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*Paul R. MILLER & Hazel L. POLLARD; M. V. WIESE; CAPITAL SYSTEMS GROUP, INC.; Georges A. LAFUENTE; Marcel V. LOCQUIN; Olle PERSSON*

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# CALONECTRIA AND ITS TYPE SPECIES, C. DALDINIANA, A LATER SYNONYM OF C. PYROCHROA

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*SUMMARY*

The monotype species of *Calonectria* de Notaris, *C. daldiniana*, is described and illustrated from the holotype specimen. This species is found to be a later synonym of *C. pyrochroa*. The genus *Calonectria* is circumscribed to include only those nectrioid species with an ascocarp wall structure like that of *C. pyrochroa* and a *Cylindrocladium* anamorph. *Calonectria pyrochora* and its *Cylindrocladium* anamorph, grown from Macaronesian collections, are described and illustrated.

Within the Hypocreales the genus *Nectria* occupies a central position from which allied genera have been segregated, often based on only one character. Although the type of *Nectria, N. cinnabarina* Tode ex Fries, does occasionally have multiseptate ascospores, *Nectria* has traditionally included species with one-septate ascospores. Species with aseptate ascospores have been placed in *Pseudonectria* and those with multiseptate ascospores in *Calonectria* and *Ophionectria*. As a result these genera have become the repository of unrelated species.

In an attempt to define natural groups within the genera related to *Nectria*, type specimens of described taxa have been examined. Rossman (1977) has restricted the genus *Ophionectria* to the type species, *O. trichospora*, excluding all other previously described species. Despite the long, multiseptate ascospores, *O. trichospora* is closely related to *Nectria* in ascocarp morphology and cultural characteristics. The genus *Calonectria* was erected for a species which has multiseptate ascospores and is differentiated from *Ophionectria* by ascospores with a length-width ratio of less than 10:1 (Rogerson, 1970). Recently Samuels (1978) has included species with multiseptate ascospores in the genus *Nectria*, thereby placing related species in "groups" within *Nectria sensu lato*.

Although over 200 species of *Calonectria* have been described, the monotype species, *C. daldiniana*, has not been examined, redescribed or illustrated since the original description published in 1867. Because requests for this spec-

*Presently the Anna E. Jenkins Postdoctoral Fellow.

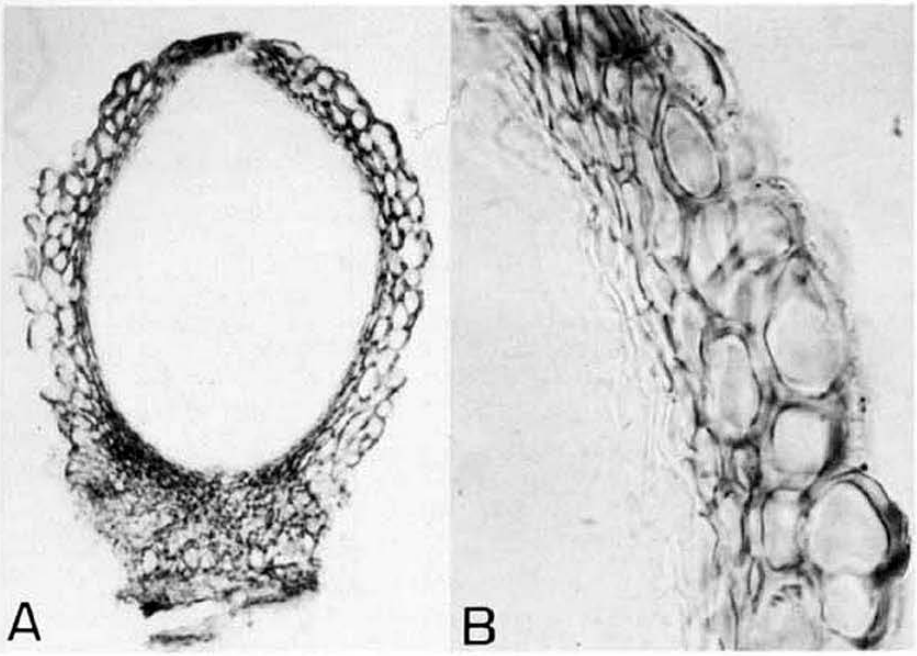


Fig. 1. *Calonectria daldiniana* Holotype (RO). A. X-section of ascocarp x 140. B. Detail of ascocarp wall x 560.

imen to numerous Italian herbaria had been negative, the type specimen of *C. daldiniana* was thought to be lost. After an examination of the type specimens of taxa described in *Calonectria*, it became imperative to determine whether or not the type of *C. daldiniana* was lost or destroyed, and if so, how the species should be neotypified.

*Calonectria daldiniana* was described in one of the last works of de Notaris (1867) published after he had come to Rome to become a Senator. In his paper the species is cited as part of "Sfer. ital. cent. II. mss.," a work that was never completed. During the summer of 1978, Dr. Gary Samuels, Division of Scientific and Industrial Research, Auckland, New Zealand, and I visited many herbaria in northern Italy searching for the missing type specimen which was finally located in Rome. Although the bulk of the specimens at RO* are those of Cesati, who worked closely with de Notaris, the rather scanty type specimen of *C. daldiniana* is housed in the smaller, general mycological herbarium. In my taxonomic judgement the type specimen of *C. daldiniana* is identical with type specimens of *Nectria pyrochroa*, an earlier epithet. Because later mycologists may not agree with this judgement and because the type and only specimen of *C. daldiniana* is in poor condition and not readily available, this specimen is described below and illustrated in figures 1 & 2.

*Abbreviations of herbaria are those of Holmgren & Keuken (1974).

*Calonectria daldiniana* de Notaris, 1867. [Figs. 1-2]

Holotype: ITALY, su foglie sternate di *Magnolia grandiflora* a Locarno, Daldini.

ASCOCARPS solitary, superficial, red-orange, "scarlet"* to light "bay," turning "red," rose-purple, in 2% KOH, reaction reversing when acidified, ovoid, 350-420 x 300-350 µm; erumpent through leaf surface, darkened around the base leaving a spot on leaf 150-200 µm diam; collapsed collabent, laterally or not at all; many ascocarps broken, fractured longitudinally or recessed through leaf epidermis, probably due to tight stacking when stored; ostiole present, apex sometimes darker, papillae slightly pointed to none, ascocarp wall appearing slightly scurfy.

ASCOCARP WALL composed of two intergrading regions: the inner 1-2 layers of hyaline, thin-walled cells, elongate parallel to the centrum; the outer layers of cells with thickened walls, elongate, becoming larger and more globose toward the outside, eventually forming textura angularis; outermost cells globose, 12-30 µm diam, walls up to 2 µm thick, sloughing off to form a granular scurf.

ASCI unitunicate, broadly clavate, 70-75 x 25-28 µm, thin-walled to evanescent, apex undifferentiated. No evidence of paraphyses but amorphous strands present, remnants of apical paraphyses.

ASCOSPORES narrowly-fusiform with rounded ends, straight, curved or sigmoid, 46-61 x 5-6 µm, 3-septate, hyaline to slightly yellow with age, generally loose in the ascocarp.

The specimen consists of three leaf fragments one of which has a rectangular portion removed suggesting that an isotype may exist. The leaves are partially skeletonized, obviously in an advanced state of decay. Of the approximately fifty ascocarps, many are overmature or disintegrating with only the bottom part of the ascocarp remaining. No evidence of a *Cylindrocladium* anamorph was found on this rather overmature specimen. Differences in the description of this specimen and that of the species *Calonectria pyrochroa* are greater variation in size and shape of ascocarps, asci and ascospores in *C. pyrochroa* and the only slight development of scurf on the ascocarps of the specimen of *C. daldiniana*.

*CALONECTRIA* de Notaris, Comment. Soc. Crittogam. Ital. 2:477. Feb. 1867.

Ascocarps superficial, red-orange to dark-umber, turning purplish in KOH, reaction reversing when acidified. Ascocarp wall composed of two intergrading regions: the inner layers of hyaline textura porrecta with cells elongate parallel to the centrum; the outer layers of textura angularis to textura globulosa toward the outside, cell walls thin to thickened, pigmented. Asci unitunicate, evanescent at maturity, apex undifferentiated. Ascospores elliptic to fusiform, one to multiseptate. Anamorph *Cylindrocladium*.

Holotype species: *Calonectria daldiniana* de Notaris, a later synonym of *Nectria pyrochroa* Desm.

*Colors in quotes are based on Rayner (1970).

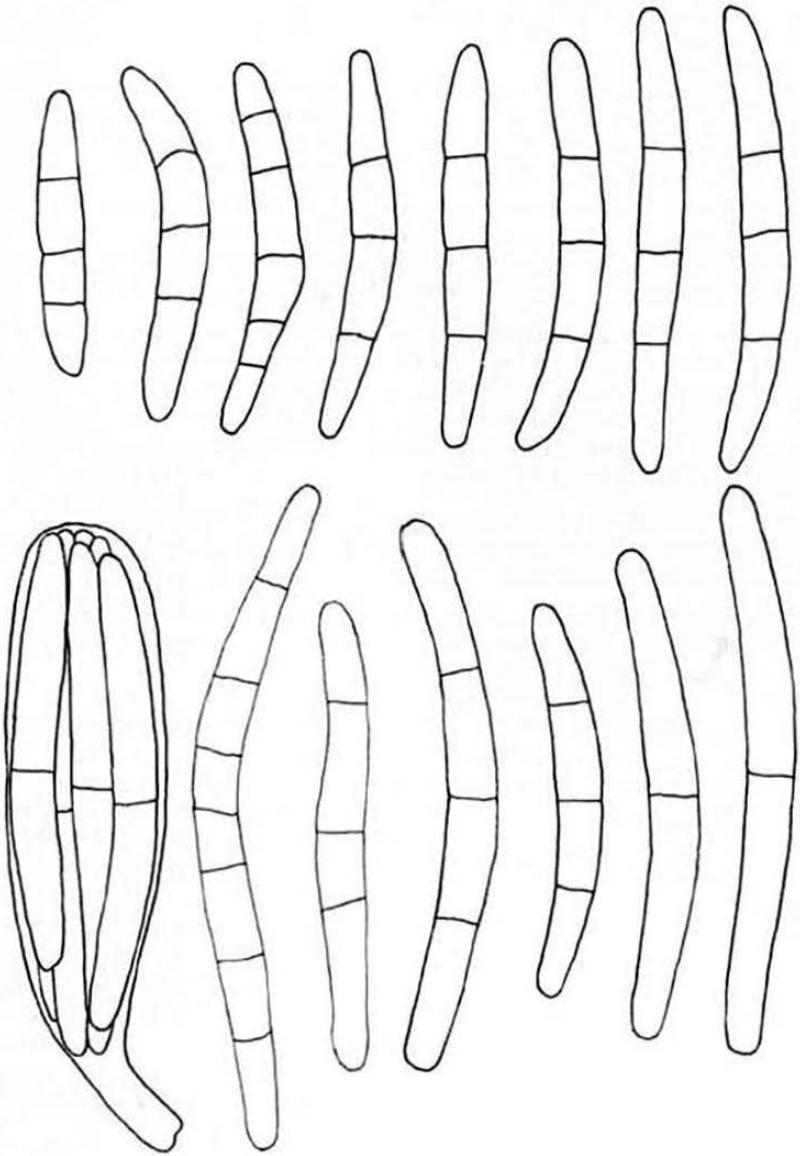

Fig. 2. *Calonectria daldiniana* Holotype (RO). Ascospores x 1000. Fig. 3. *Calonectria pyrochroa* (CUP-MM 2407). Ascus and ascospores x 1000.

*Calonectria pyrochroa* (Desm.) Sacc., Michelia 1:308. 1878. [Figs. 1-4]
≡ *Nectria pyrochroa* Desm., Pl. Crypt. France Ed. 2 (2) #372. 1856.
= *Calonectria daldiniana* de Not., Comment. Soc. Crittogam. Ital. 2:477. 1867.
= *Ophionectria puiggarii* Speg., Bol. Acad. Nac. Ci. 11:532. 1889.
= *Nectria leguminum* Rehm, Hedwigia 39:221. 1900.

ASCOCARPS solitary, superficial, erumpent through and firmly adhering to leaf surface, globose to ovoid, 300-410 x 320-380 µm, collabent or collapsing laterally or not at all when dry, red-orange to dark-red, "scarlet" to "bay", turning "red", rose to purple in 2% KOH, reaction reversing when acidified, often with a white to yellow cast due to the scurfy outer wall; papillae indistinct to small, pointed, often darker; ostiole present; ascocarps erumpent through epidermis, leaving base immersed in substrate, the base and surrounding host tissue sometimes becoming darkened and leaving a dark-rimmed spot when the ascocarp disintegrates or becomes detached.

ASCOCARP WALL composed of two intergrading regions: the inner layers of hyaline, thin-walled cells elongate parallel to the centrum; the outer layers of textura angularis becoming textura globulosa toward the outside, outer cells globose, large, 20-35 µm diam, walls pigmented, slightly thickened, up to 1.5 µm, outermost cells only loosely adhering to the ascocarp and forming an irregularly-distributed scurf; rarely with long, straight, sparsely scattered, septate hairs developing from the small, outer cells 10-12 µm diam, hairs 127-179 x 7-8 µm at base, walls thickened up to 2 µm, pigmented, occasionally branched, tapering gradually to an acuminate apex.

ASCI unitunicate, broadly obovate to clavate, thin to evanescent at maturity, 64-90 x 17-25 µm, without any specialized apical apparatus, sometimes with a short stalk on young asci. Apical paraphyses present in young ascocarps but disappearing at maturity.

ASCOSPORES narrowly-fusiform with rounded ends, often curved or sigmoid, 40-70 x 4-7 µm, 1- to 3-septate, rarely 5- or 7-septate, hyaline, sometimes slightly constricted at each septum, smooth or becoming minutely roughened, contents granular, eight parallel spores per ascus.

ANAMORPH: *Cylindrocladium* sp.

SPORULATING BRANCHES erumpent through epidermis forming a black-rimmed spot, or occasionally at base of ascocarp; arising from substrate surface or, in culture, from pigmented hyphae at surface of colony; branching one to four times, monopodial or opposite, branches 5-6 µm diam, with a septum at the base of each branch.

CONIDIOGENOUS CELLS phialidic, without a collarette or flared opening, 8-20 x 2.5-3.5 µm.

CONIDIA cylindric with truncate-rounded ends, 1- to 3-septate, hyaline, 39-60 x 4-6 µm.

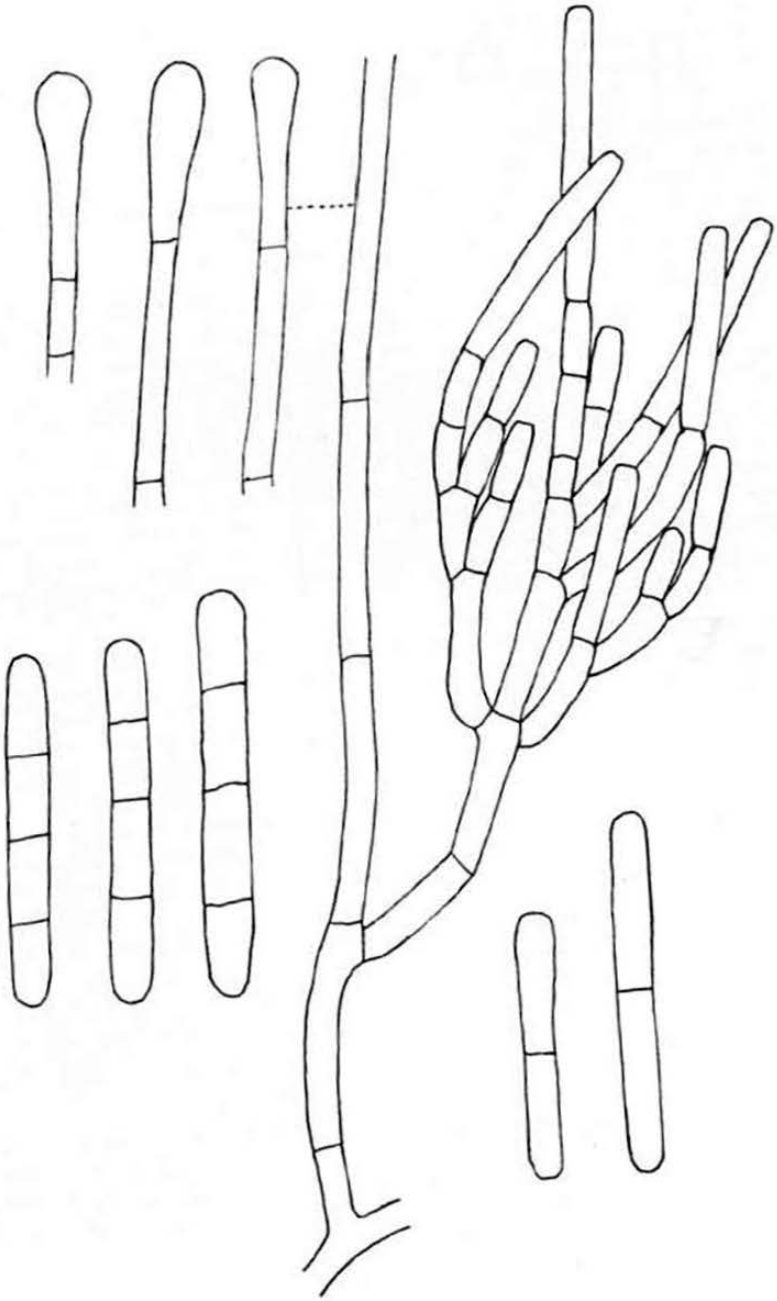

Fig. 4. *Cylindrocladium* anamorph of *Calonectria pyrochroa* (CUP-MM 2407). Conidiophorous branches, apical vesicles a

APICAL VESICLES borne on long, upright stalks branching below or at the level of the conidiophorous branches, extending beyond the tips of the conidia, stalk 150-190 µm long, vesicles ovate, clavate to subglobose, ultimate cells 25-65 x 5-6 µm at base, becoming 7-9 µm broad at apex.

CULTURAL CHARACTERISTICS: Ascospores germinate overnight on CMD* forming 1 to 3 germ tubes; colony diameter, after 3 days, on CMD, MA* and PDA* 0.8-0.9 cm; after 10 days, CMD 3.8 cm, PDA 3.3 cm, MA 2.1-2.3 cm; on CMD, aerial mycelium lacking or sparse, colony becoming "orange" to "sienna;" on MA, white, aerial mycelium, profuse sporulation, colony "sienna" to "umber;" on PDA, abundant, thick, white to "orange" hyphae, sporulation only at margin of colony, submerged mycelium "orange" to "umber." Conidia developing on all media tested after 3 days; vegetative hyphae frequently branched, contorted, 3-7 µm diam.

HABITAT: On rotting leaves, usually on the lower surface, rarely on decaying twigs and woody pods; often in wet areas such as dense forest understory, seepages and streams; known from *Acacia* sp., *Hedera helix*, *Magnolia grandiflora*, *Pittosporum undulatum*, *Platanus* sp. and unidentified Lauraceae.

DISTRIBUTION: Tropical and warm temperate regions; known from the Azores, Brazil, France, Italy, Jamaica, Madeira and Portugal.

LECTOTYPE: *France*. In foliis emortuis Platani. Autumno. Desm., Pl. Crypt. France Ed. 2 (2) #372. The specimen at BPI is here designated as the LECTOTYPE. Isolectotypes of the same exsiccati number from BR and UPS were also examined.

OTHER SPECIMENS EXAMINED: *Azores*, Flores, Caldeira Comprida above Fajazinha, on decaying evergreen leaf, 13 April 1978, coll. R. P. Korf, L. M. Kohn, N. Korf, A. Y. Rossman (CUP-MM 2114). *Brazil*, in a forest near Apiahy, on the undersurface of fallen, rotting leaves of Lauraceae, March 1888, Puiggarii #2562 *Ophionectria puiggarii* LECTOTYPE (LPS), ISOLECTOTYPE (FH-Höhnel); H. P. Rio de Papageio, on leguminous plant, 12 Feb. 1896, Ule #2282 *Nectria leguminum* HOLOTYPE (S), ISOTYPE (FH-Höhnel). *Italy*, Locarno, on fallen leaves of *Magnolia grandiflora*, coll. Daldini *Calonectria daldiniana* HOLOTYPE (RO-general mycological herbarium). *Jamaica*, Portland Parish, between Silver Hill Gap and Woodcutters Gap, 1500 m, on undersurface of dead leaf, 9 Jan. 1971, coll. R. P. Korf, *et al.*, G. J. Samuels GS 36J, A. Y. Rossman 371 (OSC). *Madeira*, 5.1 km from Terreiro da Luta toward São Goncalo, in rivulet and adjacent seepages, on decaying leaves of *Pittosporum undulatum*, 24 April 1978, coll. R. P. Korf, L. M. Kohn, N. Korf, A. Y. Rossman (CUP-MM 2407); on twigs of *Acacia* sp. (CUP-MM 2411); Chao dos Louros, 9.5 km S of S. Vicente, 26 April 1978, on dead leaves of Lauraceae, coll. R. P. Korf, L. M. Kohn, N. Korf, A. Y. Rossman (CUP-MM 2462); stream halfway between Vinhaticos and Encumeada, on leaf, 26 April 1978, coll. R. P. Korf, L. M. Kohn, N. Korf, A. Y. Rossman (CUP-MM 2478). *Portugal*, on dead leaves of *Hedera helix*, coll. Torrend #376, ex Herb. Bresadola (S) under the unpublished epithet "*lusitanica*" in *Calonectria*.

*CMD-Difco Corn Meal Agar + 0.2% Dextrose, MA-Difco Malt Agar, PDA-Difco Potato Dextrose Agar.

The genus *Calonectria*, as defined herein on the basis of ascocarp morphology and anamorph, is closely related to *Nectria*. The ascocarp is similar in structure to that of *Nectria haematococca* Berk. & Br. [Anamorph: *Fusarium solani* (Mart.) Sacc.] and *Ophionectria trichospora* (Berk. & Br.) Sacc. [Anamorph: *Antipodium spectabile* Piroz.]. The *Cylindrocladium* states of *Calonectria* species are phialidic with elongate, septate conidia as in *Fusarium* and *Antipodium* but the conidia of *Cylindrocladium* have truncate-rounded ends, rather than a foot cell or apical beak. *Cylindrocladium* species also have a peculiar, apical vesicle borne on a long, sterile filament associated with each conidial head. One species of *Calonectria*, *C. reteaudii* (Bugnicourt) Booth, has an anamorph similar to *Cylindrocladium* but lacks the apical vesicle and is placed in *Cylindrocarpon*, a genus which includes the anamorphs of several *Nectria* species.

As can be seen from the above synonymy, the correct name for the type species of *Calonectria* is *C. pyrochroa*. Of the species previously described in *Calonectria*, the species with *Cylindrocladium* anamorphs have morphologically similar teleomorphs. Many *Calonectria* species having *Cylindrocladium* anamorphs are known as plant pathogens on a variety of hosts causing diseases of conifer and peach seedlings, a root and foliar rot of tea and black rot of peanuts. Seven species with known *Cylindrocladium* anamorphs exist in the literature; they are all quite similar to *Calonectria pyrochroa* differentiated by ascosporal and conidial size and septation. Older names of *Calonectria* species for which the anamorphs are not yet known may provide earlier epithets for these pathogenic species.

*ACKNOWLEDGEMENTS*

I sincerely acknowledge the generous assistance of Dr. Richard P. Korf in providing the opportunity to collect in Jamaica (NSF Grant #GB-8548) and in Macaronesia (NSF Grant #DEB 75-23557) and the Cornell Plant Pathology Herbarium for supporting me as the Anna E. Jenkins Postdoctoral Fellow throughout this study. I thank all the curators and their assistants at numerous Italian herbaria who patiently endured our Italian in order to help search for the missing specimen.

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# THE SPECIES PROBLEM IN THE PSATHYRELLA CANDOLLEANA COMPLEX

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Summary

Interfertility tests between a large number of collections from both the Old and New Worlds show that there are four breeding groups in the collective species *Psathyrella candolleana*.

*Psathyrella candolleana* (Fr.) Maire is considered to be a collective species by the morphologist but it is very difficult to distinguish between the component species. Two separate investigations have been carried out one by Galland (1) on isolates collected only in France and the other by Jurand (2) using European and American isolates. The isolates used by Galland were collected mainly in the Oise and Val-d'Oise Departments and were studied morphologically and determined by H. Romagnesi. In the second investigation both breeding tests and morphological studies were done by Jurand.

In the investigation of Galland four breeding groups were found after making interfertility tests between the isolates, (fig. 1). H. Romagnesi (3) has decided to give specific names to these as follows : *P. candolleana* (Fr.) Maire, *P. scotospora* Rom., *P. elegans* Rom. and *P. proxima* Rom.

The isolates studied by Jurand are listed in Fig. 2 and again there were four breeding groups. It was interesting to know if the four breeding groups were the same in the two studies. Representatives of each of the four breeding groups of both studies were mated and checked for clamp connections. The strains used and the results are shown in Fig. 3.

The tables show that *P. candolleana* has been found in several European countries and once in the U.S.A. It is the commonest of the four species in France and England. In contrast 15 of the isolates were of *P. elegans*. *P. elegans* has also been found in France, England and Finland. *P. scotospora* is so far only known from France. *P. proxima* has been found in France and once in the U.S.A.

## Discussion

These studies show that *P. candolleana* should be considered as a collective or macrospecies consisting of four intersterile microspecies which are most easily identified by breeding tests. To the morphologist there might be fears that this splitting could be endless but these studies indi-

Fig. I - Strains studied by Galland, all collected by H. Romagnesi

| Cultures n° | Place of collection | Year |
|---|---|---|
| | *P. candolleana* (Fr. Maire) | |
| 881 | Luzarches (Val-d'Oise) | 1966 |
| 886 | " | 1966 |
| 899 | Forêt de Largue (Oise) | 1966 |
| 943 | Forêt d'Halatte (Oise) | 1967 |
| 944 | " | 1967 |
| 964 | Forêt de Compiègne (Oise) | 1967 |
| 992 B | Luzarches (Val-d'Oise) | 1968 |
| 994 | Coye-la-Forêt (Oise) | 1968 |
| 995 B | " | 1968 |
| 996 | Forêt d'Halatte (Oise) | 1968 |
| 1002 | Luzarches (Val-d'Oise) | 1968 |
| 1034 | Forêt de Compiègne (Oise) | 1969 |
| 1035 | Luzarches (Val-d'Oise) | 1969 |
| 1036 | " | 1969 |
| 1041 | " | 1969 |
| 1044 | Drancy (Seine-et-Marne) | 1969 |
| 1051 | Villers-Saint Frambourg (Oise) | 1969 |
| 1071 | Coye-la-Forêt (Oise) | 1970 |
| 1075 | Bois de Ver-sur-Launette (Oise) | 1970 |
| 1085 | Vauville (Manche) | 1970 |
| 1165 | Pontarmé (Oise) | 1975 |
| 1173 | Forêt de Compiègne (Oise) | 1975 |
| 1174 | " | 1975 |
| | *P. scotospora* Rom. | |
| 874 | Paris (Seine) | 1966 |
| 1032 A | " | 1970 |
| 1032 B | " | 1970 |
| | *P. proxima* Rom. | |
| 876 | Luzarches (Val-d'Oise) | 1966 |
| 999 A | Forêt de Comelles (Oise) | 1968 |
| 999 B | " | 1968 |
| 999 C | " | 1968 |
| | *P. elegans* Rom. | |
| 1029 A | Coye-la-Forêt (Oise) | 1969 |
| 1029 B | " | 1969 |
| 1073 | Compiègne (Oise) | 1970 |
| 1074 | Bois de Ver-sur-Launette (Oise) | 1970 |

cate that the four species are widespread and it is likely that further studies will only reveal one or two more species in this complex. This widespread distribution of four morphologically similar (but intersterile) species emphasises the fact that speciation in these agarics is an event affecting the cytoplasm during hyphae fusion and has nothing to do with the morphology of the fruit body. It would seem likely

Fig. 2 - Strains studied by Jurand

| Cultures n° | Place of collection | Year | Collector and n° |
|---|---|---|---|
| Group II = *P. candolleana* | | | |
| 42 | Yorkshire, England | 1970 | 7560 R.W. |
| 43 | Surrey , England | 1968 | 3390 P.D.O. |
| 136 | Warwickshire, England | 1970 | 575 S.P. |
| 142 | Turku, Finland | 1971 | 8375 R.W. |
| 146 | Helsinki, Finland | 1971 | 8561 R.W. |
| 171 | Kent, Ohio, U.S.A. | 1972 | 2096 F.H. |
| 304 | C.B.S. Baarn | 1933 | Vandendries |
| 330 | C.B.S. Baarn | 1939 | Quintanilha |
| Group IV = *P. scotospora* | | | |
| 300 | C.B.S. Baarn | 1947 | Pinto Lopes |
| Group III= *P. proxima* | | | |
| 178 | Michigan, U.S.A. | 1972 | 2217 F.H. |
| Group I = *P. elegans* | | | |
| 24 | Cheboygan County, Michigan | 1969 | 6609 R.W. |
| 141 | Herefordshire, England | 1970 | M.R. |
| 145 | Turku, Finland | 1971 | 8412 R.W. |
| 160 | Michigan, U.S.A. | 1972 | 81096 A.H.S. |
| 161 | " | 1972 | 81097 A.H.S. |
| 162 | " | 1972 | 81098 A.H.S. |
| 163 | " | 1972 | 81099 A.H.S. |
| 165 | " | 1972 | 81103 A.H.S. |
| 166 | " | 1972 | 81112 A.H.S. |
| 167 | " | 1972 | 1974 F.H. |
| 168 | " | 1972 | 81113 A.H.S. |
| 169 | " | 1972 | 204 R.N. |
| 170 | " | 1972 | 208 R.N. |
| 173 | " | 1972 | A.H.S. |
| 175 | " | 1972 | 81153 A.H.S. |
| 176 | " | 1972 | 81156 A.H.S. |
| 179 | " | 1972 | 2194 F.H. |

Abréviations : F.H., F. HOSENEY ; R.N., R. NIMKE ; P.D.O., P.D. ORTON
S.P., S. PORTER ; M.R., M. ROTHEROE ;
A.H.S., A.H. SMITH ; R.W., R. WATLING.

Fig. 3

| | 1174 France *P. candolleana* | 1029 France *P. elegans* | 874 France *P. scotospora* | 879 France *P. proxima* |
|---|---|---|---|---|
| 141 England I | - | + | - | - |
| 142 Finland II | + | - | - | - |
| 178 U.S.A. III | - | - | - | + |
| 300 France IV | - | - | + | - |

that these species are fairly recent in origin and have not yet accumulated many morphological differences. Now that the existence of four distinct breeding groups is known it may be possible to find additional characters, especially ecological ones which will aid in their identification.

(1) Contribution à l'étude du genre *Psathyrella* (Fr.) Quél. (Agaricales). Etude des mycéliums en culture pure. Application du test d'infertilité pour la délimitation d'espèces critiques. Thèse 1973, Univ. de Lyon.

(2) Breeding biology of the genus *Psathyrella*. Ph. D. Thesis, Univ. of Edinburgh.

(3) Complément à la contribution à l'étude du G. *Psathyrella* (Fr.) Quél. (Agaricales). Descriptions de quelques espèces de *Drosophila* Quél. *Psathyrella* ss. dilat.). Bull. Soc. Mycol. France 91 ; 137-224, 1975.

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# TYPE STUDIES IN THE GENUS PEZIZA. VI. SPECIES DESCRIBED BY C. H. PECK

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My observations on operculate Discomycetes described by C. H. Peck and now referred to the genus *Peziza* are provided below. In cases where species have been recently commented upon in the literature, only the presently accepted name is listed and no further comments are made. Peck's use of the generic name *Peziza* conformed with that of many of his contemporaries, such as Ellis and Cooke; almost all Discomycetes, both members of the Helotiales and Pezizales, were included. The numerous species described under *Peziza* but which now prove to be members of the Helotiales are listed after the more detailed comments. All cited material has been examined.

Peck's publications as New York State Botanist appeared rarely and irregularly. In many cases title page dates are incorrect. The dates given below in parentheses are those listed by J. H. Barnhart (unpublished manuscript in Farlow Library). These are the earliest possible dates at which a given report, in one form or another, was distributed.

I wish to thank Harold J. Larsen, Jr., Richard P. Korf, and especially J. H. Haines for help and suggestions. Dr. Haines particularly provided information on collections from Peck's notebooks.

*Peziza adusta* Cooke & Peck, Bull. Buffalo Soc. Nat. Sci. *2*: 290. 1875, Rep. New York State Bot. *27*: 107. 1873. (1875).
≡ *Humaria adusta* (Cooke & Peck) Sacc., Syll. fung. *8*: 141. 1889.
≡ *Leucoloma adusta* (Cooke & Peck) House, Rep. New York State Mus. *243-244*: 86. 1921.
Holotype: On burnt ground. West Albany, N.Y. July 1873. NYS.

Seaver (1928) considered this to be a synonym of *Patella melaloma* (Alb. & Schw.) Seaver which is now referred to *Anthracobia melaloma* (Alb. & Schw.) Boud. Annotations on the specimen by Harold J. Larsen, Jr. indicate that this is a species of *Anthracobia*. In personal communication Dr. Larsen states that he concurs with Seaver's placement of this species though there are some differences between them.

*Peziza amplispora* (Cooke & Peck) Cooke, Mycographia *1*: 167. 1879.
[≡ *Peziza repanda* var. *amplispora* Cooke & Peck, Bull. Buffalo Acad. Sci. *2*: 288. 1876. without description].
≡ *Geopyxis amplispora* (Cooke & Peck) Sacc., Syll. fung. *8*: 71. 1889.
Isotype: On ground. New York State. NYS.

This is a true *Peziza* with amyloid asci but it cannot be distinguished from *P. micropus* Pers. ex Pers.

*Peziza bronca* Peck, Rep. New York State Mus. *29*: 54. 1875. (1878).
≡ *Tarzetta bronca* (Peck) Korf & J. K. Rogers, Phytologia *21*: 206. 1971.

*Peziza convoluta* Peck, Bull. Torrey Bot. Club *30*: 101. 1903, non *P. convoluta* Rodway, 1925.

Holotype: Sandy soil. California. W. R. Dudley NYS.

Though Seaver (1928) placed this species in the synonymy of *Peziza venosa* Pers. (≡ *Disciotus venosa* (Pers.) Boud.), my studies of the type specimen show this to have amyloid asci. The spores are smooth. This seems close to or identical with *Peziza vesiculosa*.

*Peziza (Humaria) deligata* Peck, Rep. New York State Mus. *30*: 61. 1878.

≡ *Humaria deligata* (Peck) Sacc., Syll. fung. *8*: 123. 1889.

≡ *Leucoloma deligata* (Peck) House, Bull. New York State Mus. *243-244*: 86. 1921.

≡ *Humarina deligata* (Peck) Seaver, N. Amer. Cup-fungi (operculates). p. 132. 1928.

Holotype: Dead stems of herbs lying on the ground. Bethlehem, Albany County, N.Y. September 1876. NYS.

This is a species of *Iodophanus*. It seems most like *I. testaceus* (Moug. *in* Fr.) Korf as treated by Kimbrough, Luck-Allen, and Cain (1969).

*Peziza dudleyi* Peck, Rep. New York State Mus. *47*: 23. 1894.

Holotype: Ground and decayed wood. Ithaca, N.Y. October. Dudley. NYS.

Morphologically this is identical to *Sarcoscypha coccinea* as was concluded by Kanouse (1948) who treated it under *Plectania coccinea*.

[*Peziza echinosperma* Peck, Rep. New York State Mus. *24*: 95. 1870 (1872), non *Peziza echinosperma* Karst., Not. Fauna Fl. Fenn. *10*: 115. 1869].

≡ *Humaria echinosperma* Peck ex Sacc., Syll. fung. *8*: 130. 1889

≡ *Leucoloma echinosperma* (Peck ex Sacc.) House, Bull. New York State Mus. *243-244*: 86. 1921.

Holotype: Damp ground in pastures. West Albany, N.Y. June. NYS.

This is *Lamprospora crec'hqueraultii* (Cr. & Cr.) Boud. It was treated as a synonym of that species by Seaver (1928). John Haines informs me that in his notebook Peck wrote the following comment by M. C. Cooke: "A good species, but bad name."

*Peziza gallinacea* Peck, Rep. New York State Mus. *31*: 135. 1877 (1879).

≡ *Humaria gallinacea* (Peck) Sacc., Syll. fung. *8*: 63. 1889.

≡ *Leucoloma gallinacea* (Peck) House, Bull. New York State Mus. *243-244*: 86. 1921.

This specimen (Partridge dung. Oneida, N.Y. July. Warne) has not been located in the New York State Museum. From the description it seems likely that this is a *Coprotus* species. Seaver (1928) treated it as *Ascophanus gallinaceus* (Peck) Seaver.

*Peziza hesperidea* Cooke & Peck, Grevillea *1*: 5. 1875.

≡ *Geopyxis hesperidea* (Cooke & Peck) Sacc., Syll. fung. *8*: 63. 1889.

Holotype: Amongst leaves. Goat Island, near Niagara Falls, N.Y. NYS.

Seaver (1928) and Kanouse (1948) treated this as a synonym of *Plectania occidentalis* (Schw.) Seaver which is now considered a *Sarcoscypha*.

*Peziza humosoides* Peck, Rep. New York State Mus. *32*: 46. 1878.

(1880).
Type material (On dung of some wild animal, Catskill Mountains, July) could not be located in NYS.

*Peziza (Humaria) hydrophila* Peck, Rep. New York State Mus. *34*: 51. 1880. (1883), non *P. hydrophila* Karst., 1869.
≡ *Humaria hydrophila* Sacc., Syll. fung. *8*: 140. 1889 (ut "Peck").
≡ *Leucoloma hydrophila* (Sacc.) House, Bull. New York State Mus. *243-244*: 86. 1921 (ut "(Peck) House").
≡ *Psilopezia hydrophila* (Sacc.) Seaver, N. Amer. Cup-fungi (operculates) p. 106. 1928 (ut "(Peck) Seaver").
Holotype: Decaying wood lying in water. Adirondack Mountains. July. NYS.

Earlier (1973b) I stated that this was a *Peziza*, but now after examining a number of *Peziza* species I cannot justify its placement in *Peziza*. It is a species of *Pachyella* which is close to *P. punctispora* Pfister. The new combination Pachyella hydrophila (Sacc.) Pfist. comb. nov. (basionym *Humaria hydrophila* Sacc., Syll. fung. *8*: 140. 1889 ≡ *Peziza hydrophila* Peck, a later homonym) is proposed.
In both *Pachyella punctispora* and this species the gelatinous material of the medullary excipulum and outer excipulum is scanty and is not easily seen in dried material. Peck's species differs from other Pezizas in the presence of this gelatinous excipular material, the presence of textura intricata in the medullary excipulum, and the formation of short pigmented hyphoid excipular hairs. These excipular hairs are not arranged in a palisade layer; in this feature *Peziza hydrophila* Peck agrees with *Pachyella punctispora*. In addition, both species have very densely pigmented paraphyses and ornamented ascospores. They differ only critically. In the holotype of *P. hydrophila* the wide paraphyses (which reach a diam of 15 µm) and the very faintly ornamented ascospores separate it from known collections of *P. punctispora* in which the paraphyses are narrow (under 9 µm in diam) and the ascospores are more prominently marked (see Pfister 1975).

*Peziza imperialis* Peck, Rep. New York State Mus. *29*: 54. 1875 (1878), non *Peziza imperialis* Beck, 1884.
≡ *Sowerbyella imperialis* (Peck) Korf, Phytologia *21*: 206. 1971.

*Peziza leucobasis* Peck, Bull. New York State Mus. *1*: 20. 1887.
≡ *Psilopezia deligata* (Peck) Seaver fide Pfister (1973a).

*Peziza odorata* Peck, Bull. Torrey Bot. Club *23*: 420. 1896.
Holotype: Ground in a cellar. Maine. June. F. L. Harvey. NYS.
The type collection agrees in all aspects with *Peziza domiciliana* Cooke. Seaver (1928) had previously treated it as a synonym of *P. domiciliana*.

*Peziza orbicularis* Peck, Bull. New York State Mus. *1*: 20. 1887.
= *Pachyella clypeata* (Schw.) Le Gal fide Pfister (1973).

*Peziza ovilla* Peck, Rep. New York State Mus. *28*: 66. 1874 (1876).
≡ *Leucoscypha ovilla* (Peck) Harmaja, Karstenia *17*: 73. 1977.

*Peziza pallidula* Cooke & Peck, Bull. Buffalo Soc. Nat. Sci. *2*: 288. 1876.
≡ *Geopyxis pallidula* (Cooke & Peck) Sacc., Syll. fung. *8*: 70. 1889.
Isotype: On old beech wood. Croghan, N.Y. September. NYS.
If one follows Svrcek's treatment of the smooth-spored and related

species of *Peziza*, *P. pallidula* seems indistinguishable from *P. arvernensis* Boud. (= *P. sylvestris* (Boud.) Sacc. & Trav.). *Peziza pallidula* is the older name but there appears to be a species complex involved. In the specimen in NYS all the spores seen were eguttulate. Cooke (1879) stated that some spores were biguttulate.

*Peziza pellita* Cooke & Peck, Grevillea *1*: 5. 1872, Rep. New York State Mus. *25*: 98. 1873.
≡ *Lachnea pellita* (Cooke & Peck) Sacc., Syll. fung. *8*: 169. 1889.
≡ *Sepultaria pellita* (Cooke & Peck) Seaver, N. Amer. Cup-fungi (operculates) p. 152. 1928.
Holotype: Thin soil covering rocks. Lower Ausable Falls, Essex County, N.Y. Adirondack Mountains. July. NYS.
This is a member of the genus *Sepultaria*. At present the species concepts within the genus do not allow the placement of this species.

*Peziza rubra* Peck, Rep. New York State Mus. *24*: 95. 1870 (1872).
Holotype: Burnt ground. Top of the Hudson Highlands, N.Y. June. NYS.
This is *Geopyxis carbonaria* (Alb. & Schw. ex Pers.) Sacc.

*Peziza subvernalis* Peck, Rep. New York State Mus. *33*: 31. 1879 (1883).
Holotype: Decaying wood and bark of ash trees, *Fraxinus sambucifolia*. Sandlake, Rensselaer County, N.Y. May. NYS.
This is a smooth-spored species of *Peziza* which seems indistinguishable from *P. ampliata* Pers. ex Pers.

*Peziza unicisa* Peck, Rep. New York State Mus. *26*: 81. 1874.
Seaver (1928) treated this as a synonym of *Scodellina leporina*. The holotype (on ground in woods, Croghan, N.Y., September.) is on loan from NYS and has not been studied by me.

*Peziza vulcanalis* Peck, Haydn's U. S. Geol. Survey p. 792. 1872.
≡ *Geopyxis vulcanalis* (Peck) Sacc., Syll. fung. *8*: 65. 1889.
Rifai (1968) suggests that this is a synonym of *Geopyxis carbonaria*. I have not studied the material.

*Peziza warnei* Peck, Rep. New York State Mus. *30*: 59. 1878.
≡ *Discina warnei* (Peck) Sacc., Syll. fung. *8*: 102. 1889, fide McKnight (1969).

The following are species described in *Peziza* which are members of the Helotiales. Most were treated by Seaver (1951). Synonyms are listed in parentheses following the Peck name.

*Peziza aberrans* Peck (≡ *Belonium aberrans* (Peck) Sacc., = *Belonium andropogonis* (Berk. & Curt.) Sacc. fide Seaver, 1928); *Peziza agrostina* Peck (≡ *Trichopeziza agrostina* (Peck) Sacc., ≡ *Lachnella agrostina* (Peck) Seaver); *Peziza albumina* Cooke & Peck (≡ *Helotium albumineum* (Cooke & Peck) Sacc., ≡ *Calycina albumina* (Cooke & Peck) Kuntze); *Peziza assimilis* Cooke & Peck (≡ *Orbilia assimilis* (Cooke & Peck) Sacc.).

*Peziza balsamicola* Peck (≡ *Tapesia balsamicola* (Peck) Sacc.).

*Peziza capitata* Peck (≡ *Trichopeziza capitata* (Peck) Sacc., ≡ *Dasyscyphus capitata* (Peck) Le Gal); *Peziza cariosa* Peck (≡ *Pyrenopeziza cariosa* (Peck) Sacc.); *Peziza chamaeleonitina* Peck (≡ *Dasyscypha chamaeleonitina* (Peck) Sacc., ≡ *Atractobolus chamaeleonitina* (Peck) O. Kuntze); *Peziza corneola* Cooke & Peck (= *Heterosphaeria linariae* (Rab.) Rehm fide Sacc., Syll. fung. *8*: 776. 1889); *Peziza corrugata* (≡ *Durella corrugata* (Cooke & Peck) Sacc.).

*Peziza distincta* Peck (≡ *Trichopeziza distincta* (Peck) Sacc.).

*Peziza enterochroma* Peck (≡ *Ombrophila enterochroma* (Peck) Sacc.,

≡ *Kriegeria enterochroma* (Peck) Seaver).

*Peziza floriformis* Peck (≡ *Pezizella floriformis* (Peck) Sacc.).

*Peziza kalmiae* Peck (≡ *Pezicula kalmiae* (Peck) Sacc.).

*Peziza lacerata* Cooke & Peck (≡ *Pyrenopeziza lacerata* (Cooke & Peck) Sacc.); *Peziza longipes* (≡ *Phialea longipes* (Cooke & Peck) Sacc.); *Peziza longipila* Peck (≡ *Dasyscypha longipila* (Peck) Sacc., = *Trichopezizella relicina* (Fr.) Raitv. *in* Haines 1974); *Peziza luteodisca* Peck (≡ *Dasyscypha luteodisca* (Peck) Sacc.; *Atractobolus luteodiscus* (Peck) O. Kuntze).

*Peziza myricacea* Peck (≡ *Trichopeziza myricacea* (Peck) Sacc.).

*Peziza pinastri* Cooke & Peck (≡ *Mollisia pinastri* (Cooke & Peck) Sacc., = *Cenangium acuum* Cooke & Ellis); *Peziza planodisca* Cooke & Clint. (≡ *Pezizella planodisca* (Cooke & Clint.) Sacc., ≡ *Hymnoscypha planodisca* Lindau *in* Engler & Prantl, ≡ *Helotium planodiscum* (Peck & Cooke) White).

*Peziza scripina* Peck (≡ *Mollisia scripina* (Peck) Sacc.); *Peziza singularis* Peck (≡ *Mollisia singularis* (Peck) Sacc., ≡ *Pseudopeziza singularis* (Peck) Davis); *Peziza solenia* Peck (≡ *Solenopezia solenia* (Peck) Sacc., ≡ *Dasyscyphus solenia* (Peck) Dennis, ≡ *Lachnella solenia* (Peck) Seaver, ≡ *Belonidium solenia* (Peck) Raitv.); *Peziza sphaerella* Peck & Clint.; *Peziza subatra* Cooke & Peck (≡ *Pyrenopeziza subatra* (Cooke & Peck) Sacc.); *Peziza subcarnea* Cooke & Peck (≡ *Phialea subcarnea* (Cooke & Peck) Sacc., ≡ *Hymenoscyphus subcarnea* (Cooke & Peck) O. Kuntze, = *Helotium destructor* White); *Peziza subcinerea* Cooke & Peck; *Peziza subochracea* Cooke & Peck (≡ *Trichopeziza subochraceae* (Cooke & Peck) Sacc., ≡ *Lachnella subochracea* (Cooke & Peck) Seaver, ≡ *Calycella subochracea* (Cooke & Peck) Dennis); *Peziza sulphurella* Peck (≡ *Dasyscypha sulphurella* (Peck) Sacc., a synonym of *Dasyscyphus cruciferus* (Phill.) Sacc. according to Seaver (1951) and Dennis (1962)).

*Peziza tetraonalis* Peck.

*Peziza thalictri* Peck (≡ *Pyrenopeziza thalictri* (Peck) Sacc.); *Peziza tiliae* Peck (≡ *Trichopeziza tiliae* (Peck) Sacc., ≡ *Cyphella tiliae* (Peck) Cooke, ≡ *Lachnella tiliae* (Peck) W. B. Cooke); *Peziza typhae* Peck.

*Peziza urticina* Peck (≡ *Trichopeziza urticina* (Peck) Sacc., = *Dasyscyphus grevillei* (Berk.) Massee fide Dennis 1963).

*Peziza vincta* Cooke & Peck (≡ *Tapesia vincti* (Cooke & Peck) Sacc.); *Peziza viridicoma* Peck (≡ *Trichopeziza viridicoma* (Peck) Sacc., ≡ *Lachnella viridicoma* (Peck) Seaver).

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# TYPE STUDIES IN THE GENUS PEZIZA. VII. MISCELLANEOUS SPECIES DESCRIBED BY M. J. BERKELEY AND M. A. CURTIS.

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Species of *Peziza* described by Berkeley and Curtis are listed below. In cases where specimens have recently been studied the resulting new combinations have been listed without comment. In other cases the results of my studies of specimens are included. In these instances complete specimen citations have been given. The Berkeley and Curtis Pezizas described from the *United States North Pacific Exploring Expedition* were previously covered in this series (Pfister, 1977).

I am again indebted to Drs. Richard P. Korf and Harold J. Larsen, Jr. for comments on the manuscript. The Director, Royal Botanic Gardens, Kew kindly lent specimens for study.

*Peziza adnata* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 365. 1868.
≡ *Pachyella adnata* (Berk. & Curt. in Berk.) Pfister, Can. J. Bot. *51*: 2011. 1973.

*Peziza albo-cincta* Berk. & Curt. in Berk., Grevillea *3*: 154. 1875.
≡ *Leucoscypha albo-cincta* (Berk. & Curt. in Berk.) Rifai, Verh. K. Ned. Akad. Wet. II, *57*(3): 168. 1968.

*Peziza albo-tecta* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 367. 1868.
≡ *Neottiella albo-tecta* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 191. 1889.
On earth in savannahs. C. Wright. Cuba. FH-Curtis (isotype).
Study of the specimen indicates that this is a member of the lichen genus *Baeomyces*.

*Peziza bella* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 366. 1868.
≡ *Nanoscypha bella* (Berk. & Curt. in Berk.) Pfister, J. Agric. Univ. Puerto Rico *58*: 361. 1974.

*Peziza brassicaecola* Berk., Grevillea *3*: 157. 1875.
≡ *Pezizella brassicaecola* (Berk.) Sacc., Syll. fung. *8*: 283. 1889.
On dead cabbage stems. New England. Sprague. no. 5407. K.
Examination of the holotype shows that this is *Pseudombrophila deerata* (Karst.) Seaver. Annotations with the specimen show that Dr. J. A. Nannfeldt reached the same conclusion some years ago. The species is known from several localities in New England.

*Peziza cremoricolor* Berk., Grevillea *3*: 151. 1875.
On human ordure. Car. Inf. no.1748.
I have not seen a collection of this species nor have others in re-

cent years. It seems not to be available from K. It was not mentioned by Kimbrough in his various papers on dung-inhabiting fungi. Seaver (1928) placed this species questionably in the synonymy of *Ascophanus ochraceus* (Cr.) Boud.

*Peziza crispata* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 367. 1868.
≡ *Phillipsia crispata* (Berk. & Curt. in Berk.) Le Gal, Prod. Fl. Mycol. Madagascar *4*: 262. 1953.

*Peziza cubensis* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 366. 1868.
≡ *Scutellinia cubensis* (Berk. & Curt. in Berk.) Gamundi, Contr. Cient. Univ. B. Aires, Ser. Bot. *1*(2): 84. 1956.

*Peziza decolorans* Berk. & Curt. in Berk., Grevillea *3*: 150. 1875.
On the ground. Alabama. Peters. no. 6059. FH-Curtis, K.

The asci of this small species are J+. The ascospores are biguttulate, 16 - 17 x 7 - 8 µm and are intricately marked with a series of ridges and crests which form a pronounced, more or less incomplete reticulum. The condition of the material does not allow proper study of the apothecial anatomy. It was said to be white and then discolored with age.

*Peziza dochmia* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 364. 1868.
≡ *Aurophora dochmia* (Berk. & Curt. in Berk.) Rifai, Verh. K. Ned. Akad. Wet. II, *57*(3): 52. 1968.

This is the type species of the genus *Aurophora* Rifai which is distinguished from *Phillipsia* by its fan-shaped apothecia and the presence of a gelatinous matrix in the medullary excipulum. *Peziza hirneoloides* Berk. and *Peziza inaequalis* Berk. & Curt. in Berk. are said by Rifai to be related.

*Peziza elachroa* Berk. & Curt. in Cooke, Mycographia p. 160. f. 274. 1879.
On earth amongst leaves. Cuba. C. Wright (? 410). K.

This species of *Peziza* shares a series of characters with several other closely related species. The ascospores are brownish, ornamented with rounded warts or ridges, and apiculate. In this collection the ascospores are (15) 16 - 18 x 10 - 12 µm and ornamented with short, low anastomosing ridges. The apiculi are up to 5 µm wide at their base and up to 5 µm long. The portion of the holotype I examined is composed of parts of two apothecia, the larger of them reaching a diam of about 0.5 cm. The sterile tissue of the apothecia is almost completely collapsed but is darkly colored. The collection is said to have been "greenish" when fresh. The apothecia are sessile.

There are four other species with which this species must be compared: *P. apiculata* Cooke, *Aleuria reperta* Boud., *P. thozetii* Berk., and *Aleurina subapiculata* von H. All of these species form small apothecia which were variously described as brownish to olivaceous. All have ascospores with similar ornamentations and unfortunately none of these species have been often collected. I have seen type material of all of these but *A. reperta*.

Malençon (1939) has discussed *Peziza apiculata*. A summary of his description of that species (under the name *Aleuria apiculata*) follows:

Apothecia 8 - 18 mm broad, subturbinate-cupulate, "cannelle" or bister, on wood of *Quercus*. Asci cylindrical, somewhat attenuated at the base, 300 - 325 x 14 - 15 µm, J+. Paraphyses slender, 3 - 3.5 µm broad,

hyaline or lightly fuscescent. Ascospores ellipsoidal, remaining smooth and hyaline for a long time, at maturity apiculate and finely verrucose, perispore brownish. Spores without apiculus 17 - 20 x 9 - 10 µm. Apiculus 3 - 3.5 x 2.5 - 6 µm high.

There is a collection from North America in FH which matches this description (on wood, Ocala, Fla., R. Thaxter, 1897-1898, det. E. J. Durand). In this material the hymenium was said to be olive.

For *Peziza apiculata* and *Aleuria reperta*, which Malençon concluded differed in its green color and larger ascospores (22 - 23 x 9 - 11 µm without the apiculus), he proposed a new section of the genus *Aleuria*, sect. *Aleurodiscina*.

Though *P. elachroa* was said to be greenish the spores are too small to be considered *A. reperta* and, though the spore dimension is within the general range of *P. apiculata* they are wider than those of *P. apiculata* and are marked differently. In *P. apiculata* the markings are always in the form of rounded warts with few, if any, anastomosing warts. In *P. elachroa* the warts often anastomose and sometimes form an irregular incomplete reticulum.

The markings in *P. elachroa* most closely resemble those found in *P. thozetii* Berk. as redescribed by Rifai (1968). Nonetheless, the two differ in their spore size; the ascospores of *P. thozetii* measuring (20-) 23.5 - 26.7 x 9 - 11 µm.

The fourth species involved, *P. subapiculata*, is known only from the type collection from Tjibodas, Java. In that collection the ascospores are 21 - 23 x 9.4 µm and have fairly prominent apiculi. In the holotype (FH) the asci are J-. The collection was described as dark olive brown to blackish and 5 - 7 mm broad. Other than the J- asci, this collection seems quite close to *P. thozetii*.

The rather poor condition of these collections makes anatomical comparisons difficult. Also it is difficult to judge if all the materials are fully mature. The key which follows may serve to tentatively distinguish these four species, but it should be pointed out that detailed studies of the species must be carried out when better materials become available. The interspecific variation is unknown at present.

1. Ascospores with long pointed apiculi, with isolated, rounded warts; on dead wood..... 2
1'. Ascospores with ± blunt apiculi with anastomosing and elongated warts, on ground and associated with plant debris..... 3
   2. Ascospores 17 - 20 x 9 - 10 µm (without apiculi) lateral walls prominently warted, disc brownish (perhaps dark olive), sessile..... *P. apiculata*
   2'. Ascospores 22 - 23 x 9 - 11 µm (without apiculi) disc olivaceous, substipitate..... *P. reperta*
3. Ascospores 16 - 18 x 10 - 12 µm (without apiculi).. *P. elachroa*
3'. Ascospores 23.5 - 26.7 x 9 - 11 µm (without apiculi) ..... *P. thozetii*

Moravec's (1977) description of *Peziza apiculata* from Moravia is based upon another fungus, perhaps a *Thecotheus* species. I have seen a small portion of his material through the courtesy of Dr. Henry Dissing at the Institute for Sporeplanter, University of Copenhagen.

*Peziza exasperata* Berk. & Curt. in Berk., Grevillea *3*: 152. 1875.
≡ *Barlaea exasperata* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 112. 1889.
≡ *Lamprospora exasperata* (Berk. & Curt. in Berk.) Seaver, N. Amer.

Cup-fungi (operculates) p. 75. 1928.
On burnt earth. Alabama. Peters. FH-Curtis.
The asci of *Peziza exasperata* are diffusely J+ which would indicate that the species should be referred to the Pezizaceae. Seaver did not use this feature and therefore misplaced the species in *Lamprospora* (Pyronemataceae). The ascospores of *P. exasperata* are globose, 12 - 13 µm in diam and are marked with warts and ridges. In their size and ornamentation they most closely resemble *Plicaria recurva* (Berk.) Rifai. That species was described as reddish brown as was *P. exasperata*. *Plicaria recurva* was first described from Tasmania by Berkeley in 1860.

*Peziza globifera* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 366. 1868.
≡ *Pulvinula globifera* (Berk. & Curt. in Berk.) Le Gal, Prod. Fl. Mycol. Madagascar *4*: 94. 1953, see Pfister 1976.

*Peziza hirneoloides* Berk., J. Linn. Soc. London *10*: 365. 1868.
For comments on this species see *Peziza dochmia*.

*Peziza inaequalis* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 365. 1868.
For comments on this species see *Peziza dochmia*.

*Peziza irrorata* Berk. & Curt. in Berk., Grevillea *3*: 150. 1875.
On soil. Texas. C. Wright no. 3138. FH-Curtis.
This is a true *Peziza*. The ascospores are broad ellipsoid to almost subglobose, uniguttulate, 12 - 14 x 8 - 9 µm, ornamented with distinct warts and ridges which are up to 2 µm high. Asci J+ at tip, 240 - 260 x 13 - 14 µm. Paraphyses somewhat indistinct, brownish by transmitted light, up to 6 µm broad. The apothecia in the type collection range from 0.5 - 1.5 cm in diam and are dull brown when dried. Little can be determined of the apothecial anatomy.

*Peziza lobata* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 365. 1868.
≡ *Lamprospora lobata* (Berk. & Curt. in Berk.) Seaver, Mycologia *6*: 22. 1914, see also Dennis, Kew Bull. *9*: 418. 1954.

*Peziza microspora* Berk. & Curt. in Berk., Grevillea *3*: 150. 1875.
≡ *Humaria microspora* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 131. 1889.
= *Acervus epispartius* (Berk. & Curt. in Berk.) Pfister, (1975).

*Peziza monilifera* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 367. 1868.
≡ *Pyronemella monilifera* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 194. 1889.
≡ *Sphaerospora monilifera* (Berk. & Curt. in Berk.) Seaver, N. Amer. Cup-fungi (operculates) p. 47. 1928.
Tewari and Pant (1968) discuss some of the problems regarding this species. They describe an Indian collection of this species which they treat as *Pyronemella monilifera*. The status of *Pyronemella* is questionable as stated previously (Pfister 1978).

*Peziza palmicola* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 364. 1868.
≡ *Discina palmicola* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 100. 1889.
On rotten Palms. February. C. Wright (300). Cuba. FH-Curtis.
The asci are J+, the ascospores are eguttulate with smooth, thick walls. The ascospores are 17 - 19 x 9 - 11 µm. The apothecia seen are

poorly preserved and it is impossible to discern any structural detail. The apothecium is about 2 cm diam.

*Peziza petersii* Berk., Grevillea *3*: 150. 1875.
≡ *Galactinia petersii* (Berk.) Le Gal, Prod. Fl. Mycol. Madagascar *4*: 51. 1953.
On burnt soil. Alabama. Peters. no. 6063.
This species was treated by Seaver (1928) under the name *Peziza pustulata*. Rifai (1968) provides a detailed description of this *Peziza*.

*Peziza pubida* Berk. & Curt. in Berk., Grevillea *3*: 153. 1875.
≡ *Macropodia pubida* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 159. 1889.
= *Jafnea fusicarpa* (Gerard) Korf, Nagaoa *7*: 5. 1960, fide Korf.

*Peziza pusio* Berk. & Curt. in Berk., Grevillea *3*: 153. 1875.
≡ *Sarcoscypha pusio* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 155. 1889.
Rooting into the soil, the particles of which it binds together. Texas. C. Wright. no. 3145. K.
This is a small specimen of *Sarcoscypha occidentalis*. Masse (J. Linn. Soc. London *31*: 509. 1896) said, "Has all the characters of *Stamnaria*."

*Peziza scatigena* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 366. 1868.
≡ *Ascobolus scatigenus* (Berk. & Curt. in Berk.) Brumm., Persoonia Suppl. *1*: 159. 1968.

*Peziza semitosta* Berk. & Curt. in Berk., Grevillea *3*: 153. 1875.
≡ *Jafnea semitosta* (Berk. & Curt. in Berk.) Korf, Nagaoa *7*: 5. 1960.

*Peziza sordescens* Berk. & Curt. in Berk., Grevillea *3*: 150. 1875.
≡ *Geopyxis sordescens* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 69. 1889.
On soil, over which a thin mycelium is spread which binds together the particles. New England. Murray. no. 5327. FH-Curtis, FH-Sprague.
This appears to be *Otidea grandis* (Pers.) Rehm.

*Peziza spissa* Berk., Grevillea *3*: 152. 1875.
On the ground. Alabama. Peters. no. 6074. K.
The portion of the holotype examined consisted of a single poorly preserved apothecium which was barely mature. Spores are biguttulate 24 - 26 x 13 µm, and are marked with very low isolated warts. The paraphyses are light brown and about 5 µm in diam.
The material does not allow precise placement of this species but it seems likely that, despite its reported occurrence on soil, it is a species of *Pachyella* close to *P. punctispora* Pfist. and *Pachyella hydrophila* (Sacc.) Pfister. In these species characteristic gel is difficult to detect without special treatment (Pfister, 1973).

*Peziza spraguei* Berk. & Curt. in Cooke, Bull. Buffalo Acad. Sci. *2*: 289. 1876.
≡ *Neottiella spraguei* (Berk. & Curt. in Cooke) Sacc., Syll. fung. *8*: 190. 1889.
≡ *Rhizina spraguei* (Berk. & Curt. in Cooke) Massee, J. Linn. Soc. London *10*: 365. 1868.
≡ *Galactinia spraguei* (Berk. & Curt. in Cooke) Le Gal, Bull. Soc. Mycol. France *78*: 208. 1962.
On decayed wood. S. Paris, Maine (5325) (Sprague no. 268)[Aug. 1855].

(Specimen designated as type by Le Gal 1959) K. Isotype FH-Curtis.

Of the three collections cited by Cooke in the original description (New England, Carolina, and Maine) Le Gal selected the Maine specimen as type. Le Gal examined this species and compared it with *Galactinia luteorosella* Le Gal and concluded that they differed in spore size and the form of the paraphyses. In my examination of this material I find that the spores are smooth, 14 - 18 x 8 - 10 µm, and eguttulate though occasionally they are irregularly guttulate with small refractive droplets. The material both at K and FH are so poorly preserved that it is impossible to study the excipulum. The species thus cannot be adequately placed yet its broad attachment to the substrate seems distinctive.

*Peziza stictica* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 367. 1868.
≡ *Lachnea stictica* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 177. 1889.

On the ground by the side of paths. June. C. Wright (643). Cuba. FH-Curtis.

This is a member of the genus *Scutellinia*.

*Peziza stygia* Berk. & Curt. in Berk., Grevillea *3*: 153. 1875.
≡ *Pseudoplectania stygia* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 166. 1889.

Sides of moist banks amongst moss. Car. Inf. no. 2971. FH-Curtis.

This is *Pseudoplectania nigrella* (Pers. ex Fr.) Fuckel, according to Seaver (1928).

*Peziza subgranulata* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 366. 1868.
≡ *Humaria subgranulata* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 129. 1889.

On dung. C. Wright (370). Cuba. FH-Curtis.

*Peziza subgranulata* was originally described as follows: "Applanata, lutea, margine setis pallidis obsito; sporidiis granulatis. On dung. Resembling *P. granulata*, Bull.; but in that the sporidia are smooth and .0006 inch long, in this granulated and .001 inch long."

Examination of Curtis specimens yields the following information: Asci are diffusely J+, approximately 200 x 28 - 32 µm (the asci are badly collapsed). The ascospores are 24 - 27.5 x 14 - 17 µm and are marked with low lateral warts and larger polar warts. The warts have more or less parallel sides and flat tops.

This fungus is identical to *Iodophanus granulipolaris* Kimb. and provides an older name for it. The following combination is necessary: IODOPHANUS SUBGRANULATUS (Berk. & Curt. in Berk.) Pfister comb. nov. (basionym *Peziza subgranulata* Berk. & Curt. in Berk., J. Linn. Soc. London *10*: 366. 1868).

*Peziza texensis* Berk. & Curt. in Berk., Grevillea *3*: 154. 1875.
≡ *Lachnea texensis* (Berk. & Curt. in Berk.) Sacc., Syll. fung. *8*: 182. 1889.
≡ *Scutellinia texensis* (Berk. & Curt. in Berk.) Le Gal, Prod. Fl. Mycol. Madagascar *4*: 133. 1953.

*Peziza wrightii* Berk. & Curt. in Berk., Ann. Mag. Nat. Hist., III *15*: 444. 1865.
≡ *Lamprospora wrightii* (Berk. & Curt. in Berk.) Seaver, Mycologia *6*: 15. 1914.
≡ *Octospora wrightii* (Berk. & Curt. in Berk.) J. Moravec, Česká My-

kologie *23*: 227. 1969.

There is some problem in the interpretation of this species which in part is due to selection of type specimens. Dennis and Itzeroti (1973) selected, from the two original specimens mentioned, the collection from Bodelwyddan, North Wales, on *Amblystegia serpens*. Later, Khare (1976) selected, as type, and described material collected by Charles Wright in Texas, deposited in FH-Curtis. This collection (According to Henry Dissing, personal communication) occurs on a different moss and represents a different taxon. Dennis and Itzeroti's interpretation of *Peziza wrightii* should be followed.

The following species are members of the Helotiales. Synonyms are listed in parentheses.

*Peziza Agassizii* Berk. & Curt. (≡ *Lachnellula Agassizii* (Berk. & Curt.) Dennis); *Peziza alphitodes* Berk. (? = *Lachnum pygmaeum* fide White in Litt.); *Peziza andropogonis* Berk. & Curt. in Berk. (≡ *Belonium andropogonis* (Berk. & Curt. in Berk.) Sacc.); *Peziza arundinariae* Berk. & Curt. in Cooke non *Peziza arundinariae* Berk. (≡ *Pyrenopeziza arundinariæ* (Berk. & Curt. in Cooke) ex Sacc.); *Peziza arundinariae* Berk. non *Peziza arundinariae* Berk. & Curt. in Cooke (≡ *Dasyscypha arundinariae* (Berk.) Sacc.); *Peziza atro-fusca* Berk. & Curt. in Berk. (≡ *Tapesia atro-fusca* (Berk. & Curt. in Berk.) Sacc.).

*Peziza crocina* Berk. & Curt. in Berk. (= *Calycella citrina* (Hedw. ex Fr.) Quél. fide Dennis, 1954); *Peziza crocitincta* Berk. & Curt. in Berk. (= *Chlorosplenium chlora* (Schw.) Curtis in Sprague fide Dixon, 1974).

*Peziza eustegiaeformis* Berk. & Curt. in Berk. (≡ *Belonium eustigiaeformis* (Berk. & Curt. in Berk.) Sacc.); *Peziza exarata* Berk. (≡ *Phialea exarata* (Berk.) Sacc.); *Peziza exidiella* Berk. & Curt. in Berk. (≡ *Pezizella exidiella* (Berk. & Curt. in Berk.) Sacc.); *Peziza extricata* Berk. & Curt. in Berk. (≡ *Pyrenopeziza extricata* (Berk. & Curt. in Berk.) Dennis).

*Peziza fibriseda* Berk. & Curt. in Berk. (≡ *Pseudohelotium fibriseda* (Berk. & Curt. in Berk.) Sacc.); *Peziza fimbriifera* Berk. & Curt. in Berk. (≡ *Dasyscypha fimbriifera* (Berk. & Curt. in Berk.) Sacc.); *Peziza fracta* Berk. & Curt. in Berk. (≡ *Pyrenopeziza fracta* (Berk. & Curt. in Berk.) Sacc.).

*Peziza hypophylla* Berk. & Curt. in Berk. (≡ *Pocillum hypophyllum* (Berk. & Curt. in Berk.) Sacc.).

*Peziza illota* Berk. & Curt. in Berk. (≡ *Dasyscypha illota* (Berk. & Curt. in Berk.) Sacc. = *Dasyscypha brasiliensis* (Mont.) Le Gal fide Dennis (1954)); *Peziza inspersa* Berk. & Curt. in Berk. (≡ *Lachnellula inspersa* (Berk. & Curt. in Berk.) Dennis).

*Peziza melanopus* Berk. & Curt. in Berk. (= a *Hymenoscyphus* species); *Peziza miltophthalma* Berk. & Curt. in Berk. (= an inoperculate discomycete).

*Peziza nigro-cincta* Berk. & Curt. in Berk. (≡ *Mollisia nigro-cincta* (Berk. & Curt. in Berk.) Dennis, 1963).

*Peziza pomicolor* Berk. & Rav. in Berk. (≡ *Trichopeziza pomicolor* (Berk. & Rav. in Berk.) Sacc.); *Peziza protrusa* Berk. & Curt. in Berk. (≡ *Pyrenopeziza protrusa* (Berk. & Curt. in Berk.) Sacc.); *Peziza pubernla* Berk. & Curt. in Berk. (= *Dasyscyphus subauratus* (Ellis) Dennis fide Dennis, 1963).

*Peziza quisquiliarum* Berk. & Curt. in Berk. (≡ *Belonium quisquiliarum* Berk. & Curt. in Berk.) Seaver).

*Peziza rhaphidophora* Berk. & Curt. in Berk. (≡ *Dasyscypha rhaphidophora* (Berk. & Curt. in Berk.) Dennis); *Peziza Ravenelii* Berk. & Curt. in Berk. (= *Unguculariopsis ilicincola* Rehm fide Seaver); *Peziza Russellii* Berk.

& Curt. in Berk. (≡ *Helotiella Russellii* (Berk. & Curt. in Berk.) Sacc.).

*Peziza saccharifera* Berk. (≡ *Pseudohelotium sacchariferum* (Berk.) Sacc.); *Peziza scariosa* Berk. & Curt. in Berk. (≡ *Tapesia scariosa* (Berk. & Curt. in Berk.) Sacc.); *Peziza soleniiformis* Berk. & Curt. in Berk. (≡ *Pezizella soleniiformis* (Berk. & Curt. in Berk.) Sacc.); *Peziza stenostoma* Berk. & Curt. in Berk.,non *Peziza stenostoma* Mart. ex Fr. (= an inoperculate discomycete);

*Peziza taxodii* Berk. (≡ *Blitrydium taxodii* (Berk.) Sacc.); *Peziza tela* Berk. & Curt. in Berk. (≡ *Cyphella tela* (Berk. & Curt. in Berk.) Massee); *Peziza translucida* Berk. & Curt. in Berk. (= *Pezizella vulgaris* (Fr.) von H. fide Dennis, 1953).

*Peziza umbilicata* Berk. & Curt. in Berk.,non *Peziza umbilicata* Pers., nec *P. umbilicata* Karst. (= *Velutaria rufo-olivacea* (Alb. & Schw. ex Fr.) Korf fide Dennis, 1963); *Peziza ustalis* Berk. & Curt. in Berk. (≡ *Cenangium ustale* (Berk. & Curt. in Berk.) Sacc.).

*Peziza viridi-atra* Berk. & Curt. in Berk. (≡ *Pezicula viridi-atra* (Berk. & Curt. in Berk.) Sacc.).

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# ENTROPHOSPORA, A NEW GENUS IN THE ENDOGONACEAE

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Fungal spores which closely resembled *Glomus infrequens* Hall (1977) were wet sieved from a celery field soil in California. However, the mode of spore formation is unlike any described for the genera of Endogonaceae (Gerdemann and Trappe, 1974). Initially, a vesicle similar to that of *Acaulospora* spp. (Gerdemann and Trappe, 1974; Ames and Linderman, 1976; Trappe, 1977) is formed but the spore develops inside the vesicular stalk rather than laterally. No hyphae have been observed within the vesicle or vesicular stalk to indicate the presence of two fungi. In all other respects, the spores matched *G. infrequens* as contained in the type collections of Hall (Hall #437, 1, and 30, DSIR, Auckland, N.Z.). Specimens from our collections were sent to I. R. Hall and J. M. Trappe for observation. Personal communications from them supported our view that *G. infrequens* was incompletely described and should be placed in another genus in the Endogonaceae. Therefore, we are describing the new genus, *Entrophospora*, with *E. infrequens* (Hall) Ames & Schneider comb. nov. as the type species.

*Entrophospora infrequens* is similar to *Acaulospora* spp. (Gerdemann and Trappe, 1974) in the shape and color of the spore-producing vesicle. Even the pointed projection frequently observed at the apex of the vesicle has been observed for *E. infrequens*. The spores, which form inside the stalk of the vesicle, remain enclosed by the expanded vesicular wall material even though the spore may become detached from the vesicle itself. Mycorrhiza formation has not been established with *E. infrequens* despite numerous attempts.

ENTROPHOSPORA Ames & Schneider, gen. nov.

Type species: *Entrophospora infrequens* (Hall) Ames &

Schneider comb. nov.

DESCRIPTION: Azygosporae singillatim in terra ortae, in vesiculae stipite crescentes. Vesiculae exili tunica, principio densae albaeque, deinde exhauriuntur dum materia in adolescentem sporam transfertur. Crescente spora, tunica stipitis panditur et membrana fit hyalina sporaeque appressa. Sporis tunica continua excepto poro densa materia occluso qui, forma fundibuli, vesiculam init.

Azygospores produced singly in soil by expansion within the stalk of the mother vesicle. Mother vesicle thin walled, dense white, becoming empty as contents are transferred to developing spore. Walls of vesicular stalk expand to accommodate spore, forming a clear outer membrane tightly appressed to the spore. Spore wall continuous except for funnel-shaped portion which extends into the mother vesicle and is closed by a thickened plug.

ETYMOLOGY: Greek, en (within), trophos (nourished or reared), and spora (spore), referring to the spore being reared within the vesicular stalk.

ENTROPHOSPORA INFREQUENS (Hall) Ames & Schneider comb. nov. (Figs. 1 and 2) ≡ *Glomus infrequens* Hall. Trans. Br. mycol. Soc. 68(3):345-347 (1977).

