≡ *Excipula leucotricha* Peck, *Rep. St. Mus.* N.Y. **29**:49, 1878
≡ *Amerosporium leucotrichum* (Peck) Sacc., Syll. Fung. **3**:682, 1884
= *Myrothecium jollymannii* Preston, *Trans. Br. mycol. Soc.* **31**:272, 1948
= *Myrothecium indicum* Rama Rao, *Antonie van Leeuwenhoek* **29**:180, 1963.

Type: (of *M. leucotrichum*) in Herb. NYS, on dead grass and leaves, West Albany, June, C. H. Peck as *Excipula leucotricha* Peck (holotype).

On host: often cupulate, sometimes sporodochial, 60–180μ diam., 75–150μ deep,

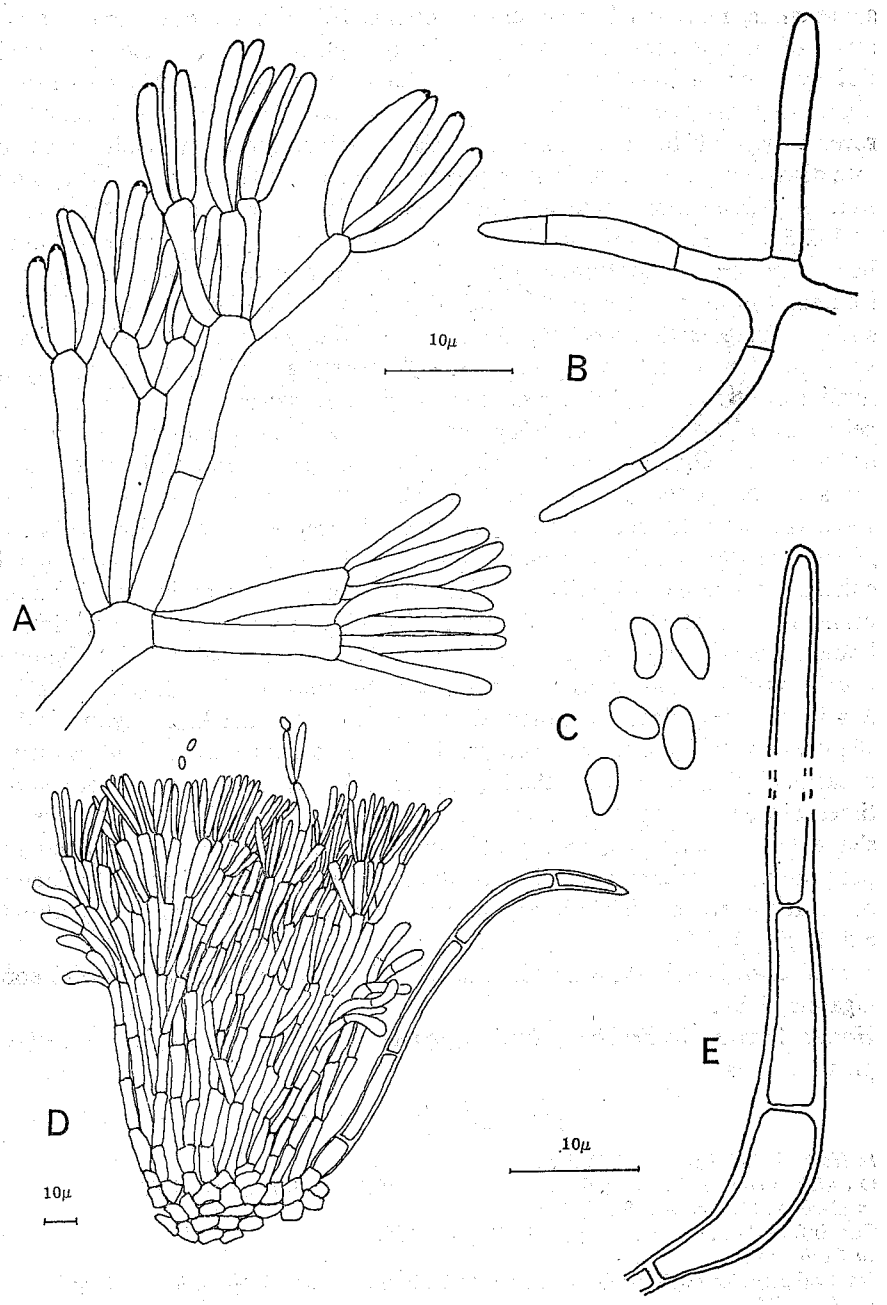

Fig. 2. *Myrothecium prestonii.* A, conidiophore and phialides; B, marginal hypha; C, conidia; D, synnema; E, seta.

polymorphic, surrounded by stiff hyaline setae which also grow through the spore mass, marginal hyphae closely compacted with the conidiophores and setae often not apparent macroscopically, spore mass wet black, convex. *Colony* reaching 40–50 mm on PDA at 25°C after 14 days. Mycelium often absent or largely submerged in the agar, if present, floccose white to rosy-buff, reverse rosy-buff to salmon, sporing areas occasionally diffuse usually coalesced into discrete sporodochia, dark cress green to olivaceous black, pale when young, wet. *Hyphae* hyaline, thin smooth walled rarely branched, septate, cells 10–25 × 1–2·5μ. *Stroma* variable often well developed and partially embedded in the host sometimes a basal knot of short celled hyphae, cells hyaline elongate to isodiametric closely compacted 3·5–6·5μ diam. *Marginal hyphae* arising in stroma, irregularly branched, blunt ended, the terminal cell often slightly swollen, often closely compacted laterally forming a plectenchymatous wall, hyaline or often dark walled, smooth or slightly verrucose near the base, septate, cells 7–20 × 2–4·5μ. *Setae* arising in the stroma, 100–350μ long, often bulbous at the base, 4–6·5μ wide and tapering to a blunt apex, 1–3·5μ wide, thin walled, walls 1–1·5μ at the base to 0·5–1μ thick at the apex, smooth or sometimes verrucose near the apex, hyaline, septate with septa every 10–30μ. *Conidiophores* usually closely compacted but sometimes more loosely arranged in culture, in cupulate fructifications longer around the margin and incurved, branching repeatedly usually forming 2 or 3 branches at each node, ultimate branches bearing phialides. Hyaline or walls darkened beneath the phialides, usually smooth sometimes verrucose, septate, cells 9–14 × 2–3μ. *Phialides* 2–4 in a whorl, closely compacted into a dense parallel layer, cylindrical to slightly clavate, hyaline or sometimes darkened near the base, smooth walled or occasionally verrucose near the base, pore well marked and a collarette sometimes visible in erythrosin and NH_4 solution, 8–16 × 1·5–2μ. *Spores* rod shaped or sometimes narrowly ellipsoid, both ends rounded or one slightly protruding and truncate, hyaline to dilute olivaceous, a fantailed appendage on one end sometimes visible in erythrosin and NH_4 solution, uni- or biguttulate, 6·5–11·5 × 1·5–2·5μ.

Distribution: Denmark, Malawi, Malaysia, New Zealand, Nigeria, Sierra Leone, Uganda, USA.

Hosts: Ananas, Dendrobium, Elaeis, Ipomoea, Lolium, Nicotiana, Ricinus, Vigna, grass, canvas.

SPECIMENS EXAMINED

In Herb. K. (*M. jollymannii* folder).
On *Ricinus communis*, Kampala, Uganda, March 1930, C. G. Hansford 1143.
In Herb. K. (*M. roridum* folder).
Car. Inf. in Syringam. ex Herb. Berk. 1879 no. 1357.
In Herb. NYS.
On dead grass leaves, West Albany, June, C. H. Peck, as *Excipula leucotricha* Pk-Type.
In Herb. IMI.
On *Ananas comosus*, Sierra Leone 56086 (h); on *Dendrobium* sp., Jamaica, 76432; ex *Elaeis guineensis*, Nigeria, 61176 and Malaysia, 68934(b); on *Ipomoea reptans*, Malaysia (Sarawak) 79455(b); ex *Lolium perenne*, New Zealand, 157855 and 157856; ex *Nicotiana tabacum*, Malawi (Type of *M. jollymanni* Preston) 1495; ex *Vigna sinensis*, Denmark, 150284; ex mixed pasture grass leaves, New Zealand, 152590, 157857 and 152595; ex tent, USA, (QM 780) 140574; ex soil, India (Type of *M. indicum* Rama Rao) 103664; Nigeria, 124889.

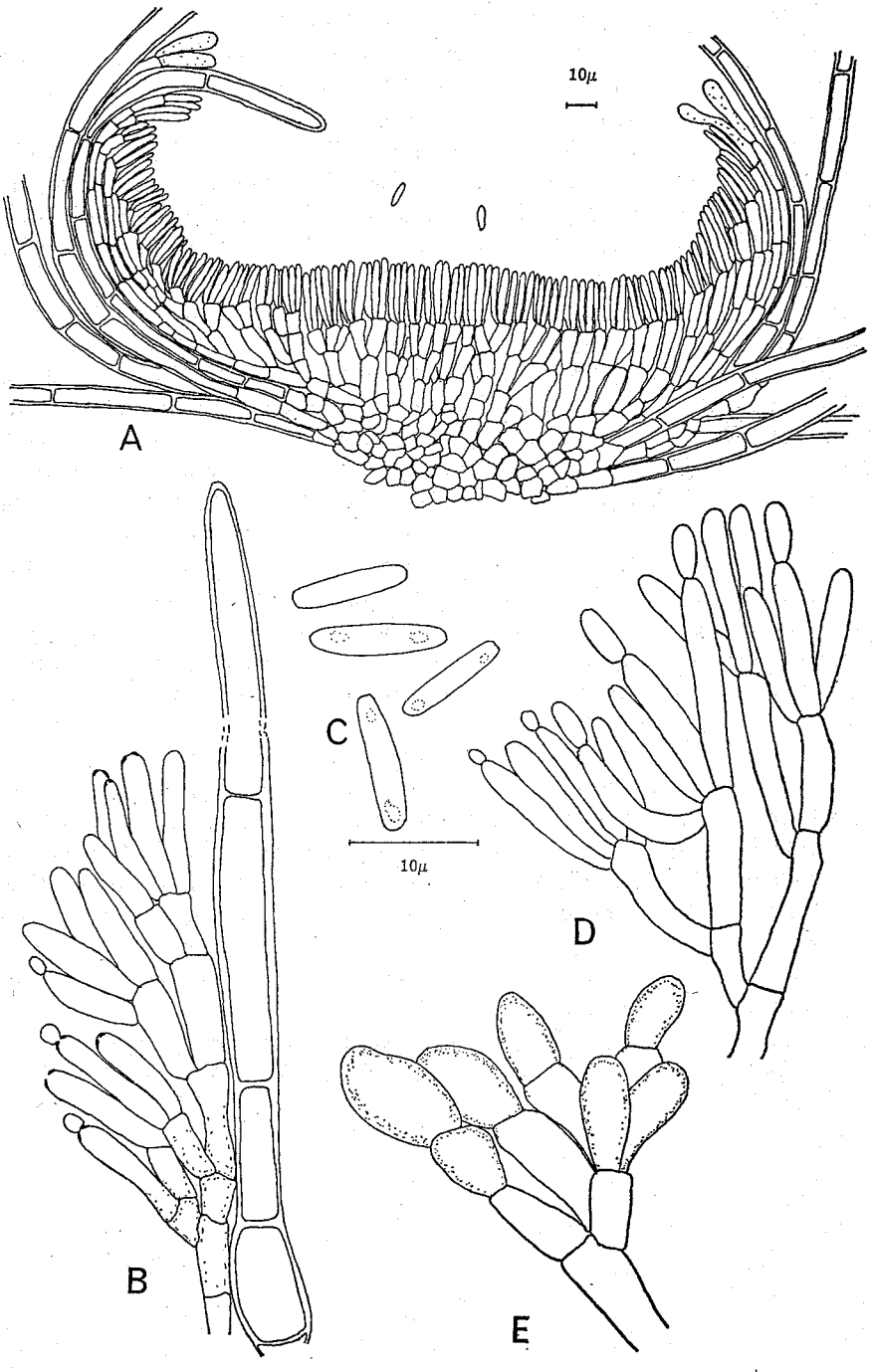

Fig. 3. *Myrothecium leucotrichum.* A, sporodochium; B, conidiophore, phialides and seta; C, conidia; D, conidiophore and phialides; E, marginal hyphae.

4. **Myrothecium gramineum** Libert, Pl. Crypt. Ard.: 380, 1837.

Type: on decaying graminicolous leaves, ex M.A. Libert. Pl. Crypt. Arduennae, Fasc. IV, 1837, no. 380 (lecto-isotype in herb PAD).

On host: cupulate, synnematous or rarely sporodochial, spore mass shiny black wet enclosed by thin marginal hyphae and hyaline setae, 60–750μ diam., 60–150μ deep, in synnemata black stipe composed of elongated conidiophores clothed by marginal hyphae, with setae arising at the base, 150–350μ high, stipe 30–50μ wide. *Colony* (no living cultures obtained, observations from dried colonies): mycelium absent or floccose white to pale rosy buff, sporing areas black usually coalesced into sporodochia. Setae few. *Hyphae* hyaline, thin walled rarely branched, septate cells 10–20 × 2μ. *Stroma* usually well developed sometimes partially embedded in the host, cells hyaline, elongate to isodiametric, closely compacted, 2·5–7μ diam. *Marginal hyphae* arising in the stroma, tapered or sometimes ending bluntly, lower part 2–3 celled, these cells 10–20 × 2–3·5μ. Slightly dark walled or sometimes hyaline, verrucose or rarely smooth, usually compacted laterally to form a plectenchymatous wall or sometimes free almost to the base; upper part if present often extended into a long hyaline sinuous tip, 0·5–1μ wide. *Setae* narrow at the extreme base in the stroma, then usually bulbous, 6–14μ wide tapering to 1·5–3·5μ wide at the pointed apex, 150–400μ long, thick smooth walled, at base 2–3·5μ, at apex 0·5–1μ; non-septate or rarely up to 2 septa at the base. *Conidiophores* closely compacted, repeatedly branched forming 2–3 branches at each node, the ultimate branches bearing phialides; hyaline, smooth walled rarely slightly verrucose, septate, in cupulate structures shorter celled nearer the middle than around the margin, longer cells found in synnemata, 6·5–13·5 × 2·5–3·5μ. *Phialides* 2–4 in a whorl, closely compacted in a dense parallel row or spreading slightly in synnemata, cylindrical or rarely slightly clavate, pore well marked and in some a small collarette visible particularly in erythrosin and NH_4 solution; hyaline, 10–16μ, up to 30μ in synnemata, × 2–2·5μ. *Spores* narrowly fusiform, pointed at one end, the other truncate and sometimes protruding, hyaline to dilute olivaceous, in some isolates a fantailed appendage can be seen from the pointed end in erythrosin and NH_4 solution, 7–12 × 2–3μ.

Distribution: S. America, Ghana, India, Jamaica, Sierra Leone, Togo.

