

- 1.5-2 μ *Chalara brevispora* (14)
 52) Mean conidium l/w ratio = 4:1 or more 53
- 53) Collarete less than 10 μ long; transition gradual; conidia lacking basal frill; mean conidium l/w ratio = 4:1 *Chalara longipes* (37)
 53) Collarete 10-15 μ long; transition usually abrupt; conidia with basal marginal frill; mean conidium l/w ratio = 5:1 *Chalara novae-zelandiae* (41)
- 54) Phialophores arising from basal stromatic aggregations of vegetative hyphae *Chalara germanica* (29)
 54) Phialophores not arising from such aggregations 55
- 55) Mean conidium l/w ratio = 2.6:1 or less 56
 55) Mean conidium l/w ratio more than 2.6:1 57
- 56) Venter 6.5-9.5 μ wide; collarete 3.5-5 μ wide; conidia 2.5-4 μ wide *Chalara brachyspora* (11)
 56) Venter 4-7 μ wide; collarete 1.5-2.5 μ wide; conidia 1.5-2.5 μ wide *Chalara parvispora* (44)
- 57) Conidia with basal marginal frill *Chalara nothofagi* (40)
 57) Conidia lacking basal frill 58
- 58) Venter up to 8 μ wide; transition abrupt; conidia 1.5-2.5 μ wide; mean conidium l/w ratio = 6:1 *Chalara cylindrosperma* (22)
 58) Venter not exceeding 5.5 μ wide; transition gradual; conidia 1-1.5 μ wide; mean conidium l/w ratio = 4:1 *Chalara crassipes* (19)
- 59) Chlamydo-spores ornamented 60
 59) Chlamydo-spores smooth 61
- 60) Phialides 20-40 μ long, often rough-walled; chlamydo-spores usually fimbriate, 11-23 μ wide; germ slits obscure *Chalara* state of *Ceratocystis adiposa* (62)
 60) Phialides 48-95 μ long, smooth; chlamydo-spores verrucose or usually striate, 11-15 μ wide; germ slit vertical *Chalara* state of *Ceratocystis radicola* (69)
- 61) Chlamydo-spores in very characteristic rectilinear series of up to 7 segments (resembling phragmoconidia), segments short-cylindrical; germ slits transverse and bipolar *Chalara elegans* (24)
 61) Chlamydo-spores usually solitary and/or sympodial; germ slits obscure or vertical 62
- 62) Germ slits on chlamydo-spores vertical; chlamydo-spores 9.5-25 x 7-15 μ *Chalara paradoxa* (43)
 62) Germ slits obscure or absent 63
- 63) Phialides 20-36 μ long; venter 2.5-4.5 μ wide; collarete 7.5-14 x 2-3 μ ; chlamydo-spores (converted phialoconidia) doliiform or ovoid, moniliform *Chalara* state of *Ceratocystis moniliformis* (67)
 63) Phialides larger 64

- 64) Chlamydo-spores sympodially arranged, subglobose or pyriform, 7.5-14 x 6-11 μ ; wall smooth or usually minutely verrucose *Chalara ovoidea* (42)
 64) Chlamydo-spores not sympodially arranged, variable in shape 65

- 65) Chlamydo-spores usually globose, up to 18 μ wide *Chalara thielavioides* (57)
 65) Chlamydo-spores usually ellipsoidal or pyriform, not exceeding 13 μ wide *Chalara* state of *Ceratocystis fimbriata* (66)

1) *Chalara acuaria* Cooke & Ellis (Figure 22A)
 in Grevillea, 6: 68, 1878.

Colony superficial, effuse, brown, hairy. Phialophores arising from a thin pseudo-parenchymatous layer in the substratum, simple, more or less cylindrical, 2-4-septate, not constricted at the septa, brown, smooth-walled, 50-120 [74] μ long and 5.5-9 [7] μ wide at the base, and terminating in a phialide. Phialides obclavate, pale brown, 33-77 [54] μ long, composed of an ellipsoidal venter 15-26 [20] x 5-11 [8] μ , and a cylindrical or more or less obconical collarete 14-57 [37] x 2.5-5 [3.8] μ ; transition from venter to collarete gradual; ratio of mean lengths of collarete and venter = 1.8:1. Phialoconidia found singly or in short chains; cylindrical with a rounded apex and a truncate base with minute marginal frill; 0-1-septate, hyaline smooth-walled, 12-20 [16] x 2-3.5 [2.7] μ ; mean conidium length/width ratio = 6:1.