DESCRIPTION: Sporocarpia ignota. Azygosporae singillatim in terra ortae, crescens quaeque hyphali in cellula, levi nec ramosa, quae in vesicula subglobosa terminatur vel ellipsoidea sive obovoida 126-214 x 157-227 µm diametro. Vesiculae, densa primo albaque materia, paulatim in adulescentem sporam exhaustae. Sporae principio albae, deinde obscure luteae vel brunneae, 69-183 (-225) x 69-164 µm diametro, subglobosae vel ellipsoideae, tunica hyalina stipitis vesicularis inclusae, quae 2.5 - 10.0 µm crassitudinis habet. Eis tunica simplex, ut videtur, spinis (sive digitis) vacuis et 2.5 - 5.0 µm longitudine extentis, spissis ac perpetuis excepto poro qui forma fundibuli vesiculam init et densa tunicae materia occlusus est. Interiorem sporae materiam exilis membrana continet. Quomodo sporae germinent, utrum mycorrhizae formentur, adhuc ignotum.

Sporocarps unknown. Azygospores produced singly in soil by expansion within a smooth, unbranched hyphal cell that terminates in a subglobose to ellipsoid or obovoid vesicle, 126-214 X 157-227 µm diam.; vesicle contents dense white, emptying as the spore develops. Spores white

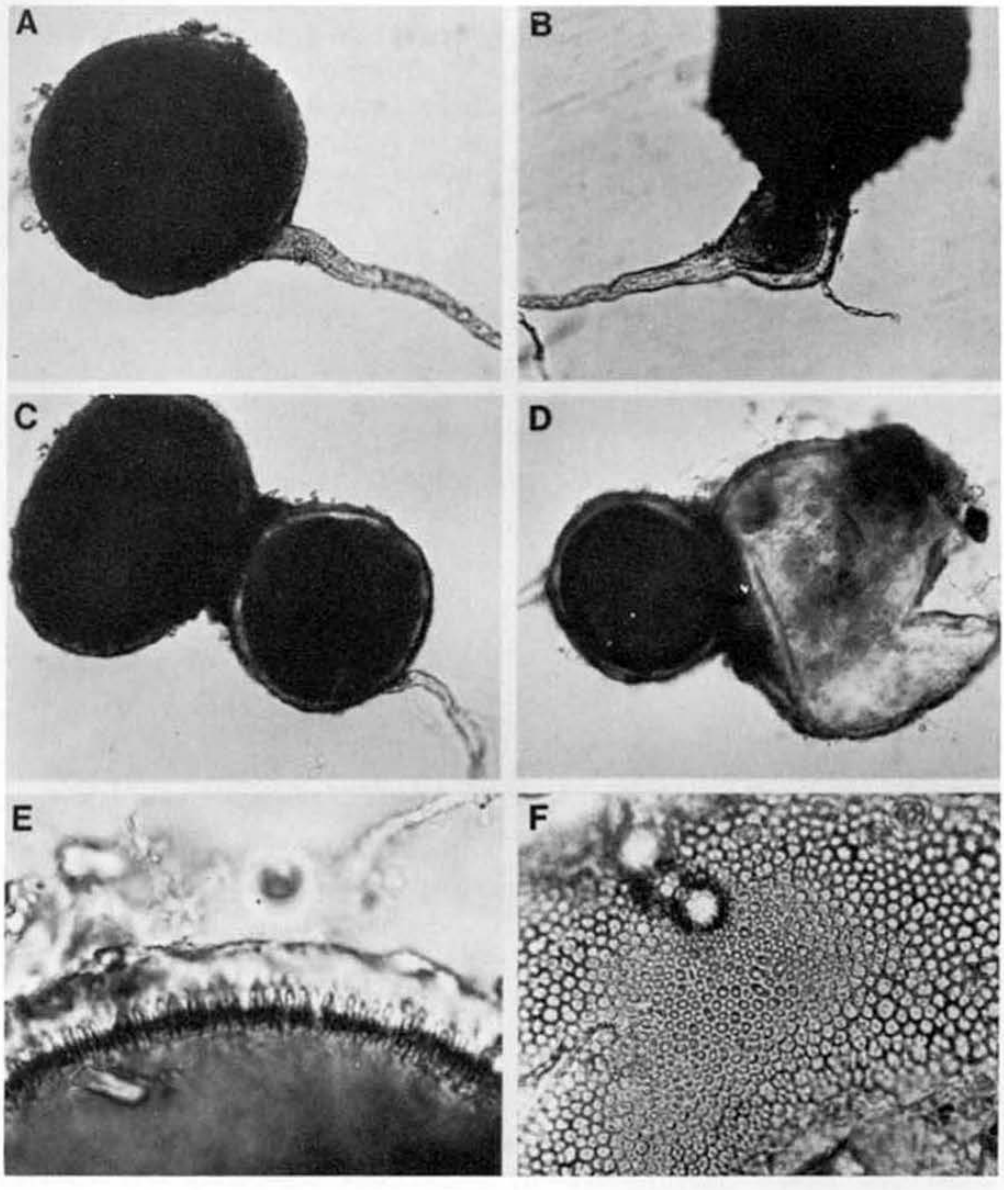


Fig. 1. (A-D) Fresh specimens mounted in water, X 160. (A) Vesicle prior to spore formation. (B) Developing spore within vesicular stalk. (C) Young spore and vesicle. (D) Mature spore with attached empty vesicle. (E-F) Squashed spore mounted in water, X 800. (E) Optical cross section showing vacuolated projections of inner spore wall and clear outer membrane. (F) Surface view of inner spore wall.

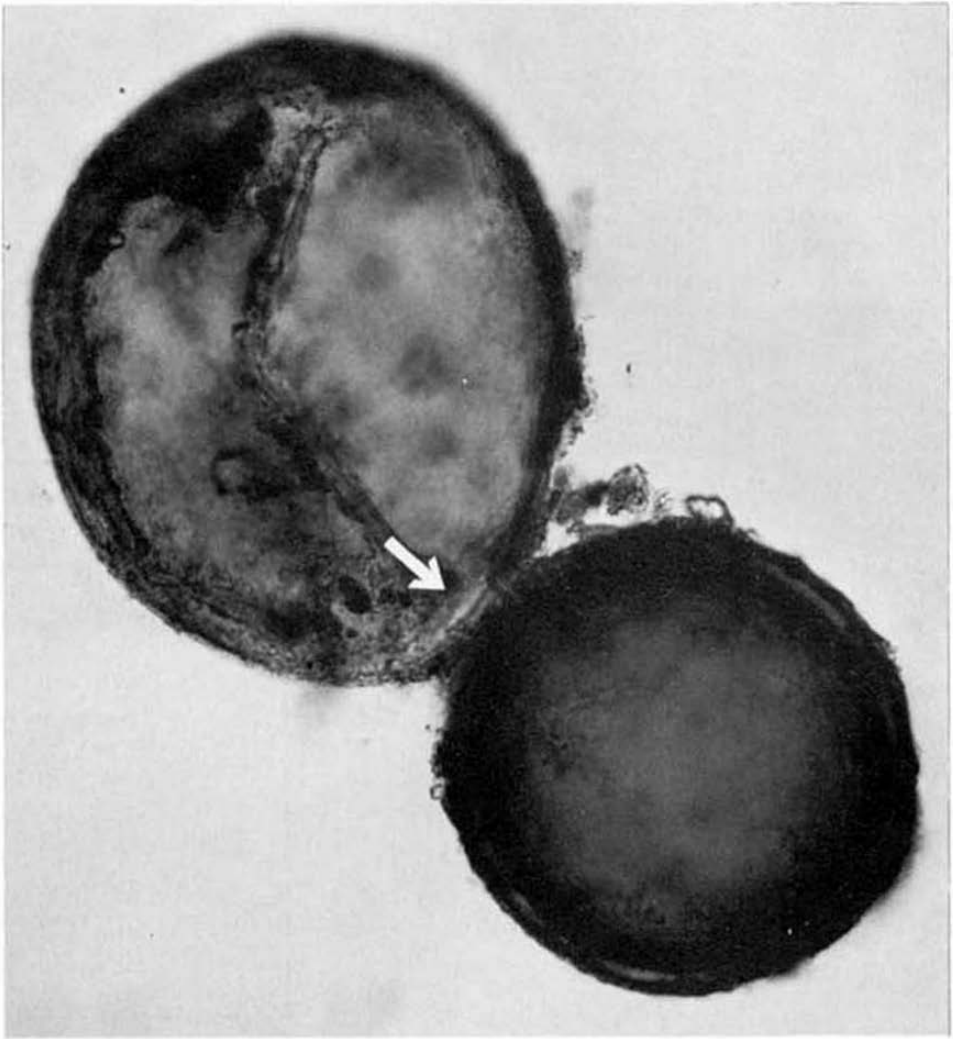

Fig. 2. Spore in lactophenol showing funnel shaped connection from spore to vesicle with thickened plug, X 320.

at first, becoming dull orange to brown, 69-183 (-225) X 69-164 µm diam., subglobose or ellipsoid. Spore enclosed by hyaline wall of vesicular stalk 2.5-10.0 µm thick; spore wall apparently one layer with vacuolated spines, 2.5-5.0 µm long, continuous except for funnel-shaped connection to the mother vesicle which is plugged with thickened wall material. Spore contents of variably sized oil globules enclosed by a thin, separable membrane. Method of spore germination undetermined. Mycorrhiza formation unknown. Vesicle and vesicular wall around spore stain blue with .05% trypan blue in lactophenol. No reaction in Melzer's reagent.

DISTRIBUTION AND HABITAT: *E. infrequens* was originally reported from New Zealand by Hall (1977). We observed it from two celery fields in the central California coast area and as a contaminant in a pot culture of *Glomus mosseae* (Nicol. & Gerd.) Gerdemann & Trappe from Oregon State University. C. Walker at Iowa State University (personal communication) found *E. infrequens* in soil under poplar trees (*Populus* sp. L.) and from soils cropped with soybean and corn in Iowa, Illinois, and Wisconsin.

MYCORRHIZAL ASSOCIATIONS: We have failed to establish mycorrhizae in pot culture using several different hosts. In other tests, trap tubes similar to those used by Ames and Linderman (1977) were inoculated with surface-sterilized spores and planted with strawberry for mycorrhiza establishment. *Glomus mosseae* and *Gigaspora margarita* Becker & Hall readily formed mycorrhizae under these conditions but *E. infrequens* did not.

COLLECTIONS EXAMINED: TYPE: NEW ZEALAND, Leith Saddle, Hall #437. PARATYPES: NEW ZEALAND, Long Bush, Hall #1, House Road, Akatore Forrest, Hall #130. Type and paratype specimens are deposited with the Herbarium, Plant Diseases Division, Dept. of Scientific and Industrial Research (DSIR), Auckland, New Zealand. Our collections are deposited in the herbaria of Oregon State University (OSC), Corvallis, Oregon 97331, and DSIR, Auckland, New Zealand. CALIFORNIA, Ventura Co., 13 km east of Oxnard and 3 km southwest of Camarillo, adjacent to U.S. Highway 34, September, 1977, Ames #03 (OSC). OREGON, Oregon State University, Corvallis, leg. B.A. Daniels, as a contaminant from pot culture of *Glomus mosseae* (Nicol. & Gerd.) Gerdemann & Trappe, Ames #04 (OSC, DSIR).

Details of the life cycle of *E. infrequens* are yet to be learned. Cotton, strawberry, celery, alfalfa, and su-

dan grass did not form VA mycorrhizae four months after inoculation with up to 70 spores of this fungus. Strawberry plants in small trap tubes dually inoculated with *E. infrequens* and either *Gigaspora margarita* or *Glomus mosseae* became mycorrhizal with infections typical of *G. margarita* or *G. mosseae* only. No parasitic activity by *E. infrequens* was observed on spores of *G. margarita*, *G. mosseae*, or on strawberry roots. *E. infrequens* may be an obligate parasite on other fungi. Spores did not germinate on water agar or potato dextrose agar after two weeks at room temperature.

Because we could not demonstrate saprophytic growth and because of the strong resemblance to *Acaulospora* spp., we feel that *E. infrequens* belongs in the Endogonaceae. The fact that mycorrhiza formation was not demonstrated by us does not present a conflict since this is apparently true for some species of *Endogone* and *Glomus* (Gerdemann & Trappe, 1974).

The authors wish to thank Dr. Charles E. Murgia for the Latin descriptions included in this article and for his assistance in choosing the Greek term for the genus.

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# TYPE STUDIES: SOME CORTINARIUS AND TRICHOLOMA SPECIES DESCRIBED BY CHARLES HORTON PECK

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SUMMARY

Type studies are presented for the following species originally described by C.H. Peck: *Cortinarius muscigenus*, *C. submarginalis*, *Tricholoma odorum*, *T. subacutum*, *T. subsejunctum*, *T. terriferum* and *T. transmutans*.

## INTRODUCTION

For decades fungal taxonomists have struggled with the names of taxa published by early mycologists who did not designate type collections or cite collections in their original descriptions, and who often did not retain herbarium specimens. These names have been a source of continuous controversy and confusion and have made it difficult or impossible to establish a sound taxonomy for several groups of fleshy fungi.

In recent years a number of North American and European mycologists have actively supported the designation of special type collections (variously referred to as 'representative specimens', 'special neotypes' and 'fixotypes') for the infrageneric taxa of fleshy fungi described by E.M. Fries and other 19th- and early 20th-century mycologists. For these taxa it has been suggested that the 'designated type collection' be made in the area where the original material was gathered and that the macroscopic and microscopic characteristics be thoroughly described and agree in every detail with the protologue of the original author of the taxon. This proposal was part

of a paper presented by A.H. Smith (1977) at the Herbette Symposium on 'Species Concepts in Hymenomycetes' held at the University of Lausanne, Switzerland, August 16-20, 1976. An interesting discussion is appended to the above paper and should be read by all interested in fungal taxonomy. The selection of 'designated type collections' will require a number of years, yet, it seems to be the best way to stabilize the names of these taxa.

In addition to the above problem there are others concerning type collections that require close attention. Many of these apply to taxa described in North America. A major problem is the lack of published, thorough, modern descriptions of a number of the taxa originally described by C.H. Peck, W.A. Murrill and other early North American mycologists. Jenkins (1974, 1977, 1978a, 1978b) found this to be the case with most of the *Amanita* species described by North American workers. Type studies done previously, for example, those of Singer (1942) and Hesler (1958), while acceptable in their day are inadequate for modern taxonomic studies. Taxonomists specializing in specific taxa should make an effort to publish thorough type studies on members of their group, preferably with illustrations of important taxonomic characteristics. For routine studies mycologists could refer to these type studies rather than sending for the type collection. This practice would cut down on the damage to type collections resulting from excessive handling.

As is the case with certain taxa in the present study and in previous studies by Ammirati (1975), Jenkins (1978a) and others, collections cited in original descriptions are, in some instances, heterogeneous and require the designation of a lectotype. There are other instances where the selection of a lectotype is required, as for example, when the original author cited two or more collections but did not designate a holotype.

In instances where only one collection was cited by the original author it is usually accepted as the holotype as long as it can be clearly established that the collection was the one upon which the original description was based. This procedure is generally no problem but as Jenkins (1978a) found, the citation in the original description and the information with the herbarium specimens do not always completely agree, making it difficult to determine if the collection at hand should be

accepted as the holotype.

In those instances where authors did not cite collections in their original description or when all of the original material and its duplicates are lost, or destroyed, the designation of a neotype is required. Often collections have been destroyed or damaged by insects. Damaged collections should be carefully studied to determine whether they are still acceptable as type collections since, in some instances, important characteristics may have been lost. When type studies are made, the number of specimens and their condition should be noted so that later workers can have some idea of what the type collection is like.

As 'designated type collections' are established for the names of taxa published by 19th- and early 20th-century mycologists (those who did not cite collections or retain herbarium specimens) the type studies discussed above will become increasingly important. They are needed to establish species concepts and relationships, to determine synonomy and they are essential for the development of a world-wide system of taxonomy for fleshy fungi.

With these ideas in mind the authors have begun a study of the taxa of *Cortinarius* and *Tricholoma* described by Charles Horton Peck. Type studies of taxa described by W.A. Murrill, G.F. Atkinson and other North American mycologists will also be published. The main reasons for these studies are to confirm the existence of or establish a type collection for each taxon and thoroughly document the features of the type collection. It is not necessarily our intent to accept or reject these taxa since in many instances further study is required to clarify concepts.

Because of the large number of new taxa (in *Cortinarius* and *Tricholoma*) described by C.H. Peck it will take several years and a series of papers to complete the type studies. This is the first in the series of these papers.

Below we have provided the original description of each taxon without modification except for conversion of certain measurements to current usage and reorganization of the descriptions to parallel the format used elsewhere. This is followed by a description of the microscopic

characteristics of the type collection. Descriptions are from sections and squash mounts studied in 3% KOH (aqueous solution) or Melzer's reagent. All colors of spores and hyphae are from material mounted in KOH. In some instances tissues could not be adequately revived making it difficult or impossible to evaluate certain features of the specimens clearly. These instances are indicated in the description or discussion. Microscopic descriptions of Cortinarii were prepared by the senior author and those of Tricholomas by the junior author.

## TYPE STUDIES

CORTINARIUS MUSCIGENUS Peck, Rep. N.Y. State Mus. 41:60. 1888.

Holotype: Wittenberg Mt., Catskills, September 1887, Leg. C.H. Peck (NYS).

Fig. 1

PILEUS 37.5-62.5 mm broad, at first ovate then convex or concave from the recurving of the margin, subumbonate, glabrous, viscose with a separable pellicle, tawny-orange and widely striate on the margin when moist, tawny and shiny when dry; flesh dingy white, tinged with yellow. LAMELLAE broad, ventricose, adnate, with a broad shallow emargination, somewhat rugose on the sides, yellowish becoming cinnamon. STIPE 75-100 mm long, 6.3-8.4 mm thick, subequal, viscid, even, silky, solid, white or whitish. SPORES .0005 to .0006 in long, .0003 to .00036 broad.

Mossy ground under balsam trees. Wittenberg Mountain. September.

Closely related to *C. collinitus* from which it is separated by its more highly colored pileus, striate margin, and even, not diffracted-squamose, stem.

Microscopic description

SPORES (12.1-) 14.6-18.6 (-20.4) X (7.0-) 7.7-10.6 (-11.7) µm, in profile view elliptical to narrowly amygdaliform or amygdaliform, somewhat to strongly inequilateral with a tendency to be somewhat flattened in the suprahilar

region, in face view mostly elliptical to broadly elliptical or somewhat ovate, distal end ± snout-like in some spores, rugulose to verruculose, ornamentation not particularly coarse, single spores yellow-brown with dark brown ornamentation. BASIDIA 4-spored, 32.9-41.6 X 10.2-16.1 µm, clavate to broadly clavate, hyaline with ± refractive hyaline granules or containing pale yellow to golden yellow or somewhat brownish yellow pigment, walls thin and hyaline or dark brownish and slightly thickened, sterigmata well developed. PLEUROCYSTIDIA and CHEILOCYSTIDIA absent; lamellar edges appear to be composed of basidia and basidioles (tissue only revives moderately well). SUBHYMENIAL HYPHAE compactly interwoven, ± cylindrical (revives poorly), hyaline or pigmented as basidia, walls thin or slightly thickened and blackish brown. TRAMAL HYPHAE OF LAMELLAE subparallel and ± interwoven, cylindrical to inflated, mostly 3.7-29.2 µm wide, hyaline or containing yellowish to golden yellow or brownish golden yellow pigment, walls thin and hyaline or slightly thickened and blackish brown. CUTICULAR HYPHAE OF PILEUS ± interwoven and compacted to somewhat loosely arranged, ± radially oriented, matrix poorly defined in KOH but distinct in Melzer's reagent, mostly 2.2-5.8 µm wide, cylindrical, hyaline, slightly yellowish or containing yellowish pigment, walls thin to slightly thickened, hyaline to yellowish or brownish and + refractive; no pilocystidia present. TRAMAL HYPHAE OF PILEUS ± interwoven, ± radially oriented especially above, cylindrical to inflated, mostly 4.4-30 µm wide; upper trama (zone adjacent to cuticle) mainly composed of golden yellow to brownish golden yellow hyphae, frequently with dark incrustations; below, the trama mainly composed of hyaline to somewhat yellowish hyphae, with scattered golden yellow hyphae. CORTICAL HYPHAE OF STIPE longitudinally arranged (somewhat irregularly arranged, narrow hyphae in places on surface), subparallel to somewhat interwoven, cylindrical to ± inflated, 4.0-25.6 µm wide, hyaline to slightly yellowish or dull yellowish, golden yellow, brownish yellow or brownish orange, the pigmented hyphae ± refractive, some hyphae containing refractive, hyaline granules, thin-walled; hymenium decurrent on stipe apex, no caulocystidia seen. CORTINAL HYPHAE cylindrical, 2.2-6.0 µm wide, hyaline, walls thin and at times somewhat indistinct and refractive. OLEIFEROUS HYPHAE refractive, ± hyaline, seen only in stipe cortex, note presence of pigmented hyphae, especially in stipe cortex, which are somewhat similar to oleiferous hyphae. CLAMP CONNECTIONS

of the normal type, present throughout the basidiocarp but difficult to see in the hymenium and lamellar trama (tissue revives poorly).

OBSERVATIONS: The information with the collection and the citation in the original description are in very close agreement. The collection contains needles and other debris of *Abies*; Peck stated that the collection was made in mossy ground under balsam trees. There is no doubt that this is the collection studied by C.H. Peck when he wrote the original description, and it is here accepted as the holotype collection.

There are 16-18 basidiocarps in the collection, including both young and mature specimens. Some are broken, and there is some insect damage, but in general the collection is in good condition. Some of the specimens are mounted on cards and most have been pressed. The tissue of the basidiocarps was somewhat difficult to revive, but all of the diagnostic characteristics could be seen.

*C. muscigenus* is in the subgenus *Myxacium*. It is one of several species that have equal to subequal, more or less cylindrical stipes and regularly produce clamp connections throughout the basidiocarp. *C. muscigenus* is distinguished by its very large spores (14.5-18.5 X 7.5-10.5 µm), tawny orange to tawny pilei and the absence of lilac or violet colours in the flesh, stipe surface and lamellae.

The relationship of *C. muscigenus* to other Myxacia is still unclear. Peck in his original discussion suggested a relationship with *C. collinitus* (Fries) S.F. Gray. A relationship to *C. mucosus* (Bull ex. Fries) Kickx also seems possible. However, without type collections for these species it is impossible to be sure of their concepts and consequently their relationship to *C. muscigenus*.

Peck described the lamellae as "yellowish becoming cinnamon" indicating that the young lamellae were yellowish and the mature lamellae cinnamon. This type of colour change is common in *Cortinarius*. It is somewhat difficult to be sure of what Peck meant by yellowish. Field studies to date have not revealed any species in this group of Myxacia with truly yellow lamellae. It is likely

that the young lamellae were tinted yellow to cream color or slightly cinnamon.

CORTINARIUS SUBMARGINALIS Peck, Bull. N.Y. State Mus. 54: 950-951. Plt. L., Figs. 6-10. 1902.

Lectotype (des. mihi): Bolton, Warren Co., August 1901, Leg. C.H. Peck, *Myxacium* (NYS).

Fig. 2

PILEUS 5-10 cm broad, fleshy, firm, convex becoming nearly plane, or concave by the elevation of the margin, viscid when moist, yellowish brown, generally a little paler on the rather definite and commonly fibrillose margin; flesh whitish. LAMELLAE thin, close, adnate, creamy yellow when young, soon cinnamon. STIPE rather long, 7.5-15 cm long, 8.4-12.6 mm thick, equal or slightly thickened at the base, solid, silky fibrillose, slightly viscid, whitish or pallid. SPORES subelliptic, .0004-.0005 of an inch long, .00002-.00024 broad.

Low moist places in woods. Bolton, August.

The margin of the pileus is generally paler than the rest and separated from it by a definite line. It is from 6.3-12.6 mm broad and is sometimes curved upward and conspicuously fibrillose. This difference between the margin and the rest of the pileus is not clearly shown in dried specimens. This species belongs in the section *Myxacium*.

Microscopic description

SPORES 10.2-12.5 X 5.5-6.6 µm, in profile elliptical to broadly elliptical or ± amygdaliform, inequilateral, in face view elliptical to broadly elliptical or somewhat ovate, distal end rounded to somewhat snout-like, mostly verruclose, light yellow-brown to light medium brown with darker brown ornamentation. BASIDIA 4-spored, clavate to broadly clavate, 23.4-31.4 X 8.0-10.2 µm, hyaline or containing light yellow, dull yellow or brownish yellow pigment, some with hyaline, + granular contents, thin-

walled. PLEUROCYSTIDIA and CHEILOCYSTIDIA absent; lamellae revive poorly, but there is no evidence of cystidia on the lamella edges. SUBHYMENIAL HYPHAE compactly interwoven, cylindrical, hyaline, thin-walled. TRAMAL HYPHAE OF LAMELLAE subparallel, ± interwoven, cylindrical to inflated, 2.6-21.9 µm wide, hyaline to slightly colored or yellowish, some containing yellow pigment, at times with granular contents, thin-walled, ± refractive. CUTICULAR HYPHAE OF PILEUS ± interwoven, ± radially oriented, cylindrical, 2.9-9.5 µm wide, ± refractive, hyaline to slightly colored or commonly yellow to golden yellow, walls thin and hyaline or slightly brownish, often incrusted; no pilocystidia seen. TRAMAL HYPHAE OF PILEUS interwoven, ± radially oriented above, cylindrical to inflated, 2.6-29.2 µm wide, hyphae in upper trama (just below cuticle) sometimes hyaline to slightly colored or slightly yellowish but usually yellow to golden yellow, below, the hyphae more commonly hyaline to slightly yellowish, in upper trama often incrusted, mostly thin-walled, ± refractive; tramal hyphae in general revive poorly, the pigmented zone in upper trama grades into cuticle and does not form a particularly distinct zone. CORTICAL HYPHAE OF STIPE longitudinally arranged, subparallel to ± interwoven, cylindrical to ± inflated, 3.3-21.9 µm wide, surface hyphae are in general narrower than those just beneath surface, occasional groups of narrow, cylindrical hyphae scattered over surface near apex (perhaps part of cortina), hyaline to slightly colored or slightly yellowish; no caulocystidia seen. CORTINAL HYPHAE absent (no specimens present with cortina). OLEIFEROUS HYPHAE present, refractive, hyaline to slightly colored; there are a lot of refractive hyphae in the lamellar trama, these are much like oleiferous hyphae. CLAMP CONNECTIONS present throughout the basidiocarp, of the normal type or some on hyphae of pileus cuticle ± medallion-like.

OBSERVATIONS: The information with the collection is in agreement with the citation in the original description. The collection is composed of six basidiocarps that have been pressed and are somewhat broken but in general are in good condition. The collection is heterogeneous, containing one discordant element, a pileus and attached short piece of stipe, that is unrelated to the remaining five basidiocarps. It is probably *Cortinarius gentilis* Fries or a related species. From the original protologue it is clear that Peck did not include the discordant element in his description. It has been removed from the

remainder of the collection which in turn has been designated as the lectotype.

The relationship of *C. submarginalis* to other species in *Myxacium* is unclear. The low number of existing herbarium specimens indicates that it is an uncommon species. According to Peck's original description it is a fleshy species with a yellowish brown pileus, creamy yellow young lamellae and a whitish to pallid stipe. These characteristics, in combination with the smaller spore size (10.2-12.5 X 5.5-6.6 µm), make it distinct.

TRICHOLOMA ODORUM Peck, Torrey Bot. Club Bull. 25(6): 321. 1898.

Holotype: Tacoma (Takoma) Park, D.C., 1895, Mrs. E.M. Williams, (NYS).

Fig. 7

PILEUS 25-50 mm broad, fleshy, convex, becoming nearly plane or slightly depressed, subumbonate; surface glabrous, shining when young, soft like kid, yellowish or pale tan; context yellow, odor strong, jessamine-like, taste at first nutty, then farinaceous. LAMELLAE broad, thick, rounded behind, adnexed, easily separating from the stem, white or tinged with pink. STIPE 50-75 mm long, 6-10 mm thick, equal, sometimes slightly bulbous; surface silky fibrillose but pruinose at the apex, colored like pileus but pale yellow toward the base and white at the apex. SPORES 7.5-10 X 5-6 µm, elliptical.

Microscopic description

SPORES 10.5-11.4 X 5.7-6.7 µm (from stipe apex), amygdaliform to subfusiform in profile, broadly fusiform in face view, smooth, thin-walled, hyaline, inamyloid. BASIDIA 33-37 X 7.6-8.6 µm, 4-spored, clavate, hyaline, inamyloid. HYMENIAL CYSTIDIA and CAULOCYSTIDIA not seen. TRAMAL HYPHAE OF LAMELLAE 3.8-9.6 µm broad, parallel, undulating, cylindrical to slightly inflated, hyaline, inamyloid. CUTICULAR HYPHAE OF PILEUS 2.9-3.8 µm broad, radially appressed to slightly interwoven, cylindrical, smooth, thin-walled, hyaline to light cinnamon tan, inamyloid. TRAMAL HYPHAE OF PILEUS 4.8-11.4 µm broad, radially arranged,

cylindrical to slightly inflated, hyaline, inamyloid. SURFACE HYPHAE OF STIPE 2.9-4.8 µm broad, longitudinally appressed, cylindrical, smooth, thin-walled, hyaline to light yellow, inamyloid. TRAMAL HYPHAE OF STIPE 3.8-12 µm broad, parallel, compacted, cylindrical to slightly inflated, hyaline, inamyloid. HYPHAE AT STIPE BASE 2.9-4.8 µm broad, cylindrical, smooth, thin-walled, hyaline, inamyloid. OLEIFEROUS HYPHAE not seen. CLAMP CONNECTIONS present at base of basidia.

OBSERVATIONS: The type collection consists of 3 fruiting bodies, all with broken stipes. The collection is homogeneous. The information with the collection agrees with that given in the original description. It is concluded that this collection is the one cited by Peck and can be accepted as the holotype.

Peck states that *T. odorum* is remarkable for its peculiar and strong odor, which resembles that of jessamine blossoms. The odor and large spores link it to *Tricholoma sulphureum* (Fr.) Staude. A number of European varieties of *T. sulphureum* are recognized (Bon, 1974), but none fit the fungus described by Peck.

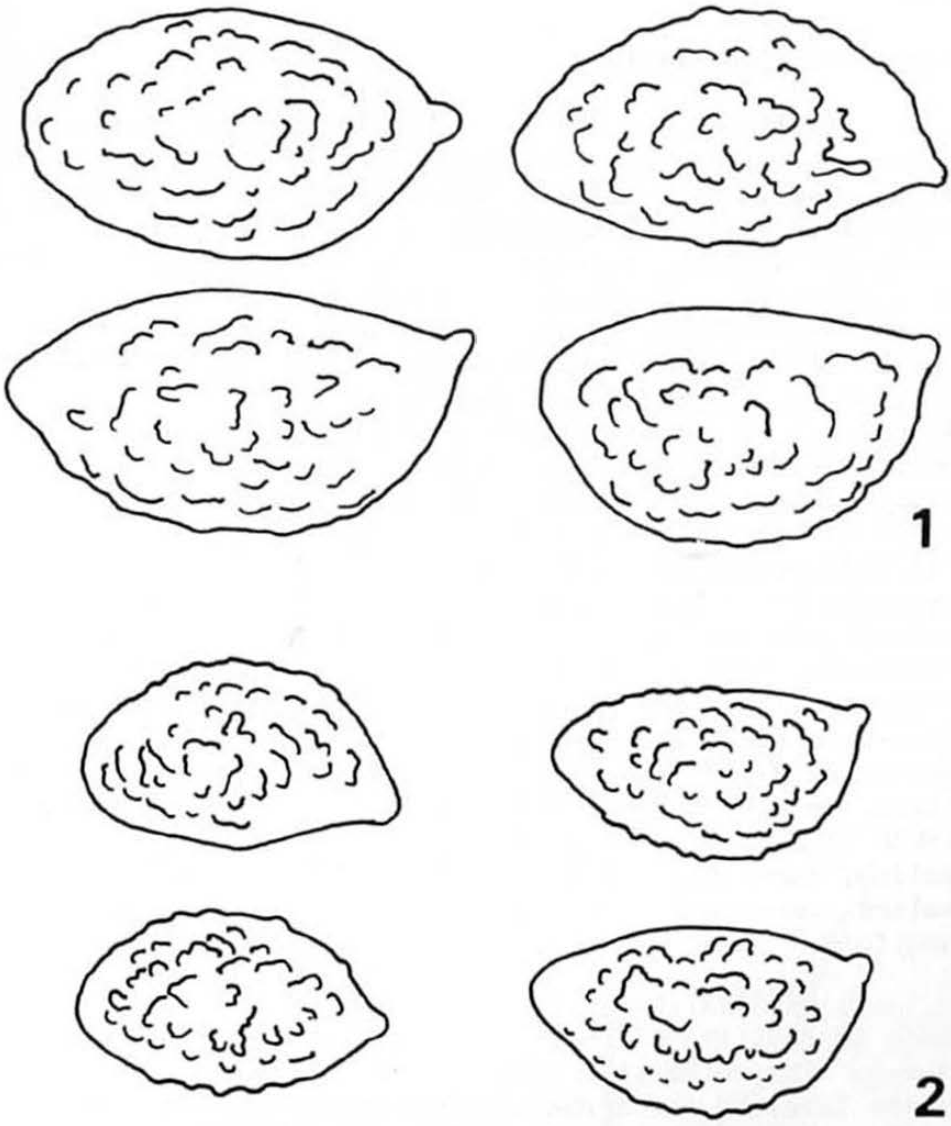
I have collected this species in Michigan and Ontario under hardwoods. The carpophores are almost entirely yellow when young, but the pilei and lamellae fade to buff or tan in age.

TRICHOLOMA SUBACUTUM Peck, Rep. N.Y. St. Mus. 42: 16-17. Plt. 1, Figs. 1-5. 1889.

Holotype: Woods and groves, North Elba, September, (NYS).

Fig. 4

PILEUS 38-76 mm broad, ovate or broadly conical at first, then convex and subacutely umbonate; surface dry, silky and obscurely virgate with minute, innate fibrils, whitish and tinged with smoky-brown or bluish-gray, darker on the umbo; context white, taste acrid or peppery. LAMELLAE slightly adnexed, white, rather close. STIPE 50-100 mm long, 6-13 mm thick, equal; surface silky-fibrillose, white; context stuffed or hollow. SPORES .00025-.0003 in long, .0002 to .00025 broad (6.4-7.6 X 5.1-6.4 µm), broadly




FIGS. 1-2 Basidiospores (x2500). 1. *Cortinarius muscigenus*. 2. *Cortinarius submarginalis*.

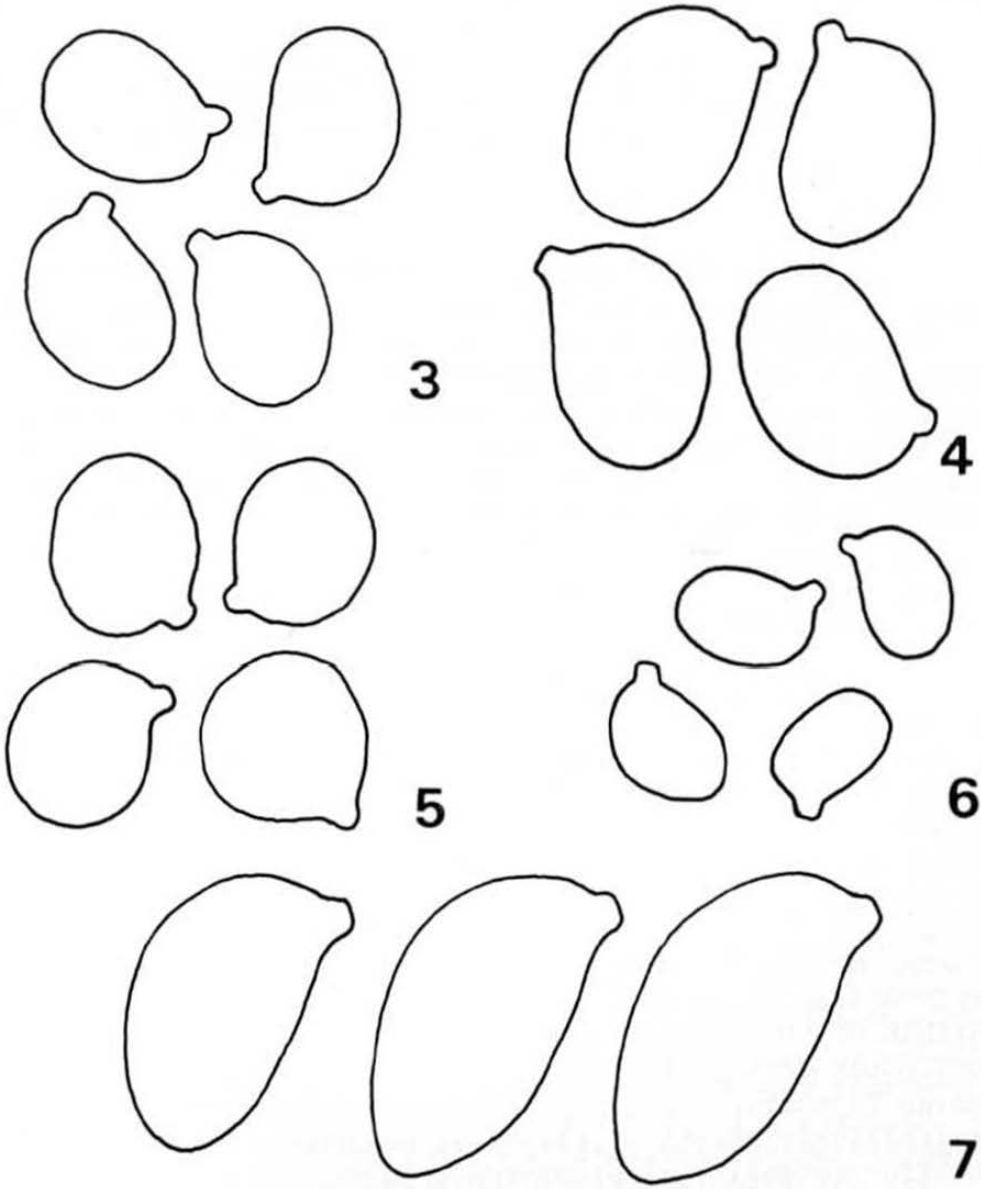
elliptical or subglobose.

Microscopic description

SPORES 7.6-8.6 X ± 5.7 µm (from stipe apex), broadly elliptical in profile and face view, smooth, thin-walled, hyaline, inamyloid. BASIDIA 34-38 X 7.6-9.5 µm, 4-spored, occasionally 2-spored or mucronate (single sterigma), hyaline, inamyloid. CHEILOCYSTIDIA 24-31 X 11-14 µm, clavate to broadly clavate (mostly collapsed), smooth, thin-walled, hyaline, inamyloid. PLEUROCYSTIDIA absent. CAULOCYSTIDIA present as recurved hyphal end cells at stipe apex or scattered elsewhere, 23-29 X 5.7-7.6 µm, cylindrical or clavate, smooth, thin-walled, hyaline, inamyloid. TRAMAL HYPHAE OF LAMELLAE 3.8-14 µm broad, parallel, cylindrical to slightly inflated, hyaline, inamyloid. HYPHAE OF SUBHYMENIUM 2.9-3.8 µm broad, hyaline, inamyloid. CUTICULAR HYPHAE OF PILEUS 2.9-5.7 µm broad, radially appressed to slightly interwoven, cylindrical, smooth, thin-walled, hyaline to light yellow, inamyloid. TRAMAL HYPHAE OF PILEUS 3.8-14 µm broad, radially arranged and cylindrical near the cuticle, interwoven and cylindrical to interwoven elsewhere, hyaline, inamyloid. SURFACE HYPHAE OF STIPE 2.9-4.8 µm broad, longitudinally appressed, cylindrical, smooth, thin-walled, hyaline, inamyloid. TRAMAL HYPHAE OF STIPE 4.8-14 µm broad, parallel, compacted, hyaline, inamyloid. HYPHAE AT STIPE BASE 2.9-5.7 µm broad, hyaline, inamyloid. OLEIFEROUS HYPHAE present, hyaline, inamyloid. CLAMP CONNECTIONS absent.

OBSERVATIONS: The type collection consists of about 10 fruiting bodies, most are broken into several pieces. The collection is homogeneous and the information on the label of the herbarium box agrees with that given in the original description. It is concluded that this collection is the one cited by Peck and thus can be accepted as the type.

Peck states that *Tricholoma subacutum* is "too closely related to *Tricholoma virgatum*, but it is separable by its prominent subacute umbo, paler pileus, hollow stem and hot or peppery taste". Since there is no type for *T. virgatum* (Fr.) Kummer, it is nearly impossible at this time to ascertain whether *T. subacutum* is a distinct species.




FIGS. 3-7 Basidiospores (x2500). 3. *Tricholoma transmutans*. 4. *Tricholoma subacutum*. 5. *Tricholoma sejunctum*. 6. *Tricholoma terriferum*. 7. *Tricholoma odorum*.

TRICHOLOMA SUBSEJUNCTUM Peck, Rep. N.Y. St. Mus. 157: 53. Plt. 24, Figs. 1-5. 1912.

Holotype: Under evergreen and deciduous trees, Lewis Co., September 21, 1911, (NYS).

Fig. 5

PILEUS 25-70 mm broad, fleshy, conic or convex; margin often wavy and lobed; surface slightly viscid when moist, virgate or reticulate with blackish brown fibrils, blackish brown, often pale yellow or greenish yellow on the margin; context white, taste farinaceous. LAMELLAE adnexed, thin, rounded behind, white, sometimes tinged yellow anteriorly, close. STIPE 30-50 mm long, 6-12 mm thick, stout, nearly equal, white, sometimes tinged yellow; context solid. SPORES minute, 5-6 X 4-5 µm.

Microscopic description

SPORES 5.7-6.7 x 4.8-5.7 µm (from stipe apex), broadly elliptical to subglobose in profile and face view, smooth, thin-walled, hyaline, inamyloid. BASIDIA 30-38 x 7.6-9.8 µm, 4-spored, clavate, hyaline, inamyloid. HYMENIAL CYSTIDIA absent. CAULOCYSTIDIA present as recurved hyphal end-cells at stipe apex, 19-26 x ± 3.8 (-7.6) µm, cylindrical or clavate, smooth, thin-walled, single or in pyramidal clusters, hyaline, inamyloid. TRAMAL HYPHAE OF LAMELLAE 3.8-14 µm broad, parallel, cylindrical to slightly inflated, hyaline, inamyloid. HYPHAE OF SUBHYMENIUM 1.9-2.9 µm broad, hyaline, inamyloid. CUTICULAR HYPHAE OF PILEUS 2.9-5.7 µm broad, loosely interwoven to nearly erect, embedded in a gelatinous matrix, cylindrical, smooth or slightly roughened, thin-walled, hyaline to dull yellowish brown, inamyloid. TRAMAL HYPHAE OF PILEUS 3.8-16 µm broad, radially arranged to interwoven, cylindrical to inflated, hyaline, inamyloid. SURFACE HYPHAE OF STIPE 2.9-4.8 µm broad, longitudinally appressed, cylindrical, smooth, thin-walled, hyaline, inamyloid. TRAMAL HYPHAE OF STIPE 3.8-14 µm broad, parallel, compacted, cylindrical to inflated, hyaline, inamyloid. HYPHAE AT STIPE BASE 2.8-5.7 µm broad, cylindrical, thin-walled, hyaline, inamyloid. OLEIFEROUS HYPHAE present, light yellow, inamyloid. CLAMP CONNECTIONS absent.

OBSERVATIONS: The type collection consists of 4 or 5 pressed fruiting bodies in fair condition. The

collection is homogeneous and the information with the collection agrees with that given in the original description. It is concluded that this collection is the one cited by Peck and can be accepted as the holotype.

*Tricholoma subsejunctum* is closely related to *Tricholoma sejunctum* Quel. but differs in having a darker (blackish brown) pileus. The illustration with the original publication shows the pileus to be streaked with black fibrils giving the pileus a blackish color; the extreme edge is tinted yellow. This extremely dark color, assuming it is accurately reproduced, easily distinguishes *T. subsejunctum* from *T. sejunctum*. The latter may have a dark brownish disc or some fibrils may be nearly black, but the pileus is never as black as that of *T. subsejunctum*. Microscopically, the two are almost identical. Additional collections of *T. subsejunctum* are needed to establish a clear concept of this species and its relationship to *T. sejunctum*.

Peck reports this species as being edible.

TRICHOLOMA TERRIFERUM Peck, Rept. N.Y. St. Mus. 41: 60. 1888.

Holotype: Woods, Catskill Mountains, September (NYS).

Fig. 6

PILEUS 76-102 mm broad, convex or nearly plane, irregular; margin often wavy; surface viscid, glabrous, pale alutaceous, generally soiled with adhering particles of earth carried up in its growth; context white and with no decided odor. LAMELLAE slightly adnexed, white, not spotted or changeable. STIPE 25-38 mm long, 13-17 mm thick, short, equal; surface floccose or squamulose at the apex, white; context solid. SPORES minute, .00012 in (3 µm) long, subglobose.

Microscopic description

SPORES ± 4.8 X 2.9-3.8 µm (from stipe apex), elliptical in profile and face view, smooth, thin-walled, hyaline, inamyloid, uniguttulate. BASIDIA 19-25 X 4.8-5.7 µm, 4-spored, clavate, hyaline, inamyloid. HYMENIAL

CYSTIDIA absent. CAULOCYSTIDIA present on stipe apex, formed from recurved end-cells or arising from intercalary cells, 24-33 X 3.8-6.7 µm, cylindrical, strangulate, clavate, some with cross walls, smooth, thin-walled, single or in fascicles or pyramidal clusters, hyaline, inamyloid. TRAMAL HYPHAE OF LAMELLAE 3.8-14 µm broad, parallel, cylindrical to slightly inflated, hyaline, inamyloid. HYPHAE OF SUBHYMENIUM + 2.9 µm broad, hyaline, inamyloid. CUTICULAR HYPHAE OF PILEUS 1.9-4.8 µm broad, embedded in a gelatinous matrix, loosely interwoven to nearly erect, smooth, thin-walled, hyaline to light yellowish brown, inamyloid. TRAMAL HYPHAE OF PILEUS 3.8-12 µm broad, radially arranged to interwoven, cylindrical to slightly inflated, hyaline, inamyloid. SURFACE HYPHAE OF STIPE 2.4-4.8 µm longitudinally appressed or sometimes loosely interwoven in spots, cylindrical, smooth, thin-walled, hyaline, inamyloid. TRAMAL HYPHAE OF STIPE 3.8-9.5 µm broad, parallel, compacted, cylindrical, hyaline, inamyloid. HYPHAE AT STIPE BASE 2.9-6.7 µm broad, cylindrical, smooth, thin-walled, hyaline, inamyloid. OLEIFEROUS HYPHAE present, light yellow, inamyloid. CLAMP CONNECTIONS absent.

OBSERVATIONS: The type collection consists of 4 fruiting bodies that are in good condition but are pressed and flattened. The collection is homogeneous and the information on the label of the herbarium box agrees with that given in the original description. It is concluded that this collection is the one cited by Peck and can be accepted as the type.

*Tricholoma terrifeum* is related to those species of *Tricholoma* with brown, viscid pilei, a group that is in need of critical study in North America. Its most distinguishing features appear to be its pale, alutaceous pileus color, lamellae that do not discolor and small spores (4.8 x 2.9-3.8 µm). Collections from the type locality with thorough notes are needed to establish a sound concept for this species.

AGARICUS (TRICHOLOMA) TRANSMUTANS Peck, Rep. N.Y. St. Mus. 29: 38. 1878.

≡ TRICHOLOMA TRANSMUTANS (Pk.) Sacc., Syll. Fung. 5: 91. 1887.

Fig. 3

Holotype: ground in woods, Sandlake, August (NYS).

PILEUS 50-76 mm broad, convex; surface smooth, very viscid or glutinous and alutaceous when moist, becoming brownish or reddish when dry. LAMELLAE narrow, whitish or pale yellow, becoming red-spotted, often branching, close. STIPE 76-100 mm long, 6-10 mm thick, equal or tapering upwards; surface smooth, whitish, often reddish stained; context stuffed or hollow. SPORES .0002 in (5 µm) in diameter, subglobose.

Microscopic description

SPORES 6.7-6.7 X ± 4.8 µm (from stipe apex), broadly elliptical in profile and face view, smooth, thin-walled, hyaline, inamyloid, uniguttulate. BASIDIA 24-29 X 5.7-7.6 µm, 4- or occasionally 2-spored, clavate or irregularly clavate, hyaline or reddish brown (particularly at gill edge), inamyloid. HYMENIAL CYSTIDIA absent but often large basidiole-like cells present (29-36 X 5.7-8.6 µm) on gill edge. CAULOCYSTIDIA recurved hyphal end-cells at stipe apex, 24-33 x 3.8-7.6 µm, cylindrical or clavate, smooth, thin-walled, single or in fascicles, hyaline, inamyloid. TRAMAL HYPHAE OF LAMELLAE 3.8-14 µm broad, parallel, undulating, cylindrical to slightly inflated, hyaline or reddish brown in spots, inamyloid. SUBHYMENIAL HYPHAE ± 3.8 µm broad, hyaline, inamyloid. CUTICULAR HYPHAE OF PILEUS 2.9-5.7 µm broad, embedded in a gelatinous matrix, interwoven, cylindrical, smooth, thin-walled or with hyaline incrustations on the outer surface, hyaline to light reddish brown, inamyloid. TRAMAL HYPHAE OF PILEUS 3.8-14 µm broad, radially arranged and narrowly cylindrical near the cuticle, interwoven and cylindrical to inflated elsewhere, hyaline, inamyloid. SURFACE HYPHAE OF STIPE 2.8-4.8 µm broad, longitudinally appressed, cylindrical, smooth, thin-walled, hyaline to light tan, inamyloid. TRAMAL HYPHAE OF STIPE 3.8-11.4 µm broad, parallel, compacted, cylindrical to slightly inflated, hyaline, inamyloid. HYPHAE AT STIPE BASE 2.9-4.8 µm broad, cylindrical, smooth, thin-walled, hyaline, inamyloid. OLEIFEROUS HYPHAE present, light brown, inamyloid. CLAMP CONNECTIONS absent.

OBSERVATIONS: The type collection consists of about 12 pressed fruiting bodies. Most are in good condition, but several are broken. The collection is homogeneous and the information with the collection agrees with that given in the original description. It is concluded that this collection is the one cited by Peck and can be accepted as the holotype.

Peck states that this species occurs in wet weather and has a tendency to grow in circles.

*Tricholoma transmutans* is one of several species of *Tricholoma* with a brown, viscid pileus. Its relationship to other species is difficult to ascertain because the color of the lamellae is difficult to interpret. Peck in his original description described them as whitish or pale yellow. Illustrations in a later publication (Peck, 1896) show the lamellae as yellowish in face view but white or light buff when viewed as a group from an oblique angle. Another possibility is that the lamellae change color as they mature, but this is not suggested in Peck's original description.

Several authors (Kauffman, 1918; Singer, 1942) relate *T. transmutans* to *T. flavobrunneum* (Fr.) Staude, a species with yellow lamellae. If, in fact the lamellae are white to light buff, rather than yellow, then *T. transmutans* is probably more closely related to *T. pessundatum* (Fr.) Quel. Additional collections, preferably from the type locality, are needed to determine the correct lamellae color for *T. transmutans*. This would provide a better overall concept of the species and help to elucidate its true relationship to other Tricholomas.

## ACKNOWLEDGEMENTS

The authors wish to thank Dr. John Haines, Senior Scientist, New York State Museum, Albany, New York for the loan of collections and for his help and interest in the taxa described by C.H. Peck. We also thank Ms. B. Malloch for her help in preparing the manuscript. Supported by grant (A9861) from the National Research Council of Canada to J.F. Ammirati.

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# STUDIES ON DIMARGARITACEAE (MUCORALES) II. A NEW DISPIRA PARASITIC ON ASCOMYCETOUS HOSTS

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*SUMMARY*

*Dispira implicata* Misra & Lata sp. nov. isolated from dung of rodents, house lizard and excreta of birds, collected from Gorakhpur, U.P., India, is described and illustrated. It parasitizes *Chaetomium bostrychodes*, *Ascotricha* sp., and *Thielavia* sp. and is characterized by complex fertile axes which form long spiral coils. This is the second member of the Dimargaritaceae which parasitizes non-mucoralean hosts.

The genus *Dispira* van Tieghem is characterized by sporophores producing sympodially branched fertile branch-systems which form coiled or angular axes bearing sterile and fertile branches, the latter terminated by two-celled sporiferous branchlets whose cells bear distal whorls of two-spored merosporangia (Benjamin, 1959). Three species are recognized in this genus: *Dispira cornuta* van Tieghem, *D. simplex* Benjamin, and *D. parvispora* Benjamin (Benjamin, 1963). The occurrence of the first two species in India has been described in a previous communication (Misra & Gupta, 1978).

An interesting *Dispira* was first isolated in December, 1977, from mouse dung collected in Gorakhpur, India. Several isolates of the same species were later obtained from incubated dung of rat, shrew, house lizard, and excreta of birds. The fungus failed to parasitize *Cokeromyces recurvatus* Poitras but grew readily on *Chaetomium bostrychodes* Zopf on yeast extract soluble starch agar (YpSs). It also grew on *Ascotricha* sp. and *Thielavia* sp. which were tried as hosts. The fungus differs sharply from the described species of *Dispira* in the nature of its fertile axes and is described here as *Dispira implicata* sp. nov. The epithet is based on the complex nature of its fertile axes. It is the second member of the family Dimargaritaceae which parasitizes non-mucoralean hosts; the other species known to parasitize *Chaetomium* is *Dispira simplex* (Benjamin, 1961; Brunk & Barnett, 1966).

DISPIRA IMPLICATA Misra & Lata, sp. nov. FIGS. 1,2

Coloniae *Chaetomium bostrychodem* in agaro cum extracto fermenti et amylo solubili composito (YpSs) vegetantem undecimam diem parasitantes 1 cm diametro, 4-6 cm altae, densae primo albae, seniores cinnamomeae evadentes. Hyphae vegetabiles 1.7-2.8 μ diametro. Sporophori erecti, septati, ad 6 mm alti, ex latere ramos 3-10 fertiles producentes. Rami fer-

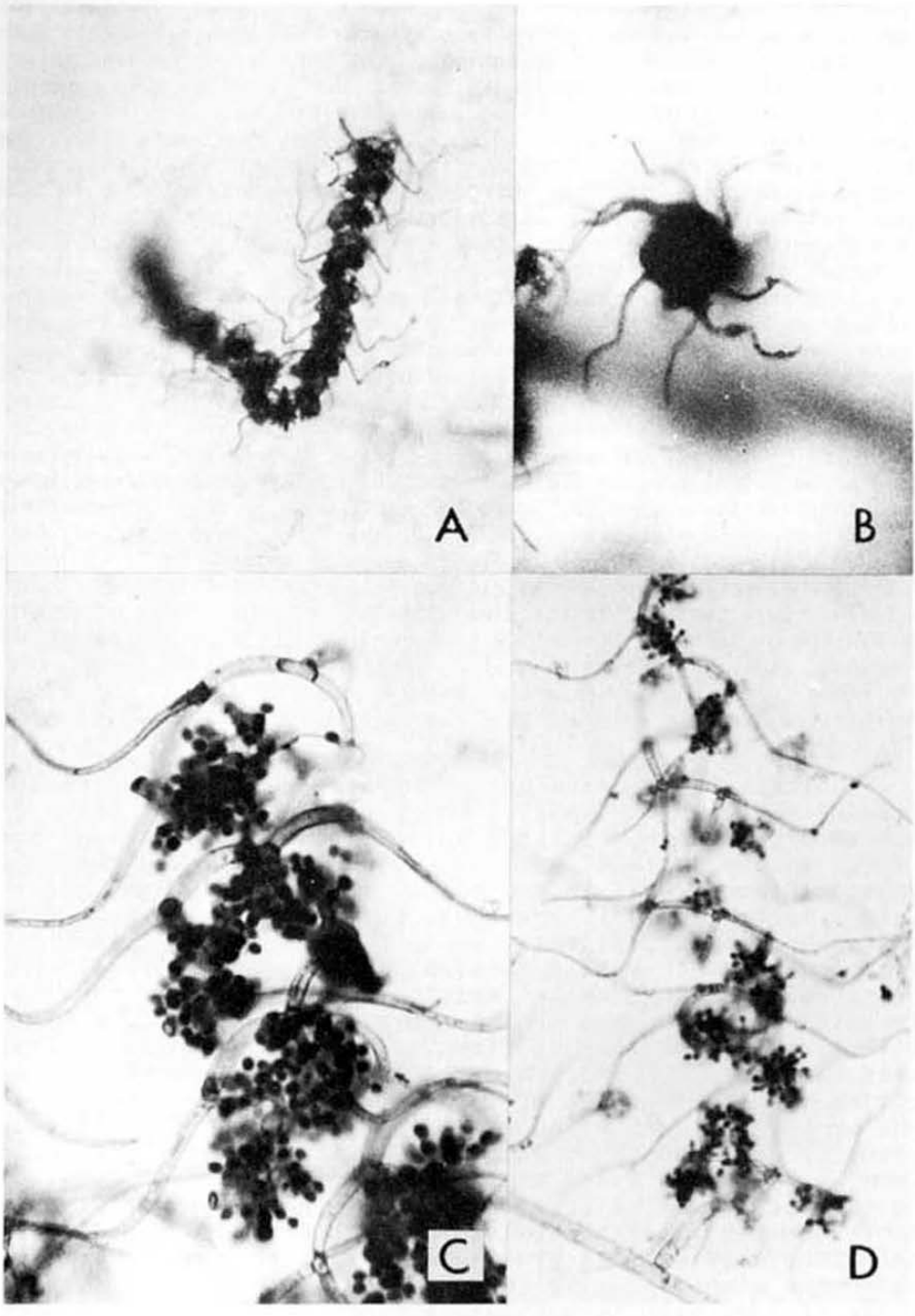


FIG. 1. *Dispira implicata*. A. Two spirally coiled fertile axes in surface view, × 110. B. Fertile axis in top view, × 240. Both A and B photographed from petri dish culture. C, D. Spirally coiled fertile axes. C, × 575. D, × 260.

tiles singuli atim, raro bini, orti, prope sub sporophori septis aliquibus, primo ex axi centrali brevi recurvato in 2-3, raro 4, ramulis sporiferis terminato et ramum lateralem solum vel par ramorum producente consistentes; unus ramus lateralis vel gemini, et nonnumquam axis centralis in ramos triplices ad quadraginta duas assiduitates fissus, unusquisque axem cochleaeformem conficiens ad omne trifurcium ramulum fertilem, ramulum sterilem, et ramulum axem producentem gignens; ramum lateralem non axem cochleaeformem efformans vulgo non post quartum trifurcium se producens; trifurcia spatio paene aequali, 16-24 μ, inter se distantes. Cochleae diametro aequae, 150-300 μ longae, 38-53 μ latae, ramis sterilibus exclusis, ad 10 gyros efficientes, plerumque 4 trifurcis inter gyrum unum inclusis, ramulis omnibus fertilibus intra cochleam positis, sterilibus tamen extra cochleam projicientibus, in superficie igitur instar centipedae. Ramuli steriles stricte attenuati, paulum cochleaeformes, haud vel semel septati, 28-75 (-93) μ longi, ad medium 1.1-2.3 μ lati. Ramuli fertiles recurvati, 17-28 μ longi ad medium 2.3-4.6 μ lati, desinentes in 2-3, raro 4 ramulos sporiferos in ordine ab gemmatione productos. Ramuli sporiferi haud a vesiculis subtendi, 9.2-13.8 × 3.4-5.7 μ, e cellulis duabus paene aequalibus, subovoideus circulos distales merosporangiorum bispororum ferentes compositi; parte terminali merosporangii a gemmatione apicali orta e basali. Sporae globosae, subglobosae, ovoideae, vel nonnumquam ellipsoidales, hyalinae, leves, maturae semper siccae; globosae 2.3-4.6 μ diametro, ovoideae et ellipsoidales 3.4-4.6 (-5.1) × 2.3-2.8 (-3.4) μ. Zygosporae in culturis vetustis in agri superficie efformantae in finibus projectorum lateralium hypharum vegetabilium, pallide griseobrunneae, globosae, crasse tunicatae, foveis ellipticis depressae, crebre paene leves, 25-35 μ diametro, maturae globulum magnum, eccentricum refractilem includentes, 10.3-13.8 μ diametro, tunica 3.4-4.6 μ crassa.

*Typus:* PCM 632.

Colonies on *Chaetomium bostrychodes* on yeast extract soluble starch agar (YpSs) 1 cm in diam in 10 days at 30 C, 4-6 mm high, dense, at first white, becoming 'Cartridge Buff' (Maerz and Paul, 1950, Plate 11 B2) in 15 days and then 'Cinnamon' (Plate 12 D7) in one month. Vegetative hyphae colorless, smooth, sparsely branched, septate, 1.7-2.8 μ in diam. Sporophores erect, septate, up to 6 mm high, very light greyish brown, smooth-walled, bearing laterally 3-10 fertile branches. Fertile branches arising singly, rarely in pairs, immediately below some of the septa of the sporophore. Fertile branch consisting at first of a short recurved central axis terminated by 2-3, rarely 4 sporiferous branchlets and giving rise to a single or a pair of lateral branches; either one or both lateral branches and sometimes the central axis becoming up to 42 times successively trichotomously branched forming spirally coiled axes bearing at each trichotomy a fertile branchlet, a sterile branchlet and a branchlet which continues the axis; the lateral branch nor forming spiral axis generally ceasing growth after fourth trichotomy; trichotomies almost equally spaced, about 16-24 μ apart. Spiral coils of same diam throughout, 150-300 μ long, 38-53 μ wide (excluding sterile branchlets), each consisting of up to 10 turns (gyres), with usually 4 trichotomies per turn, with all fertile branchlets contained within the spirals, with all sterile branchlets projecting towards the outside of the spiral coil and, in surface view, resembling the legs of a centipede. Sterile branchlets narrowly attenuated, slightly spirally coiled, aseptate or 1-septate, 28-75 (-93) μ long,

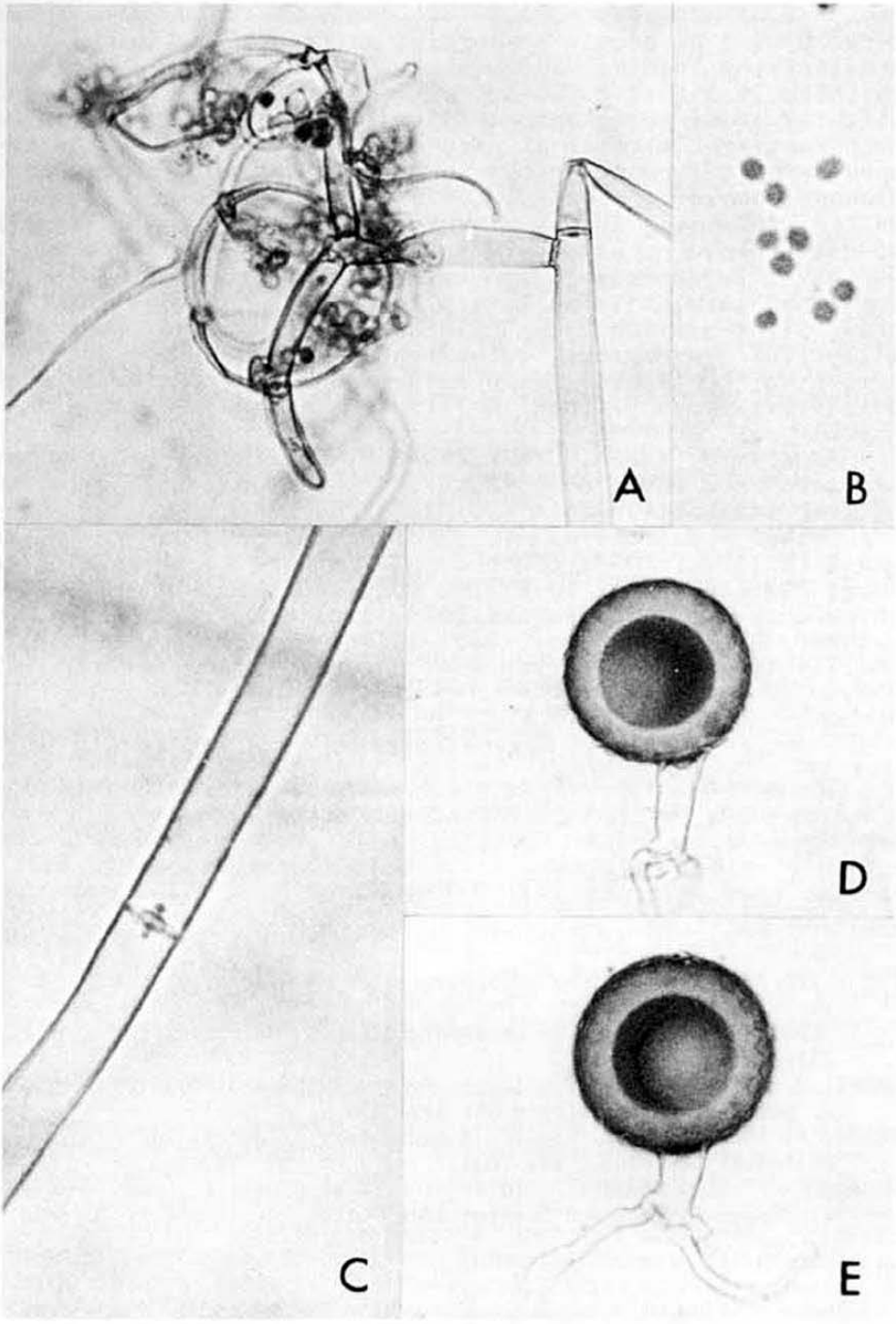


FIG. 2. *Dispira implicata*. A. Young fertile branch, × 700. B. Spores, × 800. C. Typical cross-wall, × 1000. D,E. Zygospores. D, × 730. E, × 800.

1.1-2.3 μ wide near the middle, smooth. Fertile branchlets recurved, 17-28 μ long, 2.3-4.6 μ wide in the middle, terminated by 2-3 or rarely 4 sporiferous branchlets formed successively by budding. Sporiferous branchlets not subtended by vesicles, 9.2-13.8 × 3.4-5.7 μ, composed of two almost equal, slightly ovoid cells bearing distal whorls of two-spored merosporangia; the terminal part of the merosporangium developed by apical budding from the basal. Spores globose, subglobose, ovoid or occasionally ellipsoid, hyaline, smooth-walled, remaining dry at maturity; globose spores 2.3-4.6 μ in diam, ovoid or ellipsoid spores 3.4-4.6 (-5.1) × 2.3-2.8 (-3.4) μ. Zygospores formed on agar surface in old cultures, developed terminally on lateral outgrowths of vegetative hyphae, light greyish brown, globose, thick-walled, marked with elliptical depressions, often appearing almost smooth, 25-35 μ in diam, containing, when mature, one large, usually eccentric, refractive globule 10.3-13.8 μ in diam; wall 3.4-4.6 μ thick.

*Holotype:* INDIA, UTTAR PRADESH, Gorakhpur, Dewan Bazar, isolated from mouse dung, Dec. 1977, PCM 632. Living cultures will be transmitted to ATCC, NRRL, and RSA.

*Other specimens examined:* UTTAR PRADESH, Gorakhpur, Dewan Bazar, Dec. 1977, mouse dung, PCM 631; April 1978, lizard dung, PCM 636; April 1978, rat dung, PCM 637; June 1978, shrew dung, PCM 638; August 1978, bird excreta, PCM 639; Gorakhpur, Hirapuri Colony, Dec. 1977, shrew dung, PCM 633; Dec. 1977, shrew dung, PCM 634; March 1978, mouse dung, PCM 635.

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# APOPHYSOMYCES, A NEW GENUS OF THE MUCORALES

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*SUMMARY*

*Apophysomyces elegans*, a new genus and species of Mucorales isolated from soil is illustrated and described. It has pyriform sporangia with conspicuous, funnel-shaped or bell-shaped apophyses produced singly and terminally on unbranched sporangiophores which are generally developed laterally from aerial hyphae with a 'foot-cell'-like hyphal segment at the base, or which arise at the end of stolon-like branches with a group of rhizoids below; the wall of the sporangiophores is characteristically darkened and thickened a little below the apophysis.

A new genus is described in the Mucorales to accommodate a very interesting fungus which could not be placed in any known genus. The genus is named *Apophysomyces* on account of its very distinct and characteristic apophyses. The type and only species is described here as *Apophysomyces elegans*, the epithet meaning fine or neat. The description is based on two isolates which were obtained from soil of a mango orchard and of a grassy site, situated about 50 km apart. Both isolates appeared on soil plates prepared with Martin's peptone dextrose agar (Martin, 1950). The fungus grew well on malt extract agar, synthetic *Mucor* agar (SMA) and yeast extract soluble starch agar (YpSs) media. Normal growth and reproduction occurred at 30-40 C. Growth was very poor on Czapek's solution agar and plain agar (water agar) media. On the latter medium a different mode of formation of sporangiophores was observed.

APOPHYSOMYCES Misra, *gen. nov.*

Sporangiophora plerumque singula crescentia ex hyphis aeriis cum segmento hyphali modificato in basi, vel hypharum stoloniformium in apicibus cum rhizoideis infra, haud ramosa, apicem versus gradatim attenuata, griseo-brunnea, crassi-tunicata, pariete interne plerumque fuscato et incrassato in uno loco paulatim subapophysis. Sporangia terminalia, singula, pyriformia, multispora, cum apophysis infundibuliformiis vel campanulatis distinctis atque columellis hemisphericis; paries sporangii tenuis, levis, deliquescens, derelinquens collum aliquod. Sporangiosporae plerumque oblongae, subhyalinae, leves.

Species typica: *Apophysomyces elegans* Misra, Srivastava & Lata.

Sporangiophores generally developing singly, on rich media usually arising near the ends of aerial hyphal branches with a segment of the hyphal branch at the place of origin of

sporangiophores becoming slightly thicker-walled and light greyish brown after becoming delimited by septa, on plain agar arising at the ends of stolon-like hyphae with a group of rhizoids below, unbranched, slightly tapered towards the apex, greyish-brown, thick-walled, with the wall generally darker and thicker towards the inside at a place a little below the apophysis. Sporangia produced terminally and singly, pyriform, with conspicuous funnel-shaped or bell-shaped apophyses, multispored, with hemispherical columellae. Sporangial wall thin, deliquescent, leaving a small collar at the base of the columellae. Sporangiospores mostly oblong with rounded ends, subhyaline, thin-walled, smooth.

APOPHYSOMYCES ELEGANS Misra, Srivastava & Lata, *sp. nov.*

(FIGS. 1 & 2)

Coloniae in SMA vel agaro YpSs rapide crescentes, flocculentes, primum albae, maturescentes brunneo-griseae. Hyphae aeriae ramosae, hyalinae, plerumque aseptatae vel cum septis nonnullis in culturis maturis, 3.4-8.0 µm in diam. Sporangiophora plerumque crescentia singula prope apices ramorum hyphalium aeriorum pariete uno incrassato et segmento hyphali leviter griseo-brunneo in basi, recta vel curvata, haud ramosa, crassi-tunicata, laevia, usque ad 532 µm longa, ad basim 3.4-5.7 µm lata, apicem versus gradatim attenuata 2.3-3.4 µm subapophysis; pariete interne nonnumquam leniter fuscato et incrassato uno loco 4-18 µm subapophysis. Sporangia terminalia, singula, pyriformia, multispora, distincte apophysata, columellata, 20-58 µm diam, paries pellucidus, lenis, deliquescens, derelinquens collum aliquod. Apophyses conspiquae infundibuliformes vel campanulatae, 10-46 µm altae, 11-40 µm diam in loco latissimo. Columella hemispherica, subhyalina usque ad pallide griseo-brunnea, 18-28 µm diam, collare ornata. Sporangiosporae plerumque oblongae, raro subglobosae, subhyalinae, leves, 5.4-8.0 × 4.0-5.7 µm. Zygosporae non visae.

Coloniae in agaro simplici ex hyphis ramosis, sparsis, immersis pro parte maxima compositae, formantibus paucos stolones aerios et rhizoideos. Sporangiophora singula crescentia in apice hyphalium stoloniformium ramorum quae infra structura rhizoidea sunt ornata, erecta, levia vel apicem et basim versus incrassata; pariete sporangiophorarum interne incrassante subapophysis magis conspiquum. Rhizoidea haud ramosa vel pauce ramosa, 2.3-4.6 µm diam.

Holotypus: PCM 597.

