

## Three new polyporicolous species of *Hypomyces* and their *Cladobotryum* anamorphs

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Three new species of *Hypomyces* that occur on members of the Aphyllophorales are described. The anamorph of *H. viridigriseus* is *Cladobotryum viridigriseum* comb. nov. *Hypomyces favoli* and *H. puertoricensis* have unnamed *Cladobotryum* anamorphs. Perithecia of *H. viridigriseus* are known only from the type locality, in Illinois, but its anamorph was described from Ontario and is also known from New York. *Hypomyces favoli* and *H. puertoricensis* are known only from Puerto Rico.

Keywords: Hypocreales, Aphyllophorales, fungicolous fungi, systematics.

*Hypomyces* (Ascomycetes, Hypocreales), with about 50 species recognized in recent studies (Helfer, 1991; Põldmaa, 1996; Rogerson & Samuels, 1985, 1989, 1993, 1994) is the largest genus of almost exclusively fungicolous fungi. *Hypomyces* species occur mainly on discomycetes, boletes, agarics or polypores. The polyporicolous *Hypomyces* are more numerous than any other group, with nineteen species accepted by Rogerson & Samuels (1993). Half of the polyporicolous species have been described only within the last twenty-five years. In the present work, three more polyporicolous species with proven or presumed *Cladobotryum* anamorphs – one temperate and two tropical – are described.

Two of the newly described species, *H. favoli* and *H. puertoricensis*, produce only unicellular ascospores. None of the previously known polyporicolous species of *Hypomyces* has exclusively

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unicellular ascospores, although several (*H. albidus* Rehm, *H. amaurodermatis* Rogerson & Samuels, *H. semitranslucens* G. Arnold, *H. sympodiophorus* Rogerson & Samuels, *H. tegillum* Berk. & M. A. Curt.) are known to form at least some unicellular ascospores in addition to bicellular ones. Unicellular ascospores characterize the genus *Peckiella* (Sacc.) Sacc., which is typified by *P. viridis* (Alb. & Schw.) Sacc., an agaricolous species that Rogerson & Samuels (1994) regarded as synonymous with *H. luteo-virens* (Fr.: Fr.) L.-R. Tulasne. This species does not grow in pure culture and no anamorph is known for it. In perithecial anatomy and anamorphs, the two newly described species with unicellular ascospores conform to the overall pattern found in polyporiculous species of *Hypomyces*, including growing in pure culture and forming a *Cladobotryum* anamorph. This once more confirms the unreliability of ascospore septation *per se* as a character for segregating genera from *Hypomyces*, as has been discussed in the case of boleticulous species (Rogerson & Samuels, 1989).

The anamorphs of the newly described *Hypomyces* species expand the circumscription of *Cladobotryum* beyond what was proposed by Rogerson & Samuels (1993). *Cladobotryum viridigriseum*, originally described in *Sympodiophora* G. Arnold, is the only *Hypomyces* anamorph to have green conidia, a feature which has a restricted distribution in the whole order of Hypocreales (Samuels & Seifert, 1987). Anamorphs of *H. puertoricensis* and *H. viridigriseus* are unusual also because they tend to form very long conidia that may have more than three septa in culture. The tendency to form more variable and longer conidia in vitro has previously been noted also for *Cladobotryum amazonense* Bastos & al. (Bastos & al., 1981).

### Materials and methods

Individual ascospores were isolated with the aid of a manipulator on cornmeal-dextrose agar (CMD, Difco cornmeal agar + 2% dextrose). Colony characteristics were taken from CMD, incubated at 20–21 °C with alternating 12 h darkness and 12 h cool white fluorescent light. Additional characters were described from cultures grown on malt extract agar (MEA, Difco) at 22–24 °C in darkness.

Herbarium material was rehydrated briefly in 3% KOH, from which measurements were made. The conventions KOH+ and KOH- indicate whether the original colour of the subiculum or perithecia changes when placed into 3% aq. KOH. Perithecial sections were made from rehydrated herbarium material using a freezing microtome. The optical brightener calcofluor (0.05% w/v in sodium phos-

phate buffer at pH 8; Sigma Chemical Co.) was used for fluorescence microscopy.

Representative cultures are preserved at CBS.