Hosts: Ananas, Arachis, Icacina, Panicum, Pennisetum, Schizachyrium, Zea, canvas and soil.

SPECIMENS EXAMINED

In Herb. P.
On decaying graminicolous leaves, ex M. A. Libert. Pl. Crypt. Arduennae, Fasc. IV, 1837, no. 380 T (lecto-isotype).
In Herb. K. (*M. gramineum* folder).
Isotype specimen as above.
In Herb. K. (*M. roridum* folder).
S. Carolina, no. 2232, ex herb. C. E. Broome.
In Herb. IMI.
On *Ananas comosus*, Sierra Leone, 56086(f); on *Arachis hypogaea*, Ghana, 61511 (a); Malaysia, 36520; on *Icacina senegalensis*, Togo, 45073 (a); on *Panicum maximum*, Jamaica, 76433; on *Pennisetum purpureum*, Togo, 41287 and 39709 (b); on *Pennisetum subangustum*, Sierra Leone, 1494; on *Schizachyrium platyphyllum*, Togo, 39708 (b); on *Zea mays*, Jamaica, 76434; Ghana, 38602 (e) and 38603; on grass, Jamaica, 76445; on leaves, Ghana, 49030 (a) and 39630 (b); ex textile exposure test sample, S. America, (QM 6168) 140595; ex soil, India, 114035 and 116471.

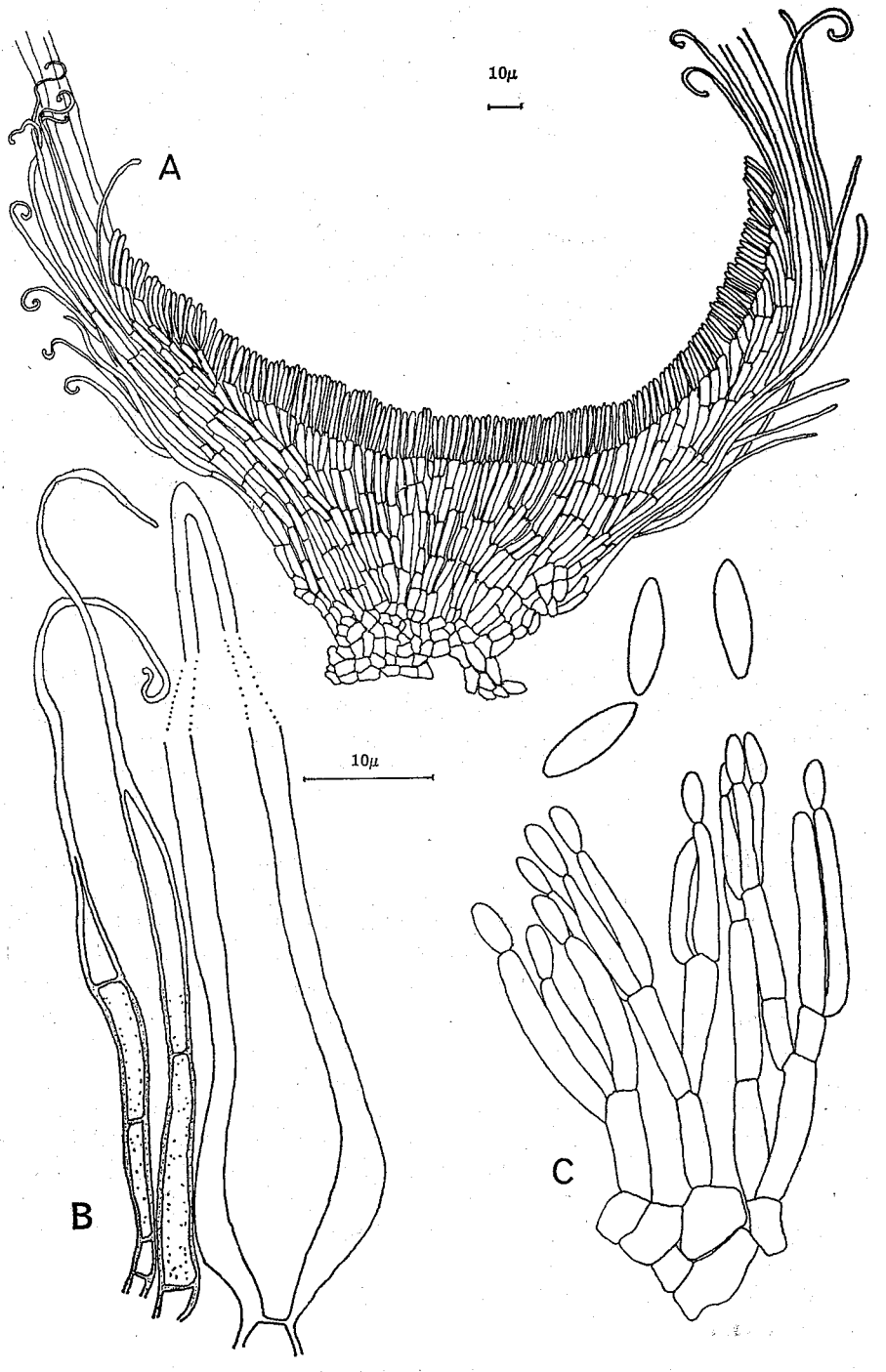

Fig. 4. *Myrothecium gramineum.* A, sporodochium; B, seta and marginal hyphae; C, conidiophores, phialides and conidia.

5. **Myrothecium cinctum** (Corda) Sacc., Syll. Fung. **4**:751, 1886
   ≡ *Fusarium cinctum* Corda, Icon. Fung. **5**:80, 1842
   = *Myrothecium ellipsosporum* Fuckel, Symb. mycol. p. 364, 1870
   = *Hymenopsis ellipsosporum* (Fuckel) Sacc., Syll. Fung. **4**:745, 1886
   = *Myrothecium striatisporum* Preston, *Trans. Br. mycol. Soc.* **31**:275–276, 1948
   = *Myrothecium brachysporum* Nicot, *Revue gén. Bot.* **68**:684–685, 1961
   = *Myrothecium ucrainicum* Pidoplichko, *Mykrobiol. Zh.* **31**:161, 1969
   = *Myrothecium longistriatisporum* Matsushima, Microfungi of the Solomon Islands and Papua–New Guinea, p. 39, 1971
   = *Myrothecium crastophylum* Sacc., in herb.
   = *Myrothecium papyricolum* Sacc., in herb.

Type: (of *M. cinctum*) in herb. PR. ex herb. A.C.I. Corda. [labelled *Fusarium cinctum* Corda], no. 155489, Mus. Hof. 1840 (holotype).

On host: sporodochial or synnematous, rarely slightly cupulate, sporodochia 300–600μ diam., 40–75μ deep, synnemata up to 400μ high, head 30–150μ wide, stipe 30–100μ wide. Spore mass wet, convex, black surrounded by curly marginal hyphae which appear grey and in synnemata clothe the stipe, stipe grey to white. Colony reaches 55–75 mm diam. on PDA at 25°C after 14 days. Mycelium absent or floccose, often radially wrinkled, white to rosy buff. Reverse rosy-buff. Sporulation in spore drops, diffuse often showing concentric zones, or coalesced into margined olivaceous black sporodochia. *Hyphae* hyaline, thin walled, rarely branched, septate, cells 12–20 × 1·5–2·5μ. *Stroma* occasionally well developed formed from hyaline elongate to isodiametric compacted cells, 4·5–6μ diam., often simply a knot of short celled hyphae. *Marginal hyphae* arising from the stroma, sinuous, sometimes branched, blunt ended, hyaline with walls verrucose and these roughenings usually dark, septate, cells 8–18 × 2–3·5μ. *Conidiophores* repeatedly branched, closely interwoven and compacted, up to 4 branches at each node, usually 2, ultimate branches bearing phialides, hyaline walls smooth or verrucose often darkened in the layer immediately beneath the phialides, septate cells 9–14 × 1·5–3μ, long celled in synnemata. Darkened sterile hyphae are sometimes found intermingled with conidiophores and phialides. *Phialides* 2–4 in a whorl, usually 2–3, closely packed in a dense parallel layer, clavate or sometimes cylindrical, hyaline, smooth walled or occasionally verrucose and darkened towards the base, apical pore often darkened sometimes with a dark collarette, phialide apex sometimes percurrent, 10–20 × 2–2·5μ with phialides up to 30μ in some synnemata. *Spores* broadly to narrowly fusiform, one end pointed the other protruding and truncate, this end sometimes darkened, striate, striae dark longitudinal and spiral, sometimes anastomosing, up to eight in one plane on the widest spores, 6·5–14 × 2·5–4·5μ.

Distribution: widespread.

Hosts: plurivorous, particularly grasses, sedges and soil.

In 1961 Nicot & Olivry described *M. brachysporum* which they distinguished

from *M. striatisporum* Preston, similarly Pidoplichko & Kirilenko in 1969 described another striate spored species *M. ucrainicum*. Nicot & Olivry separated *M. brachysporum* from *M. striatisporum* by the following features found in *M. brachysporum*: (1) greater development of aerial mycelium; (2) tendency to become stipitate in culture; (3) irregular branching of the conidiophore; (4) claviform phialides as opposed to almost cylindric in *M. striatisporum*; (5) stout heavily striate spores; (6) higher temperature tolerance and cellulolytic activity. They also mentioned a specimen from Boudier's herbarium, labelled *M. medium*, not the type, which had large striate spores. Meyer (1959) also described a long striate spored isolate which he did not name. Pidoplichko & Kirilenko (1971) differentiated *M. ucrainicum* from *M. striatisporum* by the shape of the spores which they said were elliptical in *M. ucrainicum* and spindle shaped in *M. striatisporum*, although the spore sizes they quoted for the two species were very similar.

After examining striate spored *Myrothecium* cultures and specimens it has become apparent that colonial appearance, temperature relations, cellulolytic activity and the tendency to form synnemata cannot be correlated with spore size or shape. It is impossible after looking at a large number of isolates to divide these striate spored fungi on the basis of spore size. All the spores examined had a breadth/length ratio of 1:2–4 and it was found that the heaviness of the striations varied with the age of the isolate and from one subculture to the next.

Because of these findings and because in all the material of *M. cinctum* examined by me I have found similar characteristics, particularly the marginal hyphae, I consider it better to retain one specific epithet for the *Myrothecium* with striate spores.

SPECIMENS EXAMINED

In Herb. PR.
Ex Herb. A.C.I. Corda no. 155489, as *Fusarium cinctum* Corda Mus. Hof. 1840.
In Herb. P.
On *Andropogon* Grillo, as *Mirothecium crastophylum*; on fol. *Arundo phragmit. poussilantes* as *M. ellipsosporum*; on paper as *M. papyricolum*; on fol *Poa* Gallia, Fawtrey, 807 as *M. verrucaria.*
In Herb. PC.
Ad folia *Scirpi sylvatici* 1899, Fautrey ex Herb. Boudier no. 16, as *Myrothecium medium* Sacc.; ex coll. Desmazières 1863 no. 8 (with *M. carmichaelii*) as *M. verrucaria*; sand, France 1952, R Heim as *M. striatisporum.*
In Herb. K (*Hymenopsis ellipsosporum* folder).
On *Phragmites communis*, Fuckel's Fungi Rhenani 1532, Type of *Myrothecium ellipsosporum*; sur les feuilles seches de l'*Arundo phragmites*, Jardin Bot. Lyon Septembre 1879, J. Therry; C Roumeguère Fungi Gallici Exsiccati 943 as *Myrothecium ellipsosporum.*
In Herb. K (*M. roridum* folder).
S. Carolina ex Herb. C. E. Broome.
In Herb. K (*M. verrucaria* folder).
Ex Herb. C. Roumeguère, Fungi selecti Exsiccati no. 5394.
In Herb. IMI.
Ex *Acacia karroo*, S. Africa, (CBS 177.65) 140053; on *Andropogon zizanioides*, Indonesia (West Irian), 81424(a); on *Bambusa* sp., Sierra Leone, 103348(b); on & ex *Brachiaria mutica* Malaysia, 36521; on *Carex acutiformis*, Britain, 4006; on *Carex hudsonii*, Britain, 10724; on *Carex paniculata*, Britain, 56367; on *Carex pseudocyperus*, Britain, 32872; on *Carex riparia* Britain, 34830(a) and 27785; on *Coffea arabica*, Uganda, 1527; on *Cola nitida*, Sierra Leone, 25704(d); on & ex *Glyceria aquatica*, Britain, 45148; on *Glyceria maxima*, Britain, 37298 and 58076(a); on & ex *Glyceria* sp., Britain, 158347; on *Oryza sativa*, Malaysia, 24716 and

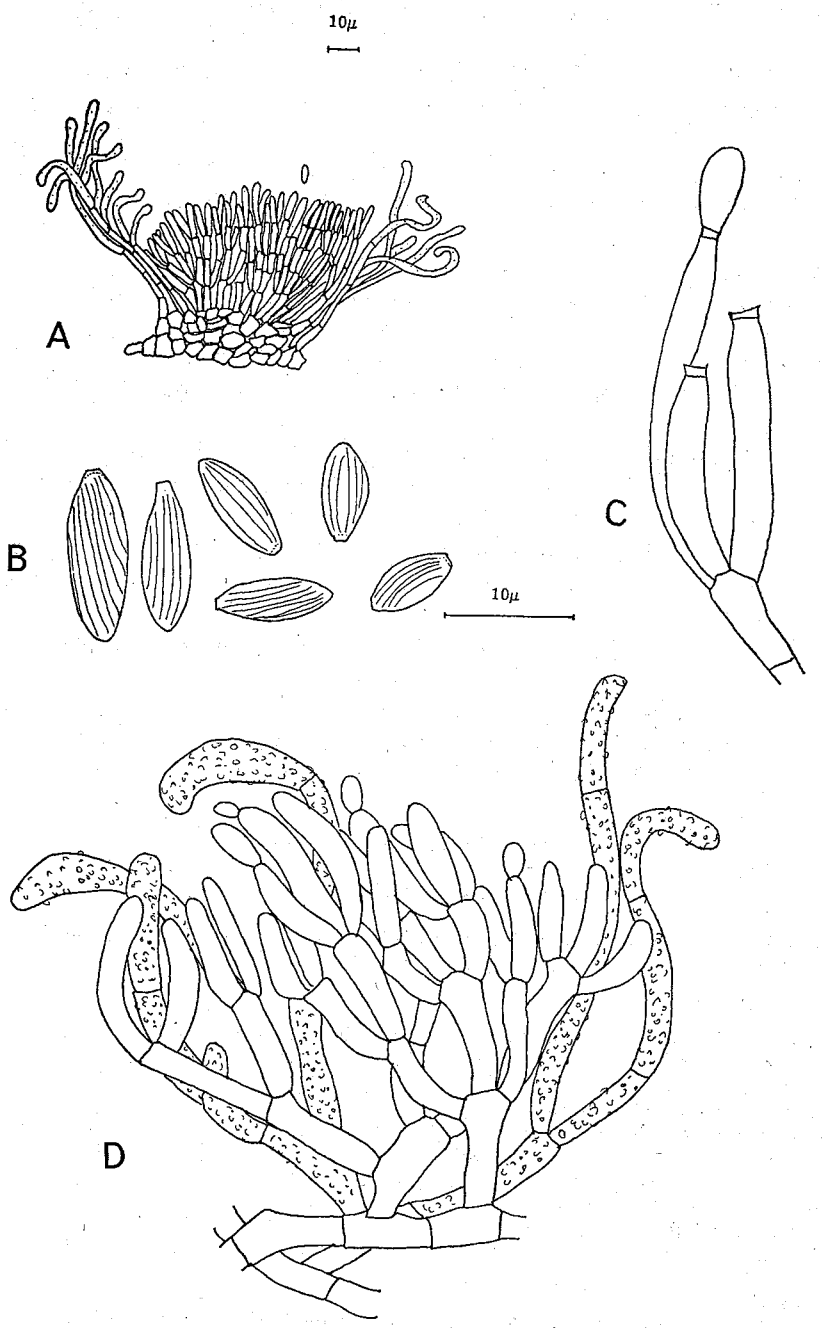

Fig. 5. *Myrothecium cinctum.* A, sporodochium; B, conidia; C, phialides; D, conidiophores, phialides and marginal hyphae.

