

KEY TO THE SPECIES OF *CORALLOMYCETELLA*

1. Ascomata red with a furfuraceous, white to yellow coating below the papilla; ascospores 29–35 × 9–11 μm, pale brown, smooth *C. jatrophae*
1. Ascomata orange-red to red, with a thin, concolorous scurf; ascospores 14–21 × 5–9 μm, hyaline to pale yellow, roughened *C. repens*

on an erumpent stroma, in caespitose clusters of 2 to several, obpyriform, 350–700 × 460–500 μm, not collapsing when dry, red, KOH+ dark red, yellow in lactic acid, with white to yellow furfuraceous covering over the lower third of each perithecium that often wears off, with acute, red, smooth apex; papilla of cylindrical, septate hyphae with rounded apices, 2–3 μm wide, walls about 1 μm thick. Cells at the surface of *textura angularis*, 10–15 μm diam, with about 2 μm thick walls, producing yellow, thin-walled hyphae. Ascumatal wall 30–40 μm thick, not differentiated into regions, cells ellipsoid, 15–20 μm long, becoming progressively more flattened toward the interior, about 2 μm wide. Asci clavate, 90–110 × 13–18 μm, apex simple, 8-spored, ascospores biserial. Ascospores ellipsoid to reniform, 29–35 × 9–11 μm, 1-septate, not constricted, hyaline, pale brown when discharged, smooth-walled.

ANAMORPH: Symbiotaxia arising from ascumatal stromata, red, branched, fertile tips widely inflated at maturity, discoidal. Macroconidia developing on a disc, 40–100 × 8–10 μm, 3–7-septate.

HABITAT.— On bark.

DISTRIBUTION.— Brazil, Colombia, Costa Rica, French Guiana, Nicaragua, Panama (Samuels, 1973a; Samuels & Dumont, 1982), Venezuela.

TYPE.— BRAZIL. Amazonas, Manaus, on bark of unidentified plant, Batista, 20 Feb 1961 (URM 22, holotype of *M. amazonensis*); Rio Jurua, Cacoira, on dead stems of *Carica* sp., May 1901, Ule 2822 (FH, isotype of *Corallomyces caricae*). PUERTO RICO, base of living tree, culture G.J.S. 96-18 = CBS 913.96.

ADDITIONAL SPECIMENS EXAMINED.— FRENCH GUIANA. Route de Belizon, track to Montagne Tortue, 15 km from road N2, on bark of newly killed tree, 18 Feb 1988, A.Y. Rossman 3230b & C. Feuillet (BPI 1107295); *ibid.*, A.Y. Rossman 3222 (BPI 1107291). NICARAGUA. Indian River, on bark of unidentified tree, 2 Mar 1896, C.L. Smith (NY). VENEZUELA. Amazonas: Cerro de la Neblina, valley at N base of Pico Phelps, cloud forest, on bark, Apr 1984, G.J. Samuels 1297 (BPI 1107268); Bolivar, along Rio Caroni near rapids just below Uriman, on bark, 11 Jan 1955, J.A. Steyermark & J.J. Wurdack, det. G.J. Samuels (BPI 552420).

ILLUSTRATIONS.— Möller (1901, Pl. 1, Figs. 21–28, 30; Pl. 2, Figs. 31, 32; Pl. 9, Fig. 5, as *Corallomyces jatrophae*); Samuels (1973a, Figs. 10–13, as *N. amazonensis*); Wollenweber (1930, No. 684, as *C. jatrophae*).

COSMOSPORA Rabenh., *Fungi europaei* no. 459. 1862

≡ *Nectria* subgenus *Cosmospora* (Rabenh.) Sacc., *Syll. Fung.* 2: 508. 1883.

Type: *C. coccinea* Rabenh.

= *Dialonectria* (Sacc.) Cooke, *Grevillea* 12: 109. 1884 (≡ *Nectria* subgenus *Dialonectria* Sacc., *Syll. Fung.* 2: 490. 1883). — Lectotype, designated by Clements & Shear (1931): *D. episphaeria* (Tode : Fr.) Cooke (≡ *Sphaeria episphaeria* Tode : Fr.), recognized as *Cosmospora episphaeria* (Tode : Fr.) Rossman & Samuels.

= *Chrysogluen* Briosi & Farneti, *Atti Ist. Bot. Univ. Pavia, Ser. 2*, 8: 117. 1904. — Lectotype, designated by Rogerson (1970): *C. biasoletianum* Briosi & Farneti, recognized as *Cosmospora biasoletiana* (Briosi & Farneti) Rossman & Samuels.

= *Sylonectria* Höhn., *Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl., Abt. 1*, 124: 52. 1915. — Type: *S. applanata* Höhn., a synonym of *Cosmospora purtonii* (Grev.) Rossman & Samuels.

Ascumata solitary to densely gregarious, superficial, rarely immersed, non-stromatic or seated on a thin basal stroma, globose, obpyriform to broadly obpyriform, small to medium-sized, usually less than 300 μm diam, collapsing laterally or not collapsing when dry, orange to red or dark red, rarely pale yellow, usually KOH+ darker, rarely KOH–, smooth to slightly scaly, glabrous or with few to numerous hairs arising from cells of the ascumatal wall surface; papilla of parallel hyphal elements with rounded ends. Cells of the ascumatal wall surface lacking a definite shape, often with a meandering aspect with walls of variable thickness and narrow lumina, adjacent cells joined by fine pores. Ascumatal wall thin, less than 20 μm thick, often translucent, of a single region of intertwined hyphae, rarely of two regions; cells lacking a definite shape or appearing ellipsoid. Asci cylindrical to narrowly clavate, apex simple or with a ring, sessile or short-stalked, 8-spored, ascospores generally uniseriate. Ascospores ellipsoid to ellipsoid-fusiform, rarely ovoid or cylindrical, 1(–3)-septate, usually yellow-brown, also hyaline, usually spinulose to tuberculate, rarely striate or smooth. Anamorphs, where known, *Acremonium*-like, with colonies and microconidia similar to those of *Fusarium* sect. *Eupionnotes*, *Chaetopsina*, *Cylindrocladiella*, *Stilbella*, and *Volutella*. On other fungi and scale insects, less frequently on decaying woody substrata.

NOTES.— *Cosmospora* and its type species were described on the label of Rabenhorst, *Fungi europaei* no.

459, which apparently is the earliest publication of these taxa. Saccardo (1883) recognized *Nectria* subgenus *Cosmospora* for species with verrucose ascospores including only *N. cosmariospora*, with *C. coccinea* Rabenh. as a synonym. Booth (1959), Rossman (1983), Samuels (1976a) and others have referred the species placed in *Cosmospora* as the *N. episphaeria*-group. Samuels *et al.* (1991) recognized this group at the subgeneric level as *Nectria* subgenus *Dialonectria* based on a combination of characteristics including ascomatal morphology and anamorph. Species additional to those in Samuels *et al.* (1991) are recognized here in *Cosmospora* including three species on scale insects. The species of slow-growing, fungicolous and insecticolous Fusaria that are anamorphs of *Cosmospora* have been shown to constitute a monophyletic group of related species within *Fusarium* (O'Donnell, 1993).

Saccardo (1883) established *Dialonectria* as a subgenus of *Nectria* including 51 species, without designating a type. Later Cooke (1884) raised the name to generic rank with 134 species, also without designating a type. Clements & Shear (1931) selected *D. episphaeria* as the lectotype of the genus *Dialonectria*. The name *Dialonectria episphaeria* is based on *Sphaeria episphaeria*, a species that has long been known as *Nectria episphaeria*. Booth (1959) designated a lectotype specimen for *Sphaeria episphaeria* and presented a modern description of *C. episphaeria* (as *Nectria episphaeria*) including the anamorph, *Fusarium aquaeductuum* Lagerh. var. *medium* Wollenw.

The genus *Chrysogluen* was described as a lichen in its own family, the *Chrysogluenaceae*. Two species were included: *C. biasolettianum* and *C. cesatii*. Rogerson (1970) designated *C. biasolettianum* as the lectotype because the type specimen of this species was said to be mature. The type specimen of *Chrysogluen biasolettianum* was examined and determined to belong in the hypocrealean genus *Cosmospora*.

Stylonectria was described by von Höhnelt as an anamorph genus with the type species, *S. applanata*, for which the teleomorph was considered to be *Nectria applanata*, a synonym of *Nectria purtonii* (Grev.) Berk. (Booth, 1959; Samuels *et al.*, 1991). Based on an examination of type material, Booth (1959) presented convincing evidence that the supposed pycnosporous described by Fuckel (1871) and regarded by von Höhnelt

as conidia inside pycnidia are, in reality, ascospores that had been released from the asci within the ascomata, a common occurrence in hypocrealean fungi. The anamorph of *N. purtonii* has been shown by Booth (1959) and others to be *Fusarium aquaeductuum* (Radlk. & Rabenh.) Lagerh. var. *aquaeductuum* (Samuels *et al.* 1991). *Cosmospora purtonii* (as *Nectria purtonii* (Grev.) Berk.) has been placed in the *Nectria episphaeria*-group (Booth, 1959) and *Nectria* subgenus *Dialonectria* (Samuels *et al.* 1991).

Cosmospora coccinea Rabenh., Fungi europaei no. 459. 1862. — Plate 28, a.

= *Nectria cosmariospora* Ces. & De Not., Schema Classif. Sferiac. ital., Comment. Soc. Crittog. Ital. 1(4): 195. 1863.

= *Dialonectria cosmariospora* (Ces. & De Not.) Moravec, Česká Mykol. 8: 92. 1954.

Anamorph: *Verticillium olivaceum* W. Gams, *Cephalosporium*-artige Schimmelpilze p. 129. 1971.

Ascomata scattered, solitary, superficial, pyriform with a pointed apex, orange, smooth, 375–450 µm high × 280–300 µm diam. Ascomatal walls 20–30 µm thick. Asci cylindrical, 130–200 × 12–15 µm, tapering to a short base, 8-spored, ascospores uniseriate. Ascospores broadly ellipsoid, (13.5–)14.5–17(–18.5) × (8.5–)10–12.5(–14.5) µm, 1-septate, at first hyaline, becoming yellow-brown to reddish-brown, coarsely warted. Description modified from Gams (1971).

HABITAT.— On hymenial surface of old polypore basidiomata, particularly *Inonotus* spp. on *Fagus* and *Alnus* (T. Læssøe and W. Gams, pers. comm.).

DISTRIBUTION.— Europe.

LECTOTYPE, designated herein: GERMANY. Near Laubach, on rotten wood [actually on rotting pores of a polypore]. leg. Solms. Rabenhorst, Fungi europaei no. 459 (BPI).

ILLUSTRATIONS.— Gams (1971, Fig. 85); Munk (1957, Fig. 4); Samuels *et al.* (1991, Figs. 5–7); Schmid & Schmid (1990, Fig. 31), all as *Nectria cosmariospora*.