### Descriptions of the species

***Hypomyces favoli*** Samuels, K. Pöldmaa et Lodge, sp. nov. – Figs. 1–4, 10–12.

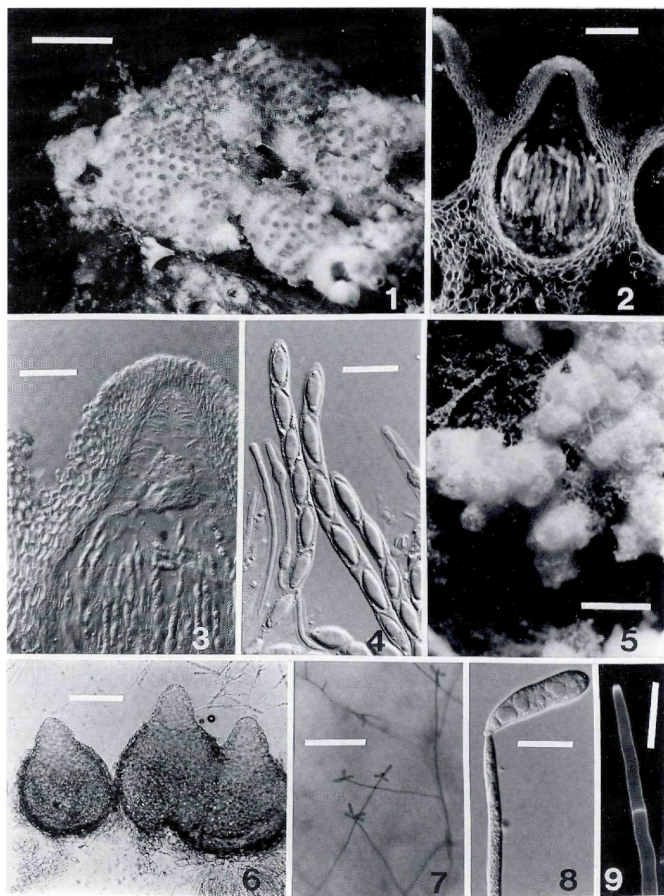
Subiculum album vel luteolum, in KOH immerso color non mutatur. Perithecia ovata vel obpyriformia, (285–)300–400(–425)  $\mu\text{m}$  alta, 195–335(–350)  $\mu\text{m}$  lata, fere superficialia, caespitosa, aurantiaca, in KOH immersa ad papillam ad roseum vertentia; hyphae aurantiacae vel flavae perithecia investientes. Asci cylindrici, (85–)107–140(–180)  $\times$  (6.0–)7.5–10.0(–12.0)  $\mu\text{m}$ , octospori, apice annulo instructo. Ascospores late fusiformes, (11.5–)14.0–19.5(–21.5)  $\times$  (6.0–)6.5–9.0(–12.0)  $\mu\text{m}$ , unicellulares, verrucosae et apiculatae; apiculi 1.5–3.0  $\mu\text{m}$  longi, obtusi. Anamorphosis *Cladobotryum* sp. Conidia ellipsoidea vel cylindrica, (10–)25.5–28.5(–35)  $\times$  (7.5–)9.0–11.5(–13.5)  $\mu\text{m}$ , 0–1-septata, catenis brevibus imbricatis adhaerentia. Chlamydosporae abundantes.

Holotypus. – Ad carposomata *Polypori tenuiculi* (Beauv.) Fr., D. J. Lodge PR 1628 (BPI).

Associated anamorph. – *Cladobotryum* sp. – Figs. 11, 12.

