KEY TO THE SPECIES OF *OPHIONECTRIA*

1. Ascospores 3–5(–7)-septate, 58–105 × 6–7 μm; ascomata having very large, conical warts, up to 300 μm high; anamorph unknown; on thin bark of unidentified, dead twig; known only from Ecuador ..... *O. magniverrucosa*
1. Ascospores 13–24-septate, 180–250 × 6–10 μm; ascomata having tuberculate warts, up to 100 μm high; anamorph *Antipodium spectabile*; on bark of decaying woody substrata; pantropical ..... *O. trichospora*

PLEOGIBBERELLA Sacc., *in* Berl. & Voglino, Syll. Fung. Addit. 1–4: 217. 1886.

Type: *P. calami* (Cooke) Berl. & Voglino (≡ *Gibberella calami* Cooke).

Stroma well-developed, pseudoparenchymatous, dark purple, becoming black when dry. Ascomata superficial, aggregated on the stroma, globose to pyriform, dark purple, KOH+ black, surface scurfy. Asci clavate, 2–3-spored. Ascospores muriform, hyaline, smooth-walled. Anamorph not known. On fruits of *Calamus*.

NOTES.— Although similar in the dark ascomata, *Pleogibberella* is differentiated from *Gibberella* by large, muriform ascospores, a well-developed stroma, and occurrence on palm fruits. Despite the dark purple pigmentation, the stroma and ascomatal wall structure are reminiscent of members of *Nectria sensu stricto*, a group that includes several species having muriform ascospores. After soaking in lactic acid, the ascomatal wall cells of *P. calami* lose their dark purple pigments and become red-orange.

Pleogibberella calami (Cooke) Berl. & Voglino, Syll. Fung. Addit. 1–4: 217. 1886 (as '*calamia*'). — Plate 32, b; Plate 34, d–h.

≡ *Gibberella calami* Cooke, Grevillea 13: 8. 1884.

Stroma well-developed, spreading, completely surrounding the individual fruits on the rachis, up to 1 mm thick, dark purple, appearing black when dry, pseudoparenchymatous, of thick-walled, pigmented cells, 7–22 μm thick, forming a *textura angularis*, stroma intergrading with outer wall of ascomata. Ascomata superficial, aggregated on the stroma, globose to pyriform, 360–420 μm high × 318–360 μm diam, collapsing laterally or not at all, dark purple, appearing dark brown when dry, KOH+ black, surface slightly cracked, scurfy, or scaly, apical region often flattened, shiny, smooth. Ascomatal wall 60–72 μm thick, of two regions: outer region 42–60 μm thick, of thick-walled, pigmented cells, 10–16 μm diam, forming a *textura angularis*, outermost cells slightly darkened with encrusted dark pigments; inner region about 12 μm thick, of thin-walled, hyaline, elongate cells, 7–10 × 3–5 μm. Cells around the ostiole elongate, parallel toward the apex, becoming thin-walled, slightly inflated toward the apex, forming a distinct, flattened area. Asci clavate, thin-walled, soon dissolving, generally 2-spored, occasionally 3-spored. Ascospores broadly ellipsoid, 22–41.5 × 13.5–23 μm, tending to develop a median septum first, then one or two additional septa, ultimately becoming dictyosporous with 2–3 major transverse, 1–2 partially transverse septa, 1 irregular longitudinal septum, and 1–2 diagonal septa in the apical cells, with one or more guttules in each cell, hyaline, becoming yellow with age, smooth-walled.

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

HOLOTYPE.— INDIA. Andhra Pradesh: Vizagapatam, on the fruits of *Calamus fasciculatus* (*Arecaceae*) (NY).

NOTES.— No anamorph was observed on the type and only known specimen of *Pseudogibberella calami*.

PSEUDONECTRIA Seaver, Mycologia 1: 48. 1909.

as nom. nov. for *Nectriella* Sacc. 1877, non Nitschke 1870.

Type: *P. rousseliana* (Mont.) Wollenw. 1931 (≡ *Nectria rousseliana* Mont.).

[≡ *Nectriella* Sacc., Michelia 1: 51. 1877, non Nitschke, 1870].