Habitat: On needles of *Abies*, *Pinus*, *Podocarpus dacrydioides*.

Specimens examined: 1) M. C. Cooke 1885—Fungi of New Jersey. 2786, on fir leaves, Newfield, N.J. U.S.A., J. B. Ellis (in IMI 112288 ex *Holotype* in Herb. M. C. Cooke in K); 2) Ellis and Everhart, N. Amer. Fungi, 2nd Ser. # 2966, on fallen leaves of *Pinus*, in FH, B and BPI; 3) PDD 32874, on *Podocarpus dacrydioides*, Big Tree Tr., Peel Forest Pk., Centerbury Prov., N.Z., 26.IV.1974, B. Kendrick (KNZ 682a).

Known distribution: New Zealand, U.S.A.

C. acuaria closely resembles *C. rubi* but differs in its more robust phialophores, the shape and size of its phialides, its more or less obconical collaretes, and because its conidia do not bear frayed fringes of wall material at one or both ends. It differs from *C. rostrata* in producing obconic rather than cylindrical collaretes, brown and few-septate, rather than usually dark brown and pluri-septate phialophores, and longer conidia.

2) *Chalara affinis* Sacc. & Berl. (Figure 31B)
 in Atti Ist. veneto Sci., 3: 741, 1885.

Colony superficial, effuse, cream yellow, crustose due to sinking in of the mass of phialoconidia. Phialophores simple, erect, cylindrical with slightly inflated base, up to 4-septate, sometimes faintly constricted at the septa, brown to fawn brown; wall smooth and 1 μ thick; 33-81 [46] μ long, 3.5-5 μ wide at the base; terminating in a phialide. Phialides lageniform, subhyaline to pale brown, 28-54 [38] μ long; venter subcylindrical or rarely subellipsoidal, 12-29 [19] x 3.5-7 [5.3] μ ; collarete cylindrical, 12-32 [20] x 2-2.5 [2.3] μ ; transition from venter to collarete abrupt; ratio of mean lengths of collarete and venter = 1.05:1. Phialoconidia extruded singly or in easily dispersible chains; cylindrical, ends blunt or slightly rounded, unicellular, hyaline, 5.5-19 [11.5] x 1.5-2.5 [1.7] μ ; mean conidium length/width ratio = 6.7:1.

Habitat: On *Aesculus*, *Beilschmiedia tawa*, *B. taraira*, *Corylus avellana*, *Fagus sylvatica*, *Nothofagus solandri*, and *Quercus*.

- 26) Phialides 59-69 (-72) μ long; collarette 5-6.5 μ wide; conidia 3.5-5 μ wide *Chalara aotearoae* (6)
- 26) Phialides 30-34 μ long; collarette 2.5-3 μ wide; conidia 2-2.5 μ wide *Chalara stipitata* (56)
- 27) Phialophore reduced to phialide alone, or phialide and one or two stalk cells 28
- 27) Phialophores with more than two stalk cells 29
- 28) Venter globose; ratio of mean lengths of collarette/venter = 3:1 *Chalara rhynchophiala* (49)
- 28) Venter ellipsoidal or subcylindrical; ratio of mean lengths of collarette/venter = 1.7:1 *Chalara hughesii* (32)
- 29) Phialides urceolate *Chalara urceolata* (61)
- 29) Phialides not so 30
- 30) Phialophores arising from a thin stromatic layer of cells; phialides obclavate or lageniform; transition from venter to collarette gradual; conidia 8-19 x 2-2.5 μ *Chalara aurea* (7)
- 30) Phialophores not arising from stromatic aggregations 31
- 31) Mean conidium l/w ratio = 7.4:1; conidia often forming long, helicoid chains *Chalara spiralis* (55)
- 31) Mean conidium l/w ratio = 3.9:1; conidia not in helicoid chains *Chalara ginkgonis* (30)
- 32) Chlamydospores absent 33
- 32) Chlamydospores present 59
- 33) Conidia ellipsoidal or clavate 34
- 33) Conidia cylindrical 37
- 34) Phialoconidia exceeding 10 μ long *Chalara breviclavata* (12)
- 34) Phialoconidia less than 10 μ long 35
- 35) Collarette asperate; base of phialophore usually broadly conical and darker *Chalara brunnipes* (15)
- 35) Collarette smooth; transition usually marked by a constriction 36
- 36) Phialides usually sessile; collarette 6-8 μ long, conidia not exceeding 4 μ long *Chalara* state of *Ceratocystis autographa* (63)
- 36) Phialophores 1-4-septate; collarette 7-11 μ long; conidia up to 8 μ long *Chalara constricta* (18)
- 37) Phialophores rough-walled 38
- 37) Phialophores smooth 40
- 38) Collarette widening toward apex, 7-9.5 μ long; transition usually marked by a constriction *Chalara ellisii* (25)
- 38) Collarette cylindrical, longer; transition lacking constriction 39
- 39) Collarette 6-15 x 1.5-3 μ ; venter 4.5-6 μ wide; conidia 3-9.5 x 1-1.5 μ *Chalara cylindrica* (21)