SPECIMEN ILLUSTRATED.— SWITZERLAND. Sächs, on old '*Polyporus*' *nodulosus*, Oct 1913, W. Krieger, Fungi saxoni-ci 1858b as *Nectria cosmariospora* (BPI 551434).

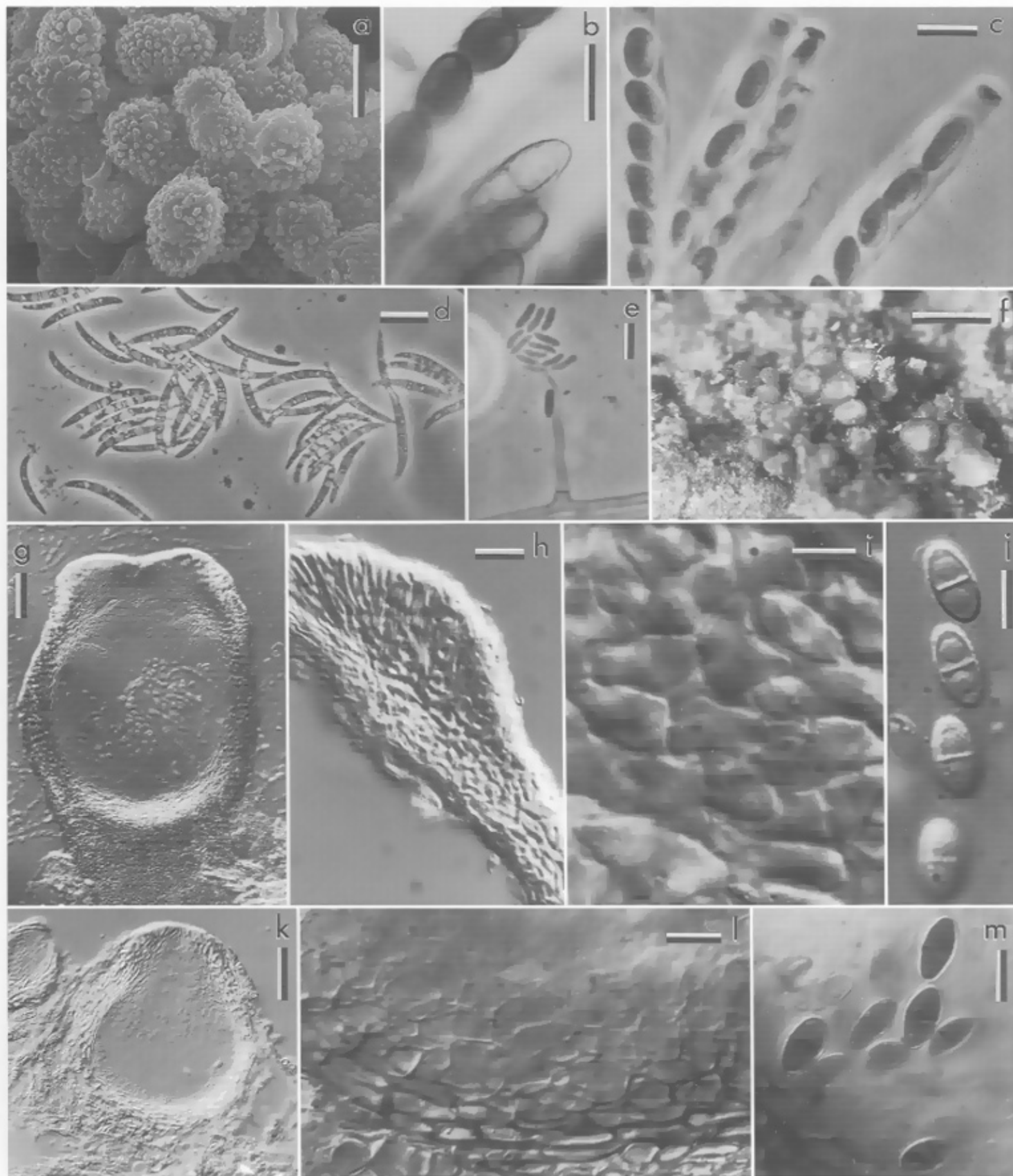
NOTES.— This species has generally been referred to as *Nectria cosmariospora*; if combined in *Nectria*, it would become a later homonym of *N. coccinea* (Pers.: Fr.) Fr. An examination of the type specimen has con-

Plate 28. a. *Cosmospora coccinea*. SEM of ascospores. b. *Cosmospora dingleyae*. Ascus apex with ascospores. c–e. *Cosmospora obscura*. c. Asci with ascospores. d. Macroconidia of *Fusarium* anamorph. e. Microconidia of *Fusarium* anamorph. f–j. *Cosmospora pseudepisphaeria*. f. Ascomata on natural substratum. g. Median section of ascoma. h. Median section of ascomatal apex. i. Close-up of ascomatal wall cells showing pores between cells. j. Ascus apex with ascospores. k–m. *Cosmospora biasolettiana*. k. Median section of ascoma. l. Close-up of ascomatal wall. m. Ascospores stained in cotton blue. a. BPI 551434. b. Holotype – PDD 46011. c–e. Holotype – PDD 46349. f–j. Holotype of *Nectria pseudepisphaeria* – NY. k–m. Holotype of *Chrysogluen biasolettianum* – NY. Scale bars: a–c, e, l, m = 10 µm; d = 20 µm; f = 500 µm; g = 100 µm; h, k = 50 µm; i, j = 25 µm.

firmed *Cosmospora coccinea* to be synonymous with the published accounts of *N. cosmariospora*. Both Gams (1971, culture CBS 341.70) and Tayel & Hastie (1975) proved that *C. coccinea* is heterothallic.

ADDITIONAL SPECIES OF *COSMOSPORA*:

Most species of *Cosmospora* were included in Samuels *et al.* (1991) who provided a synopsis with illustrations



of the forty species of *Nectria* subgenus *Dialonectria*. All of these species are transferred herein to *Cosmospora*. Three new species and eight additional new combinations are recognized, three of which are insecticolous and have *Fusarium* anamorphs. The key included here is modified from Samuels *et al.* (1991).

Cosmospora aurantiicola (Berk. & Broome) Rossman & Samuels, *comb. nov.*

≡ *Nectria aurantiicola* Berk. & Broome, J. Linn. Soc. 14: 117. 1873.

≡ *Sphaerostilbe aurantiicola* (Berk. & Broome) Petch, Ann. Roy. Bot. Gard. (Peradeniya) 7: 199. 1920.

[≡ *Corallomyces aurantiicola* (Berk. & Broome) Höhn., Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl., Abt. 1, 121: 353. 1912, gen. illeg., Art. 53].

= *Microcera aurantiicola* Petch, Trans. Brit. Mycol. Soc. 7: 158. 1921.

Anamorph: *Fusarium larvarum* Fuckel, Jahrb. Nassauischen Vereins Naturk. 23–24: 369. 1869 [1870].

HABITAT.— Associated with scale insects and adelgids.

DISTRIBUTION.— Warm temperate and tropical regions, known from Australia, Canada (Quebec), Japan, Malawi, New Zealand, Sabah, Syria, Tanzania, United States (Alabama), West Indies and Zambia as the teleomorph, while the anamorph is reported from many additional countries.

NOTES.— This species was described and illustrated by Booth (1971, 1981), as *Nectria aurantiicola* and Gerlach & Nirenberg (1982, anamorph only).

Cosmospora biasolettiana (Briosi & Farneti) Rossman & Samuels, *comb. nov.* — Plate 28, k–m.

≡ *Chrysoglutin biasolettianum* Briosi & Farneti, Atti Ist. Bot. Univ. Pavia II, 8: 117. 1904.

Anamorph: *Fusarium biasolettianum* Corda, Icon. Fung. 2: 3. 1838.

Ascomata solitary to gregarious, scattered, immersed in a translucent mass of hyphae forming a slimy, pale orange sheet over the substratum, outline of darker ascomata visible through stroma, hyphae of stroma agglutinated, forming a loose prosenchyma of thin-walled, hyaline cells, cells more or less oriented parallel to the ascomata around the sides and parallel to the substratum at the base of the ascomata; when dried, ascomata only partially immersed, when rehydrated ascomata completely immersed with only the short papilla emerging; ascomata solitary to gregarious, globose, 125–180 µm diam, laterally pinched when dry, pale yellow to pale buff, KOH–, papilla about 100 µm high

× 30 µm diam. Ascomatal surface of large, thin-walled cells, 6–12 µm diam, forming a *textura angularis*. Ascomatal wall 15–25 µm thick, of elongate cells, 6–12 × 3–4.5 µm, forming a *textura prismatica*; around the apex cells becoming thick-walled, 1.5–2 µm thick. Asci narrowly clavate, 36–45 × 8–10 µm, simple, 8-spored, ascospores obliquely uniseriate. Ascospores ellipsoid with small guttules, 9–9.5 × 4–5 µm, 1-septate, hyaline, smooth.

HABITAT.— In slime flux on tree trunks.

DISTRIBUTION.— Italy, United States (New Hampshire).

TYPE.— ITALY. Istria, 'in truncis vivis *Vitis viniferae* veris tempore fletu madidis prope Cavam Carbonariam in agro ticinensi'. G. Briosi & R. Farneti, ex Herb. Briosi, received from Briosi 20 Mar 1903 (NY – slides of isotype ex FH; FH – specimen not located).

ADDITIONAL SPECIMEN EXAMINED.— UNITED STATES. New Hampshire: Jackson, on slime exudate of *Betula*, June 1897 (NY ex FH).

NOTES.— Like many species of *Cosmospora*, *C. biasolettiana* is associated indirectly with other fungi on decaying substrata and it has a *Fusarium* anamorph. The basionym, *Chrysoglutin biasolettianum* Briosi & Farneti as '(Corda) Briosi & Farneti', is the teleomorph of *Fusarium biasolettianum* and was originally based on that name. The type specimen of *C. biasolettianum* contains mature ascomata. The relationship between *C. biasolettianum* and *F. biasolettianum* has not been confirmed. According to Wollenweber & Reinking (1935) and Booth (1971), *Fusarium biasolettianum* may be a synonym of *F. merismoides* Corda. Briosi & Farneti (1904) mentioned that they found 'gonidia' in the slime, and that the species could be lichenized. Cooke & Hawksworth (1970) indicated that the family *Chrysoglutinaceae* was entirely or partially lichenized, probably based on Briosi & Farneti's description. Although algal cells were observed among other organisms in the mixture of material on the substratum, they were not consistently associated with the ascomata. *Cosmospora biasolettiana* seems most closely related to *C. rishbethii*, a species known only from England from the cut end of a log of *Pinus sylvestris*.