[≡ *Notarisiella* Sacc., *in* Clem. & Shear, Gen. Fungi p. 280. 1931 ≡ *Nectriella* Sacc. subgenus *Notarisiella* Sacc., Syll. Fung. 2: 452. 1883 ≡ *Lasionectria* (Sacc.) Cooke subgenus *Notarisiella* Cooke, Grevillea 12: 111. 1884]. — Type: *Notarisiella rousseliana* (Mont.) Clem. & Shear (≡ *Nectria rousseliana* Mont.), recognized as *Pseudonectria rousseliana* (Mont.) Wollenw.

Ascomata superficial, solitary, with an inconspicuous basal stroma, globose to pyriform, often with a pointed apex, pale yellow, yellow to scarlet, rarely orange or greyish yellow-green, KOH– or KOH+ slightly darker, yellow in lactic acid; ascomatal wall smooth, with or without sparse to numerous hyaline to orange setae or hairs; ascomatal surface of cells with irregularly thickened walls and joined by pores; ascomatal wall less than 20 μm thick, of one region. Asci narrowly clavate. Ascospores non-septate. Anamorph *Volutella*. On decaying leaves and twigs of *Buxaceae* (*Buxus* and *Pachysandra*).

Notes.— The genus *Pseudonectria* was established as a new name for the genus *Nectriella* Sacc. 1877, a later homonym of *Nectriella* Nitschke 1870. Initially *Pseudonectria* was defined to include *Nectria*-like species with non-septate ascospores, a concept that persisted until Lowen (1991) reexamined many of the type specimens of described species and redisposed of those previously placed in *Pseudonectria* and *Nectriella* Sacc. Rossman *et al.* (1993) further restricted the genus to three species that are similar in ascomatal morphology and occurring on *Buxaceae*. One of these species, *P. coronata* (Juel) Lowen, having a *Sesquicillium* anamorph, has recently been shown to belong to the *Bionectriaceae* (H.-J. Schroers, in lit.).

Pseudonectria is similar to species of *Cosmospora* in the ascomatal wall structure that is relatively thin, often less than 15 μm thick, of one region, with cells at the ascomatal surface having a meandering aspect with irregularly thickened walls as illustrated in Rossman *et al.* (1993) and Samuels *et al.* (1991). Like *Pseudonectria*, species of *Cosmospora* generally have orange to red, KOH+ ascomata that become yellow in lactic acid.

The genus *Notarisiella* is based on *Lasionectria* subgenus *Notarisiella*, a taxon that Cooke (1884) recognized for *Nectria*-like species having hairs or setae on the ascomata and non-septate ascospores, namely *L. rousseliana* Mont., *L. villosula* Speg., *L. carnea* Desm., and *L. nigroviridis* Crouan. Clements & Shear (1931) selected *L. rousseliana* as the type; thus *Notarisiella* is a nomenclatural synonym of *Pseudonectria*.

Pseudonectria rousseliana (Mont.) Wollenw., Z. Parasitenk. (Berlin) 3: 488. 1931. — Plate 22, 1 (page 96).

≡ *Nectria rousseliana* Mont., *in* Castagne, Cat. Pl. Marseille Suppl. p. 44. 1851.
≡ *Stigmatea rousseliana* (Mont.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23–24: 97. 1870.
[≡ *Nectriella rousseliana* (Mont.) Sacc., Michelia 1: 51. 1877].
≡ *Notarisiella rousseliana* (Mont.) Sacc., *in* Clem. & Shear, Gen. Fungi p. 280. 1931.
= *Nectria rousseliana* Mont. var. *viridis* Berk. & Broome, Ann. Mag. Nat. Hist., Ser. 3, 3: 21. 1859.

Anamorph: *Volutella buxi* (DC. : Fr.) Berk., Outl. Brit. Fungol. p. 340. 1860.

≡ *Tubercularia buxi* DC. : Fr., De Candolle, Fl. gall. 6: 100. 1815 : Fries, Syst. Mycol. 3: 447. 1832.
≡ *Chaetostroma buxi* (DC. : Fr.) Corda, Icon. Fung. 2: 30. 1838.
≡ *Chaetodochium buxi* (DC. : Fr.) Höhn., Mitt. Bot. Inst. Tech. Hochschule Wien 9: 44. 1932.
= *Psilonia rosea* Fr., Sclerom. Sueciae 6, no. 220. 1821, fide Bezerra (1963).