Colonies on synthetic *Mucor* agar and yeast extract soluble starch agar growing rapidly at 30-32 C, at first low and growing near the agar surface, soon forming flocculent aerial mycelium and filling the petri dish within 7 days of inoculation, white at first, becoming brownish grey (Maerz and Paul 1950, near Plate 15 C6) in age; reverse pale yellow. Mycelium aerial and submerged; aerial hyphae branched, hyaline, smooth, generally aseptate but with a few septa in old cultures, 3.4-8.0 µm in diam; submerged hyphae very thin, profusely branched, colorless, aseptate, compacted. Sporangiophores formed slowly, generally arising singly, developing almost at right angles from aerial hyphal branches with a segment of the hyphal branch at the place of origin of sporangiophore generally becoming delimited by two septa and the segment then becoming slightly thicker-walled and light greyish brown; often the hyphal branch after forming a lateral sporangiophore proceeding to form a second sporangiophore and terminating the branch, or the branch continuing for some length before ceas-

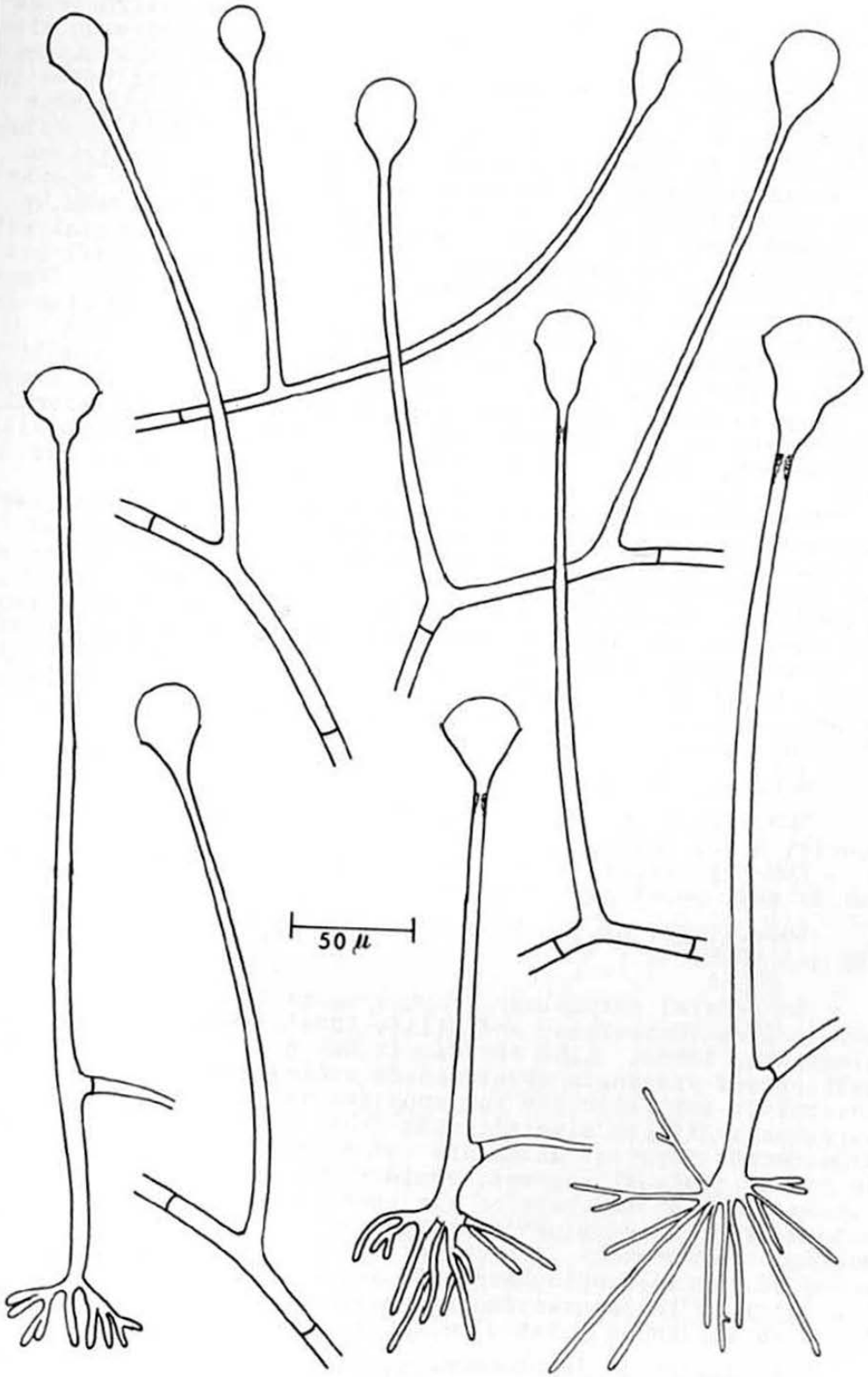



FIG. 1. *Apophysomyces elegans*. Sporangiophores.

ing growth. Sporangiophores straight or curved, slightly tapered towards the apex, unbranched, light greyish brown, often darker near the base, up to 532 µm long, 3.4-5.7 µm wide near the base, gradually tapering to 2.3-3.4 µm wide just below the apophyses; wall thick, smooth, occasionally slightly darker and thicker towards the inside at a point about 4-18 µm below the apophyses. Sporangia produced terminally and singly on the sporangiophores, pyriform, multispored, distinctly apophysate, columellate, white at first, light yellowish brown by reflected light when mature, 20-58 µm in diam; sporangial wall transparent, thin, smooth, deliquescent, leaving a small collar at the base of the columella; apophyses conspicuous, funnel-shaped or bell-shaped, 10-46 µm high, 11-40 µm in diam at the widest part, wall of apophyses smooth, light greyish brown, slightly thicker than the columellae walls; columellae hemispherical, thin-walled, subhyaline to light greyish brown, 18-28 µm in diam. Sporangiospores mostly oblong, occasionally subglobose, very light brown in mass, subhyaline individually, thin-walled, smooth, 5.4-8.0 × 4.0-5.7 µm. Zygospores not seen.

Colonies on plain agar consisting of a very sparse mostly submerged growth of vegetative hyphae forming a few aerial stolons and rhizoids. Sporangiophores generally developed at the ends of stolons with a rhizoidal structure below, erect, straight or slightly curved, smooth or occasionally roughened near the base and apex; internal thickening and darkening of the sporangiophore wall below apophyses more pronounced. Rhizoids thin-walled, colorless, light greyish brown at the place of origin, smooth, unbranched or little branched near the place of origin, 2.3-4.6 µm in diam.

Materials examined:

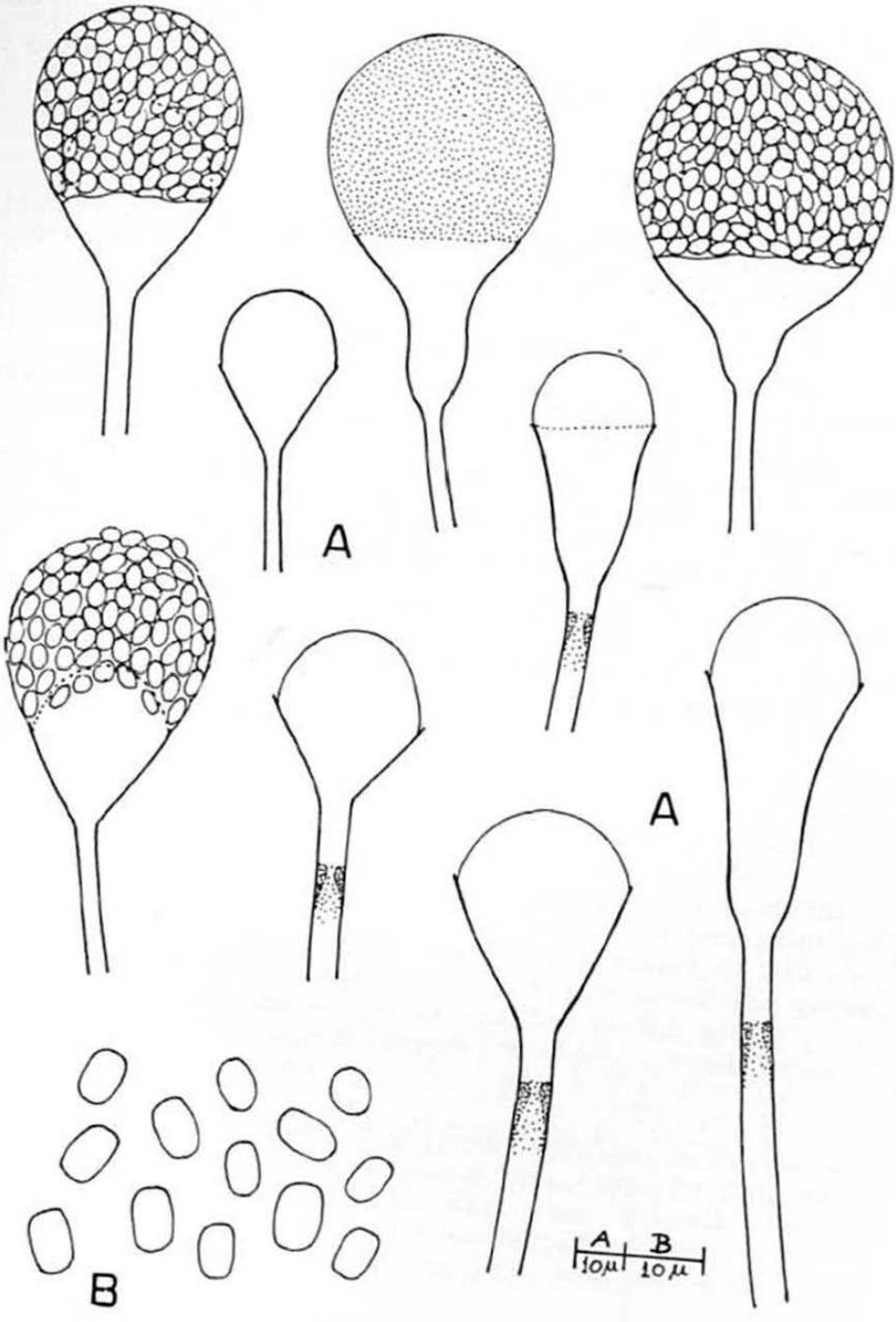
PCM 597, Type, isolated from soil of a mango orchard, Deoria, U.P., India, June 1976.

PCM 611, isolated from soil of a grassy site, near Thawai ka pul, Gorakhpur, U.P., India, June 1977.

Subcultures of the type culture will be sent to ATCC, CBS and NRRL.

In general morphology *Apophysomyces* is close to *Absidia* van Tieghem (Hesseltine and Ellis, 1964; Zycha, Siepmann and Linnemann, 1969). Like *Absidia* it has pyriform, apophysate, multispored sporangia developed on spoangiophores which arise on stolons but typically not opposite rhizoids. However *Apophysomyces* differs significantly from *Absidia* in having more pronounced apophyses which are funnel-shaped to bell-shaped, in having a hyphal segment, reminiscent of the 'foot-cell' of *Aspergillus*, at the base of the sporangiophore, and in the development of sporangiophores opposite rhizoids on plain agar medium. Furthermore, the characteristic darkening and thickening of the sporangiophore wall below the apophysis, making the lumen of the sporangiophore narrow at that point, is not found in any genus related to *Apophysomyces*.

The manner of development of the sporangiophores of *Apophysomyces* on plain agar medium is reminiscent of that described for *Saksenaea vasiformis* Saksena (Saksena, 1953). The sporangium-forming hypha from its end produces a rhizoidal




G. 2. *Apophysomyces elegans*. A, sporangia. B, sporangiophores.

complex below which is submerged in agar and an erect sporangiophore develops in the opposite direction. However, the similarity stops there for the morphology of the sporangia in the two genera is entirely different.

*ACKNOWLEDGMENTS*

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MYCOTAXON

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# AN ORTHOGRAPHIC CORRECTION

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The binomials *Trichophyton longifusus* and *Trichophyton ajelloi* var.*nana* were found to be orthographically incorrect. The correct designations, namely *Trichophyton longifusum* and *Trichophyton ajelloi* var. *nanum*, are therefore proposed.

The genus *Keratinomyces* Vanbreuseghem 1952 (5), was originally differentiated from other allied genera by the absence of microconidia and by the production of long, smooth, thick-walled, cylindrical to fusiform macroconidia. Later, when many isolates recovered from soil in the United States of America were found to produce variable numbers of microconidia, and when the perfect state of the type species of the genus *Keratinomyces*, namely *K. ajelloi*, was classified by Dawson and Gentles (2) under the genus *Arthroderma (A. uncinatum)*, where the perfect states of all other *Trichophytons* belonged, Ajello (1) rejected the genus *Keratinomyces* and transferred *K. ajelloi* to the genus *Trichophyton* as follows: *Trichophyton ajelloi* (Vanbreuseghem, 1952) Ajello 1968.

For the same reasons, the second species in the genus *Keratinomyces*, namely *K. longifusus*, described by Florian and Galgoczy (3), and *K. ajelloi* var. *nana*, described by Kunert and Hejtmanek (4), were transferred to the genus *Trichophyton* (1). The combinations were designated as follows:

*Trichophyton longifusus* (Florian and Galgoczy, 1964) Ajello 1968 and

*Trichophyton ajelloi* var. *nana* (Kunert and Hejtmanek, 1964) Ajello 1968

These two proposed binomials are now considered to be orthographically incorrect. In accordance with Recommendation 75A of the International Code of Botanical Nomenclature, the names of these two taxa are emended as follows:

from *Trichophyton longifusus* to *Trichophyton longifusum*, and from *Trichophyton ajelloi* var. *nana* to *Trichophyton ajelloi* var. *nanum*

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MYCOTAXON

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# MYCOFLORA SAXIMONTANENSIS EXSICCATA CENTUM XVI[1]

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Centum XVI of the Mycoflora consists of fungi other than rusts. Of the total, 47 were collected in Wyoming. Thirteen are from the Grand Teton National Park. The remainder are distributed as follows: Arizona 29, Nevada 1, New Mexico 2, Colorado 11, Utah 3 and Idaho 7.

Included in the issue is the isotype of *Emericellopsis stolkiae* D. E. Davidson et Martha Christensen, No. 1522.

Clarification is needed with respect to the data published with the original description of *Cercospora thermopsidis* Earle (Bull. N. Y. Bot. Gard. 2:7:348. 1902). Collection data given are: "On *Thermopsis arenaria*, Glen Rocks, Montana, July 15, 1901, Aven Nelson, No. 4818." This should have read: On *Thermopsis arinosa* A. Nels., Glenrock, Converse County, Wyoming. This correction has been made by Charles Chupp in his 1953 Monograph of Cercospora, p. 337. *T. arinosa* is now considered a synonym of *T. rhombifolia* Nutt. ex Rich.

No. 1583 of this issue is *C. thermopsidis* Earle. The specimen was distributed, in part, with a printed label which reads "*Cercospora thermopsidis* Earle n. sp." This suggests that the specimen might be an isotype or holotype. The "n. sp." should, however, not have been appended as the specimen could not be considered as either of the two types. It was collected in the same month and year as the type but by a different collector and in a different county from the type, although in the same general area of Wyoming. Names of some collectors are abbreviated as follows: Wilhelm G. Solheim, WGS; Ragnhild Solheim, RS; George B. Cummins, GBC; Robert L. Gilbertson, RLG; J. Page Lindsey, JPL. Microscopic measurements are given in µm. State abbreviations are those of the U.S. Postal Service.

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1 Contribution from the Department of Botany and the Rocky Mountain Herbarium of the University of Wyoming.

2 The author expresses his appreciation to the several individuals who have contributed to the collections as listed throughout the paper. Determination of some of the host species has been made by Dr. C. T. Mason, Jr., Dr. Frank W. Gould, Charlotte Reeder, Jack Humbles, R. L. Hartman and Gary Pierce, to whom grateful acknowledgement is given. Determination of several of the fungi has been made by Drs. R. L. Gilbertson and Sam Shushan, to whom the author is much indebted. Drs. R. B. Streets and L. M. Blank each supplied a named specimen. The late Dr. Roderick Sprague identified one, as did the late Prof. F. S. Earle.

1501. *ALBUGO CANDIDA* (Pers. ex Chev.) Kuntze. On *Descurania pinnata* (Walt.) Britt. West Speedway, Tucson, Pima Co., AZ, 1 Mar. 1973. WGS, RLG & GBC 7221.

1502. *BASIDIOPHORA ENTOSPORA* Roze et Cornu. Sporangiophores 174-307 x 10-16 below, 15-17 above, sterigmata 7-10 x 1.7-2; sporangia 25-45 x 24-39. On leaves of *Aster chilensis* Nees ssp. *adscendens* (Lindl.) Cronq. Host determined by Jack Humbles. South Brush Creek Camp Ground, Medicine Bow Mts., Carbon Co., WY, 28 Aug. 1967. WGS 6649.

1503. *PERONOSPORA ARBORESCENS* (Berk.) de By. Conidiophores 121-400 x 7-10, ultimate branches 5-10; conidia 13-22 x 12-17; oospores 21-42, wall 3.5. On leaves of *Argemone polyanthemos* (Fedde) G. B. Ownb. Wheatland cutoff, State Highway 34, near Bluegrass River, Platte Co., WY, 26 June 1962. WGS 6261.

1504. *PERONOSPORA ARTHURI* Farl. Conidiophores 170-337 x 6-8, ultimate branches 10-15.5; conidia 18-24 x 13-19; oospores 19-26. On leaves of *Camissonia chamaenerioides* (Gray) Raven. Host determined by C. T. Mason, Jr. Pantano Draw, south of Saguaro Nat. Monument, Pima Co., AZ, 15 Mar. 1973. WGS & RLG 7265.

1505. *PERONOSPORA CORYDALIS* de By. Conidiophores 215-383 x 6.5-8.5, ultimate branches 10-14; conidia 17-23 x 14-23; oospores 35-38. On leaves of *Corydalis aurea* Willd. East Speedway Blvd., near Tanque Verde, Tucson, Pima Co., AZ, 15 Mar. 1973. WGS & RLG 7268.

1506. *PERONOSPORA ECHINOSPERMI* Swingle. Conidiophores 143-460 x 7.5-8.6; conidia 24-33 x 15-22.5. On leaves of *Lappula redowskii* (Hornem.) Greene. Host determined by C. T. Mason, Jr. Tanque Verde Draw, Tucson, Pima Co., AZ, 15 Feb. 1973. WGS, RLG & GBC 7212.

1507. *PERONOSPORA FICARIAE* Tul. Conidiophores 175-430 x 7-10; conidia 24-31 x 21-24. On leaves of *Ranunculus acriformis* Gray. 9.2 miles north of junction at Jackson Lake Lodge, Grand Teton Nat. Park, WY, 25 July 1955. WGS & RS 4131.

1508. *PERONOSPORA LEPIDII* (McAlp.) G. W. Wilson. Conidiophores 110-398 x 6-15, ultimate branches 10-20; conidia 18-36 x 18-23. On leaves of *Lepidium medium* Greene. Host determined by C. T. Mason, Jr. Finger Rock Canyon, Santa Catalina Mts., Tucson, Pima Co., AZ, 15 Feb. 1973. WGS, RLG & GBC 7208.

1509. *PERONOSPORA LEPIDII* (McAlp.) G. W. Wilson. Conidiophores 138-353 x 6-7; conidia broadly elliptical, ends rounded, 26-35 x 17-21. On leaves of *Lepidium thurberi* Woot. Sandario Road, west of Tucson Mts., Tucson, AZ, 1 Mar. 1973. GBC.

1510. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 174-296 x 10-14; conidia 12-29 x 12-21. On leaves of *Arabis drummondii* Gray. Near Rob Roy Reservoir, Snowy Range Division, Medicine Bow Nat. Forest, Medicine Bow Mts., WY, 27 July 1973. WGS, WGS II & RS 7290. This appears to be a new host.

1511. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 160-353 x 11-14; conidia 18-27 x 19-22. Mostly on leaves of *Descurania pinnata* (Walt.) Britt. West Speedway, Tucson, Pima Co., AZ, 1 Mar. 1973. WGS, RLG & GBC 7222.

1512. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 246-400 x 10-14; conidia 18-28 x 16-23. Mostly on stems in inflorescences of *Descurania pinnata* (Walt.) Britt. Colossal Cave Co. Park, Rincon Mts., Pima Co., AZ, 22 Mar. 1973. RLG, GBC & JPL 10943. Numbers 1511 and 1512 occur on the same host. The effect of the fungus on the host is, however, quite different. In 1511 it is primarily the leaves which are affected while in 1512 the stems are hypertrophied and greatly deformed.

1513. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 184-368 x 10-14; conidia 18-34 x 17-26. On basal leaves of *Descurania richardsonii* (Sweet) O. E. Schulz ssp. *procera* Breit. Host determined by Jack Humbles. Near Rob Roy Reservoir, Snowy Range Division, Medicine Bow Nat. Forest, Medicine Bow Mts., WY, 27 July 1973. WGS, WGS II & RS 7292.

1514. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 352-460 x 10-18; conidia subsphaerical, 18-25 x 14-22. On leaves of *Draba cuneifolia* Nutt. Near Rocking K Ranch, Colossal Cave Road, east of Tucson, AZ, 22 Mar. 1973. GBC 73-34.

1515. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 276-624 x 12-16; conidia 15-26 x 13-20. On leaves of *Lepidium lasiocarpum* Nutt. Picture Rock Pass, west of Tucson, Pima Co., AZ, 1 Mar. 1973. WGS, RLG & GBC 7236.

1516. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 230-537 x 10-14; conidia 15-24 x 14-19. On leaves of *Lepidium lasiocarpum* Nutt. Pantano Draw, south of Saguaro Nat. Monument, Pima Co., AZ, 15 Mar. 1973. WGS & RLG 7267. This specimen is included for comparison of measurements with the preceding number.

1517. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 226-307 x 9-16; conidia subsphaerical 16-23 x 13-18. On leaves of *Lepidium medium* Greene. Host determined by C. T. Mason, Jr. West Speedway, Tucson, Pima Co., AZ, I Mar. 1973. WGS, RLG & GBC 7224.

1518. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 430-506 x 14-20; conidia 17-24 x 14-17. On leaves of *Lesquerella purpurea* (Gray) Wats. Near Red Hill Farm Road, about 5 miles north of old Benson Highway, Pima Co., AZ, 16 Mar. 1973. GBC 73-30.

1519. *PERONOSPORA PARASITICA* Pers. ex Fr. Conidiophores 200-385 x 10-14; conidia 21-30 x 14-25. On leaves of *Lesquerella purpurea* (Gray) Wats. Colossal Cave Co. Park, Rincon Mts., Pima Co., AZ, 22 Mar. 1973. RLG, GBC 10942.

1520. *PERONOSPORA TRIFOLIORUM* de By. Conidiophores 180-322 x 8-12; conidia 21-24 x 15-20; oospores 31-38. On leaves of *Astragalus alpinus* L. Host determined by Jack Humbles and Charlotte Reeder. Middle Crow Creek, Laramie Mts., Albany Co., WY, 29 July 1967. WGS & RS 6616.

1521. *PLASMOPARA GERANII* (Farl.) Berl. et DeT. Conidiophores 139-215 x 8.5-14; conidia 22-35 x 19-25. On leaves of *Geranium richardsonii* Fisch. et Trautv. Up from Pole Creek Camp Ground towards Pole Mtn., Laramie Mts., Albany Co., WY, 5 July 1972, Alt. 8,300 ft. WGS & RS 7178.

## EUROTIALES

1522. *EMERICELLOPSIS STOLKIAE* D. E. David. et M. Christ. On cornmeal agar, 3.5 weeks at room temp. Isolated from soil near margin of a saline ($MgSO_4$) lake, Twin Buttes Lake, Albany Co., WY, Mar. 1967. ISOTYPE.

## PYRENOMYCETES AND DISCOMYCETES

1523. *COLEROA RUBICOLA* (Ell. et Ev.) E. Mueller. Perithecia 80-160, ostiole plane, 12-28; asci 40-47 x 13-18; ascospores 12-16 x 6.2-8. On leaves of *Rubus strigosus* Michx. Host determined by C. T. Mason, Jr. Near Summerhaven, Mt. Lemmon, Santa Catalina Mts., Pima Co., AZ, 17 Sept. 1954. P. D. Keener.

1524. *ERYSIPHE CICHORACEARUM* DC. Cleistothecia 104-150 diam, wall cells 10-17; asci 55-65 x 24-31; ascospores 24-28 x 15-16. On leaves

of *Aster adscendens* Lindl. Host determined by R. L. Hartman. 28 miles west of Cheyenne, Happy Jack Road, Medicine Bow Nat. Forest, at spring, Albany Co., WY, 17 Oct. 1969, alt. 7,850 ft. WGS & RS 6847.

1525. *ERYSIPHE HORRIDULA* (Wallr.) Lév. On *Cryptantha barbigera* (Gray) Greene. Camino Padre Isadorro, Santa Catalina Foothills, Tucson, Pima Co., AZ, 30 Mar. 1970. RLG 9336.

1526. *ERYSIPHE HORRIDULA* (Wallr.) Lév. Cleistothecia 131-208; asci 55-72 x 27-31; ascospores 18-24 x 10-14. On leaves and stems, cleistothecia on stems of *Lappula redowskii* (Hornem.) Greene. Colossal Cave Co. Park, Rincon Mts., Pima Co., AZ, 22 Mar. 1973. RLG 10944.

1527. *NECTRIA CINNABARINA* Tode ex Fr.
*TUBERCULARIA VULGARIS* Tode stage. On twigs and bark of *Acer glabrum* Torr. Roadside below Mt. Lemmon, Santa Catalina Mts., Pima Co., AZ, 5 Oct. 1966. WGS & Mycology Class 6516.

1528. *OPHIOBOLUS FESTUCAE* Tracy et Earle. Ascocarp elliptical, 215-460 x 184-353, ostiole a slit; asci 76-125 x 16-21; ascospores 45-62 x 3.5. On leaves of *Festuca idahoensis* Elmer. Host determined by Charlotte Reeder. University of Wyoming Science Camp, Medicine Bow Mts., Albany Co., WY, 30 June 1939, alt. 9,800 ft. WGS 1648.

1529. *PHYLLACHORA EPICAMPIS* Orton. Asci 118-148 x 13.5; ascospores 20-24 x 8-10. On leaves of *Muhlenbergia metcalfii* M. E. Jones. Host determined by Charlotte Reeder. Organ Mts., NM, 28 Nov. 1939. Mr. and Mrs. L. N. Goodding A9879.

1530. *PHYLLOCHORA EPICAMPIS* Orton. On leaves of *Muhlenbergia ringens* (Benth.) Hitchc. Sycamore Canyon, Santa Cruz Co., AZ, 29 Mar. 1972. WGS, RLG, E. Canfield, C. T. Mason, Jr. & J. McHenry 7158.

1531. *SPHAEROTHECA FULIGINEA* (Schlecht. ex Fr.) Pollacci. On leaves of *Pedicularis bracteosa* Benth. var. *paysoniana* (Pennell) Cronq. Brainard Lake, Boulder Co., CO, 8 Sept. 1970, alt. 10,350 ft. H. R. Simms sf-752.

1532. *SYNCARPELLA TUMEFACIENS* (Ell. et Harkn.) Theiss. et Syd. Immature. On stems of *Artemisia tridentata* Nutt. Muddy Gap, northwest Carbon Co., WY, 25 July 1939, alt. 6,250 ft. WGS & RS 1714.

1533. *VALSA NIVEA* Hoffm. ex Fr. Asci fusiform, 36-43 x 5.5-6; ascospores biseriate, curved, 8.3-10 x 1.1-1.5. On dead, standing *Populus tremuloides* Michx. Near Monarch Pass, Gunnison-Chaffee County line, CO, 18 June 1935, alt. 9,000 ft. P. F. and V. L. Shope 908. Determined by Sam Shushan.

1534. *CIBORINIA CONFUNDENS* (Whet.) Whet. Sclerotial stage. On leaves of *Populus tremuloides* Michx. Near Sandstone Ranger Station, Sierra Madre Mts., Carbon Co., WY, 13 July 1939. WGS 1669.

1535. *DASYSCYPHA ARIDA* (Phill.) Sacc. Asci 69-76 x 7-8, ascospores 7-8.5 x 3.5-4.5. On bark of fallen *Abies lasiocarpa* (Hook.) Nutt. Brooklyn Lake, Medicine Bow Mts., Albany Co., WY, 4 Aug. 1970, alt. 10,400 ft. WGS & RS 6974.

1536. *DASCYSCYPHA ARIDA* (Phill.) Sacc. Asci 62-70 x 7, ascospores 7-11 x 3.5-5. On branches of fallen *Abies lasiocarpa* (Hook.) Nutt. Upstream from Nash Fork Bridge, Medicine Bow Mts., Albany Co., WY, 22 Aug. 1970, alt. 9,400 ft. WGS & RS 7022.

1537. *DASYSCYPHA FUSCOSANGUINEA* Rehm. Asci 76-104 x 7-8, ascospores 11-16 x 3.5-6. On twigs of *Pinus contorta* Dougl. ex Loud. 9.2 miles north of junction at Jackson Lake Lodge, Grand Teton Nat. Park, WY, 29 June 1955, alt. 6,850 ft. WGS & RS 3746.

1538. *DASYSCYPHA OBLONGISPORA* Hahn et Ayers. Asci 66-80 x 7-8, ascospores 8-12 x 4-6. On bark of fallen *Pinus contorta* Dougl. ex Loud. 4.2 miles west of entrance to Medicine Bow Nat. Forest on Laramie-Fox Park Road, below Dry Park, Medicine Bow Mts., Albany Co., WY, 25 June 1970, alt. 8,900 ft. WGS & RS 6943.

1539. *DISCINA ANCILIS* (Pers.) Sacc. Apothecia 2-7 cm diam; asci 350-537 x 24-28; ascospores with one large central vacuole, 34-42 x 13-17. On soil, wood and conifer needles in *Pinus contorta* Dougl. ex Loud. forest. 4.2 miles west of entrance to Medicine Bow Nat. Forest on Laramie-Fox Park Road, below Dry Park, Medicine Bow Mts., Albany Co., WY, 25 June 1970, alt. 8,900 ft. WGS & RS 6892.

1540. *GEOPYXIS CUPULARIS* (L.) Sacc. Apothecia smooth; asci cylindrical, 208-225 x 10-12; ascospores 14-21 x 8-10; paraphyses slender, as long as asci, slightly inflated at tip. On soil in burned over area. French Creek, Medicine Bow Mts., Carbon Co., WY, 17 July 1961, alt. 9,400 ft. WGS & RS 5909.

1541. *LACHNELLULA CHRYSOPHTHALMA* (Pers. ex Fr.) Karst. Asci 72-76 x 5-7; ascospores sphaerical, 7-8. On bark of fallen *Abies lasiocarpa* (Hook.) Nutt. Nash Fork Bridge, Medicine Bow Mts., Albany Co., WY, 22 Aug. 1970, alt. 9,400 ft. WGS & RS 7015.

1542. *PSEUDOPEZIZA MEDICAGINIS* (Lib.) Sacc. On *Medicago sativa* L. Mammoth, AZ, 30 Nov. 1966. R. B. Streets. Determined by R. B. Streets.

1543. *PSEUDOPLECTANIA NIGRELLA* (Pers.) Fckl. Apothecia disciform to slightly saucershaped or with cup, 4-20 mm across, underside with gray to brown-black, smooth hairs; paraphyses filiform, slightly enlarged at tip to slightly bulbose, hyaline below, brown to olive-brown above, about 3-4 diam; asci cylindrical, 246-325 x 13-17; ascospores sphaerical, smooth, hyaline, no oil drop, 11-14 diam. Among mosses, lichens and pine needles on soil in coniferous forest. Along stream, 4.2 miles from east entrance to Medicine Bow Nat. Forest, east of Dry Park, Medicine Bow Mts., Albany Co., WY, 25 June 1970, alt. 8,900 ft. WGS, RS & V. Solheim 6908.

## USTILAGINALES AND TREMELLALES

1544. *ENTYLOMA COMPOSITARUM* Farl. Chlamydospores smooth, 9-12, wall 1-1.5. On leaves of *Erigeron speciosus* (Lindl.) DC. Host determined by Gary Pearce. North of Research Station pasture, Grand Teton Nat. Park, WY, 4 July 1955, alt. 6,750 ft. WGS & RS 3849.

1545. *ENTYLOMA WINTERI* Linh. On *Delphinium occidentale* (Wats.) Wats. North Ridge up Pilgrim Creek, Teton Co., WY, 21 July 1956, alt. 7,000 ft. WGS & RS 4603.

1546. *USTILAGO BULLATA* Berk. On *Bromus rubens* L. Box Canyon between Price and Superior, Pinal Co., AZ, 20 Mar. 1970. WGS, RLG & A. B. Budington 6861.

1547. *USTILAGO HYPODYTIS* (Schlecht.) Fr. On *Stipa comata* Trin. et Rupr. Wheatland Cutoff, State Highway 34, Laramie Mts., Albany Co., WY, 30 Sept. 1956, alt. 6,100 ft. WGS & RS 4667.

1548. *USTILAGO NEGLECTA* Niessl Syn. *U. bouteloues* Kell. et Swingle. On *Bouteloua aristidoides* (H.B.K.) Griseb. About 3 miles south of Post Office, Marana, Pima Co., AZ, 26 Nov. 1963. Collected and determined by L. M. Blank.

1549. *GUEPINIOPSIS ALPINUS* (Tracy et Earle) Brasfield. On dead conifer twigs and stems. 19.4 miles from Biological Research Station on road to Togwotee Pass, Wind River Mts., Teton Co., WY, 3 July 1956,

alt. 8,250 ft. WGS & RS 4482.

POLYPORALES AND GASTEROMYCETES

1550. *CONIOPHORA CORRUGIS* Burt. On bark of fallen conifer. 10.5 miles north of junction at Jackson Lake Lodge, Grand Teton Nat. Park, WY, 28 June 1971, alt. 6,800 ft. WGS & RS 7075. Determined by RLG.

1551. *CONIOPHORA CORRUGIS* Burt. On bark of fallen *Pinus contorta* Dougl. ex Loud. Biological Research Station, Grand Teton Nat. Park, WY, 12 Aug. 1957, alt. 6,750 ft. WGS & RS 5333. Determined by RLG.

1552. *FOMES IGNIARIUS* (L. ex Fr.) Kickx. On *Populus tremuloides* Michx. Near Swan Lake, Grand Teton Nat. Park, WY, 5 July 1956, alt. 6,800 ft. WGS & RS 4506.

1553. *POLYPORUS ADUSTUS* Willd. ex Fr. On fallen log of *Populus tremuloides* Michx. Just below Forest boundary on Lake Owen Road, Medicine Bow Mts., Albany Co., WY, 13 Sept. 1973, alt. 8,300 ft. WGS & RS 7374. Determined by RLG.

1554. *POLYPORUS DICHROUS* Fr. On fallen *Pinus contorta* Dougl. ex Loud. 9.2 miles north of junction at Jackson Lake Lodge, Grand Teton Nat. Park, WY, 26 June 1955, alt. 6,850 ft. WGS 3716.

1555. *CALVATIA CYATHIFORMIS* (Bosc) Morg. In short grass prairie (*Bouteloua gracilis-Buchloe dactyloides*). Pawnee Nat. Grassland, 19 miles north of Nunn, Weld Co. CO, 3 Feb. 1970, alt. 5,600 ft. R. S. Egan, V. Evanson, R. D. Fogel & S. Shushan. Determined by Sam Shushan.

1556. *GASTEROCYBE LATERITIA* Watling. In lawn. 1703 Kearney, Laramie, WY, 27 July 1970, alt. 7,150 ft. WGS & RS 6924.

1557. *SECOTIUM AGARICOIDES* (Czern.) Hollos. On sandy roadside bank. Six miles northeast of Brush, near Hillrose, Morgan Co., CO, 5 Mar. 1970. S. Shushan sf-901. Determined by Sam Shushan.

FUNGI IMPERFECTI

SPHAEROPSIDALES

1558. *CYTOSPORA CORNI* West. Stromata circular, 380-460; conidia 5-7 x 1-1.5. On twigs of *Cornus stolonifera* Michx., variegated form. In garden at 20th St. & Mariposa Ave., Boulder, Boulder Co., CO, 20 Aug. 1966, alt. 5,400 ft. S. Shushan sf-646. Determined by W. G. Solheim.

1559. *CYTOSPORA CORNI* West. Conidia 6-8 x 1-1.5. On twigs of *Cornus stolonifera* Michx. 1703 Kearney, Laramie, Albany CO., WY, 9 June 1971, alt. 7,150 ft. WGS 7063.

1560. *KELLERMANNIA ANOMALA* (Cke.) Hoehn. Pycnidia 337-460; conidia without spine 52-90 x 9-14, spine 14-41 long. On leaves of *Yucca glauca* Nutt. 18 miles northeast of Ault, Weld Co., CO, 28 July 1970, alt. 5,300 ft. H. R. Simms, S. Shushan & R. Fogel sf-10,002. Determined by WGS.

1561. *PHYLLOSTICTA BRUNNEA* Dearn. et Barth. Pycnidia amphigenous, effused, abundant, 104-140; conidia bacilliform, straight or slightly curved, 5-6.5 x 1-1.5. (Agrees with F. Columb. 5040, Isotype). On leaves of *Populus fremontii* Wats. Indian Creek Winter Sports Area, Prescott Nat. Forest, south of Prescott, Yavapai Co., AZ, 22 Oct. 1956. P. D. Keener. Determined by WGS.

1562. *SCAPHIDIUM BOUTELOUAE* Clements. Conidia clavate, dilute olivaceous, straight or slightly curved, 1-septate, slightly constricted

at septum, 19-31 x 2.8-5.3. On leaves of *Bouteloua curtipendula* (Michx.) Torr. Host determined by Frank W. Gould. Highway 180, 4 miles south of Silver City, NM, 2 Oct. 1948, alt. 5,700 ft. WGS & RS 2390. Determined by Roderick Sprague.

1563. *SEPTORIA SCUTELLARIAE* Thuem. Pycnidia 63-166, ostiole 43-99; conidia 36-89 x 1.7-2.5. On leaves of *Scutellaria galericulata* L. 4.1 miles west of Idaho-Wyoming State line, east of Ashton, Targhee Nat. Forest, Fremont Co., ID, 2 Aug. 1957, alt. 6,250 ft. WGS & RS 5272. First report for Idaho.

1564. *SEPTORIA SIBERICA* Thuem. Pycnidia epiphyllous, 1-2-few per spot, 104-170, ostiole 40-100; conidia 38-90 x 1-2, 1-4-septate. On leaves of *Ribes inerme* Rydb. Host determined by R. L. Hartman. Road east of Snake River Camp Ground, south of Flag Ranch, Teton Nat. Forest, Teton Co., WY, 27 Aug. 1961, alt. 6,800 ft. WGS & RS 6136.

1565. *SEPTORIA SIGNALENSIS* Solh. Pycnidia 86-156, ostiole 34-45; conidia 45-73 x 2.5-4, 1-2-septate. On leaves of *Symphoricarpos albus* (L.) Blake var. *laevigatus* (Fern.) Blake. Hoback Canyon, Sublette Co., WY, 9 Aug. 1969, alt. 6,050 ft. WGS & RS 6813.

1566. *SEPTORIA SIGNALENSIS* Solh. Pycnidia 93-139, ostiole 33-66; conidia 33-78 x 2.8-3.5, 0-1-septate. On leaves of *Symphoricarpos vaccinioides* Rydb. This is a new host for this fungus. Howard Spring Camp Ground, Targhee Nat. Forest, Fremont Co., ID, 11 July 1957, alt. 7,000 ft. WGS & RS 4978.

1567. *SEPTORIA URTICAE* Rob. ex Desm. Pycnidia 41-104; conidia 30-48 x 1-1.5, obscurely 1-2-septate or nonseptate. On leaves of *Urtica gracilenta* Greene. High Peak Trail, Mt. Graham, Hospital Flats, Pinaleno Mts., Graham Co., AZ, 16 Aug. 1962. P. D. Keener. Determined by WGS. *S. urticaria* Tharp is similar if not the same as the above species.

## MELANCONIALES

1568. *CYLINDROSPORIUM CONSERVANS* Peck et *Phyllosticta* sp. Acervuli epiphyllous, circular, 156-260 diam; conidia 45-80 x 3.5-4, 1-2-3-septate. On leaves of *Salix lasiandra* Benth. var. *caudata* (Nutt.) Sudw. Wheatland Cutoff, State Highway 34, Laramie Mts., WY, 1 Oct. 1955, alt. 6,200 ft. WGS & Mycology Class 4422.

1569. *GLOEOSPORIUM RIBIS* (Lib.) Mont. et Desm. Conidia 20-31 x 4.5-7. On leaves of *Ribes inerme* Rydb. Snake River Camp Ground, south of Flag Ranch, north of Grand Teton Nat. Park, Teton Nat. Forest, Teton Co., WY, 27 Aug. 1961, alt. 6,800 ft. WGS & RS 6135.

1570. *MARSSONINA BRUNNEA* (Ell. et Ev.) Magn. On leaves of *Populus tremuloides* Michx. Robber's Roost Road, North Rim of Grand Canyon, AZ, 15 Aug. 1957. P. D. Keener. Determined by WGS.

1971. *MARSSONINA POTENTILLAE* (Desm.) Magn. Acervuli 180-491 x 307; conidia 17-24 x 6-7. On leaves of *Potentilla fissa* Nutt. Host determined by R. L. Hartman. Vedauwoo, Pole Mtn. Division, Medicine Bow Nat. Forest, Laramie Mts., Albany Co., WY, 16 Aug. 1967. WGS & RS 6647.

1572. *SEPTOGLOEUM RHOPALOIDEUM* Dearn. et Bisby. Acervuli hypophyllous, subsphaerical to elliptical, 140-460 x 104-306; conidia 34-83 x 9-11, 1-4-septate. On leaves of *Populus tremuloides* Michx. Road from Pearl, CO into Hayden Division, Medicine Bow Nat. Forest at junction with Big Creek Road, 6.1 miles north of CO-WY State line, Sierra Madre Mts., Carbon Co., WY, 31 Aug. 1966. WGS & E. Andrews 6465.

1573. *ALTERNARIA TENUIS* Auct. et *Peronospora arthuri* Farl. a) Conidiophores amphigenous, effused on spots, 40-70 x 3-4; conidia clavate, 28-87 x 11-22, with 3-7, mostly 5-6 cross walls and with 2 or more cells with longitudinal septa, attenuated below into a stipe 35-50 long. b) Conidiophores 184-470 x 6-9, conidia 26-34 x 17-24. On leaves of *Oenothera primiveris* Gray. Pantano Draw, south of Saguaro Nat. Monument, Tucson, Pima Co., AZ, 15 Mar. 1973. WGS & RLG 7266.

1574. *CERCOSPORA BETICOLA* Sacc. On leaves of *Beta vulgaris* L., sugar beet. United States Department of Agriculture Sugar Beet Experiment Farm, Fort Collins, CO, 4 Oct. 1930. WGS 79.

1575. *CERCOSPORA BETICOLA* Sacc. On leaves of *Beta vulgaris* L., red beet. Colorado State Agricultural College Horticultural Gardens, Fort Collins, CO, 4 Oct. 1930. WGS 81.

1576. *CERCOSPORA FRASERAE* Ell. et Ev. Conidiophores in very compact masses, 20-40 x 3-3.5; conidia 90-111 x 3-3.5, 1-4 mostly 3-septate. On leaves of *Frasera speciosa* Dougl. ex Griesb. Moose Island, Biological Research Station, Grand Teton Nat. Park, WY, 3 July 1955, alt. 6,740 ft. WGS & RS 3839.

1577. *CERCOSPORA FRASERAE* Ell. et Ev. Conidiophores 20-30 x 2.5-3.5; conidia 73-150 x 2.5-4, 2-8-septate. On leaves of *Swertia radiata* (Kellog) Kuntze. Howard Spring Camp, Togwotee Nat. Forest, Fremont Co., ID, 11 July 1957, alt. 7,000 ft. WGS & RS 4961.

1578. *CERCOSPORA GERANII* Kell. et Swingle. Conidia 41-83 x 3.5-4, 1-3-septate. On leaves of *Geranium richardsonii* Fisch. et Mey. Up from Pole Creek Camp Ground, Laramie Mts., Albany Co., WY, 5 July 1972, alt. 8,300 ft. WGS & RS 7180.

1579. *CERCOSPORA GERANII* Kell. et Swingle. Conidiophores 24-42 x 3.5-4.5, 1-2-septate; conidia 41-110 x 3-4, 1-5-septate. On leaves of *Geranium viscosissimum* Fisch. et Mey. Base of ridge north of Biological Research Station, Grand Teton Nat. Park, WY, 29 July 1955, alt. 6,750 ft. WGS & RS 4180.

1580. *CERCOSPORA ITHACENSIS* Chupp. Conidiophores 23-43 x 4-5.5; conidia 33-106 x 3-5.5, 0-1-4-septate. On leaves of *Geranium viscosissimum* Fisch. et Mey. 0.5 mile above Cliff Creek, Hoback Canyon, Sublette Co., WY, 15 July 1957, alt. 6,400 ft. WGS & RS 5050.

1581. *CERCOSPORA ROSICOLA* Pass. Conidiophores 23-50 x 3-5; conidia obclavate, dilute olivaceous, 37-66 x 3-7, 2-3-septate. On *Rosa* sp. Cemetary at Cripple Creek, Teller Co., CO, 24 Aug. 1946, alt. 10,200 ft. WGS, WGS II & RS 2146. Determined by John Baxter.

1582. *CERCOSPORA SYMPHORICARPI* Ell. et Ev. Conidiophores 24-35 x 3.5-4; conidia 25-43 x 4-5, 1-3-septate. On leaves of *Symphoricarpos* sp. Moose Ponds west of Moose, Grand Teton Nat. Park, WY, 8 July 1955, alt. 6,500 ft. WGS & RS 3904.

1583. *CERCOSPORA THERMOPSIDIS* Earle. On leaves of *Thermopsis rhombifolia* Nutt. ex Rich. Syn. *T. arinosa* A. Nels. Casper, Natrona Co., WY, 6 July 1901. L. N. Goodding 205. Determined by F. S. Earle.

1584. *DIDYMARIA CLEMATIDIS* Cke. et Harkn. Conidiophores hypophyllous, densely tufted, tufts up to 110 in diam; conidia 20-38 x 7-11, 0-1-septate. On leaves of *Clematis ligusticifolia* Nutt. ex T. et G. Bates Creek, State Highway 487, about 12 miles southeast of State Highway 220, Natrona Co., WY, 14 Sept. 1969, alt. 5,000 ft. WGS & RS 6843.

1585. *HADROTRICHUM GLOBIFERUM* (Ell. et Ev.) J. J. Davis et *Phyllosticta ferax* Ell. et Ev. a) Conidiophores 24-35 x 5-7; conidia

sphaerical, 11-16. b) Pycnidia 121-208, ostiole 20-34; conidia 3.5-5 x 1-1.5. On leaves of *Lupinus argenteus* Pursh. Tony Grove Lake, Cache Co., UT, 6 Aug. 1955. WGS & RS 4262.

1586. *HADROTRICHUM GLOBIFERUM* (Ell. et Ev.) J. J. Davis et *Phyllosticta ferax* Ell. et Ev. a) Conidiophores densely tufted, about 34 x 6-7; conidia 12-16 diam. b) Pycnidia 93-139; conidia 3.5-4.5 x 1. On leaves of *Lupinus parviflorus* Nutt. ex Hook. et Arn. Signal Mtn., Grand Teton Nat. Park, WY, 22 July 1955, alt. 7,150 ft. WGS & RS 4091.

1587. *OIDIUM AMBROSIAE* Thuem. On leaves of *Ambrosia confertifolia* DC. Host determined by C. T. Mason, Jr. Picture Rock Pass, west of Tucson, Pima Co., AZ, 1 Mar. 1973. WGS, RLG & GBC 7234.

1588. *OVULARIA MONOSPORIA* (West.) Pound et Clements. Conidiophores with several spore scars, 30-73 x 3.5-4.5; conidia clavate, 22-31 x 7.5-10. On leaves of *Rumex crispus* L. East of dead end of North Columbus Blvd., Tucson, Pima Co., AZ, 14 May 1968, alt. 2,300 ft. WGS & RS 6754.

1589. *OVULARIA MONOSPORIA* (West.) Pound et Clements. Conidiophores 44-90 x 3-4; conidia 13-42 x 5.5-11. On leaves of *Rumex hymenosepalus* Torr. Roadside, Oracle Road just north of junction with Tangerine Road, Pima Co., AZ, 7 Apr. 1968, alt. ?,500 ft. WGS & RS 6714.

1590. *RAMULARIA ADOXAE* (Rab.) Karst. Conidiophores 17-60 x 3.5-5; conidia 25-42 x 3-4, 0-1-3-septate. On leaves of *Adoxa moschatellina* L. Hidden Valley Lodge, Rocky Mtn. Nat. Park, CO, 1 July 1966. WGS & RS 6660.

1591. *RAMULARIA ARVENSIS* Sacc. Conidiophores 34-52 x 3.5, 1-septate; conidia 14-35 x 2.5-3, 0-1-2-septate. On leaves of *Potentilla norvegica* L. Host determined by R. L. Hartman. Swan Lake, Grand Teton Nat. Park, WY, 3 Aug. 1955, alt. 6,850 ft. WGS 4237.

1592. *RAMULARIA IONOPHILA* J. J. Davis. Conidiophores 17-35 x 3.5-4.5; conidia 20-42 x 3.5-4.5, 1-3-septate. On leaves of *Viola nuttallii* Pursh. Near Beaver Mtn. on Beaver Creek, Cache Nat. Forest, Wasatch Mts., Cache Co., UT, 28 June 1968. WGS & RS 6767.

1593. *RAMULARIA IONOPHILA* J. J. Davis. Conidiophores 30-83 x 3-4.5; conidia 20-53 x 3-4.5, 0-1-3-septate. On leaves of *Viola nuttallii* Pursh. var. *linguaefolia* (Nutt.) Jepson. Howard Spring Camp, Targhee Nat. Forest, Fremont Co., ID, 11 July 1957, alt. 7,000 ft. WGS & RS 4982. First report for ID.

1594. *RAMULARIA PUNCTIFORMIS* (Schlecht.) Hoehn. Conidiophores 20-33 x 3-3.5; conidia 17-27 x 3.5-5. On leaves of *Epilobium angustifolium* L. Howard Spring Camp, Targhee Nat. Forest, Fremont Co., ID, 11 July 1957, alt. 7,000 ft. WGS & RS 4958.

1595. *RAMULARIA MENTHICOLA* Sacc. Conidiophores 20-40 x 3-3.5, 0-1-septate; conidia 17-37 x 3-4.5. On leaves of *Mentha arvensis* L. Four miles west of ID-WY State line, east of Ashton, Targhee Nat. Forest, Fremont Co., ID, 2 Aug. 1957, alt. 6,250 ft. WGS & RS 5270.

1596. *RAMULARIA SEROTINA* Ell. et Ev. Conidiophores 24-38 x 2.5-3.5; conidia 11-28 x 2.5-3, 0-1-septate. On leaves of *Solidago canadensis* L. Host determined by R. L. Hartman. Moose Ponds west of Moose, Grant Teton Nat. Park, WY, 2 Aug. 1955. WGS & RS 4227.

1597. *RAMULARIA SHELDONII* Trott. Conidiophores 20-60 x 3-3.5, 0-1-septate; conidia 15-41 x 3.5-5.5. On leaves of *Delphinium occidentale* (Wats.) Wats. Howard Spring Camp, Targhee Nat. Forest, Fremont Co., ID, 11 July 1957, alt. 7,000 ft. WGS & RS 4959.

1598. *RAMULARIA SILVESTRIS* Sacc. Conidiophores 18-40 x 2.2-3; conidia 14-37 x 2.2-3, 0-1-septate. On leaves of *Dipsacus silvestris* Mill. Birch Creek Canyon east of Smithfield, UT, 22 Aug. 1961, alt. 4,800 ft. WGS & RS 6104.

1599. *TORULA HERBARUM* Link ex Cda. Conidia 5-7 diam. On leaves of *Yucca* sp. Two miles south of Poncha Springs, off Highway 285, CO, 24 July 1970, alt. 7,400 ft. H. R. Simms sf-751. Determined by WGS.

1600. *TUBERCULINA PERSICINA* (Ditm.) Sacc. On *Puccinia aristidae* Tracy, on *Anemopsis californica* (Nutt.) H. et A. Ash Springs, Lincoln Co., NV, 20 Sept. 1965. P. D. Keener. Determined by WGS.

## ADDENDUM

Dr. Solheim died in May, 1978 (Mycologia 71, 1979). Centum XVI and Centum XVII have been edited for publication by Martha Christensen, R. L. Gilbertson and G. B. Cummins. We consider that Dr. Solheim contributed more to mycological knowledge of the Rocky Mountain region than any other individual. Mycoflora Saximontanensis Exsiccata serves as a fitting memorial to his life's work.

MYCOTAXON

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# MYCOFLORA SAXIMONTANENSIS EXSICCATA CENTUM XVII[1]

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The rusts which make up the seventeenth century of Rocky Mountain Fungi are distributed as follows: Canada 2, Montana 5, Wyoming 42, Colorado 13, Utah 3 and Arizona 35.

Five of the collections were made by Ernest P. Walker, Assistant Director, National Zoological Park, Smithsonian Institution, 1930-56. From 1911-13 Walker made a survey of the birds of Wyoming and was an assistant in the zoological laboratory at Wyoming. During parts of 1912-13 he did some botanical collecting in Colorado and Utah. These collections were deposited in the Rocky Mountain Herbarium from where distributions of duplicates were made. State abbreviations are those of the U.S. Postal Service. Names of some collectors are abbreviated as follows: George B. Cummins, GBC; Robert L. Gilbertson, RLG; Ragnhild Solheim, RS; Wilhelm G. Solheim, WGS.

1601. *CHRYSOMYXA ARCTOSTAPHYLI* Diet. III. On *Arctostaphylos uva-ursi* (L.) Spreng. Ridge above University of Wyoming Science Camp, near Solheim Lake, Medicine Bow Mts., Albany Co., WY, 29 June 1939, alt. 10,500 ft. WGS 1646.

1602. *CHRYSOMYXA LEDICOLA* Lagh. II. On *Ledum groenlandicum* Oeder. Athabasca River Highway 93 at Mt. Christie Sign, Jasper Nat. Park, Canada, 25 June 1971, alt. 4,350 ft. WGS & RS 7068.

1603. *CHRYSOMYXA PIROLATA* Wint. III. On *Pyrola asarifolia* Michx. N. W. drainage from Pole Mt., above junction with Pole Creek, Laramie Mts., Albany Co., WY, 31 May 1974, alt. 8,300 ft. WGS 7382.

1604. *CHRYSOMYXA PIROLATA* Wint. On *Pyrola chlorantha* Swartz. Libby Creek Picnic Grounds on old road, Medicine Bow Mts., Albany Co. WY, 25 July 1973. WGS, WGS II & RS 7284.

1605. *COLEOSPORIUM VIGUIERAE* Diet. et Holw. I. On *Viguiera dentata* (Cav.) Spreng. var. *dentata*. Rest Park on Highway 82 west of Patagonia, Santa Cruz Co., AZ, 2 Dec. 1966. WGS, C. T. Mason, Jr. &

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1/ Contribution from the Department of Botany and the Rocky Mountain Herbarium of the University of Wyoming and from the University of Arizona Agricultural Experiment Station.

2/ Deceased May 15, 1978.

W. S. Phillips 6551. This fungus is common in the mountains of southeastern Arizona and is known also from southern New Mexico, the Big Bend region of Texas and Sonora, Mexico. It is macrocyclic and autoecious.

1606. *MELAMPSORA EPITEA* Thuem. II. On *Salix*. Near Dave Johnson Power Plant, Glenrock, Converse Co., WY, 1 Aug. 1973. WGS & RS 7312.

1607. *MELAMPSORA EPITEA* Thuem. II. On *Salix scouleriana* Barratt. Carr Peak Trail, Huachuca Mts., Cochise Co., AZ, 12 Oct. 1973, alt. about 8,800 ft. GBC 73-124.

1608. *MELAMPSORA EPITEA* Thuem. II, III. On *Salix geyeriana* Anders. Friend Creek, west base of Laramie Peak, Albany Co., WY, 25 Sept. 1974, alt. 7,700 ft. WGS & Fred Hermann 7420.

1609. *MELAMPSORA LINI* (Ehrenb.) Lév. On *Linum lewisii* Pursh. Moab Valley, UT, 20 July 1912. Ernest P. Walker 345.

1610. *MELAMPSORA MEDUSAE* Thuem. II, III. On *Populus tremuloides* Michx. Fly Peak near Crest Trail, Chiricahua Mts., Cochise Co., AZ, 13 Sept. 1973. GBC 73-115. We follow Ziller (Can. For. Service Publ. No. 1329:144-147. 1974) in treating *M. albertensis* Arth. as a synonym of *M. medusae*.

1611. *MELAMPSORA PARADOXA* Diet. et Holw. On *Salix bebbiana* Sarg. Near Caribou Resort, Crazy Woman Creek, Big Horn Mts., WY, 27 July 1965. GBC 65-24.

1612. *MELAMPSORA PARADOXA* Diet. et Holw. On *Salix myrtillifolia* Anders. Sierra Madre Mts., Carbon Co., WY, 9 Sept. 1971. WGS & RS 7146.

1613. *MELAMPSORA PARADOXA* Diet. et Holw. II, III. On *Salix lutea* Nutt. Four miles above Highway 230 at base of west slope of Sheep Mt., Medicine Bow Mts., Albany Co., WY, 13 Sept. 1973. WGS & RS 7373.

1614. *PUCCINIASTRUM EPILOBII* Otth II. On *Epilobium adenocaulon* Hausskn. Red Rock Ranch Motel, 2.5 miles east of Dubois, Fremont Co., WY, 28 Aug. 1961, alt. 6,900 ft. WGS & RS 6150.

1615. *PUCCINIASTRUM GOEPPERTIANUM* (Kuehn) Kleb. III. On *Vaccinium caespitosum* Michx. Between Albany and Keystone, Medicine Bow Mts., WY, 27 July 1973. WGS, WGS II & RS 7298.

1616. *PUCCINIASTRUM PYROLAE* Arth. II. On *Pyrola virens* Schweigg. N. W. Drainage from Pole Mt. into Pole Creek below Yellow Pine Camp Ground, Laramie Mts., Albany Co., WY, 12 June 1974. WGS 7385.

1617. *UREDINOPSIS PTERIDIS* Diet. et Holw. II. On *Pteridium aquilinum* (L.) Kuhn var. *pubescens* Underw. Kehl Springs, Coconino Nat. Forest, Coconino Co., AZ, 21 Aug. 1973. RLG 11139.

1618. *CUMMINSIELLA MIRABILISSIMA* (Peck) Nannf. II. On *Berberis repens* Lindl. Apolinaris Spring Picnic Ground, Yellowstone Nat. Park, WY, 13 Sept. 1969, WGS & RS 6839.

1619. *CUMMINSIELLA MIRABILISSIMA* (Peck) Nannf. II, III. On *Berberis repens* Lindl. Highways 3 and 93, 3 miles north of Jaffery, BC, Canadian Rockies, Canada, 26 June 1971, alt. 2,800 ft. WGS & RS 7070.

1620. *CUMMINSIELLA MIRABILISSIMA* (Peck) Nannf. II, III. On *Berberis repens* Lindl. Canyon southwest of Aspen Spring Canyon, Lukachukai-Chuska Mt. Range, Navajo Indian Reservation, AZ, 8 June 1967. C. T. Mason, Jr., WGS & R. H. Hevley 2696.

1621. *GYMNOSPORANGIUM KERNIANUM* Bethel III. On *Juniperus deppeana* Steud. Molino Basin, Santa Catalina Mts., Pima Co., AZ, 23 Mar. 1973. RLG 10945. This species occurs in other mountains of southeastern AZ, but no aecial stage has been found. In fact, species of *Amelanchier* are not known in the area.

1622. *GYMNOSPORANGIUM NIDUS-AVIS* Thaxt. III. On *Amelanchier alni-*

*folia* Nutt. Norwood Hill, San Miguel Co., CO, 16 Aug. 1912. Ernest P. Walker 467.

1623. *NYSSOPSORA CLAVELLOSA* (Berk.) Arth. III. On *Aralia racemosa* L. Upper Carr Canyon, Huachuca Mts., Cochise Co., AZ, 3 Oct. 1975. GBC 75-46. This is the only locality in the Southwest where this rust fungus has been found. It was first collected in 1909 by L. N. Goodding who contributed many records of southwestern species.

1624. *NYSSOPSORA ECHINATA* (Lév.) Arth. III. On *Ligusticum porteri* C. et R. Road west of Flag Ranch, between Grand Teton and Yellowstone Nat. Parks, Teton Co., WY, 14 July 1956. WGS & RS 4569.

1625. *PHRAGMIDIUM FUSIFORME* Schroet. I, II. On *Rosa acicularis* Lindl. Bear Dance Picnic Grounds, Flathead Nat. Forest, MT, 27 June 1971, alt. 3,000 ft. WGS & RS 7072.

1626. *PHRAGMIDIUM FUSIFORME* Schroet. II, III. On *Rosa acicularis* Lindl. Road Camp at glacial moraine, Libby Creek above Centennial, Medicine Bow Mts., Albany Co., WY, 30 Aug. 1956. WGS & RS 4664.

1627. *PHRAGMIDIUM IVESIAE* Syd. III. On *Potentilla gracilis* Dougl. ex Hook. ssp. *nuttallii* (Lehm.) Keck. South Crow Creek, Laramie Mts., Albany Co., WY, 23 Aug. 1971. WGS & WGS II 7110.

1628. *PHRAGMIDIUM MONTIVAGUM* Arth. O, I. On *Rosa woodsii* Lindl. Pass Creek, 3.7 miles north of WY border on Highway 87, MT, 18 June 1971. WGS & RS 7064.

1629. *PHRAGMIDIUM MONTIVAGUM* Arth. I, II, III. On *Rosa acicularis* Lindl. Schwin Conference Camp Road, Dubois, Fremont Co, WY, 8 Aug. 1969, alt. 6,600 ft. WGS & RS 6811.

1630. *PHRAGMIDIUM RUBI-IDAEI* (DC.) Karst. I. On *Rubus idaeus* L. var. *sachalinensis* (Levl.) Focke. Happy Jack Picnic Area, Laramie Mts., Albany Co., WY, 7 July 1960, alt. 8,200 ft. WGS 5798.

1631. *PUCCINIA ABRUPTA* Diet. et Holw. var. *abrupta* III et *Coleosporium viguierae* Diet. et Holw. I. On *Viguiera dentata* (Cav.) Spreng. var. *lancifolia* Blake. Rest Park on Highway 82, west of Patagonia, Santa Cruz Co., AZ, 2 Dec. 1966. WGS, C. T. Mason, Jr. & W. S. Phillips 6550.

1632. *PUCCINIA ACROPHILA* Peck III. On *Synthyris pinnatifida* S. Wats. var. *pinnatifida*. Mountain north of Teton Pass, southwest of Jackson, WY, 5 Sept. 1960. GBC 60-126.

1633. *PUCCINIA ANGUSTATA* Peck O, I. On *Mentha arvensis* L. Middle Crow Creek, Laramie Mts., Albany Co., WY, 16 Aug. 1962. WGS & RS 6268.

1634. *PUCCINIA BRACHYPODII* Otth var. *poae-nemoralis* (Otth) Cumm. et Greene II. On *Poa interior* Rydb. Maroon Creek Trail, one mile from Wilderness Portal, south of Aspen, CO, 21 July 1975. GBC 75-31.

1635. *PUCCINIA CALOCHORTI* Peck III. On *Calochortus gunnisonii* Wats. About one mile down on Crow Creek, from road between Vedauwoo and Happy Jack Road, Laramie Mts., Albany Co., WY, 5 July 1974. WGS, RS & Nancy Hermann 7405.

1636. *PUCCINIA CARICINA* DC. O, I. On *Ribes setosum* Lindl. University of Wyoming Camp at Trail Lake Ranch, Dubois, Fremont Co., WY, 8 Aug. 1969, alt. 7,500 ft. WGS & RS 6809.

1637. *PUCCINIA CARICINA* DC. II, III. On *Carex aquatilis* Wahl. University of Wyoming Camp at Trail Lake Ranch, Dubois, Fremont Co., WY, 29 Aug. 1961, alt. 7,700 ft. WGS & RS 6170.

1638. *PUCCINIA CARICINA* DC. II, III. On *Carex nebraskensis* Dewey. At Springs on Happy Jack Road, 28 miles west of Cheyenne, Medicine Bow Nat. Forest, Albany Co., WY, 17 Sept. 1969, alt. 7,850 ft. WGS & RS 6848.

1639. *PUCCINIA CONOCLINII* Seym. II, III. On *Eupatorium pycnocephalum* Less. Sycamore Canyon, Santa Cruz Co., AZ, 24 Sept. 1975. GBC 75-45.

1640. *PUCCINIA CRANDALLII* Pamm. et Hume O. On *Symphoricarpos albus* (L.) Blake. Bear Dance Picnic Grounds, Flathead Nat. Forest, MT, 27 June 1971, alt. 3,000 ft. WGS & RS 7071.

1641. *PUCCINIA CRANDALLII* Pamm. et Hume O, I. On *Symphoricarpos albus* (L.) Blake. Crow Creek, below road from Vedauwoo to Happy Jack Road, Laramie Mts., Albany Co., WY, 17 June 1974, alt. 7,800 ft. WGS 7393.

1642. *PUCCINIA CRANDALLII* Pamm. et Hume II. On *Poa fendleriana* (Steud.) Vasey ? (? shade form). Shady ledges, upper Carr Canyon, Huachuca Mts., Cochise Co., AZ, 3 Oct. 1975. GBC 75-48. The aecial stage occurs on Carr Peak Trail but was not seen here.

1643. *PUCCINIA DIOICAE* Magn. O, I. On *Aster foliaceus* Lindl. ex DC. var. *canbyi* A. Gray. Libby Creek Picnic Grounds on old road, Medicine Bow Mts., Albany Co., WY, 12 Aug. 1970, alt. 8,500 ft. WGS 6993.

1644. *PUCCINIA DISTORTA* Holw. III. On *Hyptis emoryi* Torr. Near upper end of Apache Lake, Salt River, Maricopa Co., AZ, 24 Oct. 1975. GBC 75-49. This species, which is common in Mexico, was collected previously in Arizona by L. N. Goodding in 1920 in the Estrella Mts., also in Maricopa Co., near Phoenix.

1645. *PUCCINIA DURANGENSIS* Cumm. II, III. On *Stipa pringlei* Scribn. Near upper end of Carr Canyon Road, Huachuca Mts., Cochise Co., AZ, 3 Oct. 1975. GBC 75-47. This and a collection of *Piptochaetium fimbriatum* (H.B.K.) Hitchc. from the Chiricahua Mts. of Cochise Co. are the known records for the U.S. It was described and is otherwise known (Cummins, The Rust Fungi of Cereals, Grasses and Bamboos. p. 380. Springer-Verlag. 1971) from Durango State, Mexico on *P. fimbriatum*.

1646. *PUCCINIA ENCELIAE* Diet. et Holw. var. *aemulans* (Syd.) Parmelee. On *Viguiera multiflora* (Nutt.) Blake. Norwood Hill, San Miguel Co., CO, 16 Aug. 1912. Ernest P. Walker 472.

1647. *PUCCINIA FRANSERIAE* Syd. II. On *Hymenoclea monogyra* Torr. et Gray. Tangerine Road, north of Tucson, Pima Co., AZ, 13 Mar. 1970. WGS & RLG 6852.

1648. *PUCCINIA FRANSERIAE* Syd. II, III. On *Hymenoclea pentalepis* Rydb. Tangerine Road, north of Tucson, Pima Co., AZ, 13 Mar. 1970. WGS & RLG 6853.

1649. *PUCCINIA FRANSERIAE* Syd. II, III. On *Ambrosia* (*Franseria*) *deltoidea* (Torr.) Payne. Tucson Mt. Park, Pima Co., AZ, 25 Apr. 1968. WGS & A. Johnston 6737. We follow Cummins (Mycologia 67:175. 1975) in separating *P. franseriae* from *P. splendens* Vize.

1650. *PUCCINIA FRASERI* Arth. On *Hieracium albiflorum* Hook. Ross Creek Trail, 1 mile from Rising Sun Camp Ground, Glacier Nat. Park, MT, 12 Aug. 1974. GBC 74-12.

1651. *PUCCINIA GIGANTISPORA* Bubák I, III. On *Anemone multifida* Poir. About 1 mile below road from Vedauwoo to Happy Jack Road on Crow Creek, Laramie Mts., Albany Co., WY, 5 July 1974. WGS & RS 7408.

1652. *PUCCINIA GLOBOSIPES* Peck. On *Lycium fremontii* Gray. Sandario Road, west of Tucson, AZ, 1 Mar. 1973. WGS 7228.

1653. *PUCCINIA GRAMINIS* Pers. II. On *Phleum pratense* L. Roadside south of Bozeman, MT, 8 Sept. 1960. WGS & RS 5817.

1654. *PUCCINIA GRINDELIAE* Peck O. (1), III. On *Baileya multiradiata* Harv. et Gray. Saguaro Nat. Monument east of Tucson, Pima Co., AZ,

17 Apr. 1973. GBC 73-59. This is the first rust fungus recorded on *Baileya*. In early season, aecia and uredinia are produced on *Baileya* and *Psilostrophe* but are soon masked by telia.

1655. *PUCCINIA GRINDELIAE* Peck III. On *Haplopappus spinulosus* (Pursh) DC. Santa Catalina Foothills, north of end of North Campbell Ave., Tucson, Pima Co., AZ, 15 Feb. 1973. WGS, GBC & RLG 7207.

1656. *PUCCINIA GRINDELIAE* Peck III. On *Erigeron eatonii* Gray. Morton Pass, State Highway 34, Laramie Mts., Albany Co., WY, 8 July 1971, alt. 7,200 ft. WGS & RS 7081.

1657. *PUCCINIA GRINDELIAE* Peck III. On *Erigeron nematophyllus* Rydb. Laramie Mts., between City Reservoir and Pilot Knob, Albany Co., WY, 3 Aug. 1969. WGS & RS 6806.

1658. *PUCCINIA GRINDELIAE* Peck III. On *Gutierrezia sarothrae* (Pursh) Britt. Morton Pass, State Highway 34, Laramie Mts., Albany Co., WY, 8 July 1971, alt. 7,100 ft. WGS & RS 7082.

1659. *PUCCINIA GRINDELIAE* Peck III. On *Psilostrophe cooperi* (Gray) Greene. Santa Catalina Foothills, north of end of North Campbell Ave., Tucson, Pima Co., AZ, 15 Feb. 1973. WGS, GBC & RLG 7205.

1660. *PUCCINIA HELIANTHELLAE* Arth. O, I, II, III. On *Helianthella quinquenervis* (Hook.) Gray. Hillside near Lizard Point, Grand Teton Nat. Park, WY, 15 Aug. 1971. John Baxter.

1661. *PUCCINIA HEUCHERAE* (Schw.) Diet. var. *austroberingiana* Savile III. On *Saxifraga arguta* D. Don. Paint Brush Canyon, Grand Teton Nat. Park, WY, 18 Aug. 1960. GBC 60-40.

1662. *PUCCINIA HIERACII* (Roehling) Mart. II, III. On *Crepis acuminata* Nutt. Hunter Creek, 2.5 miles northeast of Aspen, CO, 11 Aug. 1975. GBC 75-16.

1663. *PUCCINIA HIERACII* (Roehling) Mart. II, III. On *Lygodesmia juncea* (Pursh) D. Don. Wheatland Cutoff, State Highway 34, Laramie Mts., Albany Co., WY, 30 Sept. 1956, alt. 6,100 ft. WGS & RS 4668.

1664. *PUCCINIA HYDROPHYLLI* Peck et G. W. Clint. ssp. *mertensiae* (Peck) Hennen III. On *Mertensia ciliata* (James) D. Don. Silver Lake Camp Ground, Medicine Bow Mts., Carbon Co., WY, 15 Aug. 1969. WGS & RS 6817.

1665. *PUCCINIA INANIPES* Diet. et Holw. O, I, II, III. On *Eupatorium solidaginifolium* Gray. Rucker Canyon Lake, Chiricahua Mts., Cochise Co., AZ, 14 Sept. 1973. GBC & RLG 73-123.

1666. *PUCCINIA LASCHII* Lagerh. II. On *Cirsium*. Highway 82, 4 miles southwest of Sonoita, Santa Cruz Co., AZ, 14 May 1968, alt. 4,500 ft. WGS & RS 6752. *Puccinia cirsii* Lasch, 1859, under which this fungus has passed, is antedated by *P. cirsii* Kirch., 1856 (see Savile, Can. J. Bot. 48:1574-1576. 1970). *P. laschii* sometimes is treated as a synonym of *P. calcitrapae* DC.

1667. *PUCCINIA LIGUSTICI* Ell. et Ev. III. On *Oxypolis fendleri* (Gray) Heller. About 2.5 miles east on East Maroon Creek Trail, south of Aspen, CO, 21 July 1975. GBC 75-15.

1668. *PUCCINIA MINUSSENSIS* Thuem. O, I, II, III. On *Lactuca pulchella* (Pursh) DC. Muddy Gap, Carbon Co., WY, 29 June 1971, alt. 6,000 ft. WGS & RS 7079.

1669. *PUCCINIA MONOICA* Arth. On *Thlaspi montanum* L. Along semi-open Ute Trail through spruce-lodgepole pine woods south of Lake Irene, Rocky Mountain Nat. Park, CO, 9 July 1975, alt. 10,400 ft. F. J. Hermann.

1670. *PUCCINIA OENOTHERAE* Vize II, III. On *Camissonia californica* (Nutt. ex Torr. et Gray) Raven. Along highway, Santa Catalina Mts., Pima Co., AZ, 12 Apr. 1968, alt. 3,600 ft. WGS, RS & RLG 6734.

1671. *PUCCINIA PALLIDISSIMA* Speg. On *Stachys coccinea* Jacq. Sycamore Canyon, Santa Cruz Co., AZ, 24 Sept. 1975. GBC 75-40.
1672. *PUCCINIA PENSTEMONIS* Peck III. On *Penstemon pinifolius* Greene. Crest Trail, near boundary to Wilderness Area, Chiricahua Mts., AZ, 24 Oct. 1974. GBC 74-27. This is a new host for the rust.
1673. *PUCCINIA POARUM* Niels. 0, I. On *Helenium hoopesii* A. Gray. Dark Canyon, UT, 18 July 1912, alt. 9,500 ft. Ernest P. Walker 308.
1674. *PUCCINIA PUNCTIFORMIS* (Strauss) Roehling 0, I. On *Cirsium arvense* (L.) Scop. About 3.7 miles east of reservoir on County Highway 12, Laramie Mts., Albany Co., WY, 13 July 1971. WGS & RS 7093.
1675. *PUCCINIA RECONDITA* Rob. ex Desm. 0, I. On *Clematis ligusticifolia* Nutt. Two miles south of Poncho Springs, CO, off Highway 285, in sage-juniper association, 24 July 1970. Horace R. Simms Sf-750.
1676. *PUCCINIA RECONDITA* Rob. ex Desm. 0, I. On *Delphinium*. Sixteen miles east of Carr, CO, 18 July 1970. H. R. Simms, S. Shushan and R. Fogel, Sf-10,001.
1677. *PUCCINIA RECONDITA* Rob. ex Desm. 0, I. On *Hydrophyllum capitatum* Dougl. ex Benth. To left of Pilgrim Creek, at base of ridge, Grand Teton Nat. Park, WY, 1 July 1956, alt. 6,850 ft. WGS & RS 4478.
1678. *PUCCINIA RECONDITA* Rob. ex Desm. II, III. On *Agropyron cf. spicatum* (Pursh) Scribn. Section 32, Weld Co., CO, 18 July 1970. H. R. Simms, S. Shushan & R. Fogel Sf-10,004.
1679. *PUCCINIA SENECIONIS* Lib. I, III. On *Senecio crassulus* A. Gray. Lost Man Lake Trail, 1.5 miles from Lost Man Camp Ground, east of Aspen, CO, 29 July 1975. GBC 75-17.
1680. *PUCCINIA STIPAE* Arth. 0, I. On *Chrysothamnus visidiflorus* (Hook.) Nutt. ssp. *lanceolatus* (Nutt.) Hall et Clements. Happy Jack Road, east of Pole Mt., Laramie Mts., Albany Co., WY, 7 July 1960, alt. 8,200 ft. WGS & RS 5801.
1681. *PUCCINIA SUBDECORA* Syd. et Holw. On *Brickellia grandiflora* (Hook.) Nutt. Cascade Canyon, Grand Teton Nat. Park, WY, 12 Aug. 1971. John Baxter.
1682. *PUCCINIA TETRAMERII* Seym. On *Tetramerium hispidum* Nees. Sycamore Canyon, Santa Cruz Co., AZ, 24 Sept. 1975. GBC 75-44.
1683. *PUCCINIA VERATRI* Duby II, III. On *Veratrum californicum* Durand. Four miles up Hunter Creek, Northeast of Aspen, CO, 11 Aug. 1975. GBC 75-14.
1684. *PUCCINIA XANTHII* Schw. On *Ambrosia* (*Franseria*) *confertifolia* (DC.) Rydb. This is the first record of this rust on this host. East end of North Columbus Blvd., Tucson, Pima Co., AZ, 14 May 1968. WGS 6755.
1685. *PUCCINIA XANTHII* Schw. III. On *Ambrosia psilostachya* DC. North Columbus Blvd., Tucson, Pima Co., AZ, 4 May 1968. WGS & RS 6738.
1686. *RAVENELIA RETICULATAE* Long II, III. On *Calliandra reticulata* Gray. Gardner Canyon, east side of Santa Rita Mts., Coronado Nat. Forest, Pima Co., AZ, 11 Sept. 1975. GBC 75-34.
1687. *TRANZSCHELIA COHAESA* (Long) Arth. 0, I. On *Anemone tuberosa* Rydb. Picture Rock Pass, Tucson, AZ, 1 Mar. 1973. WGS, GBC & RLG 7229.
1688. *TRANZSCHELIA COHAESA* (Long) Arth. 0, I, II, III. On *Anemone tuberosa* Rydb. Near Rocking K Ranch, Colossal Cave Road, east of Tucson, AZ, 22 Mar. 1973. GBC 73-33.
1689. *TRANZSCHELIA COHAESA* (Long) Arth. On *Anemone tuberosa* Rydb.