Cosmospora camelliae (Shipton) Rossman & Samuels, *comb. nov.*

≡ *Calonectria camelliae* Shipton, Trans. Brit. Mycol. Soc. 72: 163. 1979.

Anamorph: *Cylindrocladiella infestans* Boesewinkel, Canad. J. Bot. 60: 2290. 1982.

HABITAT.— On wood and bark of *Pinus pinea* and on fruit of unknown rainforest tree.

DISTRIBUTION.— Australia, New Zealand (anamorph).

Cosmospora chaetopsinae (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria chaetopsinae* Samuels, *Mycotaxon* 22: 18. 1985.

Anamorph: *Chaetopsina cf. fulva* Rambelli, *Atti Accad. Sci. Bologna* 15: 5. 1956.

HABITAT.— On decaying leaves, possibly on dematiaceous hyphae.

DISTRIBUTION.— *Cosmospora chaetopsinae* is known only from New Zealand and Venezuela while *Chaetopsina fulva* is common and cosmopolitan.

Cosmospora chaetopsinae-catenulatae (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria chaetopsinae-catenulatae* Samuels, *Mycotaxon* 22: 28. 1985.

Anamorph: *Chaetopsina catenulata* Samuels, *Mycotaxon* 22: 28. 1985.

HABITAT.— On bark and ascomycetous stromata.

DISTRIBUTION.— Ecuador, Indonesia, Jamaica, Venezuela. Culture: CBS 491.92.

Cosmospora chaetopsinae-penicillatae (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria chaetopsinae-penicillatae* Samuels, *Mycotaxon* 22: 24. 1985.

Anamorph: *Chaetopsina penicillata* Samuels, *Mycotaxon* 22: 24. 1985.

HABITAT.— On bark and base of palm frond.

DISTRIBUTION.— Ecuador, Jamaica, and New Zealand.

NOTES.— In addition to Samuels *et al.* (1991), a complete description and illustrations were published in Samuels & Brayford (1994). Culture: CBS 608.92.

Cosmospora chaetopsinae-polyblastiae (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria chaetopsinae-polyblastiae* Samuels, *Mycotaxon* 22: 21. 1985.

Anamorph: *Chaetopsina polyblastia* Samuels, *Mycotaxon* 22: 21. 1985.

HABITAT.— On bark and decaying palm debris.

DISTRIBUTION.— Tropical America, common.

Cosmospora chlorina (P. Crouan & H. Crouan) Lowen, *comb. nov.*

≡ *Nectria chlorina* P. Crouan & H. Crouan, *Fl. Finistère*, p. 37. 1867.

≡ *Nectriella chlorina* (P. Crouan & H. Crouan) Sacc., *Michelia* 1: 278. 1878.

Anamorph: unknown.

Ascomata superficial, scattered or in groups of 3, non-stromatic, obpyriform, 220 µm high × 190 µm diam, translucent red, KOH+ dark red, yellow in lactic acid; papilla conical. Surface covered with 1–2 µm wide hyphae. Asci cylindrical, 35–40 × 4–5 µm, apex truncate, containing a ring; ascospores uniseriate. Ascospores ellipsoid, 5.5–7 × 2.5–3 µm, 1-septate, hyaline, smooth to slightly striate.

HABITAT AND DISTRIBUTION.— Known only from the type.

TYPE.— FRANCE. Brittany: Finistère, at the base of a dead branch of *Angelica sylvestris*, 20 May 1857, labeled '*Nectria chlorina* olim, *Sphaeria citrina* Wallr., *N. chlorina* Fr. Summa'. Crouan & Crouan (CO, lectotype, designated herein; CO, isotype specimen – packet with picture labeled 'la thèque ne présente pas ... d'un fluide du lactique, gross. 40 fois').

NOTES.— Although the drawing on the packet and the original description of *Cosmospora chlorina* indicate that this species has bright yellow ascomata, the ascomata examined were translucent red but otherwise fit the original description. This species is distinguished by having ascospores smaller than any other species of *Cosmospora*; it is allied with the lineage of *Cosmospora* that includes corticolous or herbicolous species having hyaline ascospores (Samuels *et al.*, 1991).

Cosmospora consors (Ellis & Everh.) Rossman & Samuels, *comb. nov.*

≡ *Dialonectria consors* Ellis & Everh., *J. Mycol.* 4: 122. 1888.

≡ *Nectriella consors* (Ellis & Everh.) Saccardo, *Syll. Fung.* 9: 941. 1891.

≡ *Nectria consors* (Ellis & Everh.) Seaver, *Mycologia* 1: 61. 1909.

= *Nectria ignia* Höhn., *Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl., Abt. 1*, 118: 1475. 1909.

Anamorph: *Volutella minima* Höhn., *Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl., Abt. 1*, 118: 1543. 1909.

HABITAT.— On decaying herbaceous debris.

DISTRIBUTION.— Pantropical and subtropical, extending into the Smoky Mts. of North Carolina.

NOTES.— This species and its *Volutella* anamorph were described and illustrated by Samuels (1977). Culture: CBS 328.77.

Cosmospora digitalicola (P. Crouan & H. Crouan) Lowen, *comb. nov.*

≡ *Nectria digitalicola* P. Crouan & H. Crouan, *Fl. Finistère*, p. 37. 1867.

≡ *Nectriella digitalicola* (P. Crouan & H. Crouan) Sacc., *Michelia* 1: 278. 1878.

Anamorph: unknown.

Ascomata scattered or in groups up to 3, non-stromatic, superficial, obpyriform, 220 µm high × 190 µm diam,

red-orange, KOH+ red, pallid in lactic acid, collapsed vertically, smooth, papilla with rounded apex. Cells on ascomatal surface forming a *textura epidermoidea*. Ascomatal wall 8–12 μm thick. Asci clavate, 36–40 \times 4–6.5 μm , apex simple, ascospores uniseriate with overlapping ends or irregularly biseriata. Ascospores cylindrical, 11–12 \times 3–4 μm , 1-septate, slightly constricted, hyaline, smooth-walled.

HABITAT AND DISTRIBUTION.— Known only from the type locality.

TYPE.— FRANCE. Brittany: in marshy places, on stems of *Digitalis*, 12 Oct 1863, Crouan & Crouan (CO, holotype).

NOTES.— Ascomata on the type collection of *Cosmospora digitalicola* are sparse. This species is allied with *C. consors* in the lineage of *Cosmospora* that includes corticolous or herbicolous species having hyaline ascospores (Samuels *et al.*, 1991).

***Cosmospora diminuta* (Berk.) Rossman & Samuels, comb. nov.**

≡ *Nectria diploa* Berk. & M.A. Curtis var. *diminuta* Berk., Grevillea 4:46. 1875.

≡ *Nectria diminuta* (Berk.) Sacc., Syll. Fung. 2: 498. 1883. = *Dialonectria gigaspora* Cooke & Masee, in Cooke, Grevillea 17: 42. 1888.

≡ *Nectriella gigaspora* (Cooke & Masee) Sacc., Syll. Fung. 9: 942. 1891.

≡ *Pseudonectria gigaspora* (Cooke & Masee) Petch, Ann. Roy. Bot. Gard. (Peradeniya) 7: 122. 1920.

Anamorph: unknown.

Ascomata on effete stromata of black pyrenomycetes, red, KOH+ dark red, bright yellow in lactic acid. Cells on the surface of the ascomata ellipsoid, 7 \times 4 μm , thick-walled, surface obscured by 2.5–5 μm wide hyphae. Asci clavate, 40–50 \times 10–12 μm ; apex rounded to truncate, without apical ring, asci often deliquescent in the centrum, ascospores diagonally biseriata in the middle, ascospores uniseriate above and below. Ascospores ellipsoid-fusiform, (18–)25–39 \times (6.5–)8.5–14 μm , at first 1-septate, ultimately 3-septate, hyaline, yellow-brown at maturity, finely to prominently striate.

HABITAT.— On stromata of *Botryosphaeria* and *Valsa*.

DISTRIBUTION.— Sri Lanka, United States (South Carolina).

TYPES.— SRI LANKA (Ceylon). Hakgalla, on *Botryosphaeria inflata*. Thwaites 542 (NY, isotype of *D. gigaspora*, filed as *Nectria gigaspora*); UNITED STATES. South Carolina. Society Hill, on some *Sphaeria* on alder, Car. Inf. No. 4029 (FH – Curtis Herbarium, isotype of *N. diploa* var. *diminuta*).

ILLUSTRATIONS.— Samuels *et al.* (1991, Fig. 17, as *Nectria diminuta*).

NOTES.— Young ascospores of *Cosmospora diminuta*

are 1-septate; however, additional septa often develop after the ascospores are released from the asci and are obscured by thick striations at maturity. A *Volutella*-like hyphomycete is present on the type collection of *D. gigaspora* that may be the anamorph of *C. diminuta* with characteristics as follows: Conidiogenous cells 5–11 \times 3 μm , narrowing to 2 μm at the apex; apical wall thickened, but not flared; conidia ellipsoid, 4–5.5 \times 3 μm , non-septate and smooth.

***Cosmospora dingleyae* Lowen, sp. nov.** — Plate 26, b; Plate 28, b.

Anamorph: *Fusarium* sp.

Ascomata immersa, interdum erumpentia, sparsa, vel usque ad 20 aggregata, obpyriformia, 175–420 μm alta \times 175–378 μm diam, rubro-aurantiaca, KOH+ parum fuscata, papilla truncata. Setae cingentes ostiolum, 14–24 \times 5–8 μm , pariete usque ad 3 μm incrassata, apice rotundato. Asci cylindrici, 76–88 \times 5–9 μm ; apex annulo praeditus. Ascosporeae ellipsoideae, 12–18 \times 4–8 μm , 1-septatae, brunneolae, verrucosae.

Ascomata immersed, sometimes becoming erumpent, scattered or in groups of up to 20, obpyriform, 175–420 μm high \times 175–378 μm diam, red-orange, KOH+ slightly darker red, pallid in lactic acid, slowly becoming yellow; papilla truncate, 60–120 μm high \times 100–130 μm diam; collapsing vertically with the papilla retaining its shape. Setae surrounding the ostiole 14–24 \times 5–8 μm , with walls up to 3 μm thick; apex rounded. Cells on ascomatal surface angular, 10–16 μm diam. Ascomatal wall 30–40 μm thick, of two regions: outer region 20–30 μm thick, of thick-walled, angular to rounded cells; inner region of thin-walled, elongate, rectangular cells. Asci cylindrical, 76–88 \times 5–9 μm ; apex truncate with a ring, ascospores uniseriate. Ascospores ellipsoid, 12–18 \times 4–8 μm , 1-septate, occasionally slightly constricted, at first hyaline, becoming pale brown, verrucose.