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Rodomyzella
sessilis

- 39) Collarette 15-39 x 3-4.5 μ ; venter 6-9.5 μ wide; conidia 9.5-13 x 2-3 μ *Chalara bohémica* (10)
- 40) Phialophores reduced to sessile phialides, or phialides with one or two stalk cells 41
- 40) Phialophores well-developed and multi-septate 49
- 41) Phialophores and phialides hyaline *Chalara* state of *Cryptendoxyla hypophloia* (70)
- 41) Phialophores and phialides pigmented 42
- 42) Collarettes usually shorter than venter 43
- 42) Collarettes as long as, or longer than, venter 46
- 43) Venter subcylindrical 44
- 43) Venter conic or ellipsoidal 45
- 44) Collarette 6-8 μ long; phialides lageniform, 12-21 μ long *Chalara austriaca* (8)
- 44) Collarette 6-17 μ long; phialides usually obclavate, 18-36 μ long *Chalara microspora* (38)
- 45) Venter usually ellipsoidal, 4-6.5 μ wide; collarette 3-10 x 2-3 μ ; transition usually abrupt and marked by a constriction; conidia 1.5-2.5 μ wide *Chalara ampullula* (4)
- 45) Venter usually conic, 3-4 μ wide; collarette 10-11 x 1.5 μ ; transition gradual and without constriction; conidia 1-1.5 μ wide *Chalara sessilis* (54)
- 46) Venter usually globose; phialides less than 28 μ long *Chalara fusidioides* (28)
- 46) Venter cylindrical, subcylindrical or ellipsoidal 47
- 47) Collarette darker at base; conidia with basal marginal frills *Chalara brevipes* (13)
- 47) Collarette paler than, or concolorous with, venter; conidia without marginal frills 48
- 48) Conidia up to 19 μ long; collarette 2-3 μ wide *Chalara affinis* (2)
- 48) Conidia not exceeding 8 μ long; collarette 2.5-4 μ wide *Chalara fungorum* (27)
- 49) Phialides subcylindrical; transition imperceptible 50
- 49) Phialides lageniform or obclavate; transition gradual or abrupt 51
- 50) Conidia 3.5-8 x 2-3.5 μ ; phialides 25-34 μ long, venter 3-4.5 μ wide; collarette 2.5-4 μ wide *Chalara quercina* (48)
- 50) Conidia 5.5-11 x 3.5-4.5 μ ; phialides 50-61 μ long; venter 4.5-7.5 μ wide; collarette 4.5-6.5 μ wide *Chalara ungeri* (59)
- 51) Venter longer than collarette 52
- 51) Venter as long as, or shorter than, collarette 54
- 52) Mean conidium l/w ratio = 1.5:1; conidia 2-4 x

Classification:

Kingdom : Fungi

Division : Eumycota

Subdivision : 'Deuteromycotina' (Fungi Imperfecti)

Form Class : Moniliales

Ontogenetic group : blastic

Subgroup : enteroblastic-phialidic

Conidia enteroblastic-phialidic, produced in basipetal succession from a fixed, in most cases deep-seated, conidiogenous locus within a usually determinate, stable conidiogenous cell (phialide); phialides usually pigmented, and possessing a *deep, cylindrical or subcylindrical collarete* which often determines the shape of the conidia delimited within it.

