Five new genera in the new family Pseudeurotiaceae

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The Pseudeurotiaceae, a new family of cleistothecial Ascomycetes, is established. Members of this family are characterized by nonostiolate ascocarps which are frequently dark in color, irregularly disposed asci, and hyaline or brown ascospores which lack germ pores. The conidia are usually borne on simple phialides or sympodulae. Cryptendoxyla, Hapsidospora, Lenconeurosporum, Mycoarachis, and Nigrosablrum are described as new genera and included in the Pseudeurotiaceae. A key to the genera of the Pseudeurotiaceae is also given and some comments are offered on the previously established genera.

In recent years it has become increasingly apparent that the cleistothecial Ascomycetes represent a group of fungi with very diverse origins. While, in the past, only one or two families contained all of the genera, we now find that it is more satisfactory to distribute them among several families. The present paper is one of those redistributions of genera requiring establishment of a new family.

Pseudeurotiaceae Malloch & Cain, fam. nov.
Ascocarp initials coiled. Ascocarpaceae nonostiolate, nonstromatic, with a single cavity, hyaline to dark brown. Asci irregularly disposed, subglobose to globose. Ascospores one- or two-celled, hyaline or brown, smooth or roughened, without germ pores. Conidia borne on phialides or sympodulae.

As with most families of fungi, no single character seems to characterize the Pseudeurotiaceae. It appears to be a strictly cleistothecial group with consistently irregularly disposed, subglobose to globose asci. The ascospores are usually quite small, always lack germ pores, and thus swell considerably upon germination. The conidial stages are usually either Sporothrix or Cephalosporium but can also be other simple phialide or sympodulospora types.
The family Pseudeurotiaceae is somewhat similar to the Eurotiaceae, but differs in several respects. Unlike any of the Eurotiaceae, the members of this family often produce brown ascocarps or ascospores. While the conidial stages of the Eurotiaceae are usually highly developed phialide types characterized by complex conidiophores, those of the Pseudeurotiaceae are usually very simple. Members of the Pseudeurotiaceae never produce the two-valved type of ascospores common in the Eurotiaceae.

One of the features common to several members of the Pseudeurotiaceae is the arrangement of the peridial cells to form plate-like complexes (Figs. 3 and 16). Each of these plates is made up of radiating groups of cells and is separated from adjacent plates by well-defined lines of dehiscence. Such plates can be quite small and simple (Fig. 16) or very large and complex (Fig. 3). We are using the term "cephalothecoid" to describe such structures. This term refers to the genus Cephalotheca Fcckel, used by many authors (Hohnel 1917; Chesters 1935; Ciferri 1958) to accommodate many of the cleistothecial genera with such peridial structures. We have observed this type of peridium in a large number of unrelated groups and thus cannot recognize it as being of taxonomic importance above the species level. The genus Cephalotheca itself is retained to accommodate only the type species, C. sulfurea. We have not been able to observe ascospore germination in this species, and thus unable to say whether or not it belongs in the Pseudeurotiaceae. If germination studies indicate that germ pores are lacking it would probably belong in this family. Since the family Cephalothecaceae (Hohnel 1917) is older it would take precedence as the correct name for this family.

In addition to four previously established genera which belong in the Pseudeurotiaceae we shall describe another five. The reason that five new genera appear here is not due to any kind of "splitting" but to the fact that the number of undescribed cleistothecial Ascomycetes is still very high.
KEY TO THE GENERA OF THE Pseudeurotiiaceae

1. Ascospores one-celled ................................................................................................................. 2
2. Ascospores two-celled ................................................................................................................... 9

2. Ascocarp peridium cephalothecoid, made up of “plates” of radiating cells which separate at maturity along well-defined lines of dehiscence ......................................................... 3
2. Peridium not as above ................................................................................................................... 5

3. Ascospores hyaline, marked by a few low, longitudinal ridges .................................................. Leuco/neurospora
3. Ascospores brown ........................................................................................................................ 4