34467; on *Pennisetum purpureum*, Togo, 39709(a); on *Petrea volubilis*, Sierra Leone, 41227 and 46706; ex *Poa pratensis*, Australia, 126495; on *Saccharum officinarum*, Ghana, 38574(a); ex *Schizachryium platyphyllum*, Togo, 39708(a); on *Scirpus lacustris*, Britain, 37295; on *Setaria chevalieri*, Togo, 39594(a); on *Typha latifolia*, Britain, 58077; ex pasture leaves, New Zealand, 152592, 152593 and 152591; ex sand, Iran, (Type of *M. brachysporum* Nicot) 115293; Algeria 146666 and 146669; Cambodia, J. Nicot, 146667; Senegal, 146668; ex soil, New Zealand, (Type of *M. striatisporum*) 1526; Papua–New Guinea (Type of *M. longistriatisporum* Matsushima) 163100; USSR, (Type of *M. ucrainicum* Pidopl. and Kiril.) 158441; Pakistan, 150426, 84582 and 102189; New Caledonia, 104111; Egypt, 77011; Netherlands, (CBS 373.50) 140052 (CBS 932.69) 145760; USA, (QM 8470) 140576, 55306, (QM 8472) 140577, and (QM 8471) 140599; Canada, 140637, 144469 and 144471; India, 99497; ex indet. host, India, 93692, 114519 and 132172; Uganda, 150550.

6. **Myrothecium** state of **Nectria bactridioides** Berk. & Br., *J. Linn. Soc.* (Bot.) **14**: 115, 1873.

Type: in Herb. K *Nectria bactridioides* 58, Peradeniya. SKHJ Nov 1867 ex Herb. Berk. 1879, (no conidial state seen on material) (holotype).

On host: synnematous or sporodochial, 160–225μ wide and 105–450μ high, stipe broad, white often appearing layered with growth zones, white margin of sinuous hyphae around the convex wet black spore mass. *Colony* reaching 20–40 mm diam. on PDA at 25°C after 14 days. Mycelium floccose, radially wrinkled white to rosy buff. Reverse rosy buff. Sporulation usually diffuse giving a greyish appearance to the colony but occasionally coalesced into margined olivaceous black expanses. *Hyphae* hyaline, thin walled, rarely branched, septate, cells 6–25 × 1·5–3μ. *Stroma* rarely well developed, usually consisting of a knot of shorter celled hyaline hyphae at the base of the synnema, 3–5μ diam. *Marginal hyphae* arising from the basal hyphae, and clothing the stipe surrounding the spore mass at the apex, sinuous or straight, sometimes branched, smooth walled or slightly verrucose, septate cells 10–15 × 1·5μ. *Conidiophores* very closely interwoven in the stipe, branching repeatedly producing up to 3 branches at each node but usually 2, ultimate branches bearing phialides, hyaline, septate, cells 13·5–25 × 1·5μ. *Phialides* in whorls of 2–4, closely compacted into a dense parallel layer, hyaline, narrow tapering towards the apex often varying in length within the same whorl, 20–45 × 1–1·5μ. *Spores* ellipsoid or flattened on one side, both ends usually rounded, hyaline to dilute olivaceous, black in mass, uni- or biguttulate, 3·5–5·5 × 1·5–2μ.

Distribution: Ceylon, Malaysia.

Hosts: Theobroma cacao.

SPECIMENS EXAMINED

In Herb. K. (*Nectria bactridioides* folder).
Peradeniya, no. 58, SKHJ, Nov. 1867 ex Herb Berk 1879 T; no conidial stage found
In Herb. IMI.
On *Theobroma cacao*, Malaysia, 63286, 62240(a), 62230(b and c), 68932(b) and 63653(a).

7. **Myrothecium masonii** sp. nov.

Type: on leaves of *Glyceria* sp., Wheatfen Broad, Norfolk, England, 5.6.1971, E.A. Ellis, IMI 158346 (holotype). Culture also preserved in herb.IMI.

Synnema 150–900μ altum, stipes 30–75μ latus, albus vel cinereus, capitulum mucosum, nigrum 15–75μ latum. *Coloniae* floccosae, albae vel subroseo-bubalinae, massa sporarum primo

diffusa, cinereascens, oleinde synnematosae capitulo mucoso nigroque. *Hyphae hyalinae* septatae, cellulis 13·5–27μ longis, 1–2μ latis. *Stroma* non bene evolutum, cellulis 4–7μ diam. *Hyphae marginales* hyalinae cellulis bulbosis verruculosis, 4·5–10μ longis, 2·5–5·5μ latis, stipem tegentibus terminantes. *Conidiophora* hyalina, ramosa, septata, cellulis 13–22μ longis, 2–2·5μ latis. *Phialides* 2–4 verticillatae, arcte confertae, cylindracae, hyalinae, 10–22·5μ longae, 1–2·5μ latae. *Sporae* anguste ellipsoideae, plerumque atrinque rotundatis, aliquando uno extremo paululum truncato, hyalinae vel subolivaceae, 4·5–9μ longae, 1·5–2·5μ latae. In foliis *Glyceriae* sp., Wheatfen Broad, Norfolk, England, 5.6.1971, E. A. Ellis, IMI 158346, typus.

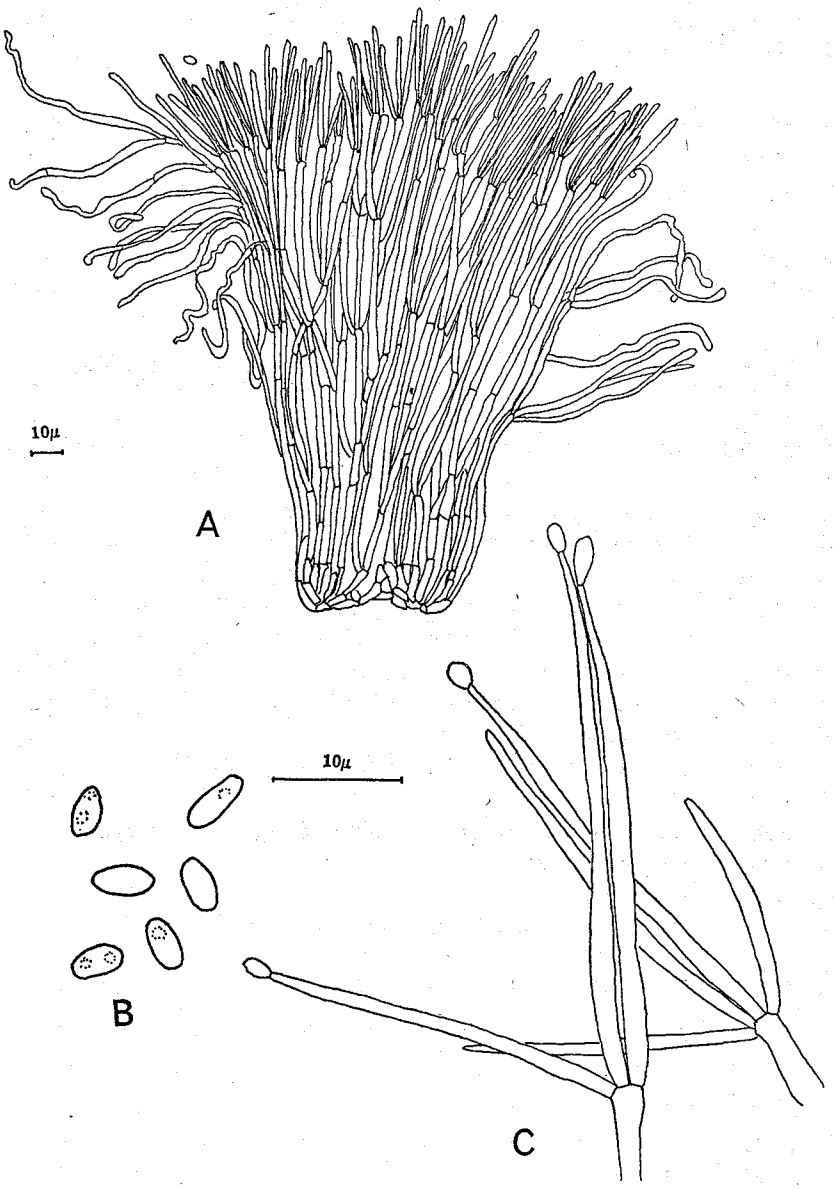

Fig. 6. *Myrothecium* state of *Nectria bactridioides*. A, synnema; B, conidia; C, phialides.

Culture also preserved in herb.IMI.

On host: synnematous, 150–900μ high, stipe 30–75μ wide, white, grey or black, head shiny black wet, 15–75μ wide. Colony reaching 60–70 mm on PDA at 25°C after 14 days. Mycelium floccose white to pale rosy buff. Reverse rosy buff. Sporing areas at first diffuse, greyish but synnemata soon apparent with wet shiny black heads. *Hyphae* hyaline, smooth walled, rarely branched, septate, 13·5–27 × 1–2μ. *Stroma* not well developed, usually a basal knot of short celled hyaline hyphae, cells 4–7μ diam. *Marginal hyphae* arising from the base covering the stipe, septate, hyaline, ending in characteristic hyaline bulbous verrucose cells 4·5–10 × 2·5–5·5μ which cover the stipe. *Conidiophores* arising from the basal knot of hyphae, closely compacted and branched at least once and usually several times forming 2 or 3 branches at each node, the ultimate branches bearing the phialides, hyaline or slightly olivaceous, septate, cells 13–22 × 2–2·5μ. *Phialides* in whorls of 2–4, closely compacted into a head, cylindrical slightly tapering towards the pore, hyaline, 10–22·5 × 1–2·5μ, rarely larger. *Spores* narrowly ellipsoid, usually both ends rounded sometimes one slightly truncate, hyaline to dilute olivaceous, 4·5–9 × 1·5–2·5μ.
Distribution: Britain, Jamaica.

Hosts: Carex, Coix, Glyceria, Juncus, Phragmites.

SPECIMENS EXAMINED

In Herb. IMI.
On *Carex*, Britain, 162836; on *Coix lachryma*, Jamaica, 78235; on *Glyceria*, Britain, 158346, T; on *Glyceria maxima*, Britain, 58076(b); on *Juncus subnodulosus*, Britain, 58088; on *Phragmites communis*, Britain, 34218.

8. **Myrothecium roridum** Tode ex Fr., Syst. mycol. **3**:217, 1829
   = *Myrothecium advena* Sacc., *Annls mycol.* **6**:560, 1908
   = *Myrothecium fragosianum* Sacc., Not. mycol. **22**:162, 1917
   = *Exotrichum leucomelas* Syd., *Annls mycol.* **12**:571, 1914
   = *Myrothecium leucomelas* (Syd.) Höhnel, *Mitt. bot. Inst. tech. Hochsch.* Wien **2**:95, 1925
   = *Hymenopsis tenuis* Petch, *Ann. R. bot. Gdns Peradeniya* **10**:178, 1927
   = *Myrotheciella catenuligera* Speg., *An. Mus. nac. Hist. nat. B. Aires* **20**:460, 1910
   = *Gliocladium nigrum* Moreau & Moreau, *Revue Mycol.* **6**:61, 1941
   = *Myrothecium roridum* var. *eichhorniae* Ponnappa, *Hyacinth Control Journal* **8**:18, 1970.

Type: (of *M. roridum*) in Herb K on *Allium sativum*, Fuckel's Fungi Rhenani, no. 166 (neotype).

On host: usually sporodochial sometimes synnematous, 60–750μ diam., 40–150μ deep, polymorphic; spore mass flattened or convex, wet, shiny black, olivaceous when young, margin pure white, floccose. *Colony* reaching 40–60 mm on PDA at 25°C after 14 days. Mycelium sparse or floccose and deep, often radially wrinkled, white to rosy buff. Reverse pale rosy buff to rosy buff often

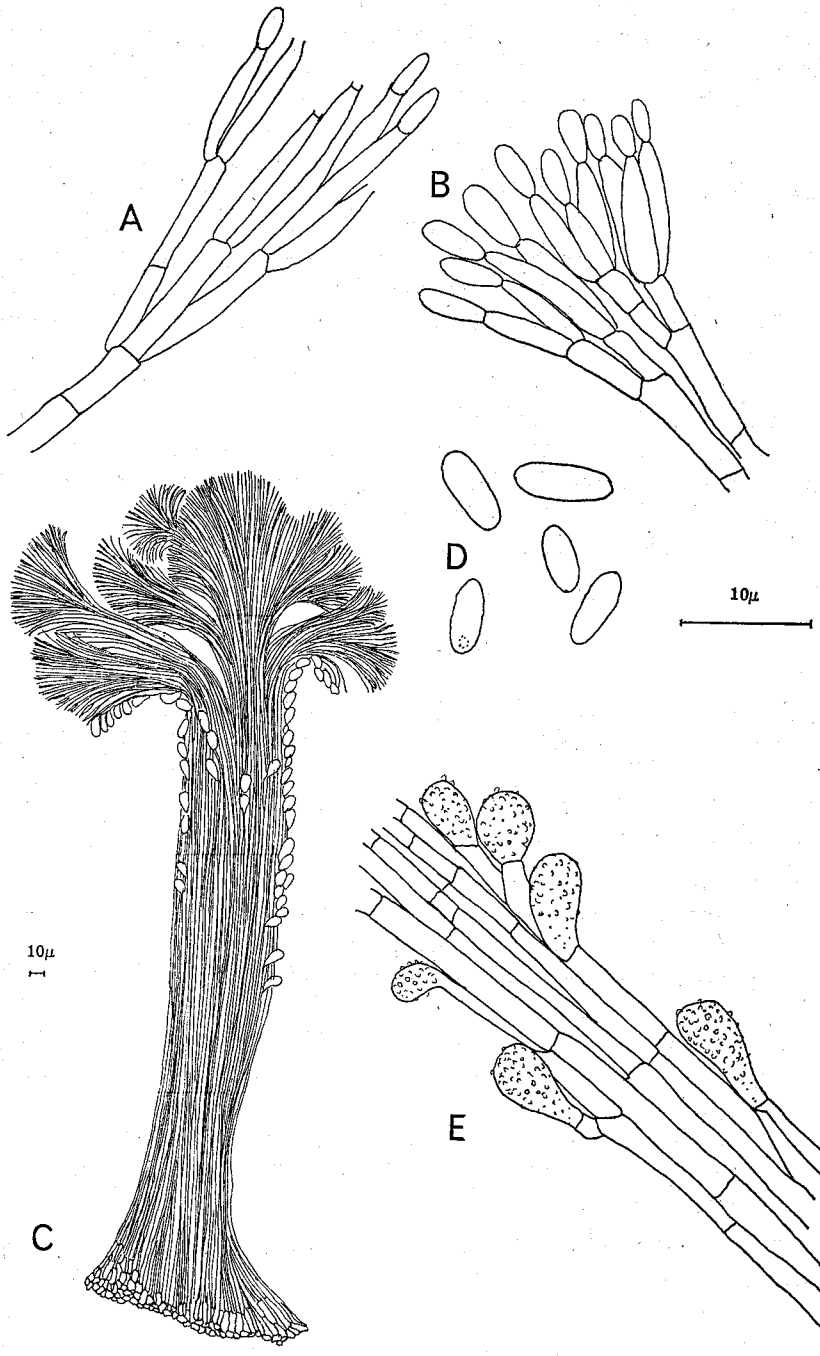

Fig. 7. *Myrothecium masonii*. A and B, conidiophores and phialides; C, synnema; D, conidia; E, marginal hyphae.