Molino Basin, Santa Catalina Mts., Tucson, AZ, 5 Feb. 1973. GBC 73-9. We follow Cummins (Mycologia 67:176. 1975) in considering that *T. tucsonensis* (Arth.) Diet. is a synonym of *T. cohaesa*.

1690. *UROMYCES GLYCYRRHIZAE* Magn. O, I. On *Glycyrrhiza lepidota* Pursh. Geyser Basin, UT, 30 July 1912. Ernest P. Walker 370. This is the uredinoid aecial form.

1691. *UROMYCES INTRICATUS* Cooke O, I. On *Eriogonum brevicaule* Nutt. About 1.4 miles north of bridge on Little Medicine Bow River, 5 miles north of Medicine Bow, WY, State Highway 487, 2 July 1967, alt. 7,000 ft. WGS & RS 6591.

1692. *UROMYCES JONESII* Peck III. On *Ranunculus alismaefolius* Geyer ex Benth. Between Albany and Keystone, Medicine Bow Mts., Albany Co., WY, 27 July 1973. WGS, WGS II & RS 7306.

1693. *UROMYCES JUNCI-EFFUSI* P. et H. Syd. II. On *Juncus saximontanensis* A. Nels. *f. brunnescens* (Rydb.) Hermann. Cypress Camp Ground, Rucker Canyon, Chiricahua Mts., Cochise Co., AZ, 14 Sept. 1973. GBC 73-120.

1694. *UROMYCES MEXICANUS* Diet. et Holw. III. On *Desmodium rosei* Schubert. Gardner Canyon, east side of Santa Rita Mts., Coronado Nat. Forest, Pima Co., AZ, 11 Sept. 1975. GBC 75-33.

1695. *UROMYCES MEXICANUS* Diet. et Holw. III. On *Desmodium procumbens* (Mill.) A. S. Hitchc. Rucker Canyon, Chiricahua Mts., Cochise Co., AZ, 17 Nov. 1961. GBC 61-479.

1696. *UROMYCES MINOR* Schroet. I, III. On *Trifolium parryi* Gray. Lost Man Lake Trail, 2 miles from Lost Man Camp Ground, east of Aspen, CO, 7 Aug. 1975. GBC 75-29.

1697. *UROMYCES PSORALEAE* Peck. On *Psoralea lanceolata* Pursh. Nine miles northeast of Nunn, Weld Co., CO, 28 July 1970. H. R. Simms, S. Shushan & R. Fogel Sf-10,003.

1698. *UROMYCES PSORALEAE* Peck O, I. On *Psoralea lanceolata* Pursh. About 2.5 miles south of Burns, Laramie Co., WY, 17 June 1960, alt. 5,400 ft. WGS 5794.

1699. *UROMYCES PUNCTATUS* Schroet. II. On *Astragalus lentiginosus* Dougl. Tangerine Road about 1/2 mile from Oracle Road, Tucson, AZ, 7 Apr. 1968, alt. 2,700 ft. WGS & RS 6717.

1700. *UROMYCES VICIAE-FABAE* (Pers.) Schroet. O, I, II, III. On *Lathyrus leucanthus* Rydb. South Brush Creek Camp Ground, Medicine Bow Mts., Carbon Co., WY, 6 Aug. 1968. WGS & J. McHenry 6783.

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# NOTES ON HYPHOMYCETES XXX. ON THREE SPECIES OF *IDRIELLA*.

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## ABSTRACT

*Idriella angustispora* Morgan-Jones and *I. bambusae* Morgan-Jones, two new species of *Idriella* Nelson and Wilhelm, are described, illustrated, and compared with other species of the genus. *Idriella variabilis* Matsushima is described and illustrated from a collection made in Alabama.

## INTRODUCTION

The generic name *Idriella* Nelson and Wilhelm was established for a single species, *I. lunata*, isolated from a root rot of strawberry. The fungus was recognized as the causal organism of this disease for which black, sunken lesions are symptomatic (Nelson and Wilhelm, 1956). The genus is characterized by possession of polyblastic, sympodial, pigmented, denticulate conidiogenous cells bearing hyaline, lunate or falcate conidia. *Idriella lunata* also produces a chlamydospore state to which Ellis (1971) applied the name *Trichocladium*.

The genus remained monotypic until Ram (1970) and Vittal (1970) each added one species to it. *Idriella couratarii* Ram was described from isolates derived from wood samples of *Couratari* sp. in Brazil whilst *I. vandalurensis* Vittal was collected in leaf litter of *Capparis* sp. in India. Both species have similar characteristics to *I. lunata* differing only in a few details, perhaps the most important of which is conidium length. The presence of a single transverse septum in the conidium of *I. vandalurensis* and possession of septate conidiophores were cited as distinguishing characteristics of this species. In addition no chlamydospores were described. *I. couratarii* was described as having intercalary chlamydospores borne in irregular chains. These are not identifiable with the genus *Trichocladium* Harz.

Matsushima (1971a, 1971b) enlarged the genus *Idriella* further by the addition of three species collected in New Guinea. These are *I. mycogonoidea* and *I. variabilis*, isolated from garden and woodland soils respectively, and *I. ramosa*, collected on rotten leaves of an unnamed broad-leaved tree and grown on sterilized leaves of *Musa paradisiaca*. The specific epithet *mycogonoidea* was derived from the fact that the chlamydospores of this taxon are similar to those characteristic of the genus *Mycogone* Link. The chlamydospores of *I. ramosa* and *I. variabilis*, however, resemble those figured by Ram for *I. couratarii*.

Kimbrough and Atkinson (1972) discovered a connection between the discomycete *Hymenoscyphus caudatus* (Karsten) Dennis and an *Idriella* sp. Cultures grown from single ascospores of the former produced a conidial state closely similar to *I. couratarii* and *I. variabilis*.

A sixth species, *I. desertorum*, isolated from desert soil from Egypt, was added subsequently by Nicot and Mouchacca (1972). This produces chlamydospores resembling those of *I. lunata*. Some further account of the cultural characteristics of *I. desertorum* was provided by Gol (1972).

Sutton et al (1972) in a study of *Microdochium* Sydow, to which three species were added, noted the similarities between this genus and *Idriella*. A possible merger of these two genera together with *Chloridiella* Arnaud, whose common characteristics with *Idriella* had been pointed out earlier by Nicot and Charpentie (1971), was suggested. Judgment on the advisability of considering them synonymous was, however, reserved until such time as more details of behaviour in culture and on natural substrata are available. *Arxiella lunata* Ruscoe was recognized to be incorrectly classified in *Arxiella* Papendorf and to be more appropriately placed in *Idriella*. To avoid creating a later homonym of *Idriella lunata* Nelson and Wilhelm by transfer of Ruscoe's binomial a new name, *I. australiensis*, was proposed for this taxon, this becoming the seventh species of *Idriella* published.

Mouchacca and Samson (1973) subscribed to the view that *Microdochium* and *Idriella* should be maintained as separate genera when they added two new species to the former.

Matsushima (1975) reported that *I. variabilis* is indistinguishable in pure culture from *Circinotrichum fertile* Pirozynski and Hodges. *C. fertile* was transferred into *Idriella* as *I. fertilis* and *I. variabilis* listed as a synonym in spite of the fact that the latter name, published in 1971, predates *C. fertile* by two years. In the same publication Matsushima described and illustrated three additional *Idriella* species but without applying any specific epithets to them. One of these (MFC -4867) was noted as being similar to *Microdochium caespitosum* Sutton, Pirozynski and Deighton. Sutton et al (1972) had previously drawn attention to a similarity between *M. caespitosum* and *I. vandalurensis*

although the condium length measurements given for his collection (20 - 30 μ) differ from those given in the type description of this species (13 - 23 μ).

During the course of an investigation of leaf litter fungi associated with *Quercus nigra* L. and *Bambusa* sp. in Alabama a number of collections assignable to *Idriella* have been obtained. There are two taxa among these which differ significantly from the species of this genus described hitherto. New names for them are established herein. Another is identified as *I. variabilis*.

## TAXONOMIC PART

*Idriella angustispora* sp. nov. (Fig. 1)

Coloniae effusae, brunneae, pilosae. Mycelium partim superifciale, partim in substrato immersum, ex hyphis ramosis, septatis, hyalinis vel pallide brunneis, laevibus, 1.5 - 4 μ crassis compositum. Chlamydosporae terminales vel intercalares, plerumque catenatae, aggregatae, abundantes, globosae, ovoideae vel ellipsoideae, crassi tunicatae, leviae, brunneae. Conidiophora macronemata, aggregata, ex chlamydospora et hyphis repentibus oriunda, stipite principali non ramoso, cylindrica, erecta, recta, brunnea vel pallide brunnea, apicem versus subhyalina, septata, usque ad 48 μ longa, 3 - 4 μ crassa. Cellulae conidiogenae holoblasticae, discretae, sympodiales vel synchronicae, subhyalina vel hyalina, cylindricae vel ampulliformes, usque ad 15 μ longae, 2 - 3 μ crassae; apex nodosus. Conidia sicca, acropleurogena, falcata, continua, hyalina, laevia, 29 - 32 X 1 - 1.5 μ.

In foliis dejectis Quercus nigrae, Auburn University, Lee County, Alabama, May 18, 1978. R. C. Sinclair, AUA, holotypus.

Colonies effuse, brown, hairy. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, hyaline to pale brown, smooth, 1.5 - 4 μ wide hyphae. Chlamydospores terminal or intercalary, frequently in chains, crowded, abundant, globose, ovoid or ellipsoid, thick-walled, smooth, brown. Conidiophores macronematous, mononematous, crowded, arising from the chlamydospores or from superficial repent hyphae, main stipe unbranched, cylindrical, erect, straight, pale brown to brown, subhyaline towards the apex, septate, up to 40 μ long, 3 - 4 μ wide. Conidiogenous cells holoblastic, discrete, in groups of three or four at the tip of the conidiophore stipe, sympodial or synchronous, cylindrical to ampulliform, up to 15 μ long, 2 - 3 μwide; apex nodose. Conidia dry, acropleurogenous, falcate, continuous, hyaline, smooth, 29 - 32 X 1 - 1.5 μ.

On fallen leaves of *Quercus nigra* L.; N. America.

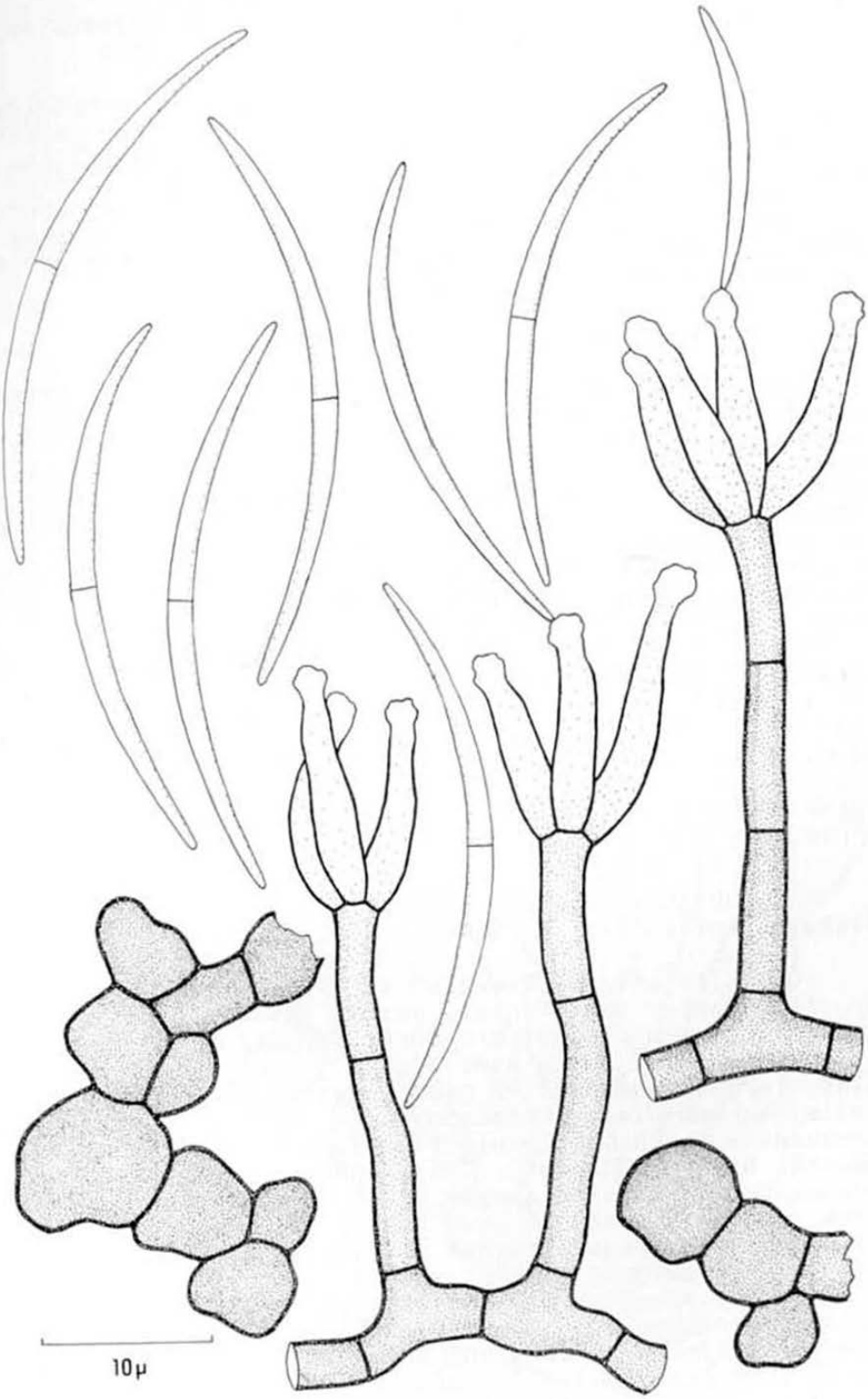


FIGURE 1. *Idriella angustispora*

Specimen examined: on *Q. nigra*, Auburn University, Lee County, Alabama, May 18, 1978, R. C. Sinclair.

*I. angustispora* differs from *I. ramosa*, a morphologically similar species, in several respects. Its conidia have a greater uniformity of size and, although falling within the length range of *I. ramosa*, are appreciably narrower. Furthermore the conidiophores of *I. angustifolia* have an unbranched main stipe bearing a single terminal whorl of a few conidiogenous cells, quite different from the abundantly branched conidiophores of *I. ramosa*.

*Idriella bambusae* sp. nov. (Fig. 2).

Coloniae effusae, fuscae vel atrae. Mycelium partim superficiale, partim in substrato immersum, ex hyphis ramosis, hyalinis vel pallide brunneis, laevibus, 2 - 4 µ crassis compositum. Stroma plectenchymatum ex cellulis pallide brunneis vel brunneis compositum. Chlamydosporae terminales vel intercalares, plerumque catenatae, ovoideae vel ellipsoideae, crassitunicatae, leviae, brunneae. Conidiophora macronemata, mononemata, ex stroma et hyphis repentibus singulatim vel in caespitulos pusillos oriunda, simplicia, interdum ramosa, cylindrica, erecta, recta, subhyalina vel pallide brunnea, versus apices pallidiora, leavia, usque ad 32 µ longa, 2.5 - 3.5 µ crassa, septis paucis praedita. Cellulae conidiogenae holoblasticae, discretae, sympodiales vel synchronicae, ampulliformes usque ad 13 µ longa, 2.5 - 3 µ latae, superne attenuatae, 1 - 1.5 µ latae; apex nodosus, denticulatus. Conidia sicca, acropleurogena, ex denticulis terminalibus successivis singulatim producta, falcata, continua, hyalina, laevia, 17 - 22 X 1 - 1.5 µ.

In caulibus emortuis Bambusae, Auburn, Lee County, Alabama, April 1978, R. Munsey, AUA, holotypus.

Colonies effuse, brownish to black, spreading. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, hyaline to pale brown, smooth, 2 - 4 µ wide hyphae. Stroma plectenchymatic, flat, repent, composed of pale brown to brown, irregular cells, superficial. Chlamydospores terminal or intercalary, frequently in chains, ovoid to ellipsoid, thick-walled, smooth, brown, abundant. Conidiophores macronematous, mononematous, arising singly or in loose fascicles of a few from stromatic cells or from superficial, repent hyphae, simple or sometimes branched, cylindrical, subhyaline to pale brown, paler distally, smooth, up to 32 µ long, 2.5 - 3.5 µ wide, usually with one or two septa especially when arising from hyphae. Conidiogenous cells holoblastic, discrete, sympodial to synchronous, narrowly ampulliform, up to 13 µ long, 2.5 - 3 µ wide at the base, narrowed to 1 - 1.5 µ wide distally, but slightly inflated at the extreme apex and bearing a number of small denticles each of which produces a single conidium. Conidia dry,

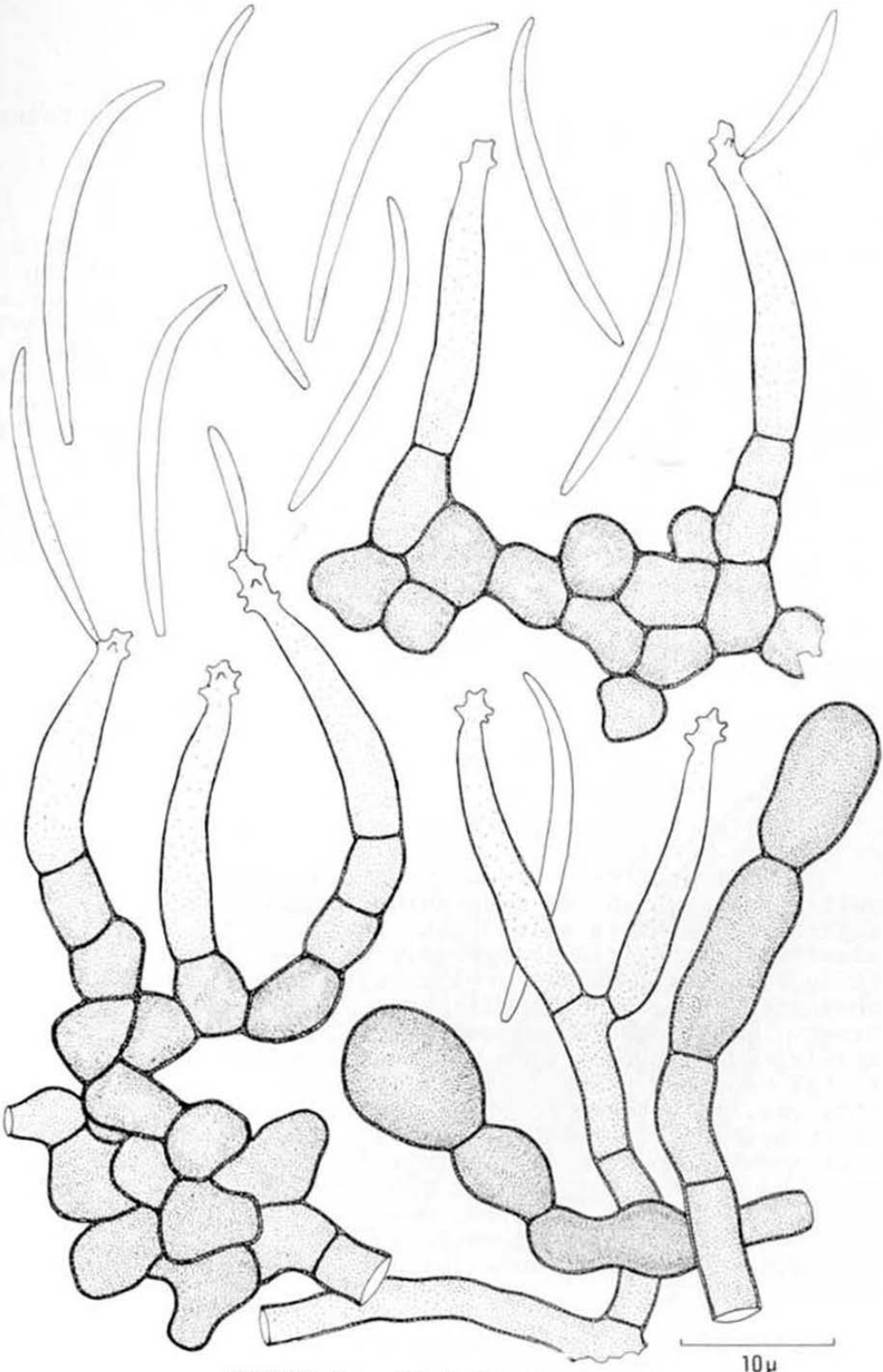


FIGURE 2. *Idriella bambusae*

acropleurogenous, produced in sympodial succession, falcate, curved more abruptly above, attenuating to a pointed apex, narrowly truncate at the base, continuous, hyaline, smooth, 17 - 22 X 1 - 1.5 µ.

On dead stems of *Bambusa* sp.; N. America.

Specimen examined: on *Bambusa* sp., Auburn, Lee County, Alabama, April 1978, R. Munsey, AUA, type.

Of the species of *Idriella* described to date *I. bambusae* most clearly resembles *I. couratarii* and *I. variabilis*. Its chlamydospores are very similar to those of these two species and there is an appreciable overlap in conidium length among the three. The conidia of *I. bambusae* however show less variation in length than those of either *I. couratarii* or *I. variabilis* being consistently towards the upper limit of their range and frequently several microns above. The conidia of *I. bambusae* are also narrower than those of the other two species. Additional distinguishing characteristics of *I. bambusae* are a greater degree of attenuation and curvature toward the upper third of the conidia and the presence of a narrow, but easily discernible, truncation at the base. It also differs from *I. variabilis* in having much shorter conidiophores whose apices are not as inflated but which bear prominent denticles.

*Idriella variabilis* Matsushima, Microfungi of the Solomon Islands and Papua-New Guinea, 31, 1971 (Fig. 3).

= *Circinotrichum fertile* Pirozynski and Hodges, Can. J. Bot. 51:160, 1973 [fide Matsushima, 1975].

≡ *Idriella fertilis* (Pirozynski and Hodges) Matsushima, Icones microfungorum a Matsushima lectorum 86, 1975.

Colonies effuse, brown. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, hyaline to pale brown, smooth, 1 - 5 µ wide hyphae; sometimes aggregated irregularly to form stromatic tissue. Chlamydospores terminal or intercalary, frequently in chains, abundant, subglobose to ellipsoid, thick-walled, smooth, brown. Conidiophores macronematous, mononematous, crowded, arising in fascicles of a few from stromata or from superficial repent hyphae, cylindrical, unbranched, erect, straight, pale brown to brown, paler towards the apex which is subhyaline, up to 90 µ long, 3 - 4 µ wide. Conidiogenous cells holoblastic, integrated, terminal, cylindrical, up to 23 µ long, 3 µ wide at the base, narrowed to 1.5 - 2 µ wide distally; inflated, nodose, 2.5 - 3 µ wide at the extreme apex. Conidia acropleurogenous, produced in sympodial succession, subfalcate, continuous, hyaline, smooth, 20 X 2 µ.

On dead leaves of *Castanopsis, Persea, Quercus, Sequoia* and *Tsuga*, and from soil; Japan, N. America, Papua-New Guinea.

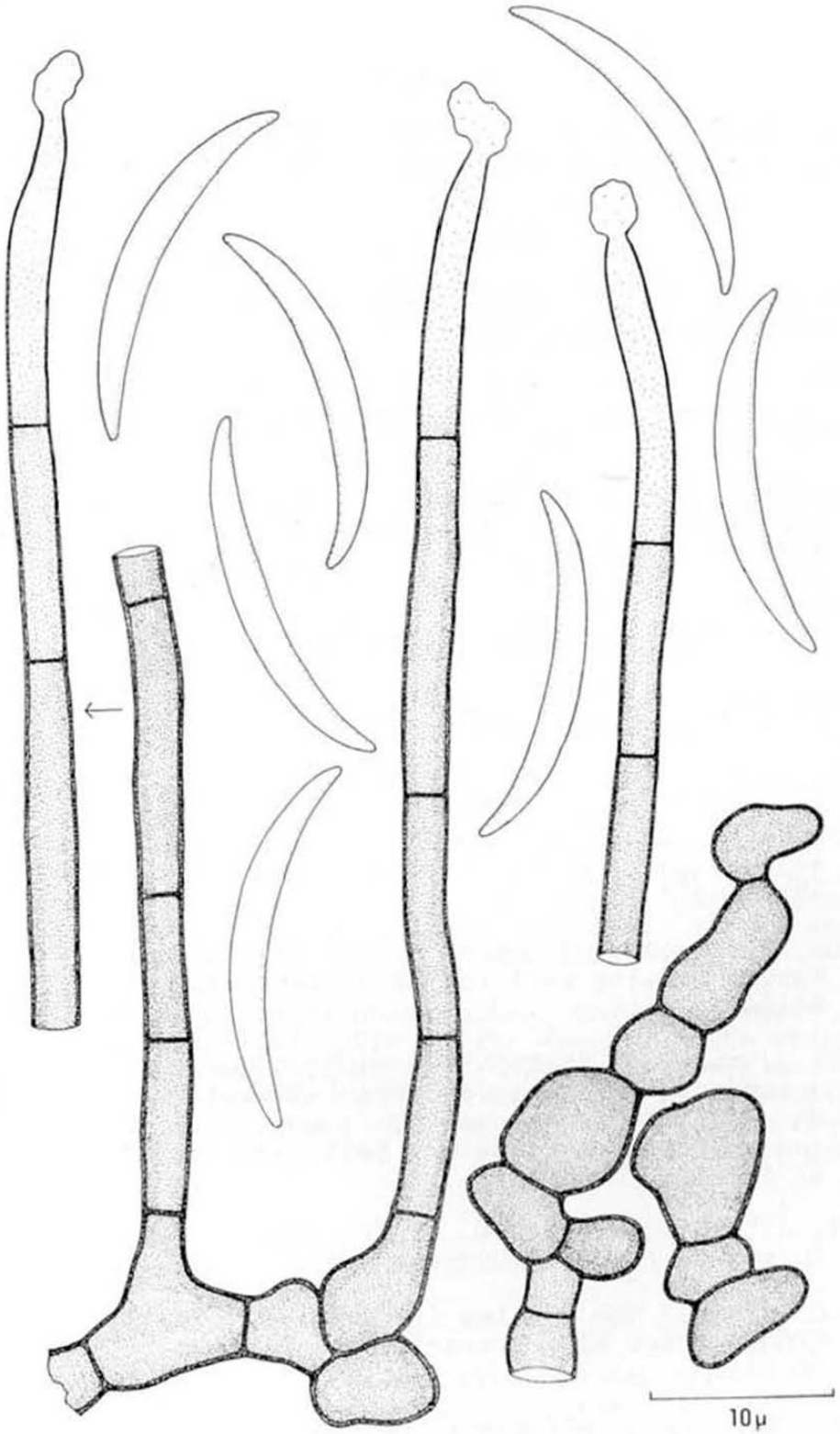


FIGURE 3. *Idriella variabilis*

Specimen examined: on *Q. nigra*, Auburn University, Lee County, Alabama, May 18, 1978, R. C. Sinclair.

ACKNOWLEDGMENT

I thank Dr. J. Leland Crane, Illinois Natural History Survey, for reviewing the manuscript.

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# NOTES ON HYPHOMYCETES. XXXI. *CHAETOPSINA AUBURNENSIS* SP. NOV.

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## ABSTRACT

*Chaetopsina auburnensis* Morgan-Jones, a new species, is described and illustrated from collections made on fallen leaves of *Quercus nigra* L. in Alabama. It is compared with several fungi possessing similar morphologies.

## INTRODUCTION

A number of dematiaceous hyphomycetes that produce phialidic conidiogenous cells directly from cells of robust, erect setae are known. Such fungi are classified in the genera *Chaetopsina* Rambelli, *Codinaeopsis* Morgan-Jones, *Cryptophiale* Pirozynski, *Gonytrichum* C.G. & F. Nees ex Pers., and *Zanclospora* Hughes and Kendrick. In *Circinotrichum fertile* Pirozynski and Hodges, which Matsushima (1975) considered to be the same fungus as *Idriella variabilis* Matsushima, the conidiogenous cells originate in the same way but in this taxon they are polyblastic.

A fungus, apparently undescribed, producing monophialidic conidiogenous cells in the manner of the above named genera has been collected on three occasions on fallen leaves of *Quercus nigra* in Alabama. It is considered best assigned to the genus *Chaetopsina*. It is, however, readily distinguishable from the two species of that genus described hitherto.

## TAXONOMIC PART

*Chaetopsina auburnensis* sp. nov. (Figs. 1 and 2)

Coloniae effusae, pilosae, atrobrunneae vel nigrae. Mycelium immersum, ex hyphis septatis, ramosis, pallide brunneis, laevibus, 2 - 4 μ crassis compositum. Setae singulatim dispersae vel fasciculatae, simplices vel ramosae, erectae, rectae vel curvae, septatae, laeves, crasse

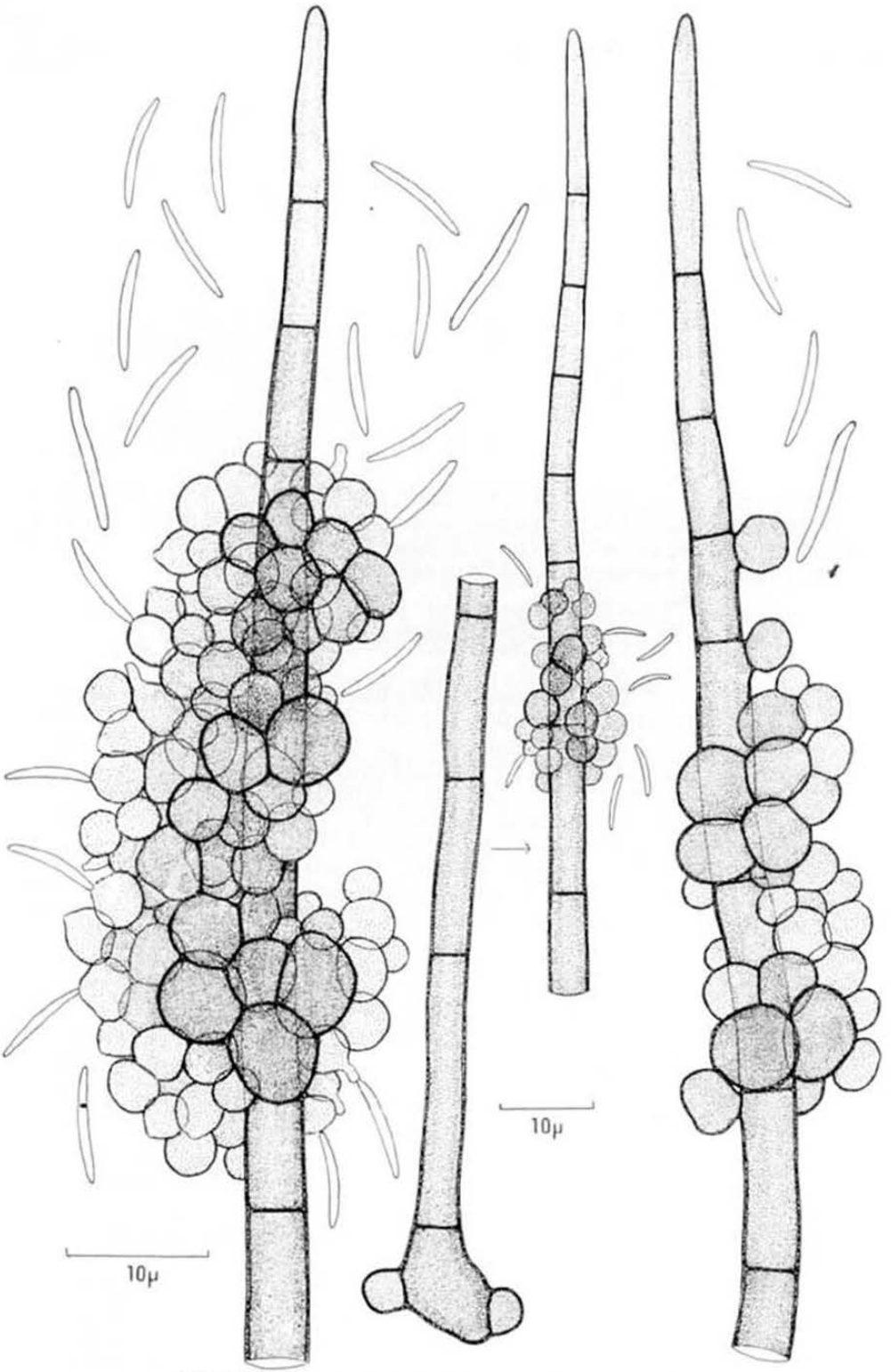


FIGURE 1. *Chaetopsina auburnensis.*
Fertile setae (conidiophores)

tunicatae, brunneae, superne gradatim angustiores et pallidiores, apicem versus subhyalinae, usque ad 400 µ longae, 6 - 7 µ crassae, basi 12 - 15 µ, apice 2 µ crassae, cellulas conidiogenas e latere gerentes. Cellulae conidiogenae (monophialides) discretae, determinatae, circa setas in fasciculis exorientes, ampulliformes, laeves, pallide brunneae. Conidia hyalina, aseptata, fusiformia, recta vel leviter curvata, laevia, 4 - 8 X .5 - .75 µ.

In folis dejectis *Quercus nigrae*, Auburn University, Lee County, Alabama, April 1976, E.G. Ingram, AUA, holotypus.

Colonies effuse, hairy, dark brown or blackish. Mycelium immersed, composed of septate, branched, pale brown, smooth hyphae 2 - 4 µ wide; sometimes aggregated into loosely arranged stromata of ellipsoid to subglobose, thick-walled, 5 - 7 µ wide cells. Setae scattered singly or sometimes in loose fascicles of a very few, simple or branched, erect, straight or slightly curved, septate, brown, gradually narrowing and becoming paler distally, subhyaline at the apex, thick-walled, up to 400 µ long, 6 - 7 µ wide in the middle part, 12 - 15 µ wide at the bulbous base, 2 µ wide at the apex; branches, of which there may be few to many, setiform, septate, pale brown, radiating from a single locus, up to 150 µ long, frequently intermixed at their point of origin with subglobose stalk cells. Conidiogenous cells monophialidic, crowded, discrete, determinate, ampulliform to lageniform, pale brown to subhyaline, 2.5 - 3 µ wide, often with short, narrow necks, arising in dense groups around the middle part or about two-thirds the way up the setae, formed directly from the cells of the setae or, more usually, from subglobose to somewhat angular, pale brown to brown stalk cells, 4 - 6 µ in diameter. Conidia hyaline, aseptate, fusiform, straight or slightly curved, smooth, 4 - 8 X .5 - 1 µ.

On fallen leaves of *Quercus nigra;* N. America.

Collections examined: (1) on *Q. nigra*, Auburn University Forestry Plots, Auburn, Lee County, Alabama, April 1976, E.G. Ingram, AUA, type; (2) on *Q. nigra*, Chewacla State Park, Lee County, Alabama, May 1976, G. Morgan-Jones, AUA; (3) on *Q. nigra*, same location as type, May 1978, R.C. Sinclair.

*Chaetopsina auburnensis* shows considerable variation in the morphology of its setae. In a few instances setae have been observed bearing neither stalk cells nor lateral branches. Sometimes setae bear only one or a few lateral branches and no stalk cells. Where there are many branches a cluster of stalk cells is also usually present, indeed some of the branches may originate from stalk cells. Rarely, if ever , are conidiogenous cells produced on setae bearing branches however.

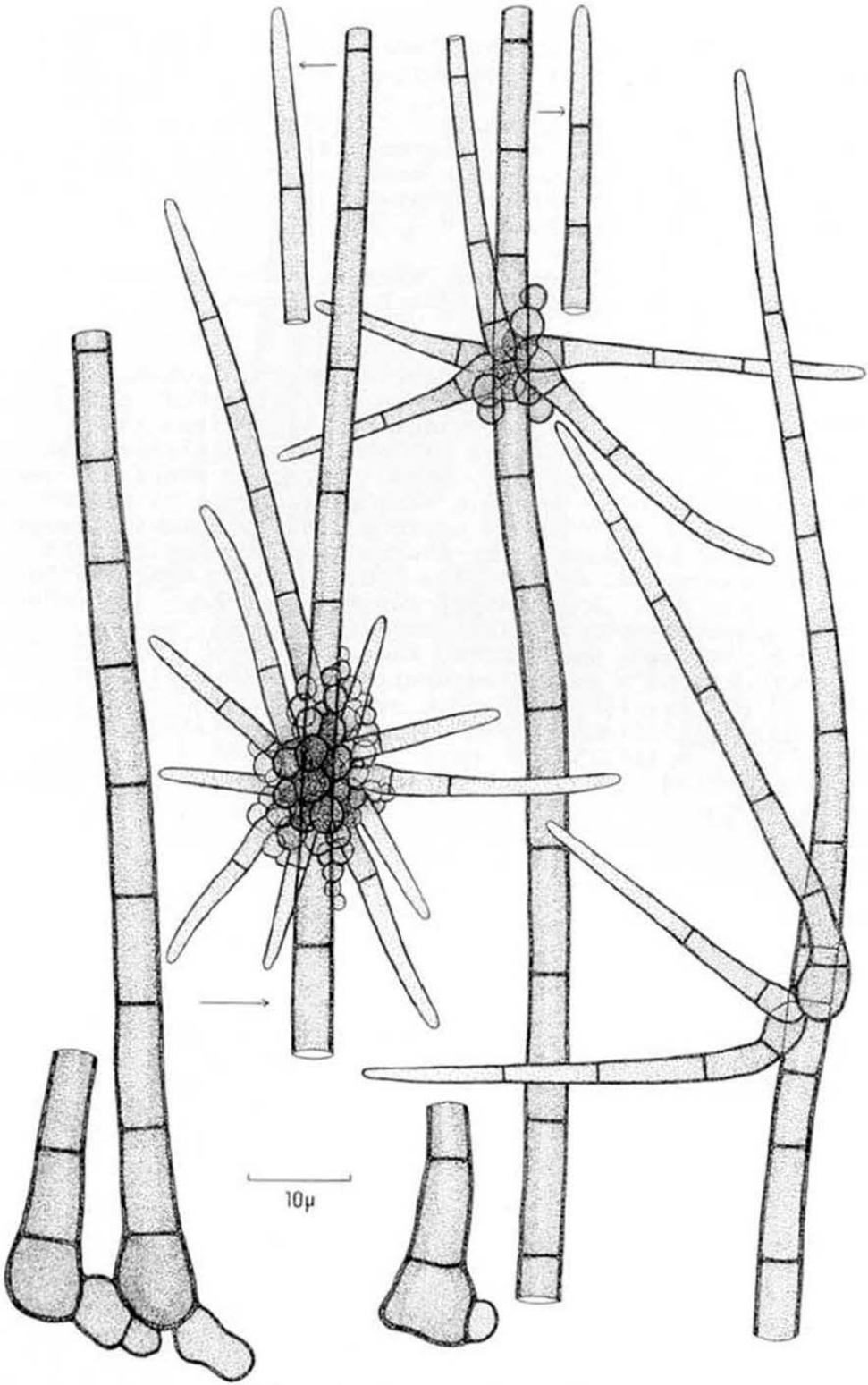


FIGURE 2. *Chaetopsina auburnensis.* Sterile setae

Lateral setal branches are known in several fungi of similar morphology. For example Pirozynski and Hodges (1973) noted the occurrence of setiform so-called 'false branches' arising from short lengths of hyphae produced laterally on the setae of *Circinotrichum fertile*. Encircling hyphae produced from the setose conidiophores of *Codinaeopsis gonytrichoides* (Shearer and Crane) Morgan-Jones sometimes behave similarly, growing out to give rise to setose branches Setose conidiophores bearing a number of setiform branches are characteristic of *Gonytrichum macrocladum* (Sacc.) Hughes.

*Chaetopsina fulva* Rambelli, the type species of *Chaetopsina*, was described from collections on fallen leaves of *Cedrus deodara* Loud., *Laurus nobilis* L., *Carpinus* and *Quercus* in Italy (Rambelli, 1956). It has subsequently been found in Japan on leaves of *Pinus densiflora* Seib. and Zucc. (Tubaki and Saito, 1969) and on *Cinnamomum japonicum* Sieb. and *Machilus thunbergii* Sieb. and Zucc. (Matsushima, 1975). There are also records of its occurrence in soil in Canada (Barron, 1968), on rotten leaves from Papua-New Guinea (Matsushima, 1971) and on fallen leaves of *Persea boronica* Spreng. in the U.S.A. (Pirozynski and Hodges, 1973). The fungus is characterized by possession of erect, subulate, brown, setiform conidiophores bearing short, hyaline, hypha-like lateral branches which give rise to a cluster of monophialidic, lageniform conidiogenous cells. Its conidia are simple, cylindrical and hyaline. Pirozynski and Hodges (1973) reported that the conidiogenous cells in their collection were almost globose.

Matsushima (1971) described a second species, *Chaetopsina ramifera*, collected on leaves of *Castanopsis* sp. in Papua-New Guinea. This differs from *C. fulva* in that the setiform conidiophore stipe produces a verticil of 1 to 4 branches of similar morphology in addition to a number of short, repeatedly branched hyphae which give rise to hyaline conidiogenous cells. The conidia are somewhat fusiform and slightly curved.

*Chaetopsina auburnensis* can be distinguished from both *C. fulva* and *C. ramifera* by several characteristics. The presence of dense clusters of more or less subglobose, thick-walled, brown stalk cells from which the conidiogenous cells arise is an unique feature of *C. auburnensis*. Other distinguishing features are the radiating setal branches and conidium size.

ACKNOWLEDGMENT

I am grateful to Dr. C.J.K. Wang for reviewing the manuscript.

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# FOLIICOLOUS ASCOMYCETES: 3. THE STALKED CAPNODIACEOUS SPECIES

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## SUMMARY

This study is intended as a monographic revision of stalked fungi in the taxon Capnodiaceae von Höhnel (1910) sensu von Arx and Müller (1975). Two genera are recognized. Scorias and Phragmocapnias both produce hyaline ascospores with two or more transsepta. Phragmocapnias is distinguished from Scorias by the presence of setae on the outer surface of the locule wall.

## INTRODUCTION

In order to reevaluate the specific and generic concepts, all specimens cited in the literature which could be located, as well as other collections, were examined. Observations were made of all possible taxonomically significant characters. Concepts of taxa were then formulated on the basis of the resulting data analysis. Descriptions in the literature were utilized for specimen identification and in an understanding of the historical position of the species concerned. The name selected to represent my concept of a valid taxon was determined from following the International Code of Botanical Nomenclature (Stafleu, 1972). Cognizance was taken of the recommendations by the International Mycological Association Nomenclature Secretariat, prepared as a result of deliberation concluded in August 1977 at the 2nd International Mycological Congress.

The holomorphic species is basically comprised of one and possibly two components. The prime holomorphic part of the nomenclatorially valid taxonomic system is the sexual reproductive component of the life history--the teleomorphosis (Hennebert and Weresub, 1977). A second component is any asexual reproductive part of the holomorphic life history--the anamorphosis or anamorphoses. The specimens were examined for a teleomorphic documentation of a particular holomorph. Any anamorphosis demonstrated by following a protocol described below to be a

component of a holomorph was so recognized.

The taxonomically reliable structure produced by the teleomorphosis is the ascocarp. The wall and the sexual reproductive system contained within are perceived as two basic ascocarp components. Reliable wall characters which can be utilized in taxon definition are the cellular pattern of wall tissue and external and internal appendages; the characters of the sexual system relate to the ascus and the ascospores.

The tissue types used by Korf (1951) apply to the wall surrounding the hymenial locule. Appendages may develop from the exterior or interior surface of the locule wall. External appendages are seta, clypeus and stalk. The seta is a lateral to apical outgrowth which forms from a single cell during locule wall formation. In all Capnodiaceae species examined so far, the setal wall contains a melinoid pigmentation; the seta may be septate at maturity or not. The clypeus is a shield-like appendage covering the ascocarp and is not present in the capnodiaceous species discussed in this monograph. The stalk is regarded as an appendage. It differs from the seta in position and in time of formation in the development of the ascocarp. The stalk is a column of tissue which is terminated with the hymenial system surrounded by the locule walls. The stalk is similar to clypeus in that both structures begin formation before the initiation of the portion of the ascocarp which will come to contain the hymenial system. The stalk differs from the clypeus in the attachment to the locule wall. The columate stalk tissue is always attached below the wall surrounding the hymenial locule; the shield-like clypeus has an apical to lateral attachment to the locule wall.

The hymenial system consists of asci with specialized walls. This type of ascus is characterized as bitunicate, in the sense of Luttrell (1951), and exhibits a nasse apicale (Reynolds, 1971a). An additional character is the reaction of the ascus wall to the Kohn-Korf iodine-potassium hydroxide protocol (1975). The blue coloration characteristic of a positive reaction is confined to the outer layer of the ascus and is more intense in younger asci. This suggests that the primary exoascus layer of the bitunicate ascus is reactive while the secondary endoascus layer is not. The ascospore wall is inconsistently Kohn-Korf positive. A positive reaction is more difficult to demonstrate in older herbarium material in that more time is required for the blue color to be seen and the reaction is also less intense.

The mature ascus will contain usually eight ascospores; no surrounding cytoplasm remains. The wall is considerably reshaped to accommodate the ascospores. The nasse apicale is best observed in the ascus after the secondary wall layer, the endoascus, has been deposited on

the inner surface of the primary wall layer, the exoascus, which is formed during the extension of the ascus mother cell. With the onset of meiosis and the subsequent ascoporogenesis, the ascus may change shape and the walls may become thinner in the lower areas. The nasse apicale may appear obscured in some mature asci and wider in some species than others.

The ascospore is best described when mature in the ascus before discharge. Spore pigmentation is a reliable character at this stage of development. A melinoid or orange to yellow brown (Kelly and Judd, 1976) pigmentation ultimately develops in all capnodiaceous species, but the time of pigment deposition in the ascospore wall is taxonomically significant. Some capnodiaceous species produce the pigmentation during ascospore maturation. In others, the pigmentation does not appear until after discharge from the ascus and the onset of the germination process. The latter ascospores are termed hyaline to indicate that the mature ascospore has no wall pigmentation before discharge from the ascus. Occasionally hyaline ascospores will be seen to germinate in the ascus and thus have developed some pigmentation; these have been mistakenly described as pigmented or having an unusual shape. A mature ascospore can be recognized by thickened outer walls, completed cross walls and a highly vacuolated cytoplasm, sometimes characterized by the presence of oil droplets. Immature ascospores by contrast have thinner walls and a dense non-vacuolated protoplast. Septation of the ascospore is also a reliable taxonomic character. The ascospore follows a distinct pattern of septum development during its development in the ascus. The first septum is formed perpendicular to the long axis of the spore and divides the protoplast into two cells. Then each half of the newly divided spore becomes once or more transversely septated. The longitudinal septa form after the transverse septa have formed. Occasionally, a collection of a particular species will produce ascospores in which the longisepta fail to appear; however, examination of many ascocarps will demonstrate the usual character. At onset of germination, a germ tube protrudes from one or more ascospore cells. Changes in ascospore morphology and color can accompany this process.

Luttrell (1951) proposed a device for organizing the Pyrenomycetes which is useful in the taxonomy of these fungi as a unifying character. Luttrell meant the centrum to refer to the characters within the ascocarp during development and at maturity. I (Reynolds, 1978b) have described the Capnodium centrum which characterizes the fungi monographed here. The major elements of this centrum type are the uniloculated ascocarp, the bitunicate ascus and the periphysoids.

The anamorphosis or anamorphoses must be demonstrated with non-intuitively derived positive proof to be a holo-

morphic life history component in order to be taxonomically significant. Taxonomically reliable structures produced by the anamorphosis are conidia and any attendant fruit bodies. The following protocol will demonstrate the required positive proof of holomorphic pleomorphy, i.e. the relationship of any anamorphosis to a teleomorphosis.

1. Primary confirmation from spore production in pure culture by an isolate which is derived from one of the following sources:

   a. Ascospore from a single ascospore isolate.
   b. Conidiospore from a single ascospore isolate.
   c. Ascospore from a single conidiospore isolate.

2. Secondary confirmation, to be used in addition to #1, from spore production utilizing specimens representing an annual growth cycle which meet all of the following requirements:

   a. Produced in nature,
   b. a series of fruit bodies,
   c. obtained in chronological sequences of maturity,
   d. from a single collection site.

The secondary confirmation procedure is least desirable when used alone, but can give a basis for reasonable assumption of holomorphic pleomorphy.

Unacceptable means which rely on an intuitive assumption of holomorphic pleomorphy found in the literature include:

   a. Primae facie determination from side-by-side occurrence of several reproductive states in a single collection (e.g. McAlpine, 1896).
   b. Comparative gross morphology of sexual and asexual fruit bodies (e.g. Yamamoto, 1954b).
   c. A dependence on hyphal morphology in order to imagine organic relationships between reproductive states (e.g. Hughes, 1976).

The data for each specimen are regarded as a unit of identification. For this reason, the information is cited as written on a label without update. For example, names of geographic localities and scientific names of associated higher plants are not edited for contemporary accuracy. This approach allows specimen verification as well as correction of discrepancies in an author's original or quoted material. The label information is categorized into Collector, Location, Collection date, Associated plant, Herbarium data and Original determination. The categories where information is available are listed

sequentially; each is punctuated by semicolons and commas. The label information statement is terminated by a period.

Example: McGinty, H. A. #10: Philippines, Camarines Sur, Magarao: 20 XII 1908: Ficus bugulu: NY100*,(S), (Fungi Exsicatti Philippinensis 23); LAM501: Capnodium +.

The H. A. McGinty specimen number 10 was collected in the Philippines, Camarines Sur Province, in the town of Magarao, on 20 December 1908. The fungus was found associated with Ficus bugulu. The collection examined came from the New York Botanical Garden and has the number 100 --the asterisk indicates that this is type material; the specimen originally came from the Stockholm herbarium and was number 23 in Fungi Exsicatti Philippinensis; the LAM number assigned to duplicate or slide preparation from the collection is 501. The initial determination of the collection was Capnodium; the "+" indicates that other fungi were noted in the collection.

KEY TO SPECIES

A Ascocarp appendaged with stalk and setae

PHRAGMOCAPNIAS BETLE

A' Ascocarp appendaged with stalk only . . . . . B

B Ascocarp occurring singly or severally on projections from surface of hygroscopic stroma; distribution temperate North America

SCORIAS SPONGIOSA

B' Ascocarp not occurring as in B, distribution tropical to subtropical . . . . . C

C Ascospores 12-17 mμ x 3-6 mμ

SCORIAS BRAZILIENSIS

C' Ascospores 19-28 mμ x 3-6 mμ

SCORIAS PHILIPPINENSIS

NOMEN HOLOMORPHOSIS GENUS:

Phragmocapnias Theissen and Sydow emend. Reynolds 1917. Annales Mycologici 15:480. Pro Parte, teleomorphosis only.

TELEOMORPHOSIS: Ascospores hyaline, transseptate, ascus bitunicate; Hymenium basal, surrounded by wall which is internally appendaged with periphysoids and externally

appendaged with setae and stalk; Ascocarp uniloculate, ostiolate.

ANAMORPHOSIS: Incertus.

Type species: Phragmocapnias betle (Sydow and Butler) Theissen and Sydow emend. Reynolds

NOMINA SYNONYMA GENUS:

=Antennellopsis Mendoza
1925. B. P. Bishop Mus. Bull. 19:55-56. Pro Parte, teleomorphosis only.

=Chaetoscorias Yamamoto
1955. Spec. Publ. in honor of 60th anniversary of Dr. Y. Tochinae and T. Jukushi. Kasai Shuppan Inst., Minato-ku, Tokyo, pp. 54, 56. Pro Parte, teleomorphosis only.

=Neocapnodium Yamamoto
1955. Spec. Publ. in honor of 60th anniversary of Dr. Y. Tochinae and T. Kukushi. Kasai Shuppan Inst., Minato-ku, Tokyo, pp. 54, 56. Pro Parte, teleomorphosis only.

≡Neocapnodium Yamamoto
1957. Sci. Rep. Hyogo Univ. of Agr., Agr. Biol. Ser. 3:32. Pro Parte, teleomorphosis only.

≡Neocapnodium Yamamoto emend. Hughes
1976. Mycologia 68:794-795. Pro Parte, teleomorphosis only.

=Phragmocapnias Theissen and Sydow emend. Hughes
1976. Mycologia 68:799-800. Pro Parte, teleomorphosis only, NON Trichomerium Spegazzini.

NON Phragmocapnias (Theissen and Sydow) emend. Batista and Ciferri
1963. Saccardoa 2:177. Spores were considered to be pigmented.

DISCUSSION

Spegazzini (1918) accepted Limacinia Neger as having hyaline ascospores. He established Phragmocapnias as a new genus on the basis of Capnodium betle Syd. & Butl. (Sydow et al. 1917) and distinguished it from Limacinia by, "...sporen braun...." He was wrong on both counts. I have seen lectotypic material of Limacinia fernandeziana Neger, the type species of Limacinia, and know the ascospores to be pigmented. I have also examined the C. betle holotype, as well as an isotype. The type specimen of C. betle is Stockholm (S) is delapidated in that the ascocarps are moldy and mostly overmature. The specimen in Kew (K) is

more scanty, but in the same condition. Most ascocarps in the type material are empty, without asci and ascospores. Ascocarps containing asci with ascospores are sparse. Hughes (1976) correctly redescribed the ascospores as hyaline, in contrast to the, "...dein fuscis" characterization by Sydow and Butler. Hughes mentioned pigmented spores on the substratus surface without mention of how they were determined to be ascospores. The fruit body stalk was not recognized in Hughes' redescription from the type material. Hughes (1976) also stated that an anamorphosis was, "...attached to the same hyphae..." as the teleomorphosis. I do not accept this observation; the skepticism I expressed earlier (1978a) concerning the intuitive attitude toward holomorphic pleomorphy is underscored. In their major treatment of the Capnodiaceae (1963a), Batista and Ciferri accepted Spegazzini's definition of Phragmocapnias as having pigmented ascospores. They did not examine the types nor authenticate material of most of the species they included in this genus.

The Phragmocapnias ascocarp is appendaged with setae, as Hughes (1976) also pointed out, and additionally with stalk. The stalk is minimally present, but distinct, in the type material, when compared to collections from the Pacific Basin. Capnodium coffeicola Puttemans, the supposed type species of the genus Trichomerium which was listed by Hughes (1976) as a synonym of Phragmocapnias without examination of the holotype. I examined Puttemans' specimen in Rio de Janeiro. I do not accept Hughes' synonymic placement of Trichomerium in Phragmocapnias.

The name Phragmocapnias seems problematic because of its establishment based on a misconception of the type species. However, I utilize Phragmocapnias with the assumption that the recognition of hyaline ascospores in the type species will also demand a change in the single spore related character used to establish the genus. Spegazzini (1918) should have correctly written, "sporen farblos." The parts of the International Code of Botanical Nomenclature dealing with priority are in regard to a name attached to a type and are unaffected by a different taxon concept resulting from a redescription of that type so long as the original holotype is clearly utilized for the same name.

I have revised Yamamoto's contributions to a degree that some explanation is needed. Yamamoto stated (1958a) that all his specimens collected, "...during the period 1937-1942..." remained in Taiwan. "The collected fungi enabled the author to carry out taxonomic as well as ecological studies in the phytopathological laboratory..." in Taiwan. He later wrote (1961), "The results of these investigations were mainly reported in the Transactions of the Natural History Society of Formosa, Journal of the Society of Tropical Agriculture (Formosa), Annals of the Phytopathological Society of Japan, and Science Reports of

the Hyogo University of Agriculture during the period 1940 to 1958...." Yamamoto went to some length in order to prove his assumption that the teleomorphosis and the anamorphoses found in foliicolous colonies were holomorphic. He utilized experimental techniques involving pure culture work as well as randomly collected specimens from nature. The statements in his publications imply that definite proof was obtained of holomorphic pleomorphy in sooty mold Ascomycetes. In order to examine Yamamoto's specimens, and to verify the experimental work, I visited Japan and Taiwan. I was able to interview his former laboratory technician as well as colleagues, concerning Yamamoto's work. I examined the collections cited in his publications as well as additional ones. In addition, I obtained pure culture isolates of sooty mold fungi from Taiwan localities identical to those utilized by Yamamoto for the same purpose. Yamamoto's experimental protocol was duplicated with the Taiwan isolates.

The Yamamoto collections in Taiwan contained specimens marked "typus" for species described by other authors. No duplicate specimens of foreign collections were located in his collections representing the legitimate holotypes of these same species. I strongly suspect that Yamamoto did not see original types or other authenticated material. The material of Japanese mycologists working with Japanese sooty mold Ascomycetes was largely war destroyed.

No cultures from ascospores of Taiwan sooty mold Ascomycetes were obtained by me. Pycnidiospore derived cultures yielded asexual fruit bodies similar to those from which the conidia were derived.

Several aspects of Wataro Yamamoto's modus operandi are evident and are important to note in that they effected the taxonomy he published.

1. Yamamoto established his own "type" from a Taiwan collection for a non-Yamamoto species.

2. Yamamoto did not accurately describe the ascocarps he utilized as the basis of several taxa.

3. Yamamoto did not obtain cultures from single ascospore isolate; ascocarps of sooty mold Ascomycetes were not produced in pure culture.

4. Yamamoto obtained cultures from single pycnidiospore isolates; conidia and fruit bodies of dematiaceous fungi and other Deuteromycetes were produced in pure culture.

5. Yamamoto failed to demonstrate a connection between a sooty mold teleomorphosis and any anamorphoses.

6. Yamamoto compared nature and pure culture derived

pycnidia with nature derived ascocarps, i.e. he intuitively determined perfect-imperfect relationships on the basis of gross morphology similarities and primae facei associations of fruit bodies found in the Taiwan collections he made.

7. Yamamoto defined taxa so as to include a teleomorphosis and anamorphoses merely assumed to be holomorphic components, i.e. without positive proof.

8. Yamamoto assigned holomorphic names to certain collections on the basis of anamorphoses present rather than a teleomorphosis.

9. Yamamoto's Taiwan and Japan publications on Taiwan fungi were done on the basis of data produced during his stay in Taiwan although his forced wartime return to Japan blocked access to his materials.

I conclude that Yamamoto's taxonomy of Taiwan fungi was highly intuitive and unsupported by the experimental work he undertook.

NOMEN HOLOMORPHOSIS SPECIES:

Phragmocapnias betle (Sydow and Butler) Theissen and Sydow emend. Reynolds.

TELEOMORPHOSIS: Ascospores hyaline, cylindrical to elliptical, with bluntly acute apexes, 16-29 x 3-5 mμ, with 3 (-5) transsepta; Ascus bitunicate with nasse apicale present at apex of inner wall, obclavate, 35-50 mμ in length; Ascus Wall Kohn-Korf (IKI-KOH) reaction positive; Hymenium basal in locule, surrounded by wall comprised of textura angularis tissue; Locule Wall internally appendaged with periphysoids which are branched, septate, hyaline, present or absent at ascocarp maturity; Locule Wall externally appendaged with setae and subtending stalk, setae 55-115 mμ x 5-6 mμ, septate or not at maturity, stalk single, discoid to cylindrical, 12-40 mμ. Ascocarp containing a single locule, ostiolate. 75-165 mμ x 70-120 mμ.

ANAMORPHOSIS: Incertus.

Type Specimen: S. Som, A. L.; East Pakistan, Dacca: 5 IV 1910: Piperis betle. Isotype Specimen: K.

NOMEN SYNONYMUM SPECIES:

(Basionym) Capnodium betle Sydow and Butler 1911. Annales Mycologici 9:384. Pro Parte, teleomorphosis only.

=Antennellopsis mangiferae Mendoza

1925. B. P. Bishop Mus. Bull. 19:55-56. Pro Parte, teleomorphosis only.

≡Antennellopsis mangiferae Mendoza emend. Batista and Ciferri
1963. Saccardoa 2:65-66. Pro Parte, teleomorphosis only.

=Capnodium tanakae Shirai and Hara emend. Sawada
1929. Studies Citrol 3:264. Cited as C. tanakae (Shirae and Hara) Sawada. Pro Parte, teleomorphosis only. NON Capnodium tanakae Shirai and Hara.

=Neocapnodium tanakae (Shirai and Hara) Yamamoto
1957. Sci. Rep. Hyogo Univ. of Agr., Agr. Biol. Ser. 3:33. Pro Parte, teleomorphosis only. NON Capnodium tanakae Shirai and Hara.

≡Neocapnodium tanakae Yamamoto
1954. Ann. Phytopath. Soc. Japan 19:1. Nomen nudum, genus not yet described.

=Scorias communis Yamamoto
1954. Ann. Phytopath. Soc. Japan 19:3, 5. Pro Parte, teleomorphosis only.

=Scorias cylindrica Yamamoto
1954. Ann. Phytopath. Soc. Japan 19:3, 5. Pro Parte, teleomorphosis only.

=Chaetoscorias vulgare Yamamoto
1957. Sci. Rep. Hyogo Univ. Agr., Agr. Biol. Ser. 3: 36. Pro Parte, teleomorphosis only.

≡Chaetoscorias vulgare Yamamoto.
1954. Ann. Phytopath. Soc. Japan 19:5. Nomen nudum, genus not yet described.

=Antennellopsis vulgaris (Yamamoto) Batista and Ciferri
1963. Saccardoa 2:65-66. Pro Parte, teleomorphosis only.

=Antennellopsis elegans Batista and Ciferri
1963. Saccardoa 2:62. Pro Parte, teleomorphosis only.

=Antennellopsis formosa Batista and Ciferri
1963. Saccardoa 2:64. Pro Parte, teleomorphosis only.

=Trichomerium jambosae Batista and Ciferri
1963. Saccardoa 2:213-215. Pro Parte, teleomorphosis only.

## PHRAGMOCAPNIAS SPECIES IMPERFECTLY KNOWN:

Antennella citri Sawada
1929. Studies Citrol 3:261. The type of this species is badly damaged. No ascocarps remain in the collection. Sawada later published this species as a synonym of Antennella citrina Hara. See the discussion under Scorias. This species is probably a synonym of P. betle.

## EXCLUDED SPECIES

Phragmocapnias callitris (McAlpine) Ciferri and Batista
1963. Saccardoa 2:179. The ascospores were considered to be pigmented.

Phragmocapnias crassa (Patouillard) Theissen and Sydow emended Batista and Ciferri
1963. Saccardoa 2:179. The ascospores were considered to be pigmented.

Phragmocapnias fulignoides (Rehm) Ciferri and Batista
1963. Saccardoa 2:180. The ascospores were considered to be pigmented.

Phragmocapnias heliconiae Batista and Ciferri
1963. Saccardoa 2:180-182. The ascospores are pigmented.

Phragmocapnias inspericua (Saccardo) Batista and Ciferri
1963. Saccardoa 2:182. This species belongs in the genus Trichomerium.

Phragmocapnias juniperi (Cooke) Theissen and Sydow
1917. Ann. Mycol. 15:480. The ascospores were considered to be pigmented.

Phragmocapnias resinae (Saccardo and Bresadola) Theissen and Sydow emend. Batista and Ciferri
1963. Saccardoa 2:182-183. The ascospores were considered to be pigmented.

Phragmocapnias salicina (Montagne) Ciferri and Batista
1963. Quaderno 3:98. This combination was published nomen nudum and was apparently to be based on Capnodium salicinum Montagne emend. Fraser (1935).

Phragmocapnias smiliciana Mendoza
1925. Bulletin B. P. Bishop Museum 19:58-59. This species belongs in the genus Limacinia Neger.

## SPECIMENS EXAMINED

Batista, A. C. --Brasil, Pernambuco, Jabatao: Croton campestris: URM2794; LAM200721: Antennellopsis elegans +.

Butler, E. J. --Burma, Amherst, Mudon: 6 I 1908: Piper betle: S, (Herb. Sydow), (Herb. Crypt. Ind. Orient 1062); LAM200816: Capnodium betle.

Charles and A. Ballon. --Cuba, Santiago de Las Vegas: 18 X 1921: Durante repens: URM9129; LAM200724: Trichomerium jambosae +.

Fenix, E. --Philippines, Palawan: VII 1912: Cocos nucifera: URM3947, (Herb. P. A. Saccardo); LAM200861: Antennellopsis mangiferae.

Fujikuro, Y. --Taiwan: 12 XII 1907: Thea senenis: TNU; LAM201870: Scorias capitata.

Nascimento, M. L. --Brasil, Pernambuco, Recife, Dois Iramos: Mangifera indica: URM2690*; LAM200503: Antennellopsis formosum +.

Obregon, Rafael. --Colombia, La Esperanza: V 1934: Labiatae: URM5021, (BPI); LAM200860: Antennellopsis elegans.

Rhoads, Arthur S. --USA, Florida, Dade County, Snapper Creek, between Fairchild Tropical Garden and Chapman Field: 1 III 1944: Eugenia axillaris: BPI; LAM 201519: Capnodium.

Reinking, O. A. --Thailand, Bangkok: 16 I 1920: URM5246, (BPI); LAM200723: Trichomerium jambosae +.

Silva, S. J. --Brasil, Pernambuco, Recife, Casa Amarella: Psidium guajava: URM2669*; LAM200875: Antennellopsis elegans. Brasil, Pernambuco, Recife: Jambosae malaccensis: URM2606*; LAM200693: Trichomerium jambosae +. Brasil, Pernambuco, Vitoria: Bromelia: URM2635; LAM 200725: Trichomerium jambosae +.

Som, A. L. --East Pakistan, Dacca: 5 IV 1910: Piper betle: IMI26117, (Dacca Herb. Crypt. Ind. Orient); LAM200969: S*; LAM200816: Capnodium betle.

Stevens, F. L. --British Guyana, Vreid en Hoor: 10 VIII 1922: Mangifera indica: BISH*; LAM202069: ILL6629; LAM200605: Antennellopsis mangiferae. Puerto Rico, Utuado: 8 IX 1913: Sesamum indicum: URM9078; LAM20722: Trichomerium jambosae.

Yamamoto, W. --Taiwan, Sintiku, Sansa: 19 III 1942: Citrus poonensis: TNU; LAM201825: Scorias philippensis. Taiwan, Sintiku, Sansa: 19 III 1942: Citrus pooensis: TNU; LAM201843: Capnodium tanakae. #95: Taiwan, Sintiku, Sansa: 19 III 1942: Ficus retusa: TNU; LAM201824: Scorias philippensis. Taiwan, Sintiku, Simpô: 18 III 1942: Citrus maxima: TNU; LAM201814: Scorias philippensis. Taiwan, Sintiku, Simpô: 18 III 1942: Citrus

maxima: TNU; LAM201844: Capnodium tanakae. #59 --Taiwan, Sintiku, Simpô: 18 III 1942: Citrus tankan: TNU; LAM 201849: Antenella citri, Capnodium tanakae. #92 --Taiwan, Sintiku, Simpô: 19 III 1942: Citrus kotokan: TNU; LAM 201850: Antenella capnodium. Taiwan, Taihoku, Mokusaku: 16 III 1941: Leleba olhami: TNU; LAM201820: Scorias philippensis. --Taiwan, Taihoku, Sirin: 23 II 1941: Trema orientalis: TNU; LAM201811: Scorias philippensis?. #14 --Taiwan, Taihoku, Sirin: 16 II 1942: Citrus maxima: TNU; LAM201812: Scorias philippensis. --Taiwan, Taihoku, Sinten: 23 X 1938: Dendrocalamus latiflorus: TNU; LAM 201816; Scorias philippensis. --Taiwan, Taihoku, Sinten: 23 X 1938: Mallotus japonicus: TNU; Scorias philippensis. --Taiwan, Taihoku, Sinten: 14 I 1941: Leleba dolichoclada: TNU; LAM201817: Scorias philippensis. --Taiwan, Taihoku, Sinten: 22 II 1942: Schefflera octophylla: TNU; LAM 201818: Scorias philippensis. --Taiwan, Taihoku, Sirin: 29 I 1938: Citrus maxima: TNU; LAM201810: Scorias philippensis. --Taiwan, Taihoku, Sirin: 29 I 1939: Citrus maxima: TNU; LAM201842: Capnodium tanakae. #14 --Taiwan, Taihoku, Sirin: 8 II 1942: Citrus tankan: TNU; LAM 201813: Scorias philippensis. #22 --Taiwan, Taihoku, Tomita-tyo: 12 I 1939: Coffee liberica: TNU*; LAM201801: Scorias philippensis, Scorias communis. #8 --Taiwan, Taihoku, Tomita-tyo: 22 II 1942: Citrus sinensis: TNU; LAM 201848: Antenella citri. --Taiwan, Taihoku, Taihoku: 21 X 1938: Sapindas mukurossi: TNU; LAM201802: Scorias philippensis. --Taiwan, Taihoku, Taihoku: 16 X 1938: Castanea crenata: TNU; LAM201803: Scorias philippensis. --Taiwan, Taihoku, Taihoku: 1 X 1938: Eugenia malaccensis: TNU; LAM201666: Chaetoscorias. --Taiwan, Taihoku, Taihoku: 20 X 1938: Ficus septica: TNU; LAM201667: Chaetoscorias. --Taiwan, Taihoku, Taihoku: 16 XI 1938: Diaspyras kaki var. domestica: TNU; LAM201665: Chaetoscorias. --Taiwan, Taihoku, Taihoku: 12 I 1939: Coffea liberica: TNU: Capnodium tanakae. --Taiwan, Taihoku, Taihoku: 12 I 1939: Ficus septica: TNU; LAM201804: Scorias philippensis. --Taiwan, Taihoku, Taihoku: 13 I 1939: Psidium guajava: TNU; LAM201806: Scorias philippensis. --Taiwan, Taihoku, Taihoku: 13 I 1939: Ficus wrightiana: TNU; LAM201805: Scorias philippensis. --Taiwan, Taihoku, Taihoku: 25 XII 1940: Citrus tankan: TNU*; LAM201836: Capnodium tanakae. --Taiwan, Taihoku, Taihoku: 2 II 1941: Citrus maxima: TNU; LAM201837: Capnodium tanakae. --Taiwan, Taihoku, Taihoku: 9 II 1941: Coffea arabica: TNU; LAM201807: Scorias philippensis. --Taiwan, Taihoku, Taihoku: 10 II 1941: Coffea liberica: TNU; LAM201808: Scorias philippensis. --Taiwan, Taihoku: 28 II 1941: Mallotus repandus: TNU; LAM201839: Capnodium tanakae. --Taiwan, Taihoku, Taihoku: 9 III 1941: Halarrhena antidysenterica: TNU: Chaetoscorias. --Taiwan, Taihoku, Taihoku: 16 III 1941: Ficus bengalensis: TNU; LAM201840: Capnodium tanakae. --Taiwan, Taihoku, Taihoku: 16 III 1941: Gardinia angusta var. ovalifolca: TNU: Scorias philippensis. --Taiwan, Taihoku, Taihoku: 20 V 1942: Myrica rubra: TNU* (neotype); LAM201800: Scorias cylindrica. --Taiwan, Taihoku,

Taihoku, Tomita-cho: 6 XI 1938: Quercus glandulifera: TNU: Scorias philippensis. --Taiwan, Taihoku Botanical Garden: 13 III 1942: Eugenia malaccensis: TNU; LAM 201815: Chaetoscorias. --Taiwan, Taihoku: 16 II 1941: Citrus paradisii: TNU: Capnodium tanakae. #44 --Taiwan, Taityu, Nama, Nantoo: 20 III 1942: Achras zapota: TNU; LAM201827: Scorias. --Taiwan, Taityn, Nantoo: 21 III 1942: Citrus sinensis: TNU; LAM201826: Scorias philippensis. --Taiwan, Taityu, Nantoo: 21 III 1942: Citrus sinensis: TNU*; LAM201846: Capnodium tanakae. --Taiwan, Taitya, Nisui: 29 I 1942: Coffea arabica: TNU* (neotype); LAM201669: Chaetoscorias. --Taiwan, Taityu, Nisui: 29 I 1942: Coffea arabica: TNU; LAM201847: Capnodium tanakae. --Taiwan, Tainan, Kansirei: 28 XII 1938: Moesa formosana: TNU; LAM201823: Scorias philippensis. --Taiwan, Taityn, Nama, Nantto: 20 III 1942: Citrus pooensis: TNU; LAM201845: Capnodium tanakae. --Taiwan, Takao, Kuwarusu: 12 IV 1942: Cinchona: TNU; LAM201668: Chaetoscorias. --Taiwan, Takao, Kurarusu: 12 IV 1942: Cinchona: TNU; LAM201821: Scorias philippensis. --Taiwan, Takao, Kuwarusu: 12 IV 1942: Cinchona: TNU; LAM201841: Capnodium tanakae. --Taiwan, Takao, Kuwarusu: 12 IV 1942: Phyllostachys makinoi: TNU; LAM201822: Scorias philippensis. #33 --Taiwan: 2 XII 1942: Citrus maxima forma buntan: TNU; LAM201828: Scorias philippensis.

## DISCUSSION

Yamamoto completely ignored the setal appendage projecting from the outer surface of the ascocarp wall surrounding the hymenial locule. This appendage was found on every ascocarp in each Yamamoto collection cited under the several synonyms of P. betle which was reexamined; the specimens otherwise generally fit the description proffered. The illustration (Yamamoto, 1942b, 1955b, 1957b) of the synonymic species, Neocapnodium tanakae, as having a branch multiply bearing stalked ascocarps is not representative of Taiwan material. I again note that Yamamoto redescribed this Japanese species based on Taiwan material; the illustration was a promulgation as a result of the merger of the Yamamoto redescription with the original description and illustration of Shirai and Hara (Hara, 1916). The Shirai and Hara holotype is defunked; I could not locate additional Japanese material. As indicated in the discussion under "Species incompletely known" Capnodium tanakae Shirai and Hara seems to be a valid temperate Asian species closely related to S. spongiosa.

## NOMEN HOLOMORPHOSIS GENUS:

Scorias Fries emend. Reynolds
1825. Systema Orbis Vegetabilis 1:171.

TELEOMORPHOSIS: Ascospores hyaline, transseptate; Ascus bitunicate; Hymenium basal, surrounded by wall which is internally appendaged with periphysoids, and externally

appendaged with stalk; Ascocarp uniloculate, ostiolate.

ANAMORPHOSIS: Incertus.

Type species: Scorias spongiosa (von Schweinitz) Fries emend. Reynolds

NOMINA SYNONYMA GENUS:

≡Scorias Fries emend. Fries
1832. Syst. Mycol. 3:290. Pro Parte, teleomorphosis only.

≡Scorias Fries emend. Montagne
1856. Sylloge generum specierumque cryptogamarum quas in variis operibus descriptas..., nunc ad diagnosim.... Paris. J. B. Baillaiere. P. 257. Pro Parte, teleomorphosis only.

≡Scorias Fries emend. Saccardo
1882. Sylloge Fungorum 1:83. Pro Parte, teleomorphosis only.

≡Scorias Fries emend. Ellis and Everhart
1892. North American Pryenomycetes. Newfield, New Jersey, Private printing. P. 55. Pro Parte, teleomorphosis only.

≡Scorias Fries emend. Theissen and Sydow
1917. Ann. Mycol. 15:473. Pro Parte, teleomorphosis only.