4. Ascospores reniform; conidia borne on sympodulae ................................................................. Frugiphora
4. Ascospores cylindrical; conidia borne on phialides (Chalara) .................................................. Cryptendoxyla

5. Ascospores hyaline in mass at maturity ....................................................................................... Nigrosabulum
5. Ascospores brown in mass at maturity ........................................................................................ 6

6. Ascospores with reticulations, “wings” or crests ....................................................................... Haploclera
6. Ascospores smooth ...................................................................................................................... 7

7. Ascospores spherical, reticulate .................................................................................................. Eumericelopsis
7. Ascospores ellipsoidai, with “wings” or crests .......................................................................... Pseudeurotium

8. Ascospores ellipsoidai or spherical .............................................................................................. Mycoavachis
8. Ascospores reniform ................................................................................................................... 9

9. Ascospores hyaline, smooth ........................................................................................................... Testudina
9. Ascospores brown, reticulate ....................................................................................................... 10

Cryptendoxyla Malloch & Cain, gen. nov.

TYPUS GENERIS: Cryptendoxyla hypophloia Malloch & Cain.

ETYMOLOGY: Greek, kryptos = hidden, and Endoxyla, a genus with similar ascospores.

Ascocarps subglobosoe to globose, dark brown to black, glabrous, nonstioIiate, with a cephalo-thecoid peridium. Ascii irregularly disposed, pyriform to subglobose, eight-spored, evanescent. Ascospores cylindrical, brown, one-celled, without germ pores. Conidial stage consisting of simple phialides bearing conidia from within the neck (Chalara).

Cryptendoxyla hypophloia, the only species of the genus so far known, can be characterized by its cephalothecoid peridium and cylindrical brown ascospores which lack germ pores. It produces a Chalara conidial stage and may be related to the genus Pseudeurotium but is maintained separately because of these characteristics and because of its habitat.

Cryptendoxyla hypophloia Malloch & Cain sp. nov.
Coloniae in agaro Weitzman et Silva-Hutner secundum diametrem aetate 35 diem 7.5 cm, floccosae; ascocarps subglobosae vel globosae, nigrae, glabrae, 70–160 μ in diametrae; ascii a pyriformibus subglobosae, octospori, evanescentes, 8–12 × 5.5–7.0 μ; ascosporae cylindraceae, brunneae, laeves, 4.2–5.5 × 2.0–3.0 μ; conidiophorae hyalinae, simplices, rare ramosae, attenuatae, 17–50 × 2.0–3.0 μ; phialosporae cylindraceae, hyalinae, laeves, 3.0–7.0 × 1.5–2.5 μ, ex conidiophoribus in catenis extrusae.


ETYMOLOGY: Greek, hypo = beneath, and phlois = bark, referring to the position of the ascocarps beneath the bark of dead trees.