Key to Genera

- 1) Phialophores aggregated into sporodochia or synnemata; conidia cuboid *Bloxamia* (page 167)
- 1) Not as above 2
 - 2) Phialophores consistently associated with sterile setae or capitate hyphae ... 3
 - 2) Phialophores not associated with such sterile elements 5
- 3) Sterile elements in the form of pigmented setae without apical mucilaginous (?) caps *Chaetochalara* (page 148)
- 3) Sterile elements in the form of capitate hyphae with apical, hyaline, mucilaginous (?) caps 4
 - 4) Capitate hyphae resembling young phialophores; phialophores characteristically with long, percurrent proliferations; collarete shallow or cupulate, usually wider than venter; ameroconidia dark, angular or wedge-shaped, widest at apex *Catenularia*
 - 4) Capitate hyphae much narrower and shorter than phialophores; collarete very deep, cylindrical; phragmoconidia dark, cylindrical *Sporoschisma* (page 157)
- 5) Phialides clavate, lacking a morphologically differentiated venter, wall uniformly thick, splitting vertically at apex of collarete to release conidia; phragmo- or dictyo-conidia hyaline, cylindrical *Ascoconidium* (page 164)
- 5) Phialides not clavate, with differentiated venter, wall attenuated toward collarete apex which is lost by circumscissile split to release conidia 6

- 6) Conidia accumulating in a slimy droplet at apex of collarettes7
- 6) Not as above8
- 7) Phialophores with well-defined stipe, bearing a complex apical penicillate conidigenous apparatus, the ultimate tier of metulae subtending numerous phialides *Phialocephala*
- 7) Phialophores much simpler; stipe often lacking, metulae absent; phialides solitary or in small clusters *Phialophora*
- 8) Phialides borne singly at apex of phialophores, or sessile9
- 8) Phialides borne in simple radiating clusters at apex of phialophores *Sporendocladia* (page 162)
- 9) Collarlet shallow, cupulate, or funnel shaped, usually wider than venter *Sporoschismopsis*
- 9) Collarlet deep, cylindrical, narrowly conical or obconical10
- 10) Phialides with a convex thickening of the inner wall at the zone of transition from venter to collarlet; dimorphic conidia produced from each phialide; first conidium cylindrical, subsequent conidia fusiform or sigmoid *Fusichalara* (page 144)
- 10) Phialides without localized thickening of the inner walls; conidia monomorphic, mostly cylindrical; chlamydospores present in some species *Chalara* (page 60)

In the species descriptions that appear on the following pages, records of lengths of conidiophores include the lengths of phialides. The general mean of a quantitative character is given in square brackets, e.g. 5-7[6.5]μ. Where they occur, extreme measurements are indicated in round brackets by numerals accompanied by a hyphen, e.g. 5-7(-9)μ. Type specimens are clearly indicated under 'specimens examined.'

In the key to species, numerals appearing in parentheses after species' names indicate the order in which the descriptions appear. To facilitate identification, the illustrations immediately follow the key. As far as possible illustrations have been prepared to the same scale. Unless otherwise stated, the scale on an illustration represents 20μ.

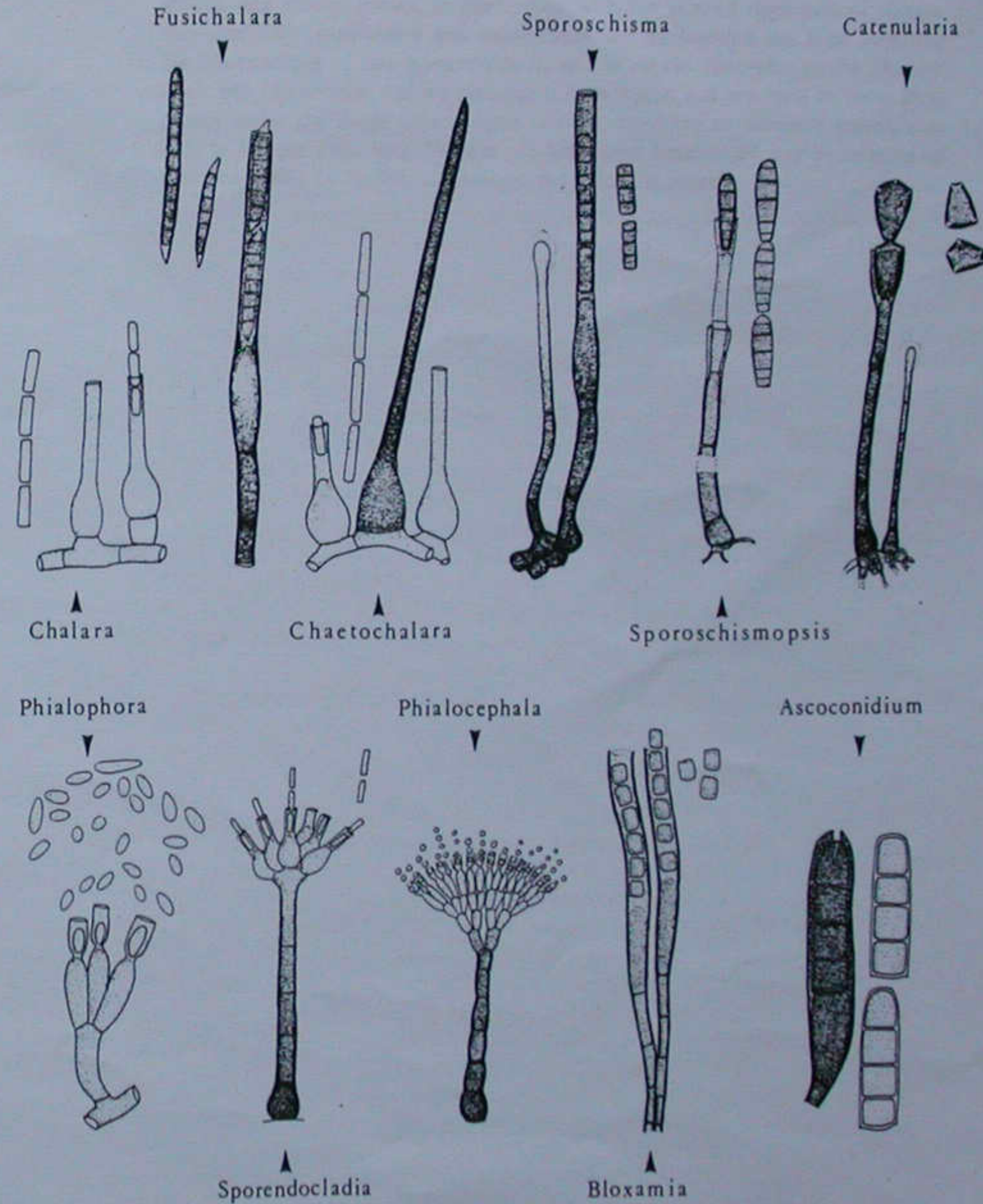
Chalara (Corda) Rabenh.