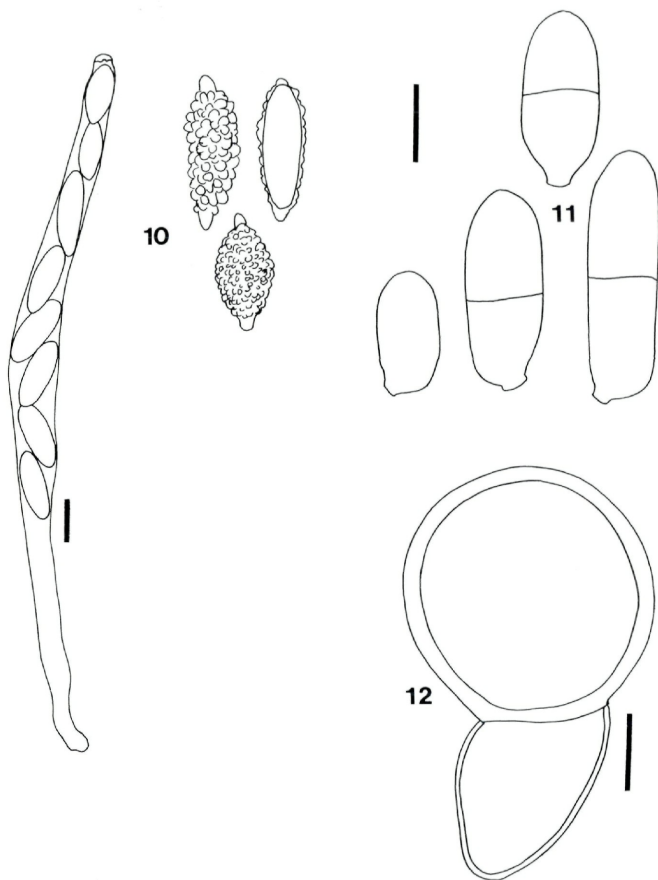
Subiculum restricted to the regions of perithecial production, white to pale yellow; subicular hyphae hyaline, smooth-walled, ca. 6  $\mu\text{m}$  wide but greatly swollen around perithecia with cells 15–20  $\mu\text{m}$  diam, KOH<sup>–</sup>. – Perithecia ovate or obpyriform, (285–)300–400(–425)  $\mu\text{m}$  high, 195–335(–350)  $\mu\text{m}$  wide, nearly superficial in the subiculum, caespitose, orange, with a furfuraceous coat of pale orange to yellow hyphae, KOH<sup>+</sup> (roseous) at the papilla, KOH<sup>–</sup> in the lower part; papilla well developed, 90–100  $\mu\text{m}$  high. – Perithecial wall ca. 25  $\mu\text{m}$  thick, cells  $\pm$  ellipsoidal in section, ca. 15  $\times$  5  $\mu\text{m}$ . – Papilla formed of outwardly diverging files of cells, the innermost of which are narrow and brick-like, but becoming more ellipsoidal to  $\pm$  circular or clavate at the surface, measuring ca. 5  $\mu\text{m}$  diam. – Asci cylindrical, (85–)107–140(–180)  $\times$  (6.0–)7.5–10.0(–12.0)  $\mu\text{m}$ , apex thickened and with a pore; ascospores uniseriate, partially overlapping. – Ascospores broadly fusiform, (11.5–)14.0–19.5(–21.5)  $\times$  (6.0–)6.5–9.0(–12.0)  $\mu\text{m}$ , unicellular, prominently verrucose and apiculate; apiculi 1.5–3.0  $\mu\text{m}$  long, obtuse.

Characteristics of the associated anamorph. – Anamorph sparse on the natural substratum. – Conidiophores indefinite in length, 4–8  $\mu\text{m}$  wide, terminating in one to three conidiogenous branches at the tip; terminal branches aseptate or 1–2-septate, 38–125  $\mu\text{m}$  long, 4–6  $\mu\text{m}$  wide at base and tapering to 2.5  $\mu\text{m}$



Figs. 1-4. - *Hypomyces favoli*. - 1. Habit of perithecia. - 2, 3. Median longitudinal sections of mature perithecia. - 4. Ascus with immature ascospores. - 5-9. *Hypomyces puertoricensis*. - 5. Habit of perithecia. - 6. Whole mount of three mature perithecia, showing cells at perithecial apex. - 7. Conidia held in short, imbricate chains that appear as radiating heads on CMD. - 8. Conidium held at the tip of a conidiogenous cell. - 9. Periclinal thickening at the conidiogenous locus, fluorescence microscopy. - Figs. 1-3 from Lodge 704; 4 from Lodge 1628; 5, 6 from Lodge 3215; 7-9 from Samuels 96-12. - Scale bars: Fig. 1 = 1 mm, 2, 6 = 100  $\mu$ m; 3 = 50  $\mu$ m; 4, 8, 9 = 25  $\mu$ m; 5 = 0.5 mm; 7 = 200  $\mu$ m.





Figs. 10–12. – *Hypomyces favoli*. – 10. Ascus and ascospores. – 11. Conidia. – 12. Chlamydospore. – Figs. 10, 11 from Lodge 704; 12 from Lodge 1628. – Scale bars = 10  $\mu$ m.

wide at tip, each bearing a single terminal conidiogenous cell. – Conidia ellipsoidal or cylindrical, (10–)25.5–28.5(–35)  $\times$  (7.5–)9.0–11.5(–13.5)  $\mu$ m, 0–1-septate, with a protuberant, flat, often laterally displaced basal hilum, held in short imbricate chains. – Chlamy-

dosporos abundant in host tissue, arising on short branches of hyphae, the lateral branch sometimes appearing as a specialized 'support' cell, globose, unicellular, 15–45  $\mu\text{m}$  in diam, yellowish-brown, wall 1.5–4.5  $\mu\text{m}$  wide, smooth.