COLONIES on Weitzman and Silva-Hutner's medium (Weitzman and Silva-Hutner 1967) attaining a diameter of 7.5 cm in 35 days at room temperature, felty to somewhat cottony, brown at the center where the ascocarps are mature, white toward the margin, azonate; reverse
FIGS. 1-9. Cryptendoxyla hypophloia. Fig. 1. Ascocarp initials, × 1500. Fig. 2. Ascocarp, showing arrangement of cephalothecoid plates, × 325. Fig. 3. Peridial plate, × 650. Fig. 4. Peridium cross section, × 650. Fig. 5. Asci, × 1500. Fig. 6. Ascospores, × 1500. Fig. 7. Germinating ascospores, × 1500. Fig. 8. Conidiophores, × 1500. Fig. 9. Conidia, × 1500. Figs. 10-15. Hapsidiosporae irregularis. Fig. 10. Peridium surface, × 1500. Fig. 11. Peridium cross section, × 650. Fig. 12. Asci, × 1500. Fig. 13. Ascospores, × 1500. Fig. 14. Germinating ascospores, × 1500. Fig. 15. Conidial stage, × 650.
pinkish to pale olive green; **MYCELIUM** hyaline to light brown, frequently anastomosing, branched, remotely septate, narrowest when aerial, 2–10 μ in diameter; **ASCOCARP INITIALS** at first simple coils, soon becoming compact and contorted as a result of profuse branching, not involving neighboring hyphae or involving it only to a slight extent, with filaments 2–3 μ wide; **ASCOCARPS** subglobose to globose, black by reflected light, opaque, nonostiolate, smooth, 70–160 μ in diameter; **ASCOCARP PERIDIUM** cephalothecoid, made up of several plates of hyaline, flat in cross section, nearly square in surface view, thickened by dark nodular growths of wall material around the periphery of the septa and other points, about 2–5 μ in diameter; peridial cells of the inner layer hyaline, flattened in cross section, evanescent; **ASCI** arising from croziers on a branched ascogenous system, distributed evenly throughout the centrum, eight-spored, pyriform to subglobose, short-stipitate, evanescent, 8–12 X 5.5–7.0 μ; **ASCOSPORES** cylindrical, slightly constricted around the middle, nonseptate, smooth, light brown by transmitted light, dark brown in mass, without germ pores, 4.2–5.5 X 2.0–3.0 μ, swelling slightly on one side upon germination and producing a single germ tube; **CONDIAL STAGE** in *Chalara*; **CONDIOPHORES** hyaline, simple or more rarely branched, septate near the base, tapering slightly to an open tip from which the conidia are borne, 17–50 X 2.0–3.0 μ, larger if terminating a hypha; **CONIDIA** cylindrical, hyaline, one-celled, smooth, 3.0–7.0 X 1.5–2.5 μ, borne in chains at the tips of the conidioophores.


Cultures derived from TRTC 45320 and 45682 have been deposited with the American Type Culture Collection, and the Centraal-bureau voor Schimmelcultures and the Commonwealth Mycological Institute.

Like many cleistothecial forms *C. hypophloia* is probably dispersed by arthropods. Its habitat beneath the bark of dead trees would prevent it from being dispersed directly by the wind. It was noted at the time the collections were made that there were numerous mites present among the ascocarps. Some of the ascocarps had broken loose, were trapped among the hairs on the bodies of the mites, and were dispersed in this manner. Some of the ascocarps had also broken open and the ascospores had become attached to the mites. The ecology of this species may not be very different from species of *Ceratocystis* except that it occurs at a much later stage of decay. The *Chalara* imperfect stage, also known for *Ceratocystis*, may also figure in arthropod dispersal.

The cephalothecoid peridium in this species is quite interesting. Unlike most forms with this peridium type, *C. hypophloia* has only a few large plates. When examined under a dissecting microscope the lines of dehiscence are seen to extend around the ascocarps. Under the drying effect of the microscope lamp the ascocarps split along the dehiscence lines and spread open.

Microscopically the most prominent feature is the ascospore morphology. The ascospores are nearly cylindrical but are usually somewhat constricted around the middle. This constriction gives them a girdled or bone-shaped appearance.

**Emericellopsis** van Beyma, Antonie van Leeuwenhoek, 6: 264, 1940.

**TYPE SPECIES**: *E. terricola* van Beyma, l.c. p. 265. *Emericellopsis* is characterized by dark ascospores with wing-like appendages and a *Cephalosporium* conidial stage. The peridium is usually thin and very light colored or hyaline.

The taxonomy of *Emericellopsis* is still somewhat unsettled. Some authors (Grosklags and Swift 1957; Backus and Orpurt 1961; Mathur and Thirumalachar 1960, 1962) recognize up to nine species while others (Durrell 1959; Maag et al. 1959) recognize as few as two. The reader is referred to these papers for detailed accounts of the species.
Fragosphaeria Shear, Mycologia 15: 124. 1923.

Type species: F. purpurea Shear, l.c.