Ascomata solitary to gregarious, superficial, with inconspicuous stroma at the base, globose with a small, pointed apex, 190–204 μm high × 168–175 μm diam, collapsing laterally, pale yellow to yellow or greyish yellow-green, KOH–, with long, hyaline setae scattered over the ascomatal surface, setae occasionally lacking on overmature ascomata. Ascomatal wall thin, 7–12 μm thick, of a single region of intertwined hyphae, with 1.5 μm thick walls. Setae arising from individual outer wall cells, lanceolate, (25–)56–160 μm long × 5.5–7(–9.5) μm at the base, tapering toward the rounded apex, walls at the base 1.5 μm thick, becoming thin-walled at the apex, with finely granular incrustations on the surface, with thin-walled septa every 12–35 μm, setae rarely branching, producing red droplets at the apex when moist. Asci narrowly clavate, 43–52 × 7.5–11 μm, slightly truncate at the apex, ascospores irregularly biseriate. Ascospores narrowly ellipsoid with ends slightly truncate, 11–15(–17.5) × 3–4.5(–5) μm, non-septate, often with one, rarely two small droplets in each end, hyaline, smooth-walled.

Anamorph: Sporodochia developing on the undersurface of recently killed leaves, evenly scattered, solitary to aggregated, non-stromatic, easily detached from the substratum, variable in size, 50–240 μm diam, with red-tipped, hyaline setae developing from base and sides, setae 80–180 × 3–5.5 μm, conidial mass salmon, sometimes conidial masses of adjacent sporodochia coalescing. Conidiophores solitary, borne on weakly fasciculate, aerial hyphae at the margin, coalescing to form slimy masses of conidia toward the center, monophialidic, slender, tapering to the apex, 19–43 μm long, tapering from 2.5–3.5 μm at the base to 1.5–2 μm at the apex, septate only at the base, rarely two developing at the same point at an acute angle, thus appearing weakly verticillate. Conidia ellipsoid to short-fusiform, variable in size and shape, 3–8.5 × 2–4.5 μm, non-septate, hyaline, smooth-walled.

Habitat.— On the undersurface of dead leaves including recently killed leaves still attached to a twig, and dead twigs of *Buxus sempervirens*, often associated

Key to the species of *Pseudonectria*

1. Ascomata pale yellow to yellow, rarely orange or greyish yellow-green, with long, scattered hairs, up to 160 μm long; ascospores 11–15(–17.5) × 3–4.5(–5) μm; on *Buxus* ..... *P. rousseliana*
1. Ascomata scarlet, with short, protruding hairs interspersed with sparse, long setae, up to 135 μm long; ascospores 9.5–13 × 3–4 μm; on *Pachysandra* ..... *P. pachysandricola*