streaked with pure yellow. Sporulation often in concentric zones, diffuse or coalesced into marginate olivaceous black to black sporodochia. *Hyphae* hyaline, thin smooth walled, rarely branched, septate, cells 9–23 × 1–2·5μ. *Stroma* rarely well developed, loosely packed elongate or isodiametric hyaline cells, 3·5–6μ diam. forming a thin layer. *Marginal hyphae* arising from stroma, straight or curling, repeatedly branched often forming branches at right angles below a septum, blunt ended, walls smooth, septate, cells 8·5–18 × 1·5–2·5μ. *Conidiophores* closely interwoven, repeatedly branched forming 2–5 branches at each node, ultimate branches bearing phialides, hyaline or darkened at the nodes, septate, cells 8–15·5 × 1·5–2·5μ. Dark sterile hyphae occur occasionally between the conidiophores and phialides. *Phialides* in whorls of 3–6 usually 4–5, closely packed in a dense parallel row, cylindrical or rarely slightly clavate, hyaline sometimes darkened at the base, pore sometimes darkened and occasionally with a small collarette, sometimes percurrent, 11–16 × 1·5–2μ. *Spores* rod shaped or narrowly ellipsoid, rarely slightly ovoid, mostly with both ends rounded, occasionally one truncate, hyaline to dilute olivaceous, black in mass, up to three guttules seen, 5·5–7 × 1·5–2μ.

Distribution: widespread.

Hosts: plurivorous.

SPECIMENS EXAMINED

In Herb. K. (*M. roridum* folder).
On *Allium sativum*, Fuckel's Fungi Rhenani, no. 166, neotype; on *Ricinis* sp., North America; on *Viola* sp., Corstorphine, Edinburgh, Scotland, 23.6.1943, R. W. Dennis; on dying *Viola*, Oct. 1920, herb. W. G. Grove; on *Viola* (Moseley Cream), Birmingham, England, 24.7.1934, Herb. C. G. C. Chesters, on *Viola* sp., Birmingham, England, 5.7.1934, Herb. C. G. C. Chesters; on *Viola* (Audrey Paling), Blackheath, Birmingham, England, Herb. C. G. C. Chesters.
In Herb. K. (*M. verrucaria* folder).
Pennsylvania, Michener, Herb. Berk. 1879, no. 4123.
In Herb. K. (*M. carmichaelii* folder).
Peradeniya, Ceylon, Dec. 1869, Herb. Berk. 1879, no. 1049, (Type *Hymenopsis tenuis* Petch).
In Herb. P.
(On decaying pages), no. 807, as *M. roridum*; on *Scirpus lacustris*, as *M. roridum*; on *Coffea arabica*, Cherbourg, France, as *M. advena* (Type); as *M. fragosianum* (Type).
In Herb. PC.
On *Galium aperine*, Bois de Mendon, April 1906, as *M. roridum*.
In Herb. L.
On *Cucumis* sp. Herb. Lugd. Bat, 910, 255, 287, as *M. verrucaria*.
In Herb. LPS.
La Plata, Argentina, 18.8.1880, Leg. C. Spegazzini, no. 36217, as *M. roridum*; on *Lycopersicon esculentum*, La Plata, Argentina. 5.4.1904. C. Spegazzini, no. 15885, as *Myrotheciella catenuligera* Speg. Type.
In Herb. IMI.
On *Adhatoda* sp., India, 96516; on *Ailanthus excelsa*, India, 152143; on *Althaea rosea*, India, 101734; Zambia, 100130 and 152143; ex *Althoffia pleiostigma*, Papua–New Guinea, 150985; on *Amaranthus gangeticus*, Malaysia, 53222; on *Amaranthus* sp., Ghana, 72042(b); ex *Antirrhinum majus*, Britain, 37899; ex *Arachis hypogaea*, Ghana, 61511(b); British Solomon Islands, 77317(a); ex *Artocarpus integer*, West Pakistan, 91430(b); ex *Asclepias curassavica*, Sierra Leone, 1502(b); on *Asystasia* sp., 1503; on *Azadirachta indica*, Ghana, 39898(b); on *Barleria prinoides*, India, 96512; on *Brassica chinensis*, British Solomon Islands, 77260(b); ex *Broussonetia papyrifera*, Papua–New Guinea, 74159; ex *Bryophyllum* sp., Ghana, 72025; on *Callichilia subsessilis*, Sierra Leone, 57694; on *Calotropis gigantea*, India, 77916; on *Canavalia ensiformis*, Sierra Leone, 8177(c) and 1512; on *Canavalia* sp., Sierra Leone, 1513; on *Carica papaya*, Malaysia, 24909(c); Sudan, 48805(b); on *Casearia tomentosa*, India, 108466; on *Ceiba pentandra*, British Solomon Islands, 77222(a); on *Citrullus vulgaris*, Ghana, 39553; on *Coffea arabica*, India, 71360 and 71361; Indonesia (West Irian), 81368(b); ex *Coffea arabica*, India,

70817; ex *Coffea* sp. (CBS 372.50), 140050; on *Colocasia esculenta*, British Solomon Islands, 77152; on *Corchorus capsularis*, Malaysia (West), 62205(a); India, 47792; on *Corchorus olitorius*, Papua–New Guinea, 74159; Sierra Leone, 1518 and 38680; ex *Crotalaria juncea*, India, 131055(a); ex *Cucumis melo*, India, 106891; on *Cucurbita maxima*, Malaysia (Sabah), 78793(a); on *Cyamopsis psoraloides*, Malaysia (West), 38871; on *Cyamopsis tetragonoloba*, India, 61812; on *Dahlia* sp., via Denmark, 150282; on *Daucus carota*, British Solomon Islands, 77084; on *Dodonea viscosa*, India, 93703(b); on *Eichhornia crassipes*, Burma, 79771(a); India, 103602 (Type *M. roridum* var. *eichhorniae* Ponnappa); on *Ficus capensis*, Sierra Leone, 1517; on *Ficus* sp., Ghana, 44589; ex *Glycine max*, Malaysia (West), 135676; on *Glycine max*, Malaysia (West), 35585; on *Glycine tabacina*, Zambia, 75706(d); on *Gossypium* sp., S. Yemen, 68973; ex *Gossypium* sp., Nigeria, 148918, 148883, 148881, 148917 and 148934; Thailand, 109901; India, 126743 and 96856; on *Grevillea robusta*, Sudan, 90587; ex *Helianthus tuberosus*, Malaysia (West), 72938(b); on *Hibiscus cannabinus*, India, 142635(a); on *Hibiscus esculentus*, Nigeria, 63711; Sierra Leone, 1514; Tanzania, 1515 and 126969; ex *Hibiscus esculentus*, Malaysia, 36519; on *Hibiscus manihot*, British Solomon Islands, 77123; ex *Hibiscus rosa-sinensis*, India, 61681; on *Hibiscus rosa-sinensis*, Sierra Leone, 5398 and 53400; British Solomon Islands, 77330 and 77287; on *Hibiscus* sp., Papua-New Guinea, 83520; on *Impatiens balsamina*, Malaysia (Sabah), 79320(b); on *Impatiens sultani*, Sierra Leone, 1501; on *Ipomoea reptans*, British Solomon Islands, 77345; on *Justicia flava*, Ghana, 39559; on *Justicia insularis*, Ghana, 69563; on *Lablab niger*, Malaysia (Sabah), 78852(b); Sierra Leone, 1505; Papua-New Guinea, 119088; Ghana, 1508; ex *Lactuca sativa*, Malaysia, 62948; on *Lantana camara*, Malaysia (West), 61993; on *Lepidagathis* sp., Sudan, 45195; ex *Luffa acutangula*, Malaysia, 35614; on *Luffa acutangula*, Sierra Leone, 1499; Brunei, 152113; on *Luffa cylindrica*, Malaysia, 37806; Malaysia (Sarawak), 111050; on *Lupinus ornatus*, Britain, 37900; ex *Lycopersicon esculentum*, Mexico, 16236 and (QM 188) 140569; Turkey, 145763; China, 33307; New Zealand, 135714; Britain, 37898, 70235, 70236, 70237, 70239 and 96857; on *Lycopersicon esculentum*, British Solomon Islands, 77239; India, 128179; Zambia, 101939; Kenya, 63664; ex *Malvastrum coramandelianum*, Venezuela, 143493; ex *Malvastrum tricuspidatum*, India, 131073; ex *Mangifera indica*, India, 130822; ex *Melia azedarach*, India, 95016; on *Moluccella* sp., Kenya, 129244; ex *Monochoria* sp., Singapore, 71817; on *Musa cavendishii*, Sierra Leone, 36408; ex *Musa sapientum*, Egypt, 143024; ex *Nasturtium*, 150283; ex *Nelumbium nuciferum*, 108330; ex *Nicotiana tabacum*, 94909; ex *Orchis* sp., Indonesia, 142375; ex *Oryza sativa*, India, 131920 and 96812; on *Peperomia caperata*, Britain, 110486; on *Petunia hybrida*, Zambia, 59205; on *Phaseolus acutifolius*, Zambia, 75704(b); Trinidad, 78684; on *Phaseolus adenanthus*, Sierra Leone, 1504, 1506; on *Phaseolus lunatus*, Nigeria, 1507; Sierra Leone, 1511; on *Phaseolus mungo*, Tanzania, 1509; India, 113048(b); on *Phaseolus semi-erectus*, Indonesia (West Irian), 81407(a); on *Phyla strigillosa*, Venezuela, 141800; on *Psophocarpus tetragonolobus*, Malaysia (Sabah), 79371; Malaysia, 36518, 36511; British Solomon Islands, 77303; on *Pueraria hirsuta*, Sierra Leone, 53417; on *Ricinus communis*, Malaysia, 38888; on *Rinorea liberica*, Sierra Leone, 1520; on *Rinorea microdon*, Sierra Leone, 1519 and 49010; on *Ruella tuberosa*, Venezuela, 145279; ex *Saccharum officinarum*, South Africa, 108788; ex *Salvia coccinea*, Mauritius, 76378; ex ? *Salvinia auriculata*, India, 148982; ex *Sesbania grandiflora*, India, 131079; on *Sida cordifolia*, India, 129827; Tanzania, 91030; on *Sida rhombifolia*, Indonesia (West Irian), 81448; Sierra Leone, 1516; on *Sida* sp., Papua-New Guinea, 74160; on *Solanum* ? *aculeatum*, Venezuela, 151287; on *Solanum melongena*, Ghana, 69567; Indonesia (West Irian), 81443; Malaysia (Sabah) 80608; Malaysia, 34469; Malaysia (Sarawak), 98639; British Solomon Islands, 77351; ex *Solanum muricatum*, Tanzania, 52041; ex *Solanum tuberosum*, India, 102382; Britain, 37901; on *Sumbavia* sp., (Type *Exotrichum leucomelas* Sydow) 1497(a); on *Theobroma cacao*, Sierra Leone, 51654; on *Trapa bispinosa*, India, 148988; on *Trichosanthes anguina*, British Solomon Islands, 77325 and 77347(b); Malaysia, 49612; Sierra Leone, 1498 and 1500; on *Triplochiton zambesiacus*, Zambia, 90064; on *Vigna marina*, Malaysia (West), 49921; on *Vigna sesquipedalis*, British Solomon Islands, 79044(b); on *Vigna sinensis*, Nigeria, 147268; Malaysia (Sabah), 92775(a); Malaysia, 24912 and 34468; British Solomon Islands, 77272(d); on *Vinca rosea*, India, 112974; on *Viola odorata*, Tanzania, 1521; on *Viola tricolor*, Britain, 62421; on and ex *Viola* sp., Tanzania, 126966 and 126967; Britain, 70234; ex *Vitis vinifera*, India, 146617, 146613 and 112039; ex *Vitis* sp., Britain, 44747; on *Withamia somnifera*, India, 109944; on *Xanthium strumarium*, West Pakistan, 90197(b); on *Xanthosoma sagittifolium*, British Solomon Islands, 77247; Ghana, 49027; ex cellulosic material, Egypt, 146829; on tent rope, USA, (QM 129B) 140568; on textile sample, S. America, (QM 4534) 140575; ex soil, France, (Type of *Gliocladium nigrum* Moreau & Moreau) 155923; ex soil (around *Ammophila arenaria*), Britain, 60912; (grassland), West Pakistan, 123919; Singapore, 127393; India, 100524, 100525, 140382; Canada, 41736; USA, (QM 350), 140573; Libya, 149274; Britain, 110111(b); ex

indet. host, India, 114492, 132257, 132174, 132137; Britain, 70243; New Zealand, 131661; Egypt, 134930; Germany, 148391; and USA, 139647.