Fragosphaeria is characterized by brown, reniform ascospores and very small conidia borne on sympodials. The peridium in the two known species is cephalotheccoid (although often very obscure in F. reniformis).

Both species were studied by Chesters (1935) as species of Cephalotheca. The species Chesters studied as C. reniformis is a “good” Fragosphaeria and is transferred here to that genus as Fragosphaeria reniformis (Saccardo & Therry)

Malloch & Cain comb. nov.

Basionym: Cephalotheca reniformis Saccardo & Therry, Michelia, 2: 312. 1881.

Both species are well described and illustrated by Chesters (1935).

The genus Cephalotheca Fuckel was described with a single species C. sulphurea Fuckel collected on decaying oak boards in Rheingau (Fuckel 1871). Cultures of this species have not been available and ascospore germination has not been observed. Consequently, we are unable to determine the position of the genus and the family Cephalothecaceae.

Hapsidospora Malloch & Cain, gen. nov.


Type species: H. irregularis Malloch & Cain.

Etymology: Greek, hapsis = net, and spora = spore, referring to the reticulate ascospores.

Ascocarps globose, dark green to black, smooth, glabrous, nonostiolate. Asci subglose to globose, eight-spored, evanescent. Ascospores one-celled, dark olive green to brown, reticulate, without germ pores. Conidia one-celled, pink to orange, borne in wet masses at the tips of simple phialides (Cephalosporium).

Type species: H. irregularis Malloch & Cain.

Hapsidospora is a fairly characteristic member of the Pseudeurotiaceae, differing from other genera in having globose, dark reticulate ascospores. It seems closest to Pseudeurotium which has dark, one-celled, smooth ascospores and Testudina which has two-celled, brown, reticulate ascospores.

There is only one species.
or from solitary hyphae, tapering from the base to the apex, ending as a phialide, hyaline, 20–50 \times 1.5–2.0 \mu; conidia nearly hyaline by transmitted light, pink to orange in mass, ellipsoidal to somewhat alantoid, 3.5–5.5 \times 2.0–3.0 \mu, collecting in wet masses at the tips of the conidiophores.

**SPECIMEN EXAMINED**: CANADA: Ontario: York Co.: Toronto, on lawn grass compost heap incubated in a moist chamber, July 1966, W. Collins (HOLOTYPE, TRTC 44852).

Cultures derived from TRTC 44852 have been deposited in the American Type Culture Collection, the Centraalbureau voor Schimmelcultures, and the Commonwealth Mycological Institute.

**Leuconeurospora Malloch & Cain gen. nov.**


**TYPUS GENERIS**: Eurotium pulcherrimum Winter.

**ETYMOLOGY**: Greek, leucos = white, and the genus Neurospora, referring to the ribbed ascospores which are white in mass.

Ascocarps globose, dark reddish brown, glabrous, nonstipitate, eight-spored, conidial stage unknown. Conidia borne in clusters at the tips of simple phialides, one-celled, hyaline, white in mass, ellipsoidal-fusoid, marked by thick anastomosing ridges which sometimes form a reticulum, without germ pores, 5.5–7.0 \times 3.5–5.0 \mu, arranged in a compact mass in the ascus; conidial stage unknown.

**HABITAT**: on dung of dog, fox, porcupine, rabbit, and rat.

**DISTRIBUTION**: Canada, Denmark, and Germany.


**Mycoarachis Malloch & Cain gen. nov.**

Ascocarps subglobose ad globosae, ad olivaceis nigrae, nonostiolatae, glabrae. Ascii subglobosi vel globosi, octospori, evanescentes. Ascosporeae uniseptatae, hyalinae, laeves. Conidia ignota.

**TYPUS GENERIS**: M. inversa Malloch & Cain.

**ETYMOLOGY**: myco from the Greek mykes = fungus, and Arachis, the generic name of the cultivated peanut, and refers to the peanut-shaped ascospores.