- in *Kryptogamenflora* 1: 38, 1844; description emended Nag Raj and Kendrick.
- ≡ *Torula* (Pers.) Link subg. *Chalara* Corda in *Icones Fung.* 2:9, 1838.
- ≡ *Torula* (Pers.) Link sect. *Chalara* (Corda) Corda in *Icones Fung.* 5:5, 1842.
- = *Cylindrocephalum* Bon. in *Handb. Allg. Mykol.*, 1851 fide Hughes in *Can. J. Bot.*, 36: 747, 1958.
- = *Thielaviopsis* Went in *Arch. voor de Java Suekerr.*, 1893, p. 4.
- = *Stilbochalara* Ferd. & Winge in *Bot. Tidsskr.*, 30: 220, 1910.
- = *Chalaropsis* Peyr. in *Staz. sper. agr. ital.*, 49: 595, 1916.
- = *Excicoconidium* Plunkett apud Stevens in *Bull. Bernice P. Bishop Mus.*, 19: 156, 1925.
- = *Hughesiella* Bat. & Vital in *Anais Soc. Biol. Pernamb.*, 14: 142, 1956.

Phialophores simple, rarely branched, scattered or aggregated, sometimes reduced to phialides, or cylindrical, septate, hyaline, subhyaline, brown to dark brown, terminating in a phialide. *Phialides* ampulliform, lageniform, obclavate, urceolate or sub-

cylindrical, composed of a well-differentiated venter and usually a long collarlet; transition from venter to collarlet abrupt, gradual or barely perceptible. *Conidia* enteroblastic-phialidic, cylindrical, obclavate or ellipsoid, with rounded or truncate ends, often provided with basal marginal frill or rarely fringes of wall material,

11) Reciprocal illustrations supplementing generic key [not drawn to scale].



Appendix

Calycellina carolinensis sp. nov. and *Hyaloscypha cladii* sp. nov.

On page 55, we mentioned the consistent association of discomycetes with two species of *Chaetochalara*. Apothecia of two discomycetes were found to be intimately associated with, and may indeed have arisen from the same mycelium as the *Chaetochalara* species involved. Since these very reduced discomycetes have few good characters left in the ascocarp, a precise knowledge of their conidial states, where such exist, would be of considerable taxonomic value. Although we are not in a position to substantiate genetic relationships between the discomycetes and *Chaetochalara*, the possibility of such a relationship cannot be excluded in view of the manifest association in two geographically disparate collections. Accordingly, we felt the need to establish the identity of these discomycetes. We are grateful to Dr. R. W. G. Dennis, Royal Botanical Gardens, Kew, Surrey, England, who has kindly examined the specimens and has advised us that the discomycetes represent undescribed species of *Calycellina* and *Hyaloscypha*.