**Holotype.** – PUERTO RICO: Northwest, Guajataca State Forest, on *Polyporus tenuiculus* (Beauv.) Fr. [= *Favolus brasiliensis* (Fr.) Fr.], 15 Oct. 1994, D. J. Lodge PR 1628 (BPI).

**Paratype.** – PUERTO RICO: Caribbean National Forest, Luquillo Mts., Luquillo Experimental Forest, El Verde Research Area, trail to Río Sonadora, part way up hill, elev. ca. 370 m, on *Polyporus tenuiculus*, 26 Nov. 1991, D. J. Lodge PR 704 (BPI).

**Etymology.** – From Latin '*favolus*', a small honeycomb, also the commonly known, but antedated, name of the host, *Favolus brasiliensis*, in reference to the honeycomb-like aspect of the host hymenium.

Pure cultures of this species, obtained from *Lodge PR 704*, died before we had a chance to characterize the anamorph beyond noting that it was a *Cladobotryum* species. The *Cladobotryum* described here was taken from the paratype specimen, where it is poorly developed. Chlamydospores (Fig. 12), immersed in host tissue, were found in both specimens.

Because of its orange perithecia, which are KOH<sup>+</sup> at the papilla, and *Cladobotryum* anamorph, *H. favoli* is clearly related to the polyporiculous *Hypomyces* species *H. aurantius* (Pers. : Fr.) L.-R. Tul. and *H. subiculosus* (Berk. & M. A. Curt.) Höhnelt. *Hypomyces aurantius* is common at north and south temperate latitudes while *H. subiculosus* is primarily tropical in distribution. Both of these species produce their conidia in long chains. Conidia of *H. aurantius* are held end-to-end whereas conidial chains of *H. subiculosus* are imbricate. In *H. favoli* conidia are held in short, imbricate chains, reminding of radiating heads. The anamorph shows resemblance to *Cladobotryum purpureum* (Morgan-Jones) W. Helfer but the lack of pure cultures in *H. favoli* does not allow their further comparison.

***Hypomyces puertoricensis*** Samuels, K. Pöldmaa et Lodge, sp. nov. – Figs. 5–9, 13–17.

Subiculum effusum, album. Perithecia obpyriformia, 230–360  $\mu\text{m}$  alta, 136–270  $\mu\text{m}$  lata, in subiculo immersa vel fere superficialia, dense gregaria, luteola; in KOH immersa colorem non mutant; papilla conspicua, acuta, 70–100  $\mu\text{m}$  alta. Asci cylindracei, (115–)120–134(–138)  $\times$  7.0–9.5(–11.5)  $\mu\text{m}$ , apice incrassato, poro instructi. Ascosporae fusiformes, (11.0–)12.5–14.5(–16.0)  $\times$  (4.0–)4.5–5.5(–6.0)  $\mu\text{m}$ , unicellulares, prominenter verrucosae, apiculatae; apiculi 3–4  $\mu\text{m}$  longi, obtusi. Anamorphosis *Cladobotryum* sp. Conidia oblonga, cylindrica vel anguste clavata,

29–42 × 7–11 µm, 1–3-septata. Chlamydosporae paucae, globosae vel ellipsoideae, unicellulares, 10–20 µm diam, dilute melleae.