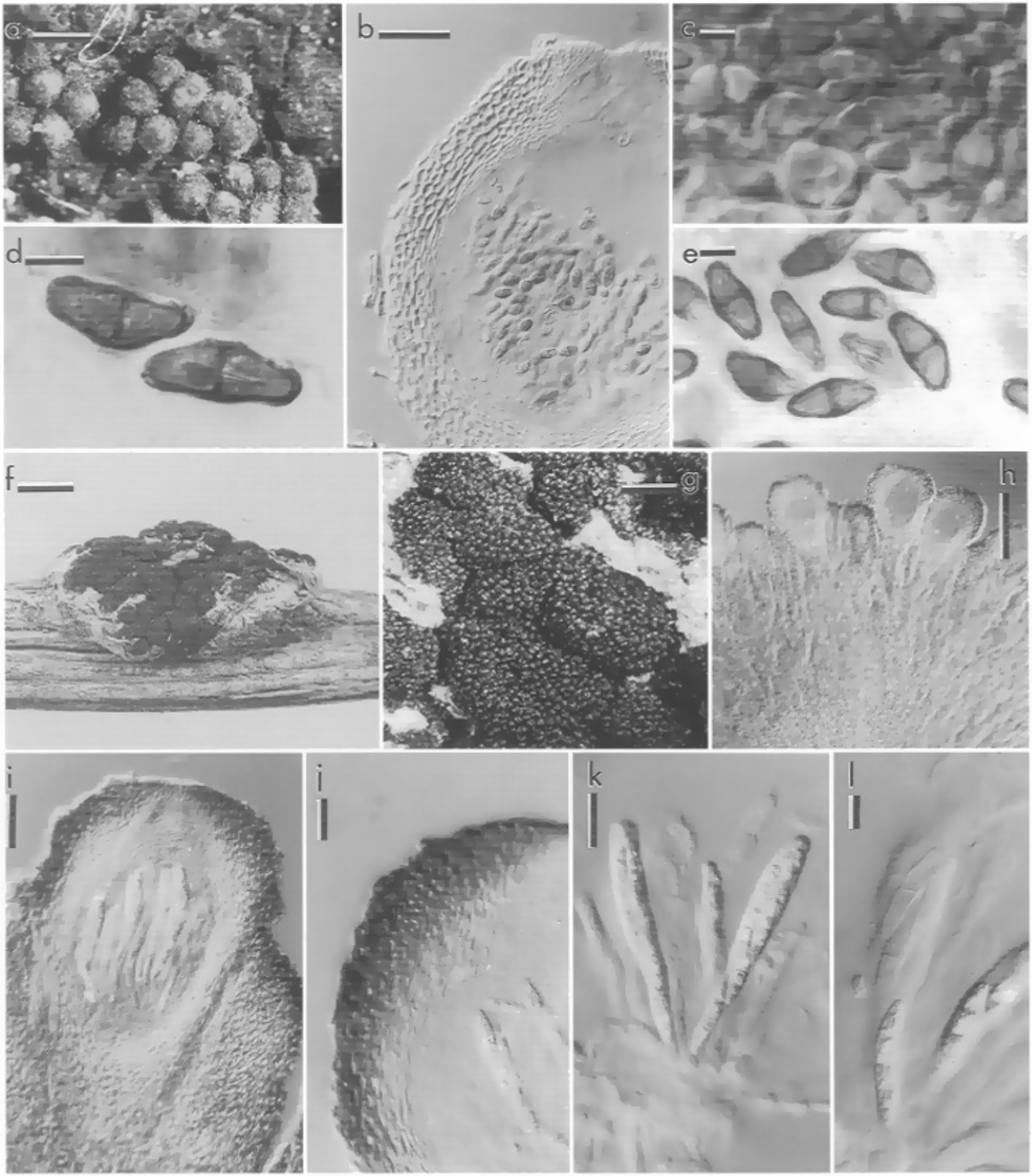

Plate 35. a–e. *Rubrinectria olivacea*. a. Ascomata on natural substratum. b. Median section of ascoma. c. Close-up of ascomatal wall showing pores between cells. d, e. Ascospores in asci. **f–l.** *Stalagmites tumefaciens*. f, g. Ascomata on natural substratum. h, i. Median sections of ascomata and stroma. j. Close-up of median section of ascomatal wall. k, l. Asci with ascospores. a, d, e. BPI 801936. b. BPI 1107216. c. BPI 631932. f, g. Isolectotype – LPS. h. Lectotype – S. Scale bars: a = 500 μm; b, i = 50 μm; c–e, l = 10 μm; f = 4 mm; g = 1 mm; h = 200 μm; j, k = 25 μm.

with *Hyponectria buxi* (Desm.) Sacc., '*Pseudonectria*' *coronata* or its anamorph, *Sesquicillium buxi* (Link : Fr.) W. Gams.

Distribution.— Europe and North America.

Type.— FRANCE. Ad folia *Buxi sempervirentis*, Meloduno, primus Roussel (PC, lectotype).
Additional specimens examined are listed in Rossman *et al.* (1993).
Specimen illustrated.— FRANCE. Sauveterre de Bearn Isle (64), on leaves of *Buxus*, 12 June 1994,. J.-F. Magni, A9491.

Illustrations.— Bezerra (1963, Figs. 1–3); Candoussau & Magni (1995, Fig. 4a); Dennis (1978, Pl. 35M); Juel (1925, Fig. a, Pl. I.1); Petch (1938, Fig. 4); Rossman *et al.* (1993, Figs. 7–12).

Notes.— *Pseudonectria rousseliana* and its anamorph *Volutella buxi* (DC.) Berk. are known as the cause of a disease of *Buxus* (Bezzera, 1963; Samuels, 1977; Sinclair *et al.*, 1987). The ascomata of *P. rousseliana* are variable in color ranging from pale yellow to yellow-green. In one collection the ascomata on one leaf varied in color from straw to greyish yellow-green, thus, the variety *viridis* distinguished by greenish ascomata is considered a synonym of the type variety.

The anamorph bears similarity to *Volutella minima*, the anamorph of *Cosmospora consors* (Samuels, 1977; Samuels *et al.*, 1991, as *Nectria consors*) as discussed in Rossman *et al.* (1993), but it has much more diffuse sporodochia, giving the culture a slimy aspect. *Pseudonectria rousseliana* and its more commonly encountered anamorph are reported wherever *Buxus sempervirens* is grown, primarily in Europe and North America (Petch, 1938). Unlike most species of *Cosmospora*, *P. rousseliana* occurs on living to recently killed plant tissue.