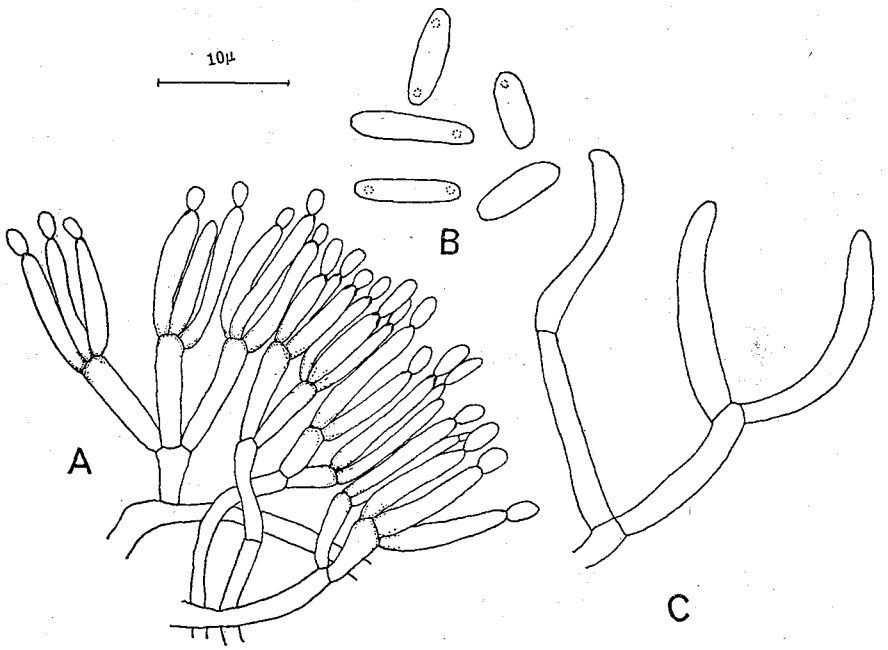

Fig. 8. *Myrothecium roridum*. A, conidiophores and phialides; B, conidia; C, marginal hyphae.

9. **Myrothecium verrucaria** (Alb. & Schw.) Ditm. ex Fr., Syst. mycol. **3**:217, 1829
   ≡ *Peziza verrucaria* Alb. & Schw., Consp. Fung. p. 340, 1805
   = *Gliocladium fimbriatum* Gilman & Abbott, *Iowa St. Coll. J. Sci.* **1** (3) 304, 1927
   = *Metarhizium glutinosum* Pope, *Mycologia* **36**:346, 1944
   = *Starkeyomyces koorchalomoides* Agnihothrudu, *J. Indian bot. Soc.* **35**:41, 1956.

Type (of *M. verrucaria*): ex cotton bale, IMI 45541 (neotype).

On host: sporodochial or rarely synnematous, 150–750μ diam., 50–150μ deep. Spore mass wet, black, convex surrounded by white floccose margin. *Colony* reaching 40–50 mm diam. on PDA at 25°C after 14 days. Mycelium absent or floccose, white to rosy buff. Reverse rosy buff. Sporulation diffuse or coalesced into pale olivaceous to black sporodochia with a white margin, occasionally stipitate. *Hyphae* hyaline, smooth thin walled rarely branched, septate, cells 15–30 × 1·5–3μ. *Stroma* rarely well developed, usually a thin layer of isodiametric or elongate hyaline cells 3·5–5μ diam. *Marginal hyphae* curling, some branched with a blunt tip, usually verrucose sometimes smooth walled, hyaline, septate, cells 10–25 × 1·5–2·5μ. *Conidiophores* arising from knot of

basal hyphae in culture or from thin stromatic layer, branched repeatedly, usually forming 2–4 branches at each level, the ultimate branches bearing phialides, hyaline, septate, cells 9–14 × 1·5–2μ. *Phialides* 3–6 in a whorl, closely packed in a dense parallel layer, cylindrical sometimes slightly tapered towards the apex, hyaline, sometimes darkened around the pore, 10·5–14·5 × 1·5–2μ. *Spores* broadly fusiform, one end pointed the other protruding and truncate, in erythrosin and NH_4 solution with a fantailed appendage on the pointed end, 6·5–8 × 2–3·5μ.

Distribution: widespread.
Hosts: plurivorous, particularly soil.

M. verrucaria can be distinguished from *M. roridum*, the other common species, by the fantailed appendage which has not been observed in *M. roridum*. It is found, however, in *M. gramineum* and *M. leucotrichum* but both these species have setae.

Preston (1961) suggested that the name *M. verrucaria* should be attributed to Ditmar alone. No evidence has been found to support this and since Ditmar quoted *Peziza verrucaria* Alb. & Schw. as a basionym it would appear that the above citation is correct.

SPECIMENS EXAMINED

In Herb. K. (*M. verrucaria* folder).
On decaying vegetable matter, carrot patch, Clyde N.Y., Aug. 1887, O. F. Cook, Jr, Ellis and Everhart, N.A. Fungi 2084; on *Lactuca*, Newfield, New Jersey, J. B. Ellis, 2769, ex Herb. M. C. Cooke, 1885.
In Herb. K. (*M. roridum* folder).
S. Carolina, ex Herb. C. E. Broome; on twine, Australia, 515; on *Eleusine indica*, Aug., Curtis ex H. W. Ravenel's Herb; on *Eleusine indica*, Herb. Berk. 1879.
In Herb. Madras. Herb. MUBL no. 1390, ex rhizosphere of pigeon pea, 4.10.1953 V. Agnihothrudu, as *Starkeyomyces koorchalomoides* Agnihothrudu, type.
In Herb. IMI.
Ex *Agave sisalana*, Tanzania, 88251 and 88252; on *Arachis hypogaea*, Gambia, 68288; ex *Chrysanthemum indicum*, Britain, 44743; ex *Citrus* sp., (CBS 188.46) 140057; Rhodesia, 1522; ex *Cucumis sativus*, Jamaica, 89911(b); ex *Dianthus* sp., Britain, 70240; ex *Dolichos biflorus*, Nepal, 155913; on *Durio zibethinus*, Malaysia, 37811(b); ex *Glycine max*, China, 33551; ex *Glycine soja*, 150281; Rhodesia, 46565; Egypt, 148400; ex *Gossypium* sp., Turkey, 144597; ex *Lolium perenne*, N. Zealand, 157820 and 157819; ex *Lupinus* sp., Australia, 104174; ex *Lycopersicon esculentum*, Britain, 99259 and 140438; Egypt, 11411; Britain, 42072 and 70241; on *Musa* sp., Venezuela, 74766; ex *Musa* sp., Indonesia, 141590; ex *Olea* seedlings, Tanzania, 96595; ex *Oryza sativa*, Denmark, 150280; ex *Oryza* sp., India, 131919 and 96812; ex *Phaseolus vulgaris*, Egypt, 83720; ex *Phlox* sp., Britain, 70242; ex *Poa pratensis*, Australia, 126494; ex *Saccharum* sp., Jamaica, 125925; ex *Sesamum orientale*, Sudan, 111783; ex *Solanum capsicastrum*, Britain, 36635; ex *Solanum tuberosum*, Cyprus, 1524 and (CBS 189.46) 140060; ex *Trifolium alexandrinum*, Egypt, 112720; ex *Triticum vulgare*, Kenya, 45776; ex *Vitis vinifera*, India, 112040; ex *Viola tricolor*, Oregon, 147184; ex apple orchard, S. Africa, 87232; ex cotton bale, USA, (QM 460 and 2002, ATCC 9095), (Type of *Metarhizium glutinosum* Pope), 45541, neotype and 16235; ex cotton duck, (QM 2002) 140590; ex cellulosic material, 146827; ex canteen cover, Papua–New Guinea, (QM 34f) 140578 and USA, 1945, (QM 3687) 140593; ex canvas shoe, Britain, 25291; ex paper, India, 153496; ex sand, USA, (QM 353) 140585; ex sewage, Pakistan, 146293; ex shoe, Papua–New Guinea, (ZM 70h) 140579; ex string (broom), USA, (QM 781) 140589; ex textile, Central America, (QM 5947) 140594; ex twig, India, 142878; ex soil, Canada, 41737, 144465 and 144470; Egypt, 77018, 115964, 116441 and 116462; Ghana,72016; India, 76549, 100526, 115918, 131469 and 131690; Iraq, 72716, 72735, 72736, 72751, 72752, 72753, 133148 and 133653; Nigeria, 54694 and 81223; Pakistan, 84885, 116938; Sudan, 1525; USA, (QM 347) 140582, (QM348) 140583 and (QM349) 140584; ex indet. host, Egypt, 101545; France, (QM 504) 140588, (QM 7636) 140596, (QM8200)

140597, (QM 8489) 140598, 158443 and 158444; Ghana, 49030(d); Pakistan, 150352; USA, (QM 460b) 140586 and (QM 461) 140587; (ATCC 13667) 139648, (CBS 176.27, QM 7989) (Type of *Gliocladium fimbriatum* Abbott) 140054, (CBS 207.30) 140055, (CBS 253.47) 140058 and (CBS 231.56) 140059.

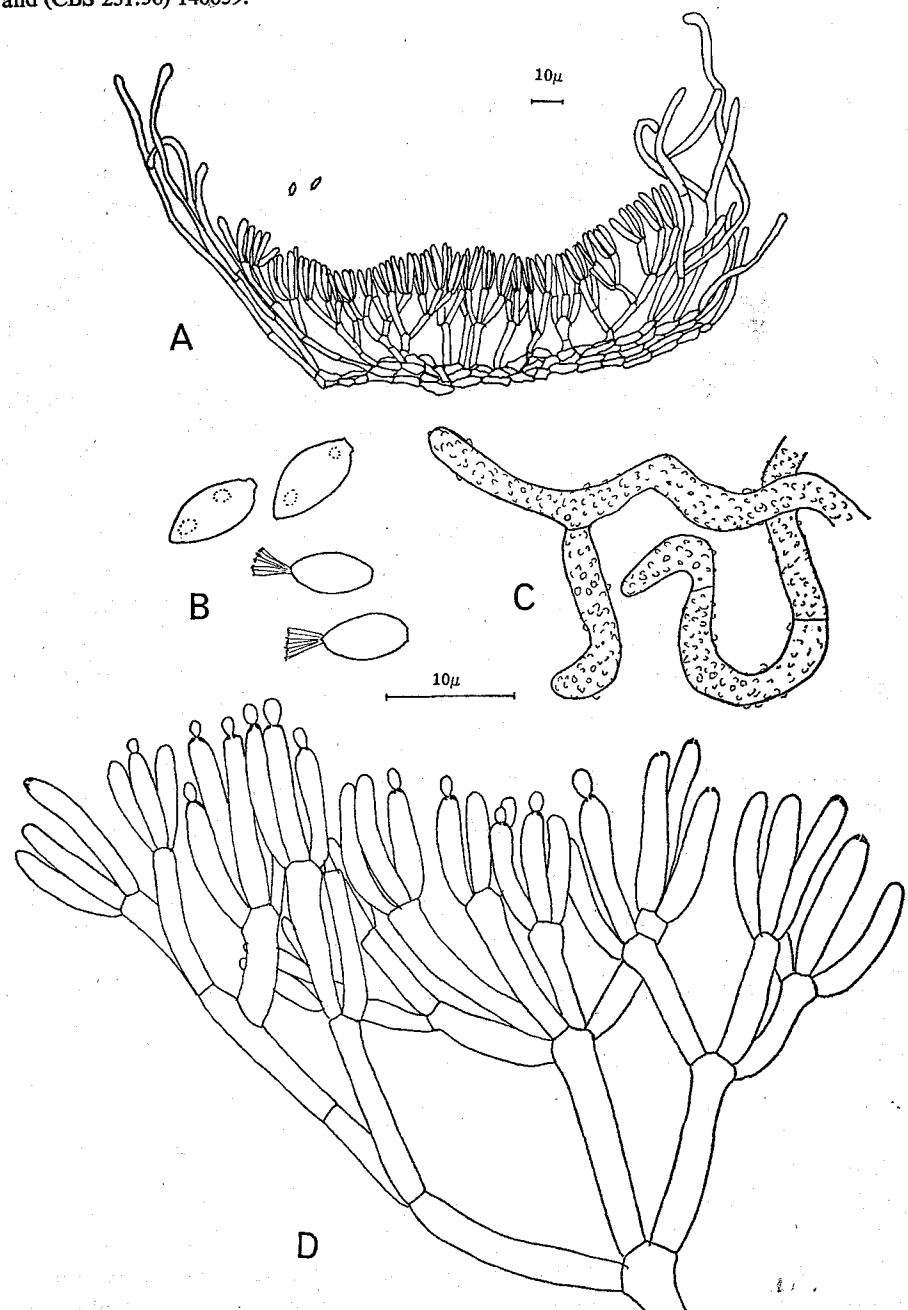

Fig. 9. *Myrothecium verrucaria.* A, sporodochium; B, conidia, two show fan tailed appendage; C, marginal hyphae; D, conidiophore and phialides.

10. **Myrothecium carmichaelii** Grev., Scot. Crypt. Fl. **3**:140, 1825
= *Myrothecium pulchellum* Speg., *An. Soc. Cient. Arg.* **22**:222, 1886 (Fungi Guar. 1:176).

Type: (of *M. carmichaelii*) on putrescent vegetable matter Appin Captn. Carmichael, in Herb. E (holotype).

On host: sporodochial, polymorphic, 150–600μ diam., 75–100μ deep, spore mass black shiny, surrounded by a dense white floccose margin. Not cultured. *Stroma* not well developed, similar to *M. roridum*, loosely compacted short cells. *Marginal hyphae* hyaline, frequently branched often at right angles, smooth walled, septate with septa prominent, cells shorter and broader than those in *M. roridum*, 9–15 × 2–4·5μ. *Conidiophores* closely interwoven, repeatedly branched producing 2–4 branches at one node, ultimate branches bearing phialides, septate cells 9–13·5 × 2–2·5μ. *Phialides* usually 3–6 in a whorl closely compacted into a dense parallel row, cylindrical, hyaline often with a noticeable pore at the apex, 12–18 × 1·5μ. *Spores* rod shaped, rounded at both ends or rarely slightly protruding and truncate at one end, hyaline to dilute olivaceous, black in mass, often biguttulate, 9–13 × 1–1·5μ.

Distribution: S. America, Britain.
Hosts: Eupatorium, Epilobium, Iris, Luehea, vegetable matter and bark.

This species can be distinguished from *M. roridum* by the characteristically broad short celled marginal hyphae and the breadth: length ratio of its spores usually 1:7–9 whereas in *M. roridum* it is 1:3–5.

It has not been possible to obtain this species in culture to confirm these differences.

SPECIMENS EXAMINED

In Herb. E.
On putrescent vegetable matter, Appin Captn. Carmichael: ex Herb. Greville. T.
In Herb. LPS.
Ex Herb. Speg. no. 32.764. *Luehea grandifolia* Paraguay, Guarapi VII 1883. B.Balansa no. 3868. Type of *Myrothecium pulchellum.*
In Herb. PC.
Ex coll. Desmazières 1863 no. 8 (with *M. cinctum*) as *M. verrucaria.*
In Herb. K. (*M. roridum* folder).
On bark, Scalberth Bay, 4.8.1968. R. W. G. Dennis.
In Herb. K. (*M. inundatum* folder).
Ex Herb. J. W. Ellis, Elistock. "*M. roridum*" Jan 11.1910.
In Herb. IMI.
On *Epilobium hirsutum*, England, 69362(b); on *Eupatorium cannabinum*, England, 34763; on *Iris pseudacorus*, England, 41597.