≡Scorias Fries emend. Yamamoto
1957. Sci. Rep. Hyogo Univ. of Agr., Agr. Biol. Ser. 3:34. Pro Parte, teleomorphosis only.

≡Scorias Fries emend. Hughes
1976. Mycologia 68:807. Pro Parte, teleomorphosis only.

=Antennella Theissen and Sydow
1917. Annal. Mycol. 15:47. Pro Parte, teleomorphosis only.

=Hyalocapnias Batista and Ciferri
1963. Saccardoa 2:114. Pro Parte, teleomorphosis only.

=Leptocapnodium Batista and Ciferri
1963. Saccardoa 2:121. Pro Parte, a nomen confusum.

≡Leptocapnodium Batista and Ciferri emend. Hughes
1976. Mycologia 68:776-777. Pro Parte, teleomorphosis only.

NOMEN HOLOMORPHOSIS SPECIES:

Scorias spongiosa (von Schweinitz) Fries
1829. Systema Mycologicum 3:291 emend. Reynolds

TELEOMORPHOSIS: Ascospores hyaline, fusiform, 15-19 mμ x 5-6 mμ, with 3 transsepta; Ascus bitunicate, 55-60 mμ in length, nasse apicale present at apex of inner wall; Ascus Wall Kohn-Korf (IKI-KOH) reaction positive; Hymenium basal in locule, surrounded by wall comprised of textura angularis tissue; Locule Wall internally appendaged with periphysoids which are branched, septate, hyaline, and are present or absent at ascocarp maturity; Locule Wall externally appendaged with subtending stalk, forming cylindrical column measuring 100-300 mμ x 25-50 mμ; Ascocarp containing a single locule, ostiolate, borne on stroma surface projections, measuring 90-140 mμ x 75-100 mμ.

NOMEN ANAMORPHOSIS: Incertus.

ANAMORPHOSIS: Conidium unicellular, 8-10 mμ x 2-8 mμ, hyaline; conidiogenous cell enteroblastic, monophialidic or rarely not; conidiophores acropleurogenous, branched, hyaline, borne basally and laterally in cavity surrounded by walls comprised of textura prismatica tissue; Anamorphic centrum borne internally or terminally from rostrate outgrowths on stromal surface; Fruit body ostiolate, ostiole acolluminate or with a neck measuring 35-40 mμ x 75-300 mμ, which is fimbriate or not.

Type specimen. FH., (ex. Herbarium Curtis), (ex. Herbarium L. D. von Schweinitz). No collection data available.

NOMINA SYNONYMA SPECIES:

(Basionym) Botrytis spongiosa von Schweinitz
1822. Schrift. naturf.-Ges., Leipzig 1:127. Pro Parte teleomorphosis only.

≡Scorias spongiosa (Schw.) Ellis and Everhart
1892. The North American Pyrenomycetes. Privately published. Newfield, New Jersey. P. 55. Pro Parte, teleomorphosis only.

=Scorias spongiosa (Schw.) Fr. var. longipendiculata Batista and Ciferri
1963. Saccardoa 2:192.

SPECIES IMPERFECTLY KNOWN:

Capnodium caroliniense Berkeley and Desmazieres
1849. J. Roy. Soc. London 4:252-253.

Capnodium expansum Berkeley and Desmazieres
1849. J. Roy. Soc. London 4:253.

## SPECIMENS EXAMINED

Adams, J. F. --USA, Pennsylvania, Curtis County, Bear Meadows: 17 X 1919: Alnus: CUP30541, (Pennsylvania State College Department of Botany); LAM201632: Scorias spongiosa.

Anonymous --USA, Ohio: III: K, (Herb. M. J. Berkeley 145, in 1879); LAM200675: Scorias spongiosa. --USA, Ohio: K. (Herb. M. J. Berkeley in 1879); LAM200674, LAM 200676, UPS, (Herb. M. J. Berkeley), (Herb. E. Fries); LAM 200670, LAM200671: Scorias spongiosa. --USA, Pennsylvania: UPA, (Lenarmand); LAM200672, LAM200671: Scorias spongiosa. --Alnus: BPI; LAM201458. This is the only record known to me from the western USA. The published specimen data is regarded as unreliable. The specimen was published in Batista and Ciferri (1963) page 188 with the data, "Brown, W. H.: USA, Washington, Sellick: XII 1932." A note in the specimen packet indicates that the collection was sent by a Washington State Agriculture Department employee to V. K. Charles, who determined it as Scorias spongiosa. The sender had received the collection from Brown without collection data. Fagi and Alni: E, (Fungi Cardini 81); LAM201453: Scorias spongiosa. --FH*, (Herb. Curtis), (Herb. L. D. von Schweinitz); LAM200749: Scorias spongiosa. --E; LAM201452: Scorias spongiosa.

Banker, H. J. --USA, Pennsylvania, California: 22 III 1904: NYS, (Herb. Howard J. Banker); LAM201588: Scorias spongiosa.

Bigelow, M. E. B. #950: USA, Michigan, Cheboygan County, University of Michigan Biological Station, Camp area; 12 VII 1953: Pinus strobus: MASS; LAM201596: Scorias spongiosa. --#2671 and H. E. Bigelow: USA, Massachusetts, Conway, Baptist Hill: 24 V 1960: MASS; LAM 201599: Scorias spongiosa. --#4605 and H. E. Bigelow: USA, Vermont, Mount Mansfield State Forest, Little River area: 30 VIII 1964: Alnus: MASS; LAM201591: Scorias spongiosa.

Bird, Henry: USA, New York, Rye: XII 1911: Pine: NYS; LAM201576: Scorias spongiosa.

Brower, A. E.: USA, Maine, Wesley: XII 1934: Alnus: CUP25228; LAM201633: Scorias.

Burnham, Stewart H.: USA, New York, Washington County, east of Tripoli, along Halfway: VIII 1896: Alnus incana: CUP22844, (Flora of Lake George Region, New York); LAM201616: Scorias spongiosa. --USA, New York, Washington County, Southern W. Fort Ann, south bank of Tripoli pond: 16 III 1916: Alnus incana: CUP22191, (Flora of Lake George Region, New York); LAM201615: Scorias spongiosa. --USA, New York, NE of Forest Home: 12 XI 1904: CUP22845, (Flora of Cayuga Lake Basin, New York); LAM201623: Scorias

spongiosa. --USA, New York, Ithaca, Six Mile Creek: 27 III 1905: Fagus: CUP22933, (Flora of Cayuga Lake Basin, New York); LAM201619: Scorias spongiosa. --USA, New York, Southern W. Fort Ann, east of Tripoli, Halfway Brook: 20 X 1914: Alnus incana: CUP22603, (Flora of Lake George Regions, New York); LAM201624: Scorias spongiosa.

Clinton, G. W.: USA, New York, Buffalo: VIII 1871: Alnus incana: BUFF45455; LAM201610: Scorias spongiosa. --USA, New York, Buffalo: 3 X 1871: BUFF45458; LAM201613: Scorias spongiosa. --USA, New York, Springville: X 1873: BUFF45457; LAM201612: Scorias spongiosa. --Sp. 1873: Beech: BUFF45456; LAM201611: Scorias spongiosa.

Codding, G. M.: USA, New York, New York City: II 1917: Fagus?: MASS2111; LAM201600: Scorias spongiosa.

Coker, W. C.: USA, North Carolina, Chapel Hill: 1903: Beech: CUP; LAM201639: Scorias spongiosa.

Cooke, W. B. #2157: USA, Ohio, Hamilton County, Newtown Woods: 24 III 1933: Fagus grandiflora: OSC13988; LAM201604: Scorias spongiosa. --#17064 and V. G. Cooke: USA, Virginia, Prince William County, Manasses, near Ravenwood: "5-6-45": Beech: CUP, (Mycobiota of North America 171); LAM201629. WS21294; LAM201607: Scorias spongiosa. --#38253 and V. G. Cooke: USA, Ohio, Hocking County, Old Man's Cave State Park: 26 XI 1966: MASS; LAM201603: Scorias spongiosa.

Davis, W. H.: USA, Massachusetts, Amherst, Gun Club, The Notch: 30 V 1939: Pinus strobus: MASS; LAM201594: Scorias spongiosa.

Diehl, W. W.: USA, Virginia, Dead Run: IV 1924: Fagus americana: BPI; LAM201438: Scorias spongiosa.

Dimetrio, C. H.: USA, Missouri, near Perryville: Vere 1884: Fagi obducens: III, (Rabenhorst-Winter Fungi Europaei 3052); LAM200632: Scorias spongiosa.

Dudley, W. R.: New York, Ithaca, Six Mile Creek: 5 X 1889: Fagus: NYS; LAM201579: Scorias spongiosa.

Everhart, B. M.: USA, Pennsylvania, West Chester: VI 1884: Beech: CUP, (North American Fungi 1363a); LAM 301638. ILL; LAM200629. MASS, (North American Fungi 1363a); LAM201593. OSC35309, (North American Fungi 1363a); LAM201606. URM4821, North American Fungi 1363a); LAM 201442: Scorias spongiosa. --USA, Pennsylvania, West Chester: X 1885: Beech: CUP, (North American Fungi 1363b); LAM201637. ILL, (North American Fungi 1363b); LAM 200628. MASS, (North American Fungi 1363b); LAM201592. OSC35308, (North American Fungi 1363b); LAM201605; Scorias spongiosa.

Fitzpatrick, H.: USA, Pennsylvania, Center County, Bear Meadows: "6-12-1920": Alnus incana: CUP, (Fungi collected by Cornell University Plant Pathology, New York Botanical Garden, Pennsylvania State College Department of Botany, Syracuse University Department of Botany 68); LAM 201631: Scorias spongiosa. --and Roon: USA, New York, near Ithaca, Gorge at Enfield Falls: V 1920: Hemlock: CUP11132; LAM201614: Scorias spongiosa.

Fullerton, D. H.: USA, Maryland, Mitchellville: 2 III 1918: Fagus: CUP30540, (Plant Pathology, New York State); LAM201625: Scorias spongiosa.

Fultz, S.: USA, Massachusetts, South Amherst: 28 V 1970; Pinus strobus: MASS; LAM201595: Scorias spongiosa.

G., H. E.: USA, New York, Ithaca, Coy Glen: V 1885: Beech: CUP20591, (Herb. William R. Dudley), (Flora Cayuga Lake Basin, New York); LAM201618: Scorias spongiosa.

House, H. D.: USA, Essex County, Minerva, Upper Minerva Brook: 3 X 1927: Alnus incana: NYS, LAM201581: Scorias spongiosa.

Hungerford, R.: USA, New Hampshire, Grafton County, Littleton, one mile north: 11 VIII 1967: Pinus strobus: WS57475; LAM201608. WS57728; LAM201609: Scorias spongiosa.

Luttrell, E. S.: USA, Georgia, Athens, University of Georgia campus: 18 VIII 1973: Fagus grandiflora: LAM 200000. --USA, Georgia, Athens, University of Georgia campus: 25 X 1971; Fagus grandiflora: LAM200001. --USA, Georgia, University of Georgia campus: 2 II 1972: LAM 200002. --USA, Georgia, Athens, University of Georgia campus: 9 II 1972: Fagus grandiflora: LAM200003. --USA, Georgia, University of Georgia campus: 12 XI 1971: Fagus grandiflora: LAM200004. --USA, Georgia, Athens, University of Georgia campus: 20 II 1972: Fagus grandiflora: LAM200005. --USA, Georgia, Athens, University of Georgia campus: 02 XII 1971: Fagus grandiflora: LAM200006. --USA, Georgia, University of Georgia campus: 20 XII 1971: Fagus grandiflora: LAM200007. --USA, Georgia, Athens, University of Georgia campus: 21 I 1972: Fagus grandiflora: LAM200008. --USA, Georgia, University of Georgia campus: 05 IV 1972: Fagus grandiflora: LAM200009. --USA, Georgia, Athens, University of Georgia campus: 24 IV 1970: Fagus grandiflora: LAM200010. --USA, Georgia, Athens, University of Georgia campus: 11 V 1972: Fagus grandiflora: LAM200011. --USA, Georgia, Athens, University of Georgia campus: 11 V 1970: LAM200012. --USA, Georgia, Athens, University of Georgia campus: 10 V 1973: Fagus grandiflora: LAM200013. --and M. E. B. Bigelow 6184: USA, Georgia, Athens, University of Georgia campus: 22 III 1974: Fagus grandiflora: MASS; LAM201601: Scorias spongiosa.

Mackworth, G. D. #728: USA, Louisiana, Bogalusa: 13 II 1926: Pinus glabra: BPI*: Capnodium.

Manning, M. F.: USA, New York, New York City, Landscape Foresters Ltd.: Pinus strobus: NYS; LAM201575: Scorias spongiosa.

Overholts, L. O.: USA, Pennsylvania, Hutingdon County: 5 IX 1921: Tsuga canadensis: URM5158, (BPI); LAM201446.

Peck, C. H.: USA, New York, Wells: 19 IX 1904: NYS; LAM201585: Scorias spongiosa. --USA, New York, Ulster County, Barrytown: 26 VI 1908: Chestnut: NYS; LAM201590: Scorias spongiosa. --USA, New York, Elizabethtown: VI: Alnus rugosa: NYS; LAM201582: Scorias spongiosa. --USA, New York, Albany County, Karner: Alnus rugosa: NYS; LAM 201584: Scorias spongiosa. --and G. W. Clinton: USA, New York, Albany and Buffalo; NYS; LAM201583: Scorias spongiosa.

Ravenel, H. W.: USA, South Carolina, Aiken: Alni: BPI, (Fungi Americani Exsiccati 334); LAM201459. CUP; LAM 201636. E; LAM201454, LAM201455: Scorias spongiosa. --USA, South Carolina: XII: Alni: K, (Herb. M. J. Berkeley); LAM200677: Scorias spongiosa. --USA, South Carolina, Aiken: Alni: ILL, (Fungi Americani Exsiccati 187); LAM200631: Scorias spongiosa. --Fagus sp.: URM 4817, (NY), LAM201443.

Reddick, Donald: Summer, 1905: CUP35890, (Flora of Cayuga Lake Basin, New York 230); LAM201630: Scorias spongiosa.

Rogers, D. P.: USA, Illinois, Shawnee National Forest: 14-15 III 1958: ILL; LAM200618: Scorias spongiosa.

Schuster, R.: USA, North Carolina, Greensborough: Winter, 1956-1957: Beech: MASS; LAM201598: Scorias spongiosa.

Seaman, W.: USA, Washington, D.C.: 1875: Fagus americana: B, (DeThumen, Mycotheca Universalis 967); LAM 201038. ILL; LAM200630. NYS; LAM201573. URM4822; LAM 201444: Scorias spongiosa.

Seaver, F. J. and Carlos E. Chardon: Puerto Rico, Mayaguez: 24 I - 5 IV 1923: Palm: CUP, (New York Botanical Garden, Department of Agriculture and Labor of Porto Rico, West Indian Exploration 405), (Explorations of Porto Rico 1670); LAM201635; Scorias spongiosa--This misdetermination is noteworthy becuase of the tropical locale).

Schallert, P. O.: USA, Forsyth County, Nifong Rock: "3/15-1936": Beech: VT7885, (Herb, P. O. Schallert); LAM

201572: Scorias spongiosa.

Shear, C. L.: USA, Florida, Gainesville: 21 II 1920: BPI, (FLAS46426); LAM201998. URM5144, (BPI); LAM201445: Scorias spongiosa. --USA, Maryland, Tacoma Park: 2 I 1903: Alnus: BPI; LAM201457. --USA, Virginia Fairfax: 4 X 1935: Betula: BPI; LAM201437.

Sherwood, M. A.: USA, New York, Tompkins County, Cornell University campus, near Beebe Lake: 21 I 1977: Alnus: CUP55854; LAM201034: Scorias spongiosa.

Smith, Erwin F.: USA, Maryland, Caroline County: 23 I 1891: Alnus: BPI1599; LAM201456: Scorias spongiosa.

Smith, Stanley J. #12884: USA, New York, Albany County, Albany: 23 XI 1952: NYS; LAM201588: Scorias spongiosa. --#14820 and W. M. Mansfield: USA, New York, Albany County, Meadowdale, Alnus swamp: X 1953: NYS; LAM 201587: Scorias spongiosa. --#15611: USA, Florida, Wakulla County, Wakulla Crossing: 29 III 1954: Hardwood: NYS; LAM201574: Scorias spongiosa. --#16155: USA, Alabama, Sumter County, NE of Cuba: 2 IV 1954: NYS; LAM 201589: Scorias spongiosa. --#27177, Gary E. Larson and Thomas H. Matthews: USA, Caldwell, 3 miles west: 25 VIII 1958: Pinus strobus: NYS; LAM201578: Scorias spongiosa. --#40918 and Robert Cote: USA, Saratoga County, East Galway vicinity: 8 XI 1966: Osmunda regalis var. spectabilis: NYS; LAM201580: Scorias spongiosa.

Van Denburg, M. W.: USA, Mt. Vernon: Liriodendron tulipifera: NYS; LAM201577: Scorias spongiosa.

Von Schweinitz, L. D.: USA, North Carolina, Salem, Bethelehem: P, (Herb. L. D. von Schweinitz), (Syn. Fungi 3077-1); LAM201440: Scorias spongiosa. --Fagus betle: BPI; LAM200673, LAM201441. UPS; LAM200673: Scorias spongiosa.

West, Erdman #3548: USA, Florida, Fairbanks: 2 II 1927: Alder: FLAS1864; LAM201448: Scorias spongiosa. --#9949: USA, Florida, St. Johns County, Pellicier Creek: "2.10, 1935": Black Alder: FLAS1862; LAM201449: Scorias spongiosa. --: USA, Florida, Clay County, Penny Farms: 31 I 1939: Alnus rugosa: FLAS21140; LAM201450: Scorias spongiosa. --#11595 and Lillian Audd: USA, Florida, Gainesville, Newmans Lake: 15 I 1937: Alnus: FLAS21183; LAM201447: Scorias spongiosa. --and Lee O. Overholts: USA, Pennsylvania, Seven Mountains, Greenlee Mountain: 17 III 1918: Black Alder: FLAS1863, (The Pennsylvania State College Department of Botany 54); LAM201451: Scorias spongiosa.

Whetzel, H. H.: USA, New York, Ithaca, Enfield Gorge: 22 X 1904: Beech: CUP2083; LAM201627: Scorias spongiosa. --USA, New York, McLean Preserve: 20 X 1935: CUP25015; LAM201626: Scorias spongiosa. --Cotton, Pethybridge, Uanjer: USA, New York, Ithaca: 7 VII 1919: Alnus incana: CUP1223; LAM201628; Scorias spongiosa. --Muenscher, White, Niederhauser: USA, Virginia, Fredericksburg, 20 miles north: 1 IV 1940: CUP28996; LAM201621: Scorias spongiosa. --and L. White: USA, New York, McLean, Lloyd Preserve: 28 III 1835: Alnus incana: CUP24916; LAM201617: Scorias spongiosa. --and L. White: USA, New York, Lloyd Preserve: 28 IV 1935: CUP24695; LAM201620: Scorias spongiosa.

Wilson, Donald: USA, Massachusetts, West Acton: 15 I 1956: Pinus strobus: MASS; LAM201597: Scorias spongiosa.

Wolf: USA, Illinois, Canton: ILL6623; LAM200619: Scorias spongiosa.

## DISCUSSION

I (Reynolds, 1978a) used collections of sequentially produced ascocarps from a natural habitat to establish that the anamorphosis of Scorias spongiosa underwent several morphological expressions. Several extant generic names could be applied to the range of anamorphic expression I found involving a single anamorphic centrum. A similar range of pycnidial forms I reported for S. spongiosa could be individually found in various collections of Scorias utilized in this study, along with other non-pycnidial asexual forms. However, the assumptions I made of the holomorphic reproductive states of S. spongiosa are not transferable to other species in the genus for several reasons. I did not report confirmation of the observations on field-derived specimens with data derived from pure culture isolates. More importantly, the collections utilized were randomly obtained by various collectors over a period of time from many localities. Consequently, positive proof of a biological connection between any teleomorphosis with any anamorphoses was impossible to ascertain. In my experience, these same pycnidial (and non-pycnidial) forms are also to be found in many other sooty mold Ascomycete collections where the Scorias teleomorphosis is unknown.

## NOMEN HOLOMORPHOSIS SPECIES:

Scorias brasiliensis (Puttemans) Reynolds 1971. Bull. Torrey Bot. Club 98:151.

TELEOMORPHOSIS. Ascospores hyaline, fusiform, 12-17 mμ x 3-6 mμ, with three transsepta; Ascus bitunicate, obclavate, 30 mμ in length; Ascus Wall Kohn-Korf (IKI-KOH) reaction positive, nasse apicale present at apex of inner

layer; hymenium basal in locule; Locule Wall internally appendaged with periphysoids which are branched, septate, hyaline and present or absent at ascocarp maturity; Locule Wall externally appearing as textura angularis, externally appendaged with subtending stalk which forms a cylindrical column measuring 100-150 mμ x 30-60 mμ; Ascocarp ostiolate, containing a single locule, 60-80 mμ x 60-80 mμ.

ANAMORPHOSIS: Incertus.

Type specimen. RBR*: Puttemans, A. #337: Brasil, São Paulo, Horto Botanicão: 27 VIII 1902: Coffee.

NOMINA SYNONYMA SPECIES:

(Basionym) Capnodium brasiliensis Puttemans 1904. Bull. Soc. Mycol. Fr. 20:153. Pro parte, teleomorphosis only.

≡Paracapnodium brasiliense (Puttemans) Spegazzini 1918. Physis 4:228. Pro parte, teleomorphosis only.

≡Leptocapnodium brasiliense (Puttemans) Batista and Ciferri 1962. Saccardoa 2:122. Pro parte, teleomorphosis only.

=Capnodium usterii Rehm 1907. Ann. Mycol. 5:521. Pro parte, teleomorphosis only.

≡Antennella usterii (Rehm) Theissen and Sydow 1917. Ann. Mycol. 15:473. Teleomorphosis only.

≡Capnodina usterii (Rehm) Spegazzini 1918. Physis 4:287. Pro parte, teleomorphosis only.

=Scorias paulensis P. Hennings 1908. Hedwegia 48:6. Pro parte, teleomorphosis only.

=Hyalocapnias amorimii Batista 1963. Saccardoa 2:114-116. Pro parte, teleomorphosis only.

=Antennellina hawaiiensis Mendoza emend. Batista and Ciferri 1963. Saccardoa 2:60-61. Pro parte, teleomorphosis only. A redescription based on a Trinidad collection misconstrued as the holotype.

NON Antennellina hawaiiensis Mendoza 1925. B. P. Bishop Mus. Bull. 19:55-56.

=Blastocapnias citricola Batista and Ciferri 1963. Saccardoa 2:68. Teleomorphosis only.

=Blastocapnias verrucosa Batista and Ciferri 1963. Saccardoa 2:69-70. Teleomorphosis only.

EXCLUDED SPECIES

Antennella capsulifera Rehm sensu Ciferri and Batista
1963. Saccardoa 2:59.

This species is a Trichomerium as circumscribed from Capnodium capsuliferum Rehm (1907); the Rehm concept was based on discordant elements.

SPECIMENS EXAMINED

Amorim, Washington: Brasil, Pernambuco, Vitoria: Cocos nucifera: URM2741*; LAM200565: Hyalocapnias amorium+.

Fraser, L. R.: Australia, New South Wales, Bulga:19 I 1934: Lyonia strammea: IMI26119; LAM200979. DAR; LAM 200778: Scorias philippensis.

Freire, J. R. Jardim: Brasil, Rio Grande do Sul, Venancio Aires: 13 V 1947: Citrus sineneis: URM9048, (SFPA3887); LAM200499: Capnodium.

Puttemans, A. #337: Brasil, Sao Paulo, Horto Botanico: 27 VIII 1902: Coffee: RBR*; LAM200711: Limacinia coffeicola. --#1270: Brasil, Sao Paulo: V 1905: Justica: S*, (Herb. Sydow); LAM200810: Scorias paulensis.

Silva, M. A.: Brasil, Camaragibe: Citrus lineata: URM2743*; LAM200863: Blastocapnias citricola+.

Silva, S. J.: Brasil, Pernambuco, Recife, Beberibe: 18 IV 1956: Centella asiatica: URM2802*; LAM200864: Blastocapnias verrucosa+.

Stevens, F. L.: Trinidad, Long Stretch: 13 VIII 1922: Tabebuia: BISH*; LAM202070: ILL6628; LAM200592: Antennellina hawaiiensis+.

NOMEN HOLOMORPHOSIS SPECIES:

Scorias philippensis Mendoza emend. Reynolds 1932. Phil. J. Sci. 47:289-290. Pro parte, teleomorphosis only.

TELEOMORPHOSIS: Ascospores hyaline, cylindrical, tapering at one end, 19-28 mμ x 3-6 mμ with 3 transsepta; Ascus bitunicate, cylindrical to clavate, 40-50 mμ in length; Ascus Wall Kohn-Korf (IKI-KOH) reaction positive,

nasse apicale present at apex of inner wall; hymenium basal in locule, surrounded by wall comprised of textura angularis; Locule Wall internally appendaged with periphysoids which are branched, septate, hyaline, present or absent at ascocarp maturity; Locule Wall externally appendaged with subtending stalk, forming cylindrical column measuring 62-100 mμ x 62-118 mμ; Ascocarp containing a single locule, ostiolate, 75-108 mμ x 50-118 mμ.

ANAMORPHOSIS: Incertus.

Type specimen. Location unknown. Ramos, M. and D. Deroy: Philippines, Batangas; IV or V 1915: Ficus hauile: Philippine Bureau of Science 22672. Lectotypes: BPI: Hanser, J. S.: Cuba: X 1907: Psidium guajava. URM 5263: Rands, R. D.: Java: VI 1919: Pyrus malus.

NOMEN SYNONYMUM SPECIES:

=Hyalocapnias psidii Batista and Ciferri 1963. Saccardoa 2:114-117. Pro parte, teleomorphosis only.

SPECIMENS EXAMINED

Hanser, J. S.: Cuba, Santrope de Las Vegas: X 1907: Psidium guajava; URM5263, (BPI); LAM200936: Hyalocapnias psidii+.

Rands, R. D.: Java: VI 1919: Pyrus malus: URM 5251; LAM200937: Hyalocapnias psidii.

DISCUSSION

The larger ascospore size distinguishes this species from others in the genus Scorias. The tropical species published by Batista and Ciferri (1963) as Hyalocapnias psidii belongs here. The Australian record of Scorias philippinensis established by Fraser (1935) is updated as S. brasiliensis. I cannot yet locate holotypic material of S. philippinensis. The Philippine Bureau of Science duplicates were routinely distributed to many herbaria and the likelihood of the existence of an isotype is good; none exists in any herbarium in the Philippines. Additional field work should yield more definitive material. I can locate only two collections which fit within the accepted species concept. Consequently I intend the designation of lectotypes to only temporarily surplant the holotype and deliberately designate two collections in order to emphasize this attitude. One collection does not have precedence over the other as a syntype because of the order in which they are listed. However, I did use the Hanser and the Rands collections to determine the presence of periphysoids and for the Kohn-Korf reaction.

## SCORIAS SPECIES IMPERFECTLY KNOWN:

Capnodium tanakae Shirai and Hara
1916. in Hara, K. A discourse on fruit diseases. p. 239. This species was described as having cylindric and simple to branched ascocarps with fuscous three septate ascospores. Sawada (1929) and Yamamoto (1954b) redescribed this species based on Taiwan material instead of the Japanese type. The holotype in TNS is badly damaged. The original description and Tanaka's (1920) English translation of the description suggests a Scorias species closely related to the other temperate species, S. spongiosa.

Neocapnodium theae (Hara) Hara
1959. in Yamamoto, W., Sci. Reports Hyogo Univ. Agri., Agri. Biol. Ser. 4:20. The basionym of this species (Hara, 1931) is Capnodium theae Hara; a later synonym is Capnodaria theae Hara (Hara, 1931).. Yamamoto (1959b) considered the species to be related to those in Neocapnodium, differing in the elongated ascospores. This name is not associated with Capnodium theae Boedijn (1931).

Scorias citrina (Hara) Yamamoto
1959. Sci. Reports Hyogo Univ. Agri., Agri. Biol. Ser. 4: 20. Antennella citrina Hara (1931) is the basionym of this combination. No holotype could be found in the Hara herbarium now located in TNS. Yamamoto (1959b) cited no new collections. The Hara (1931) description of the species is an insufficient basis for reassessment.

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MYCOTAXON

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# STUDIES ON THE LEPIOTACEAE OF THE PACIFIC COAST REGION. I. TWO NEW SPECIES

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SUMMARY

A brief survey of pertinent literature on the species of *Lepiota sensu lato* encountered on the western slope of the Pacific Coast States is presented, and two new species--*Lepiota glabridisca* and *Lepiota oregonensis*--are described.

The first report on the Lepiotaceae of the Pacific Coast region was that of Harkness and Moore (1880) who listed five *Lepiota* species as *Agaricus*. Murrill (1912) recorded 21 species, 15 of which were described as new; one has since been transferred to *Cystoderma* (Smith and Singer, 1944). Zeller later (1922, 1929, 1933, 1934, 1938) reported six new species and several new records from Oregon. Additional distribution records and another four new taxa were recorded by Kauffman (1924, 1929), Smith and Rea (1944), Burlingham (1945), and Smith (1949). The only recently published works on Lepiotaceae of the Pacific Coast are those of Sundberg (1967, 1971a, 1971b, 1976).

Because of the paucity and scattered nature of available information, these studies were initiated to more

fully document all the species of *Lepiota sensu lato* known to occur on the western slope of the Pacific Coast States. In this paper, two new species are described. Colors in quotation marks are from Ridgway (1912). Where employed, herbarium abbreviations are from Holmgren and Keuken (1974).

*LEPIOTA GLABRIDISCA* Sundberg, sp. nov. Figs. 2, 3

Pileus 1.5-4.2 cm latus, convexus demum plano-convexus, perumque umbonatus, udus demum siccus, demum rimosus, glaber, obscure rufo-brunneus vel vinaceo-brunneus, ad marginem pallide cinnamoneus; sapor amarus. Lamellae liberae, albae. Stipes 3-8.5 cm longus, 2-5 mm crassus, albus, glaber; annulus subapicalis, albus, ad marginem brunneus. Sporae (6.3-)7.0-9.5(-10.3) x 4-4.8 (-5.5) µm, subellipsoideae. Cheilocystidia (21-)27-45(-54) x 6-10 µm, clavata vel ventricosa. Holotypus in Herbario San Francisco State University conservatum est: legit prope Patrick's Point State Park, Humboldt Co., California, Sundberg 888, Oct. 9, 1966.

PILEUS 1.5-4.2 cm broad, initially convex, becoming plano-convex to plane, then uplifted, usually umbonate; margin slightly incurved at first, then decurved, becoming plane, entire at first, rimose to eroded in age, striate where not covered by the cuticle; surface dry to moist, rarely subviscid; cuticle initially continuous and glabrous throughout, remaining so on the disc, becoming radially diffracted and exposing the white flesh toward the margin, infrequently appearing appressed scaly due to partial disruption of the radially arranged cuticular strips, often receding from the margin; disc rarely appearing hygrophanous, dark reddish brown ("vandyke brown" to "warm sepia") to dark vinaceous brown ("natal brown") to reddish brown ("rood's brown") to orange-brown ("mikado brown"), paler ("army brown" to "avellaneous" or "cinnamon" to near "pinkish buff") toward the margin.

FLESH 1-3 mm thick, compact but soft, white, unchanging. Taste bitter. Odor not distinctive.

LAMELLAE free, approximate to remote, some forking or anastomosing or both near the stipe apex; white to pale cream ("cartridge buff"), unchanging; close; thin; margin minutely fimbriate, concolorous. Lamellulae in one to two tiers, sometimes anastomosing with the lamellae.

STIPE 3.0-8.5 cm long, 2-5 mm wide at the apex,

enlarged below to distinctly clavate; surface dry, glabrous throughout; white, sometimes slightly yellowish near the base, becoming sordid upon handling; stuffed, becoming hollow, pith fibrils white, cortex white to slightly darker, both unchanging.

ANNULUS superior, sometimes appearing movable, sheathing below and flaring to appressed against the stipe above, membranous, thin and fragile, white above and below with a dark reddish brown to cinnamon lower margin.

BASIDIOSPORES white in mass; (6.3-)7.0-9.5(-10.3) x 3.9-4.8(-5.5) µm, ovoid to ellipsoid, often tapered toward the apex and with a convex apical protrusion, inequilateral in lateral view, smooth; thick-walled as seen in cresyl blue, more so at the apex, apical pore lacking, the apical region appearing paler and somewhat differentiated in Melzer's reagent; uni- to biguttulate, rarely granulose; hyaline to pale yellowish green in KOH, dextrinoid (pale to dark reddish brown) in Melzer's reagent. BASIDIA 20-31 (-36) x 6-10 µm, clavate, mostly 4-spored, rarely 1- to 2-spored, finely granulose, hyaline in KOH and Melzer's reagent. CHEILOCYSTIDIA (21-)27-45(-54) x 6-10 µm; abundant; clavate to ventricose, often rostrate, apices rounded to subacute, bases frequently narrow and elongate; thin-walled and sometimes flexuous, rarely appearing faintly encrusted toward the midregion, hyaline in KOH and Melzer's reagent. PLEUROCYSTIDIA absent. LAMELLAR TRAMA loosely interwoven, some hyphae with a granular incrustation on the walls, hyaline in KOH and Melzer's reagent, oleiferous hyphae present. PILEAL TRAMA loosely interwoven, more compact and radially arranged toward the cuticle, hyaline in KOH, hyaline to pinkish or tinged pale orange in Melzer's reagent, oleiferous hyphae present. CUTICLE appearing two layered on the disc; the upper layer irregularly and sometimes loosely interwoven, frequently appearing gelatinous, thinner and often scattered in patches or absent toward the margin, cells somewhat thinner than those of the lower region, walls thin, not encrusted, some with a pale yellowish brown content, hyaline to pale yellowish brown in KOH and Melzer's reagent; the lower layer more or less radially interwoven, cells elongate, wider than those of the superficial region, often anastomosing, walls frequently encrusted, pale to dark yellowish brown in mass in KOH and concolorous to dark brown or pale to dark reddish brown in Melzer's reagent. CLAMP CONNECTIONS absent.

HABIT AND HABITAT: Solitary to scattered to gregarious in humus under *Picea sitchensis* (Bong.) Carr, *Sequoia sempervirens* Endl., and *Tsuga heterophylla* (Raf.) Sarg.

September to November in northwestern California, western Oregon, and Idaho.

COLLECTIONS EXAMINED: California: Madden 764; Sundberg 434, 452, 768, 786, 787, 888 (HOLOTYPE), 1005; Thiers 14245 (all SFSU). Oregon: H. V. Smith 124, 128a, 165 (all MICH). Idaho: H. V. Smith 8-25-66 (MICH).

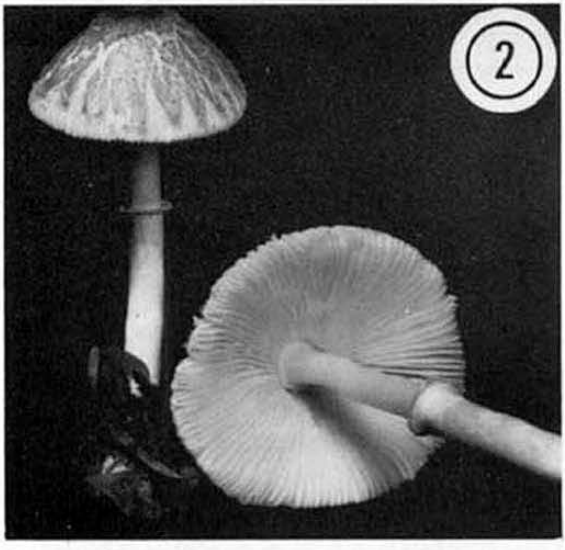
DISCUSSION: The smaller size, more fragile nature, dark reddish brown to vinaceous brown tinges, and interwoven cuticle differentiate *L. glabridisca* from *L. rubrotincta* Peck. *Lepiota Glatfelteri* Peck and *L. felinoides* Peck are also similar but lack the two layered cuticle with the irregular and often gelatinous-appearing upper layer.

*LEPIOTA OREGONENSIS* H. V. Smith, sp. nov. Fig. 1

Pileus 8-25 mm latus, convexus demum obtuse campanulatus vel plano-expansus, ad marginem appendiculatus, siccus, granulosus demum subsquamulosus, aurantio-cinnamomeus; sapor farinaceus. Lamellae liberae, approcimatae, latae, confertae, auantio maculatae. Stipes 1.5-9 cm longus, 1.5-3 mm crassus, granulosus, aurantio-cinnamomeus, ad basim albidus. Sporae 4-4.8 x 2-2.4 µm, ellipsoideae. Cheilocystidia 24-42 x 6-10 µm, fusoide-ventricosa, obtusa vel capitata. Cellulae cuticulae 12-44 µm diam, tenuitunicatae. Fibulae defunt. Holotypus in Herbario Univ. Mich. conservatum est: legit prope Otis, Lincoln Co., Oregon, H. V. Smith 156, Oct. 10, 1970.

PILEUS 0.8-2.5 cm broad, buttons rounded, nearly globose at first, expanding to obtuse or more or less campanulate and finally nearly plane with a distinct umbo; the margin incurved and somewhat appendiculate from the fibrillose veil at first, becoming uplifted and with a few rather wide radial splits; surface granulose or granulose-warty, the warts or granules larger and more numerous over the disc, becoming finer toward the margin and at times merely slightly granulose at the margin; disc tawny-brown to orange-cinnamon ("mikado brown", "tawny", "russet", "ochraceous-tawny", "orange-cinnamon"), progressively paler--pinkish buff to cinnamon-buff to pale yellowish white to white--toward the margin, in age becoming pale brown over all; warts darkest at the apex.

FLESH thin, white, unchanging or at times becoming

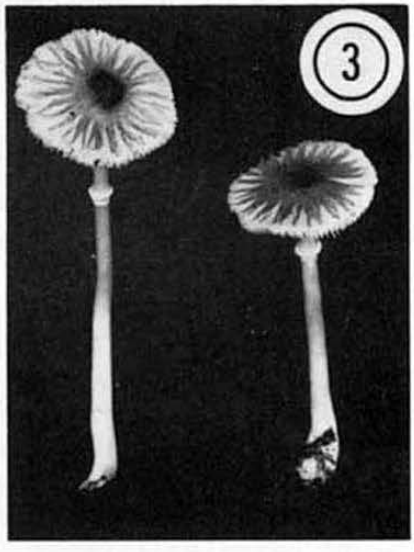




Fig. 1. *Lepiota oregonensis*. H. V. Smith 156. X 4/5.
Fig. 2. *Lepiota glabridisca*. H. V. Smith 165. X 1.
Fig. 3. *Lepiota glabridisca*. Sundberg 888. X 2/3.

pale orange to burnt orange after handling, firm, somewhat watery-sordid in age. Odor fungoid. Taste mildly farinaceous.

LAMELLAE free, approximate at first but becoming more distant from stipe, somewhat ventricose when mature; dull white to pale cream color, becoming watery-sorded in age, in places stained brownish cinnamon or with distinct rusty spots; margins even, concolorous or tinted with pale orange after handling. Lamellulae few.

STIPE 1.5-9 cm long, 1.5-3 mm thick at apex, equal to the base where it may enlarge to 4-5 mm, covered by a gran-

ulose or somewhat warty layer nearly to the apex; apex silky and whitish, below "pinkish cinnamon" to "cinnamon" or somewhat ochraceous-tawny, bruised areas more or less "orange-cinnamon"; thinly hollow with a white fibrillose pith in places, cortex tinted with colors of surface, somewhat watery, "orange-cinnamon" where bruised; in older basidiocarps watery brownish, usually whitish around the base where it is attached to the soil.

BASIDIOSPORES 4-4.8 x 2-2.4 µm, ellipsoid, hyaline to very pale rusty brown in Melzer's reagent, thin-walled. CHEILOCYSTIDIA 24-42 x 6-10 µm, inflated-clavate with a rounded apex, capitate or having 1-4 narrowed constrictions giving rise to a somewhat short moniliform tip with the segments smaller toward the apex, thin walled. PLEUROCYSTIDIA absent. CUTICLE a layer of thin-walled spherical cells 12-44 µm in diameter. CLAMP CONNECTIONS not seen.

HABIT AND HABITAT: Gregarious to caespitose in soil and litter under *Alnus* sp., *Pseudotsuga meziesii* (Mirb.) Franco and *Tsuga heterophylla*. September and October in western Oregon.

COLLECTIONS EXAMINED: Oregon: H. V. Smith 140a, 140b, 156 (HOLOTYPE), 157, 164; A. H. Smith 23426, 24267; Ammirati 5735, 5736, 5761 (all MICH).

DISCUSSION: Sections of dried material prepared for anatomical study produce a pale rusty exudate in KOH. Sectioned material is pale yellowish in KOH with some pale rusty spots on the lamellar margins and in the cutis.

Smith has collected this species over a number of years but has found it abundantly only during one year at the Cascade Head Experimental Forest, near Otis, Oregon.

*Lepiota oregonensis* differs from *L. rufescens* Lange in its much more orange-tawny colors and its lack of pleurocystidia. *Lepiota fumosifolia* Murrill is also similar but has somewhat larger spores and lacks cheilocystidia.

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The senior author expresses appreciation to Dr. Erich E. Steiner, Director of the University of Michigan Matthaei Botanical Gardens for providing laboratory space to carry out her studies. Photographs of the Smith and Sundberg collections are used through courtesy of the University of Michigan and San Francisco State University Herbaria respectively.

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# NOTES ON *COLLYBIA*. I. *COLLYBIA ALKALIVIRENS*

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In the course of preparing a monograph of New England species of *Collybia*, I have encountered an unusual species that Singer (1948) named *Collybia alkalivirens*. His description is based on holotype material collected in Virginia and a paratype collection from Massachusetts. Examination of these two collections has shown that this agaric has some very distinct characteristics. First of all, in sections of the basidiocarp that are revived and mounted in water, the hyphae of the pileipellis, pileus trama, lamellar trama, and stipitipellis are conspicuously encrusted with a dark brown pigment. Secondly, if an alkaline solution is applied to the sections, the tissues become an intense green color. The reaction of fresh material to alkaline solutions is not known for all the collections studied. However, the field notes on one collection (Gilliam 511, MICH) do indicate that a green reaction occurs when KOH is applied to the fresh pileus and lamellae. Thirdly, the basidiocarps are darkly pigmented when fresh and become dark brown to black when dried.

The examination of additional collections indicates that *C. alkalivirens* is more widely distributed than previously believed and that it also occurs on a greater variety of substrates. *C. alkalivirens* has not been described subsequent to the original publication nor has it been included in any recent discussion or listing of agarics except in Singer (1975). The following description of macroscopic characters of fresh material is adapted from field notes compiled by Dr. H. E. Bigelow. All collections cited are deposited in the Mycological Herbarium of the University of Massachusetts (MASS) except where otherwise

indicated. Capitalized color terms are taken from Ridgway (1912). The terminology used for cortical layers is from Bas (1969) and Singer (1975).

*COLLYBIA ALKALIVIRENS* Singer, Sydowia 2: 26. 1948.
*Collybia plexipes* Fr. sensu Kauffman, Agar. Michigan 1: 762. 1918.

Fig. 1 & 2

Pileus 8-27 mm broad, convex or hemispheric with the margin incurved or inrolled at first, expanding to broadly convex or obtusely conic or plane, finally plane with a low broad umbo; margin obscurely rugose-striate or nearly sulcate; surface dull, glabrous, hygrophanous, dark vinaceous-brown when moist (near Carob Brown), fading to rufous on the disc, usually the margin becoming cinnamon to buff with a rufous cast, sometimes only the disc fading, dark brown to black or sometimes buff when dried; flesh thin, very thin at edge of pileus, whitish with a rufous flush; odor and taste none.

Lamellae narrowly adnate to nearly free, close, narrow (0.5-2 mm), equal, soft-textured, more or less glaucous, separable from the pileus, not forked, sometimes intervenose, brown (near Auburn to Bay), fading to chocolate brown, blackish when dry; edges even, straight or slightly undulate.

Stipe 3-6.5 cm long, 1-3 mm thick, equal, fibrous-cartilaginous, straight or curved, centrally attached; surface dull, glabrous except for brownish tomentum at base, dark vinaceous-brown (near Carob Brown) to blackish (near Bone Brown to Clove Brown) and paler at the apex; interior hollow.

Spores white in deposit, 5.4-6.5(8.6) X 2.2-3.2(5.4) µm, slightly wrinkled in water mounts of herbarium material, smooth and pale greenish in alkali, inamyloid, acyanophilous, pip-shaped to narrowly ellipsoid and inequilateral in profile, ellipsoid to subcylindric in face or back view. Basidia 18.4-27.0 X 5.4-6.5 µm, clavate to subclavate, four sterigmate, greenish in alkali; siderophilous granules absent. Pleurocystidia absent. Cheilocystidia scattered, inconspicuous, filamentous to clavate with occasionally a few broad obtuse projections, 19.5-72.5 µm long, green in alkali. Lamellar trama of subparallel to slightly inter-

FIGURE 1. *Collybia alkalivirens* Singer, (Bigelow 12564) X 1. (Courtesy Dr. H. E. Bigelow)

woven hyphae; cells 4.3-9.7 µm in diam, occasionally inflated to 16.2 µm, with conspicuous spots of dark brown granular encrusting pigment present in water mounts; pigment mostly dissolving in alkali and discoloring the tissues to greenish. Pileus trama loosely interwoven; hyphae branched, 4.3-8.6 µm in diam, slightly encrusted with brown pigment which dissolves in alkali. Pileipellis a layer of repent, branched hyphae, not diverticulate or coralloid, not radially arranged (*i.e.*, a cutis of the "*dryophila* type"); hyphae 3.2-5.4 µm in diam, coarsely encrusted with a brown plate-like pigment which partially dissolves and becomes dark green in alkali solutions. Stipitipellis a layer of parallel, vertically oriented hyphae; cells 3.2-5.4 µm in diam, encrusted, giving rise to long, filamentous to contorted caulocystidia, green in alkali. Clamp connections present in all tissues.

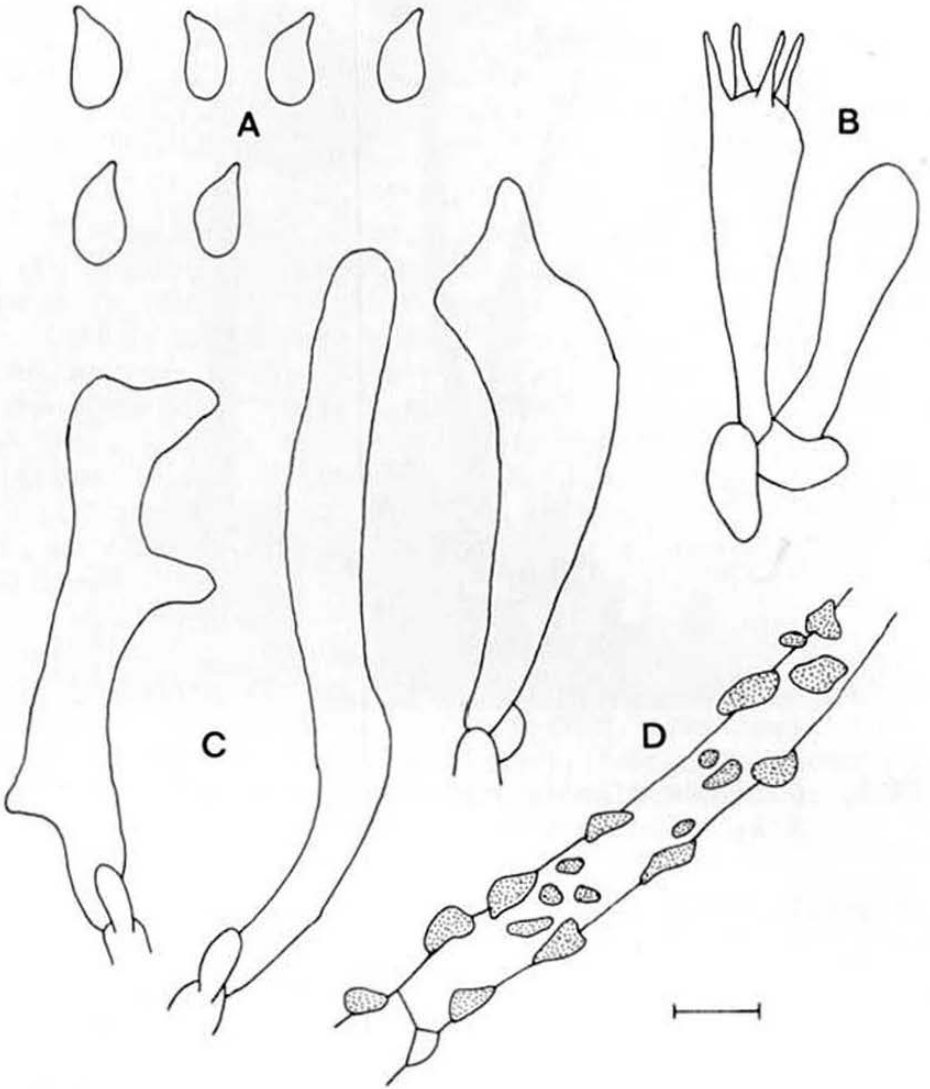


FIGURE 2. *Collybia alkalivirens* Singer. A) Basidiospores. B) Basidium & basidiole. C) Cheilocystidia [from Bigelow 15013]. D) Portion of hypha from lameller trama [from Bigelow 6562]. Standard line = 5 µm.

Habit, habitat, and distribution: Solitary, scattered, gregarious, or cespitose on soil, among moss, decaying wood debris, or old fern hummocks. Occuring in hardwood forests during June and July in New England, Quebec, Michigan, New York, and Virginia. Also known from conifer forests in Idaho and Oregon during October and December.

Material Examined: CANADA - QUEBEC: Bigelow 5048. U.S.A. - IDAHO: Latah Co. - W. B. Cooke 19024 (MICH). MASSACHUSETTS: Franklin Co. - Smith 84054 (MICH); Bigelow 6741, 9437, 15013. Hampshire Co. - Bigelow 6470, 6471, 6562, 6563, 6564, 6565, 6566, 6567, 6568, 6614, 6849, 7996. Middlesex Co. - Stowe, leg. S. Davis, 1909, PARATYPE (FH). MAINE: Piscataquis Co. - Bigelow 10133, 10192, 10231. MICHIGAN: Cheboygan Co. - Smith 66683 (MICH). Jackson Co. - Mazzer 4782 (MICH). Emmet Co. - Shaffer 1364 (MICH). Gratiot Co. - Potter 4837 (MICH). Luce Co. - Bigelow 786, 902; Smith 41597, 41723 (both MICH). Marquette Co. - Ammirati 4106, 4191, 4288 (all MICH). Washtenaw Co. - Gilliam 511 (MICH); Kauffman, 10 June 1906; Kauffman, 1 June 1912 (both MICH). NEW YORK: Warren Co. - Bigelow 5139. OREGON: Clackamas Co. - Smith 24736 (MICH). VERMONT: Lamoille Co. - Bigelow 12556, 12564, 12864. VIRGINIA: Giles Co. - Singer 337, HOLOTYPE (FH).

Discussion: The affinities of *C. alkalivirens* appear to be with members of Section *Levipedes* (*e.g.*, *Collybia fuscopurpurea* and *Collybia dryophila*), but it is distinct from them because *C. fuscopurpurea* has encrusting pigments which are insoluble in alkali and *C. dryophila* has pigments that are apparently intracellular. *Collybia alkalivirens* is the taxon that Kauffman (1918) called "*Collybia plexipes* Fr. var.", and his two collections cited above were so determined by him. However, according to Kühner and Romagnesi (1953), *C. plexipes* is a *Lyophyllum* with ornamented spores, and Moser (1978) equates *C. plexipes* sensu Kühner and Romagnesi with *Tephrocybe tylicolor* (Fr.) Moser. *Collybia alkalivirens*, of course, lacks siderophilous granules in the basidia and has smooth spores. Lange and Sivertsen (1966) discuss the nomenclature of some rough-spored *Lyophyllum* species, but do not provide a disposition for the Friesian *C. plexipes*.

The two collections from the western United States (Cooke 19024 and Smith 24736) possess spores which are larger (6.5-8.6 X 3.2-5.4 µm) than is typical for material from the eastern United States, but whether or not this is

significant cannot be determined until more western collections are studied.

Finally it is clear that *C. alkalivirens* is a distinct element in the mycoflora of New England and adjacent areas and is widely distributed. Although the affinities of this taxon are with Section *Levipedes* as currently outlined by Singer (1975), *C. alkalivirens* is somewhat of an anomaly in this section.

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I would like to thank Dr. D. H. Pfister for the loan of type specimens from the Farlow Herbarium, and I also thank Dr. R. L. Shaffer, Director of the Herbarium at the University of Michigan, for the loan of collections and for reviewing the manuscript. In addition, I wish to thank Dr. E. G. Simmons for his advice on Latin and nomenclature, and finally I express my gratitude to Dr. H. E. Bigelow for the use of his notes and his guidance and advice.

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# RECOLTE DE CORDYCEPS INTERMEDIA DANS LES PYRENEES ATLANTIQUES, ESPECE NOUVELLE POUR L'EUROPE

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*SUMMARY*

A collection of *Cordyceps intermedia* Imai (= *C. valliformis* Mains) was made on August 22, 1978 in the woods near the St. Blaise Hospital, Pyrénées Atlantiques. Known till now only from Japan and eastern North America, it is redescribed here from the French collection.

*RÉSUMÉ*

Une récolte de *Cordyceps intermedia* Imai, Proc. Imp. Acad. Tokyo 10: 677, 1934, = *C. valliformis* Mains, Bull. Torrey Club 84: 250, 1957, a été faite le 22 août 1978 dans les bois près de l'Hôpital St Blaise - Pyrénées Atlantiques. Ce *Cordyceps* n'a à notre connaissance jusqu'à présent été récolté qu'au Japon, et dans l'Est de l'Amérique du Nord, nous le rédecrivons ici d'après une récolte française.

## CARACTÈRES MACROSCOPIQUES

Stroma solitaire avec un long stipe, distinctement capité, globuleux, 5 mm de diamètre, de couleur brun clair, ostioles proéminentes. Stipe 7,5 cm de long × 0,2 cm de large, noir brillant, de consistance cornée (FIG. 1) légèrement furfuracé-sillonné et brun clair dans sa partie supérieure (FIG. 2).

## CARACTÈRES MICROSCOPIQUES

Couche superficielle du stroma nettement différenciée (FIG. 3-C), composée d'hyphes parallèles, septées, de 25-40 µm de long et 5-7 µm de large, à parois légèrement épaissies se terminant par des cellules arrondies, n'allant pas s'élargissant.

Sous le cortex, chair de textura epidermoidea à textura angularis, composée de cellules de 7 à 10 µm.

Périthèces allongés jusqu'à 1000 × 300 µm de large.

Ostioles proéminentes mais non différenciées des cellules de la surface du stroma.

Stipe composé d'hyphes parallèles de 3,5-5 µm de diamètre (FIG. 3-D). Les hyphes de l'extérieur du stipe se différencient seulement de celles de l'intérieur par leur couleur

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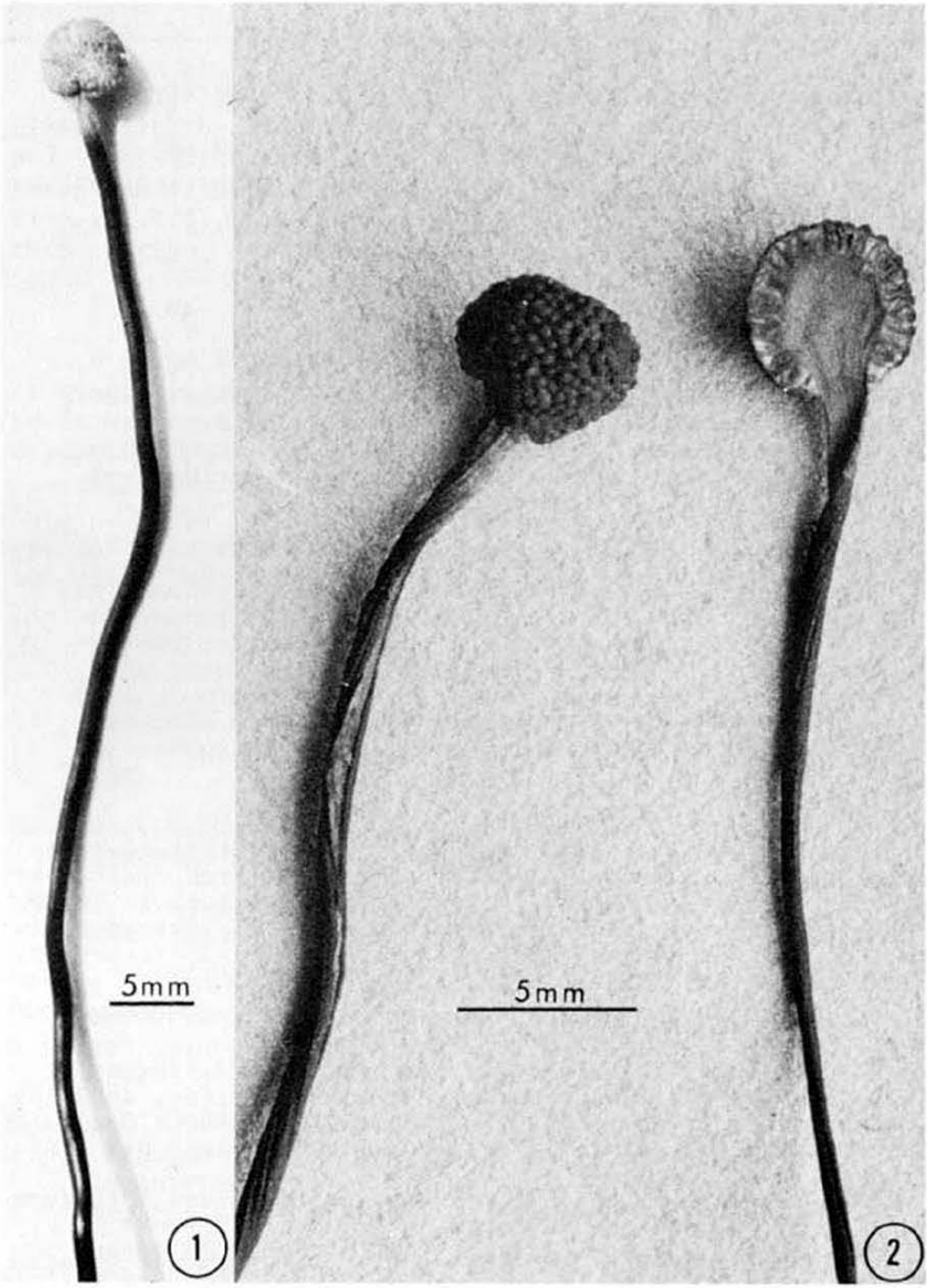


FIG. 1, 2. *Cordyceps intermedia* (Herbier F. Candoussau 4789-2). 1: Carpophore × 2 (photo Guy Roux). 2: à gauche, détail du stroma laissant voir les périthèces saillants ainsi que le haut du stipe sillonné; à droite, en coupe, grandeur des périthèces et de l'intérieur du stipe × 4.25 (photo Emile Jarias).

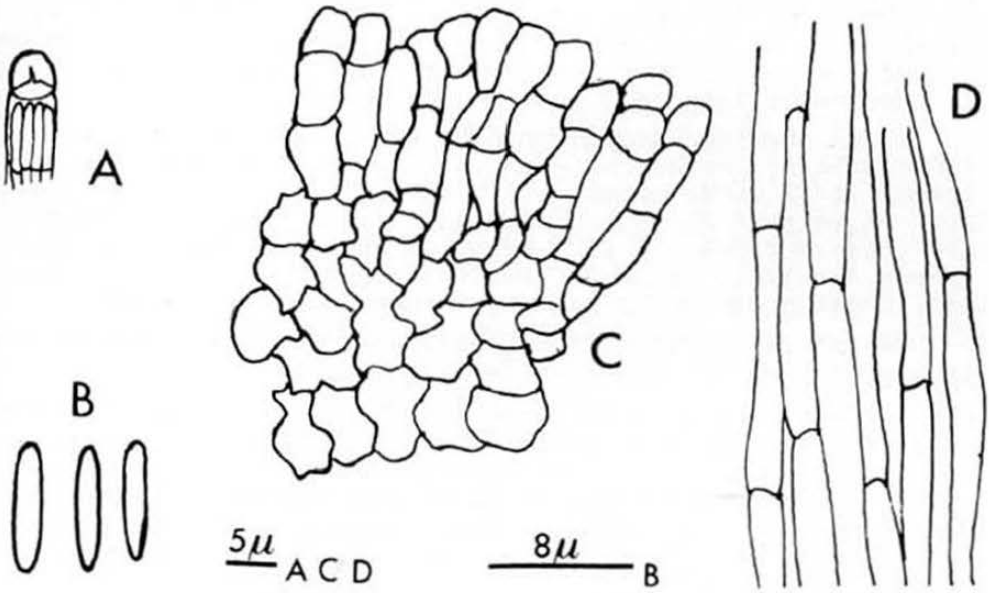


FIG. 3: détails microscopiques. a, haut d'un asque avec spores; b, 3 fragments sporaux; c, couche superficielle et différenciée du stroma; d, hyphes de l'intérieur et de l'extérieur du stipe. (F.C. 4789-2).

brune, leurs mensurations sont identiques.

Asques étroitement cylindriques 250-350 × 6-7 µm à sommet épaissi (FIG. 3-A).

Spores aussi longues que les asques, filiformes, multiseptées. Fragments sporaux unicellulaires, fusoïdes de (7-) 8 (-9) µm (FIG. 3-B).

HABITAT inconnu.

SPECIMEN EXAMINÉ

France, Pyrénées Atlantiques, bois près de l'Hôpital Saint Blaise, sur le sol, sur *Elaphomyces ?*, Françoise Candoussau et Gary Samuels, 22 août 1978 (Herb. Candoussau 4789-2).

REMARQUE

A la fois *C. intermedia* Imai et *C. valliformis* Mains sont décrit sur *Elaphomyces*, il ne nous a pas été malheureusement possible de retrouver l'hôte de la récolte française.

Notre récolte s'identifie bien à *Cordyceps intermedia* d'après les descriptions de Kobayasi et Shimizu (1960) et Mains (1941, sous le nom de *C. valliformis*) synonymisé par Kobayasi et Shimizu.

DISCUSSION

Notre récolte se différencie de la récolte japonaise par

son stroma plus petit: 5 mm au lieu de 6-12 mm de diamètre; le haut du stipe furfuracé sillonné et non squamuleux; les périthèces proéminents, leur hauteur de 1000 µm au lieu de 450-540 µm; la forme de ses fragments sporaux fusoïdes et non cylindriques tronqués; leur mensurations plus grandes: 8,5 µm de moyenne au lieu de 4,5 µm.

Notre récolte est plus proche de la récolte de Mains (1957) décrite *Cordyceps valliformis* par la mensuration du stroma: 3-12 mm de diamètre; la hauteur des périthèces 500-700 µm; le haut du stipe furfuracé; la dimension des fragments sporaux 3-8 × 2 µm. Reste en désaccord la forme des spores fusoïdes, Mains ne les décrit pas clairement et les périthèces proéminents sur notre récolte.

Malgré ces petites différences nous pensons cependant qu'il s'agit bien de *Cordyceps intermedia* Imai.

Ce *Cordyceps* se situe dans le groupe Valliformes minutae entre *C. tenuispora* Mains, espèce à petites spores comme *C. intermedia* (6-8 × 1-1,5 µm) mais à stroma clavulé et *C. rouxii* Cand. groupe Valliformes mediae à stroma capité mais dont les spores sont supérieures: 16 × 2,5-3 µm et qui macroscopiquement est une espèce moins elancée et à stroma brun noir.

Nous remercions Gary Samuels pour ses suggestions.

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# CLATHRUS RUBER IN CALIFORNIA AND WORLDWIDE DISTRIBUTIONAL RECORDS

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Clathrus ruber Micheli ex Persoon (Clathraceae, Phallales, Gasteromycetes) has a red receptacle consisting of a spongy network with meshes unequal in size. The dark, foul-smelling gleba covers the inner surface of the receptacle and the basal portion of the receptacle is surrounded by a white volva with a central mycelial cord. The smooth, elongated spores measure 5-6 x 1.7-2 mμ. Dennis (1954) stated that this species is distinguished from the closely related tropical species, Clathrus crispus Turpin, by the absence of corrugated rims which surround each mesh of the sporocarp. The species is well illustrated in the older literature as indicated by Saccardo and Traverso (1910).

American mycologists usually refer to this species as C. cancellatus Linnaeus, which is most likely based on the American Code of Botanical Nomenclature in which the starting point date was Linnaeus, Species plantarum, 1753. According to the International Code of Botanical Nomenclature the starting point date for the nomenclature of the Gasteromycetes is 31.XII.1801, the arbitrary publication date for Persoon, Synopsis methodica fungorum, 1801. Therefore, the correct specific epithet for this fungus is Clathrus ruber Micheli ex Persoon and the following are synonyms according to the literature:

> Clathrus ruber Micheli ex Persoon, Synopsis methodica fungorum, 2: 241, 1801.
>
> ≡ [Clathrus ruber Mich. Nova plantarum genera, p. 214, tab. 93, 1729.]

≡ Clathrus cancellatus L. ex Fr. a. ruber (Mich. ex Pers.) Fr. Systema mycologicum, 2: 288, 1823.

= Clathrus nicaeensis Barla. Les champignons de la province de Nice, p. 108, pl. 45, fig. 5-12, 1859.

= Clathrus cancellatus L. ex Fr. f. typicus Ed. Fisch. Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss. 32: 58, 1890.

Persoon (1801) and Fries (1823, v. 2) provide additional pre-starting point synonyms.

The literature provides no mention of California as a distributional station for this species, but there have been four different California collections in the San Francisco Bay region. Sporocarps (NY) were found in Palo Alto, on soil in a slightly shaded garden on July 4, 1952 and again on July 6, 1952. Specimens (UC #143,727) were reported by Mrs. Ted Bowers of Oakland, in October 4, 1959, but no additional data on the collection are available. On several occasions in 1976 Harry Thiers (personal communication) reported finding the lattice stinkhorn in some of the flower beds or cultivated areas in the arboretum in Golden Gate Park, San Francisco. The specimen (Fig. 1) (SFU-HDT #36,481) examined was found under Escallonia sp. In the fall of 1977, James Armstrong (personal communication) found the fungus in sandy soil under Veronica sp. south of Golden Gate Park. No voucher specimen exists for this find, but a photo of it is deposited in (NY).

Clathrus ruber had been previously reported from five states in the United States. Schweinitz (1822) reported it from Georgia. In June 1966, Kozelnicky and Moncrief (1966) found the stinkhorn in Virginia and North Carolina in golf turf. Peck ("1879" [1880]) reported the species from Buffalo, New York. His distributional record is questionable and the species reported may be C. columnatus Bosc according to Lloyd (1903). Murrill (1951) indicated the presence of the fungus in Florida. Gillis (1972) reported that this phalloid was found in the Miami,

Fig. 1. Clathrus ruber. ca x 1.75.

Florida, area and was frequently spotted at the Kampong in Coconut Grove, Florida.

Lloyd (1909) stated that C. ruber is a native of southern Europe and had been found in Italy, southern France and rarely in the channel coast of France, England and into Holland. Northern Africa was also cited by Lloyd as a distributional station. He (1906) also included Switzerland and the islands of the Mediterranean as distributional stations. Dennis (1955) provided a complete record of distribution for England and a distributional map for western Europe. Coker and Couch (1928) listed Jamaica, the Bahamas and Puerto Rico as places from which specimens had been examined. Fischer (1888) cited additional locations of Santo Domingo, Sri Lanka (cited as Ceylon), Khasia, Greece, Hindustan (cited as Hindostan) and New Zealand. In Africa Bottomley (1948) mentioned the fungus from Lake Nyassa and Hendrickx (1948) cited collections from Lukolela and Ipamu, Zaire. The tropical distributions cited by Coker and Couch, Fischer, Bottomley and Hendrickx are dubious since C. ruber is not a tropical species. Eckblad (1975) cited the Canary Islands. Dennis (1977) cited the Azores and he (personal communication) indicated records from Luxemburg, Lithuania and a questionable one from Greece. This phalloid had also been cited for the following countries: Canada (Lowe 1977), Mexico (Guzmán 1972 & 1975), Ireland (Scannell 1974), Belgium (Dennis 1955), Portugal (Almeida 1972), Spain (Calonge 1975), West Germany (Koch 1975), East Germany (Thiel and Breitkopf 1976), Czechoslovakia, Yugoslavia and Poland (Pilát 1958), Romania (Eliade 1965), U.S.S.R. (Sosin 1973), Iran (Ershad 1977) and Japan (Kobayasi 1938).

Porcher (1854) graphically provided the following account of a poisoning by this species: "A young person having eaten a bit of it, after six hours suffered from a painful tension of the lower stomach, and violent convulsions. He lost the use of speech, and fell into a state of stupor, which lasted for forty-eight hours. After taking an emetic he threw up a fragment of the mushroom, with two worms, and mucus, tinged with blood. Milk, oil, and emollient fomentations, were then employed with success."

I am grateful for the loan of specimens from the New York Botanical Garden's Cryptogamic Herbarium and the

University Herbarium of the University of California-Berkeley through the aegis of the Santa Barbara Botanic Garden. I thank Larry Stickney and James Armstrong for distributional data. Special gratitude is extended to Dr. Clark T. Rogerson for supplying information on older references; to Dr. Richard P. Korf and Dr. R.W.G. Dennis for reviewing and revising the paper; and to Dr. Harry D. Thiers for his suggestions in revising this paper, for distributional information and for the color photo.

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# PISOLITHUS TINCTORIUS, A PAVEMENT BREAKER IN SOUTHERN CALIFORNIA

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The distribution in the United States of Pisolithus tinctorius (Pers.) Coker & Couch (Gasteromycetes: Sclerodermatales) was cited by Marx (1977) as occurring in 38 states. In addition occurrence in the District of Columbia was cited by Grand (1976).

From September to December 1978, a large number of fruitings of P. tinctorius occurred throughout the University of California, Santa Barbara campus. Collections are deposited in LG, NY and UCSB herbaria. Pisolithus tinctorius occurred in silty sand alongside bike lanes, paths and sidewalks under Juniperus sp., Eucalyptus globulus Labill., Pinus pinea L. and P. radiata D. Don. The species of tree associates supplement Marx's (1977) list for the United States. McClatchie (1897) stated that Pisolithus tinctorius (cited as Polysaccum crassipes DC) was found only occasionally in soil under Eucalyptus trees in the Southern California coastal region.

An unusual occurrence was observed on October 10, 1978. Under Pinus radiata a large sporocarp had erupted through macadam 4 cm thick of a bike lane creating a hole 10.5 x 19 cm. Stevenson (1936) reported similar pavement breakage

for the gasteromycetous fungi, Phallus ravenelii Berk. & Curt. (cited as Ithyphallus ravenelii (Berk. & Curt.) Fisch.) and Scleroderma geaster Fr.

The authors extend gratitude to Dr. L. F. Grand for reviewing this paper.

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# ACAULOSPORA BIRETICULATA SP. NOV.

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As part of a continuing study on the endomycorrhizal status of six high-value hardwood species, seedlings of these and various other hardwoods were extracted from seedbed or perimeter areas of the two state tree nurseries in Kentucky. A portion of the soil collected with the seedlings from each of the growing sites was examined for spores of vesicular-arbuscular (VA) fungi by a wet sieving method (Gerdemann and Nicolson, 1963). In addition, young root segments were cut from each seedling and examined for VA mycorrhizae by the Phillips and Hayman (1970) staining procedure, with some modifications. The remaining soil and chopped root segments from each sample were thoroughly mixed and planted to corn (*Zea mays* L.) in greenhouse flats. After the seed germinated, the plants were supplied with Long Ashton nutrient solution each week for 5 weeks. After 90 days' growth, the corn roots were examined by the above-mentioned staining technique. A new species of *Acaulospora* was found in a perimeter soil sample from the Kentucky Dam tree nursery. Microscopic slides and photographs that illustrate the stages of development in the type species of this VA mycorrhizal fungus have been deposited in the herbarium at Oregon State University.

*ACAULOSPORA BIRETICULATA* Rothwell and Trappe sp. nov. (Figs. 1-2)

*Sporocarpia ignota. Azygosporae singulae in solo efformatae, sessiles, lateraliter gestae in hypha 10-30 µm diam in vesiculo globoso prope terminata. Sporae globosae, 150-155 µm diam, pallide brunae; reticulo cristis 2 x 1.5-2 µm e stratis tribus formatis; alveolae reticulati 6-18 µm longae, pagina sporae inclusae processibus angulatis, obtusis 1 x 1 µm, munitae aspectu reticuli inversi. Sporae tunica e stratis tribus, unumquidque ± 1 µm crassum. HOLOTYPUS Rothwell SP169 (OSC).*

Sporocarps unknown. Azygospores formed singly in soil, sessile, borne laterally on a hyaline, thin-walled hypha tapered from 2.5-7.5 µm diam at its base to 10-30 µm diam near its terminus, globose to subglobose vesicle 127-135 µm diam; spore-bearing hypha with emergent, branched, flagellate hyphae and collapsing by maturity. Spores globose, 150-155 µm diam, subhyaline in youth, becoming light brown by maturity. Spore surface ornamented with a polygonal reticulum, the ridges 2 × 1.5-2 µm with sinuous, dark grayish-green sides and a paler, depressed central stratum; ridges occasionally branched toward the center of polygons or forming irregular, isolated projections at polygon centers. Polygons 6-18 µm long, the enclosed spore surface beset with round-tipped, 4- to 6-sided processes ± 1 × 1 µm to give the appearance of an inverted reticulum. Spore walls of three layers, each ± 1 µm thick, the outer layer dark grayish green to grayish brown, the inner layers hyaline.

DISTRIBUTION AND HABITAT: To date, *A. bireticulata* is known only from a perimeter soil sample of the Kentucky Dam tree nursery in western Kentucky.

MYCORRHIZAL ASSOCIATIONS: Associated in nature with the roots of *Sassafras albidum* (Nutt.) Ness, and in greenhouse culture with *Zea mays* L.

COLLECTIONS: TYPE: KENTUCKY, Marshall County, Kentucky Dam Nursery, October 1976, Rothwell SP169 (OSC).

The complex spore ornamentation of *A. bireticulata* distinguishes it from all other known members of the genus. *A. elegans* spores often have a single-layered reticulum deposited on top of crowded spines 0.5 µm thick that

ornament the spore surface. The three-layered reticulum and angular processes 1 µm thick on spores of *A. bireticulata* are distinctly different.