CHARACTERISTICS IN CULTURE.— Colonies grown at 20°C on PCA: aerial mycelium cottony, slightly zonate, at first orange, nearly transparent; reverse slightly darker orange; margin white, then pale brown with diffusing, pale brown pigment. Conidiophores arising directly from the agar surface and from the aerial mycelium; microconidiophores morphologically distinct from macroconidiophores. Microconidiophores arising from aerial mycelium, stipe ca 20 μm long, branching irregularly, each branch terminating in a single phialide; phialides cylindrical, ca 20 μm long, tapering from 1.5 μm at the base to 1 μm at the apex. Microconidia cylindrical, 4–7 \times 1.5–2 μm . Macroconidiophores 70–255 μm long, 5–9 μm wide at the base, 3.5(–5) μm wide at the apex, hyaline, smooth; apex with visible periclinal thickening, not flared. Macroconidia falcate, 40–50 \times 4–6 μm , 3–7-septate, smooth, hyaline; foot-cell indis-

tinct; held in a hyaline liquid droplet. Chlamydo-spores not observed.

HABITAT.— On bark.

DISTRIBUTION.— New Zealand.

TYPE.— NEW ZEALAND. Northland, Hokianga County, vic. Mangamuka Bridge, Omahuta State Forest, Omahuta Kauri Sanctuary, 10 May 1981, G.J. Samuels 81-106 & E. Horak (PDD 46011, holotype; IMI 297573, isotype culture and slides).

ADDITIONAL SPECIMEN EXAMINED.— NEW ZEALAND. Westland: Waiho, in bark of *Olearia avicenniifolia*, June 1950, J.M. Dingley 12/46 (part of PDD 10507).

ETYMOLOGY.— Named in honor of Joan M. Dingley, for her collection of this fungus and for her work with hypocrealean fungi.

NOTES.— The *Fusarium* anamorphs of *Cosmospora dingleyae* and *C. obscura* are characterized by slow-growing, slimy, orange cultures that produce little aerial mycelium, similar to *Fusarium merismoides* Corda and other *Fusarium* anamorphs of species of *Cosmospora*. Despite their immersed ascomata reminiscent of *Nectriella*, *C. dingleyae* and *C. obscura* are placed in *Cosmospora* on the basis of the verrucose, pale brown ascospores and *Fusarium* anamorphs. *Cosmospora dingleyae* is distinguished from *C. obscura* by the orange ascomata and setae encircling the ostiole and from other species of *Cosmospora* by the immersed, setose ascomata. *Cosmospora dingleyae* is similar to *C. pseudo-flavoviridis* in having setae around the ostiole.

Cosmospora diploa (Berk. & M.A. Curtis) Rossman & Samuels, *comb. nov.*

≡ *Nectria diploa* Berk. & M.A. Curtis, J. Linn. Soc. (Bot.) 10: 378, 1869.

≡ *Creonectria diploa* (Berk. & M.A. Curtis) Seaver, Mycologia 1: 190, 1909.

≡ *Calonectria diploa* (Berk. & M.A. Curtis) Wollenw., Angew. Bot. 8: 193, 1926.

= *Nectria coccophila* Nomura, Rep. Imp. Agric. Exp. Stn. 18: 105, 1901.

Anamorph: *Fusarium coccidicola* Henn., Bot. Jahrb. Syst. 34: 57, 1904.

= *Fusarium juruanum* Henn., Hedwigia 43: 398, 1904.

= *Aschersonia henningsii* Koorders, Bot. Untersuch. Java p. 213, 1907.

≡ *Pseudomicrocera henningsii* (Koorders) Petch, Trans. Brit. Mycol. Soc. 7: 164, 1921.

HABITAT.— Associated with scale insects.

DISTRIBUTION.— Tropical regions.

NOTES.— This species was described and illustrated by Booth (1971, as *Calonectria diploa*) and Rossman (1983, as *Nectria diploa*). The anamorph synonymy follows Gerlach & Nirenberg (1982).

Cosmospora episphaeria (Tode : Fr.) Rossman & Samuels, *comb. nov.*

≡ *Sphaeria episphaeria* Tode : Fr., Tode, Fungi Mecklenb. Sel. 2: 21, 1791 : Fries, Syst. Mycol. 2: 454, 1823.

≡ *Nectria episphaeria* (Tode : Fr.) Fr., Summa Veg. Scand. p. 388, 1849.

≡ *Dialonectria episphaeria* (Tode : Fr.) Cooke, Grevillea 12: 110, 1884.

Anamorph: *Fusarium aquaeductuum* (Radlk. & Rabenh.) Lagerh. var. *medium* Wollenw., Z. Parasitenk. (Berlin) 3: 298, 1931.

HABITAT.— On stromatic ascomycetes on hardwoods.

DISTRIBUTION.— Cosmopolitan but more common in north temperate regions.

Cosmospora flammea (Tul. & C. Tul.) Rossman & Samuels, *comb. nov.*

≡ *Sphaerostilbe flammea* Tul. & C. Tul., Sel. Fung. Carpol. 3: 103, 1865.

≡ *Nectria flammea* (Tul. & C. Tul.) Dingley, Trans. Roy. Soc. New Zealand 79: 189, 1951.

= *Nectria laeticolor* Berk. & M.A. Curtis, J. Linn. Soc. (Bot.) 10: 377, 1868.

[≡ *Corallomyces laeticolor* (Berk. & M.A. Curtis) Höhn., Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl., Abt. 1, 121: 363, 1912, genus illeg., Art. 53].

= *Nectria aglaothele* Berk. & M.A. Curtis, Grevillea 4: 45, 1875.

= *Nectria subcoccinea* Sacc. & Ellis, Michelia 2: 570, 1881.

= *Nectria passeriniana* Cooke, Grevillea 12: 81, 1884.

[= *Corallomyces brachysporus* Penz. & Sacc., Malpighia 15: 228, 1901, genus illeg., Art. 53].

Anamorph: *Fusarium coccophilum* (Desm.) Wollenw. & Reink., Die Fusarien p. 34, 1935.

HABITAT.— Associated with scale insects.

DISTRIBUTION.— Warm temperate and tropical regions.

NOTES.— This species was described and illustrated by Booth (1971, 1981, as *Nectria flammea*), Gerlach & Nirenberg (1982, anamorph only), and Samson *et al.* (1988, as *N. flammea*).

Cosmospora flavoviridis (Fuckel) Rossman & Samuels, *comb. nov.*

≡ *Sphaerostilbe flavoviridis* Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24: 22, 1869 [1870].

Anamorph: *Fusarium melanochlorum* (Casp.) Sacc., Syll. Fung. 4: 725, 1886.

≡ *Fusisporium melanochlorum* Casp., Sitzungsber. Preuss. Akad. Wiss., Physik.-Math. Kl. p. 309, 1855.

HABITAT.— On stromatic ascomycetes on wood.

DISTRIBUTION.— Europe, England.

Cosmospora ganymede (Lowen & Minter) Rossman & Samuels, *comb. nov.*

≡ *Nectria ganymede* Lowen & Minter, Trans. Brit. Mycol. Soc. 88: 59. 1987.

Anamorph: *Fusarium* sp.

HABITAT.— Ascomata of *Zeus olympius*.

DISTRIBUTION.— Greece.

Cosmospora geastroides (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria geastroides* Samuels, Mycol. Pap. 164: 20. 1991.

Anamorph: *Acremonium*-like.

HABITAT.— On bark, wood, petioles, possibly on mycelium and fructifications of ascomycetes.

DISTRIBUTION.— Jamaica, Peru, ?New Zealand.

Cosmospora glabra (Rossman) Rossman & Samuels, *comb. nov.*

≡ *Nectria glabra* Rossman, Mycol. Pap. 150: 34. 1983.

Anamorph: *Fusarium* sp.

HABITAT.— Fungicolous, herbicolous or corticolous.

DISTRIBUTION.— Colombia, Ecuador, Jamaica, Venezuela.

NOTES.— This species was described and illustrated by Rossman (1983) and Samuels & Brayford (1994).

Cosmospora joca (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria joca* Samuels, Mycol. Pap. 164: 21. 1991.

Anamorph: *Acremonium*-like.

HABITAT.— On *Hypoxyton* sp.

DISTRIBUTION.— Brazil.

Cosmospora jucundula (Sacc. & Speg.) Rossman & Samuels, *comb. nov.*

≡ *Nectriella jucundula* Sacc. & Speg., *Michelia* 1: 409. 1878.

Anamorph: None known.

HABITAT.— On dead culms of *Arundo donax*.

DISTRIBUTION.— Italy.

NOTES.— This species was described in Rossman *et al.* (1993).

Cosmospora kurdica (Petra) Rossman & Samuels, *comb. nov.*

≡ *Calonectria kurdica* Petra, *Sydowia* 13: 95. 1959.

≡ *Nectria kurdica* (Petra) Rossman, Mycol. Pap. 150: 35. 1983.

Anamorph: *Fusarium kurdicum* Petra, *Sydowia* 13: 96. 1959.

= *Stagonopsis sclerotioides* Höhn., *Ann. Naturhist. Hofmus.* 20: 368. 1905.

≡ *Botryocrea sclerotioides* (Höhn.) Petra, *Sydowia* 3: 141. 1949.

[= *Fusarium sclerotioides* (Höhn.) Samuels & Rossman, Mycol. Pap. 164: 23. 1991, non Sherb. 1915].

HABITAT.— Corticolous.

DISTRIBUTION.— Canary Islands, Iran.

NOTES.— This species has a *Fusarium*-like anamorph that is produced in pycnidia as described in Rossman (1983) and Sutton (1980, anamorph only).

Cosmospora lasiodiplodiae (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria lasiodiplodiae* Samuels, Mycol. Pap. 164: 24. 1991.

Anamorph: *Acremonium*-like.

HABITAT.— On bark and on pycnidia of *Lasiodiplodia theobromae* and its teleomorph.

DISTRIBUTION.— Brazil (Amazonas).

Cosmospora leptosphaeriae (Nießl) Rossman & Samuels, *comb. nov.*

≡ *Nectria leptosphaeriae* Nießl, *Fungi Saxonici* 165. 1886.

≡ *Hypomyces leptosphaeriae* (Nießl) Wollenw., *Ann. Mycol.* 15: 8. 1917.

≡ *Lasionectria leptosphaeriae* (Nießl) Petch, *Trans. Brit. Mycol. Soc.* 21: 268. 1938.

= *Nectria leptosphaeriae* var. *macrospora* Wollenw., *Angew. Bot.* 8: 187. 1926.

Anamorph: *Fusarium sphaeriae* Fuckel, *Jahrb. Nassauischen Vereins Naturk.* 23–24: 370. 1869 [1870].

HABITAT.— On *Leptosphaeria* on herbaceous stems.

DISTRIBUTION.— England, Europe.

Cosmospora macrochaetopsinae (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria macrochaetopsinae* Samuels, in Samuels, Doi & Rogerson, *Mem. New York Bot. Gard.* 59: 40. 1990.

Anamorph: *Chaetopsina* sp.