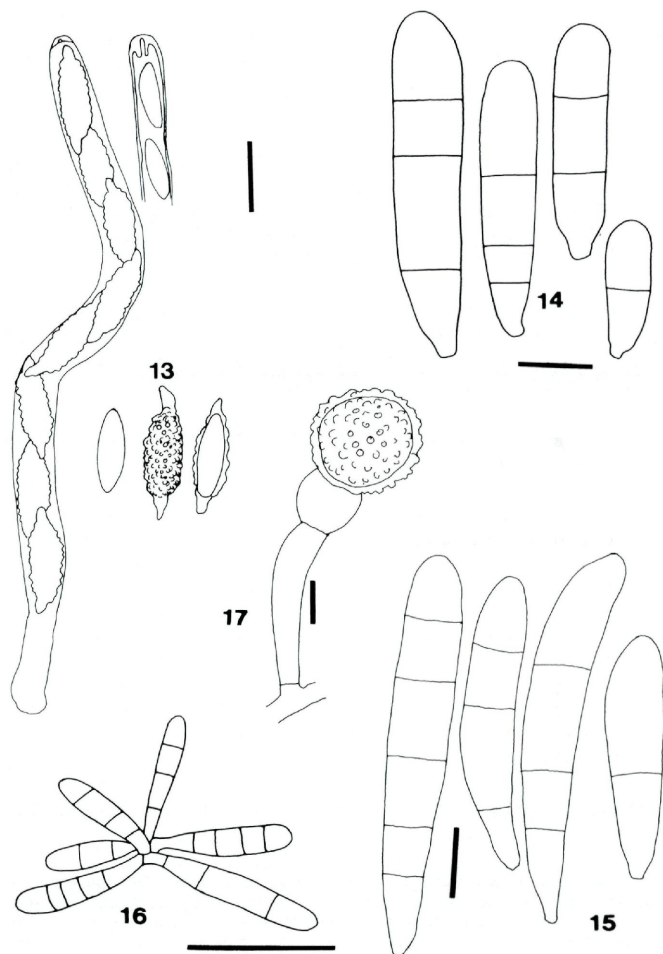
Holotypus. – Ad carposomata *Rigidopori lineati* (Pers.) Ryvarden, ad lignum, G. J. Samuels 8037 (BPI).

Anamorph. – *Cladobotryum* sp. – Figs. 14–17.

Subiculum effused over old host basidiomata and surrounding rotten wood, white, thin and easily removed from the substratum; subicular hyphae hyaline, smooth-walled, 4–8 µm wide, often forming inflated cells up to 20 µm diam, KOH<sup>+</sup>. – Perithecia obpyriform, 230–360 µm high, 136–270 µm wide, immersed to half-free in the subiculum, gregarious in large numbers, pale yellow, KOH<sup>+</sup>; papilla prominent, acute, 70–100 µm. – Perithecial wall ca. 25 µm thick, cells of outer region ellipsoidal, 8–13 × 5–8 µm, becoming more fusiform or oblong toward the interior. – Papilla formed of diverging files of cells, those at the surface clavate, 7–12 × 4–6 µm. – Asci cylindrical, (115–)120–134(–138) × 7.0–9.5(–11.5) µm, apex thickened and with a pore; ascospores uniseriate, partially overlapping. – Ascospores fusiform, (11.0–)12.5–14.5(–16.0) × (4.0–)4.5–5.5(–6.0) µm, unicellular, prominently verrucose and apiculate; apiculi 3–4 µm long, obtuse; many ascospores (probably immature) smooth and nonapiculate.

Characteristics of the associated anamorph. – Anamorph sparse on natural substratum. Conidiophores and conidiogenous cells not observed. – Conidia oblong, cylindrical to narrowly clavate, 29–42 × 7–11 µm, 1–3-septate. – Chlamydosporae scarce among subicular hyphae, globose or ellipsoidal, unicellular, 10–20 µm in diam, pale yellowish-brown, wall 1.5–3 µm wide, roughened.

Characteristics in culture. – Cultures derived from ascospores grown 7 d on CMD >5 cm diam, cottony, white, reverse not coloured. – Conidiation abundant, odour absent. – Conidiophores arising from aerial hyphae, ascending, not differentiated from aerial hyphae, simple or irregularly branched, indefinite in length, 5–6 µm wide, each terminating in a single conidiogenous cell with a slight periclinal thickening at the tip, forming up to 10 conidia from the single conidiogenous locus. – Conidia oblong, cylindrical to narrowly clavate, straight or bent at the tip, (20–)32.5–53.5(–59.5) × (6.5–)8.0–10.5(–12.0) µm, 1–3-septate (to 75 µm long and 2–5-septate on MEA), hyaline, with a protuberant, flat, central or slightly lateral, basal hilum, held in short imbricate chains, which appear as radiating heads. – Chlamydosporae



Figs. 13–17. – *Hypomyces puertoricensis*. – 13. Ascus, ascus tip, and ascospores. Tip of ascus on left drawn as seen in phase contrast microscopy using water; tip of ascus on right as seen in phase contrast microscopy using water followed by aqueous phloxine (1%). – 14, 16. Conidia. – 15. Cluster of conidia held together. – 17. Chlamydospore. – Fig. 13 from Lodge 704; 14–17 from Samuels 96-12; 14 from CMD; 15–17 from MEA. – Scale bars: Figs. 13–15, 17: 10  $\mu$ m; Fig. 16: 35  $\mu$ m.



abundant on MEA, arising from aerial hyphae on 10–130 µm long branches, topmost cell globose, 19–38 µm diam., yellow, wall ca. 4 µm thick, unevenly warted, warts to 3 µm high, disappearing in age, usually supported by a specialized, ellipsoidal, basal cell which may have a few warts.