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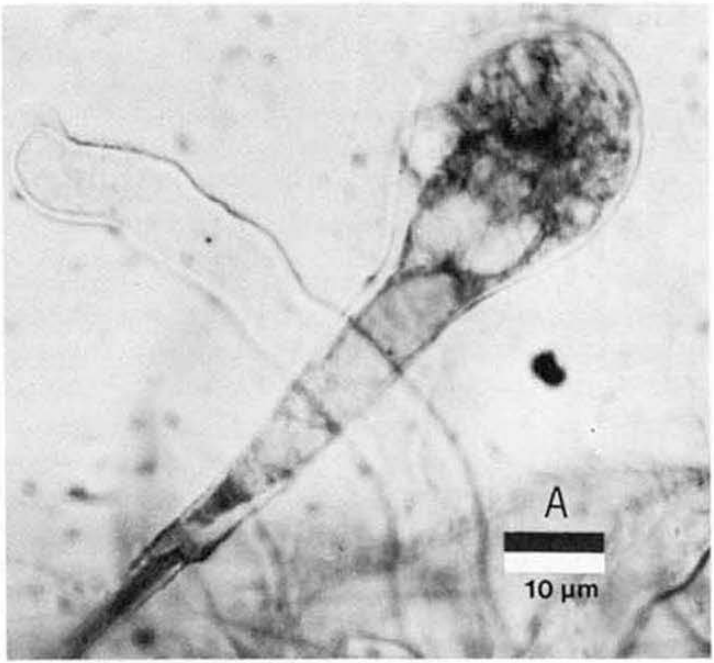
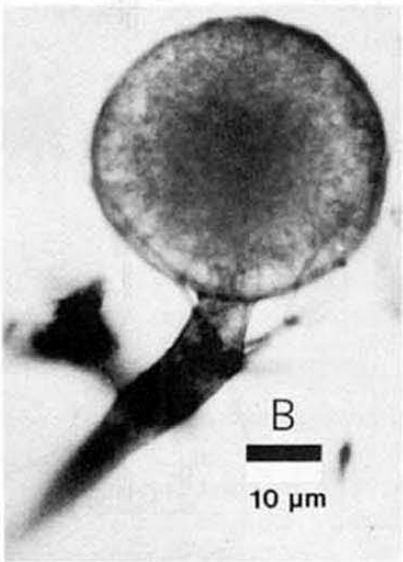
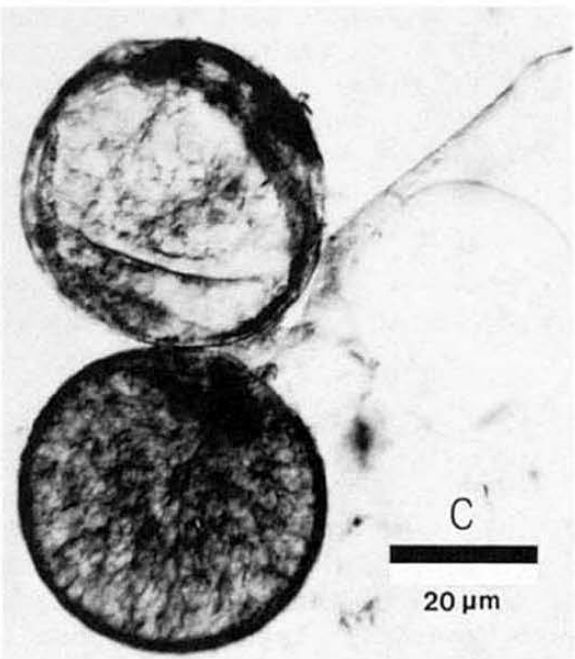
## PLATES

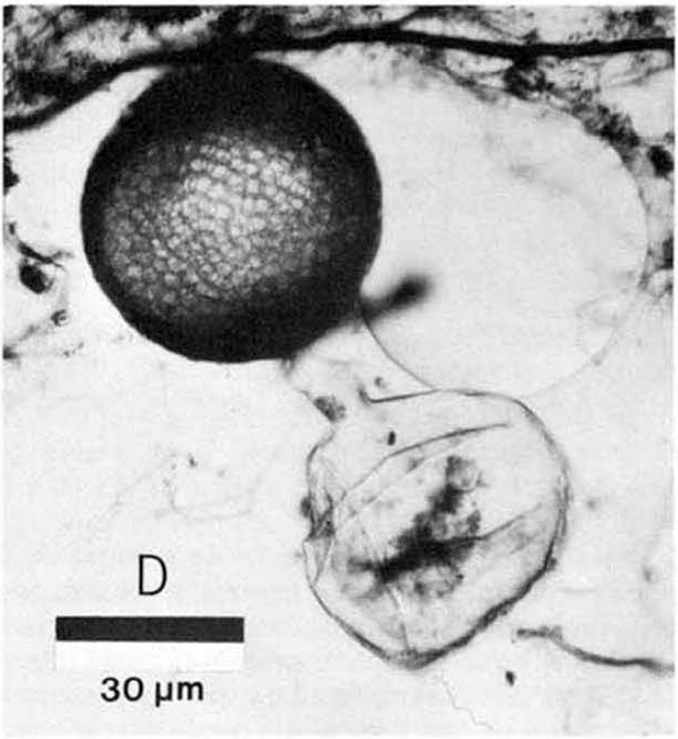
*(on pages that follow)*

FIG. 1, A-D. Developmental stages in the formation of azygospores in *Acaulospora bireticulata*. (A) Early stage of vesicle formation (scale bar, 10 µm). (B) Mature vesicle with branched, flagellate hyphae (scale bar, 10 µm). (C) Late stage in transfer of vesicle contents to azygospore (scale bar, 20 µm). Note spore size, which approximates the emptying vesicle. (D) Mature azygospore attached to empty, collapsed vesicle (scale bar, 30 µm).


A
10 µm


B
10 µm


C
20 µm



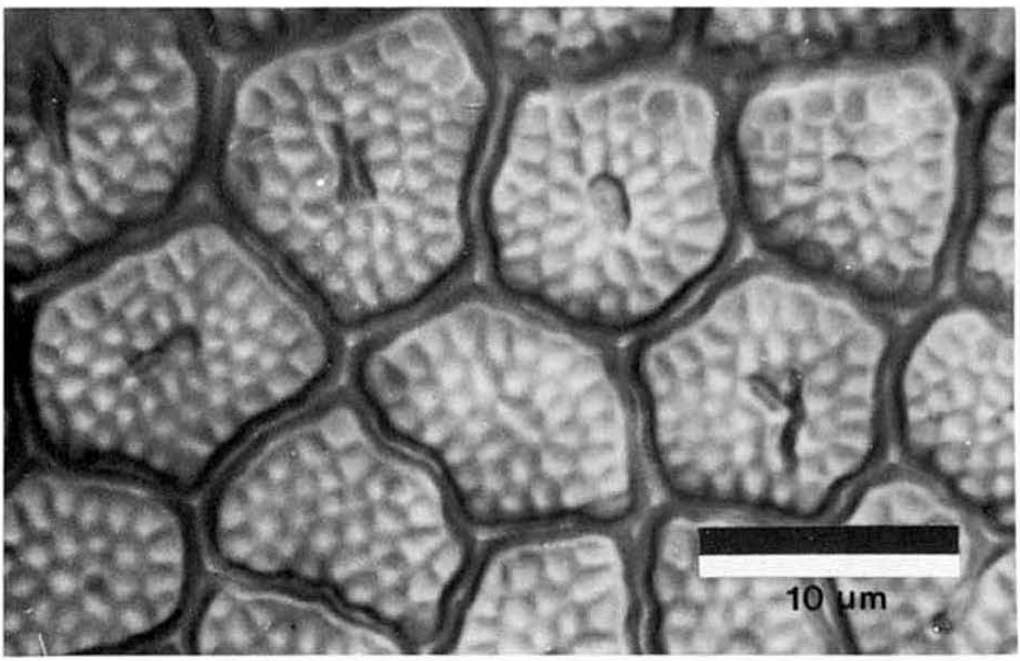




FIG. 2. Detail of double reticulum on outer wall of azygospores (scale bar, 10 µm).

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# FIRST AUTHENTICATED NORTH AMERICAN RECORD OF MONILINIA FRUCTIGENA, WITH NOTES ON RELATED SPECIES

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SUMMARY

A fungus indistinguishable from *Monilinia fructigena* was isolated during an evaluation of accessions of pears for the occurrence of fungi causing brown rots of fruits at Beltsville, Maryland. It has narrow-ellipsoid ascospores with tapered, but not pointed, ends; its conidia are elongate-ellipsoidal and the conidiophores are generally arranged in buff to light yellow-brown sporodochia. In contrast, the ascospores of *M. fructicola* are ellipsoidal or ovoid and generally have rounded ends; the conidia are limoniform or ellipsoidal; and the sporodochia are light grayish to mouse gray. *M. laxa* does not morphologically differ appreciably from *M. fructicola*, except for slower, scanty, and effuse growth on potato dextrose or peach agar media, and lobate intramatrical margin.1/

## INTRODUCTION

*Monilinia* Honey (Discomycetidae: Inoperculatae) includes approximately 30 species and primarily attacks Rosaceae and Ericaceae (4,7,8). Three species, *M. fructicola* (Wint.) Honey, *M. fructigena* (Aderh. & Ruhl.)

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1/Mention of a trademark or proprietary product does not constitute a guarantee or warranty of the product by the U. S. Department of Agriculture and does not imply its approval to the exclusion of other products that may also be suitable.

Honey, and *M. laxa* (Aderh. & Ruhl.) Honey, are destructive to apples, pears, and stone fruits. They cause brown rots of fruits, blossom wilt and blight, and stem cankers which often follow blossom blight or fruit rots (2,7,13). Apothecia of *Monilinia* arise from a hollow-sphaeroid stroma. Monilioid chains of conidia are produced on all affected parts of the host and the conidiophores in many species, including the ones causing the brown rots of fruits, are usually arranged in sporodochia.

## OBSERVATIONS

Since 1973, field-collected mummies of stone fruits, apples and pears have been routinely incubated on a window sill at this laboratory to obtain apothecia of *Monilinia*. During April, 1974, two long-stalked, 1-3 mm wide apothecia developed in one of the five dishes containing 'Kieffer' pears (*Pyrus serotina* Rehder var. *culta* Rehder *X P. communis L.* var. *sativa L.*) collected at the "South Farm", USDA, Beltsville, MD. One of the apothecia aborted, but the other matured. Several single-ascospore cultures were obtained using a technique described earlier (1). At the time of initial plating the isolates did not sporulate on Difco potato dextrose agar or peach agar, but two of the seven single-spore isolates formed stroma characteristic of the family Sclerotiniaceae, which includes *Monilinia*. Although the cultures were buff to light yellow-brown (instead of the usual light gray to mouse gray) they were accessioned and stored at 5C for 16 months along with over 160 isolates of the North American brown rot fungi *M. fructicola* and *M. laxa*. All seven isolates subsequently formed conidia and microconidia on Difco malt agar.

During the fall of 1975, P. D. Millner of this Laboratory recovered several isolates of a *Monilinia* from conidia-bearing whitish sporodochia on fruits of the same 'Kieffer' pear tree from which the apothecia-bearing mummies originated in the spring of 1974. These isolates resembled the cultures of ascosporic origin described above but sporulated on potato dextrose agar and peach agar. The conidia of these fall isolates were characteristic of *M. fructigena*. Additional 'Kieffer' pears infected with this organism could be detected in the field on the basis of whitish to buff sporodochia during October, 1975. *M. fructicola* also attacked various pear cultivars in the orchard at this time and could be readily recognized because of its grayish sporodochia. Six 'Kieffer' trees

were tagged for presumed cankers and for detection of *M. fructigena* during the following spring. However, the pathogen was not recovered from any of the 25 presumed cankers or from blossoms.

All Beltsville isolates designated as *M. fructigena*, including those from apothecia, were compared with 38 single conidial representative isolates of *M. fructicola* and with 13 similar isolates of *M. laxa*. Isolates of the latter two species came from diverse Rosaceae from the United States and represented all available morphological variants. Also, fruits of 'Bartlett' *(Pyrus communis)* and 'Kieffer' pears and 'Golden Delicious' apples *(Malus sylvestris* Mill.) were aseptically inoculated in the laboratory with the Beltsville isolates. Symptoms and signs were noted, and the fungus was reisolated and compared with authentic herbarium material and with a European isolate of *M. fructigena*, ATCC 24976, cultured at the American Type Culture Collection, Rockville, Maryland . Dried cultures, mummies, microscope slides and numerous photographs are on deposit at the National Fungus Collections of our laboratory and living cultures are deposited with the ATCC. The following description and comparative account of *M. fructigena*, is based entirely on the Beltsville material and compares well with that given by Harrison and others outside North America (2,5,6,9,10,11,13). The characterization of *M. fructicola* is closely comparable with descriptions by Elliot (3) and by Honey (7). The American account of *M. laxa* does not differ from European accounts ( 2,13) although I have not compared cultures from the two areas.

Salient Characters of Beltsville Specimens

*Monilinia fructigena* (Aderh. & Ruhl.) Honey (Figs. 1,2,4)

Apothecia cupulate, stipitate, light brown, margin entire, the mature apothecium 3 mm in diam., anatomically similar to that of *M. fructicola* as recently described by Elliot (3); asci cylindrical, 8-spored, pore staining blue with Melzer's reagent, 160-180 X 9-11 µm; ascospores uniseriate, arranged obliquely or end to end within the ascus, hyaline, eguttate, smooth, narrow-ellipsoidal, generally with ends tapered but not pointed, and measure 9-11 X 5.0-6.6 µm (mode 10.0 X 5.5 µm); paraphyses unbranched, septate, 2-3 µm wide, not enlarged above; sporodochia on fruits solitary or confluent and matted on maturity, buff to light yellow-brown, 1-2 mm wide and up to 2 mm high; conidia elongate-ellipsoidal, 15-25 X 12-16 µm (mode 21 X 14 µm); seven day old colonies in an incubator at 25C and

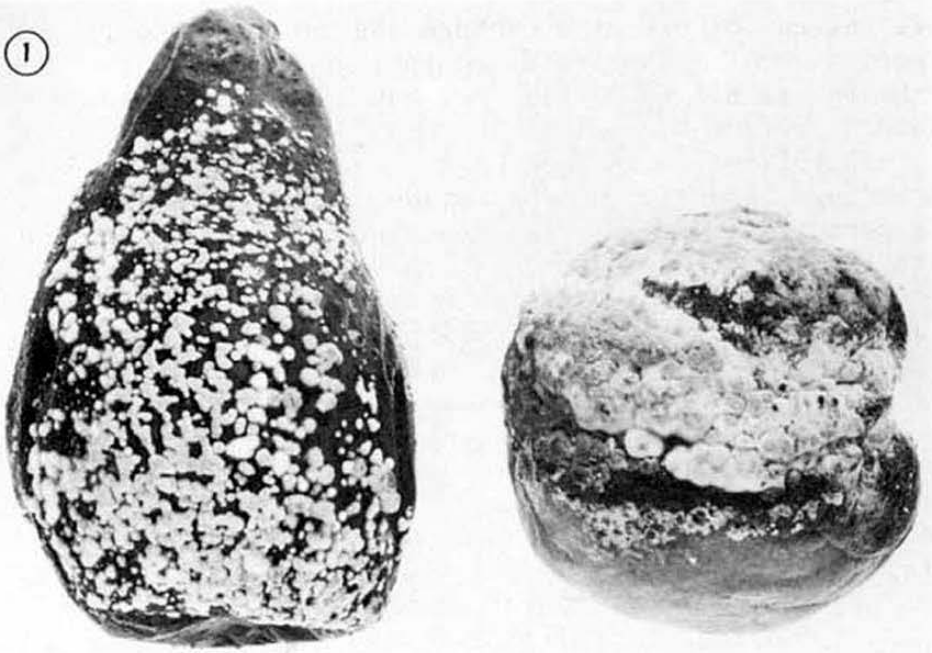



Fig. 1. Sporodochia of *Monilinia fructigena*. A 'Kieffer' pear and a 'Redskin' peach inoculated with Beltsville isolate Batra-3008, photographed 12 da. after incubation at 25C, approx. nat. size.

with 12 hour light-darkness cycle are 8.5 cm across, within 8th - 11th day a circular cushion-like band of fluffy mycelium, 5-6 mm wide, 3-4 mm high, and about 5 cm from the colony center, is formed, underneath which appear loaf shaped, nearly superficial, initially discrete but eventually confluent sclerotia between 12th and 21st day. Two to four similar additional concentric circles are subsequently formed outside the first circle and monilioid chains of conidia are abundant throughout the colony. Apples, pears and peaches inoculated with *M. fructigena* remain rather compact, and the mycelium, ectostroma, and sporodochial masses are conspicuous, tough and matted.

The preceding account of apothecia of *M. fructigena* resembles that of the type, as given by Harrison (6). The vegetative and asexual stages compare well with the following material from Europe: ATCC 24976; exsiccatae on deposit at the National Fungus Collections: C. Roumeguère fungi selecti exiccati 6566 and de Thümen, Mycotheca Universalis 477 and 1377.

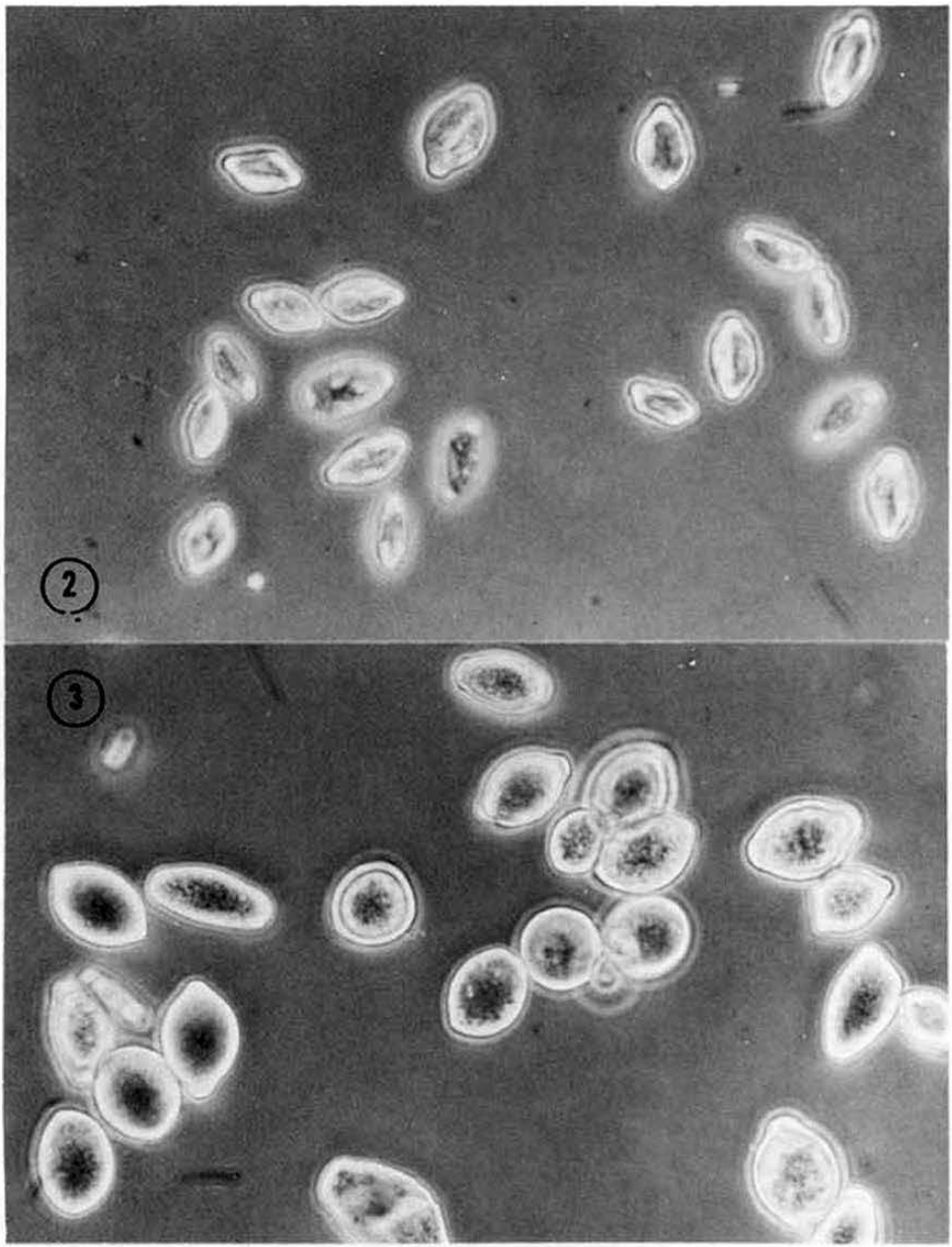
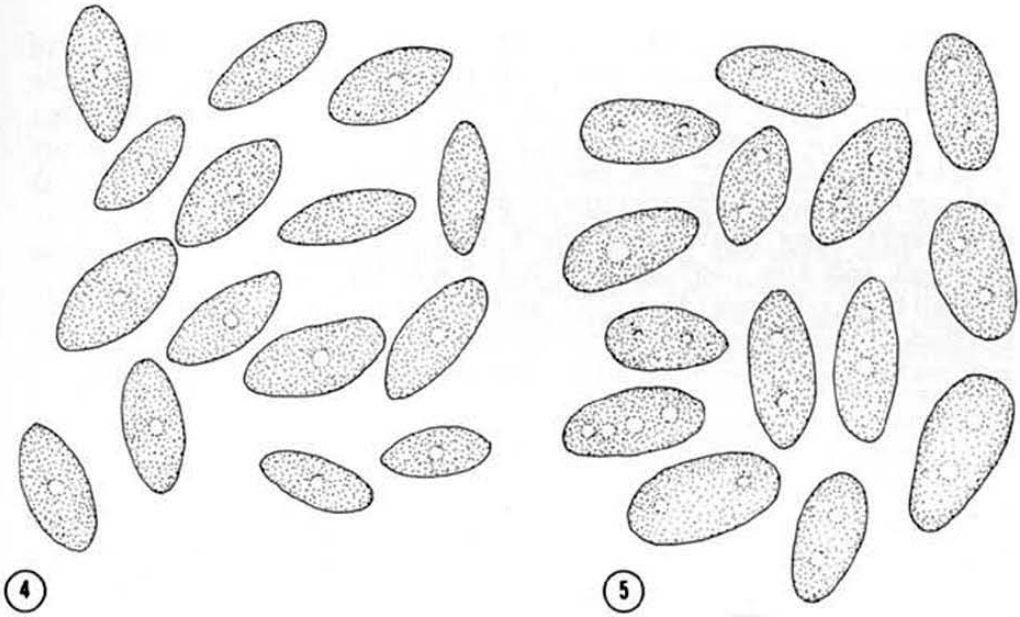



Fig. 2,3. Conidia mounted in water. 2. *M. fructigena;* 3. *M. fructicola* All X650.

*Monilinia fructicola* (Wint.) Honey (Figs. 3,5)

Elliot (3) gives an updated account of *M. fructicola* and my observations on 12 microscope slides, prepared by E. K. Cash in 1924, from the apothecial material of the type confirm this account. Apothecia of this species are uncommon at Beltsville but apparently common elsewhere in



Figs. 4,5. Ascospores mounted in lactophenol. 4. *M. fructigena;* 5. *M. fructicola.* Both X1500.

North America (2,5,6,7). The ascospores are ellipsoidal to ovoid, generally with rounded ends, hyaline, binucleate, and measure 10.5-13.0 X 4.5 - 6.6 µm. The sporodochia on fruits are granular, usually discrete, light gray or mouse gray, 0.5 - 0.75 mm wide and up to 1 mm high. The conidia are limoniform or ellipsoidal and measure 15-17 X 8-11 µm. The colonies grown under similar conditions as those for *M. fructigena* are grayish to olive gray, and the sclerotial masses, though concentric, are ill-defined, thin, and mostly intramatrical. Apples and pears inoculated with *M. fructicola* are spongy or soft and sporodochia on the fruit surface are inconspicuous or lacking.

*Monilinia laxa* (Aderh. & Ruhl.) Honey

This is a well recognized European species and its biology and cultural characteristics are subtly but consistently different from those of *M. fructigena* (2,11,13) and *M. fructicola*. I did not examine any living material of it from overseas. The North American west coast *Monilinia* causing blossom blight and fruit rot of stone fruits has been referred to as this species but without critical, comparative investigations, probably because of quarantine considerations. The western United States isolates of *M. laxa* were compared with the eastern isolates of *M. fructi-*

*gena* and *M. fructicola*. Except for its slower, scanty, and effuse growth, and lobed intramatrical margin, *M. laxa* does not morphologically differ appreciably from *M. fructicola*. Apothecia of *M. laxa* were initially reported from Germany and twice from England (6,12). The ascospores have two or three oil drops and rounded ends. The light gray sporodochia are 0.5-.75 mm wide and 0.5 mm high and the conidia are ellipsoidal, 12-18 X 9-10 µm. According to Wormald's (13) description of cultures of *M. laxa*, the western United States brown rot of *Monilinia* may well be congeneric with the European species.

## CONCLUSIONS AND DISCUSSION

I investigated herbarium material or cultures of many populations of 23 species (over 700 herbarium specimens and 160 cultures) of the approximately 30 species recognized for *Monilinia* and have critically studied the descriptions of the rest. In general, the external apothecial characters and asci, ascospores and paraphyses have limited value in delineating a species. In seven species of *Monilinia* from Japan, Harada (4) found asci and ascospores rather similar in appearance but most species could be separated from each other on the basis of shape and size of conidia and general colony characters. Taken as a whole, one or two micromorphological, subtle but consistent cultural characters, and symptoms and signs of the diseased material, as indicated above, are available to delineate *M. fructigena, M. fructicola* and *M. laxa*. The latter two species are distinct from each other, as judged from electrophoresis (11).

*M. fructigena* is predominantly restricted to Europe, Western USSR, Turkey, Iran, Israel, Korea, Japan and Morocco. These reports are backed by adequate data on fungus morphology, symptomatology, or both. Since *M. fructicola* is unknown from Eurasia, the presumed primary gene center of *M. fructigena*, it would be important to know what factors have kept apart the two species, particularly since (1) both species have a wide host range in their native areas (13), (2) there has been considerable reciprocal traffic of fruits and nursery stock, and (3) the fungi do overwinter in cankers of Rosaceae (although *M. fructicola* does not survive for long in cankers). Such information would be useful to adequately assess the potential or actual threat of each species after their entry and establishment outside their present geographic range.

At Beltsville in my studies in a related program on

brown rot fungi, *M. fructigena* was not recovered from stone fruits although several hundred isolations were attempted from blossoms, twigs, and fruits during 1973 through 1978 and several thousand fruits were examined in the field. It only came from one mummied 'Kieffer' pear during the spring of 1974 and from several fruits of the same cultivar found on the ground during October, 1975. *M. fructicola*, on the other hand, was the commonest fungus observed during surveys of orchards of stone fruits, including apricots (*Prunus armeniaca L.*), plums (*P. domestica L.* and allied species), peaches and nectarines (*Prunus persica (L.)* Batsch and its var. *nectariana*) at Beltsville. It also occasionally attacked diverse apples and pears.

Since I have been unable to recover apothecia or cultures of *M. fructigena* from additional mummies of 'Kieffer' pears collected from the initial site or to isolate the fungus from marked "cankers", the primary source of inoculum cannot be pin-pointed. Additional critical surveys must be conducted to confirm my findings and before implementing any control measures, including containment by quarantine.

ACKNOWLEDGEMENTS

Harry Keil, Fruit Laboratory, Beltsville, provided counsel on brown rot fungi, and Frances Maclary and Patricia Millner, both of this laboratory, maintained cultures used in this work.

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# A PRELIMINARY ACCOUNT OF THE TAXA DESCRIBED IN CALONECTRIA

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***SUMMARY***

Taxa described in *Calonectria* are reevaluated based on a study of type specimens. If unrelated to *Calonectria*, nectrioid species with multiseptate ascospores are returned or transferred to *Nectria*, placed near related, uniseptate species. Fourteen names are transferred to *Nectria*: *N. albosuccinea*, *N. calami*, *N. coccidophaga*, *N. collapsa*, *N. cyathula*, *N. erythrina*, *N. geralensis*, *N. gymnosporangii*, *N. lagerheimiana*, *N. miniscula*, *N. novae-zealandica*, *N. pseudopeziza*, *N. varians* and *N. vermoniae*. Five new names are proposed for species whose epithets are preoccupied in *Nectria*: *N. astromata*, *N. byssophila*, *N. jactata*, *N. megaspora* and *N. microleuca*. Additional new combinations of species in the Hypocreales are *Allonectella guaranitica*, *Nectriella sceptri* and *N. obvoluta*. Two names are transferred to ostropalean genera: *Absconditella duplicella* and *Cryptodiscus rutilus*. In the Dothideales the new combination *Hyalocrea arcuata* is proposed. Three names are transferred to *Tubeufia*, *T. aurantiella*, *T. pachythrix* and *T. stromaticola* and one to *Massarina*, *M. viburnicola*. Among the pleosporaceous fungi occurring on *Meliola* six new combinations are proposed: *Byssocallis capensis*, *Melioliphila appendiculata*, *M. coralloides*, *M. erysiphoides*, *M. longisetosa* and *M. volutella*.

The genus *Calonectria* de Notaris has been redescribed by Rossman (1979) based on the monotype species, *C. daldiniana*, a later synonym of *C. pyrochroa*. *Calonectria* now includes only those species having an ascocarp wall structure similar to *C. pyrochroa* and a *Cylindrocladium* anamorph. In the past *Calonectria* has included all species which are like *Nectria* but have multiseptate ascospores (Saccardo, 1883; Seaver, 1909a; Rogerson, 1970). With an increased knowledge of the correlation of ascocarp wall structure with anamorph, several workers (Booth, 1959, 1978; Samuels, 1976a, 1978; Samuels & Rossman, 1979) have defined groups of related species within the *Nectria*-complex. These include species from genera related to *Nectria* but previously separation on the basis of ascospore septation. Thus, segregation of genera based on ascospore characters has been shown to be artificial. In this paper the taxa described in *Calonectria* are reevaluated. Nectrioid

*Presently an Anna E. Jenkins Postdoctoral Fellow.

species, which are unlike *Calonectria sensu stricto* but have multiseptate ascospores, are returned or transferred to *Nectria*, placed near related species having uniseptate spores.

Each specific epithet is listed alphabetically in *Calonectria*, followed by nomenclatural and taxonomic synonyms. Infraspecific epithets follow the specific epithet in *Calonectria* under which they were proposed. The names which I accept are capitalized. All references to herbaria are abbreviated using Holmgren & Keuken (1974). Specimens at FH are housed in special collections for which the following abbreviations are used: FH-C, Curtis herbarium; FH-ex, undistributed exsiccati; FH-G, general herbarium; FH-H, von Höhnel herbarium; FH-P, Patouillard herbarium. Special collections cited from CUP are CUP-A, Atkinson herbarium and CUP-F, Fairman herbarium. Except for placing the anglicized version of the country first, the unedited citation of the type specimen is reproduced here as printed in the original description, including punctuation and italicized words. Reference to a name which has been placed in *Calonectria* is noted in the synonymy and should be cross-checked under that epithet for further information. Unless type or authentic specimens were located and adequate for microscopic examination, I have not speculated on the identity of a taxon. Most older descriptions and illustrations are inadequate to determine ascus type, a character now considered of primary importance.

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*Calonectria aculeata* (Kirschst.) Weese, Centralbl. Bakteriol., 2 Abth. 42:595. 1914.
≡ *Trichonectria aculeata* Kirschst., Verh. Bot. Vereins Prov. Brandenburg 47:60. 1907.

Type: Germany. Auf der Rinde einer abgestorbenen noch stehenden Rottanne in der Rathenower Stadtforst. 22. 11. 05.

The holotype specimen (B) has nothing on it resembling the described fungus. From the description this species may be a later name for *Nectria hirta* (≡ *Calonectria hirta*, ≡ *Trichonectria hirta*) but without a good authentic specimen this synonymy cannot be adequately determined. *Trichonectria aculeata* is the monotype species of *Trichonectria* Kirschst.

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*Calonectria adianti* Rehm, Hedwigia 37:197. 1898.
≡ *Melioliphila adianti* (Rehm) Piroz., Kew Bull. 31:596. 1976.

Type: Brazil. Auf Adiantum trapeziforme. Tubarão. Ule no. 1326 a. H. B.

An isotype specimen at FH-G with the additional data "Estado de Sta. Catharina: Mai 1890" lacks any fungus resembling the description. In FH-H another isotype "ex Herb. Berlin" again has no suitable fungus. At S there are notes made by Rehm of the type "ex Herb. Berol." but no specimen. The holotype specimen at B has apparently been destroyed. The type description, Rehm's notes and a description by Batista, *et al.* suggest that this species may be *Melioliphila balanseana* (≡ *Calonectria balanseana*) as are many later spec-

imens labelled *C. adianti*. Without examining the type specimen, Pirozynski (1976) transferred the species to *Melioliphila*.

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*Calonectria agnina* (Rob. ex Desm.) Sacc., Michelia 1:311. 1878.
≡ *Sphaeria agnina* Rob. ex Desm., Ann. Sci. Nat. Bot., ser. 3, 6:72. 1846.
= *NECTRIA DECORA* (Wallr.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24:179. 1870.

Type: France. Ad ramos siccos Ulmi, autumno. Nob.

In discussing this species, Desmazières (1846) stated "Les branches et surtout les rameaux secs de l'Orme, exposés à une humidité prolongée, donnent naissance a cette Sphérie, l'une des plus jolies et des plus petites que nous connaissions." The label of Desmazières, Pl. Crypt. France #1765, issued in 1849 as *Sphaeria agnina*, reads "En automne, sur les branches et surtout sur les rameaux secs de l'Orme, exposés à une humidité prolongée." Although not specifically designated, Desmazières's comments in the original description and on the packets indicate that this exsiccati number is the type collection. Many isotype specimens of Desmazières, Pl. Crypt. France #1765 have been examined (BPI, BR, FH-H, H, NY, UPS). The specimen at NY is here designated the LECTOTYPE. As Weese (1914a), Wollenweber & Reinking (1935) and Pirozynski (1975) have suggested, this name is found to be a later synonym of *Nectria decora* (≡ *Calonectria decora*).

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*Calonectria albosuccinea* Pat., Bull. Soc. Mycol. France 8:132. 1892.
≡ *NECTRIA ALBOSUCCINEA* (Pat.) Rossman, *comb. nov.*
= *Calonectria ecuadorica* Petrak, Sydowia 4:463. 1950.

Type: Ecuador. Sur écorce purrie. Puente de Chimbo. Aout.

The holotype specimen (FH-P) is in good condition. This species is hypocreaceous but is unrelated to *Calonectria* as recently circumscribed by Rossman (1979). The ascocarp wall of *Nectria albosuccinea* is white and rough-warted, similar to that of *Nectria rigidiuscula* (≡ *Calonectria rigidiuscula*); however, *N. albosuccinea* lacks a well-developed stroma. *N. albosuccinea* is also reminiscent of *N. astromata* (≡ *C. verrucosa*), the latter having longer ascospores. The specimen described by Petrak (1948) as *C. albosuccinea* was examined (BPI). It has dark-red ascocarps on a well-developed stroma, not at all like Patouillard's type specimen. This mistaken concept of the species is perpetuated in Dennis (1970).

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*Calonectria ambigua* Speg., Anales Soc. Ci. Argent. 12:212. 1881.
≡ *Subiculicola ambigua* (Speg.) Speg. (*ut* 'Speg.'), Bol. Acad. Nac. Ci. 26:347. 1924.
= *MELIOLIPHILA VOLUTELLA* (Berk. & Br.) Rossm., Mycotaxon 8:551. 1979.

Type: Brazil. In foliis vivis Laurineae cujusdam in nemorosis prope Apiahy, Jul. 1881, leg. Cl. Dr. J. Puiggari, sub. n. 1507. (no. 1661).

The holotype (LPS) is a good specimen of *Melioliphila volutella* (≡ *Calonectria volutella*) having bitunicate asci and white, setose ascocarps which occur on *Meliola*. The isotype (FH-P) is different from the holotype specimen. The isotype is *Melioliphila balanseana*, closely related to *M. volutella*, but lacking hairs on the ascocarp. Spegazzini (1881) described hairs on the ascocarp, stating that they often disappear with age. Balansa, Pl. du Paraguay #3796 (NY) issued as *C. ambigua* is *Melioliphila balanseana* (≡ *C. balanseana*). *C. ambigua* is the monotype species of *Subiculicola* Speg., a synonym of *Melioliphila* Speg., whose monotype species is *C. graminicola* Stevens, a synonym of *M. volutella* (≡ *C. volutella*). These genera were published on the same day. Pirozynski (1976) stated that *Subiculicola* is questionably synonymous with *Melioliphila*. In accordance with Article 57 of the International Botanical Code (Stafleu, *et al.*, 1972) and Pirozynski's apparent preference, *Melioliphila* is chosen as the correct name.

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*Calonectria ambigua* var. *exappendiculata* Speg., Anales Soc. Ci. Argent. 33:476. 1919.

Type: Brazil. Sobre las hojas vivas de una Sapindacea?, cerca de Apiahy, enera 1888 (J. Puiggari, no. 1507).

The label of the specimen sent from LPS as the holotype of this variety reads "TIPO. No. 1660. S/ .Sapindacea Brasil, Apaihy,I-188. Leg. J. Puiggari,nro.1507." Although the collection data given in the type publication are slightly different from those on the packet, the Puiggari number is the same. In addition, these collection data and Puiggari number are almost the same as that of the typical variety. Years after he described *Calonectria ambigua* (= *Melioliphila volutella*), Spegazzini may have noticed the ascocarps of this variety on the holotype specimen of *C. ambigua* and split the collection. The hyperparasitic species on *Meliola* often occur intermixed on the same colony. The specimen has no ascocarps. The drawings on the packet and published description of *C. ambigua* var. *exappendiculata* suggest *Melioliphila balanseana* (≡ *Calonectria balanseana*).

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*Calonectria apoensis* Petrak, Sydowia 22:392. 1969.

Type: Philippines. Mt. Apo, Davao Prov., Mindanao, auf stark, verfaulten Blattscheiden von Musa textilis, June, 1924, leg. M. S. Clemens, nr. 5268.

The holotype specimen may be at W but Petrak's specimens are not yet available for study.

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*Calonectria appendiculata* Rehm, Hedwigia 37:197. 1898.
≡ *MELIOLIPHILA APPENDICULATA* (Rehm) Rossman, *comb. nov.*

Type: Brazil. Folia Euphorbiaceae. Ule no. 927. H. B.

The holotype specimen at B has apparently been destroyed; therefore, the isotype specimen in FH-H "ex Herb. Berlin" is here designated the LECTOTYPE. The lectotype reveals a *Melioliphila* species, close to *M. balanseana* (≡ *Calonectria*

*balanseana)* and *M. volutella (≡ C. volutella)* but the ascocarps have short, blunt hairs around the ostiole and hyphae radiating from the sides and base of the ascocarp. Later collections, issued as *C. appendiculata*, Rehm, Ascomyceten #1689 (BPI, CUP) and Theissen, Decades Fungorum Brasiliensum #149, are *Melioliphila balanseana*.

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*Calonectria arcuata* Hansf., Mycol. Pap. 15:119. 1946.
≡ *HYALOCREA ARCUATA* (Hansf.) Rossman, *comb. nov.*

Type: Uganda. Entebbe Road, in plagulis Asterinae in foliis Tetracerae potatoriae, Hansford no. 2797.

The holotype specimen at IMI has been examined as well as several paratype and authentic specimens (BPI: Hansford 2796 & 3353; PREM: Hansford 3490). This species is dothideaceous, having bitunicate, saccate asci with few asci per ascocarp, and belongs in *Hyalocrea*, whose monotype species, *H. epimyces (≡ Calonectria epimyces)*, has light-yellow ascocarps and occurs on the carbonous stromata of other fungi.

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*Calonectria atkinsonii* Rehm, Ann. Mycol. 2:178. 1904.
= *HERPOTRICHIA MUTABILIS* (Pers. ex Fries) Winter, Rabenh. Kryptogamen-Fl. Bd. 1 Abt. 2:209. 1887.

Type: United States. MacKinney Glon, leg. Riters. Comm. Atkinson no. 5240 (sub *Calonectria chlorinella* Cooke ?), ad corticem.

The data on the type collection are somewhat altered in the original publication and, as stated on the isotype packet (CUP-A), should read "New York, Cayuga Lake Basin, McKinney's Glen, leg. A. J. Pieters, Oct. 27, 1894, #5240." The holotype (S-as *Calonectria chlorinella*), isotype specimen (CUP-A) and isotype slides (FH-G, IMI) were examined. In agreement with C. T. Rogerson, New York Botanical Garden, this name is found to be a later synonym of *Herpotrichia mutabilis*, as are numerous specimens deposited as *C. atkinsonii*.

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*Calonectria aurantiella* Penz. & Sacc., Malpighia 11:515. 1897.
≡ *TUBEUFIA AURANTIELLA* (Penz. & Sacc.) Rossman, *comb. nov.*

Type: Java. Tjibodas, ad ligna putrida superficie obscurata, 1.III.97. No. 126.

Although the fragmentary isotype at FH-H has nothing on it, the holotype specimen (PAD) reveals that this species belongs in *Tubeufia*, close to *T. palmarum* (Torrend) Samuels, Rossman & E. Müller, 1979. Occurring with dematiaceous fungi on well-rotted wood, *T. aurantiella* has fleshy ascocarps covered with bright-yellow, crystalline granules, numerous pseudoparaphyses, bitunicate asci and long, fusiform ascospores.

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*Calonectria aurea* (Crouan & Crouan) Sacc., Michelia 1:344. 1878.
≡ *NECTRIA AUREA* Crouan & Crouan, Florule de Finistère p. 37. 1867.

Type: France. Finistère, sur les tiges mortes de Ronce. Hiv. r. r.

The holotype specimen at CO was examined. Although the ascospores are multiguttulate, they have only one septum. The species is unrelated to *Calonectria*, as redefined by Rossman (1979), and is retained in *Nectria*, close to members of the *N. episphaeria*-group as delimited by Booth (1959).

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*Calonectria aurea* Ade, Hedwigia 64:304. 1923, *non C. aurea* (Crouan & Crouan) Sacc., 1878.

Type: Germany. Auf der Innenseite abgeworfener, alter Buchenrinde in Gesellschaft einer Melanomma am Nordhang des Ruckberges bei Reussendorf (Rhön) auf Basaltboden bei ungefahr 850 m Höhe. 25.5.1915.

The holotype specimen could not be located. The occurrence with carbonous pyrenomycetes, color and hairs of the ascocarp, ascospore size, shape and septation, and associated *Helicomyces*, all suggest that this is *Tubeufia cerea* (≡ *Calonectria cerea*). Until an authentic specimen is located, this species cannot be accurately characterized.

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*Calonectria aurigera* (Berk. & Rav.) Sacc., Michelia 1:308. 1878.

≡ *NECTRIA AURIGERA* Berk. & Rav. *(ut 'auriger')*, Grevillea 4:46. 1875.

Type: United States. South Carolina, Santa Canal, on Fraxinus. Car. Inf. Ravenel no. 1830.

The isotype specimen (FH-C) and isotype slide (IMI) reveal this to be a good hypocreaceous species belonging to the *Nectria aquifolii*-group as delimited by Booth (1959). *N. aurigera* provides the earliest epithet for the North American species often mistakenly called *Scoleconectria polythalama sensu* Ravenel, Fungi Carol. #541 and *sensu* Seaver (1909a). The holotype specimen of *Nectria polythalama* (≡ *Calonectria polythalama*, ≡ *Scoleconectria polythalama*) at K proves *N. polythalama* to be a later synonym of *Thyronectria pseudotrichia* (Schw.) Seeler as suggested by Dingley (1952). Ellis, North Amer. Fungi #79 (CUP, FH-ex, NY) is correctly named as *N. aurigera*.

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*Calonectria bahiensis* Hempel, Bol. Agric. (São Paulo) 5:22. 1904.

≡ *Anthostomella bahiensis* (Hempel) Speg., Revista Fac. Agron. Univ. Nac. La Plata ser. 2, 2:304. 1907.

Type: Brazil. No Estado da Bahia, vivendo como parasita na casca do tronco do Cacaoeiro.

The holotype specimen (LPS) shows this species to be lichenized or perhaps, xylariaceous, as suggested by Spegazzini's combination. The name is not mentioned in Francis (1975). The semiimmersed ascocarps are carbonous, containing loose ascospores which are large, 60-70 x 20-23 µm, nonseptate and dark-brown with germ pores at each end. The disposition of this species could not be determined.

*Calonectria balanseana* Berl. & Roum., Rev. Mycol. (Paris) 10:77. 1888.
≡ *MELIOLIPHILA BALANSEANA* (Berl. & Roum.) Piroz., Kew Bull. 31:596. 1976.
= *Calonectria melioloides* f. *microspora* Rehm, Hedwigia 37:196. 1898.
= *Calonectria gyalectoidea* Rehm, Hedwigia 37:197. 1898.
= *Calonectria warburgiana* P. Henn. in O. Warburg, Monsunia 1:25. 1899.
= *Calonectria meliolae* Hansf., Proc. Linn. Soc. Lond. 153: 33. 1941.

Type: Philippines. Tonkino, in pagina superiore foliarum Bambusae speciei cujusdam.

Although not specifically stated, Roumeguère, Fungi selecti exs. #4452 collected in December 1887, has the above collection data and is assumed to be the type. Many specimens of this number have been examined (BPI, BR, FH-P, FH-ex, NY). The one at NY is here designated the LECTOTYPE; the others become isolectotypes. This species has fleshy, white ascocarps without hairs, bitunicate asci and occurs on *Meliola*.

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[*Calonectria balanseana* Teng, Sinensia 4:276. 1934. *nom. nud.*]

Specimen cited: China. Kiangsu, Nanking, Teng 1285.

In an article on the Fungi of Nanking, Teng (1932) listed the specimen cited above as "*Calonectria balanseana* Berl., in Roum." Teng (1934) included this specimen from his earlier publication as a synonym of *Calonectria bambusae* (Hara) Höhnel referring to "*Calonectria balanseana* Teng, Contr. Biol. Lab. Sci. Soc. China, Bot. 8:9. 1932. [*non* Berl.]" . In so doing Teng created a later homonym which is also a *nomen nudem*. This invalid name is listed by Tai (1937).

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*Calonectria balansiae* A. Möller, Phycomyc. & Ascomyc., Untersuchungen aus Brasil p. 197. 1901.
≡ *Weesia balansiae* (A. Möller) Höhnel, Akad. Wiss. Wien Sitzungsber., Math.-Naturwiss. Kl., Abt. 1, 129:150. 1920.

Type: Brazil. St. Catherine bei Blumenau auf grasbewohnender *Balansia redundans* A. Möller.

This is the monotype species of *Weesia* Höhnel. The type specimen is not at B or FH-H and has not been located.

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*Calonectria balsamea* (Cooke & Peck) Sacc., Syll. Fung. 9:986. 1891.
≡ *Nectria balsamea* Cooke & Peck, Grevillea 12:81. 1884.
≡ *THYRONECTRIA BALSAMEA* (Cooke & Peck) Seeler, J. Arnold Arbor. 21:442. 1940.

Type: United States. New York, North Elba, on dead branches of *Abies balsamea*, Aug. 1872, coll. C. H. Peck.

Isotype specimens (NY, NYS) were examined. This species has muriform ascospores and is, thus, justifiably placed in *Thyronectria;* however, it closely resembles *Scoleconectria cucurbitula* (≡ *Calonectria cucurbitula),* separated by the slightly shorter, wider ascospores with irregular, longitudinal septa. Both species belong in the *Nectria aquifolii*-group as delimited by Booth (1959). For a complete list of synonyms, consult Rossman (1977) and Seeler (1940).

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*Calonectria bambusae* (Hara) Höhnel, Ann. Mycol. 17:120. 1920.
≡ *MIYAKEAMYCES BAMBUSAE* Hara, Bot. Mag. (Tokyo) 27:248. 1913.

Type (translated from Japanese): Japan. Mino and Sagami, on stromata of *Phyllachora phyllostachydis* on bamboo.

Although not stated in the type description, Sydow, Fungi exotici exs. #385 issued in March, 1915 and labelled "*nov. gen. et spec.*" is taken to be the type collection. These were the only specimens of this species encountered and the collection data in the type description match those on the exsiccati packets: "Japan: Kawauye-mura, prov. Mino. Parasitica in *Phyllachora Phyllostachydis* Hara ad folia *Phyllostachydis bambusoidis*. 11. 11. 1911. K. Hara." Specimens of this exsiccati number have been examined from B, BPI, C, CUP, DAOM, FH-G, FH-H, NY and S. The one at NY is here designated the LECTOTYPE; the others become isolectotypes. An authentic collection (FH-H, S) was made in January, 1912. This species appears hypocreaceous having brown, fleshy ascocarps and unitunicate asci but is quite unlike any other member of the *Nectria*-complex. The small, pyriform ascocarps are crowded together, partially immersed in a byssoid stroma of brown hyphae. At present, *M. bambusae,* the monotype species of *Miyakeamyces,* is retained in that genus, related to *Nectria.*

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*Calonectria bambusina* Rolland, Bull. Soc. Mycol. France 17: 119. 1901.

Type: France. Golfe-Juan, ad corticem uvidem Bambusae, Villa des Cocotiers, Februario, 1899.

The type specimen is not at PC and has not been located.

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*Calonectria biseptata* Döbbeler, Mitt. Bot. Staatssamml. München 14:58. 1978.

Type: New Guinea. Papua, Dist. Northern, Subdist. Kokoda, eastern side lake Myola No. 1, (9° 10' S, 147° 45' E), submontane rainforest, 2000 m, auf *Dawsonia grandis,* gemainsam mit *Bryorella crassitecta* und *Calonectria phycophora,* 23. VII. 1974 J. R. CROFT et al. (LAE 61975), (-), (Holotypus M).

The holotype specimen of this recently described species has not been examined. This species was placed in *Calonectria* solely on the basis of the multiseptate ascospores. From the description and illustration, it appears to be unlike *Calonectria pyrochroa, (= C. daldiniana,* the monotype species of *Calonectria)* (Rossman, 1979) and should be placed with allied species in the genus *Nectria.*

*Calonectria bloxami* (Berk. & Br.) Sacc., Nuovo Giorn. Bot. Ital. 7:23. 1875.
≡ *Nectria bloxami* Berk. & Br., Ann. Mag. Nat. Hist. ser. 2, 13:467. 1854.
≡ *Nectriella bloxami* (Berk. & Br.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 29-30:21. 1875.
≡ *Dialonectria bloxami* (Berk & Br.) Cooke, Grevillea 12:100. 1884.
= *NECTRIA ARENULA* (Berk. & Br.) Berk., Outl. Brit. Fung. p. 394. 1860.

Type: England. Twycross, on dead stems of herbaceous plants, Rev. A. Bloxam, Brit. F. #781.

After examining the holotype (K) and authentic specimens (K, PC), I agree with Booth (1959) who stated that *Nectria bloxami* is a synonym of *N. arenula*. *N. arenula* is redescribed and illustrated by Samuels (1978) and Booth (1959). Many specimens labelled *N. bloxami* are *Nectriella sceptri* (≡ *Calonectria sceptri*) including Rehm, Ascomyceten #1466 (BR, CUP, FH-H, S) issued as *C. bloxami*.

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[*Calonectria bloxami* var. *umbelliferarum* Höhnel, Ann. Mycol. 2:49. 1904. *nom. prov.*]
≡ *Charonectria umbelliferarum* Höhnel, Hedwigia 42:187. 1903.

Type: Austria. Tirol, an dürren Umbelliferen-Stengeln, Tumpener See im Ötztal.

The holotype specimen (FH-H) has the additional information "Aug. 99, Höhnel, 27 XII 1902". This specimen contains only a few bumps which suggest *Nectriella* (= *Charonectria* Sacc. *fide* Seaver, 1909a) but it is too scanty to be identified accurately. Rehm, Ascomyceten #1867 issued as *Charonectria? umbelliferarum* (CUP, FH-H) is a *Nectriella* with a ring of short, thick hyphae around the ostiole. Höhnel (1904) stated that *Pseudodiplodia umbelliferarum* Höhnel may be the imperfect state of *Charonectria umbelliferarum* and that, according to Rehm, this species should be a variety of *Calonectria bloxami*, which Höhnel, therefore, proposed provisionally.

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*Calonectria blumenaviae* P. Henn., Hedwigia 41:6. 1902.

Type: Brazil. St. Catherine bei Blumenau auf Bambusstamm. Marz, 1891. No. 47.

In FH-H there is a specimen which is undoubtedly a fragment of the holotype "ex Herb. Berlin" but no hypocreaceous fungus is left. The specimen at B apparently no longer exists. The description suggests *Nectria calami* (≡ *Calonectria calami*) but without a type specimen, this cannot be accurately determined.

*Calonectria brongniartii* (Crouan & Crouan) Sacc., Michelia 1:314. 1878.
≡ *Nectria brongniartii* Crouan & Crouan, Florule du Finistère p. 37. 1867.
≡ *PSEUDONECTRIA BRONGNIARTII* (Crouan & Crouan) Dobb., Mitt. Bot. Staatssamml. München 14:98. 1978.

Type: France. Finistère, sur le *Frullania dilatata*, sur un vieux Houx, aut. r. r.

The holotype and isotype specimens have been examined at CO. I agree with the placement of this species in *Pseudonectria* by Döbbeler (1978) who presented a detailed description, illustrations and synonyms of this species.

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*Calonectria bryophila* Rossm., Mycologia 69:364. 1977.
≡ *Ophionectria muscivora* Petch, Trans. Brit. Mycol. Soc. 27:142. 1945.
≡ *NECTRIA BYSSOPHILA* Rossman, *nom. nov.*

Type: Ceylon. On moss on tree trunks, Nuwara Eliya, 19 June 1927.

The holotype specimen (K) has been examined. This species is quite unlike *Calonectria pyrochroa* (= *C. daldiniana*, the monotype species of *Calonectria*) (Rossman, 1979). *Nectria byssophila* belongs in the *Nectria muscivora*-group as delimited by Samuels (1976a). *Nectria bryophila* (Desm.) Sacc., 1878, and *Nectria muscivora* (≡ *Calonectria muscivora*) require that this species be given a new specific epithet when placed in *Nectria*. Occurring on moss, the yellow-orange ascocarps are partially immersed in a byssoid stroma, as suggested by the new epithet. The ascocarps are composed of small, thin-walled cells with an outer prosenchymatous layer of hyphae. The asci are unitunicate and the ascospores are very long-fusiform, curved to sigmoid, up to thirteen septate, 125-230 x 2-2.5 µm.

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*Calonectria calami* P. Henn. & E. Nym. in O. Warburg, Monsunia 1:163. 1899.
≡ *NECTRIA CALAMI* (P. Henn. & E. Nym.) Rossman, *comb. nov.*
= *Calonectria oodes* Petch, Ann. Roy. Bot. Gard. Peradeniya 7:135. 1920.
= *Calonectria ignota* Chardon, Scientific Survey of Porto Rico and Virgin Islands 8:41. 1926.
= *Calonectria kampalensis* Hansf., Proc. Linn. Soc. Lond. 153:34. 1941.

Type: Java. Hort. Bogor auf Blattscheiden von *Calamus* sp., 4 März 1898. (E. Nyman)

There are two isotype specimens at FH, one in the Höhnel collection with slides and one in the general herbarium. Because the holotype at B, studied by Weese (1927), was apparently destroyed, the isotype specimen in FH-G is here designated the LECTOTYPE. This is a good hypocreaceous species but is quite unlike the type of *Calonectria*, *C. pyrochroa* (= *C. daldiniana*), as redescribed by Rossman (1979). Although similar to *Nectria pseudopeziza* (≡ *C. pseudopeziza*), *Nectria calami* is differen-

tiated by the smaller, orange ascocarps which become collabent when dry, the ascocarp wall having a middle, pigmented layer, ascospores 19-30 x 4-5 µm, and occurrence on monocot wood.

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*Calonectria callorioides* Penz. & Sacc., Malpighia 11:515. 1897.

Type: Java. In Horto bot. Bogoriensi, in culmis v. caulibus *Monocotyledum* superficie atratis, socia *Chaetosphaeria* (C.). Habitus *Orbilae* v. *Calloriae*.

The holotype specimen at PAD no longer contains any suitable fungus and the isotype at FH-H is in very poor condition. The remnant of a white, translucent ascocarp has questionably unitunicate asci with a distinct apical ring, and hyaline, fusiform ascospores, 27-29 x 3.5-4 µm, which are 3- to 5-septate. The illustrations in the type description suggest that the asci are bitunicate. Without a better type specimen, this species cannot be accurately characterized.

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*Calonectria camelliae* Shipton, Trans. Brit. Mycol. Soc. 72:163. 1979.

See addendum on page 556.

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*Calonectria canadensis* (Ellis & Everh.) Berl. & Vogl., Add. Saccardo's Syll. Fung. p. 212. 1886.
≡ *NECTRIA CANADENSIS* Ellis & Everh., Bull. Torrey Bot. Club 11:74. 1884.
≡ *Scoleconectria canadensis* (Ellis & Everh.) Seaver, Mycologia 1:199. 1909.

Type: Canada. Ottawa, on bark of elm limbs, August, 1883. Macoun (No. 311).

The holotype specimen has not been located and a probable isotype labelled *Sphaerostilbe canadensis* "Mus. bot. Berol. ex Herb. Ellis" (FH-H) has no fungus left. Authentic specimens (DAOM, NY-both Macoun #225 coll. September 28, 1883) and many exsiccati specimens issued by Ellis & Everhart reveal *Nectria canadensis* to be a member of the *Nectria aquifolii*-group as defined by Booth (1959). Like *Nectria aurantiaca* (Tul.) Jaczewski, *N. canadensis* occurs on *Ulmus* sp. and has a stilboid anamorph, ascocarps on a well-developed stroma, an ascocarp wall structure like *N. aurantiaca* and ascospores which bud outside the ascus, filling the ascocarp with asconidia. Differences between these species are based mainly on ascospore size and septation. If the *Nectria aquifolii*-group were recognized as a separate genus, these species would be placed in *Scoleconectria*. However, because of the close relationship of this group to the *Nectria cinnabarina*-group as delimited by Booth (1959), which includes *N. cinnabarina* (Tode ex Fries) Fries, type species of *Nectria*, all species of the *N. aquifolii*-group should be retained in *Nectria*, regardless of ascospore septation. *Nectria canadensis* was distributed as Ellis & Everh., North Amer. Fungi, second series #2547 (BPI, CUP, OSC), Ellis & Everh., Fungi Columbiana #25 (BPI, CUP) and #226 (BPI, CUP, FH-ex), the last two numbers as *Calonectria canadensis*.

*Calonectria capensis* Doidge, Bothalia 1:218. 1921
≡ *BYSSOCALLIS CAPENSIS* (Doidge) Rossman, *comb. nov.*

Type: Republic of South Africa. Cape Province, Humansdorf District, Storms River, parasitic on *Irene Podocarpi* on leaves of *Podocarpus elongata*, 15.5.23. Doidge (17167).

The holotype specimen (PREM) has bright-yellow, fleshy ascocarps and bitunicate asci. This species belongs in the Pleosporales, close to *Melioliphila*, but, due to the bright-yellow hyphae and ascocarps, is more correctly placed in the related genus *Byssocallis* H. Syd. Unlike *B. phoebes*, the type species of *Byssocallis*, *B. capensis* lacks setae on the ascocarp and has an associated *Eriomycopsis* anamorph as do several *Melioliphila* species.

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*Calonectria celata* Döbb., Mitt. Bot. Staatssamml. München 14:61. 1978.

Type: Germany. Bayern, Oberbayern, Chiemgauer Alpen, nordseitige Kalkfelsabbrüche am Weg von der Schlectenberger Alm nach Hohenaschau, 900 - 1000 m, gemeinsam mit *Micarea cyanescens* und *Myxophora amerospora*, 29.IX.1974 J. POELT (Holotypus GZU; Isotypus DÖ 1890).

The holotype specimen of this recently described species has not been examined. This species was placed in *Calonectria* solely on the basis of the multiseptate ascospores. From the description and illustration, it appears to be unlike *Calonectria pyrochroa (= C. daldiniana*, the monotype species of *Calonectria)* (Rossman, 1979), and should be placed with allied speciesin the genus *Nectria*.

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*Calonectria cephalosporii* Hansf., Mycol. Pap. 15:117. 1946.
= *NECTRIA LEUCORRHODINA* (Mont.) Samuels, Mem. New York Bot. Gard. 26:90. 1976.

Type: Uganda. Kawanda, in plagulis *Meliolae markhamiae* in foliis *Markhamiae platycalycis*, Hansford no. 2554.

Although said by Hansford to be deposited in IMI, the holotype specimen could not be located there. Several authentic specimens examined at (BPI: Hansf. 3293, 3435, 3552; IMI: Hansf. 2699, 3293; PREM: Hansf. 3293, 3552) and the type description prove this species to be a later synonym of *Nectria leucorrhodina (≡ Calonectria leucorrhodina)*. Hansford (1946) separated *Calonectria limpida (= N. leucorrhodina)* from *C. cephalosporii* "mainly by the constant presence of the conidial state" in the latter. Hansford grew the fungus in culture from both conidia and ascospores but was unable to induce perithecial formation. Gams (1971) examined the *Cephalosporium* anamorph of many collections identified as *C. cephalosporii* and suggested that this imperfect was not a typical *Acremonium (= Cephalosporium)* but that without a living culture its taxonomic position could not be determined. *Calonectria ukolayii*, another synonym of *Nectria leucorrhodina*, also has this *Acremonium*-like anamorph, which is described as *Cylindrocarpon ukolayii* Thaung. The phialidic anamorph apparently belongs to *Nectria leucorrhodina*.

*Calonectria cerea* (Berk. & Curt.) Sacc., Syll. Fung. 2:551. 1883.
≡ *Sphaeria cerea* Berk. & Curt., Grevillea 4:108. 1876.
≡ *TUBEUFIA CEREA* (Berk. & Curt.) Hohnel, Akad. Wiss. Wien Sitzungsber., Math.-Naturwiss. Kl., Abt. 1, 128:562. 1919.
= *Calonectria fulvida* (Ellis & Everh.) Berl. & Vogl., Add. Saccardo's Syll. Fung. p. 212. 1886.
≡ *Nectria fulvida* Ellis & Everh., J. Mycol. 1:140. 1885.
≡ *Dialonectria fulvida* (Ellis & Everh.) Ellis & Everh., J. Mycol. 2:122. 1886.

Type: United States. North Carolina, parasitic on *Sphaeria (Diatrype) stigma*, Car. Inf. #2315.

The scanty, holotype specimen at K was examined only macroscopically. Booth (1964) examined this specimen and has accurately characterized the species which seems to be correctly placed in *Tubeufia* (Pleosporales). Unlike the type species of *Tubeufia*, *T. paludosa* (Crouan & Crouan) Rossm. (= *T. javanica* Penz. & Sacc.) which has translucent, white ascocarps, *T. cerea* has yellow-brown ascocarps covered with a yellow scurf. Both species are associated with helicosporous anamorphs. For a description, illustrations and complete list of synonyms of *T. cerea*, see Booth (1964) and Rossman (1977).

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*Calonectria chlorinella* (Cooke) Sacc., Syll. Fung. 2:543. 1883.
≡ *Nectria chlorinella* Cooke, Grevillea 11:108. 1883.
≡ *THYRONECTRIA CHLORINELLA* (Cooke) Seeler, J. Arnold Arbor. 21:444. 1940.

Type: United States. seaboard of South Carolina, on bark of *Ulmus Americanus*.

In the original publication the author is cited as "Cooke in Rav. Fungi Amer., No. 736." I have examined specimens of this exsiccati number at BPI, CUP, NY and FH-G. Seeler (1940) considered the specimens at K and FH to be types. Based on ascospore septation, this species is correctly placed in *Thyronectria*; However, it is related to members of the *Nectria aquifolii*-group as delimited by Booth (1959). The muriform, primary ascospores bud in the ascus and the ascocarps are covered with a green-yellow scurf. Ellis & Everhart, North Amer. Fungi, second series #2546 issued as *C. chlorinella* (BPI, CUP, OSC) is *Thyronectria xanthoxyli* (Peck) Ellis & Everh., and Ellis & Everhart, Fungi Columbiana #2006 issued as *C. chlorinella* (BPI, CUP, NY, NYS) is *Herpotrichia mutabilis* (Pers. ex Fries) Winter, as are many other specimens deposited as *C. chlorinella*.

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*Calonectria chorleyi* Hansf., Mycol. Pap. 15:124. 1946.
= *MELIOLIPHILA VOLUTELLA* (Berk. & Br.) Rossm., Mycotaxon 8:551. 1979.

Type: Uganda. Mukono, Kiagwe, in plagulis *Meliolae coffeae*, in foliis *Coffeae*, Hansford no. 3032.

I have examined a slide of the holotype specimen at IMI and an authentic specimen (BPI: Hansf. 3562). The white, setose ascocarps contain bitunicate asci and 3-septate, fusiform ascospores and are associated with an *Eriomycopsis* anamorph. This name is found to be a synonym of *Melioliphila volutella* (≡ *Calonectria volutella*).

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*Calonectria ciliatum* (Link) Snyder & Hansen, Amer. J. Bot. 32:664. 1945.

Automatic type: type specimen of *Fusarium ciliatum* Link.

This *Calonectria* name is incorrect and cannot be used for the ascigerous state because the new combination is based on *Fusarium ciliatum*, a *nomen anamorphosum*.

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*Calonectria cinnabarina* P. Henn., Hedwigia 36:220. 1897.
= *OPHIONECTRIA TRICHOSPORA* (Berk. & Br.) Sacc., Michelia 1:323. 1878.

Type: Brazil. St. Cathar. pr. Blumenau auf Baumrinden. A. Möller n. 229.

The type specimen in FH-G has been designated the lectotype (Rossman, 1977) with isolectotypes at FH-P, NY and S. These specimens have a bright-orange subiculum from which sporulates the anamorph of *Ophionectria trichospora*, *Antipodium spectabile* Piroz. *O. trichospora*, the monotype species of *Ophionectria*, was redescribed and illustrated by Rossman (1977).

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*Calonectria circumposita* Kirschst., Verh. Bot. Vereins Prov. Brandenburg 48:59. 1907.

Type: Germany. Auf faulender Pappe in der Rathenower Stadtforst. 16.10.04.

The holotype specimen is not at B and has not been located.

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*Calonectria citrinoaurantia* (Delacr.) Sacc., Michelia 1:314. 1878.
≡ *NECTRIA CITRINOAURANTIA* Delacr. in Desm., Pl. Crypt. France ser. 3, #778. 1860.

Type: France. Sur les Saules à Vannerie, à Saint-Romain-sur-Vienne, Février, 1859.

Specimens of this exsiccati number have been examined from BPI and BR. Of the three isotype specimens on one herbarium sheet at BR, I have marked the top specimen and here designate it the LECTOTYPE; the other specimens of this number become isolectotypes. Rabenhorst, Fungi europaei #325 labelled "ad ramulos salicinos, Februario 1859, St. Romani - ad - Vigennam, in agro pictax. legebat T. de Lacroix Pter", is apparently the same collection and was examined from BPI, BR, FH-H, NY and S. This species has small, translucent-yellow ascocarps crowded on a well-developed stroma, unitunicate asci and hyaline, one-septate ascospores. Petch (1938) and Booth (1959) have redescribed and illustrated *Nectria citrinoaurantia*.

*Calonectria coccidophaga* Petch, Trans. Brit. Mycol. Soc. 7: 161. 1921.
≡ *NECTRIA COCCIDOPHAGA* (Petch) Rossman, *comb. nov.*

Type: Australia. Victoria, Warburton, on *Planchoma acaciae*, on *Acacia* sp., April 30, 1917 (Coll. J. Farrell). Submitted by C. C. Brittlebank.

The holotype (K) and an isotype specimen (FH-G as '*coccophaga*') were examined. This species is hypocreaceous belonging in *Nectria*. The red-orange ascocarps are immersed in a well-developed stroma covering the scale insects. The wall of the ascocarp becomes purple in 2% KOH while the darker stroma does not. The asci are unitunicate, clavate, without any apical apparatus; the ascospores are ellipsoid, 10-17 x 6-8 µm, 3-septate, slightly constricted at the middle septum. Petch (1921) described the associated fungus, *Microcera tasmaniensis* McAlp., which appears to be a *Fusarium*. *Nectria coccidophaga* is certainly not a synonym of *Gibberella pulicaris* (Fries) Sacc., as stated by Wollenweber & Reinking (1935).

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*Calonectria coffeae* A. W. Zimm., Centralbl. Bakteriol., 2. Abth. 7:139. 1901.

Type: Java. Buitenzorg, auf der Rinde von *Coffea arabica*.

The holotype specimen was not at B and has not been located.

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*CALONECTRIA COLHOUNII* Peerally, Trans. Brit. Mycol. Soc. 61:92. 1973.

Type: Mauritius. In foliis *Thea sinensis* L., Wooton, 1970. Holotypus IMI 167581.

I have examined slides of the holotype at IMI. This species belongs in *Calonectria* as circumscribed by Rossman (1979) and is related to the type species *C. pyrochroa* (= *C. daldiniana*). *C. colhounii* has a *Cylindrocladium* anamorph which causes a disease of tea. This species is redescribed and illustrated by Peerally (1974e).

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*Calonectria collapsa* Starb., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 25:29. 1899.
≡ *NECTRIA COLLAPSA* (Starb.) Rossman, *comb. nov.*

Type: Brazil. Rio Grande do Sul, col. Ijuhy in trunco humi jacente, 29/3 93. No. 305.

The holotype specimen (S) was examined and found to be a a *Nectria* with unknown affinities. The dark-yellow ascocarps have a distinct collar around the apex, are immersed in a white byssus and are associated with a stilbaceous anamorph. The unitunicate, clavate asci contain one-septate, fusiform, punctate ascospores, 13-15 x 4-4.5 µm.

*Calonectria copelandii* P. Henn., Hedwigia 47:253. 1908.

Type: Philippines. Mindanao, Santa Cruz in foliis Orchidaceae 1316. April 1904 (Copeland n. 1317).

I have examined isotype specimens at BPI, FH-H, K and NY. I have been unable to find the described fungus on any of them.

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*Calonectria coralloides* Maubl., Bol. Agric. (Sao Paulo) 16:315. 1915.
≡ *MELIOLIPHILA CORALLOIDES* (Maubl.) Rossman, *comb. nov.*
≡ *Paranectria coralloides* (Maubl.) Hansf., Mycol. Pap. 15:130. 1946.

Type: Brazil. In *Meliola* sp. (immatura) ad folia *Melastomataceae* cujusdam socio *Trichothyrio fimbriato*, Speg, Rio de Janeiro. (Exs. 640. Dec. 1912).

In a later publication about this species, Maublanc (1920) cited the type specimen as "In foliis *Clidemiae hirtae* G. Don, supra mycelium *Meliolae Melastomacearum* Speg.,... (no. 353)." A presumed isotype specimen (FH-P) with collection data matching parts of both descriptions has a printed label titled "A. Maublanc - Fungi Brasiliensis 353" and may be part of an exsiccati set. Because this was the only possible type encountered, the specimen in FH-P is here designated the LECTOTYPE. Hansford's combination was based solely on Maublanc's descriptions and drawings. *Melioliphila coralloides* has small, fleshy, white ascocarps, bitunicate asci and fusiform, attenuate, three-septate ascospores. Although the ends of the ascospores are attenuate, they do not have cellular appendages or distinct cilia as in *Paranectriella*, a genus erected for species of *Paranectria sensu* Hansford (Pirozynski, 1976). Several species of *Melioliphila* have ascospores with elongate, tapering ends. *M. coralloides* is distinguished by the coralloid appendages on the ascocarps.

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*Calonectria cremea* A. W. Zimm., Centralbl. Bakteriol., 2. Abth. 7:140. 1901.
= *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Type: Java. Buitenzorg, auf abgestorbenen Früchten von *Theobroma cacao*.

The holotype specimen is not at B and could not be located. Weese (1924) stated that this species is the smooth form of *Calonectria sulcata*, a synonym of *Nectria rigidiuscula* (≡ *C. rigidiuscula*). Wollenweber & Reinking (1935) considered *C. cremea* a synonym of *C. rigidiuscula*. Based on the above authors's opinions, the type description, illustrations and host, I accept the synonymy of *C. cremea* with *N. rigidiuscula*, a common, tropical saprophyte on woody substrates.

*Calonectria crescentiae* Seaver & Waterston, Mycologia 32:404. 1940.
= *NECTRIA ERUBESCENS* (Desm.) Phill. & Plowr., Grevillea 10:70. 1881.

Type: Bermuda. Smith's Parish, on a weathered shell or fruit rind of the calabash, *Crescentia cujete* L., Dec. 9, 1938.

Isotype specimens (BPI, K, NY) were examined. Samuels (1978) listed isotype specimens at NY which he examined. I have marked the one with Seaver's notes, illustrations and photographs as the LECTOTYPE. In agreement with Samuels (1978), I find this name to be a later synonym of *Nectria erubescens* (≡ *Calonectria erubescens*) in the *Nectria arenula*-group as delimited by Booth (1959) and Samuels (1978). Samuels (1978) redescribed and illustrated both the teleomorph and anamorph of *Nectria erubescens*.

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*CALONECTRIA CROTALARIAE* (Loos) Bell & Sobers, Phytopathology 56:1364. 1966.
≡ *C. theae* Loos var. *crotalariae* Loos, Trans. Brit. Mycol. Soc. 33:17. 1950.

Type: Ceylon. On stems of *Crotalaria anagyroides* and *Tephrosia vogelii*.

A possible type specimen at IMI was examined and found to to belong in *Calonectria* as delimited by Rossman (1979). *C. crotalariae* was described and illustrated by Peerally (1974d). This species has a *Cylindrocladium* anamorph which is similar to that of *Calonectria pyrochroa*.

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*Calonectria cucurbitula* (Tode ex Fries) Sacc., Michelia 1:312. 1878.
≡ *Sphaeria cucurbitula* Tode ex Fries, Systema Mycol. 2:415. 1823.
≡ *SCOLECONECTRIA CUCURBITULA* (Tode ex Fries) Booth, Mycol. Pap. 73:15. 1959.

Type: Sweden. In cortice arborum frondosarum raro; frequens in Pino & Melia Azederach.

The type collection of *Sphaeria cucurbitula* was issued in 1822 as Fries, Scleromyceti Sueciae #263. Booth (1959) has redescribed and illustrated *Scoleconectria cucurbitula*. He designated the specimen at K the lectotype. I have examined an isolectotype (BPI) which agrees well with Booth's description. This is the type and only species in *Scoleconectria*, a genus which could be used to accommodate the *Nectria aquifolii*-group as delimited by Booth (1959). *S. cucurbitula* is related to *Thyronectria balsamea* (≡ *C. balsamea*), differentiated by the slightly longer, narrower ascospores with irregularly-transverse septa.

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*Calonectria curtisii* (Berk.) Sacc., Michelia 1:316. 1878.
≡ *Nectria curtisii* Berk., Grevillea 4:46. 1875.
= *NECTRIELLA SCEPTRI* (Karst.) Rossm., Mycotaxon 8:542. 1979.

Type: United States. South Carolina, on *Zea*. Car. Inf. No. 3795.

An isotype specimen (FH-C) was examined. This name is found to be a later synonym of *Nectriella sceptri* (≡ *Calonectria sceptri*).

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*Calonectria cyathula* H. Syd., Ann. Mycol. 37:224. 1939.
≡ *NECTRIA CYATHULA* (H. Syd.) Rossman, *comb. nov.*

Type: Sierra Leone. Njala, parasitica in stromate Phyllochorae spec. ad folia viva Harunganae madagascariensis, 19. X. 1935, leg. F. C. Deighton (no. 864, typus).

I have examined the holotype and authentic specimens (IMI). This species has small, translucent-red ascocarps and belongs in the *Nectria epispheria*-group as delimited by Booth (1959).