Calycellina carolinensis sp. nov. (Figure 61A)

Apothecia vulgo hypophylla nonnunquam amphigena, superficialia, sessilia, flava vel brunnea cum annulo fuscato basilium cellularum, pallidis, septatis, laevibus, obtusis, marginalibus, 24-40 x 3-4 μ , pilis tecta discus planus, pallidus, 170-290 μ diam. Asci clavati, hyalini, 8-spori, 45-70 x 6.5-8 μ . Ascospores anguste fusiformes, leniter curvatae, 1-septatae, hyalinae, pariete laevi, 12-17 x 2.5-3.5 μ biserialim vel irregulatim dispositae. Paraphyses filiformes, hyalinae, septatae, pariete laevi, usque ad 70 μ long. et 2-2.5 μ lat.

Apothecia amphigenous, mostly hypophyllous, superficial, sessile on a small base, pale yellow to brown with a dark ring of basal cells, covered with pale, septate, smooth, blunt marginal hairs, 25-40 x 3-4 μ ; disc flat, pale yellow, 170-290 μ diam. Asci clavate, 45-70 x 6.5-8 μ , hyaline, smooth-walled, octosporous. Ascospores narrowly fusiform, slightly curved, 1-septate, hyaline, 12-17 x 2.5-3.5 μ , biserial or irregularly arranged. Paraphyses filiform, septate, hyaline, up to 70 μ long and 2-2.5 μ wide.

Habitat: On leaves of *Knightia excelsa* and *Myrica cerifera*, in association with *Chaetochalara aspera*.

Specimens examined: DAOM 139268 [*Holotype*], on leaf of *Myrica cerifera*, Research Triangle Pk., North Carolina, U.S.A., 11.IX.1972, C. S. Hodges; PDD 32877, on leaf of *Knightia excelsa*, Kauaeranga Valley, Thames Co., N.Z., 21.I.1974, B. Kendrick (KNZ 213).

Known distribution: New Zealand, U.S.A.

Hyaloscypha cladii sp. nov. (Figure 61B) \equiv

Apothecia dissita, sessilia vel breviter stipitata, poculiformia, brunnea, ad marginem basaliter septatos, pallide brunneos, subulatos pilos, 40-75 x 2.5-3.5 μ ferentia; discus concavus, pallidus, ca. 170 μ diam. Asci clavati, hyalini, 8-spori, 44-60 x 10-12 μ . Ascospores ellipsoideae, 1-septatae, hyalinae, guttulate, pariete laevi, 12-16 x 4-5 μ , biserialim vel irregulatim dispositae. Paraphyses filiformes, hyalinae, sparsim septatae, pariete laevi, 40-60 x 1.5-2 μ .

Apothecia scattered, sessile to shortly stalked, cup-shaped, brown, bearing, near the margin, basally septate, pale brown, subulate hairs, 40-75 x 2.5-3.5 μ ; disc concave, pallid, about 170 μ diam. Asci clavate, hyaline, octosporous, 44-60 x 10-12 μ . Ascospores ellipsoidal, 1-septate, hyaline, guttulate, smooth-walled,

= *Hyalosc. cladii-martii* Svrch 1986
 = ~~*Hyalosc. cladii*~~ *Uncinia scintillans* Gradl 1974!
 = *Phaeoscypha cladii* (Nag R. + K.) Spooner
 in Kirk & Spooner
 1984
 5.57

12-16 x 4-5 μ , biseriate or irregularly arranged. Paraphyses filiform, hyaline, sparsely septate, smooth-walled, 40-60 x 1.5-2 μ .

Habitat: On *Cladium mariscus*, in association with *Chaetochalara cladii*.

Specimen examined: IMI 89626(b) [*Holotype*] Sugar Hill, Wareham, Dorset, 26.IV.1961.

Known distribution: U.K.

61A) *Calycellina carolinensis*. Vertical section of an apothecium, seta, marginal hairs, paraphysis, ascus and mature ascospores ex type in DAOM 139268.

61B) *Hyaloscypha cladii*. Vertical section of an apothecium, setae, marginal hairs, paraphysis, ascus, and mature ascospores (illustration prepared by Dr. K. A. Pirozynski, DAOM, Ottawa, and reproduced here with his kind permission).

Typus von Phalloscypha Spooner

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