HABITAT.— Corticolous.

DISTRIBUTION.— Indonesia (North Sulawesi), known only from the type.

Cosmospora magnusiana (Rehm) Rossman & Samuels, *comb. nov.*

≡ *Nectria magnusiana* Rehm, *Michelia* 1: 294. 1878.

Anamorph: *Fusarium epistromum* (Höhn.) C. Booth, The Genus *Fusarium* p. 66. 1971.

≡ *Dendrodochium epistromum* Höhn., Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl., Abt. 1, 118: 424. 1909.

HABITAT.— On *Diatrypella* spp. on *Betula* spp., *Fagus* spp., and *Quercus* spp.

DISTRIBUTION.— England, Europe.

Cosmospora meliopsicola (Henn.) Rossman & Samuels, *comb. nov.*

≡ *Nectria meliopsicola* Henn. in Engler, Pflanzenw. Ost-Afrikas. p. 32. 1895.

Anamorph: *Acremonium*-like.

HABITAT.— On wood, including *Meliopsis usambarensis*, possibly fungicolous.

DISTRIBUTION.— Eastern and southern Africa (Gabon, Zimbabwe).

Cosmospora metepisphaeria (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria metepisphaeria* Samuels, Mycol. Pap. 164: 29. 1991.

Anamorph: *Acremonium*-like.

HABITAT.— On immersed, black pyrenomycete.

DISTRIBUTION.— Venezuela (Coastal Cordillera), known only from the type.

Cosmospora nothepisphaeria (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria nothepisphaeria* Samuels, Mycol. Pap. 164: 30. 1991.

Anamorph: *Fusarium* cf. *ciliatum* Link, Species Plant. VI, 2: 105. 1825.

HABITAT.— On loculoascomycetes including *Leptosphaerulina* sp., *Leptosphaeria* sp., *Othia* sp.

DISTRIBUTION.— New Zealand (North Island), known only from the type locality.

Cosmospora obscura Lowen, *sp. nov.* — Plate 26, c; Plate 28, c-e.

Anamorph: *Fusarium* cf. *merismoides* Corda, Icones Fungorum 2: 4. 1838.

Ascomata immersa vel erumpentia, distantia vel usque ad 20 aggregata ad caulis nodos, obpyriformia, 150–300 µm alta × 100–230 µm diam, luteola, KOH–; papilla conica, 80 µm alta × 60–80 µm diam; setis paucis, 20–60 × 4–10 µm, 0–1-septatis. Asci cylindrici vel leniter clavati, 60–110 × 5–8 µm,

apex annulo praeditus. Ascospores ellipsoideae vel ovoideae, 8–12 × 4–8 µm, 1-septate, brunneolae, verrucosae.

Ascomata immersed to erumpent with only the base immersed, separate or in groups of up to 20 at nodes of stem, obpyriform, 150–300 µm high × 100–230 µm diam, pale yellow, KOH–; papilla conical, 80 µm high × 60–80 µm diam; collapsing vertically; with sparse setae, 20–60 × 4–10 µm, 0–1-septate. Ascomatal surface cells angular, 5–10 µm diam. Ascomatal wall 12–20 µm thick, of two regions: outer region 16 µm thick, of thick-walled, angular cells; inner region 4 µm thick, of thin-walled, rectangular cells. Asci cylindrical to slightly clavate, 60–110 × 5–8 µm, apex truncate, with a ring; ascospores obliquely uniseriate. Ascospores ellipsoid to ovoid, 8–12 × 4–8 µm, 1-septate, at first hyaline, becoming pale brown, verrucose.

ANAMORPH IN CULTURE: Colonies on PSA lacking aerial mycelium, opaque, slimy, orange, with white radial furrows; margin white, scalloped; odor strong, sweet. Conidiophores arising as lateral branches directly from the agar surface, branching irregularly; each branch terminating in a single phialide; phialides cylindrical, 0–1-septate, hyaline, smooth, 13–30 × 2.5–3 µm; apex with a slight periclinal thickening, not flared. Microconidia lacking. Macroconidia falcate, arcuate, (0–1)–3(–6)-septate: 0-septate 16–26 × 2–3 µm; 1-septate 21–32 × 3–4 µm; 3-septate 34–48 × 3–5 µm; 4-septate 40–50 × 3–5 µm; 5–6-septate 43–54 × 3.5–5 µm; foot-cell indistinct. Chlamydospores not observed.

HABITAT.— On bark.

DISTRIBUTION.— French Guiana, New Zealand.

ETYMOLOGY.— Refers to the pallid ascomata that are difficult to see.

TYPE.— NEW ZEALAND. Gisborne, Urewera National Park, Lake Waikaremoana, vic. Motor camp, Ngamoko Track, on bark, 30 May 1983, G.J. Samuels 83-172, P.R. Johnston, T. Matsushima & A.Y. Rossman (PDD 46349, holotype; IMI 297574, isotype cultures and slides).

ADDITIONAL SPECIMENS EXAMINED.— FRENCH GUIANA. 15 km SW of Saül toward Mt. Galbao, 600–650 m, Jan 1986, G.J. Samuels 2858 & J. Boise (NY); vic. Saül, ca 7 km SW of Saül toward Mt. Galbao, 450–500 m, 3–16 Feb 1986, G.J. Samuels 2786 & J. Boise [*Haematonectria haematococca* also present] (NY). NEW ZEALAND. North Canterbury: Arthur's Pass National Park, Cockayne Nature Walk, on bark of *Pseudopanax crassifolia* [Araliaceae], 20 May 1983, G.J. Samuels 83-153, T. Matsushima, A.Y. Rossman (PDD 46333); Auckland: Waitemata City, Waitakere Ranges, Piha Road, Cowan Track, on bark of *Ripogonum scandens* (Liliaceae), 4 June 1983, A.Y. Rossman & G.J. Samuels 83-130 (IMI 297577, culture and slides; PDD 46312).

NOTES.— *Cosmospora obscura* was grown in culture from single ascospores and produced a slow-growing, slimy, orange culture with little aerial mycelium similar to *Fusarium merismoides* Corda. *Cosmospora obscura* is differentiated from the other immersed species, namely *C. dingleyae*, by the pale yellow ascomata with

sparse setae and from other species of *Cosmospora* by the immersed, inconspicuous, KOH- ascomata. *Cosmospora consors* and *Volutella* sp. are also present in the type collection of *Cosmospora obscura*.

Cosmospora papilionacearum (Seaver) Rossman & Samuels, *comb. nov.*

≡ *Nectria papilionacearum* Seaver, *Mycologia* 1: 62. 1909.

Anamorph: None known.

HABITAT.— On *Parodiella* spp. on leaves of dicotyledonous plants.

DISTRIBUTION.— Costa Rica, United States. (Mississippi, Missouri, Nebraska, South Carolina)

Cosmospora peponum (Berk. & M.A. Curtis) Rossman & Samuels, *comb. nov.*

≡ *Nectria peponum* Berk. & M.A. Curtis, in Berkeley, *Grevillea* 4: 16. 1875.

= *Nectria brassicae* Ellis & Sacc., in Saccardo, *Michelia* 2: 374. 1881.

≡ *Dialonectria brassicae* (Ellis & Sacc.) Cooke, *Grevillea* 12: 110. 1884.

= *Nectria peponum* Berk. & M.A. Curtis var. *aurelia* Berk., *Grevillea* 4: 16. 1874.

Anamorph: *Fusarium* (presumed).

HABITAT.— Herbicolous

DISTRIBUTION.— England, Panama (dubious), United States (Florida, Georgia, New Jersey, South Carolina, Virginia).

Cosmospora pseudepisphaeria (Samuels) Rossman & Samuels, *comb. nov.* — Plate 28, f–j.

≡ *Nectria pseudepisphaeria* Samuels, *Mycol. Pap.* 164: 34. 1991.

Anamorph: *Acremonium*-like.

HABITAT.— On immersed pyrenomycete (?*Diatrypaceae*).

DISTRIBUTION.— Venezuela (Mérida).

Cosmospora pseudoflavoviridis (Lowen & Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria pseudoflavoviridis* Lowen & Samuels, *Mycol. Pap.* 164: 36. 1991.

Anamorph: *Fusarium* cf. *melanochlorum* (Casp.) Sacc., *Syll. Fung.* 4: 725. 1886.

≡ *Fusisporium melanochlorum* Casp., *Sitzungsber. Preuss. Akad. Wiss., Physik.-Math. Kl.* p. 309. 1855.

HABITAT.— Associated with other fungi, including *Nectria* cf. *discophora* and a pyrenomycete with black perithecia, on *Rhopalostylis sapida* and *Metrosideros robusta*.

DISTRIBUTION.— New Zealand (North Island).

Cosmospora purtonii (Grev.) Rossman & Samuels, *comb. nov.*

≡ *Sphaeria purtonii* Grev., *Scott. Crypt. Fl.* 6. Synopsis: 23. 1828.

≡ *Nectria purtonii* (Grev.) Berk., *Outl. Brit. Fungol.* p. 394. 1860.

≡ *Cucurbitaria purtonii* (Grev.) O. Kuntze, *Rev. Gen. Pl.* 3(3): 461. 1898.

= *Nectria applanata* Fuckel, *Jahrb. Nassauischen Vereins Naturk.* 25–26: 310. 1871.

≡ *Dialonectria applanata* (Fuckel) Petch, *Trans. Brit. Mycol. Soc.* 25: 170. 1941.

= *Nectria microspora* Cooke & Ellis, *Grevillea* 5: 53. 1876.

= *Nectria moschata* Gluck, *Hedwigia* 34: 254. 1895.

= *Nectria episphaeria* (Tode : Fr.) Fr. var. *coronata* Wollenw., *Z. Parasitenk.* 3(3): 298. 1931.

Anamorph: *Fusarium aquaeductuum* (Radlk. & Rabenh.) Lagerh. var. *aquaeductuum*, *Zentralbl. Bakteriolog. Abt.* 2, 9: 655. 1891.

≡ *Selenosporium aquaeductuum* Radlk. & Rabenh., *Hedwigia* 2: 73. 1873.

HABITAT.— On other immersed pyrenomycetes including *Diatrype stigma*, and on bark of hardwoods and conifers.

DISTRIBUTION.— North temperate regions.

Cosmospora rickii (Rehm) Rossman & Samuels, *comb. nov.*

≡ *Nectria rickii* Rehm, *Hedwigia* 44: 2. 1904.

Anamorph: None known.

HABITAT.— On *Xylariaceae*.

DISTRIBUTION.— Brazil, known only from the type.

Cosmospora rishbethii (C. Booth) Rossman & Samuels, *comb. nov.*

≡ *Nectria rishbethii* C. Booth, *Mycol. Pap.* 73: 92. 1959.

Anamorph: *Acremonium*-like.

HABITAT.— On cut end of log of *Pinus sylvestris*.