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*Calonectria dacrymycella* (Nyl.) Sacc., Michelia 1:314. 1878.
≡ *Sphaeria dacrymycella* Nyl., Flora 46:322. 1863.
≡ *Nectria dacrymycella* (Nyl.) Karst.[*ut* 'Nyl.'], Fungi Fenn. exs. #667. 1867.
≡ *Nectriella dacrymycella* (Nyl.) Rehm, Ascomyceten #232. 1874.

Type: Finland. Ad caules Urticae in Tavastia (P. A. Karsten).

I have been unable to locate the type specimen of this species; it is not at H. Many specimens deposited as *Nectriella dacrymycella* including Rehm, Ascomyceten #232 and #232b (BPI, NY, S) and Thümen, Mycotheca Universalis #1064 (NY, NYS) are *Nectriella sceptri* (≡ *Calonectria sceptri*). If the type specimen of *N. dacrymycella* is identical with *N. sceptri*, *N. dacrymycella* will provide an earlier epithet for the species.

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*Calonectria dacrymycella* (Nyl.) Sacc. f. *aconiti* (Sacc.) Rehm, Ascomyceten #1868. 1909.
≡ *Nectria dacrymycella* (Nyl.) Sacc. f. *aconiti* Sacc., Syll. Fung. 2:490. 1883.
= *NECTRIELLA SCEPTRI* (Karst.) Rossm., Mycotaxon 8:542. 1979.

Type: Italy. In caulibus Aconiti Napelli sócia *Leptosphaeria modesta*, in alpinis Vette di Feltre, (BIZZOZERO).

The holotype specimen could not be located. Specimens of Rehm, Ascomyceten #1868 were examined (BPI, CUP, FH, NY, PACA, S) and found to be *Nectriella sceptri* (≡ *Calonectria sceptri*). Specimens of this form are similar to *Nectriella dacrymycella sensu* Rehm (= *Nectriella sceptri*) but the ascospores tend to be slightly larger. I have found the size of ascospores in specimens of *N. sceptri* to be variable, ranging continuously from 10-25 µm, thus including *C. dacrymycella* f. *aconiti* within the range.

*Calonectria daldiniana* de Not., Comment. Soc. Crittogam. Ital. 2:477. 1867.
= *CALONECTRIA PYROCHROA* (Desm.) Sacc., Michelia 1:308. 1878.

Type: Italy. Su foglie sternate di *Magnolia grandiflora* a Locarno, Daldini.

This is the monotype species of *Calonectria*. The holotype specimen (RO-general mycological herbarium) was examined and this name is found to be a later synonym of *Calonectria pyrochroa*. The scanty, holotype specimen of *C. daldiniana* and the species *C. pyrochroa* with its *Cylindrocladium* anamorph are redescribed and illustrated by Rossman (1979).

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*Calonectria dearnessii* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 42:245. 1891.
= *NECTRIA DECORA* (Wallr.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24:179. 1870.

Type: Canada. London, on decaying branches, Jan., 1890. J. Dearness No. 1346. Caespitose on ostiole of some *Massaria* on ash and elm.

The holotype specimen is at NY and reveals this name to be a later synonym of *Nectria decora* (≡ *Calonectria decora*) as first suggested by Weese (1914a). Authentic specimens, collected in February, 1890, were issued as Ellis & Everhart, North Amer. Fungi, second ser. #2548 (BPI, CUP, FH-G, OSC) and Ellis & Everhart, Fungi Columbiana #818 (BPI, CUP, FH-G). All are *Nectria decora*.

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*Calonectria decora* (Wallr.) Sacc., Michelia 1:310. 1878.
≡ *Sphaeria decora* Wallr., Fl. Crypt. Germ. 2:842. 1833.
≡ *NECTRIA DECORA* (Wallr.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24:179. 1870.
= *Calonectria agnina* (Rob. ex Desm.) Sacc., Michelia 1:311. 1878.
≡ *Sphaeria agnina* Rob. ex Desm., Ann. Sci. Nat. Bot. ser. 3, 6:72. 1846.
= *Calonectria massariae* (Pass.) Sacc., Michelia 1:312. 1878.
≡ *Nectria massariae* Pass. in Rabenh., Fungi Europ. #1827. 1874.
= *Calonectria dearnessii* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 42:245. 1891.

Type: Germany. Ad Aceris campestris ramulos languidos Thrg. rariss. no. 4057.

The holotype specimen has not been located. Weese (1914a) stated that the type was unobtainable but that Fuckel, Fungi Rhenani #986 agreed with it! Noone seems to have located or examined the type specimen but *Nectria decora* is consistently described and illustrated by Fuckel (1870), Weese (1914a), Wollenweber & Reinking (1935) and Pirozynski (1975). I have examined Fuckel, Fungi Rhenani #986 (B, BR, FH-H, UPS) and agree with their concept. Although occurring in the temperate zone, *Nectria decora* has affinites with the *Nectria subfalcata*-group as delimited by Samuels (1976a) which at

present, contains only tropical species. The light-yellow ascocarps are immersed in a white, byssoid stroma parasitic on *Massaria*. Herbier Barbey-Boissier #865 (BPI, BR, FH-G, NY, S, UPS), also Herbier Fuckel #1894-Fungi Rhenani #986, issued as *Calonectria decora* is *Nectria decora*. Seaver (1909a), Weese (1914a), Wollenweber & Reinking (1935) and Pirozynski (1975) list the numerous synonyms of *Nectria decora* but erred in synonymyzing *Calonectria diminuta* with *C. decora* (≡ *N. decora*). Saccardo (1883) listed *C. pyrrochlora* Sacc. *nec* Auersw., as a synonym of *C. massariae* (= *N. decora*). *C. pyrrochlora* Sacc. is a *nomen nudem* and intentional later homonym of *C. pyrrochlora* (Auersw.) Sacc. (≡ *Thyronectria pyrrochlora*). This invalid species is listed as a synonym of *Nectria decora* by later authors.

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*Calonectria decora* f. *parasitica* Hazsl., Magyarorszag Tarsorszagainak Sphaeriai p. 17. 1892.

Type: A Massaria Populа tomlotokjainak csucsain no.

The type specimen is not at BP and was apparently destroyed. Pirozynski (1975) considered this form a questionable synonym of *Calonectria decora* (≡ *Nectria decora*).

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*Calonectria diminuta* (Berk.) Berl. & Vogl., Add. Saccardo's Syll. Fung. p. 213. 1886.
- ≡ *Nectria diploa* Berk. & Curt. var. *diminuta* Berk., Grevillea 4:46. 1875.
- ≡ *NECTRIA DIMINUTA* (Berk.) Sacc., Syll. Fung. 2:498. 1878.
- ≡ *Dialonectria diminuta* (Berk.) Cooke, Grevillea 12:83. 1884.

Type: United States. South Carolina, Society Hill, on some Sphaeria. On alder. Car. Inf. No. 4029.

An isotype specimen at FH-C labelled "*Nectria diploa* B. & C. (4029) on *Alno* emortus. Nov. 1853. Society Hill, S. C." was examined. This is taken to be type material of *Nectria diminuta*. *N. diminuta* belongs in the *Nectria episphaeria*-group as delimited by Booth (1959). Specimens of *Nectria diminuta* were issued as *N. diploa* in Ravenel, Fungi Carol. exs., fasc. III #55 (BPI, NY). *Nectria diminuta* has been mistakenly synonymized with *Calonectria decora* (≡ *Nectria decora*). When Seaver (1909a) described *Calonectria diminuta*, he examined only specimen of *C. dearnessii* which he considered a questionable synonym of *C. diminuta*. *C. dearnessii* is a synonym of *Nectria decora* (≡ *Calonectria decora*). Based on Seaver's description of *C. diminuta*, Weese (1914a) with some reservation, Wollenweber & Reinking (1935) and Pirozynski (1975) listed *C. diminuta* as a synonym of *Calonectria decora* (≡ *Nectria decora*).

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*Calonectria diploa* (Berk. & Curt.) Wollenw., Angew. Bot. 8: 193. 1926.
- ≡ *NECTRIA DIPLOA* Berk. & Curt., J. Linn. Soc., Bot. 10:378. 1869.

Type: Cuba. On bark. Cuban Fungi #767. (≡ Wright #606).

In the original description Berkeley (1869) listed Wright #606 as the type specimen but also cited "Car. Inf., no. 4029" which later became the type of *N. diploa* var. *diminuta*. These specimens are different species and only Wright #606 from Cuba is considered the type collection of *N. diploa*. Isotype specimens at FH-C and NYS were examined; others are housed at K, according to Booth (1971). *Nectria diploa* is related to *N. flammea* (Tul.) Dingley and *N. aurantiicola* Berk. & Br., all having *Fusarium* anamorphs and occurring on scale insects. Booth (1971) described and illustrated *N. diploa* and related species. Petch (1921), Wollenweber (1926), Wollenweber & Reinking (1935) and Booth (1971) list many synonyms which I have not confirmed.

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*Calonectria discophora* Höhnel & Weese, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 125:532. 1916.

Type: Java. Tjibodas, 1908. auf einem faulenden, fast entrindeten Holzstücke, coll. Höhnel.

The holotype specimen at FH-H is in poor condition and was not examined microscopically. From the description and macroscopic appearance, this species apparently belongs in the *Nectria mammoidea*-group as delimited by Booth (1959).

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*Calonectria dolichospora* Sacc. & Trott., Syll. Fung. 22:490. 1913.

≡ *Calonectria macrospora* Rick, Broteria 5:41. 1906, *non C. macrospora* Sacc. & Speg., 1878 *vel C. macrospora* (P. Henn. & E. Nym.) Weese, 1910.

Type: Brazil. Rio Grande do Sul, in foliis putridis palmae.

This name was erected to legitimize Rick's species. I have been unable to locate the holotype specimen.

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*Calonectria duplicella* (Nyl.) Karst., Bidrag Kännedom Finlands Natur Folk 23:218. 1873.

≡ *Sphaeria duplicella* Nyl., Not. Sällsk. Fauna Fl. Fenn. Förh. 10:89. 1868.

≡ *ABSCONDITELLA DUPLICELLA* (Nyl.) Rossman, *comb. nov.*

Type: Finland. In Lapponia orientali extrema, ad Ponoi, supra caespites Jungermanniarum (N. I. Fellman).

The holotype specimen (H) was examined. Isotype slides are deposited at FH-G. This species was found to be ostropalean and, after consultation with M. A. Sherwood, is placed in *Absconditella*. *Absconditella* was erected in 1965 for *A. sphagnorum* which, like *A. duplicella*, occurs on bryophytes and is weakly lichenized. Macroscopially similar to *A. sphagnorum* (Sherwood, 1977), *A. duplicella* is differentiated by the longer, multiseptate ascospores which are 35-50 x 9-10 µm, 3- to 7-septate. Racovitza (1959) and Döbbeler (1978) included this species as a *Calonectria* without examining the type specimen.

*Calonectria eburnea* Rehm, Hedwigia 37:196. 1898.
= *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Type: Brazil. Pedras Grandes, an Baumrinde im Wald. Ule no. 1582c. H. B.

The holotype specimen at B was apparently destroyed. An isotype specimen at FH-H is labelled "Herb. Berlin" and is here designated the LECTOTYPE. An examination of this specimen reveals that *C. eburnea* is a later synonym of *Nectria rigidiuscula* (≡ *C. rigidiuscula*) as suggested by Weese (1927) and Wollenweber & Reinking (1935).

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*Calonectria ecuadorica* Petrak, Sydowia 4:463. 1950.
= *NECTRIA ALBOSUCCINEA* (Pat.) Rossm., Mycotaxon 8:487. 1979.

Type: Ecuador. Prov. Tungurahua: Hacienda San Antonio bei Banos, auf berindeten, am Boden liegenden, faulen Asten, 10. I. 1938, Nr. 712b.

The holotype specimen may exist at W but Petrak's specimens are not yet available for study. An isotype specimen (ZT) was examined. This name is found to be a later synonym of *Nectria albosuccinea* (≡ *Calonectria albosuccinea*), the type specimen of which was collected in Ecuador. The isotype specimen of *C. ecuadorica* lacks a dark base on the ascocarp but this may be due to differences in substrate or state of maturity.

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*Calonectria effugiens* Penz. & Sacc., Malpighia 6:515. 1897.
= *TUBEUFIA PALUDOSA* (Crouan & Crouan) Rossm., Mycologia 69:383. 1977.

Type: Java. In caulibus *Monocotyledonum* emortuis in Horto Bogoriensi 2. I. 97 (n. 219).

The holotype specimen (PAD) was examined but few ascocarps are left. A fragmentary isotype specimen at FH-H contained no fungus but the isotype slide (FH-H) was useful. The ascocarp wall structure of *C. effugiens* is similar to *Tubeufia paludosa* composed of thin-walled, horizontally-elongated cells. In addition, the ascocarps occur on monocotyledonous wood and are associated with dematiaceous hyphae and *Alternaria* and *Acrodictys*-like conidia. Because the specimen is immature, the minutely-striate ascospores, which measure 45-60 x 4.5-5 µm inside the ascus, are shorter than those of *T. paludosa*.

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*Calonectria epimyces* (H. & P. Syd.) Sacc., Syll. Fung. 24:680. 1926.
≡ *HYALOCREA EPIMYCES* H. & P. Syd., Ann. Mycol. 15:214. 1917.

Type: Philippines. Mt. Makiling, prov. Laguna, in superficie stromatis Catacaumatis Elmeri ad folia Fici minahassae, 7. 1916, leg. C. F. Baker no. 4358.

An isotype specimen at FH-G "ex Herb. Theissen" is labelled no. 4358. In addition, isotype specimens were issued as "*Hyalocrea epimyces* Syd. *n. gen. & n. sp.*," C. F. Baker, Fungi Malayana #541 (BPI, CUP, FH-G) having the same collection data as in the original description. *Hyalocrea epimyces*, the monotype species of *Hyalocrea*, belongs in the Dothideales as suggested by the saccate, bitunicate asci, few asci per ascocarp and lack of pseudoparaphyses. The small, translucent ascocarps have large, triangular hairs around the apex; the broad, elliptical ascospores are three-septate, 38-48 x 16-18 µm.

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*Calonectria equiseti* Starb., Ark. Bot. 5:10. 1905.
= *NECTRIA OCHROLEUCA* (Schw.) Berk., Grevillea 4:16. 1875.

Type: Argentina. Prov. Jujuy, Quinta pr. Laguna de la Brea in caulibus aridis Equiseti, 17/6 1901, No. 86.

The holotype specimen (S) was examined. This name is found to be a later synonym of *Nectria ochroleuca* which was redescribed and illustrated by Samuels (1976a).

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*Calonectria erubescens* (Rob. ex Desm.) Sacc., Michelia 1:309. 1878.
≡ *Sphaeria erubescens* Rob. ex Desm., Ann. Sci. Nat. Bot. ser. 3, 6:72. 1846.
≡ *NECTRIA ERUBESCENS* (Rob. ex Desm.) Phill. & Plowr., Grevillea 10:70. 1881.
= *Calonectria umbelliferarum* Seaver, Mem. New York Bot. Gard. 6:507. 1916.
= *Calonectria crescentiae* Seaver & Waterston, Mycologia 32:404. 1940.

Type: France. Hab. in pagina inferiore foliorum *Ilicis aquifolii*. Autumno. Nob.

Desmazières, Pl. Crypt. France #1766, issued in 1849, is labelled "en automne, à la face inférieure des vielles feuilles de Houx tombées à terre" with a reference to the article where *Sphaeria erubescens* is described. This exsiccati number is taken as the type collection; no other possible type specimens have been located. Isotype specimens have been examined from BPI, BR, IMI, NY and UPS. Samuels (1978) examined the isotype at NY and this specimen is here designated the LECTOTYPE. *Nectria erubescens* is a member of the *N. arenula*-group as delimited by Booth (1959) and Samuels (1978). *N. erubescens* has been redescribed, illustrated and discussed by Samuels (1978) who has cultured and described its *Cylindrocarpon* anamorph. Due to Ellis & Everhart's (1892) and Seaver's (1909a) mistaken concept of the species, many of the specimens in United States herbaria, identified as *Calonectria erubescens* are foliar hyperparasites belonging to the *Nectria leucorrhodina*-group as delimited by Samuels (1976a) or to the pleosporaceous genus *Melioliphila*.

*Calonectria erysiphoides* Berl. & Roum., Rev. Mycol. (Paris) 10:76. 1888.
≡ *MELIOLIPHILA ERYSIPHOIDES* (Berl. & Roum.) Rossman, *comb. nov.*

Type: Philippines. Tonkino, parasitice in subiculo *Meliolae amphitrichae* in foliis adhuc vivis Citri Bigarradiae.

Specimens of Roumeguère, Fungi selecti exs. #4451 labelled "*Calonectria erysiphoides sp. nov.* Berl. & Roum." with collection data similar to those in the type description are considered isotypes. Isotype specimens have been examined from BPI, BR, FH-P and NY. This species has yellow-brown ascocarps covered with setae, bitunicate asci and clavate, three-septate ascospores. It is placed in *Melioliphila*, differing from all other species in the genus by the brown pigmentation of the ascocarps and hyphae. Hansford (1946) redescribed this species as a *Calonectria*.

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*Calonectria erythrina* H. & P. Syd., Ann. Mycol. 10:81. 1912.
≡ *NECTRIA ERYTHRINA* (H. & P. Syd.) Rossman, *comb. nov.*

Type: Indonesia. Süd-Ost-Borneo, Hayoep, in corticibus et ad lignum putridum, 8. 6. 1908, leg. H. Winkler no. 2338.

The isotype specimens (FH-H, K) contain a hypocreaceous fungus which belongs in the *Nectria aquifolii*-group as delimited by Booth (1959). Aggregated on a well-developed stroma, the red-orange ascocarps are slightly roughened and deeply cupulate when dry, as are those of *Scoleconectria cucurbitula* (≡ *C. cucurbitula*) and *Thyronectria balsamea* (≡ *C. balsamea*). The ascospores are ellipsoid, faintly striate, 1- to 3-septate, 14-18 x 5-6 µm, but do not bud in the ascus.

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*Calonectria eucalyptina* Sousa da Camara & Gomes da Luz, Agron. Lusit. 1:48. 1939.

Type: Portugal. In cortice truncorum *Eucalypti* sp., pr. Synthia (Castela dos Mouros) leg. Silva Teixeira, aprili, 1937.

The holotype specimen could not be located.

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*Calonectria ferruginea* Rehm, Hedwigia 39:225. 1900.
≡ *Trichopeltis ferruginea* (Rehm) Rehm, Hedwigia 44:1. 1904.
≡ *Cryptopeltis ferruginea* (Rehm) Rehm, Ann. Mycol. 4: 410. 1906.
= *PORINA LIMBULATA* (Kremp.) Vain., Ann. Acad. Sci. Fenn., ser. A 15:363. 1921.

Type: Brazil. Folia arboris (spec.). Rhoupalae Isola Sta. Catharina. Ule no. 602. - Folia Geonomatis H. Bresl. Pedras Grandes. Ule no. 1754. - Folia Xylopiae. Tijuca, Rio de Janeiro. Ule no. 2321 a. H. P. - Folia Dactylostemonis verticillati. Rio de Janeiro. Ule no. 700b. - Folia Soroceae ilicifoliae. Tubarao. Ule no. 1507. H. Bresl.

Santesson (1952) selected Ule #602 (S) as the lectotype. I have not seen this specimen but Santesson examined it and concluded that this species is a later synonym of the lichen

*Porina limbulata*. I have examined some of the isolectotype and paratype specimens: Ule #602 (B), Ule #1754 (B, BPI, FH-G), Ule #2321 (FH-G). Although Ule #1754 (BPI) contains ascocarps of *Melioliphila balanseana* (≡ *Calonectria balanseana*) on *Meliola*, Rehm's description and illustrations suggest that he was describing *Porina limbulata* which occurs on many of the type specimens. Santesson's synonymy is accepted.

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*Calonectria fimbriata* Seaver & Waterston, Mycologia 32:404. 1940.
= *NECTRIA SYLVANA* Mouton, Bull. Soc. Roy. Bot. Belgique 39:49. 1900.

Type: Bermuda. On dead stems of *Foeniculum vulgare* Gaertn.

The holotype specimen at NY was examined. In agreement with Samuels (1976b), this name is found to be a later synonym of *Nectra sylvana* in the *Nectria peziza*-group as delimited by Booth (1959) and Samuels (1976b). *N. sylvana* and its *Acremonium* anamorph were redescribed and illustrated by Samuels (1976b).

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*Calonectria flavida* (Corda) Sacc., Michelia 1:313. 1878.
≡ *Sphaeria flavida* Corda, Icon. Fung. 4:40. 1840.
≡ *Nectria flavida* (Corda) Fries, Summa Veg. Scand. 2: 388. 1849.
≡ *Lasiosphaeria flavida* (Corda) Cooke, Grevillea 12:112. 1884.

Type: Czechoslovakia. Im Frühjahre auf modernden Holzspanen der Erle. Sawist bei Prag. 1838.

Booth (1959) stated that there is no type material of this species in existance and erected *Nectria ellisii* to accommodate the specimens from Britain identified as *C. flavida*. He admitted, however, that these specimens do not fit Corda's description. Petch (1938) redescribed *Lasionectria flavida* based on several British collections, some of which were examined by Booth and placed in *Nectria ellisii*, stating that he "accepted Berkeley & Broome's interpretation of Corda's species." I have been unable to locate the holotype specimen.

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*Calonectria flavida* (Corda) Sacc. var. *aurantiorufa* Sacc., Syll. Fung. 2:548. 1883.

Type: Russia. In ramis emortuis Tiflis, (Haussknecht).

Saccardo erected this variety based on Rabenhorst's (1871) misidentification of *Nectria flavida* (Corda) Fries, citing Rabenhorst's description and specimen. The holotype specimen has not been located.

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[*Calonectria flavida* Massee ex Petch, Ann. Roy. Bot. Gard. Peradeniya 7:117. 1920. *nom. nud.*]
= *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Specimen cited: West Indies. Grenada, on bark of *Theobroma cacao*.

In listing the specimens examined of *Calonectria rigidiuscula*, Petch inadvertently published Massee's herbarium name. This is a *nomen nudem* as well as a later homonym of *C. flavida* (Corda) Sacc., 1878. Massee's unpublished name has been listed by Weese (1924), Wollenweber & Reinking (1935) and Booth (1971) as a synonym of *C. rigidiuscula*. Indeed, Massee's specimen with this name (NY) is *Nectria rigidiuscula* (≡ *C. rigidiuscula*).

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*Calonectria flavitecta* (Berk. & Curt.) Sacc., Michelia 1:308. 1878.
≡ *Nectria aurigera* Berk. & Rav. var. *flavitecta* Berk. & Curt., Grevillea 4:46. 1875.
= *HERPOTRICHIA MUTABILIS* (Pers. ex Fries) Winter, Rabenh. Kryptogamen-Fl. Bd. 1 Abt. 2:209. 1887.

Type: United States. South Carolina, on *Kerria japonica*. Car. Inf. no. 4025.

An isotype specimen (FH-C) was examined. This variety is found to be a later synonym of *Herpotrichia mutabilis*.

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*Calonectria floridana* Sobers, Phytopathology 59:366. 1969.
= *CALONECTRIA KYOTENSIS* Terashita, Trans. Mycol. Soc. Japan 8:124. 1968.

Type: United States. Georgia, Tifton, E. radicibus *Pruni persicae* L. isolatum.

Isotype specimens at BPI and NY have been examined. This name is considered a synonym of *Calonectria kyotensis* which has a *Cylindrocladium* anamorph.

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*Calonectria frullaniae* Racovitza, Mem. Mus. Natl. Hist. Nat., Ser. B., Bot. 10:91. 1959.

Type: Rumania. Distr. Cambovita, parasiticum ad sporogonia juniora *Frullaniae dilalatae* (L.) Dum., ad truncos Quercos, in silva prope "Badulesti", 16 VIII 1944, A. Racovitza.

The type specimen has not been located. Döbbeler (1978) included this species in *Calonectria* based solely on Racovitza's publication. From the description and illustrations, this species does not seem to belong to *Calonectria* as defined by Rossman (1979).

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*Calonectria fuckelii* (Nits. ex Fuckel) Sacc., Michelia 1:310. 1878.
≡ *NECTRIELLA FUCKELII* Nits. ex Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24:176. 1870.

Type: Austria. Auf den Rheinauen, an faulem, aber noch hartem Holz von Populus nigra, sehr selten, im Herbst.

Specimens of Herbier Barbey-Boissier #915 (BPI, FH-G), issued as *Calonectria fuckelii* are labelled Herbier Fuckel

#1894 and have collection data identical to those in the type description. These are considered type specimens; the one at FH-G is here designated the LECTOTYPE. *Nectriella fuckelii* has light-yellow ascocarps which are partially immersed in hard, decorticated wood and have a broad, protruding papillae. Surrounding the papillae is a ring of long, hyaline setae. The unitunicate asci are clavate with a distinct apical ring and the ascospores are one-septate, minutely punctate, 17-22 x 5-7 µm. Seaver (1909a) lectotypified the genus *Nectriella* Fuckel with *N. fuckelii*. Other species of *Nectriella* occur on dead herbaceous stems and lichens. *Nectriella* species are related by more than the immersed ascocarps; all have clavate, unitunicate asci each with a distinct apical ring.

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*Calonectria fuckelii* (Sacc.) Rehm in Tranz. & Serebrianikow, Mycotheca Rossica #68. 1910 *non C. fuckelii* (Fuckel)Sacc.
≡ *Nectria fuckelii* Sacc., Michelia 1:289. 1878.
≡ *Nectriella coccinea* Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24:177. 1870.
≡ *NECTRIELLA TINCTA* (Fuckel) R. Sant. in Eriksson, Sv. Bot. Tidskr. 58:235. 1964.

Type: Germany. Auf dem noch lebenden Thallus und den Apothecien von Hagenia ciliaris, wie es scheint, sehr selten, im Frühling. Im Jura bei Neuchatel (Morthier). Fungi Rhenani #1836 (unter *Cryptodiscus tinctus*).

In 1866 Fuckel issued Fungi Rhenani #1836 as *Cryptodiscus tinctus* with a species description on the packet label. Later he published the superfluous name *Nectriella coccinea*, citing the same Fungi Rhenani #1836 as the type specimen. When transferring *Nectriella coccinea* to *Nectria*, Saccardo (1878) recognized that a new epithet must be given because *coccinea* was preoccupied in *Nectria*. He, therefore, proposed the epithet *fuckelii* to accommodate this species in *Nectria*. Rehm transferred *N. fuckelii* to *Nectriella;* however, this epithet was already preoccupied in *Calonectria*. Because *Cryptodiscus tinctus* provides the earliest epithet and the species is correctly placed in *Nectriella*, the correct name for this fungus is *Nectriella tincta* (≡ *Calonectria tincta*) typified by Fuckel, Fungi Rhenani #1836. Weese (1914c) and Keissler (1930) redescribed this species as *Nectriella coccinea*.

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*Calonectria fuckelii* (Sacc.) Rehm f. *everniae* Rehm in Motouschek, Centralbl. Bakteriol., 2 Abth. 42:105. 1915.
≡ *NECTRIELLA TINCTA* (Fuckel) R. Sant. in Eriksson, Sv. Bot. Tidskr. 58:235. 1964.

Type: Russia. Schebekino prov. Kursk, in thallo Evernia prunastri Ach., 15. VII. 1908., leg. Serebrianikow.

Some specimens of Tranzschel & Serebrianikow, Mycotheca rossica fasc. 2, #68 were issued as *Calonectria fuckelii* f. *everniae* (BPI) and others as *C. tincta* (Fuckel) Rehm (CUP). The collection data are identical on both labels except that *C. fuckelii* f. *everniae* is "in thallo Everniae Prunastri Ach."

while *C. tincta* is "in thallo Anaptychiae ciliaris Körb." It is conceivable that Rehm may have recognized, after some of the labels were printed, that *C. fuckelii* f. *everniae* was a later name for *C. tincta* and that the lichen was misidentified. An isotype specimen (BPI) was examined and this form is found to be a synonym of *Nectriella tincta* (≡ *C. tincta*).

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*Calonectria fulvida* (Ellis & Everh.) Berl. & Vogl., Add. Saccardo's Syll. Fung. p. 212. 1886.
≡ *Nectria fulvida* Ellis & Everh., J. Mycol. 1:140. 1885.
≡ *Dialonectria fulvida* (Ellis & Everh.) Ellis & Everh., J. Mycol. 2:136. 1886.
= *TUBEUFIA CEREA* (Berk. & Curt.) Hohnel, Akad. Wiss. Wien Sitzungsber. Math.-Naturwiss. Kl., Abt. 1, 128:562. 1919.

Type: United States. New Jersey, Newfield, on bark of decaying oak limb lying on the ground, Oct. 7, 1885.

An isotype specimen (FH-G) reveals this name to be a later synonym of *Tubeufia cerea* (≡ *Calonectria cerea*) as previously suggested by Seaver (1909a), Booth (1964) and Rossman (1977).

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*Calonectria funicola* (Berk. & Br.) Sacc., Michelia 1:312. 1878.
≡ *Sphaeria funicola* Berk. & Br., Ann. Mag. Nat. Hist. ser. 2, 7:188. 1851.
≡ *NECTRIA FUNICOLA* (Berk. & Br.) Berk., Outl. Brit. Fung. p. 393. 1860.
≡ *Nectriella funicola* (Berk. & Br.) Petch, Naturalist, Hull 1937:281. 1937.
≡ *Lasionectria funicola* (Berk. & Br.) Cooke, Grevillea 12:112. 1884.
= *Calonectria luteofusca* (Crouan & Crouan) Sacc., Michelia 1:317. 1878.
≡ *Nectria luteofusca* Crouan & Crouan, Florule du Finistère p. 39. 1867.

Type: England. King's Cliff, on decayed rope, Oct. 1841.

The holotype specimen at K was examined and agrees with descriptions of this species by Petch (1938) and Booth (1959). Booth placed *Nectria funicola* in the *Lasionectria*-group of miscellaneous *Nectria* species with hairs on the ascocarp.

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*Calonectria geralensis* Rehm, Hedwigia 37:198. 1898.
≡ *NECTRIA GERALENSIS* (Rehm) Rossman, *comb. nov.*

Type: Brazil. Ad folia viva Panici. Serra Geral 1/1891. Ule no. 1765. H. B.

Isotype specimens were examined from S and FH-H; the specimen at S containing Rehm's notes is in excellent condition and is here designated the LECTOTYPE. *Nectria geralensis* belongs to the *Nectria arenula*-group as delimited by Booth (1959) and Samuels (1978). The superficial, yellow-brown ascocarps occur singly in grass leaves, sometimes surrounded by a thin, hyphal stroma. The clavate asci with

undifferentiated apices contain long, fusiform ascospores which are 9- to 11-septate, 48-63 x 2.5-4 µm. Additional specimens were issued as E. Ule, Mycotheca Brasiliensis #70 (B, BPI, C, CUP, FH-H, NY, PACA, PREM, S).

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*Calonectria gigaspora* Massee, Bull. Misc. Inform. 7:257. 1906.
≡ *NECTRIA MEGASPORA* Rossman, *nom. nov.*

Type: West Indies. Trinidad, in channel made by the "borer" in sugar-cane, Hart.

Isotype specimens (K, NY) were examined. *Nectria megaspora* is distinctive having some of the largest ascospores in the Hypocreales, 90-160 x 20-25 µm, 3-septate. The solitary, superficial, red-orange ascocarps are also large, 1000-1050 µm tall and obpyriform with a broadly-rounded papillae. The asci are apparently evanescent at maturity. The affinities of this species within *Nectria* could not be determined. The epithet of the basionym is preoccupied in *Nectria* by *N. gigaspora* P. Henn.

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*Calonectria gigaspora* Weese, Ann. Mycol. 9:424. 1911, *non C. gigaspora* Massee, 1906.
≡ *Calonectria macrospora* (P. Henn. & E. Nym.) Weese, Ann. Mycol. 8:467. 1910, *non C. macrospora* Sacc. & Speg., 1878 *vel C. macrospora* Rick, 1906.
≡ *Nectria macrospora* P. Henn. & E. Nym. in O. Warburg, Monsunia 1:161. 1899, *non N. macrospora* Starb., Jan. 1899.
≡ *NECTRIA JACTATA* Rossm., Mycotaxon 8:527. 1979.

See *Calonectria macrospora* (P. Henn. & E. Nym.) Weese for an account of this species.

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*Calonectria graminicola* (Berk. & Br.) Wollenw., Phytopathology 3:34. 1913.
≡ *Nectria graminicola* Berk. & Br., Ann. Mag. Nat. Hist. ser. 3, 3:376. 1859.
≡ *Nectriella graminicola* (Berk. & Br.) Niessl. in Rabenh., Fung. Europ. #1652. 1873.
≡ *Dialonectria graminicola* (Berk. & Br.) Cooke, Grevillea 12:110. 1884.
= *NECTRIA ARENULA* (Berk. & Br.) Berk., Outl. Brit. Fung. p. 394. 1860.

Type: England. Batheaston, on Aira caespitosa, Jan. 1850, C. E. B., Brit. Fungi #897.

Booth (1959) listed this species as incompletely known because the type collections are sparse. He stated that the few remaining ascocarps resemble *Nectria arenula* and that this name is either a synonym of *N. arenula* or a *nomen dubium*. Krieger, Fungi Saxonici #1424 (CUP), issued as *Nectria graminicola* is *Nectria arenula*. *Calonectria graminicola* was considered by Ihssen (1910) and Wollenweber (1913) to be the perfect state of *Fusarium nivale* (Fries) Ces., a snow mould and cause of a disease of grasses and cereals. The perfect state of *Fusarium nivale* is *Monographella nivalis* (≡*Calonectria nivalis*) as explained by Müller (1977).

*Calonectria graminicola* var. *neglecta* Krampe, Angew. Bot. 8: 252. 1926.

Type: Switzerland. In culmo inferiore Tritici vulgaris, legit Appel. coll. O. Krampe, 1924.

The holotype specimen is not in B and could not be located. An 'authentic' specimen, probably the type specimen, is illustrated by Wollenweber (1916). The superficial ascocarps have a prominent apical disk and what appears to be a *Cylindrocarpon* anamorph. The illustration suggests a fungus in the *Nectria mammoidea*-group as delimited by Booth (1959) but without a type specimen this variety cannot be adequately characterized.

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*Calonectria graminicola* Stevens, Bot. Gaz. 45:232. 1918, *non C. graminicola* (Berk. & Br.) Wollenw., 1913.
≡ *Melioliphila graminicola* Speg. [*ut* '(Stevens) Speg.'], Bol. Acad. Nac. Ci. 26:344. 1924.
= *MELIOLIPHILA VOLUTELLA* (Berk. & Br.) Rossm., Mycotaxon 8:551. 1979.

Type: Puerto Rico. On *Meliola panici* Earle on *Lasiacis compacta*, 4663 (type), Utuado; on *Lasiacis divaricata*, 4298, Manati 6796, Arecibo. On *Meliola andirae* E. on *Andira jamaicensis*, 5269, Manati.

*Calonectria graminicola* Stevens is the monotype species of *Melioliphila* Speg., 1924. (See *Calonectria ambigua*.) Isotype specimens of Stevens 4663 (CUP, NY) and paratype specimens of Stevens 5269 (BPI, CUP, FH-G, NY) were examined. The isotype at CUP is here designated the LECTOTYPE. This species is found to be a later synonym of *Melioliphila volutella* (≡ *Calonectria volutella*), as is Sydow, Fungi Venezuelani #260a (BPI, PREM) issued as *C. graminicola* Stev.

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*Calonectria granulosa* Seaver, Mem. New York Bot. Gard. 6:508. 1916.
= *NECTRIA HAEMATOCOCCA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Type: Bermuda. Near Harrington Sound, on dead stems of *Jasmium*.

The holotype specimen (NY) was examined and reveals this species to be a later synonym of *Nectria haematococca*.

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*Calonectria guaranitica* Speg., Anales Soc. Ci. Argent. 19:42. 1885.
≡ *Broomella guaranitica* (Speg.) Roum., Rev. Mycol. (Paris) 9:150. 1887.
≡ *ALLONECTELLA GUARANITICA* (Speg.) Rossman, *comb. nov.*

Type: Brazil. Ad folia viva *Bambusaceae* cujusdam in uliginosis sylvae *Naranjo*, 24 Maj. 1883 (sub num. 3828).

The holotype specimen (LPS) was examined. Isotype specimens were issued in Balansa, Champignons du Paraguay #247 (NY) and Roumeguere, Fungi Selecti exs. #4144 (BPI, NY) as

*Broomella guaranitica*. This species has dark-red ascocarps aggregated on the carbonous stroma of *Phyllachora*. The unitunicate asci are clavate, each with an undifferentiated apex, and the ellipsoid ascospores are 28-35 x 8-9 µm, three-septate. This species is similar to *Allonectella rubescens* Petrak, 1950, the monotype species of *Allonectella*. The type specimen of *A. rubescens* is not available for study but from Petrak's detailed description *Allonectella* seems to be hypocreaceous. *Broomella* has been reviewed recently and belongs in the Amphisphaeriaceae (Shoemaker & Müller, 1963).

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*Calonectria guarapiensis* Speg., Anales Soc. Ci Argent. 19:41. Jan. 1885.
≡ *NECTRIA MICROLEUCA* Rossman, *nom. nov.*
= *Calonectria inconspicua* Winter, Rev. Mycol. (Paris) 7:207. 1 Oct. 1885.
= *Calonectria leucophaës* Rehm, Hedwigia 37:195. 1898.
= *Nectria bakeri* Rehm, Ann. Mycol. 6:319. 1908.

Type: Brazil. Ad folia viva v. languida *Sapindaceae* species in sylvis prope *Guarapi*, Jul. 1883 (sub num. 3781).

The holotype specimen (LPS) was examined and reveals this species to be an earlier synonym of *Nectria bakeri*, a species which was redescribed and illustrated by Samuels (1976a). This species occurs on *Meliola* and belongs in the *Nectria leucorrhodina*-group as delimited by Samuels (1976a). The epithet of the basionym of *N. microleuca* is preoccupied in *Nectria* by *N. guarapiensis* Speg., 1885. Rehm, Ascomyceten #1379, issued as *C. guarapiensis* is *Nectria leucorrhodina* (≡ *Calonectria leucorrhodina*) (B, BPI, BR, CUP, S). Roumeguère, Fungi selecti exs. #4047, issued as *C. guarapiensis*, is *Melioliphila balanseana* (≡ *Calonectria balanseana*) (NY).

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*Calonectria gyalectoidea* Rehm, Hedwigia 37:197. 1898.
= *MELIOLIPHILA BALANSEANA* (Berl. & Roum.) Piroz., Kew Bull. 31:596. 1976.

Type: Brazil. Oberseite der Blatter einer Sapindacee. Ule no. 1196 A a. H. B.

The holotype (S) and isotype specimens (FH-G, FH-H) were examined. This name is found to be a later synonym of *Melioliphila balanseana* (≡ *C. balanseana*). Weese (1914b) suggested the synonymy of *C. gyalectoidea* with *C. balanseana*. Rick, Fungi Austro-americana #321 (BPI, FH-G, S) issued as *C. gyalectoides* [*sic*] is *Nectria leucorhhodina* (≡ *C. leucorrhodina*).

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*Calonectria gymnosporangii* Jaap, Ann. Mycol. 14:10. 1916.
≡ *NECTRIA GYMNOSPORANGII* (Jaap) Rossman, *comb. nov.*

Type: Yugoslavia. Dalmatians, auf *Gymnosporangium confusum* Plowr. an Zweigen von *Juniperus phoenicea* L. und *J. oxycedrus* L. mit dem Konidienpilz *Fusarium gymnosporangii* Jaap n. sp. auf der Halbinsel Lapad bei Ragusa, 27. 3. 1914. Vgl. Fungi sel. exs. n. 750!

The holotype (HBG) and an isotype specimen (CUP-F Otto Jaap, Fungi selecti exs. #750 issued as *Fusarium gymosporangii* Jaap) were examined. This species is found to be a *Nectria* with multiseptate ascospores belonging in the *Nectria coccinea*-group as delimited by Booth (1959). Weese (1924) suggested that *C. gymnosporangii* was related to *Nectria punicea* and *N. galligena* both in the *Nectria coccinea*-group. On the holotype specimen there is an associated *Cylindrocarpon* anamorph which Jaap called *Fuasrium gymnosporangii*. Wollenweber & Reinking (1935) transferred the anamorph to *Bactridium*.

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*CALONECTRIA HEDERAE* Arnaud ex Booth & Murray, Trans. Brit. Mycol. Soc. 43:70. 1960.
[≡ *Calonectria hederae* Arnaud, Bull. Soc. Mycol. France 68:214. 1952, *nom. nud.*]

Type: England. Farnham, Surrey, habitat in foliis ad ramis *Hederae helicis*, J. S. Murray, 6 Nov. 1958. (Herb. IMI 75300).

The holotype specimen (IMI) was examined. *C. hederae* is related to *C. pyrochroa* (= *C. daldiniana*, the monotype species of *Calonectria*) (Rossman, 1979), having a *Cylindrocladium* anamorph. *C. hederae* is redescribed and illustrated by Terashita (1969), Matsushima (1971) and Peerally (1974c). Booth & Murray (1960) attribute this species to Arnaud (1952) whose name was invalidly published due to the lack of a Latin diagnosis. Booth & Murray did not choose Arnaud's specimen as the type, perhaps because it was unavailable.

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*Calonectria hederiseda* Rolland & Fautrey, Rev. Mycol. (Paris) 16:73. 1894.

Type: France. Cote-d'OR, sur bois denude de *Hedera helix*, juillet, 1893. (F. Fautrey.)

The holotype specimen is not at PC and has not been located.

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*Calonectria helminthicola* (Berk. & Br.) Sacc., Michelia 1:315. 1878.
≡ *Nectria helminthicola* Berk. & Br., Ann. Mag. Nat. Hist., ser. 3, 3:375. 1859.
≡ *LETENDRAEA HELMINTHICOLA* (Berk. & Br.) Weese ex Petch, Trans. Brit. Mycol. Soc. 21:277. 1938.

Type: England. Parasitic on some large species of *Helminthosporium*. Batheaston, Jan. 1859. C. E. B.

The holotype specimen (K) has been examined. In addition, isotype specimens were issued as *Nectria helminthicola*, Rabenhorst, Fungi Europ. #47 (BR, FH-H) labelled "Batheaston, ad ramos Ulmi campestris, Jan. 1859 leg. C. E. Broome." Weese (1914d) stated that *N. helminthicola* belonged in *Letendraea* but did not make the combination. Petch (1938) was the first author to use the combination *Letendraea helminthicola*. *L. helminthicola* (= *L. eurotioides*, the monotype species of *Letendraea* Sacc.) has fleshy, white ascocarps, bitunicate asci and pale-brown, one-septate ascospores. This species is related to *Tubeufia* which generally occurs with dematiaceous fungi on

rotting wood. Müller & von Arx (1962) and Samuels (1973) redescribe, illustrate and list the synonyms of *L. helminthicola*.

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*Calonectria hendrickxii* (Hansf.) Rossm., Mycologia 69:364. 1977.
≡ *Ophionectria hendrickxii* Hansf., Sydowia Beih. 2:122. 1957.
= *SACCARDOMYCES SOCIUS* P. Henn., Hedwigia 43:353. 1904.
= *Tubeufia asclepiadis* Batista & Garnier, Mem. Soc. Brot. 14:67. 1961.

Type: Zaire. In plagulis *Englerulae macarangae* in foliis *Macaranga* spec., Mt. Biega, Kivu, Hendrickx 3499.

The holotype specimen (IMI) was examined. This species is not hypocreaceous, but belongs in the Sphaeriaceae. There has been some confusion concerning the complex of genera with species which are hyperparasitic or occur directly on living leaves and have small, fleshy ascocarps, unitunicate asci and elongate ascospores. Rather than adding another unfounded opinion, I have chosen to ignore the recent literature on such genera as *Pseudomeliola*, *Schweinitziella*, *Hyalosphaera* and *Saccardomyces* (Petrak & Sydow, 1936; von Arx, 1958; Pirozynski, 1976). I have studied an isotype specimen (FH-G) of *Saccardomyces socius*, the type species of *Saccardomyces*. (Type: Peru. Rio Amazonas, Leticia: Auf Blattern von Solanum, mit Dimerium Saccardoanum, Asterina etc. Juli 1902. No. 3158.) *Calonectria hendrickxii* is a later synonym of *Saccardomyces socius*. *Tubeufia asclepiadis* was also found to be a later synonym of *S. socius*. The holotype specimen (URM) was examined. (Type: Brazil. In foliis *Asclepiadis curassavicae*, Tamatamirim, Victoriae, Pern., Leg. Oswaldo Soares, 28.8.959, Typus, 19054, IMUR. Hyperparasitans *Parasterinam laxiusculam* (Syd.) Bat. & Maia et so. iniens cum *Helminthosporio glabroide* F. L. Stevens et *Trichoccinno ugandensi* Bat. & Maia.) Contrary to reports of von Arx (1958) and Pirozynski (1976), the ascocarp walls of *Saccardomyces socius* are not deliquescent at maturity.

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*Calonectria hibiscicola* P. Henn., Hedwigia 48:105. 1908.
= *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Type: Paraguay. Hort. botan. Goeldi in corticibus *Hibisci schizopetali*. Jan. 1908 (Baker n. 216.)

An isotype specimen (FH-G) was examined. Although the asci are eight-spored, *Calonectria hibiscicola* is a later synonym of *Nectria rigidiuscula* (≡ *Calonectria rigidiuscula*). According to Booth (1971), heterothallic strains of *C. rigidiuscula* may be 2- to 8-spored. As is often the case, *Nectria haematococca* Berk. & Br. occurs with *N. rigidiuscula* on the isotype specimen (FH-G) of *C. hibiscicola*. Weese (1914b, 1924, 1927) remarked on the synonymy of *C. hibiscicola* with *Nectria bulbophylli* P. Henn., *C. meliae*, *C. rigidiuscula* and *C. sulcata*. He examined a type specimen of *C. hibiscicola* at B which apparently no longer exists. The isotype specimen at FH-G is here designated the LECTOTYPE.

*Calonectria hippocastani* (Otth) Sacc., Hedwigia 35:33. 1896.
≡ *Nectria hippocastani* Otth, Mitth. Naturf. Ges. Bern 1868:57. 1868.

Type: Switzerland. Bern, an abgestorbene Zweigen von Aesculus Hippocastanum, im Herbst.

An isotype specimen (FH-G) labelled "Original ex Herb. Otth" was examined. The only fungus present was *Nitschkea cupularis* (Pers. ex Fries) Karsten which does not fit Otth's description. Until a suitable type specimen is found, this species cannot be adequately characterized.

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*Calonectria hirsutellae* Petch, Trans. Brit. Mycol. Soc. 21: 49. 1938.

Type: United States. North Carolina, Cranberry, on a leafhopper, coll. Thaxter, August 1887, No. 6153.

The holotype (K) and an isotype specimen (FH-G) were examined. This species is a member of the Clavicipitales, unrelated to *Calonectria* in the Hypocreales. Like *"Calonectria" pruinosa*, no suitable genus could be determined for it. The ascocarps are pyriform with smooth, rubbery walls, appearing shiny, composed of small, thin-walled cells, typical of members of the Clavicipitales, and are partially immersed in a byssoid stroma covering the leaf hopper. The asci are unitunicate, each having a cap-like, hemisphaerical apical thickening when young but the apex appearing only slightly thickened at maturity. The ascospores are hyaline, long-ellipsoid and multiseptate but not filiform and not separating into part-spores. This species resembles members of *Torrubiella*, *Byssostilbe* and *Barya* but lacks the capitate asci and long, filiform ascospores. Of these genera only *Torrubiella* is entomogenous. *"Calonectria" hirsutellae* is considered by Petch (1938) to be the ascigerous state of *Hirsutella floccosa* Speare.

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*Calonectria hirta* (Bloxam) Sacc., Michelia 1:307. 1878.
≡ *NECTRIA HIRTA* Bloxam in Currey, Trans. Linn. Soc. London 24:158. 1863, *non N. hirta* Dobb. & Poelt, 1978.
≡ *Trichonectria hirta* (Bloxam) Petch, Naturalist, Hull 1937:282. 1937.
≡ *Lasionectria hirta* (Bloxam) Cooke, Grevillea 12:112. 1884.

Type: England. Twycross, Leicestershire, on decaying rails. Rev. A. Bloxam.

Isotype specimens (K) were examined. Occurring on well-rotted bark, the pale-yellow ascocarps are superficial, solitary, covered with hyaline setae and seated on a thin, hyphal subiculum. The unitunicate asci contain long-ellipsoid, multiseptate ascospores. The type specimen of *Trichonectria aculeata* (≡ *Calonectria aculeata*), monotype species of *Trichonectria*, has nothing on it that resembles Kirschstein's species. *T. aculeata* and *T. hirta* are similar in description but until a good type specimen of *T. aculeata* is discovered or the species is neotypified, *Trichonectria* cannot be characterized.

*Calonectria höhneliana* Jaap, Ann. Mycol. 14:10. 1916.
≡ *PORINA HÖHNELIANA* (Jaap) R. Sant., Symb. Bot. Upsal. 12:262. 1952.
≡ *Phylloporina höhneliana* (Jaap) A. Zahlbr., Oesterr. Bot. Z. 68:75. 1919.

Type: Yugoslavia. Dalmatians, auf noch lebenden Cladodien und Stengeln von *Ruscus aculeatus* L., bei Castelnuovo, 27. 4. 1914.

I have examined an isotype specimen (HBG). Santesson (1952) examined another isotype (W) listing it as 'holotype?' The specimen at W is designated the LECTOTYPE. The placement of this species in the lichen genus *Porina* by Santesson (1952) is accepted.

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*Calonectria höhnelii* Rehm in Höhnel, Ann. Mycol. 2:43. 1904.
="*Calonectria*" *rubropuntata* Rehm, Ann. Mycol. 7:539. 1909.

Type: Brazil. Rio de Janeiro, in pagina inferiore foliorum *Psidii* sp. prope Petropolin, mense Augusto 1899, legit de Höhnel.

The holotype specimen (S) and an isotype (FH-H) were examined; the latter is in better condition. As Weese (1924) recognized, "*Calonectria*" *rubropunctata* is a synonym of *C. höhnelii*. The dark-red, fleshy ascocarps occur superficially on living leaves, loosely surrounded by hyphae which are encrusted with rose-red granules. The bitunicate asci contain narrowly-clavate, three-septate ascospores. "*Calonectria*" *höhnelii* resembles *Podonectria gahnia* Dingley in having dark-red, thin-walled ascocarps and reddish, granulate hyphae but "*C.*" *höhnelii* lacks a well-developed stroma and does not occur on scale insects. Although "*C.*" *höhnelii* is a member of the hypocreoid Pleosporales, none of the genera currently recognized in that group can accommodate this species (Pirozynski, 1976).

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*Calonectria ignota* Chardon, Scientific Survey of Porto Rico & Virgin Islands 8:41. 1926.
= *NECTRIA CALAMI* (P. Henn. & E. Nym.) Rossm., Mycotaxon 8:494. 1979.

Type: Puerto Rico. Rio Piedras, on dead wood. Herbarium Insular Experiment Station (Stevenson & Rosa) No. 6499, June 18, 1917.

The holotype specimen and an apparent isotype, both at BPI, were examined. This name is found to be a synonym of *Nectria calami* (≡ *Calonectria calami*).

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*CALONECTRIA ILICICOLA* Boedijn & Reitsma, Reinwardtia 1:58. 1950.

Type: Java. This perfect state developed in cultures of *Cylindrocladium ilicicola* (Hawley), isolated from potato tubers be Boedijn and Reitsma, Bogor, February 1948. Type culture B. R. 9/49 deposited in the collection of the "Central Bureau voor Schimmelcultures," Baarn, Netherlands.

The holotype specimen has not been examined but from the description and *Cylindrocladium* anamorph, this species seems to be related to *Calonectria pyrochroa* (= *C. daldiniana*, the monotype species of *Calonectria*) (Rossman, 1979).

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*Calonectria inconspicua* Winter, Rev. Mycol. (Paris) 7:207. 1885.
= *NECTRIA MICROLEUCA* Rossm., Mycotaxon 8:515. 1979.

Type: Paraguay. Ad folia viva plantae ignotae in *Meliola parasitans*, leg. Balansa.

An isotype specimen (FH-H) 'ex Herb. Winter (Herb. Berlin)' was examined. The specimen in B apparently no longer exists and the isotype at FH-H is designated the LECTOTYPE. *Calonectria inconspicua* is a synonym of *Nectria microleuca* (≡ *Calonectria guarapiensis*). Sydow, Fungi Venezuelani #239b issued as *C. inconspicua* (S) is *Nectria leucorrhodina* (≡ *C. leucorrhodina*) while #47 (BPI, S) and #233 (S) are *Nectria pipericola* P. Henn.

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*CALONECTRIA INDUSIATA* Seaver [*ut Nectria*], Mycologia 20:58. 1929.

Type: Trinidad. Morne Bleu, on a fallen leaf of *Micropolis* sp., March 13, 1921 (Seaver 3176).

Although published as a species of *Nectria*, this was an error in printing. The author clearly intended to publish this species as a *Calonectria*. The published illustrations and type specimen are labelled *Calonectria*. Seaver (1909a, 1916) placed all multiseptate-spored *Nectria* species in *Calonectria*. The holotype specimen (NY) was examined. *Calonectria indusiata* is related to *Calonectria pyrochroa* (= *C. daldiniana*, the monotype species of *Calonectria*) (Rossman, 1979).

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*Calonectria intermixta* P. Henn., Hedwigia 41:6. 1902.

Type: Brazil. St. Catharin. bei Blumenau auf berindeten Zweigen mit Eriosphaeria sowie mit unreifen Fruchtkörpern einer Ophioceras? untermischt. Juli 1892. No. 687b.

A fragmentary isotype specimen (FH-H) had no suitable fungus on it. No other type specimen has been located.

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*Calonectria jasmini* Hansf., Proc. Linn. Soc. Lond. 157:190. 1946.

Type: Uganda. Entebbe Road, in foliis *Jasmini dichotomi*, Hansford 3114.

Isotype specimens (BPI, IMI, PREM) were examined. This species is distinctive having translucent, pale-yellow ascocarps, covered with large, deltoid fascicles of hairs, bitunicate asci and clavate, seven-septate ascospores which lack appendages. Although the ascospores are considerably shorter, *"Calonectria" jasmini* is related to the pleosporaceous *"Ophionectria"* species on rusts reported by Rossman (1977). At present, a generic disposition for these members of the hypocreoid Pleosporales is unknown.

*Calonectria javanica* (Penz. & Sacc.) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 118: 1180. 1909.
≡ *CRYPTOTHECIUM JAVANICUM* Penz. & Sacc., Malpighia 1: 388. 1897.
[≡ *Byssonectria javanica* (Penz. & Sacc.) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 118:1180. 1909, *nom. prov.*]

Type: Java. Tjibodas, in foliis putrescentibus Elettariae, 4. III. 97 (195, 366).

An isotype specimen (PAD) labelled #366 was examined; a fragmentary isotype (FH-H) had no suitable fungus on it. This species has small, subglobose ascocarps immersed in a byssoid stroma composed of spinulose, dichotomously-branched hyphae which are encrusted with bright-yellow granules. Although resembling some *Nectria* species, *Cryptothecium javanicum* is retained in this monotypic genus because of the distinctive hyphae of the stroma. The genus *Byssonectria* is based on a discomycete (Korf, 1971).

*Calonectroa jimenezii* Pat., Bull. Soc. Mycol. France 38:83. 1922.
= *NECTRIA PIPERICOLA* P. Henn., Hedwigia 43:244. 1904.

Type: Costa Rica. Sur le mycélium de *Meliola malchotricha* Speg. des feuilles de *Dichondra repens*, à San Francisco de Guadalupe, en décembre (O. Jimenes).

The holotype specimen (FH-P) was examined. This name is found to be a later synonym of *Nectria pipericola*, a species in the *Nectria leucorrhodina*-group, which has been redescribed and illustrated by Samuels (1976a).

*Calonectria jungermanniarum* (Crouan & Crouan) Sacc., Michelia 1:313. 1878.
≡ *Nectria jungermanniarum* Crouan & Crouan, Florule du Finistère p. 37. 1867.
≡ *PSEUDONECTRIA JUNGERMANNIARUM* (Crouan & Crouan) Döbb., Mitt. Bot. Staatssamml. München 14:98. 1978.
≡ *Lasionectria jungermanniarum* (Crouan & Crouan) Cooke [*ut 'jungermanniae'*], Grevillea 12:112. 1884.

Type: France. Finistère, sur le *Frullania tamarisci* et sur le *Lophocolea bidentata*. Aut. Pr. r.

The lectotype specimen (CO) was examined. I concur with the placement of this species in *Pseudonectria* by Döbbeler (1978) who lectotypified, redescribed and illustrated this species.

*Calonectria kampalensis* Hansf., Proc. Linn. Soc. Lond. 153: 34. 1941.
= *NECTRIA CALAMI* (P. Henn. & E. Nym.) Rossm., Mycotaxon 8:494. 1979.

Type: Uganda. Kampala, in foliis emortuis humidis *Musae sapientium*, Hansford 1887.

The holotype specimen (K) was examined. This name is found to be a later synonym of *Nectria calami* (≡ *Calonectria calami*).

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*Calonectria kurdica* Petrak, Sydowia 13:95. 1959.

Type: Iran. Auf abgestorbenen Stämmchen und dickeren Ästchen von *Astragalus* spec. Kurdistan: Qandil-Gebirge zwischen dem kleinem und grossen Zab, 2800 m, 31. VII. 1957. leg. K. H. Rechinger.

Petrak's specimens (W) are not yet available for examination.

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*CALONECTRIA KYOTENSIS* Terashita, Trans. Mycol. Soc. Japan 8:124. 1 Jan. 1968.
= *Calonectria floridana* Sobers, Phytopathology 59:366. 1969.
= *Calonectria uniseptata* Gerlach, Phytopath. Z. 61:379. April 1968.

Type: Japan. On the leaflet of *Robinia pseudoacacia*, Sep., 1963, Kansai Reg. For. Exp. Sta., Momoyama, Kyoto, leg. Terashita (Type); on the leaves of *Acacia dealbata*, Jan., 1964, at the same locality, leg. Terashita; on *A. dealbata* Mar., 1965, Matsuo National Forest, Kyoto, leg. Terashita. (IFO H'No. 11597 for Holotype and IFO No. 8962 for the tube culture).

Dried cultures and slides "ex Type Coll." (IMI) were examined. This species has a *Cylindrocladium* anamorph and is related to *Calonectria pyrochroa*, (= *C. daldiniana*, the monotype species of *Calonectria*) (Rossman, 1979). Peerally (1974a) redescribed and illustrated *C. kyotensis*.

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*Calonectria lacustris* Kirschst., Ann. Mycol. 34:186. 1936.
= *NECTRIELLA SCEPTRI* (Karst.) Rossm., Mycotaxon 8:542. 1979.

Type: Germany. Auf trockenen noch stehenden Blättern von Typha latifolia behnitzer See, Westhavelland. 5. 11. 35.

The holotype specimen (B) as well as an authentic collection (B) labelled '*sp. n.*' and dated '4. 11. 35' were examined. This name is found to be a later synonym of *Nectriella sceptri* (≡ *Calonectria sceptri*).

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*Calonectria lagerheimiana* Pat., Bull. Herb. Boissier 3:71. 1895.
≡ *NECTRIA LAGERHEIMIANA* (Pat.) Rossman, *comb. nov.*

Type: Ecuador. Parasite du mycelium de *Meliola*, sur rameaux de *Mimosa Quitensis*. Pululahua.

The holotype specimen (FH-P) was examined and this species is found to belong to the *Nectria leucorrhodina*-group as delimited by Samuels (1976a). *Nectria lagerheimiana* has longer ascospores than any other member of the group.

*Calonectria lagerheimii* (Pat.) Höhnel, Ann. Mycol. 17:120. *1919.*
≡ *Broomella lagerheimii* Pat., *Bull. Soc. Mycol. France* 11:229. 1895.
≡ *ALLONECTE LAGERHEIMII* (Pat.) H. Syd., Ann. Mycol. 37: 378. 1939.
[≡ *Puttemansia lagerheimii* (Pat.) Höhnel, Ann. Mycol. 17:120. 1919, *nom. prov.*]

Type: Ecuador. Feuilles d'une bambusee "moya". San Jorge Juillet.

The holotype specimen (FH-P) has not been examined. This species is described and illustrated by Müller & von Arx (1962) and is retained in the monotypic genus, *Allonecte* H. Syd. Occurring on living leaves, the red-brown ascocarps are covered with long, white hairs and have a basal foot immersed in the leaf, as do some species of *Puttemansia* whose ascocarps are white to pale-yellow. Species of both genera have bitunicate asci and fleshy ascocarps and are related to *Letendraea* and *Tubeufia* in the hypocreoid Pleosporales. Species of *Puttemansia* and *Tubeufia* have elongate, clavate ascospores while those of *Letendraea* and *Allonecte* have ellipsoid, uniseptate ascospores.

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*Calonectria lanosa* (P. Henn.) Weese, Mycol. Centralbl. 4:187. 1914.
≡ *PUTTEMANSIA LANOSA* P. Henn., Hedwigia 41:112. 1902.

Type: Brazil. São Paulo, Mattos da Serra da Cantareira, auf Blättern einer Lauracee. 26./III. 1901. No. 178.

Isotype specimens (BPI, CUP, FH-H) and an authentic specimen collected '19. 8. 05' (BPI) were examined. The holotype specimen at B apparently no longer exists; the isotype at BPI is here designated the LECTOTYPE. This species is the monotype of *Puttemansia*. The fleshy, pale-yellow ascocarps are densely covered with hairs and are attached to the substrate of living leaves by a basal foot. The bitunicate asci contain clavate, multiseptate ascospores. *Tetracrium* conidia are often associated with the ascocarps suggesting a relationship with *Podonectria*, another member of the hypocreoid Pleosporales (Pirozynski, 1976; Rossman, 1978).

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*Calonectria leightonii* (Berk.) Sacc., Michelia 1:309. 1878.
≡ *Nectria leightonii* Berk., J. Linn. Soc., Bot. 10:379. 1869.

Type: Cuba (641.) On dead trees. June.

In the original publication, Berkeley listed the type specimen of *Nectria leightonii* as Cuban Fungi #777. He then cited specimens from Europe after the Cuban specimen, noting that "Mr. Leighton's specimens are from Yorkshire, on Larch." Cooke (1873) revised the list of specimens, placing the British specimens first. The Cuban specimen and those from Europe are different and, as Petch (1936) pointed out, only the Cuban collection is considered type material. The holotype (K) and isotype specimens (FH-C, FH-H) were examined. As Seaver (1910)

and Petch (1936) have suggested, this species is a discomycete, probably belonging to the genus *Calycella* (B. Spooner, pers. comm.).

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*Calonectria leucophaëa* Rehm, Hedwigia 37:195. 1898.
= *NECTRIA MICROLEUCA* Rossm., Mycotaxon 8:515. 1979.

Type: Brazil. Oberseite der Blatter einer Cordia. Ule no. 924. H. B.

An isotype (FH-H) and two authentic specimens (BPI, FH-H) were examined. This name is found to be a synonym of *Nectria microleuca* (≡ *Calonectria guarapiensis*) in the *Nectria leucorrhodina*-group as delimited by Samuels (1976a).

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*Calonectria leucorrhodina* (Mont.) Speg., Anales Soc. Ci. Argent. 12:213. 1881.
≡ *Peziza leucorrhodina* Mont. in Sagra, Hist. Cuba Pl. Cell. p. 360. 1842.
≡ *NECTRIA LEUCORRHODINA* (Mont.) Samuels, Mem. New York Bot. Gard. 26:90. 1976.
= *Calonectria tubaroensis* Rehm, Hedwigia 37:195. 1898.
= *Calonectria sensitiva* (Rehm) Weese, Ann. Mycol. 8:423. 1910.
≡ *Nectria sensitiva* Rehm, Hedwigia 39:222. 1900.
= *Calonectria limpida* H. & P. Syd., Leafl. Philipp. Bot. 5:1545. 1912.
= *Calonectria cephalosporii* Hansf., Mycol. Pap. 15:117. 1946.
= *Calonectria ukolayii* Thaung, Trans. Brit. Mycol. Soc. 67:435. 1976.

Type: Cuba. On a leaf, Sagra.

Samuels (1976a) examined the holotype specimen (PC) leaving his notes at NY, which were reviewed. He has redescribed, illustrated and listed the synonyms of *Nectria leucorrhodina*. This species forms the basis of the *N. leucorrhodina*-group as delimited by Samuels (1976a), all the species of which occur on *Meliola*. Synonyms, additional to those listed above, are given by Samuels (1976a).

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*Calonectria leucorrhodina* var. *minor* Speg., Anales Soc. Ci. Argent. 19:40. 1885.
= *NECTRIA PIPERICOLA* P. Henn., Hedwigia 43:244. 1904.

Type: Brazil. Ad folia viva Aurantiaceae cujusdam prope Guarapi, Jul. 1883 (sub num. 3781).

The holotype specimen (LPS) was examined. Isotypes were issued as Roumeguère, Fungi selecti exs. #4142 (BPI, NY). This name is a synonym of *Nectria pipericola* in the *N. leucorrhodina*-group. *N. pipericola* was redescribed and illustrated by Samuels (1976a).

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*Calonectria levieuxii* (Fries) Sacc., Michelia 1:313. 1878.
≡ *Sphaeria levieuxii* Fries, Elenchus fungorum 2:84. 1828.
≡ *NECTRIA LEVIEUXII* (Fries) Crouan & Crouan, Florule du Finistère p. 37. 1867.

Type: France. Ad cortices truncorum circa Rothomagum. Levieux.

Fries (1828) listed this species as "*Sphaeria peziza* var. *levieux*! in litt." A specimen from UPS labelled *Sphaeria levieuxii* collected in France by Mougeot is considered the holotype. The scarlet, scurfy ascocarps are crowded on a well-developed stroma and become deeply cupulate when dry. The unitunicate, cylindric asci contain ellipsoid, uniseptate ascospores which are 13-15 x 4-5 µm. *Nectria levieuxii* belongs to the *Nectria coccinea*-group as delimited by Booth (1959).

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*Calonectria lichenicola* (Ces.) Rehm, Ascom. Lojk. p. 44. 1882.
≡ *Cryptodiscus lichenicola* Ces. in Rabenh., Herb. Mycol. ed. 2, #523. 1857.
≡ *Nectria lichenicola* (Ces.) Sacc., Michelia 1:289. 1878.
≡ *Nectriella lichenicola* (Ces.) Fuckel ex Höhnel & Weese, Ann. Mycol. 8:466. 1910.
≡ *Pronectria lichenicola* (Ces.) Clements & Shear, Genera of Fungi p. 282. 1931.
= *NECTRIELLA ROBERGEI* (Mont. & Desm.) Weese, Ann. Mycol. 8:467. 1910.

Type: Italy. Circa lacusculum montanum di Bertignana alterumque paullo distantem di Viverone ad limited austro-occid-ditionis Bugellensis (Pedemont.) Oct.-Nov. 1856.

I have not seen any of the type specimens of *Cryptodiscus lichenicola*. Many authors (Winter, 1872; Rehm, 1881; Vouaux, 1912; Weese, 1914c; Keissler, 1930; Müller & von Arx, 1962) have recognized the synonymy of *C. lichenicola* with *Nectriella robergei*.

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*Calonectria lichenigena* Speg., Bol. Acad. Nac. Ci. 11:530. 1889.

Type: Argentina. In thallo lichenino quodam ad cortices languidos Apiahy, Jul. 1881 (sine n.).

The holotype specimen (LPS) has white *Tubercularia*-like sporodochia which are erumpent through lichens on bark. There are no ascocarps present; this species cannot be adequately characterized.

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*Calonectria limpida* H. & P. Syd., Leafl. Philipp. Bot. 5:1545. 1912.
= *NECTRIA LEUCORRHODINA* (Mont.) Samuels, Mem. New York Bot. Gard. 26:90. 1976.

Type: Philippines. Palawan, Brooks Point (Addison Peak), parasitic on the mycelium of an old *Meliola* on the leaves of *Acalypha stipulacea* Klotz., February, 1911, no. 12656.

Isotype specimens were located at BPI, FH-G and IMI. The holotype specimen at B has apparently been destroyed; the isotype at FH-G is here designated the LECTOTYPE. This name is found to be a later synonym of *Nectria leucorrhodina* (≡ *Calonectria leucorrhodina*). Hansford (1946) placed *Calonectria*

*limpida* close to *C. cephalosporii*, another synonym of *Nectria leucorrhodina*.

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*Calonectria longisetosa* Hansf., Mycol. Pap. 15:125. 1946.
≡ *MELIOLIPHILA LONGISETOSA* (Hansf.) Rossman, *comb. nov.*

Type: Uganda. In plagulis *Meliolae chorleyi* in foliis *Trichiliae*, Hansford no. 2456 (typus); in plagulis *M.* spec., in foliis *Jaundeae monticolae*, Kawanda Uganda, Hansford no. 2841.

Authentic specimens from Uganda (IMI: Hansford 2999, 3331; PREM: Hansford 3331) were examined; no other type collections were located. This species belongs in *Melioliphila*, having bitunicate asci and fleshy, pale-yellow ascocarps occurring on *Meliola*. Although close to *M. volutella* (≡ *Calonectria volutella*), the longer ascospores and dense covering of long, flexuous hairs on the ascocarps of *M. longisetosa* make this species distinctive.

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*Calonectria luteofusca* (Crouan & Crouan) Sacc., Michelia 1: 317. 1878.
≡ *Nectria luteofusca* Crouan & Crouan, Florule du Finistère p. 39. 1867.
= *NECTRIA FUNICOLA* (Berk. & Br.) Berk., Outl. Brit. Fung. p. 393. 1860.

Type: France. Sur une corde pourrie, sur la terre, dans un verger. Hiv. Pr. r. r.

The holotype specimen (CO) was examined. This name is found to be a later synonym of *Nectria funicola* (≡ *Calonectria funicola*), a species which was redescribed and illustrated by Booth (1959).

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*Calonectria luteola* (Rob. ex Desm.) Sacc., Michelia 1:315. 1878.
≡ *Sphaeria luteola* Rob. ex Desm., Ann. Sci. Nat. Bot., ser. 3, 16:314. 1851.
≡ *NECTRIELLA LUTEOLA* (Rob. ex Desm.) Weese, Ann. Mycol. 12:131. 1914.

Type: France. In foliis siccis arborum. Aestate.

The type collection was issued in 1850 without a description as Desmazières, Pl. Crypt. France #2078. Despite the eventually emergent ascocarps, isotype specimens (BPI, FH-C, H, NY) show this species to be allied with *Nectriella*. The smooth, subglobose ascocarps become collabent when dry. The narrowly-clavate asci have a distinct apical ring and the ascospores are ellipsoid, uniseptate, 11-14 x 3-4 µm.

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*Calonectria macrospora* Sacc. & Speg. in Sacc., Michelia 1:251. 1878.
= *MASSARINA VIBURNICOLA* (Crouan & Crouan) Rossm., Mycotaxon 8:550. 1979.

Type: Italy. In cortice emortuo Vitis viniferae a Conegliana, Aut. 1876 (Spegazzini).

This species was described in Saccardo's (1878a) article on Fungi Veneti Series VIII, covering new and critical species in the exsiccati centuries VIII-XIII. The type collection may be Saccardo, Mycotheca Veneta #1275 whose collection data agree with those in the type description except that the exsiccati was collected in Jan. 1878 while the type was said to be collected in "Aut. 1876." The exsiccati specimens are at least authentic and were examined from BPI, BR, FH-H, LPS and NY. Two specimens in FH-H marked "Original" and "Original, ex Herb. Saccardo" are probably type specimens but the labels are insufficient to determine whether either could be part of the holotype collection. These specimens are all identical with the type of *Massarina viburnicola* (≡ *Calonectria viburnicola*).

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*Calonectria macrospora* Sacc. & Speg. ssp. *tarvisina* Speg., Michelia 1:464. 1879.
≡ *Calonectria tarvisina* (Speg.) Speg. ex Sacc. (*ut* 'Speg.'), Syll. Fung. 2:540. 1883.
= *MASSARINA VIBURNICOLA* (Crouan & Crouan) Rossm., Mycotaxon 8:550. 1979.

See *Calonectria tarvisina*.

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*Calonectria macrospora* Rick, Broteria 5:41. 1906, *non C. macrospora* Sacc. & Speg., 1878 *vel C. macrospora* (P. Henn. & E. Nym.) Weese, 1910.
≡ *Calonectria dolichospora* Sacc. & Trott., Syll. Fung. 22:490. 1913.

Type: Brazil. Rio Grande do Sul, in foliis putridis palmae.

Saccardo & Trotter (1913) legitimized Rick's species by renaming it. I have been unable to locate the type specimen.

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*Calonectria macrospora* (P. Henn. & E. Nym.) Weese in Höhnel & Weese, Ann. Mycol. 8:467. 1910, *non C. macrospora* Sacc. & Speg., 1878 *vel C. macrospora* Rick, 1906.
≡ *Nectria macrospora* P. Henn. & E. Nym. in O. Warburg, Monsunia 1:161. 1899, *non N. macrospora* Starb., Jan. 1899.
≡ *Calonectria gigaspora* Weese [*ut* '(P. Henn.) Weese'] in Höhnel & Weese, Ann. Mycol. 9:424. 1911, *non C. gigaspora* Massee, 1906.]
≡ *NECTRIA JACTATA* Rossman, *nom. nov.* [Etymology: Latin, *jactatus*, meaning tossed around.]

Type: Java. Hort. Bogor.: auf abgestorbenen Zweigen. Aug. 1898. (E. Nyman.)

Isotype specimens of *N. macrospora* P. Henn. & E. Nym. were examined from FH-H and S; the latter is here designated the LECTOTYPE. This distinctive species is related to *N. pseudopeziza* (≡ *Calonectria pseudopeziza*) in ascocarp wall structure; however, *N. jactata* has one-septate, punctate ascospores, 30-38 x 11-17 µm.

[*Calonectria mangiferae* Sechet, Fruits d'outre mer 8:270. 1953, *nom. nud.*]

Type: Madagascar. Tananarive, a 1300 m, on *Mangifera indica*.

The type description lacks a Latin diagnosis and is, therefore, not validly published. No specimen under this name has been located.

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*Calonectria massariae* (Pass.) Sacc., Michelia 1:312. 1878.
≡ *Nectria massariae* Pass. in Rabenh., Fungi Europ. #1827. 1874.
= *NECTRIA DECORA* (Wallr.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24:179. 1870.

Type: Italy. Parmae--Giardino pubblico. Parasitans in Massaria inquinante ad ramulos Aceris campestris. Martio 1874. leg. G. Passerini.

Isotype specimens of this exsiccati number were examined (BPI, BR, FH-H, S). This name is found to be a later synonym of *N. decora* (≡ *Calonectria decora*) as stated by Weese (1914a), Wollenweber & Reinking (1935) and Pirozynski (1975).

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*Calonectria meliae* A. W. Zimm., Centralbl. Bakteriol., 2. Abth. 7:106. 1901
= *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Type: Java. Buitenzorg, an einem absterbenden Stamme von Melia arguta.

The type specimen has apparently been destroyed; it is not at B. Höhnel & Weese (1911) and Weese (1914b, 1924) suggested that *Calonectria meliae* is a synonym of *C. sulcata* (= *N. rigidiuscula*) and later (Weese, 1927) of *C. rigidiuscula* (≡ *N. rigidiuscula*) as do Wollenweber & Reinking (1935) and Booth (1971). Based on these previous decisions and the type description, I accept *C. meliae* as a synonym of *Nectria rigidiuscula* (≡ *Calonectria rigidiuscula*).