Ascocarps globose, dark olive-green to black, nonostiolate, nonstipitate. Ascii irregularly disposed, subglobose to globose, eight-spored. Ascospores two-celled, hyaline, smooth, without germ pores. Conidia borne in clusters at the tips of simple phialides, one-celled, hyaline, smooth (Cephalosporium).

Mycoarachis is readily recognized by its two-celled hyaline ascospores. It appears to be most closely related to Nigrosabulum, which differs in having one-celled ascospores.
Figs. 16–19. *Leucoclospora pulcherrima*. Fig. 16. Peridial plate, × 650. Fig. 17. Asccarp, showing arrangement of cephalothecoid plates, × 130. Fig. 18. Asci, × 1500. Fig. 19. Ascospores, × 1500. Figs. 20–25. *Mycocallis inversa*. Fig. 20. Peridium cross section, × 650. Fig. 21. Asci, × 1500. Fig. 22. Ascospores, × 1500. Fig. 23. Ascospore with one cell germinating and one ungerminated cell, × 1500. Fig. 24. Conidiophores, × 1500. Fig. 25. Asccarp initials, × 1500. Figs. 26–33. *Nigrosporum globosum*. Fig. 26. Ascocarp initials, × 1500. Fig. 27. Peridium cross section, × 650. Fig. 28. Immature asci, × 1500. Fig. 29. Asci, × 1500. Fig. 30. Ascospores, × 1500. Fig. 31. Germinating ascospores, × 1500. Fig. 32. Conidiophores, × 1500. Fig. 33. Conidia, × 1500.
Only one species, *M. inversa* is known so far, but it appears to be widely distributed. The peridium in this species appears to be reversed when compared with that of most species (hence the specific epithet “inversa”). As is often the case, the peridium is made up of a light and a dark layer of cells, but, contrary to the usual condition, the light-colored layer is exterior to the dark layer. A comparison of Figs. 11, 20, and 27 illustrates this difference. Because of this the ascocarps, when dry, have a characteristic metallic sheen which makes them appear as tiny pieces of metal scattered over the substrate.

**Mycoarachis inversa** Malloch & Cain, sp. nov.

Coloniae in agaro YpSs (Emerson 1958) secundum diametrem aetate 30 dieorum 5.0–6.5 cm, ab appressis floccosae, a roseis aurantiacae; ascocarpeae subglobosae vel globosae, ab olivaceis nigrae, nonostiolatae, glabrae, 50–200 μ crassae; peridium in strato interno et strato pallido externo compositum; ascii subglobosi vel globosi, ocytopori, evanescentes, 5.5–11.0 μ secundum diametrem; ascosporea cylindraceae ellipsoideae, hyalinae, laeves, 5.0–5.5 X 3.0–3.5 μ septo medio praeeditae, ad septum constrictae; conidioforae hyalinae, simplices, rare ramosae, attenuatae, 14–35 X 2.0–3.5 μ; phialosporae ellipsoideae, fusoidae, ovoideae, a cylindraceae allantioideae, hyalinae, laeves, uniloculares, ex conidiophoribus in capitulum mucosum successivae extrusae.

**HOLOTYPUS:** In fimo elephanto, Mweya Lodge, Queen Elizabeth National Park, Uganda, 27 July 1966, *Cain, Griffin, and Krug*. In Cryptogamic Herbarium, University of Toronto (TRTC 66.2166f).