DISTRIBUTION.— England, known only from the type. Culture CBS 496.67.

Cosmospora rubrisetosa (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria rubrisetosa* Samuels, in Samuels, Doi. & Rogerson, *Mem. New York Bot. Gard.* 59: 42. 1990.

≡ *Dialonectria episphaeria* (Tode : Fr.) Fr. var. *verruculosa* Cooke, *Grevillea* 12: 84. 1884 [non *Nectria verruculosa* (Nießl) Penz. 1882].

Anamorph: None known.

HABITAT.— On black ascomycete on wood.

DISTRIBUTION.— Indonesia (Java), known only from the type.

Cosmospora sansevieriae (Bat., J.L. Bezerra & C.R. Almeida) Rossman & Samuels, *comb. nov.*

≡ *Macbridella sansevieriae* Bat., J.L. Bezerra & C.R. Almeida, An. XIV Congr. Nac. Soc. Bot. Brasil, Manaus 1963: 118. 1964.

≡ *Nectria sansevieriae* (Bat., J.L. Bezerra & C.R. Almeida) Samuels, *Canad. J. Bot.* 51: 1279. 1973.

Anamorph: None known.

HABITAT.— On decaying leaf of *Sansevieria* sp.

DISTRIBUTION.— Brazil, known only from the type.

Cosmospora stilbellae (Samuels & Seifert) Rossman & Samuels, *comb. nov.*

≡ *Nectria stilbellae* Samuels & Seifert, *Sydowia* 43: 250. 1991.

Anamorph: *Stilbella aciculosa* (Ellis & Everh.) Seifert, *Stud. Mycol.* 27: 44. 1985.

≡ *Stilbum aciculosum* Ellis & Everh., *J. Mycol.* 1: 153. 1885.

≡ *Botryonipha aciculosa* (Ellis & Everh.) O. Kuntze, *Rev. Gen. Pl.* 2: 845. 1891.

= *Stilbum citrinellum* Cooke & Masee, *Grevillea* 16: 81. 1887.

= *Stilbum pallidulum* Penz. & Sacc., *Malpighia* 15: 250. 1901.

= *Stilbella bulbicola* Henn., *Hedwigia* 44: 176. 1905.

≡ *Stilbum bulbicola* (Henn.) M.A. Litv., *Opredelitel' mikrosk. pochvenn. Gribov*, p. 196. 1967.

= *Stilbella flavescens* Estey, *Trans. Brit. Mycol. Soc.* 68: 120. 1977.

HABITAT.— On bark of recently dead trees, possibly on mycelium and immersed fructifications of ascomycetes; the anamorph is known also from terrestrial, estuarine and marine soils, roots and fruits, and dung (Seifert, 1985).

DISTRIBUTION.— French Guiana; the anamorph is reported from both northern temperate and tropical regions (Seifert, 1985).

Cosmospora stilbosporae (Tul. & C. Tul.) Rossman & Samuels, *comb. nov.*

≡ *Nectria stilbosporae* Tul. & C. Tul., *Sel. Fung. Carpol.* 3: 66. 1865.

Anamorph: *Fusarium expansum* Schlecht., *Flora Berol.* 2: 139. 1824.

HABITAT.— On *Valsa* spp. including *V. sorbi*.

DISTRIBUTION.— Europe (France, Germany) and Canada (anamorph only, Gerlach & Nirenberg, 1982).

Cosmospora thujana (Sacc.) Lowen, *comb. nov.*

≡ *Nectriella thujana* Rehm ex Sacc., *Michelia* 1: 295. 1878.

[≡ *Nectriella thujana* Rehm, *Ascomyceten* no. 338. 1875, nomen nudum, Art. 32.1.]

Anamorph: unknown.

Mycelium white, sparse. Ascomata scattered or in groups of 4–5, superficial, easily removed from the substratum, obpyriform, 190–200 μm high × 140–150 μm diam, pale orange to pale red, KOH+ dark red, yellow in lactic acid, papilla conical, pallid, collapsing laterally. Cells on ascomatal surface angular, 10 μm diam, walls distinct. Asci clavate, 60–80 × 12 μm, without an apical ring; ascospores biserial in the middle, uniseriate above and below, filling the ascus. Ascospores ellipsoid, 8–15 × 7–8 μm, 1-septate, often slightly constricted, hyaline, becoming pale brown, smooth to spinulose, with 1 large guttule per cell.

HABITAT.— In axils of dead, scale-like leaves of *Chamaecyparis*.

DISTRIBUTION.— United States (New Jersey), known only from the type.

TYPE.— UNITED STATES. New Jersey: Newfield, on dead foliage of *Cupressus thyoides* L. [≡ *Chamaecyparis thyoides* (L.) B.S.P.] (white cedar), Nov 1875. J.B. Ellis, with *Pithya cupressina* (S. holotype, handwritten packet; isotypes: NY as North American Fungi no. 160; K, 2 collections; S as Rehm, *Ascomyceten* no. 338, and Thümen, *Mycoth. univers.* no. 972).

NOTES.— Although Stevenson (1971) listed the type of *Cosmospora thujana* as Thümen, *Mycotheca universalis* no. 972, the packet in S has a handwritten packet, labeled 'original' suggesting that this was the specimen examined by Rehm. Rehm, *Ascomyceten* no. 338, Ellis, North American Fungi no. 160 and Thümen, *Mycotheca universalis* no. 972, are isotype collections. Rehm in *Ascomyceten* no. 338 did not validly publish this specific name; later Saccardo validated this taxon. Only a few ascomata remain in most of the specimens examined of *Cosmospora thujana*.

Cosmospora triqua (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria triqua* Samuels, *Mycol. Pap.* 164: 40. 1991.

Anamorph: *Acremonium*-like.

HABITAT.— On *Diatrypaceae* on bark.

DISTRIBUTION.— French Guiana, known only from the type.

Cosmospora tungurahua (Petra) Rossman & Samuels, *comb. nov.*

≡ *Nectria tungurahua* Petra, *Sydowia* 2: 345. 1948.

Anamorph: None known.

HABITAT.— On *Parmulariaceae* (*Dothideales sensu* von Arx & Müller, 1975) on bamboo.

DISTRIBUTION.— Ecuador, known only from the type.

Cosmospora vilior (Starbäck) Rossman & Samuels, *comb. nov.* — Plate 22, f (page 96).

≡ *Nectria vilior* Starbäck, Bih. Kongl. Svenska Vetensk.-Akad. Handl. 25 (3, 1): 28. 1899.

= *Nectria stigma* Rehm, Hedwigia 44: 2. 1904.

= *Nectria episphaeria* var. *kretzschmariae* Henn., Bot. Jahrb. Syst. 14: 364. 1891.

≡ *Nectria kretzschmariae* (Henn.) Weese, Sitzungsber. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl. Abt. 1, 125: 506. 1916.

= *Nectria ustulinae* Teng, Sinensia 4: 275. 1934.

= *Nectria viridescens* C. Booth, Mycol. Pap. 73: 89. 1959.

Anamorph: *Acremonium berkeleyanum* (P. Karst.) W. Gams, Netherlands J. Pl. Pathol. 88: 76. 1982.

≡ *Verticillium berkeleyanum* P. Karst, Meded. Soc. Fauna Fl. Fenn. 18: 64. 1891.

= *Acremonium butyri* (van Beyma) W. Gams, *Cephalosporium-artige Schimmelpilze* p. 126. 1971.

≡ *Tilachlidium butyri* van Beyma, Zentralbl. Bakteriologie Parasitenk., Abt. 2, 99: 388. 1938.

HABITAT.— Fungicolous, most frequently on *Xylariaceae* but also on other pyrenomycetes (Europe) and on polypores (Europe, New Zealand).

DISTRIBUTION.— Pantropical and subtropical, Europe, New Zealand.

NOTE.— *Verticillium berkeleyanum* was described as purported anamorph of *Hypomyces berkeleyanus* Plowr. & Cooke, but the teleomorph was misidentified by Karsten (see *Sphaerostilbella berkeleyana*).

Cosmospora viliuscula (Samuels) Rossman & Samuels, *comb. nov.*

≡ *Nectria viliuscula* Samuels, in Samuels, Doi, & Rogerson, Mem. New York Bot. Gard. 59: 44. 1990.

Anamorph: *Acremonium* cf. *berkeleyanum* (P. Karst.) W. Gams, Netherlands J. Pl. Pathol. 88: 76. 1982.

(= *Acremonium* cf. *butyri* (van Beyma) W. Gams, *Cephalosporium-artige Schimmelpilze* p. 126. 1971.)

≡ *Tilachlidium butyri* van Beyma, Zentralbl. Bakteriologie Parasitenk., Abt. 2, 99: 388. 1938.)

HABITAT.— On old stroma of *Ustilina* sp.

DISTRIBUTION.— Indonesia, known only from the type.

KEY TO THE SPECIES OF *COSMOSPORA*

- | | | |
|--------|---|------------------------|
| 1. | On scale insects and adelgids | 2 |
| 1. | Not on scale insects | 4 |
| 2 (1) | Ascospores 3-septate, 26–34 × 11–12.5 μm | <i>C. diploa</i> |
| 2. | Ascospores 1-septate | 3 |
| 3 (2). | Ascospores broadly fusiform, 12–15 × 5.5–6.5 μm | <i>C. aurantiicola</i> |
| 3. | Ascospores ovoid to ellipsoid, 16–20 × 7.5–10 μm | <i>C. flammea</i> |
| 4 (1) | Ascomata fully to partially immersed, pale yellow, KOH–; anamorph <i>Fusarium</i> cf. <i>merismoides</i> | <i>C. obscura</i> |
| 4. | Ascomata superficial, orange, red to dark red, KOH+; anamorph not <i>Fusarium</i> cf. <i>merismoides</i> | 5 |
| 5 (4). | Ascospores averaging < 10 μm long | 6 |
| 5. | Ascospores averaging > 10 μm long | 22 |
| 6 (5). | Ascospores averaging < 4 μm wide | 7 |
| 6. | Ascospores averaging > 4 μm wide | 15 |
| 7 (6) | Ascospores averaging < 7 μm long | 8 |
| 7. | Ascospores averaging > 7 μm long | 11 |
| 8 (7). | Ascospores averaging < 3.5 μm wide; perithecia with hairs or hyphae; on stromatic pyrenomycetes, wood, or herbicolous | 9 |
| 8. | Ascospores averaging > 3.5 μm wide; perithecia glabrous; on <i>Xylariaceae</i> | 10 |