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*Calonectria meliolae* Hansf., Proc. Linn. Soc. Lond. 153:33. 1941.
= *MELIOLIPHILA BALANSEANA* (Berl. & Roum.) Piroz., Kew Bull. 31:596. 1976.

Type: Uganda. In plagulas *Meliolae tecleae* in foliis *Techleae nobilis*, Kazi, Kampala, Hansford 1909 p. p.

The holotype (K) and authentic specimens (BPI: Hansford 2866, 2874, 3065, 3470; PREM: Hansford 3304) reveal this name to be a synonym of *Melioliphila balanseana* (≡ *Calonectria balanseana*).

*Calonectria melioloides* Speg., Anales Soc. Ci. Argent. 19:41. 1885.
≡ *MELIOLIPHILA MELIOLOIDES* (Speg.) Piroz., Kew Bull. 31:596. 1976.
≡ *Calonectria melioloides* Speg. f. *macrospora* Rehm, Hedwigia 37:196. 1898.

Type: Brazil. Ad folia viva Myrtaceae cujusdam in sylvis prope Guarapi, Jun. 1881 (sub num. 2744).

Isotype specimens of Balansa, Pl. du Paraguay #2744 were examined at FH-H, FH-P and NY. Roumeguère, Fungi selecti exs. #4141 (BPI) has the same collection data as those cited in the type description. The specimen sent as type from LPS was collected "XI--1883. No. 1674. Leg. Balansa, nro. 4017" and is considered authentic. This species belongs in *Melioliphila* having bitunicate asci, fleshy, pale-yellow ascocarps covered with long, flexuous hyphae and clavate, three-septate ascospores. Weese (1914b, 1927) stated that *Calonectria trichilae* and *C. soroccae* (both = *Melioliphila volutella*) and *C. erysiphoides* (≡ *M. erysiphoides*) are synonyms of *C. melioloides* (≡ *M. melioloides*) and that on the basis of ascocarp wall structure these species resemble *C. balanseana* (≡ *M. balanseana*) and *C. appendiculata* (≡ *M. appendiculata*). These species, all now placed in *Melioliphila*, are separated on differences in ascocarp ornamentation.

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*Calonectria melioloides* Speg. f. *macrospora* Rehm, Hedwigia 37:196. 1898.
= *MELIOLIPHILA MELIOLOIDES* (Speg.) Piroz., Kew Bull. 31: 596. 1976.

Type: Brazil. Feuilles de ?Guarapi, 6/1889. Balansa Pl. du Paraguay no. 2744. H. B.

Rehm (1898) divided *Calonectria melioloides* into two forms: *macrospora* and *microspora*. The typical form must be *macrospora* because the type specimen of form *macrospora* seems to be the same as that of *C. melioloides*. Although both are listed as #2744, the year is listed as "1889" in Rehm's type citation of form *macrospora* and "1881" in Spegazzini's publication of *C. melioloides*.

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*Calonectria melioloides* Speg. f. *microspora* Rehm, Hedwigia 37:196. 1898.
= *MELIOLIPHILA BALANSEANA* (Berl. & Roum.) Piroz., Kew Bull. 31:596. 1976.

Type: Brazil. Feuilles. Guarapi. 7/1883. Balansa pl. du Paraguay no. 3796. H. B.

An isotype specimen (FH-H) shows this form to be a synonym of *Melioliphila balanseana* (≡ *C. balanseana*) having smooth ascocarps and shorter ascospores than *M. melioloides* (≡ *C. melioloides*).

*Calonectria mellina* (Durieu & Mont.) Höhnel, Ann. Mycol. 8: 467. 1910.
≡ *Sphaeria mellina* Durieu & Mont., Expl. Sci. Algérie Bot. 1:497. 1849.
≡ *Nectria mellina* (Durieu & Mont.) Mont. [*ut* Mont.], Syll. Generum Spec. Plantarum Cryptogam. p. 225. 1856.
≡ *Ophionectria mellina* (Durieu & Mont.) Sacc. [*ut* '(Mont.) Sacc.'], Michelia 1:323. 1878.
= *NECTRIA PSEUDOPEZIZA* (Desm.) Rossm., Mycotaxon 8:536. 1979.

Type: Algeria. In ramulo dejecto ad Mustapha prope Alger a Durieu inventa.

The holotype specimen (PC) was examined. This name is found to be a later synonym of *Nectria pseudopeziza* (≡ *Calonectria pseudopeziza*). Weese (1914b) suggested that *C. mellina* was a synonym of *C. plowrightiana* which I place in synonymy with *N. pseudopeziza*.

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*Calonectria mindoensis* Petrak, Sydowia 2:323. 1948.

Type: Ecuador. Auf faulenden Stämmen einer Bambusee. Prov. Pichincha: Mindo. 15. XI. 1937, Nr. 388/a.

Petrak's specimens (W) are not yet available for study.

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*Calonectria miniscula* Sacc. & Speg. in Sacc., Michelia 1:251. 1878.
≡ *NECTRIA MINISCULA* (Sacc. & Speg.) Rossman,

Type: Italy. In foliis subputrescentibus Cryptomeriae japonicae a Susegana. Martio 1877. (Spegazzini).

An isotype specimen (LPS) was examined. Another fragmentary isotype specimen (FH-H) no longer contains any suitable fungus. *Nectria miniscula* is a member of the *Nectria arenula*-group as delimited by Samuels (1978), close to *N. erubescens* (≡ *Calonectria erubescens*). Unlike *N. erubescens*, ascocarps of *N. miniscula* have a distinct corona of cells surrounding the ostiole.

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*Calonectria minutissima* W. Grove, J. Bot. 68:131. 1930.

Type: England. In culmis emortuis *Heleocharidis palustris*, in paludosis prope Aldridge. Staffs, Septembri.

The holotype specimen has not been located.

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*Calonectria moravica* Petrak, Ann. Mycol. 32:432. 1934.

Type: Czechoslovakia. Moravia. Auf faulenden, feucht liegenden Ästen von *Robinia pseudoacacia;* Mähr-Weisskirchen, Bahndamm bei Teplitz, IV. 1912.

Petrak's specimens (W) are not yet available for study.

*Calonectria muscicola* Zerova, Bot. Zhurn. (Kiev) 12:106. 1955.

Type: Russia. Kazachistan-Ukraine, in juga Zilijskij-Alatua, on *Plagiothecium pulchellum* (Hedw.) Br., in saxosis prope lac. Issyk, sparse, 4. IX 1943, leg. A. S. Lasarenko.

The holotype specimen has not been located. Racovitza (1959) stated that this species is related to *Calonectria duplicella* (≡ *Absconditella duplicella*), a member of the Ostropales. The type description and geographical distribution suggest that *C. muscicola* may also belong in *Absconditella*. Döbbeler (1978) included *C. muscicola* in *Calonectria* without examining the type specimen.

*Calonectria muscivora* (Berk. & Br.) Sacc., Michelia 1:315. 1878.
≡ *Sphaeria muscivora* Berk. & Br., Ann. Mag. Nat. Hist., ser. 2, 7:188. 1851.
≡ *NECTRIA MUSCIVORA* (Berk. & Br.) Berk., Outl. Brit. Fung. p. 394. 1860.

Type: England. King's Cliffe, on mosses upon the mud tops of walls in winter.

The holotype (K) and an isotype specimen (PC) were examined only macroscopically. Samuels (1976a) and Döbbeler (1978) have redescribed, illustrated, discussed and listed the synonyms of *Nectria muscivora*.

*Calonectria nivalis* Schaffnit, Mycol. Centralbl. 2:255. 1913.
≡ *MONOGRAPHELLA NIVALIS* (Schaffnit) Müller & von Arx, Rev. Mycol. (Paris) 41:132. 1977.
≡ *Griphosphaeria nivalis* (Schaffnit) Müller & von Arx, Phytopath. Z. 24:356. 1955.
≡ *Micronectrella nivalis* (Schaffnit) Booth, The genus *Fusarium* p. 42. 1971.

Type: None designated.

No specimen that Schaffnit examined has been located; however, mycologists have come to an agreement on the concept of this species. Müller (1977) discussed the confusion surrounding the generic placement of *Monographella nivalis* and listed the numerous synonyms. This fungus is known as a snow mould causing a disease of cereals. Until recently thought to be a member of the Hypocreales, *M. nivalis* is quite unlike *Nectria* or *Gibberella* species having *Fusarium* anamorphs. Likewise, Booth (1971) considered the *Fusarium* state of *M. nivalis* to be distinct within *Fusarium*. *Monographella* is now placed in the Physosporellaceae, Phyllachorales by Barr (1976).

*Calonectria novae-zealandica* Dingley, Trans. & Proc. Roy. Soc. New Zealand 79:404. 1952.
≡ *NECTRIA NOVAE-ZEALANDICA* (Dingley) Rossman, *comb. nov.*

Type: New Zealand. Hooker moraine, Canterbury, on *Discaria toumatou* Raoul, Feb. 1947.

The holotype specimen (PDD) was examined. *Nectria novae-zealandica* belongs to the *Nectria aquifolii*-group as delimited by Booth (1959), particularly related to *Thyronectria pseudotrichia* (Schw.) Seeler, *Nectria canadensis* (≡ *Calonectria canadensis*) and *Nectria aurigera* (≡ *C. aurigera*).

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*Calonectria obtecta* Rehm, Hedwigia 39:225. 1900.
≡ *Trichopeltis obtecta* (Rehm) Rehm, Hedwigia 44:1. 1904.
≡ *Cryptopeltis obtecta* (Rehm) Rehm, Ann. Mycol. 4:409. 1906.
= *PORINA EPIPHYLLA* (Fee) Fee, Essai Crypt. Suppl. p. 76. 1837.

Type: Brazil. Folium Corymbidis. Ule no. 868b.--Folium filicis. Ule no. 863a.--Folium Myrtaceae. Tubarao. Ule no. 1400a.--Folia Lindsayae. Itajahy. Ule no. 622 (stroma 1 mm). --Folia Liriosomatis. Ule no. 950b.--Folia Calatheae. Ule no. 950b. H. Bresl.

Syntype specimens were examined (FH-G: Ule #1400, #622, #863 as *'obtusa'*). Ule #622 at FH-G is here designated the LECTOTYPE. Santesson (1952) suggested that all the specimens in the herbarium at Breslau were destroyed. He did not see any type material of *Calonectria obtecta* but examined Rehm, Ascomyceten #1671 (S) issued as *Cryptopeltis obtecta* and agreed with Weese (1924) who synonymized *C. obtecta* with *Porina epiphylla*. After examination of the type specimens at FH-G, I agree with this evaluation.

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*Calonectria obvoluta* (Karst.) Sacc., Michelia 1:316. 1878.
≡ *Nectria obvoluta* Karst., Bidrag Kännedom Finlands Natur Folk 23:217. 1873.
≡ *NECTRIELLA OBVOLUTA* (Karst.) Rossman, *comb. nov.*

Type: Finland. Supra folia *Calamagrostidis* arida mense Octobri prope Mustiala reperta.

The holotype specimen (H) was examined. It is in poor condition but was found to be a *Nectriella*. The pale-yellow ascocarps are immersed initially, becoming superficial at maturity. The clavate asci have an apical ring and the ascospores are fusiform, uniseptate, 8-10 x 1.5-2 µm.

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*Calonectria ochraceopallida* (Berk. & Br.) Sacc., Atti Accad. Sci. Veneto-Trentino-Istriana, Padua 7:23. 1875.
≡ *Sphaeria ochraceopallida* Berk. & Br., Ann. Mag. Nat. Hist. ser. 2, 7:187. 1851.
≡ *Nectria ochraceopallida* (Berk. & Br.) Berk., Outl. Brit. Fung. p. 394. 1860.
= *NECTRIA PSEUDOPEZIZA* (Desm.) Rossm., Mycotaxon 8:536. 1979.

Type: England. Rockingham Forest, on elm branches.

The holotype (K), isotype slides (IMI) and authentic specimen (H, ex Herb. Plowright; UPS, ex Herb. Broome) were examined. This name is found to be a later synonym of *Nectria pseudopeziza* (≡ *Calonectria pseudopeziza*).

*Calonectria olivacea* Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 116:107. 1907.

Type: Germany. An stark vermorschtem *Fagus*-Holz. Sauerbrunnleiten bei Rekawinkel im Wienerwalde, August 1906.

Only a label without the holotype specimen can be found at FH-H. No type specimen has been located.

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*Calonectria oodes* Petch, Ann. Roy. Bot. Gard. Peradeniya 7: 135. 1920.
= *NECTRIA CALAMI* (P. Henn. & E. Nym.) Rossm., Mycotaxon 8:494. 1979.

Type: Ceylon. On a decaying stem, Peradeniya, June, 1919; No. 6009 in Herb. Peradeniya.

A portion of the type specimen was examined (K). This name is found to be a synonym of *Nectria calami* (≡ *Calonectria calami*), as recognized by Weese (1927) and Petch (1950).

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*Calonectria opalina* (Crouan & Crouan) Sacc., Michelia 1:311. 1878.
≡ *NECTRIA OPALINA* Crouan & Crouan, Florule du Finistère p. 39. 1867.

Type: France. Finistère, sur les tiges mortes et submergées de Cirsium palustre. Pr. r.

The holotype specimen (CO) was examined. This species belongs in *Nectria* and has white, partially immersed ascocarps, unitunicate asci and fusiform, multiseptate ascospores.

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*Calonectria otagensis* (Currey ex Lindsay) Sacc., Michelia 1: 308. 1878.
≡ *NECTRIA OTAGENSIS* Currey ex Lindsay, Trans. Roy. Soc. Edinburgh 24:428. 1867.

Type: New Zealand. Otago. On stockyard fences of old "Goai" timbers, ravines of the Chain Hills.

The holotype (E) and an authentic specimen (E) were examined. This species belongs in *Nectria* and has globose, pale-yellow ascocarps on a well-developed stroma, unitunicate asci and ellipsoid, uniseptate ascospores, 12-23 x 4-7 µm. Dingley (1951) redescribed, illustrated and discussed *Nectria otagensis*. Wollenweber & Reinking (1935), followed by Booth (1971), were incorrect in stating that *Calonectria otagensis* is a synonym of *Gibberella baccata* (Wallr.) Sacc.

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*Calonectria oudemansii* (Westend.) Sacc., Michelia 1:308. 1878.
≡ *Nectria oudemansii* Westend., Bull. Soc. Roy. Bot. Belgique 5:39. 1866.
= *NECTRIA OCHROLEUCA* (Schw.) Berk., Grevillea 4:16. 1875.

Type: Holland. Sur l'écorce des branches et rameaux morts de l'*Urostigma Neumannii* Miq., dan les serres du Jardin botanique, M. J.-A.-C.-A. Oudemans, professeur a l'Athenée illustre d'Amsterdam. Mai. 1864.

Two isotype specimens at BR and one at B were examined. The isotype at BR with Westendorp's notes is here designated the LECTOTYPE. *Nectria oudemansii* is a later synonym of *Nectria ochroleuca*, a species which was redescribed and illustrated by Samuels (1976a).

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*Calonectria pachythrix* Rehm, Ann. Mycol. 5:531. 1907.
≡ *TUBEUFIA PACHYTHRIX* (Rehm) Rossman, *comb. nov.*

Type: Brazil. Ad ramulos Rubi. Sao Francisco dos Campos, Sao Paulo 12. 1896, leg. F. Noack comm. Sydow no. 199.

Isotype specimens (FH-G, S) were examined. The specimen at S is here designated the LECTOTYPE. This species is a *Tubeufia* associated with old pyrenomycetes and dematiaceous hyphae on well-rotted wood. The pale-yellow ascocarps are covered with long, tapering hairs. The asci are bitunicate and the ascospores are long-fusiform, multiseptate, 40-57 x 4-5 µm. *Tubeufia pachythrix* is similar in ascocarp structure to *T. paludosa* (Crouan & Crouan) Rossm. *(= T. javanica* Penz. & Sacc., the type species of *Tubeufia)* but unlike the common temperate species, *T. cerea (≡ Calonectria cerea)* and *T. helicoma* (Phill. & Plowr.) Piroz.

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*Calonectria pellucida* O. Rostrup, Dansk. Bot. Ark. 2:8. 1916.

Type: Denmark. Ad paleas *Dactylidis glomeratae*. S. Gelsskov, Marts 1912.

The holotype specimen is not at C or CP and has not been located.

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*Calonectria perpusilla* Sacc., Atti Accad. Veneto-Trentino-Istriana, Padua ser. 3, 10:69. 1917.

Type: Philippines. In glumis emortuis Oryzae sativae, Los Banos, Oct. 1914 (3802). Socium adest *Myrothecium oryzae*, quod cfr. suo loco.

The holotype specimen (PAD) was examined. This species belongs in the Physosporellaceae, Phyllachorales as reviewed by Barr (1976). The small, dark-brown, fleshy ascocarps are immersed but eventually become superficial with only the base of the ascocarp embedded in the substrate. The unitunicate asci are broadly clavate, each with a refractive apical ring and the ascospores are ellipsoid, with broadly-rounded ends, equally one-septate, 17-19 x 5-6 µm. An *Arthrinium*-like fungus is associated with the ascocarps as in *Apiospora montagnei* Sacc. However, *A. montagnei* has ascocarps which are surrounded by a well-developed clypeus and the ascospores are unequally one-septate. The solitary ascocarps and medially septate ascospores of *"Calonectria" perpusilla* suggest *Monographella* Petrak whose type species, *M. divergens* Petrak *(= M. nivalis, ≡ Calonectria nivalis)* has a *Fusarium* anamorph. The generic placement of *"Calonectria" perpusilla* could not be determined.

*Calonectria phycophora* Döbb., Mitt. Bot. Staatssamml. München 14:66. 1978.

Type: New Guinea. Papua, Dist. Northern, Subdist. Kokoda, eastern side of lake Myola No. 1, (9° 10' X, 147° 45' E), submontane rainforest, 2000 m, gemeinsam mit *Bryorella crassitecta* und *Calonectria biseptata*, 23. VII. 1974. J. R. CROFT et al. (LAE 61975), (-), (Holotypus M; Isotypus Dö 2278).

The holotype specimen of this recently described species has not been examined. This species was placed in *Calonectria* solely on the basis of the multiseptate ascospores. From the description and illustration it appears to be unlike *Calonectria pyrochora ( = C. daldiniana*, the monotype species of *Calonectria)* (Rossman, 1979), and should be placed with allied species in the genus *Nectria*.

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*Calonectria pithecoctenii* Verissimo d'Almeida & Souza da Camara, Revista Agron. (Lisbon) 3:254. 1905.

Type: Portugal. In ramulis emortuis *Pithecoctenii Squali* DC., in horto botanico Coimbra, leg. A. Moller, octobri, 1904.

COI has not responded to inquiries concerning the type specimen which has not been located.

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*Calonectria platasca* (Berk.) Sacc., Michelia 1:308. 1878.
≡ *Sphaeria platasca* Berk. in W. J. Hooker, The English Flora 5:263. 1836.
≡ *Nectria platasca* (Berk.) Berk., Outl. Brit. Fung. p. 393. 1860.

Type: England. On the soft wet decayed stump of a maple which has been broken off. Winter. Rockingham Forest, Norths. Rev. M. J. Berkeley.

Petch (1936) stated that the type specimen of this species is exhausted. Its identity remains in obscurity.

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*Calonectria plowrightiana* Sacc., Michelia 1:307. 1878.
= *NECTRIA PSEUDOPEZIZA* (Desm.) Rossm., Mycotaxon 8:536. 1979.

Type: England. In caule putrescente Lappae, Febr. 1878 (C. B. Plowright).

The type collection of this species was issued as Plowright, Sphaeriacei Britannici cent. III, #15. Isotype specimens (FH-H, H, NY) were examined. This name is found to be a later synonym of *Nectria pseudopeziza (≡ Calonectria pseudopeziza)*. Weese (1914b), Petch (1938) and Dingley (1952) suggested that *C. plowrightiana* is a synonym of *C. ochraceopallida* which I place in synonymy with *Nectria pseudopeziza*.

*Calonectria polythalama* (Berk.) Sacc., Michelia 1:308. 1878.
≡ *Nectria polythalama* Berk. in J. D. Hooker, Flora of New Zealand 2:203. 1855.
≡ *Scoleconectria polythalama* (Berk.) Seaver, Mycologia 1:200. 1909.
= *THYRONECTRIA PSEUDOTRICHIA* (Schw.) Seeler, J. Arnold Arbor. 21:438. 1940.

Type: New Zealand. On dead bark, Bay of Islands, J. D. H.

The holotype specimen (K) was examined. In agreement with Dingley (1952), I find this name to be a later synonym of *Thyronectria pseudotrichia*. *Scoleconectria polythalama sensu* Seaver is *Nectria aurigera* (≡ *Calonectria aurigera*), a name which had previously been thought to be a synonym of *S. polythalama* (Seaver, 1909a). Ravenel, Fungi Carolinensis fasc. 3, #54 (BPI, BR, FH-H), issued as *Nectria polythalama*, is *Nectria aurigera* (≡ *Calonectria aurigera*).

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*Calonectria pruinosa* Petch, Trans. Brit. Mycol. Soc. 16:226. 1931.

Type: Ceylon. Nuwara Eliya, on a leafhopper on bamboo (*Arundinaria debilis*), etc.

An isotype specimen (K) was examined. Like *"Calonectria" hirsutellae*, *"Calonectria" pruinosa* belongs in the Clavicipitales; however, no suitable genus for it could be determined. The pale-yellow, conical ascocarps are composed of small, thin-walled cells forming *textura angularis* and are partially embedded in a byssoid stroma which completely covers the insect. The asci are cylindric, each with a capitate apex when immature, but having a narrow canal through the slightly-thickened apex at maturity. Unlike most members of the Clavicipitales, the ascospores are not filiform, but fusiform, 7- to 9-septate, 20-26 x 3-5 µm. Petch (1931) described the conidial state as *Hirsutella versicolor*. *"Calonectria" pruinosa* and *"Calonectria" hirsutellae* are related to species of *Byssostilbe*, *Barya* and *Torrubiella*, all of which are characterized by filiform ascospores which may or may not separate into part-spores inside the ascus. Of these genera only *Torrubiella* is entomogenous.

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*Calonectria pseudopeziza* (Desm.) Sacc., Michelia 1:307. 1878.
≡ *Sphaeria pseudopeziza* Desm., Ann. Sci. Nat. Bot. ser. 2, 13:186. 1840.
≡ *NECTRIA PSEUDOPEZIZA* (Desm.) Rossman, *comb. nov.*
= *Calonectria mellina* (Durieu & Mont.) Höhnel in Höhnel & Weese, Ann. Mycol. 8:467. 1910.
≡ *Sphaeria mellina* Durieu & Mont., Expl. Sci. Algèrie, Bot. 1:497. 1849.
= *Calonectria ochraceopallida* (Berk. & Br.) Sacc., Atti Accad. Sci. Veneto-Trentino-Istriana, Padua 7:23. 1875.
≡ *Sphaeria ochraceopallida* Berk. & Br., Ann. Mag. Nat. Hist. ser. 2, 7:187. 1851
= *Calonectria plowrightiana* Sacc., Michelia 1:307. 1878.
[= *Calonectria salicis* P. Larsen ex Munk, Dansk Bot. Ark. 17:55. 1957, *nom. nud.*]

Type: France. L'un est sur bois dénudé, un autre sur l'écorce d'un rameau que nous croyons appartenir au *Cytisus Laburnum*, et la troisième, enfin, sur l'*Arundo Donax*...recoltés dans les environs de Caen. M. Roberge.

The holotype specimen (PC) was examined. Occurring solitary to gregarious without a basal stroma, the pale-yellow ascocarps of *Nectria pseudopeziza* are globose, often flattened apically, and have a concolorous apical disc with a small, pointed papillae. In cross section, the ascocarp wall is 40-80 µm thick, divided into three regions with a dense middle layer which is composed of thick-walled cells. The ascocarp wall remains after the centrum disintegrates, leaving an empty outer shell. The narrowly-clavate asci are unitunicate and the ascospores are long-ellipsoid, 5- to 7-septate, 35-60 x 4-7 µm.

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*Calonectria pulchella* (Starb.) Weese, Z. Gärungsphysiol. 4: 230. 1914.

≡ *MALMEOMYCES PULCHELLUS* Starb., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 25:32. 1899.

≡ *Chaetothyrium pulchellum* (Starb.) Theissen, Ann. Mycol. 11:496. 1913.

Type: Brazil. Rio Grande do Sul, col. Ijuhy ad ramulum juniorem Bambusae cujusdam mucidae in silva primaeva, 1/4 93. Una cum n:o 316.

An isotype specimen (FH-G) was examined. *Malmeomyces pulchellus*, the monotype species of *Malmeomyces*, is similar to species of *Nectria*, particularly those in the *Nectria peziza*-group as delimited by Samuels (1976a). The ascocarps are ochraceous, becoming collabent when dry, with four to eight, conspicuous, black setae forming a ring around the ascocarp apex. The unitunicate asci are clavate, each with an undifferentiated apex and the ascospores are one-septate, striate, 15-19 x 3-4 µm. The black setae on the ascocarps are the basis for retaining *Malmeomyces pulchellus* in its own genus; however, *Malmeomyces* is closely related to *Nectria*. Theissen (1913) considered *Malmeomyces* a synonym of *Chaetothyrium*.

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*Calonectria pulcherrima* (Berk. & Br.) Sacc., Michelia 1:315. 1878.

≡ *NECTRIA PULCHERRIMA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Type: Ceylon. On bark. (no. 1102).

The holotype (K) and an isotype specimen (UPS) were examined. *Nectria pulcherrima* has solitary, scarlet ascocarps which are lightly scurfy. The walls of the ascocarps are composed of thick-walled cells forming *textura globulosa*. The unitunicate asci are narrowly clavate and the uniseptate ascospores are coarsely striate, ellipsoid with slight apiculus as each end, 22-24 x 8-10 µm.

*CALONECTRIA PYROCHROA* (Desm.) Sacc., Michelia 1:308. 1878.
≡ *Nectria pyrochroa* Desm., Pl. Crypt. France ed. 2 (2) #372. 1856.
= *Calonectria daldiniana* de Not., Comment. Soc. Crittogam. Ital. 2:477. 1867.

Type: France. In foliis emortuis Platani. Autumno. (Desmaz.)

The lectotype (PC) and isolectotype specimens (BPI, BR, UPS) were examined. *Calonectria pyrochroa* is an earlier name for *Calonectria daldiniana*, the monotype species of *Calonectria*. The genus *Calonectria* is restricted to species having an ascocarp wall structure similar to *C. pyrochroa* and a *Cylindrocladium* anamorph. *C. pyrochroa* and its anamorph have been redescribed and illustrated by Rossman (1979). Thümen, Fungi Austriaci exs. #172 (BPI), issued as *Nectria pyrochroa*, is *Calonectria pyrochroa*.

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*Calonectria pyrrochlora* (Auersw.) Sacc., Michelia 1:251. 1878.
≡ *Nectria pyrrochlora* Auersw. in Rabenh., Fungi Europ. #1234. 1869.
≡ *THYRONECTRIA PYRROCHLORA* (Auersw.) Sacc., Michelia 1:325. 1878.
≡ *Pleonectria pyrrochlora* (Auersw.) Winter, Rabenhorst's Kryptogamen-Fl. Bd. 1, Abt. 2:108. 1887.

Type: Germany. Arnstadiae, in Aceris campestris ramulis siccis leg. Fleischhack.

I have examined isotype specimens (BPI, CUP, FH-H). Seeler (1940) examined an isotype at FH which he listed as "type". Based on the muriform ascospores, this species belongs in *Thyronectria*; however, it is clearly related to species in the *Nectria aquifolii*-group as delimited by Booth (1959). Seeler (1940) redescribed and illustrated *Thyronectria pyrrochlora*.

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[*Calonectria pyrrochlora* Sacc., Syll. Fung. 2:546. 1883, *nom. nud.*]

Type: None designated.

Saccardo (1883) listed *Calonectria pyrrochlora* Sacc. *nec* Auersw., as a synonym of *C. massariae* (= *Nectria decora*, ≡ *C. decora*). *C. pyrrochlora* Sacc. is a *nomen nudem* and an intentional later homonym of *C. pyrrochlora* (Auersw.) Sacc. (≡ *Thyronectria pyrrochlora*). This invalid species is listed as a synonym of *Nectria decora* (≡ *C. decora*) by Wollenweber & Reinking (1935), Booth (1971) and Pirozynski (1975).

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*CALONECTRIA QUINQUESEPTATA* Figueiredo & Namekata, Arch. Inst. Biol. (São Paulo) 34:93. 1967.

Type: Brazil. Isolated from leaf spots of sugar-apple (*Annona squamosa* L.) and seedlings of eucalyptus (*Eucalyptus* sp.).

Dried isotype specimens of isolates from both hosts are housed at NY. This species is the teleomoph of *Cylindrocla-*

*dium quinqueseptatum* Boedijn & Reitsma. The ascocarps are similar in structure to those of *Calonectria pyrochroa (= C. daldiniana,* the monotype species of *Calonectria)* (Rossman, 1979). *Calonectria quinqueseptata* is correctly placed in *Calonectria sensu stricto.*

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*Calonectria rehmiana* Kirschst., Verhandl. Bot. Ver. Prov. Brandenburg 48:59. 1907.

Type: Germany. Auf einem durch *Humulus lupulus* zum Absterben gebrachten Stamme von *Cornus sanguinea.* Hasellake b. Gross-Behnitz. Oktober 1905.

The holotype specimen (B) had nothing on it resembling the described fungus. A specimen from S labelled *Calonectria n. sp.* has an illegible epithet written and signed by Kirschstein. The collection data on this specimen fit those published for the type specimen of *C. rehmiana.* This specimen has only a few ascocarps left. The ascocarps are dark-red on a well-developed stroma, suggesting the *Nectria aquifolii*-group as delimited by Booth (1959). The narrowly-clavate asci are unitunicate and the ascospores are fusiform with rounded ends, three-septate, 24-27 x 6-7 µm. Without a better specimen this species cannot be adequately characterized. Wollenweber's drawing (1916) of the type specimen shows an associated *Fusarium*-like anamorph. Höhnel (1912) and Wollenweber & Reinking (1935), followed by Booth (1971), stated that this species is a synonym of *Gibberella pulicaris* (Fries) Sacc.

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*CALONECTRIA RETEAUDII* (Bugnicourt) Booth, Mycol. Pap. 104:41. 1966.

≡ *Neonectria reteaudii* Bugnicourt, Encycl. Mycol. 11: 189. 1939.

Type: Viet Nam. *Smithia Bequaertii,* collet et pivot. Sud-Annam (Province du Haut-Donnai, Blao); novembre 1936.

The holotype specimen is not at PC. Booth (1966) obtained the type culture which he lists "ex Herb. Paris, IMI 55922." Booth redescribed and illustrated this species suggesting that *Cylindrocarpon reteaudii,* the anamorph of *Neonectria reteaudii,* is simply a *Cylindrocladium* without a terminal vesicle. Likewise, the teleomorph appears similar to species of *Calonectria* having *Cylindrocladium* anamorphs (Rossman, 1979) and is correctly placed in *Calonectria.*

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*Calonectria richonii* Sacc. [*ut 'richoni'*], Syll. Fung. 2:542. 1883.

[≡ *Nectria mellina* Richon ex Sacc., Syll. Fung. 2:542. 1883, *nom. nud. pro syn.*]

= *NECTRIA PSEUDOPEZIZA* (Desm.) Rossm., Mycotaxon 8:536. 1979.

Type: France. In ramis siccis Salicis Capreae, Saint-Amand.

Saccardo (1883) erected *Calonectria richonii* based on a specimen which Richon (1881) identified and reported as *Nectria mellina* (≡ *Calonectria mellina*). Because the asci and ascospores were smaller than those described for *N. mellina*, Saccardo thought Richon's specimen a different species for which he proposed a new name. Inadvertently, Saccardo also introduced the invalid, later homonym attributing it to Richon. I have examined the holotype specimen (PC) and find it to be *Nectria pseudopeziza* (≡ *Calonectria pseudopeziza*) of which *Nectria mellina* (≡ *C. mellina*) is an later synonym. Within *N. pseudopeziza* the ascospore size ranges from 25-60 x 4-7 µm. This variability is characteristic of many long-spored ascomycetes.

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*Calonectria rickiana* Sacc. & Syd., Ann. Mycol. 5:177. 1907.
≡ *PUTTEMANSIA RICKIANA* (Sacc. & Syd.) Petrak, Ann. Mycol. 29:339. 1931.

Type: Brazil. Sao Leopoldo, in foliis Nectandrae, parasitice in peritheciis ascomycetis immaturi cujusdam, Julio 1906. Legit Pat. J. Rick, commun. H. Sydow.

The holotype specimen (PAD) was examined. Specimens in Theissen, Decades fungorum brasiliensium #88 (BPI, FH-G), issued as *Calonectria rickiana*, are authentic, collected in February, 1907. *Puttemansia rickiana* occurs on the carbonous stroma of *Phaeodomus lauracearum* Höhnel. The white to cream, fleshy ascocarps contain bitunicate asci and long-clavate ascospores. This species is correctly placed in *Puttemansia*. It is related to other species of hypocreoid Pleosporales in *Melioliphila* and *Podonectria*.

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*Calonectria rigidiuscula* (Berk. & Br.) Sacc., Michelia 1:313. 1878.
≡ *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.
= *Calonectria meliae* A. W. Zimm., Centralbl. Bakteriol., 2. Abth. 7:106. 1901.
= *Calonectria cremea* A. W. Zimm., Centralbl. Bakteriol., 2. Abth. 7:140. 1901.
= *Calonectria hibiscicola* P. Henn., Hedwigia 48:105. 1908.
= *Calonectria eburnea* Rehm, Hedwigia 37:196. 1898.
= *Calonectria sulcata* Starb., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 25:29. 1899.
= *Calonectria tetraspora* (Seaver) Sacc. & Trott., Syll. Fung. 22:487. 1913.
≡ *Scoleconectria tetraspora* Seaver, North Amer. Flora 3:27. 1910.
[= *Calonectria squamulosa* Rehm ex Weese, Mitt. Bot. Lab. Techn. Hochsch. Wien 2:53. 1924, *nom. nud.*]
[= *Calonectria flavida* Massee ex Petch, Ann. Roy. Bot. Gard. Peradeniya 7:117. 1920, *nom. nud.*]

Type: Ceylon. On bark. (no. 173c).

The holotype specimen (K) was examined macroscopically and appears to agree with the descriptions and illustrations by authors who have examined it microscopically (Petch, 1920; Booth, 1971). The ascocarp wall structure and anamorph are quite unlike those of *Calonectria sensu stricto* (Rossman, 1979). This species is retained in *Nectria*. *N. rigidiuscula* as *Calonectria* has been described, illustrated and discussed by Petch (1920), Weese (1924, 1927), Wollenweber (1926), Reinking & Wollenweber (1927), Wollenweber & Reinking (1935), Booth & Waterston (1964) and Booth (1971). This organism, particularly as the anamorph *Fusarium decemcellulare* Brick, causes a disease of *Theobroma cacao* and other tropical plants.

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[*Calonectria rubiginosa* A. L. Smith ex P. Syd., Just's Botanischer Jahresbericht 29:175. 1901, *lapsus calami*.]
≡ *HYPOCRELLA RUBIGINOSA* A. L. Smith, J. Linn. Soc., Bot. 35:18. 1901.

Type: West Indies. Dominica. Parasitic on an old specimen of *Hypoxylon*, Castle Bruce River, Feb., 1896. No. 1497.

This name, published as *Hypocrella rubiginosa*, was mistakenly cited as *Calonectria* in Sydow's list of new fungi. The holotype specimen (K) was examined. This species is correctly placed in *Hypocrella* (Clavicipitales). Although this one is "parasitic" on *Hypoxylon*, most species of *Hypocrella* occur on scale insects.

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*Calonectria rubropunctata* Rehm, Ann. Mycol. 7:539. 1909.
= *Calonectria höhnelii* Rehm in Höhnel, Ann. Mycol. 2:43. 1904.

Type: Brazil. In hypophyllo folii Eugeniae bagensis. Sao Leopoldo, Rio Grande do Sul, 1908, Theissen S. J.

The holotype specimen (S) was examined. Authentic specimens were issued in Rick, Fungi Austro-americani #322 (BPI, FH-G, FH-P, NY, S) and Theissen, Decades fungorum brasiliensium #151 (BPI). This name is a later synonym of *"Calonectria" höhnelii*, the name under which the placement of this species is discussed.

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*Calonectria rutila* Kirschst., Ann. Mycol. 37:116. 1939.
≡ *CRYPTODISCUS RUTILUS* (Kirschst.) Rossman, *comb. nov.*

Type: Germany. Wald bei Rathenow. a. d. H. Auf morschem Kieferholz.

The holotype specimen (B) was examined. Notes inside the packet are labelled with the epithet *"dissipata"*, an unpublished, alternative name. This species has unitunicate asci, each with the distinctly thickened apex of ostropalean fungi. After consultation with M. A. Sherwood, this species is placed in *Cryptodiscus*. Unlike most species of *Cryptodiscus* whose ascocarps are barely erumpent at maturity (Sherwood, 1977), the ascocarps of *C. rutilus* become almost superficial. The ascocarps are small apothecia occurring on well-rotted wood.

[*Calonectria salicis* P. Larsen ex Munk, Dansk Bot. Ark. 19: 55. 1957, *nom. nud.*]
= *NECTRIA PSEUDOPEZIZA* (Desm.) Rossm., Mycotaxon 8:536. 1979.

Type: Denmark. On dead branches of *Salix* cfr. *alba* (Dec.; J.: Marielund near Kolding).

This name is not validly published as no diagnosis is provided. When Munk (1957) mentioned Poul Larsen's herbarium name, Munk noted that Larsen's specimen on *Salix* was exhausted. However, he stated that Larsen had previously determined another specimen on *Lonicera* to be *C. salicis*. Munk cited a specimen on *Lonicera* as *"Calonectria* cfr. *richoni* Sacc." I have examined this specimen (C) and find it to be *Nectria pseudopeziza* (≡ *Calonectria pseudopeziza*), of which *C. richonii* is a later synonym.

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*Calonectria sasae* Hara, Bot. Mag. (Tokyo) 27:247. 1913.

Type (translated from Japanese): Japan. Parasitic on the sheath of *Sasa albo-marginata*. Collected in Kawakami village of Mino Province (Feb.)

The holotype specimen is not at TNS and has not been located.

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*Calonectria sceptri* (Karst.) Sacc., Michelia 1:314. 1878.
≡ *Nectria dacrymycella* (Nyl.) Karst. var. *sceptri* (Karst.) Karst., Fungi Fenn. exs. #667. 1867.
≡ *Nectria sceptri* Karst., Not. Sällsk. Flora Fenn. Förh. 8:213. 1864.
≡ *NECTRIELLA SCEPTRI* (Karst.) Rossman, *comb. nov.*
= *Calonectria curtisii* (Berk.) Sacc., Michelia 1:316. 1878.
≡ *Nectria curtisii* Berk., Grevillea 4:46. 1875.
= *Calonectria dacrymycella* (Nyl.) Sacc. f. *aconiti* Sacc., Syll. Fung. 2:490. 1883.
= *Calonectria lacustris* Kirschst., Ann. Mycol. 34:186. 1936.

Type: Finland. Ad caules emortuos *Sceptri Carolini* in Subovi die 11 Julii.

The collection data cited above are taken from Karsten's (1864) first publication of this species in his article on fungi "in Lapponia orientali." In 1873 he cited similar collection data, "ad caules emortuos *Sceptri Carolini* in Lapponia maxime boreali, Subovi, mense Julio reperimus" and listed the exsiccatum, "Karst. Fung. Fenn. 667," which bears the data "Subovi, pa torra stjelkar af *Sceptrum carolin.*, 11 Juli 1861" and is labelled "*Nectria dacrymycella* Nyl. var. *sceptri*." In all cases it would seem that Karsten is referring to the same collection. In 1864 the ascospore size is listed as "longit. 10-12 mmm., crassit. 2-2,5 mmm.," while in 1874 Karsten cited this as "longit. 12 mmm., crassit. 2,5 mmm." and on the packet of Fungi Fenniae exs. #667, it is "14-18 mikr. longit., 3,5-4 cr." The holotype (H) and an isotype specimen (FH-H) of Fungi Fenniae exs. #667 were examined. This species is found to be a *Nectriella* having immersed ascocarps

and clavate asci, each with an apical ring. Ascospores of *N. sceptri* range from 12-20 x 2.5-4.5 µm, thus including those cited in all Karsten's descriptions. The ascospores of *Sphaeria dacrymycella* (≡ *Calonectria dacrymycella*) are listed by Nylander (1863) as "longit. 0,016-18 millim., crassit. 0,004-5 millim." If the type collection of *S. dacrymycella* is identical to specimens identified later by Rehm, Ascomyceten #232 and #232b, as *Nectriella dacrymycella*, this name will provide an earlier epithet for the species.

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*Calonectria sensitiva* (Rehm) Weese, Ann. Mycol. 8:423. 1910.
≡ *Nectria sensitiva* Rehm, Hedwigia 39:222. 1900.
= *NECTRIA LEUCORRHODINA* (Mont.) Samuels, Mem. New York Bot. Gard. 26:90. 1976.

Type: Brazil. Ad folia Mimosaceae. Rio de Janeiro. Ule no. 2274. H. P.

The holotype (S) and isotype specimens (FH-G, FH-H) were examined. This name is found to be a later synonym of *Nectria leucorrhodina* (≡ *Calonectria leucorrhodina*). Höhnel & Weese (1910) stated that *N. sensitiva* is a synonym of *N. byssiseda* Rehm, also a synonym of *N. leucorrhodina*.

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*Calonectria soroccae* Rehm, Hedwigia 39:224. 1900.
= *MELIOLIPHILA VOLUTELLA* (Berk. & Br.) Rossm., Mycotaxon 8:551. 1979.

Type: Brazil. Folia Soroccae ilicifoliae. Tubarao. Ule no. 1507c. H. Bresl.

The holotype (S) and isotype specimens (FH-G filed under *Mellitosporiopsis violacea* Rehm, FH-H) were examined. This name is found to be a later synonym of *Melioliphila volutella* (≡ *Calonectria volutella*).

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[*Calonectria squamulosa* Rehm ex Weese, Mitt. Bot. Lab. Techn. Hochsch. Wien 2:53. 1924, *nom. nud.*]
= *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Specimen cited: Philippines. Los Baños, auf Rinde von *Ficus Pseudopalma*, leg. M. B. Raimundo, comm. C. F. Baker, No. 1397b.

Rehm (1915) listed a specimen under *Calonectria sulcata* with the same collection data as those listed by Weese (1924) and on herbarium specimens (S, FH-H) labelled *C. squamulosa*. Rehm may have recognized the synonymy with *C. sulcata* and decided against publishing this name. However, Weese (1924) picked up the unpublished name and stated that the type species of *C. squamulosa* Rehm, 1913, is identical to *C. sulcata*, a later synonym of *Nectria rigidiuscula* (≡ *Calonectria rigidiuscula*). Examination of the specimen cited by Weese (1924) reveals that it is *Nectria rigidiuscula*, as previously recognized by Weese (1927), Reinking & Wollenweber (1927), Wollenweber & Reinking (1935) and Booth (1971).

*Calonectria stromaticola* P. Henn., Bot. Jahrbuch. Syst. 40: 226. 1908.
≡ *Berkelella stromaticola* (P. Henn.) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 119:824. 1909.
≡ *TUBEUFIA STROMATICOLA* (P. Henn.) Rossman, *comb. nov.*

Type: Peru. Berge südwestlich von Monzon, 2000-2500 m, auf lederigen Blättern einer Lauracea, Weberbruer #3530.

Isotype specimens (FH-G, FH-H as *'leptostromaticola'*) were examined. Because the holotype, presumably at B, has apparently been destroyed, the isotype in FH-G is here designated the LECTOTYPE. *Tubeufia stromaticola* occurs on the stroma of a microthyriaceous fungus on the upper surface of a leaf. The transparent, yellow ascocarps are densely covered with short, thick-walled hairs. The asci are bitunicate and the ascospores are long-clavate, finely punctate, 52-66 x 5.5-7.5 µm.

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*Calonectria sulcata* Starb., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 25:29. 1899.
= *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Type: Brazil. Rio Grande do Sul, col. Ijuhy ad truncum jacentum in silva primaeva, 7/4 93. N:o 336.

The holotype specimen (S) was examined. Weese (1914b) examined part of the type collection at B but this is apparently destroyed. In agreement with Weese (1924), Reinking & Wollenweber (1927), Wollenweber & Reinking (1935) and Booth (1971), this name is found to be a later synonym of *Nectria rigidiuscula (≡ Calonectria rigidiuscula)*. For many years *Calonectria sulcata* was thought to be the oldest epithet and much of the older literature (Höhnel, 1909; Weese, 1914b; Rehm, 1915) used this name for *Nectria rigidiuscula*.

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*Calonectria sulphurella* Starb., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 25:30. 1899.
= *NECTRIA FLAVOLANATA* Berk. & Br., J. Linn. Soc., Bot. 14: 114. 1873.

Type: Brazil. Rio Grande do Sul, col. Ijuhy ad corticem trunci humi jacentis, 29/3 93. N:o 305.

The holotype specimen (S) was examined. In agreement with Weese (1924), this name is found to be a later synonym of *Nectria flavolanata*. Weese (1914b) examined part of the type collection in H. Sydow's herbarium (B) but this apparently no longer exists. Weese noted that *C. sulphurella* was synonymous with *Nectria tjibodensis* and *N. flocculenta*, all synonyms of *N. flavolanata*. This common, tropical saprophyte on rotten wood has been redescribed and illustrated by Seaver (1928) as *Nectria rhytidospora* Pat. *(= N. flavolanata)*.

*Calonectria tarvisina* (Speg.) Speg. ex Sacc. (*ut* 'Speg.'), Syll. Fung. 2:540. 1883.
≡ *Calonectria macrospora* Sacc. & Speg. ssp. *tarvisina* Speg., Michelia 1:464. 1879.
= *MASSARINA VIBURNICOLA* (Crouan & Crouan) Rossm., Mycotaxon 8:550. 1979.

Type: Italy. In ramulo emortuo putrescente Gleditschiae triacanthi, a Treviso, 22 Novemb. 1878, rarissime.

The holotype specimen (LPS) was examined. This name is found to be a later synonym of *Massarina viburnicola* (≡ *Calonectria viburnicola*).

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*Calonectria tessellata* Petch, Trans. Brit. Mycol. Soc. 21:279. 1938.

Type: Britain. On decaying stalks of *Brassica*, North Wootton, November 1935; on dead apple twig, Camberley, November 1920, Hb. B. M.

The type specimens could not be located at K or elsewhere.

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*Calonectria tetraspora* (Seaver) Sacc. & Trott., Syll. Fung. 22:487. 1913.
≡ *Scoleconectria tetraspora* Seaver, North Amer. Flora 3:27. 1910.
= *NECTRIA RIGIDIUSCULA* Berk. & Br., J. Linn. Soc., Bot. 14:116. 1873.

Type: Jamaica. Port Maria, on cacao trunks, November 14, 1902, F. S. Earle 455.

The holotype specimen (NY) was examined. In agreement with Petch (1920), Reinking & Wollenweber (1927), Wollenweber & Reinking (1935) and Booth (1971), this name is found to be a later synonym of *Nectria rigidiuscula* (≡ *Calonectria rigidiuscula*).

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*CALONECTRIA THEAE* Loos, Trans. Brit. Mycol. Soc. 33:17. 1950.

Type: Ceylon. On mature leaves of *Camellia theae* in culture.

The holotype specimen (IMI) reveals that *Calonectria theae* is similar in ascocarp morphology and the *Cylindrocladium* anamorph to *Calonectria pyrochora* (= *C. daldiniana*, the monotype species of *Calonectria*) (Rossman, 1979). Loos (1950) erected this name for the teleomorph that developed from a culture of *Cercosporella theae* Petch. Loos stated that this *Cercosporella* actually belonged in *Candelospora*, which is now considered a synonym of *Cylindrocladium* (Boedijn & Reitsma, 1950). Peerally (1974b) redescribed and illustrated *Calonectria theae* and its anamorph which causes "*Cercosporella* disease" of tea.

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*Calonectria theae* Loos var. *crotalariae* Loos, Trans. Brit. Mycol. Soc. 33:17. 1950.
≡ *CALONECTRIA CROTALARIAE* (Loos) Bell & Sobers, Phytopathology 56:1364. 1966.

See *Calonectria crotalariae* for an account of this species.

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*Calonectria tincta* (Fuckel) Rehm, Ann. Mycol. 8:302. 1910.
≡ *Cryptodiscus tinctus* Fuckel, Fungi Rhenani #1836. 1866.
≡ *NECTRIELLA TINCTA* (Fuckel) R. Sant. in Eriksson, Sv. Bot. Tidskr. 58:235. 1964.
≡ *Nectriella coccinea* Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24:177. 1870.
≡ *Nectria fuckelii* Sacc., Michelia 1:289. 1878.
≡ *Calonectria fuckelii* (Sacc.) Rehm in Transchel & Serebrianikow, Mycotheca Rossica fasc. 2, #68. 1910, *non C. fuckelii* (Fuckel) Sacc., 1878.
= *Calonectria fuckelii* (Sacc.) Rehm f. *everniae* Rehm in Motouschek, Centralbl. Bakteriol., 2. Abth. 42:105. 1915.

Type: Germany. Ad Hageniae ciliaris thallum apotheciaque, raro. Vere. In Jura colleg. Morthier.

The label of Fuckel, Fungi rhenani #1836, *Cryptodiscus tinctus* (FH-ex) includes a description of the species which is, therefore, validly published. Fuckel (1870) later listed *Cryptodiscus tinctus* as a synonym of his newly-described species, *Nectriella coccinea*, based on the same type specimen. Fuckel may have changed his mind about the identity of Fungi rhenani #1836 when he discovered that it was associated with *Illosporium coccineum* Fries. Of the isonyms, *Cryptodiscus tinctus* and *Nectriella coccinea*, the former provides the earlier epithet. The isotype specimen at FH-ex does not have any suitable fungus on it. From later descriptions (Weese, 1914c; Keissler, 1930; both as *Nectriella coccinea*) and later specimens of this species, a stable concept of *Nectriella tincta* has evolved. Specimens of Rehm, Ascomyceten #1897 issued as *Calonectria tincta* (BPI, CUP, PACA) and Transchel & Serebrianikow, Mycotheca rossica fasc. 2, #68, issued both as *C. tincta* (CUP) and *C. fuckelii* f. *everniae* (BPI, FH-ex), are all *Nectriella tincta*.

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*Calonectria transiens* Rehm, Hedwigia 39:225. 1900.
= *NECTRIA ARENULA* (Berk. & Br.) Berk., Outl. Brit. Fung. p. 394. 1860.

Type: Brazil. Folium putridum Agaves. Ule no. 841. b. H. Bresl.

The holotype (S) and isotype specimens (FH-H, S) were examined. This name is found to be a later synonym of *Nectria arenula* as noted by Samuels (1978). *N. arenula* is redescribed and illustrated by Samuels (1978) and Booth (1959).

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*Calonectria trichilae* Rehm, Hedwigia 37:198. 1898.
= *MELIOLIPHILA VOLUTELLA* (Berk. & Br.) Rossm., Mycotaxon 8:551. 1979.

Type: Brazil. Feuilles de Trichilia. Balansa pl. du Paraguay no. 4015. H. B.

Two isotype specimens, both in FH-H, were examined. This name is found to be a later synonym of *Melioliphila volutella* (≡ *Calonectria volutella*). Rehm (1898) noticed that *Calonectria trichilae* was related to *C. ambigua* (= *Melioliphila volutella*). Weese (1914b, 1927) stated that *C. trichilae* was synonymous with *C. melioloides* (≡ *Melioliphila melioloides*).

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*Calonectria truncata* Petch, Trans. Brit. Mycol. Soc. 25:257. 1942.

Type: West Indies. St. Lucia, on a leaf-hopper, 20 November 1939, collected by Mr. R. G. Fennah.

The type collection is not at K and has not been located. The habit on leafhoppers and associated *Hirsutella* anamorph suggests that this species belongs in the Clavicipitales.

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*Calonectria tubaraoensis* Rehm, Hedwigia 37:195. 1898.
= *NECTRIA LEUCORRHODINA* (Mont.) Samuels, Mem. New York Bot. Gard. 26:90. 1976.

Type: Brazil. In utrague pagina foliorum Tragiae? Tubarao. 7/1890. Ule no. 1514. H. B. Blatt einer Mikania. Ule no. 592. H. B. Blatt einer Trigonia. Tubarao. 7/1890. Ule no. 1021, 923a. Oberseite der Blatter von Abutilon. Ule no. 1177. H. B. Blatter von Mendons. Velloz. Ule no. 912b. H. B. Baumblatter. Rio de Janeiro. 9/1887. Ule no. 1524b. H. B. Blatt einer Malvacee. Ule no. 59. H. P.

Several of the syntypes were examined. Ule #923a (S) is here designated the LECOTYPE. The lectotype and Ule #1021 (FH-H) are *Nectria leucorrhodina* (≡ *Calonectria leucorrhodina*). Ule #1524b (FH-G) is *Calloriopsis gelatinosa* (Ellis & Everh.) Dennis. From the original publication, it is apparent that Rehm was describing *Nectria leucorrhodina* of which *Calonectria tubaroensis* is a later synonym. Weese (1914a) noted that *C. tubaroensis* was synonymous with *C. leucorrhodina* (≡ *Nectria leucorrhodina*). Rehm, Ascomyceten #1920 issued as *C. tubaroensis* (BPI, CUP, FH-G, NY) is *Nectria leucorrhodina*.

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*Calonectria ugandae* Hansf., Proc. Linn. Soc. Lond. 153:35. 1941.
= *MELIOLIPHILA VOLUTELLA* (Berk. & Br.) Rossm., Mycotaxon 8:551. 1979.

Type: Uganda. In plagulas *Irenis natalensis* parasitica, in foliis *Oncobae spinosae*, Entebbe Road, Hansford 2490.

The holotype (IMI) and authentic specimens (BPI: Hansford 2835, 3192, 3326, 3327, 3332, 3362, 3371, 3372; PREM: Hansford 3327) were examined. This species belongs in *Melioliphila*; the name is found to be a later synonym of *M. volutella* (≡ *Calonectria volutella*).

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*Calonectria ukolayii* Thaung, Trans. Brit. Mycol. Soc. 67:435. 1976.
= *NECTRIA LEUCORRHODINA* (Mont.) Samuels, Mem. New York Bot. Gard. 26:90. 1976.

Type: Burma. Rangoon, in coloniis *Meliolae tabernaemontanicolae* Hansf. & Thirm. in foliis vivis *Vallaris heynii* Spreng., Maung Mya Thaung, 23 Jan., 1975, IMI 191468b, holotypus.

the holotype specimen (IMI) was examined. This is a later synonym of *Nectria leucorrhodina* (≡ *Calonectria leucorrhodina*). The associated anamorph, *Cylindrocarpon ukolayii* Thaung, appears to be the *Cephalosporium* (= *Acremonium*) often found with this species which is described by Gams (1971) as the anamorph of *Calonectria cephalosporii* (= *N. leucorrhodina*).

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*Calonectria ulicis* (Crouan & Crouan) Sacc., Michelia 1:316. 1878.
≡ *NECTRIA ULICIS* Crouan & Crouan, Florule du Finistère p. 38. 1867.

Type: France. Finistère, sur les racines et tiges mortes d'Ajonc. Pr. p. c.

Isotype specimens (CO) consisting of two packets were examined. The one with Crouans's drawings is here designated the LECTOTYPE. In addition four more packets of authentic collections (CO) were examined. This species is found to be a *Nectria* with uniseptate spores belonging to the *Nectria mammoidea*-group as delimited by Booth (1959).

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*Calonectria umbelliferarum* Seaver, Mem. New York Bot. Gard. 6:507. 1916.
= *NECTRIA ERUBESCENS* (Desm.) Phill. & Plowr., Grevillea 10:70. 1881.

Type: Bermuda. Near Harrington Sound, on dead stems of *Foeniculum foeniculum*.

The holotype specimen (NY) was examined. In agreement with Samuels (1978) this name is found to be a synonym of *Nectria erubescens* (≡ *Calonectria erubescens*).

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*Calonectria uniseptata* Gerlach, Phytopath. Z. 61:379. April 1968.
= *CALONECTRIA KYOTENSIS* Terashita, Trans. Mycol. Soc. Japan 8:124. 1 Jan. 1968.

Type: Germany. In culturis puris *Cylindrocladii scoparii* ex radicibus putridis *Paphiopedili callosi;* Celle, IV 1967. Typus in herbario Instituti Mycologici sub No. 10759 conservatur (Biologische Bundesanstalt, Berlin-Dahlem).

An isotype specimen (NY) of the type culture was examined. In agreement with Peerally (1974a), this name is found to be a later synonym of *Calonectria kyotensis*.

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*Calonectria uredinophila* H. Syd., Ann. Mycol. 27:422. 1929.

Type: China. Parasitica in uredosoris Pucciniae Phyllostachydis Kus. ad folia Phyllostachydis spec., prov. Chekiang, Hangchow, X. 1928 (no. 2406 ex p.).

Although listed by Tai (1937), the type specimen has not been located.

*Calonectria varians* Sacc., Michelia 1:52. 1877.
≡ *NECTRIA VARIANS* (Sacc.) Rossman, *comb. nov.*

Type: Italy. In ramis putrescentibus corticatis Mori albae, socia *Botryosphaeria pulicari & moricola*, a Selva Aug. 1876.

The scanty holotype specimen (PAD) was examined. This hypocreaceous species is related to *Nectria citrinoaurantia* (≡ *Calonectria citrinoaurantia*). *Nectria varians* has small, translucent-yellow, smooth ascocarps crowded on a well-developed stroma. The asci are unitunicate and the ascospores are broadly-ellipsoid, three-septate, 19-24 x 6-8 µm. The stroma develops at the base of, or through the old stromata of *Gibberella* species. This may be what led Wollenweber & Reinking (1935), followed by Booth (1971), to suggest the synonymy of *C. varians* with *Gibberella baccata* (Wallr.) Sacc.

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*Calonectria venezuelensis* H. Syd., Ann. Mycol. 33:88. 1935.

Type: Venezuela. In foliis putridis Fici radulae Willd., El Limon (no. 301).

The holotype specimen has not been located.

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*Calonectria vermispora* Massee & Crossland, Naturalist, Hull 1904:4. 1904.
≡ *Dialonectria vermispora* (Massee & Crossland) Massee & Crossland, Fungus Flora Yorkshire p. 214. 1905.
= *NECTRIA HIRTA* Bloxam in Currey, Trans. Linn. Soc. London 24:158. 1863.

Type: England. On a decorticated fallen trunk, Hardcastle. Coll. J. Needham, November 1897.

The holotype specimen (K) has nothing left of the described fungus. Petch (1938) considered this species a synonym of *Trichonectria hirta* (≡ *Nectria hirta*, ≡ *Calonectria hirta*) and from the original description, *C. vermispora* is most probably a later synonym of this distinctive species.

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*Calonectria vernoniae* (Hansf.) Rossm., Mycologia 69:366. 1977.
≡ *Ophionectria vernoniae* Hansf., Proc. Linn. Soc. London 158:39. 1945.
≡ *NECTRIA VERNONIAE* (Hansf.) Rossman, *comb. nov.*

Type: Uganda. In foliis *Vernoniae campaneae*, Entebbe Road, Hansford 3502.

The holotype (IMI), an isotype (PREM) and an authentic specimen (IARI) were examined. This species is unique in having small, yellow-brown ascocarps superficial on living leaves, unitunicate asci and long, vermiform, multiseptate ascospores, 70-110 x 2-3 µm. The ascocarp structure is unlike that of *Calonectric pyrochroa* (= *C. daldiniana*, the monotype species of *Calonectria*) (Rossman, 1979); *C. vernoniae* is, therefore, placed in *Nectria*. The ascocarp wall of *Nectria vernoniae* is 18-22 µm thick, consisting of two layers. The outer layer is prosenchymatous while the inner one is pseudoparenchymatous, composed of small, thin-walled, elongate cells. This ascocarp structure suggests that *N. verno-*

*niae* belongs in the *Nectria muscivora*-group as delimited by Samuels (1976a)

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*Calonectria verrucosa* Pat., Bull. Soc. Mycol. France 11:228. 1895.

≡ *NECTRIA ASTROMATA* (Pat.) Rossman, *nom. nov.*

Type: Ecuador. Tiges pourries de Chusquea. San Jorge.

The holotype specimen (FH-P) was examined. This species has yellow, warty ascocarps which are superficial on the substrate. In structure the ascocarps are similar to those of *Nectria rigidiuscula* (≡ *Calonectria rigidiuscula*) but, like *N. albosuccinea* (≡ *C. albosuccinea*), *N. verrucosa* lacks a well-developed stroma, as the new epithet suggests. The asci are unitunicate and the ascospores are long-fusiform with rounded ends, 7- to 9-septate, 50-62 x 7-9 µm. The epithet of the basionym of *N. astromata* is preoccupied in *Nectria* by *N. verrucosa* (Schw.) Sacc., 1883.

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*Calonectria verruculosa* Niessl in Thumen, Instituto; Rev. Sci. Litt. Coimbra 27:251. 1879.

≡ *Nectria verruculosa* (Niessl) Penzig, Michelia 2:420. 1882.

= *NECTRIA RALFSII* Berk. & Br., Ann. Mag. Nat. Hist., ser. 2, 13:467. 1854.

Type: Portugal. Felgueiras in ramis emortuis adhuc erectis Citri Limoni Risso, ut videtur parasitans in pyreniis stylosporiferis Anthostomellae. Vere 1879. Raro. leg. Prof. J. A. Henriques.

The type collection of this species was issued in Thumen, Mycotheca universalis #1550 (B, BPI, FH-H, NY, NYS) and Roumeguère, Fungi selecti exs. #4760 as *Nectria verruculosa* (BPI, NY). The isotype specimen of Mycotheca universalis #1550 at NY is here designated the LECTOTYPE. In agreement with Weese (1914b, 1918) and Booth (1959), this species is found to be a later synonym of *Nectria ralfsii* having a *Myrothecium* anamorph. Booth (1959) redescribed, illustrated and listed the synonyms of *N. ralfsii*.

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*Calonectria viburnicola* (Crouan & Crouan) Sacc., Michelia 1: 311. 1878.

≡ *Nectria viburnicola* Crouan & Crouan, Florule de Finistère p. 39. 1867.

≡ *MASSARINA VIBURNICOLA* (Crouan & Crouan) Rossman, *comb. nov.*

= *Calonectria macrospora* Sacc. & Speg., Michelia 1:251. 1878.

= *Calonectria tarvisina* (Speg.) Speg. ex Sacc. (*ut* 'Speg'), Syll. Fung. 2:540. 1883.

Type: France. Finistère, sur les rameaux morts de *Viburnum tin.*Pr. r. r.

The holotype specimen (CO) was examined. This species has bitunicate asci in immersed ascocarps which show only the bright yellow-orange wall around the ostiole and are surrounded by a poorly-developed clypeus. The ascospores are

long-fusiform, hyaline, becoming golden-brown with age, 5- to 9-septate, constricted at the central septum, 58-77 x 8-14 µm.

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*Calonectria volutella* (Berk. & Br.) Sacc., Michelia 1:309. 1878.
≡ *Nectria volutella* Berk. & Br., J. Linn. Soc., Bot. 14:115. 1873.
≡ *MELIOLIPHILA VOLUTELLA* (Berk. & Br.) Rossman, *comb. nov.*
≡ *Lasionectria volutella* (Berk. & Br.) Cooke, Grevillea 12:112. 1884.
= *Calonectria ambigua* Speg., Anales Soc. Ci. Argent. 12: 212. 1881
≡ *Subiculicola ambigua* (Speg.) Speg. [*ut* 'Speg'], Bol. Acad. Nac. Ci. 26:347. 1924.
= *Calonectria trichilae* Rehm, Hedwigia 37:198. 1898.
= *Calonectria soroceae* Rehm, Hedwigia 39:224. 1900.
= *Calonectria graminicola* Stevens, Bot. Gaz. 45:232. 1918, *non C. graminicola* (Berk. & Br.) Wollenw., 1913.
≡ *Melioliphila graminicola* Stev. [*ut* '(Stev.) Speg'], Bol. Acad. Nac. Ci. 26:34. 1924.
= *Calonectria ugandae* Hansf., Proc. Linn. Soc. Lond. 153: 35. 1941.
= *Calonectria chorleyi* Hansf., Mycol. Pap. 15:124. 1946.

Type: Ceylon. On leaves of *Atalanta monophylla* on a lichenoid hispid white crust. (nos. 445, 448).

Syntype specimens (K-#445, UPS-number unknown) were examined; the specimen at K is here designated the LECTOTYPE. Occurring on *Meliola*, this species has white, fleshy ascocarps and bitunicate asci. The ascospores are clavate, three-septate, 30-33 x 8-10 µm. This is the earliest epithet for *Calonectria graminicola* Stev., the monotype species of *Melioliphila*. *M. volutella* is associated with an *Eriomycopsis* anamorph. Pirozynski (1976) mistakenly cited *Melioliphila melioloides* as the type species of *Melioliphila*. See *C. ambigua* for further discussion of *Melioliphila* and *Subiculicola*.

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*Calonectria warburgiana* P. Henn. in O. Warburg, Monsunia 1: 25. 1899.
= *MELIOLIPHILA BALANSEANA* (Berl. & Roum.) Piroz., Kew Bull. 31:596. 1976.

Type: Indonesia. Moluccas, Batjan: auf Blättern von *Phyllocladus digitata* Warb. (O. Warburg.)

An isotype specimen (FH-H) no longer has any of the described fungus on it. Weese (1927) examined the holotype specimen from B, which apparently has been destroyed, and stated that *C. warburgiana* was a synonym of *Calonectria balanseana*. From the original description, Weese seems to be correct and this species is considered a later synonym of *Melioliphila balanseana* (≡ *Calonectria balanseana*).

*Calonectria xantholeuca* (G. Kunze ex Fries) Sacc., Syll. Fung. 2:547. 1883.
≡ *Sphaeria xantholeuca* G. Kunze ex Fries, Syst. Mycol. 2:503. 1822.

Type: Switzerland. In caulibus Epilobii.

The holotype specimen (UPS) was examined. The only fungus present was pycnidial. From the original description and thost of Strasser (1911), this species probably belongs in *Nectriella* but until a good authentic specimen is found, the species cannot be accurately characterized.

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## *ADDENDUM*

*Calonectria camelliae* Shipton, Trans. Brit. Mycol. Soc. 72:163. 1979.
[≡ *Calonectria camelliae* Shipton & Booth in Shipton, Trans. Brit. Mycol. Soc. 69:59. 1977, *nom. nud.*]

Type: Australia. IMI 174836 e fructis arboris pluviosilvestris ignotae, Whitfield Range prope Cairns, Queensland, January 1973, sejunctus.

The holotype of this species has not been examined. From the illustrations and *Cylindrocladium* conidial state, it appears to belong in *Calonectria sensu stricto*. The ascospores are relatively short (6.7-10.7 µm) and uniseptate. In the anamorph, *Cylindrocladium camelliae* Venkataramani & Venkata Ram, the presence of a terminal vesicle is variable, "rare in older cultures", suggesting that this structure should not be considered of great taxonomic importance.

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# NEW COMBINATIONS IN *RHIZOPLACA* FOR ENDEMIC AMERICAN SPECIES OF *LECANORA* AUCTT.

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SUMMARY

*Three new combinations,* Rhizoplaca glaucophana, R. haydenii *and* R. marginalis *are proposed, with notes on previously unreported characters.*

The genus *Rhizoplaca* Zopf was recently revived for some umbilicate species formerly included in *Lecanora* (Leuckert, Poelt & Hähnel 1977). However, only those species occurring in Eurasia were treated. North America contains three endemics that should also be transferred.

*RHIZOPLACA GLAUCOPHANA* (Nyl. *ex* Hasse) W. A. Weber, *comb. nov.* Based on *Lecanora glaucophana* Nyl. *ex* Hasse, Lich. S. Calif. ed. 2 [of McClatchie 1897]: 11. 1898.

According to Poelt (1958) this taxon was known only from the type specimen from the San Gabriel Mountains of California, 1300 msm, June 1897, *Hasse in herb. Nylander no. 28256 (H).* Recently Miss Jeanne Larson collected ample material of it on the San Joaquin Experimental range.

The spores, of which Poelt found only undeveloped individuals, are narrowly oblong, curved and often narrower at one end, 15-20 X 3-5 µm. Spores in the other species of the genus are broadly ellipsoid or almost spherical. The pycnidia are visible as black surface dots and the pycnoconidia are acicular, curved, 25-40 X less than 1 µm. *R. glaucophana* might be mistaken for a juvenile thallus of *R. marginalis* but although its largest thalli reach a diameter of only 7 mm they are fully fertile even at 3 mm and they have immersed brown apothecia which only in age develop even a slight tendency to marginal rim formation and are very rarely lightly pruinose on the disk and thallus. *R. marginalis* develops a large thallus up to 2 cm, has blue-black, adnate apothecia with prominent contorted rims, and the entire thallus is very thickly pruinose.

Its spores are nearly spherical. *R. glaucophana* ranges widely through southern California west of the Sierra Nevada. Calaveras Co.: Winton Road, 7 mi E of Westpoint, open moist hillside, 4100 ft. alt., Blue Mountain Quadr., T6N R13E Sec 36, with *Cercocarpus* and *Mimulus* on exposed andesite mudflow, 21 May 1975, *T. E. Weier 968 (COLO L-61,-643)*. Monterey Co.: Hastings Natural History Reservation, 1200-1400 ft. alt., 12 Feb. 1944, *J. M. Linsdale (COLO L-29018)*. Madera Co.: San Joaquin Experimental Range, 28 mi N of Fresno, on granodiorite outcrops, 300-350 msm, 11 Dec. 1978, *J. R. Larson (COLO L-66706-66709)*.

*RHIZOPLACA HAYDENII* (Tuck.) W. A. Weber, *comb. nov.* Based on *Lecanora haydenii* Tuck., Proc. Amer. Acad. Arts Sci. 6:267. [1864] 1866.

Poelt reported this taxon only from Nebraska and Wyoming. It is present in Montana: Carbon Co.: Beartooth Plateau, 12,600 ft., 15 Aug. 1977, *Nash 15164* (ASU, COLO); Park Co.: on soil, travertine mines ca. 2 km N of Gardiner, 18 April 1977, *DeSpain 103* (COLO).

*RHIZOPLACA MARGINALIS* (Hasse) W. A. Weber, *comb. nov.* Based on *Lecanora marginalis* Hasse, The Bryologist 13: 112. 1910.

This taxon has a peculiar distribution involving both the eastern and western bases of the Sierra Nevada Range in southern California, suggesting that its origin possibly antedates the uplift of the range. The substrate for the type was given as "on shaded lava and basaltic rocks at Little Lake Station, Inyo County" but I searched for it there without success. However, *R. marginalis* is common on huge granite boulders on the road to Whitney Portal, across the draw from the first Forest Camp W of Lone Pine (*COLO L-35237*). Since this is the only substrate it has been found on in its entire range I believe it likely that Hasse's statement was incorrect. Elsewhere in California *R. marginalis* is now known to occur in Tulare and Madera counties. Pycnoconidia are curved, acicular, 25-40 X <1 µm.

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# REVUE DES LIVRES

par

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SETAS DEL PAIS VASCO, par la Sociedad de Ciencias Naturales Azarandi, en pochettes: 1-2e série, 54 pls., 1972; 3e série, 36 pls. 1973; 4e série, 36 pls., 1974; 5e série, 36 pls., 1975; 6e série, 36 pls., 1976, 7e série, 36 pls., 1977. Ed. Societad de Ciencias Naturales AZARANDI, Secion di micologia, Caja de Ahorros Municipal, San Sebastian, España.

L'ouvrage se présente sous forme de fiches de format 21 x 15 cm, portant sur une face la photographie de l'espèce et son nom, de l'autre, une courte notice descriptive. La qualité de la reproduction est irrégulière mais l'ensemble des 234 illustrations vaut cependant la peine et représente déjà un bon échantillon de la mycoflore du pays basque. La série sera régulièrement continuée.

MUSHROOMS OF NORTH AMERICA, par Orson K. MILLER, Jr. , 368p., 292 phot. col., 108 figs., 21x14 cm., paperback, 1977. Ed. E. P. Dutton & Co, 201 Park Ave South, New York, NY 10003. Prix US $ 8.95.

L'auteur a voulu un livre didactique, à la portée de tous et cependant un livre scientifique, sans approximation. Il emploie l'image pour rendre parlantes les clés majeures, et pour définir les termes techniques réunis dans le glossaire. C'est aussi par une photographie de haute qualité qu'il guide le mycologue débutant au coeur du sujet. 422 espèces sont décrites, 280 sont illustrées; chacune fait l'objet de commentaires visant à les distinguer d'espèces voisines, au nombre de 258 citées. La caractéristique de l'ouvrage est l'importance des clés, clés des classes et des familles, clés des genres et des espèces. Les noms d'espèces sont correctement cités avec noms d'auteurs. Les descriptions sont détaillées. L'édition est fort agréable.

# AUTHOR INDEX, VOLUME EIGHT

PUBLICATION DATES OF MYCOTAXON

Volume 7, No. 2: November 4, 1978
Volume 8, No. 1: January 13, 1979

## ERRATA: VOLUME 7

page 455, line 33: *for* (Died. *read* Died.
485, 9: *for* On *read* In
49: *for* (1976: *read* (1967:

## ERRATA: VOLUME 8

page 25, line 2: for *A. majusculus* read *A. majusculus* var.*majusculus*
33, 36: for *A.* read *Agaricus*
40, 28: for *badius* read *subplacomyces* var.*badius*
65, 37; for *rodmani* read *rodmanii*
46: for *rodmani* read *rodmanii*
72, 10: for *triculphuratus* read *trisulphuratus*
108, 42: for *micromegatha* read *micromegathus*
111, 26: for *rodmani* read *rodmanii*
118, 23: for *diminitivus* read *diminutivus*
157, 9; 158, line 25; 160, line 16; 162, lines 1, 8, 17, 24, 34: for *capsulata* read *capsulatus*
191, 36: for *barleana* read *barlaeana*
233, 4: for LAGERSTRAEMIA read LAGERSTROEMIA
lines 10 & 14: for *lagerstraemiae* read *lagerstroemiae*
line 16: for *Lagerstraemia* read *Lagerstroemia*
234, 1; 235, line 1; 236, line 38: for *lagerstraemiae* read *lagerstroemiae*
236, 39: for LAGERSTRAEMIAE read LAGERSTROEMIAE
304, *add:* ERRATUM: The holotype collection, ES #2520, has been divided among 3 herbaria. The portion at MPDD is the holotype, those at OSC and IMI are isotypes. The paratype collection, ES #2522, is also divided, that at MPPD the paratype, those at OSC and IMI isoparatypes.

*front cover* 8(1), CONTENTS line 8: *for* Barundi *read* Burundi
26: for BARR read FARR
30: for *Lagerstraemia* read *Lagerstroemia*

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# INDEX TO FUNGOUS AND LICHEN TAXA, VOLUME EIGHT

This index includes genera, infrageneric taxa, species, and infraspecific taxa. New taxa are in CAPITALS, and the pages where they are published are in *italics*. Rossman's treatment of *Calonectria* (pp. 485-558) is separately indexed; reference to that index is indicated by the notation *"see"*.

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