11. **Myrothecium lachastrae** Sacc., *Michelia* **2**:643, 1882.

Type: on leaves In Herb. P no. 1581 (holotype).

On host: sporodochial, polymorphic, 150–600μ diam., 50–75μ deep, convex olivaceous black to black spore mass, white floccose prominent margin. Not obtained in culture. *Stroma* not well developed, thin small celled layer similar to *M. roridum*. *Marginal hyphae* arising from the basal stroma, straight or curled, repeatedly branched, septate cells 10–15 × 1–2μ. *Conidiophores* closely compacted, branched repeatedly, usually forming 2–3 branches at each

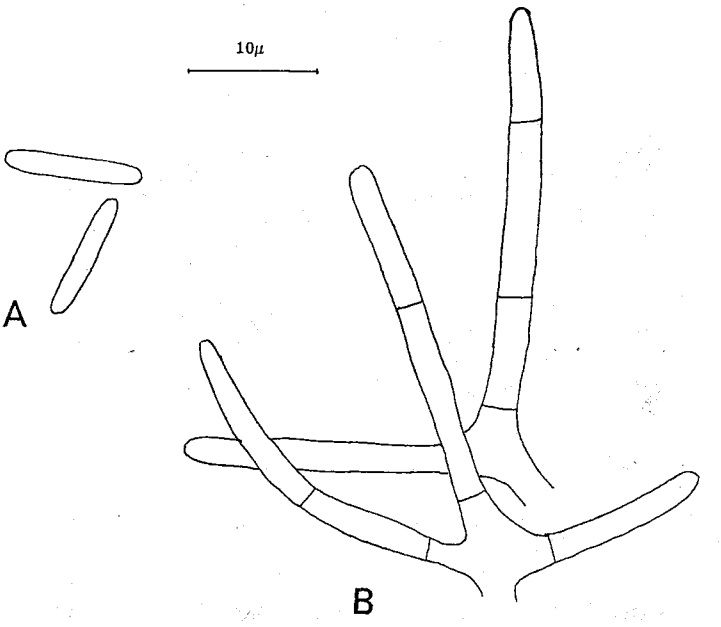

Fig. 10. *Myrothecium carmichaelii.* A, conidia; B, marginal hyphae.

node, ultimate branches bearing phialides, hyaline, septate, cells 9–13·5 × 2μ. *Phialides* in whorls of 3–5, closely compacted in a dense parallel row, cylindrical or some slightly clavate, hyaline, 11–15·5 × 1–2μ. *Spores* rod shaped, one or both ends rounded or frequently one slightly protruding and truncate, hyaline or dilute olivaceous, vacuolate, 18–25 × 2μ.

Known only from the type.

This species, although only represented by one collection, can be separated from *M. carmichaelii* as the spores are twice as long. This has not been confirmed in culture.

SPECIMENS EXAMINED

In Herb. P.
On leaves, no. 1581, Type.

12. **Myrothecium atrum** (Desm.) comb. nov.
≡ *Graphium atrum* Desm., *Annls Sci. nat.* Ser. 10, **3**:343, 1848
≡ *Phaeostilbella atra* (Desm.) Höhnel, *Ber. dt. bot. Ges.* **37**:153, 1919
≡ *Saccardaea atra* (Desm.) Mason & M. B. Ellis, *Mycol. Pap.* **56**:40, 1953
= *Sporocybe rhopaloides* Sacc. & Roum., *Michelia* **2**:643, 1892
= *Stilbum olivaceum* Matsushima, Microfungi of the Solomon Islands and Papua–New Guinea, p. 63, 1971.

Type: (of *M. atrum*) Desmazières, Crypt. France Ser. 1. 1848, no. 1622, [labelled *Graphium atrum* Desmaz. in Herb. K.] (holotype).

On host: synnematous, 150–450μ high, stipe narrow 30–60μ wide, black, arising from a basal knot of hyphae, head 45–105μ wide, black. Not obtained in culture. *Stroma* hyaline to slightly dark walled small isodiametric to elongate

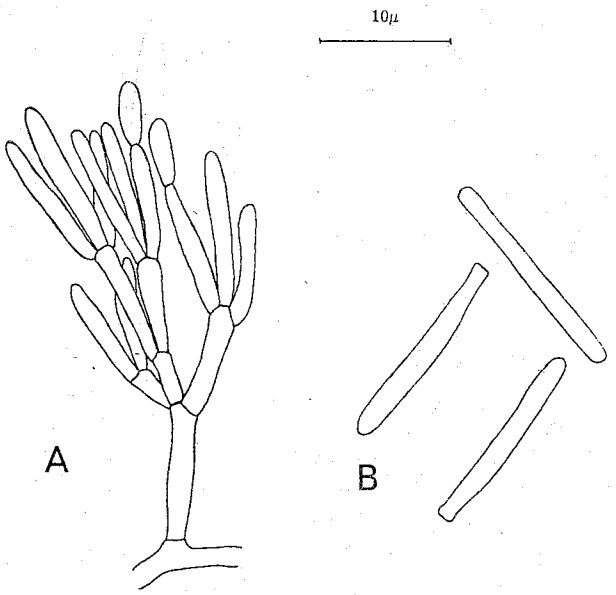

Fig. 11. *Myrothecium lachastrae.* A, conidiophore and phialides; B, conidia.

cells at the base of the stipe, 4–7μ diam. *Marginal hyphae* covering the stipe arising from the base, closely compacted and rarely branched, walls dilute olivaceous to dark olivaceous and sometimes verrucose usually smooth, at apex tapered and hyaline forming a fringe around the spore mass, septate, cells 20–40 × 2·2–2·5μ at apex tapering to 1μ wide. *Conidiophores* closely compacted in the stipe with the marginal hyphae and difficult to separate, branched several times usually forming 2 branches at each node, sometimes 3, these branches closely compacted in the stipe but spreading at the apex, bearing phialides, walls hyaline or olivaceous, septate, cells 10–25 × 1·5–2μ. *Phialides* in whorls of 2–3, spreading in the head, cylindrical, hyaline often with a darkened collarette, occasionally percurrent, 15–35 × 1·5–2·5μ. *Spores* narrowly fusiform tapered at one end and the other truncate, olivaceous, 10–13·5 × 2·5–3·5μ.

Distribution: Europe.

Hosts: Grasses.

SPECIMENS EXAMINED

In Herb. P.
On fol. *Cynosurus caeruleus* (?), no Lb. 66 as *Sporocybe rhopaloides*, T.
In Herb. K. (*Graphium* folder).
Desmazières Crypt. France Ser 1, 1825–1851, no. 1622, *Graphium atrum* Desm. T., labelled *Saccardaea atra* Mason and M. B. Ellis; *Graphium atrum*, Isle of Wight, ex Herb. M. C. Cooke, 1885; *Graphium atrum* ex Herb. Berk, 1879, no. 357, Isle of Wight.
In Herb. T. Matsushima, ex. *Pometia*, on dried *Musa* leaves, Honiara, British Solomon Islands, 5.1.1970, MFC 2832.
In Herb. IMI.
On ornamental grass, England, 101719 and 10720(a).

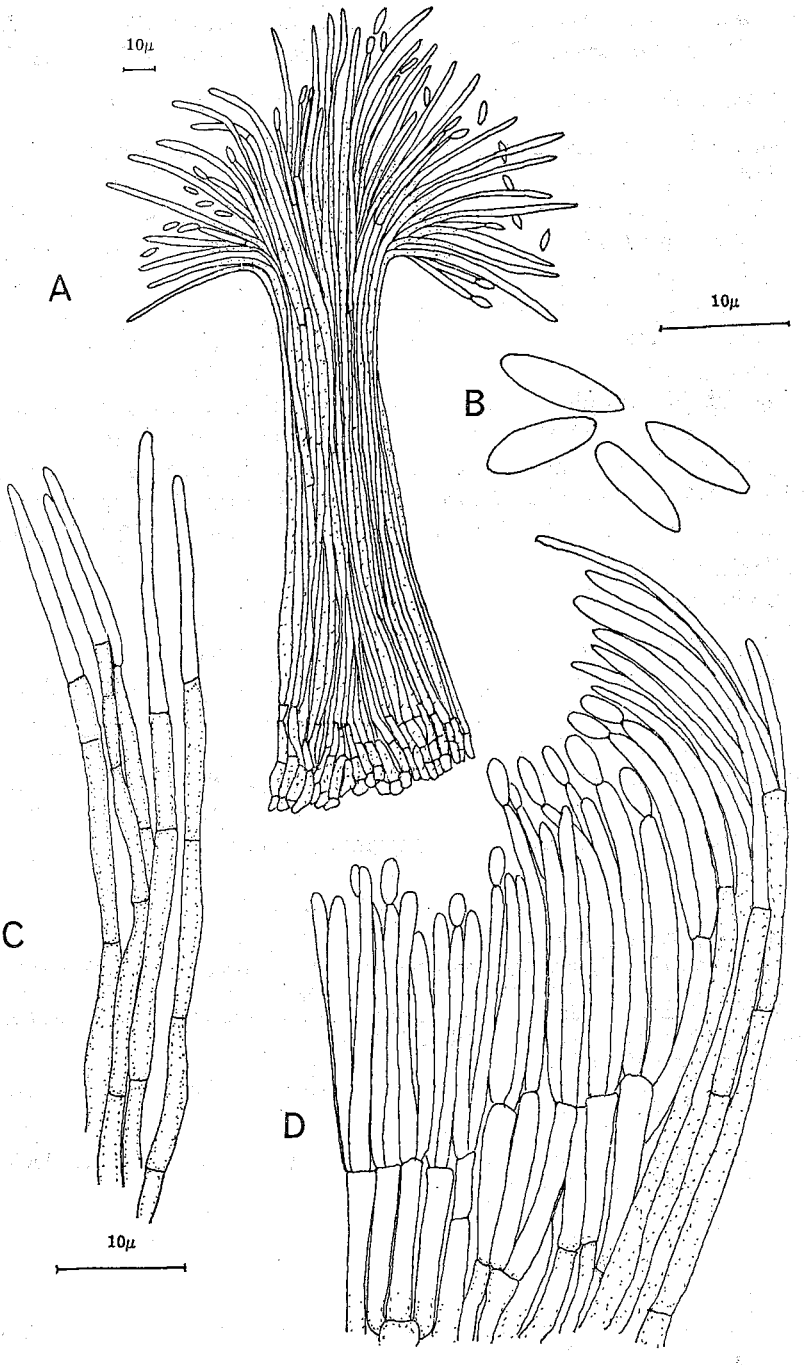

Fig. 12. *Myrothecium atrum.* A, synnema; B, conidia; C, marginal hyphae; D,conidiophores and phialides.

13. **Myrothecium atroviride** (Berk. & Br.) comb. nov.
≡ *Myxormia atroviridis* Berk. & Br., *Ann. Mag. nat. Hist.* Ser 2, **5**:457, 1850
≡ *Crocireas atroviride* (Berk. & Br.) Höhnel, *Annls mycol.* **1**:403, 1903.

Type: Batheaston, Dec. 1849, in Herb. K *Crocireas* folder (holotype).

On host: cupulate, 75–850μ diam., 75–150μ deep, olivaceous black. Not obtained in culture. *Stroma* well developed, sometimes slightly embedded in the host, cells irregular to isodiametric, hyaline to slightly dark walled, 3·5–6·5μ diam. *Marginal hyphae* arising from the basal stroma, incurved and closely packed laterally forming a plectenchymatous wall, free at the blunt apex and sometimes free for some of the length; walls slightly dark often olivaceous; hyaline at the apex, septate, cells 10–25 × 2–2·5μ. *Conidiophores* closely compacted, branched repeatedly usually forming 2–3 branches at each node, bearing phialides on ultimate branches, short in the centre and longer around the margin, hyaline, septate cells 10–13·5 × 2–2·5μ. *Phialides* 2–4 in a whorl; closely packed in a dense parallel layer, cylindrical, often pore well marked, hyaline, 14–20 × 1–1·5μ. *Spores* narrowly fusiform tapered at one end truncate at the other, dilute olivaceous, uni- or biguttulate, 10–12 × 2–2·5μ.

Distribution: Europe.
Hosts: Grasses.

This species and the previous one, *M. atrum*, have been described only from old exsiccata. Their characters fit the concept of *Myrothecium* and at least until newer material and cultures are available they appear to be most reasonably placed in *Myrothecium*. The specimens of the two species can be divided on the shape of the terminal cell of the marginal hypha. It is possible that cultures may show a range between the two in which case they should be placed in one species as their spore similarity might suggest.

SPECIMENS EXAMINED

In Herb. K. (*Crocireas* folder)
Batheaston, Dec. 1849, Type of *Myxormia atroviridis*, T; on grass, Somerset, Winter 1850, ex Herb. C. E. Broome for H. Ravenel; on *Aira caespitosa*, Batheaston, December 1858 ex Herb. C. E. Broome; Batheaston, January 1850, ex Herb. C. E. Broome; ex Fuckel's Fungi Rhenani, no. 548 as *Crocireas graminearum*, ex Herb. C. E. Broome.
In Herb. K. (*Myxormia* folder).
Somersetshire, Winter ex Herb. W. A. Leighton; Batheaston, ex Herb. Berk; on grass, C. E. Broome, ex Herb. W. B. Grove.
In Herb. K. (in *Myxormia* and *Crocireas* folders)
Several collections on *Aira caespitosa*, Batheaston, January 1859, C. E. Broome, including one from Rabenhorst's Fungi Europaei no. 63.