The second accepted species in *Pseudonectria*, *P. pachysandricola* Dodge, and its anamorph, *Volutella pachysandricola* Dodge, was described and illustrated in Rossman *et al.* (1993) and Sinclair *et al.* (1987).

RUBRINECTRIA Rossman & Samuels, *gen. nov.*

Type: *R. olivacea* (Seaver) Rossman & Samuels (≡ *Macbridella olivacea* Seaver, Mycologia 2: 178. 1910).

Stroma pseudoparenchymatosum. Ascomata aggregata, superficialia, aurantiaca vel rubra, verrucis concoloribus vel viridibus obtecta. Paries ascomatis 20–30 μm crassus, e duabus partibus: pars externa *textura angulari*, cellulae usque ad 1 μm crassitunicatae et pigmentatae; pars interna *textura prismatica*, elongata, cellulae tenuitunicatae. Asci cylindrici. Ascosporae 1-septatae, aureo-brunneae, grosse striatae. Anamorphosis *Dendrodochii* similis, sed conidiis catenatis.

Stromata erumpent, pseudoparenchymatous. Ascomata aggregated, superficial, orange to red with concolorous to greenish warts. Ascomatal wall 20–30 μm thick, of two regions: outer region of *textura angularis*, cells with up to 1 μm thick, pigmented walls, intergrading with the stroma; inner region of *textura prismatica*, with elongate, thin-walled cells. Asci cylindrical. Ascospores broadly ellipsoid to fusiform, one-septate, golden-brown, with coarse striations. Anamorph similar to *Dendrodochium* but bearing conidia in chains. On decaying woody substrata, often fruiting on newly killed wood.

Notes.— The unispecific genus *Rubrinectria* is described for an unusual *Nectria*-like species having ascomata often with a green-tinged, warted wall, golden-brown, coarsely striate ascospores, and a peculiar sporodochial anamorph bearing conidia in chains.

Rubrinectria olivacea (Seaver) Rossman & Samuels, *comb. nov.* — Plate 32, c; Plate 35, a–e.

≡ *Macbridella olivacea* Seaver, Mycologia 2: 178. 1910.
≡ *Phaeonectria olivacea* (Seaver) Sacc. & Trotter, Syll. Fung. 22: 485. 1913.
≡ *Nectria olivacea* (Seaver) Samuels, Canad. J. Bot. 51: 1277. 1973.
= *Macbridella cinnabarina* Seaver, *in* Seaver & Chardón, Sci. Surv. Porto Rico and Virgin Isl. 8: 43. 1926.

Anamorph: cf. *Dendrodochium* sp., but conidia in chains.

Mycelium subcortical, forming stromata at points. Stromata erumpent through bark, gregarious, buff-colored, at first conidial, later producing ascomata, cells of stroma pseudoparenchymatous, about 10 μm in greatest dimension, walls about 1 μm thick. Ascomata aggregated in groups of 5 to 10 to densely gregarious, superficial, globose to broadly ovate or broadly pyriform, (280–)340–450 μm high × 280–375 μm diam, collapsing laterally when dry or not, with a short, rounded papilla, orange to red with orange, rarely green, scales, KOH+ dark red. Papilla obtuse, 80–100 μm diam at the apex, cells at the surface of the papilla ellipsoid, 7–10 × 3–4 μm, thin-walled. Ascomatal surface cells forming a *textura angularis*, circular to ellipsoid, 10–15 μm diam, walls 1–1.5 μm thick. Ascomatal wall 30–60 μm thick, of two regions: outer region 20–30 μm thick, of ellipsoid cells, about 10 μm diam, becoming flattened toward the interior, with 1–2 μm thick walls, merging with the stroma below, forming scales at the surface; inner region of elongate, hyaline, thin-walled cells. Asci cylindrical, 75–105 × (6–)7–13 μm, apex simple or with a small, refractive ring, 8-spored, ascospores uniseriate to irregularly biseriate. Ascospores broadly ellipsoid to fusiform, 10–17 × 5–8 μm, one-septate, slightly constricted at the septum, very pale brown to golden-brown, coarsely striate.
Anamorph: Sporodochia erumpent, about 1–2 mm diam × 0.5 mm high, buff-colored, in culture pale orange.