**ETYMOLOGY:** Latin, *inversus* = turned upside down, referring to the reversed layers of the peridium.

Colonies on YpSs medium attaining a diameter of 5.0–6.5 cm in 30 days at room temperature, appressed to cottony, pink or orange, dark green to black where ascocarps are abundant, azonate to closely zonate, tending to produce sectors of greater and lesser fertility; reverse pink to orange, black under areas of abundant ascocarp production; mycelium hyaline, remotely septate, branched, 1–3 μ in diameter, occasionally developing very thick, dark-staining cell walls in the neighborhood of the septa and swelling up to 7 μ in diameter; ascocarp initials at first simple coils with filaments about 1–3 μ in diameter, later becoming compact and contorted as a result of abundant proliferation; ascocarps subglobosae vel globosae, metallic in appearance by reflected light when dry, dark green to black by transmitted light, nonostiolate, glabrous, 50–200 μ in diameter; ascocarp peridium 11–30 μ thick, consisting of a light-colored outer layer and a darker inner layer; peridial cells of the outer layer pseudoparenchymatous, hyaline to pale brown, 3–22 μ in diameter, one to five cells deep in cross section; peridial cells of the inner layer dark brown, flattened, 4–20 X 2.0–10.5 μ, one or two cells deep in cross section; ascii irregularly disposed in small clusters, eight-spored, subglobosae vel globosae, evanescens, nonstipitatae, 5.5–11.0 μ in diameter; ascosporea cylindricae or allantoidae, hyalinae, with a single median septum which divides the spore into two equal globosa cells, constricted at the septum, smooth, without germ pores, 5.0–5.5 X 3.0–3.5 μ, with each cell swelling up to 8.5 μ upon germination and producing one to three germ tubes; conidial stage a *Cephalosporium*; conidiphores arising from the substrate mycelium, simple or sparingly branched, septate, tapering from the base to the apex, ending in a phialide, 14–35 X 2.0–3.5 μ; phialosporae ellipsoideae, fusoidae, ovoideae, cylindraceae allantioideae, hyalinae, laeves, unicellulares, ex conidiophoribus in capitulum mucosum successive extrusae.


Cultures derived from all of these collections have been deposited with the American Type Culture Collection, the Centraalbureau voor Schimmelcultures, and the Commonwealth Mycological Institute.

**Nigrosabulum** Malloch & Cain, gen. nov.

Ascocarpeae subglobosae vel globosae, nigrae, glabrae, nonostiolatae. Ascii subglobosi vel globosi, ocytopori, evanescentes. Ascosporea globosae, unicellulares, hyalinae, laeves. Conidia modo phialosporarum (*Cephalosporium*).
Pseudeurotium in having brown ascospores and a glabrous, nonostiolate, nonstromatic. Asci irregularly disposed, subglbose to globose, evanescent. Ascospores one-celled, hyaline, smooth, without germ pores. Conidia borne on tapering unbranched conidiophores which end in a phialide, one-celled, hyaline, collecting in wet masses at the tips of the conidiophores (Cephalosporium).

*Nigrosabulum* probably comes closest to being the “typical” cleistothecial Ascomycete. If the descriptions of all the genera of cleistothecial Ascomycetes are placed together, side by side, it is found that, for each character, *Nigrosabulum* falls with the majority. Only in having spherical ascospores is *N. globosum*, the only species, at all unusual.

The genera most similar to *Nigrosabulum* are *Mycoarachis* and *Pseudeurotium*. *Mycoarachis* differs in having two-celled ascospores and *Pseudeurotium* in having brown ascospores and a thinner ascocarp peridium. In addition, *Pseudeurotium*, a soil fungus, has never been reported from dung and *Nigrosabulum* is not known from any other substrate but dung.

*Nigrosabulum globosum* Malloch & Cain, sp. nov.