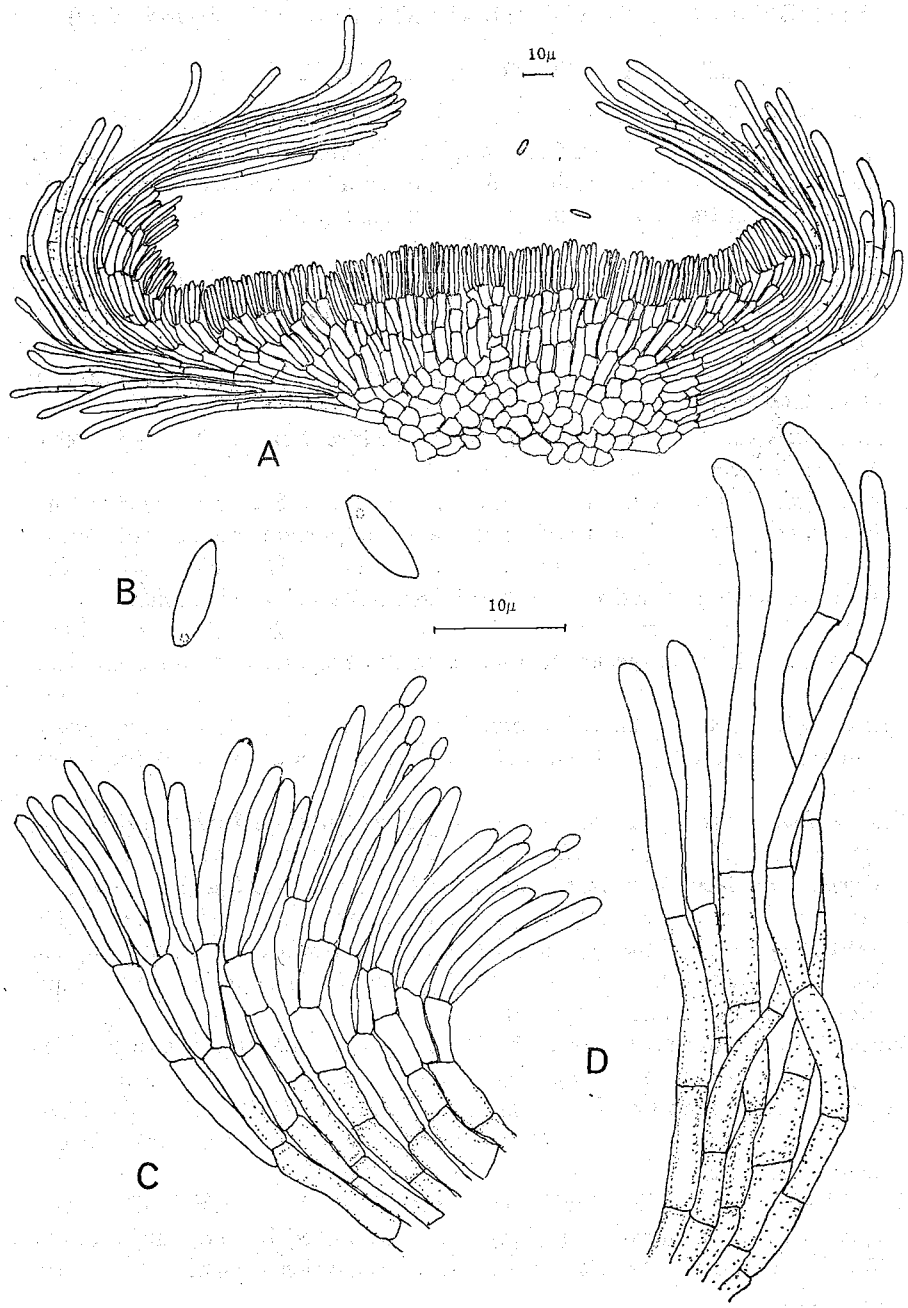

Fig. 13. *Myrothecium atroviride*. A, sporodochium; B, conidia; C, conidiophores and phialides; D, marginal hyphae.

VIII. GENERA AND SPECIES CHECK LIST (M=*Myrothecium*)

GENERA—DOUBTFUL AND EXCLUDED

Chaetodochium Höhnel, *Mitt. bot. Inst. tech. Hochsch. Wien* **9**:44, 1932. Based on *Volutella buxi* (DC. ex Fr.) Berk. ≡ *Chaetodochium buxi* (DC. ex Fr.) Höhnel. Höhnel distinguished this genus from *Volutella* as its sporodochia grew through the leaf stomata not the cuticle; probably synonymous with *Volutella.*

Chaetostroma Corda in J. Sturm, Deut. Fl. **3** (2):123, 1829, Under Article 70 of the International Code of Botanical Nomenclature 1966, this genus should be rejected as the original drawing shows two spore types; in addition the description is not sufficient to enable identification of the genus and no type material is available.

Exotrichum Syd., *Annls mycol.* **12**:571, 1914 = *Myrothecium.* The type species *E. leucomelas*=*M. roridum* Tode ex Fr.

Lomakashaka Subram., *J. Indian bot. Soc.* **25** (1):67, 1956. Type material not examined. The generic description of a green sporodochium surrounded by a white margin appears close to *Myrothecium.* The characteristic fan-tailed appendage described is found in some *Myrothecium* species.

Myrotheciella Speg., *An. Mus. nac. Hist. nat. B. Aires* **20**:460, 1910 = *Myrothecium.* The type species *Myrotheciella catenuligera* = *M. roridum* Tode ex Fr.

Myxormia Berk. & Br., *Ann. Mag. nat. Hist.* Ser 2, **5**:457, 1850 = *Myrothecium.* The type species *Myxormia atroviridis* ≡ *M. atroviride* (Berk. & Br.) comb. nov.

Phaeodochium Farr, apud Farr & Horner, *Nova Hedwigia* **15**:268, 1968. The type species *P. myrothecioides* appears to be a species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc., or *Phaeopolynema* Speg.

Saccardaea Cavara, *Atti Inst. bot. Univ. Lab. crittogam. Pavia* 2 Ser. **3**:346, 1894. Material of the type species *S. echinocephala* Cavara not available, from the original description possibly a *Myrothecium* species but the conidiogenous cells are not described.

Schizotrichella Morris, *Mycologia* **48**:733, 1956 = *Colletotrichum* Corda. The type species *S. lunata* = *Colletotrichum dematium* (Pers. ex Fr.) Grove.

Starkeomyces Agnihothrudu, *J. Indian Bot. Soc.* **33** (1):41, 1956 = *Myrothecium.* The type species *S. koorchalomoides* = *M. verrucaria* (Alb. & Schw.) Ditm. ex Fr.

Verticilliodochium Bubák, *Annls mycol.* **12**:220, 1919. Material of the type species *V. tubercularioides* (Speg.) Bubák examined but no fungus found. Bubák's authentic material appears to fit Bonorden's concept of *Dendrodochium.*

CHECK LIST OF SPECIFIC EPITHETS INCLUDING DOUBTFUL AND EXCLUDED SPECIES.

Accepted *Myrothecium* species in bold type.

M. advena Sacc., *Annls mycol.* **6**:560, 1908 = *M. roridum* Tode ex Fr.

Volutella albo-pila Boudier, *Bull. Soc. mycol. Fr.* **1**:82, 1891. Type material not examined, from the original description possibly *M. leucotrichum* (Peck) comb. nov.

M. album (Peyl) Lindau in Rabenh. Krypt. Fl. **1** (9):623, 1910 ≡ *Chaetospora album* Peyl, *Lotos* 7:66, 1857. Type material not available, from original description possibly a *Volutella* species.

Chaetostroma aterrimum (Cooke) Sacc., Syll. Fung. **4**:750, 1886 ≡ *Psilonea aterrima* Cooke, *Grevillea* **11**:33, 1883 = *Lacellina graminicola* (Berk. & Br.) Petch.

M. atrocarneum Berk. & Br. (Fungi of Ceylon no. 1207), *J. Linn. Soc.* **15**:85, 1876 ≡ *Hymenopsis atrocarnea* (Berk. & Br.) Sacc., Syll. Fung. **4**:747, 1886 = *Hymenula socia* Sacc.

M. atroviride Sacc., in herb. = *Endocalyx melanoxanthus* (Berk. & Br.) Petch.

M. atroviride (Berk. & Br.) comb. nov. p. 34 ≡ *Myxormia atroviridis* Berk. & Br. *Ann. Mag. nat. hist.* **5**:457, 1850 ≡ *Crocireas atroviride* (Berk. & Br.) Höhnel, *Annls mycol.* **1**:403, 1903.

M. atrum (Desm.) comb. nov. p. 31 ≡ *Graphium atrum* Desm., *Annls Sci. nat.* Ser. 10, **3**:343, 1848 ≡ *Phaeostilbella atra* (Desm.) Höhnel, *Ber. dt. bot. Ges.* **37**:153, 1919 ≡ *Saccardaea atra* (Desm.) Mason & M. B. Ellis, *Mycol. Pap.* **56**:40, 1953.

M. state of **Nectria bactridioides** p. 21.

Stilbum basitruncatum Matsushima. Microfungi of the Solomon Islands and Papua–New Guinea, p. 62, 1971 = *Graphium penicilloides* Corda.

M. brachysporum Nicot, *Rev. gén. Bot.* **68**:672, 1961 = *M. cinctum* (Corda) Sacc.

M. caricis Fuckel, Symb. mycol. p. 364, 1870 ≡ *Chaetostroma caricis* (Fuckel) Sacc., Syll. Fung. **4**:750, 1886. Species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc., or *Phaeopolynema* Speg.

Chaetostroma carmichaelii Corda, Sturms Deut. Fl. **3** (2):123, 1829. Type species of *Chaetostroma* Corda, nomen rejectiendum, type material not available, cannot be identified from the original description.

M. carmichaelii Grev. p. 30.

M. catenulatum Pidopl., *Mŷkrobiol. Zh.* **12** (2):40. 1950. Type material not available, from original description possibly *Metarhizium anisopliae* (Metsch.) Sorokin.

Myrotheciella catenuligera Speg., *An. Mus. nac. Hist. nat. B. Aires* **20**:460, 1910 = *M. roridum* Tode ex Fr.

Dendrodochium caucasicum Pidopl. & Pil., *Mŷkrobiol. Zh.* **12**:39, 1950. Type material not available, from original description possibly *M. roridum* Tode ex Fr., but the spore dimensions given are wider than in this species.

M. cinctum (Corda) Sacc. p. 18 ≡ *Fusarium cinctum* Corda, Icon. Fung. **5**:80, 1842.

M. cinereum Pass., *J. hist. nat. Bord.* **3**:136, 1885. Type material not available, cannot be identified from the description.

M. cinereum Cooke see *M. cookei* Sacc.

Hymenula citrina Boudier, *Bull. Soc. mycol. Fr.* **7**:82, 1891. Type material not examined, from original description possibly *M. lachastrae* Sacc.

M. commune Pidopl. & Kiril., *Mykrobiol. Zh.* **31** (2):159, 1969 = *Metarhizium anisopliae* (Metch.) Sorokin.

M. conicum Fuckel, Symb. mycol. p. 364, 1870. Species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc. or *Phaeopolynema* Speg.

M. convexum Berk. & Curt., *Grevillea* **3**:99, 1875. Not a *Myrothecium* species, close to *Kabatina* Schneider & Arx, but the spores have a scar at both ends and may be catenulate.

M. cookei Sacc. & Syd., Syll Fung. **14**:1129, 1899 ≡ *M. cinereum* Cooke, *Grevillea* **30**:113, 1892 = *Colletotrichum gloeosporioides* (Penz.) Sacc.

M. crastophylum Sacc., in herb. = *M. cinctum* (Corda) Sacc.

M. dubium Fung. mecklenb. **1**:27, 1790. Type material not available = *Sphaeria fissia* Pers. fide Fries, Syst. mycol. **3**:216, 1829.

Saccardaea echinocephala Cavara, *Atti Ist. bot. Univ. Lab. crittogam. Pavia* 2, Ser. **3**:346, 1894. Type material not available, from original description possibly a stipitate *Myrothecium* species, but conidiogenous cells not described.

M. ellipsosporum Fuckel, Symb. mycol. p. 364, 1870 ≡ *Hymenopsis ellipsosporum* (Fuckel) Sacc., Syll. Fung. **4**:745, 1886 = *M. cinctum* (Corda) Sacc.

M. fasciculatum Syd. No published description found, known only from label in Herb IMI.

Gliocladium fimbriatum Gilman & Abbott, *Iowa St. Coll.J.Sci.* **1** (3):304, 1927 = *M. verrucaria* (Alb. & Schw.) Ditm. ex Fr.

M. flavidum Pers., Traite sur les champignons comestibles, p. 114, 1818. Known only from the name, from text possibly a *Volutella* sp.

M. fragosianum Sacc., Not. mycol. **22**:162, 1917 = *M. roridum* Tode ex Fr.

M. fungicolum Peck, *Rep. St. Mus. N.Y.* **26**:79, 1872 as *M. fungicola* Peck, = *M. inundatum* Tode ex Gray.

M. fuscum Bonorden, Handbuch der Allgemeinen Mykologie, p. 143, 1851. Type material not available, cannot be identified from original description.

Metarhizium glutinosum Pope, *Mycologia* **36**: 346, 1944 as *Metarrhizium glutinosum* Pope = *M. verrucaria* (Alb. & Schw.) Ditm. ex Fr.

M. gramineum Libert p. 16.

M. hispidum Tode, Fung. mecklenb. **1**:27, 1790. Type material not available = *Peziza* sp., fide Fries, Syst. mycol. **3**:216, 1829.

Myxormia indica Morgan-Jones & Ponnappa, *Trans. Br. mycol. Soc.* **51** (2) 335, 1968. Species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc., or *Phaeopolynema* Speg.

M. indicum Rama Rao, *Antonie van Leeuwenhoek* **29**:180, 1963 = *M. leucotrichum* (Peck) comb. nov.

M. indicum Pavgi, Singh & Dular, *Mycopath. Mycol. appl.* **30**:316, 1966 (non *M. indicum* Rama Rao) species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc., or *Phaeopolynema* Speg.

M. inundatum Tode ex Gray p. 9.

M. jollymannii Preston, *Trans. Br. mycol. Soc.* **31**:272, 1948 = *M. leucotrichum* (Peck) comb. nov.

Lomachashaka kera Subram., *J. Indian. bot. Soc.* **25** (1):67, 1956. Type material not examined, from original description possibly *M. gramineum* Libert but setae not recorded.

Starkeyomyces koorchalomoides Agnihothrudu, *J. Indian bot. Soc.* **35** (1):41, 1956 = *M. verrucaria* (Alb. & Schw.) Ditm. ex Fr.

M. lachastrae Sacc. p. 30.

M. lecanidiiforme Speg. *An. Soc. Cient. Arg.* **13**:34, 1882 (Fungi Argent., p. 133, 1882) ≡ *Hymenopsis lecanidiiformis* (Speg.) Sacc., Syll. Fung. **4**:746, 1886. Species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc. or *Phaeopolynema* Speg.

M. leucomelas (Syd.) Höhnel, *Mitt. bot. Inst. tech Hochsch. Wien* **2**:95, 1925 = *Exotrichum leucomelas* Syd., *Annls mycol.* **12**:571, 1914 = *M. roridum* Tode ex Fr.

M. leucotrichum (Peck) comb. nov. p. 12 ≡ *Excipula leucotricha* Peck, *Rep. St. Mus. N.Y.* **29**:49, 1875 issued 1878 ≡ *Amerosporium leucotrichum* (Peck) Sacc., Syll. Fung. **3**:682, 1884.

M. longistriatisporum Matsushima, Microfungi of the Solomon Islands and Papua–New Guinea, p. 39, 1971 = *M. cinctum* (Corda) Sacc.

Schizotrichella lunata Morris, *Mycologia* **48**:733, 1956 = *Colletotrichum dematium* (Pers. ex Fr.) Grove.

M. luteo-album Bonorden, Handbuch der Allgemeinen Mykologie, p. 143, 1851. Type material not available, from original description probably a *Volutella* species.

M. macrosporum on packet only of type material of *M. lachastrae* Sacc., named on packet and in publication as *M. lachastrae* Sacc.