- 9 (8). Perithecia with red, triangular, fasciculate hairs; ascospores (6–)6.5–8.5(10.5) × 2–3.5 μm, smooth to minutely spinulose; on stromatic pyrenomycetes, wood, or herbicolous *C. geastroides*
9. Perithecia with hyphae; ascospores 5.5–7 × 2.5–3 μm, smooth to slightly striate; herbicolous *C. chlorina*
- 10 (8). Ascospores (5.5–)6–7(–8) × 3.5–4(–5) μm; anamorph *Acremonium* cf. *butryi* with a white colony; Indonesia *C. vilioscula*
10. Ascospores (5.5–)8–11(–13) × (3–)4–5.5(–6) μm; anamorph *Acremonium butryi* with a green colony, tropical and subtropical *C. vilior*
- 11 (7). Fungicolous; ascospores averaging > 3.5 μm wide, spinulose, yellow brown 12
11. Corticolous or herbicolous; ascospores averaging < 3.5 μm wide, smooth, hyaline 13
- 12 (11). Ascospores (7–)9–11(–11.5) × (3.5–)4–4.5(–5) μm; ascomatal wall < 25 μm thick, of one region; anamorph *Fusarium aquaeductuum* var. *medium*, with microconidia *C. episphaeria*
12. Ascospores 8–11 × 3.5–4.5 μm; ascomatal wall > 25 μm thick, of two regions; anamorph *Fusarium aquaeductuum* var. *aquaeductuum*, without microconidia *C. purtonii*
- 13 (11). Ascospores (7–)8–9.5(–12.5) × 2–2.5(–3.5) μm; anamorph *Chaetopsina* cf. *fulva* *C. chaetopsinae*
13. Ascospores averaging > 2.5 μm wide; anamorph *Chaetopsina* or *Cylindrocladiella* . 14
- 14 (13). Anamorph *Chaetopsina*; ascospores 10–12 × 2.5–3.5 μm *C. cf. chaetopsinae*
14. Anamorph *Cylindrocladiella*; ascospores 6.5–10.5 × 2.5–4 μm *C. camelliae*
- 15 (6). Ascospores (5.5–)8–11(–13) × (3–)4–5.5(–6) μm, tuberculate, yellow-brown; on *Diatrypaceae* or *Xylariaceae*; tropical 16
15. Ascospores 7–12 × 3.5–5 μm, smooth, spinulose, or tuberculate, yellow-brown or hyaline; fungicolous, lignicolous, or corticolous; temperate or tropical 18
- 16 (15). On *Diatrypaceae*; ascospores (7–)8–9.5(–10.5) × (3.5–)4–4.5(–5) μm *C. triqua*
16. On *Xylariaceae* 17
- 17 (16). Ascospores (5.5–)8–11(–13) × (3–)4–5.5(–6) μm; common *C. vilior*
17. Ascospores (9.5–)9.5–11(–12) × 5.5–7(–7.5) μm; rare *C. joca*
- 18 (15). Fungicolous; ascospores spinulose 19
18. Lignicolous or corticolous; ascospores spinulose to tuberculate 20
- 19 (18). Ascospores 7.5–9 × 4–5 μm; anamorph *Acremonium berkeleyanum* *C. vilior* (temperate specimens)
19. Ascospores 7–11.5 × 3.5–4.5 μm; anamorph *Fusarium* see 12
- 20 (18). Ascospores 8–9.5 × 4–5 μm, tuberculate; anamorph unknown; corticolous; Indonesia *C. xanthostroma*
20. Ascospores smooth or spinulose; temperate 21
- 21 (20). Ascospores 8–12 × 3.5–5 μm, spinulose; anamorph *Acremonium*; lignicolous; England *C. rishbethii*
21. Ascospores 9–9.5 × 4–5 μm, smooth; anamorph *Fusarium*; corticolous; Italy and United States (New Hampshire) *C. biasoletiana*

- 22 (5). Ascospores averaging $< 15 \mu\text{m}$ long 23
22. Ascospores averaging $> 15 \mu\text{m}$ long 49
- 23 (22). Ascospores averaging $< 4 \mu\text{m}$ wide, hyaline, smooth 24
23. Ascospores averaging $> 4 \mu\text{m}$ wide, yellow-brown, spinulose, tuberculate, or striate; smooth and hyaline in one species 32
- 24 (23). Anamorph *Acremonium* or unknown; ascospores $8\text{--}14 \times 3\text{--}4.5 \mu\text{m}$ 25
24. Anamorph *Chaetopsina*, *Stilbella*, or *Volutella*; ascospores $8\text{--}16 \times 2.5\text{--}5 \mu\text{m}$ 28
- 25 (24). Lignicolous; ascospores $8\text{--}12 \times 3.5\text{--}5 \mu\text{m}$; anamorph *Acremonium*; England *C. rishbethii*
25. Herbicolous (*Arundo*, *Sansevieria* or *Digitalis*); anamorph unknown 26
- 26 (25). On *Arundo donax* (*Poaceae*); ascospores $9.5\text{--}12 \times 2.5\text{--}3 \mu\text{m}$; Italy *C. jucundula*
26. On dicotyledonous plants 27
- 27 (26). On *Digitalis*; ascospores $11\text{--}12 \times 3\text{--}4 \mu\text{m}$; France *C. digitalicola*
27. On *Sansevieria*; ascospores $11\text{--}14 \times 3\text{--}4.5 \mu\text{m}$; tropical America ... *C. sansevieriae*
- 28 (24). Anamorph *Stilbella* or *Volutella*; ascospores $9\text{--}13 \times 2.5\text{--}4 \mu\text{m}$ 29
28. Anamorph *Chaetopsina*; ascospores $7.5\text{--}16 \times 2.5\text{--}5 \mu\text{m}$ 30
- 29 (28). Anamorph *Stilbella*; ascospores $(9\text{--})10\text{--}11.5\text{--}(12.5) \times 2.5\text{--}3\text{--}(3.5) \mu\text{m}$ *C. stilbellae*
29. Anamorph *Volutella*; ascospores $(9\text{--})10\text{--}11\text{--}(13) \times (2.5\text{--})3\text{--}4 \mu\text{m}$ *C. consors*
- 30 (28). Conidia non- or 1-septate, $(6.5\text{--})10\text{--}19.5 \times (1.5\text{--})2\text{--}3.5\text{--}(4.5) \mu\text{m}$; conidiogenous cells monoblastic; ascospores $(10\text{--})10.5\text{--}13\text{--}(15) \times (3\text{--})3.5\text{--}4.5\text{--}(5) \mu\text{m}$ *C. chaetopsinae-catenulatae*
30. Conidia non-septate, smaller; conidiogenous cells monoblastic or polyblastic; ascospores $7.5\text{--}16 \times 2.5\text{--}3.5 \mu\text{m}$ 31
- 31 (30). Conidia $3.5\text{--}4.5\text{--}(5) \times 1.5\text{--}2 \mu\text{m}$; conidiogenous cells monoblastic; ascospores $(9\text{--})10\text{--}12\text{--}(12.5) \times 2.5\text{--}3.5\text{--}(3.5) \mu\text{m}$ *C. cf. chaetopsinae*
31. Conidia $(5.5\text{--})7\text{--}9 \times 2.5\text{--}3 \mu\text{m}$; conidiogenous cells polyblastic or monoblastic; ascospores $(7.5\text{--})11\text{--}15\text{--}(16) \times 3\text{--}3.5 \mu\text{m}$ *C. chaetopsinae-polyblastiae*
- 32 (23). Ascospores averaging $< 6 \mu\text{m}$ wide 33
32. Ascospores averaging $> 6 \mu\text{m}$ wide 43
- 33 (32). Herbicolous, fructicolous, corticolous, or lignicolous, not fungicolous 34
33. Fungicolous 36
- 34 (33). Ascospores $(8\text{--})9.5\text{--}12.5\text{--}(13) \times 4\text{--}4.5\text{--}(5) \mu\text{m}$, hyaline; on herbaceous tissue; anamorph unknown *C. peponum*
34. Ascospores $8\text{--}18 \times 3.5\text{--}8 \mu\text{m}$; pale brown to yellow brown; corticolous or lignicolous; anamorph *Acremonium*-like or *Fusarium* 35
- 35 (34). Ascospores $8\text{--}12 \times 3.5\text{--}5 \mu\text{m}$, hyaline to yellow-brown; lignicolous (*Pinus*); anamorph *Acremonium*-like *C. rishbethii*
35. Ascospores $12\text{--}18 \times 4\text{--}8 \mu\text{m}$; pale brown; corticolous; anamorph *Fusarium* *C. dingleyae*

- 36 (33). Ascospores striate, $10\text{--}15 \times 4.5\text{--}6.5 \mu\text{m}$; anamorph *Acremonium*-like; tropical America 37
36. Ascospores smooth to spinulose, verruculose or tuberculate, not striate; anamorph *Acremonium*-like, *Fusarium*, or unknown; tropical and temperate regions 38
- 37 (36). Ascospores $10\text{--}12(-12.5) \times (4.5\text{--})5\text{--}6(-6.5) \mu\text{m}$; ascus apex with a conspicuous ring; with salmon colonies *C. lasiodiplodiae*
37. Ascospores $(10\text{--})11\text{--}14(-15) \times 5\text{--}5.5(-6) \mu\text{m}$; ascus apex simple; with white colonies *C. metepisphaeria*
- 38 (36). Ascospores tuberculate, $9.5\text{--}11(-12) \times 5.5\text{--}7(-7.5) \mu\text{m}$; anamorph *Acremonium*-like, with salmon colonies *C. joca*
38. Ascospores smooth to spinulose or verruculose; anamorph *Acremonium*-like, *Fusarium*, or unknown 39
- 39 (38). Perithecia with hyphal hairs arising from the surface of the perithecial wall; ascospores $12\text{--}13 \times 5\text{--}7 \mu\text{m}$; anamorph unknown *C. rubrisetosa*
39. Perithecia glabrous; ascospores $9.5\text{--}15 \times 4.5\text{--}7 \mu\text{m}$; anamorph *Acremonium*-like or *Fusarium* 40
- 40 (39). Ascospores $(10\text{--})11.5\text{--}14.5(-16) \times (5\text{--})5.5\text{--}7.5(-10) \mu\text{m}$, smooth to slightly spinulose; anamorph *Acremonium*-like; on wood, possibly fungicolous; central and southern Africa *C. meliopsicola*
40. Ascospores $9.5\text{--}15 \times 4.5\text{--}7 \mu\text{m}$, spinulose; on immersed ascomycetes; anamorph *Fusarium*; north temperate or New Zealand 41
- 41 (40). Perithecia scattered, perithecial apex acute to subacute; ascospores $10\text{--}16 \times 5\text{--}8 \mu\text{m}$; anamorph *Fusarium melanochlorum* with green cultures *C. flavoviridis*
41. Perithecia caespitose, perithecial apex blunt to discoidal; ascospores $9.5\text{--}15 \times 4.5\text{--}7 \mu\text{m}$; anamorph *Fusarium* species with salmon-colored cultures 42
- 42 (41). Ascospores $10\text{--}15 \times 4.5\text{--}6(-7) \mu\text{m}$; on *Diatrypella* spp.; anamorph *Fusarium epistroma*; north temperate *C. magnusiana*
42. Ascospores $(9.5\text{--})10\text{--}13(-14) \times (5\text{--})5\text{--}6.5(-7) \mu\text{m}$; on loculoascomycetes; anamorph *Fusarium ciliatum*; New Zealand *C. nothepisphaeria*
- 43 (32). Perithecia with a fringe of hyphal hairs around the perithecial apex; ascospores $(12\text{--})13\text{--}16.5(-17) \times (5.5\text{--})6\text{--}7.5(-8) \mu\text{m}$; anamorph *Fusarium*; on non-valsaceous fungi *C. pseudoflavoviridis*
43. Perithecia glabrous or with setae surrounding the ostiole; ascospores $8\text{--}18.5 \times 4\text{--}8 \mu\text{m}$ 44
- 44 (43). Perithecia with setae surrounding ostiole; ascospores $12\text{--}18 \times 4\text{--}8 \mu\text{m}$; anamorph *Fusarium*; on bark; New Zealand *C. dingleyae*
44. Perithecia glabrous; anamorph *Acremonium*-like, *Fusarium* or unknown; on *Xylariaceae* or wood; temperate or tropical regions 45
- 45 (44). Europe or United States (New Jersey) 46
45. Tropical America, central and southern Africa 47
- 46 (45). On *Valsa sorbi*; Europe; ascospores $(13\text{--})13.5\text{--}16.5(-18.5) \times (5.5\text{--})6\text{--}7(-7.5) \mu\text{m}$; anamorph *Fusarium expansum* *C. stilbosporae*
46. On dead, scale-like leaves of *Chamaecyparis* (possibly on immersed ascomycetes); United States (New Jersey); ascospores $8\text{--}15 \times 7\text{--}8 \mu\text{m}$; anamorph unknown *C. thujana*