Figs. 26–33

Coloniae in agaro Weitzman and Silva-Hutner’s medium (Weitzman and Silva-Hutner 1967) attaining a diameter of 6.0–6.5 cm in 30 days at room temperature, appressed to granular, grey to dark green, closely zonate; reverse dark green; MYCELIUM fairly delicate, hyaline, remotely septate, 1–3 μ in diameter; ASCOCARP INITIALS produced as distinct cylindrical coils, soon becoming compact and contorted as a result of abundant proliferation, not involving the neighboring mycelium greatly, with filaments 1–2 μ in diameter; ASCOCARPS subglbose to globose, black by reflected light, opaque, smooth, glabrous, nonostiolate, 75–350 μ in diameter; ASCOCARP PERIDIUM 15–33 μ thick, carbonaceous, consisting of a dark outer layer and a hyaline inner layer; peridial cells of the outer layer dark brown, pseudoparenchymatous, nearly isodiametric in cross section, thick-walled, 3–10 μ in diameter, two to six cells deep in cross section; peridial cells of the inner layer hyaline, thin-walled, evanescent, forming an indefinite number of layers, up to 18 μ in diameter; ASCI borne in irregularly disposed clusters, subglbose to globose, eight-spored, evanescent, nonstipitate, 6–9 μ in diameter; ASCOSPORES globose, hyaline, smooth, without germ pores, often with small particles adhering to the wall, 3.0–4.0 μ in diameter, swelling to 6–8 μ upon germination and producing one to four germ tubes; CONIDIAL STAGE *Cephalosporium*; CONIDIOPHORES arising from the aerial or substrate mycelium, unbranched, septate, tapering from the base to the apex and ending in a phialide, 20–32 × 2–3 μ; PHIALOSPORES ellipsoidal, fusoid, ovoid or allantoid, hyaline, smooth, nonseptate, borne in moist clusters at the tips of the conidiophores, 3.5–8.5 × 1.0–3.0 μ, swelling upon germination and producing one to several germ tubes.


Cultures derived from these collections have been deposited with the American Type Culture
Collection, the Centraalbureau voor Schimmelcultures, and the Commonwealth Mycological Institute.

The distribution of *N. globosum* is interesting in that it is similar to that of *Mycoarachis inversa*. Apparently both are fungi of warm dry climates.

The ascospores of *N. globosum* often have small particle-like attachments. These have been observed on all of the collections examined. It is not known whether they are part of the ascospore wall or simply adhering particles of some kind.

On the natural substrate *N. globosum* always grows very superficially and is never closely attached to the substrate. Because of this the ascocarps are very easily removed and are usually nearly free of contamination.

The conidial stage was very abundant on the cultures of the type collection, rare on TRTC 66.1741g, and apparently absent on TRTC 45651. There is some indication that the nature of the medium may affect the amount of conidial production.


**Type species**: *P. zonatum* l.c., p. 416.

*Pseudeurotium* is a fairly typical member of the Pseudoteliaceae distinguished by brown, smooth ascospores. *Nigrosabulum* differs in having hyaline ascospores and a much thicker ascocarp peridium.

The conidial stage of *Pseudeurotium* species is usually reported to be a sympodulospore type (*Sporothrix*). While this appears to be the case in *P. ovalis*, those of *P. zonatum* appear to us to be phialides. The two types of conidium production, however, may be phylogenetically related in groups such as this, with the sympodulospore type being derived from the phialospore (or anellospore) type by reduction of the phialides to conidia. Sympodulae and phialospores (or anellospores) are found in the same genus in several families, including the Microascaceae and the Ophiostomataceae.

A number of species of *Pseudeurotium* have been described, but most have been shown to be members of other genera. Of the species treated by Booth (1961), for example, we would recognize only *P. zonatum* and *P. ovalis*. *P. punctatum* (Panasenko 1964) may also be a "good" species.

Some of the species studied by the above authors have been treated also by Stolk (1955) and Udagawa (1965). Routien (1957) and Milko (1965) have described and illustrated *P. zonatum* as *Levispora terricola* Routien.

**Testudina** Bizzozero, Fung. Ven., 1, 1885.

**Type species**: *T. terrestris* Bizz., l.c.

*Testudina* has a cephalothecoid peridium and two-celled, brown ascospores with reticulate markings. In this respect it combines characters of both *Mycoarachis* and *Haplospora*. The conidia were reported by Marchal (1895) to be borne in chains in the synonymic species *Marchaliella zopfielloides* Bomm. and Rouss.

Marchal's illustration (the only illustration of this genus) shows chains of conidia arising from an unbranched phialide-like conidiophore.

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