M. masonii sp. nov. p. 21.

M. medium Sacc. & Wint., *Hedwigia* **22** (1):14, 1883 ≡ *Hymenopsis medium* (Sacc. & Wint.) Sacc., Syll. Fung. **4**:745, 1886. Species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc., or *Phaeopolynema* Speg.

Phaeodochium myrothecioides Farr apud Farr & Horner, *Nova Hedwigia* **15**:268, 1968. Species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc., or *Phaeopolynema* Speg.

M. nigrescens Pers., in herb., on label in Herb. Persoon in Herb. Lug. Bal., also labelled *M. verrucaria*, material in packet *M. roridum* Tode ex Fr.

Gliocladium nigrum Moreau & Moreau, *Revue Mycol.* **6**:61, 1941 = *M. roridum* Tode ex Fr.

Stilbum olivaceum Matsushima, Microfungi of the Solomon Islands and Papua–New Guinea, p. 63, 1971 = *M. atrum* (Desm.) comb. nov.

M. oryzae Sacc., Not. mycol. **23**:93, 1917. Type material not available, cannot be identified from original description.

M. papyricolum Sacc., in herb. = *M. cinctum* (Corda) Sacc.

M. parasiticum Tropova & Zerova apud Khokhryakov, Diseases and Pests of Oil Yielding Plants (in Russian) **1** (2):35, 1934. Type material not available, from original description possibly *M. gramineum* but setae not described.

M. prestonii sp. nov. p. 12.

M. pulchellum Speg., *An. Soc. Cient. Arg.* **22**:222, 1886 (Fung. Guar. **1**:176, 1886) = *M. carmichaelii* Grev.

M. pulvinatum nom. nud. known only from folder label in herb. K on *Ostracoderma pulvinatum* Fr. – not a *Myrothecium*.

M. puniceum Corda, known only from the name in Oedeman's Enum. Syst. Fung. **1**:184, 1919 as Corda Icon. Fung. **4**,2, probably misprint for *Myxosporium puniceum* Corda, Icon. Fung. **3**:2, 1839.

M. pygmaeum Faurel & Scholter, *Revue Mycol.* **30**:160, 1956. Type material not available, cannot be identified from the original description.

Myrothecium state of *Nectria ralfsii* Berk. & Br., *Ann. Mag. nat. Hist.* **2**, **13**: 467, 1854, not a *Myrothecium*.

Sporocybe rhopaloides Sacc., *Michelia* **2**:643, 1892 = *M. atrum* (Desm.) comb. nov.

M. roridum Tode ex Fr. p 23

M. roridum var. *apiculatum* Haware & Pavgi, *Sydowia* **24**:129, 1970 issued 1971. Species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc., or *Phaeopolynema* Speg.

M. roridum var. *eichhorniae* Ponnappa, *Hyacinth Control Journal* **8**:18, 1970. (No Latin diagnosis) = *M. roridum* Tode ex Fr.

M. roridum var. *violae* Lobik, *Bolez. Rast.* **17**:188, 1928. Type material not available, from the description possibly *M. roridum* Tode ex Fr.

Chaetostroma sacchari Mass., *Grevillea* **22**:67, 1894 = *Lacellina graminicola* (Berk. & Br.) Petch.

M. scybalorum Schum., Fr., Syst. mycol. **3**:218, 1829. Type material not available, cannot be identified from the original description.

M. stercorum Tode, Fung. mecklenb. **1**:26, 1790. Type material not available = *Peziza* sp., fide Fries, Syst. myc. **3**:218, 1829.

M. striatisporum Preston, *Trans. Br. mycol. Soc.* **31**:275, 1948 = *M. cinctum* (Corda) Sacc.

Hymenopsis tenuis Petch, *Ann. R. bot. Gdns. Peradeniya* **10**:178, 1927 = *M. roridum* Tode ex Fr.

Dendrodochium toxicum Pidopl. & Bil., *Dokl. Akad. Nauk SSSR* **56**:759, 1947. Type material not available, from original description probably *M. verrucaria* (Alb. & Schw.) Ditm. ex Fr.

M. trochiloides Sacc., *Michelia* **2**:367, 1881 ≡ *Hymenopsis trochiloides* Sacc., Syll. Fung. **4**:144, 1886. Type species of the genus *Hymenopsis*. Species within the genera *Cryptomela* Sacc., *Hymenopsis* Sacc. or *Phaeopolynema* Speg.

Verticilliodochium tubercularioides (Speg.) Bubák, *Annls mycol.* **12**:220, 1914 ≡ *Verticillium tubercularioides* Speg., not available, Bubák's material appears possibly to be a *Dendrodochium* sp.

M. typhae Fuckel, Symb. mycol. p. 364, 1870. ≡ *Hymenopsis typhae* (Fuckel) Sacc., Syll. Fung. **4**:745, 1886. Type material poor, shows large olivaceous spores on phialides, spores similar to those of the conidial state of *Nectria ralfsii*, no definite conclusions reached.

M. ucrainicum Pidopl & Kiril., *Mykrobiol. Zh.* **31** (2):161, 1969 = *M. cinctum.* (Corda) Sacc.

M. verrucaria (Alb. & Schw.) Ditm. ex Fr. p. 27.

M. viride Pers., in Sacc., Syll. Fung. **4**:751, 1886 nom. inval. as synonym of *M. inundatum* Tode ex Gray = *M. inundatum* Tode ex Gray.

M. vitis Bonorden, Handbuch der Allgemeinen Mykologie, p. 143, 1881 = *Volutella vitis* (Bonorden) Sacc., Syll. Fung. **4**:688, 1886. Type material not available, cannot be identified from original description.

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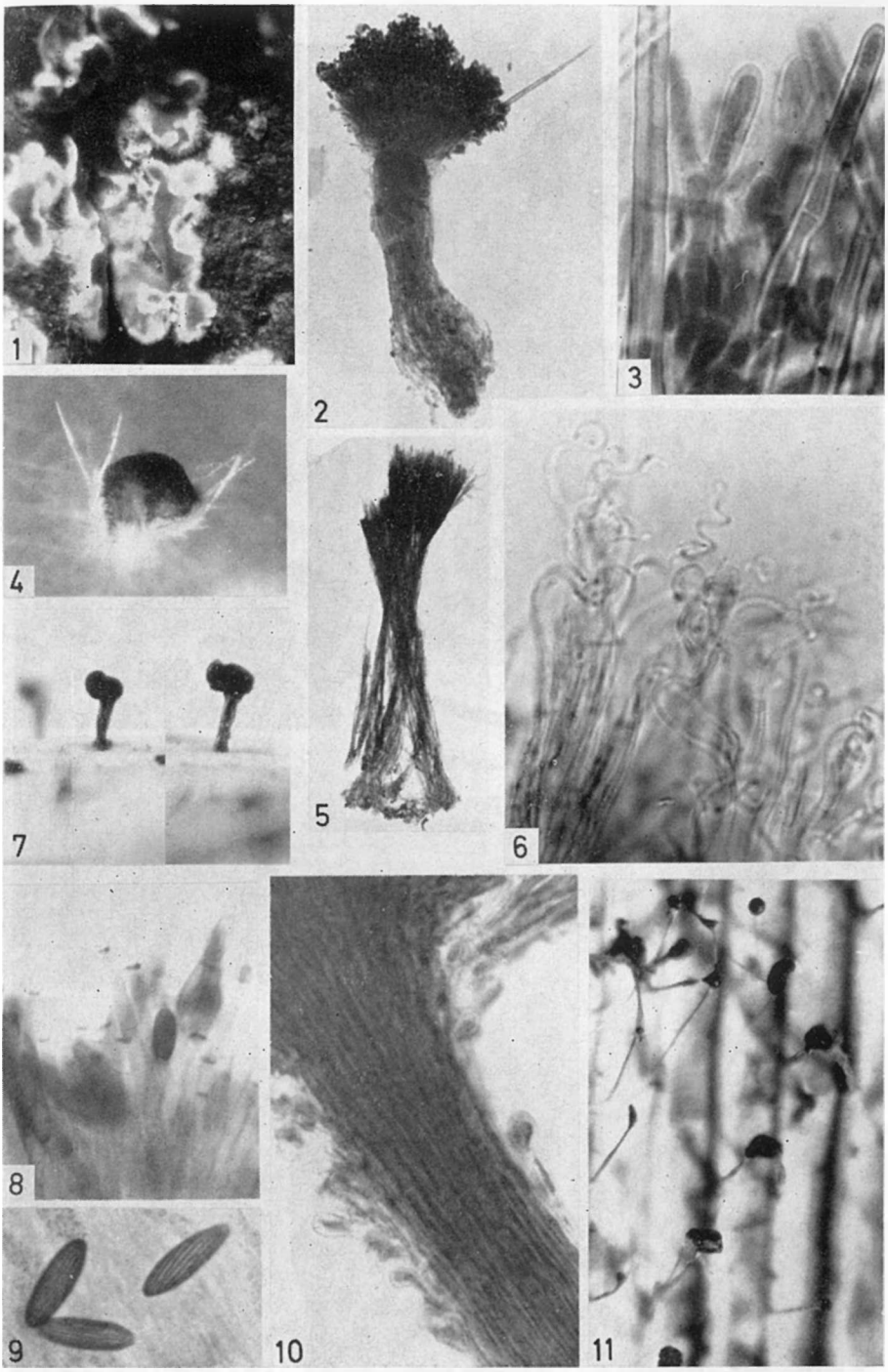

Plate 1

Fig. 1. *Myrothecium inundatum*; sporodochia on decaying *Russula* pileus, × 13.
Fig. 2. *Myrothecium prestonii*; synnema, × 250.
Fig. 3. *Myrothecium leucotrichum*; setae and marginal hyphae, × 1000.
Fig. 4. *Myrothecium leucotrichum*; sporodochium in culture, × 35.
Fig. 5. *Myrothecium gramineum*; synnema, × 100.
Fig. 6. *Myrothecium gramineum*; marginal hyphae, × 1000.
Fig. 7. *Myrothecium cinctum*; synnemata on leaf, × 20.
Fig. 8. *Myrothecium cinctum*; phialides, × 1000.
Fig. 9. *Myrothecium cinctum*; conidia, × 1000.
Fig. 10. *Myrothecium masonii*; stipe showing marginal hyphae, × 1000.
Fig. 11. *Myrothecium masonii*; synnemata on leaf, × 20.

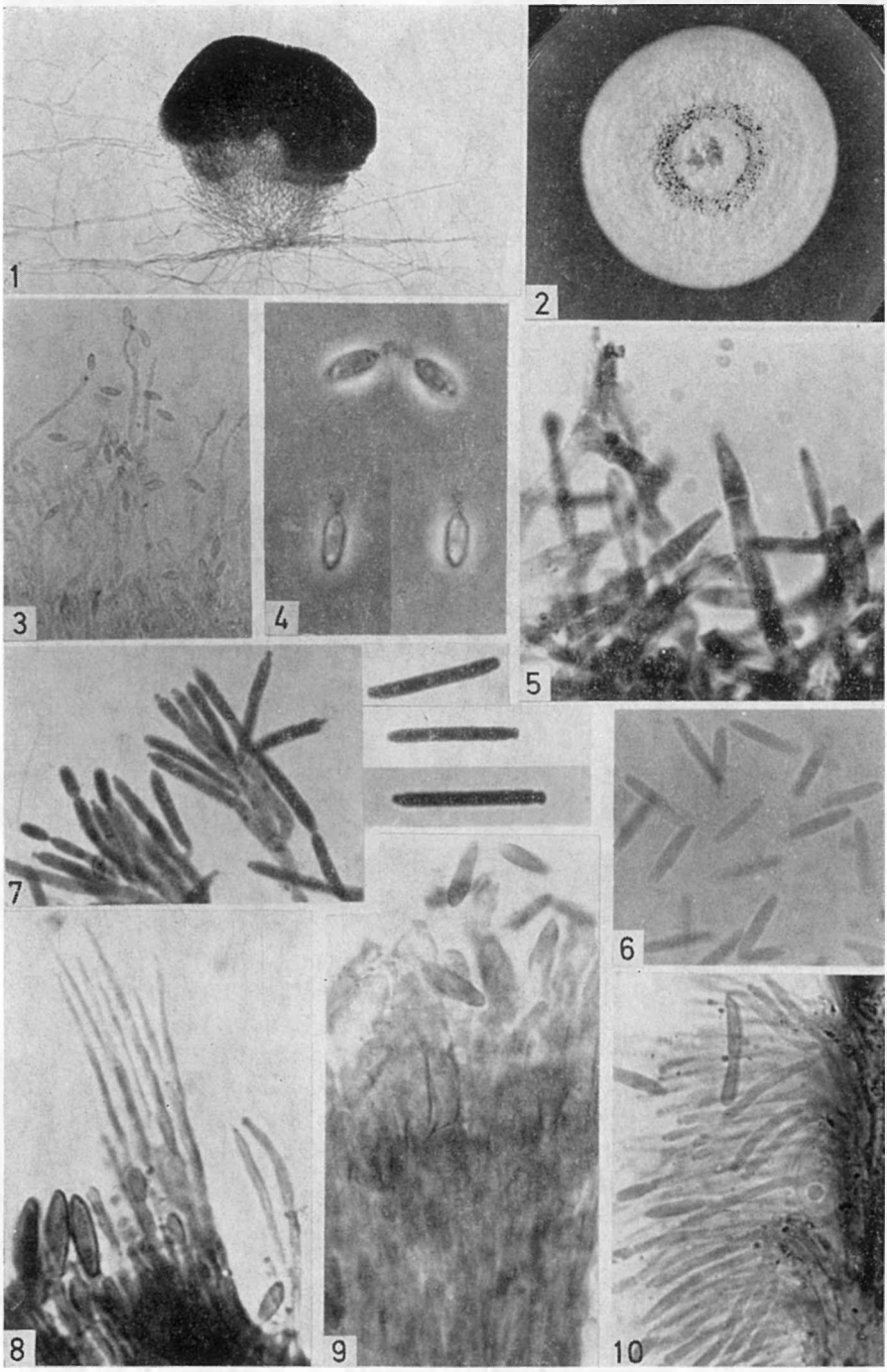

Plate 2

Fig. 1. *Myrothecium roridum*; sporodochium in slide culture. × 100.

Fig. 2. *Myrothecium roridum*; in culture on PDA, × 0·6.

Fig. 3. *Myrothecium verrucaria*; marginal hyphae. × 400.

Fig. 4. *Myrothecium verrucaria*; conidia, erythrosin stained under phase contrast. × 900.

Fig. 5. *Myrothecium carmichaelii*; marginal hyphae, × 1000.

Fig. 6. *Myrothecium carmichaelii*, conidia. × 1000.

Fig. 7. *Myrothecium lachastrae*; conidiophores, phialides and conidia, × 1000.

Fig. 8. *Myrothecium atrum*; marginal hyphae and conidia, × 1000.

Fig. 9. *Myrothecium atroviride*; marginal hyphae, × 1000.

Fig. 10. *Myrothecium atroviride*; conidiophores, phialides and conidia, × 1000.