- 47 (45). On *Xylariaceae*; ascospores $(13.5)14.5-15.5(-16) \times (5.5-6.5-7.5(-8) \mu\text{m}$; anamorph unknown; southern Brazil *C. rickii*
47. On wood, possibly on immersed ascomycetes; ascospores $11-16 \times 5-10 \mu\text{m}$; anamorph *Acremonium*-like; tropical America, southern Africa 48
- 48 (47). Perithecia with an apical disc; ascospores $11-13(-14) \times 6-7.5(-8) \mu\text{m}$, smooth to spinulose; tropical America *C. pseudepisphaeria*
48. Perithecial apex obtuse; ascospores $(10-)11.5-14.5(-16) \times (5-)5.5-7.5(-10) \mu\text{m}$, smooth to spinulose; central and southern Africa *C. meliopsicola*
- 49 (22). Ascospores averaging $< 22 \mu\text{m}$ long 50
49. Ascospores averaging $> 22 \mu\text{m}$ long 58
- 50 (49). Ascospores 3-septate, $17-22 \times 5-7 \mu\text{m}$; on bark; anamorph pycnidial *Fusarium* *C. kurdica*
50. Ascospores 1-septate; on fungi, wood, or palms; anamorph not pycnidial 51
- 51 (50). On *Polyporaceae*; ascospores $(13.5-)14.5-17(-18.5) \times (8.5-)10-12.5(-14.5) \mu\text{m}$, conspicuously warted; anamorph *Verticillium* *C. coccinea*
51. On ascomycetes, wood, or palms; ascospores $8-19(-28) \times 5-9 \mu\text{m}$, slightly tuberculate, or striate 52
- 52 (51). On *Rhytismataceae*; ascospores $8-23 \times 6-8 \mu\text{m}$; anamorph *Fusarium* *C. ganymede*
52. On loculoascomycetes, pyrenomycetes, wood or palm; ascospores $13-19(-28) \times 5-9 \mu\text{m}$ 53
- 53 (52). On lignicolous or palmicolous ascomycetes 54
53. On herbicolous *Leptosphaeria* or *Parodiella* 57
- 54 (53). Perithecia with setae or a distinct fringe of hyphal hairs; anamorph *Fusarium* 55
54. Perithecia glabrous; anamorph *Acremonium*-like or unknown 56
- 55 (54). Perithecia with a distinct apical fringe of hyphal hairs; ascospores $13-16.5(-17) \times (5.5-)6-7.5(-8) \mu\text{m}$, striate *C. pseudoflavoviridis*
55. Perithecia with setae surrounding the ostiole; ascospores $12-18 \times 4-8 \mu\text{m}$, verrucose *C. dingleyae*
- 56 (54). On *Pseudovalsia berkeleyi*; ascospores $(13-)16-19 \times (7-)8-9 \mu\text{m}$; anamorph *Acremonium*-like; north temperate *C. wegeliniana*
56. On *Xylariaceae*; ascospores $(13.5-)14.5-15.5(-16) \times (5.5-)6.5-7.5(-8) \mu\text{m}$; anamorph unknown; southern Brazil *C. rickii*
- 57 (53). On *Leptosphaeria* on herbaceous stems; ascospores $(14.5-)15-17.5(-26) \times (5-)5.5-6.5(-7) \mu\text{m}$; anamorph *Fusarium* *C. leptosphaeriae*
57. On *Parodiella* on dicotyledonous leaves; ascospores $14-19(-28) \times (5-)5.5-6.5(-8) \mu\text{m}$; anamorph unknown *C. papilionacearum*
- 58 (49). Ascospores 3-septate, striate or smooth 59
58. Ascospores 1-septate, striate, smooth, or spinulose 60
- 59 (58). Ascospores striate, yellow-brown, $(18-)25-39 \times (6.5-)8.5-14 \mu\text{m}$; anamorph unknown *C. diminuta*
59. Ascospores smooth, hyaline, $24-40 \times 8-12 \mu\text{m}$; anamorph *Fusarium* *C. glabra*

- 60 (58). Ascospores striate 61
 60. Ascospores smooth to spinulose 62
- 61 (60). Ascospores (18–)25–39 × (6.5–)8.5–14 μm, finely striate; anamorph unknown; fungicolous *C. diminuta*
 61. Ascospores (19–)25–42(–48) × 6–10(–11) μm, coarsely striate; anamorph *Chaetopsina*; corticolous or on palm fronds *C. chaetopsinae-penicillatae*
- 62 (60). Corticolous, not conspicuously fungicolous; ascospores 36–41.5 × 6–7 μm, smooth; anamorph *Chaetopsina* *C. macrochaetopsinae*
 62. Fungicolous; ascospores smooth or spinulose; anamorph *Fusarium* 63
- 63 (62). On *Parmulariaceae* on bamboo; ascospores 28–37(–42) × 8–13.5(–16) μm, smooth; anamorph unknown *C. tungurahua*
 63. Not on *Parmulariaceae* on bamboo; ascospores spinulose, < 28 μm long; anamorph *Fusarium* 64
- 64 (63). On *Rhytismataceae*; ascospores 8–23 × 6–8 μm *C. ganymede*
 64. On *Leptosphaeria*; ascospores (14.5–)15–17.5(–26) × (5–)5.5–6.5(–7) μm *C. leptosphaeriae*

Cosmospora wegeliniana (Rehm) Rossman & Samuels, *comb. nov.*

≡ *Nectria episphaeria* (Tode : Fr.) Fr. var. *wegeliniana* Rehm, *Hedwigia* 30: 260. 1891.

≡ *Dialonectria wegeliniana* (Rehm) Petch, *Trans. Brit. Mycol. Soc.* 21: 266. 1983 [as '*wegeliniana*'].

Anamorph: *Acremonium*-like.

HABITAT.— On *Pseudovalsa berkeleyi*.

DISTRIBUTION.— Europe (type), Neotropics, New Zealand.

Cosmospora xanthostroma (Penz. & Sacc.) Rossman & Samuels, *comb. nov.*

≡ *Nectria xanthostroma* Penz. & Sacc., *Malpighia* 11: 514. 1897.

Anamorph: None known.

HABITAT.— On bark, possibly dematiaceous hyphae.

DISTRIBUTION.— Indonesia

GIBBERELLA Sacc., *Michelia* 1: 43. 1877.

Type: *G. pulicaris* (Fr. : Fr.) Sacc. (≡ *Sphaeria pulicaris* Fr. : Fr.) = *Lisea* (Sacc.) Sacc., *Michelia* 1: 43. 1877 (≡ *Botryosphaeria* subgenus *Lisea* Sacc., *Michelia* 1: 42. 1877). — Type: *L. nemorosa* (Sacc.) Sacc. (≡ *Botryosphaeria nemorosa* Sacc.), recognized as *Gibberella nemorosa* (Sacc.) Wollenw.).

= *Lisiella* (Cooke & Masee) Sacc., *Syll. Fung.* 9: 945. 1891 (≡ *Gibberella* subgenus *Lisiella* Cooke & Masee, in Cooke, *Grevillea* 16: 5. 1887). — Type: *L. passiflorae* (Cooke & Masee) Sacc., *Syll. Fung.* 9: 945. 1891, recognized as *Gibberella passiflorae* Cooke & Masee, in Cooke, *Grevillea* 16: 5. 1887.

Ascomata solitary or on a thin stroma erumpent through the epidermis, superficial, subglobose to globose, not collapsing, bluish purple, KOH+ dark purple, pigment dissolving in lactic acid, slightly rugose to tuberculate, without hairs or appendages. Ascomatal wall of two regions: outer region of thick-walled, pigmented cells forming a *textura angularis* to *textura globulosa*; inner region of elongate, hyaline, thin-walled cells, becoming thinner toward the centrum. Asci narrowly clavate, often with an apical ring. Ascospores (0–1–)3-septate, ellipsoid, hyaline. Anamorph, where known, *Fusarium*. Saprobic and pathogenic on woody and herbaceous substrata, isolated from soil.

NOTES.— *Gibberella* was initially described in a footnote to *Botryosphaeria advena* Ces. & De Not., in which the genus *Botryosphaeria* is discussed as being heterogeneous and was divided into three genera, *Botryosphaeria*, *Giberella* (sic), and *Lisea*. In the original description, this generic name was spelled '*Giberella*'; however, the name is a diminutive of '*Gibera*' and most authors have spelled it as '*Gibberella*' (Clements & Shear, 1931; Farr *et al.*, 1979b; Hawksworth *et al.*, 1995). The genus *Gibberella* was characterized by Saccardo (1877) as having fleshy, bluish purple ascomata and ovoid-fusoid, 3-septate, subhyaline ascospores. Both *Gibberella* and *Lisea* were placed in the *Hypocreaceae* at that time.

At the same time Saccardo (1877) raised *Botryosphaeria* subgenus *Lisea* to generic rank and considered *Lisea* to be similar to *Gibberella* except in having one-septate ascospores. *Botryosphaeria* subgenus *Lisea* initially included only one species, *B. nemorosa*,