**Holotype.** – PUERTO RICO: Caribbean National Forest, Luquillo Mts., Luquillo Experimental Area, El Verde Research Area, elev. 350 m, on *Rigidoporus lineatus* and surrounding wood, 19 Feb. 1996, G. J. Samuels 8037 & H.-J. Schroers (BPI, Isotype TAA; cultures: CBS 495.97, Samuels 96–12, TAA 96–29).

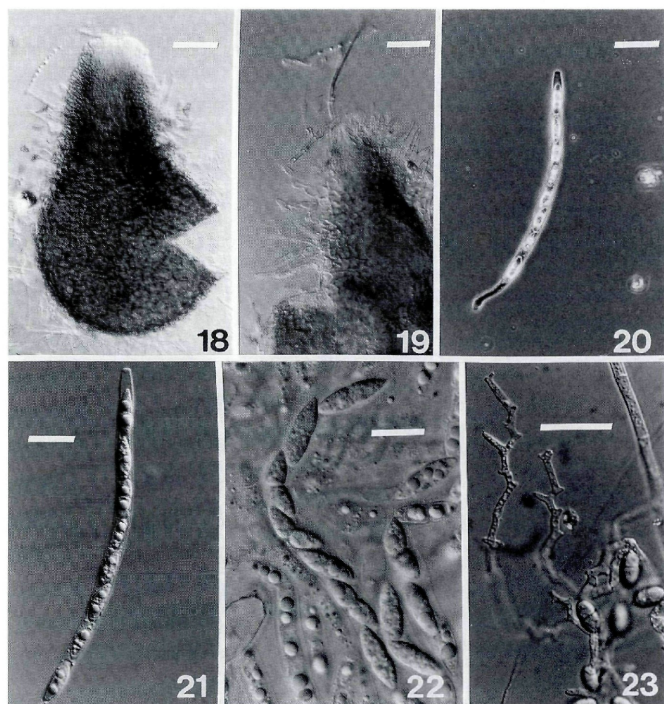
**Paratype.** – PUERTO RICO: Caribbean National Forest, Luquillo Mts., El Verde Research Area, Quebrada Prieta, Vogt wood addition plot, on polypore and rotten wood of standing dead tree, 5 June 1996, D. J. Lodge PR 3215 (BPI).

**Etymology.** – Refers to Puerto Rico, the geographic origin of the type specimen.

In its pale yellow, KOH<sup>+</sup> perithecia and white subiculum (Fig. 5), *H. puertoricensis* resembles the temperate species *H. semi-translucens* and *H. albidus*. *Hypomyces puertoricensis* is distinguished by its relatively small, unicellular ascospores and – above all – by its *Cladobotryum* anamorph, which has exceptionally large conidia (Fig. 14–16). According to this feature it is similar to *C. amazonense*, which is characterized by the verticillate branching pattern of conidiophores and grows on basidiocarps of litter inhabiting agarics (Bastos & al., 1981). Conidiogenesis in *H. favoli* is presumably retrogressive as hila at the base of conidia seem to become progressively wider in age.

***Hypomyces viridigriseus*** K. Pöldmaa et Samuels, sp. nov. – Figs. 18–30.

Subiculum album, viridescens. Perithecia obpyriformia, 250–400(–500) µm alta, 165–300(–400) µm lata, in subiculo semiimmersa vel quasi superficialia, solitaria vel gregaria, aurantio-brunnea, in KOH immersa colorem non mutant; papilla conspicua, 70–135 µm alta; apex perithecii setosus, setae hyphales, 30–70 × 4–5 µm, hyalinae, septatae, glabrae. Asci cylindracei, 100–140 × 7–8 µm, ad apicem leniter incrassati. Ascospores fusiformes, (14–)17–19(–30) × (4–)4.5–6(–7.5) µm, bicellulares, septo mediano divisae, in asco aliquae disarticulatae, glabrae vel minute verrucosae; apiculi nulli vel conspicui, 2(–4) µm alti. Anamorphosis *Cladobotryum viridigriseum* (G. Arnold et al.) K. Pöldmaa et Samuels. Conidia in natura ellipsoidea, cylindrica vel clavata, (15–)17.5–28.5(32.5) × 7–10(–11) µm, 1–3-septata, dilute viridia. Chlamydosporae atrovirides, globosae, unicellulares, 12–18 µm diam.



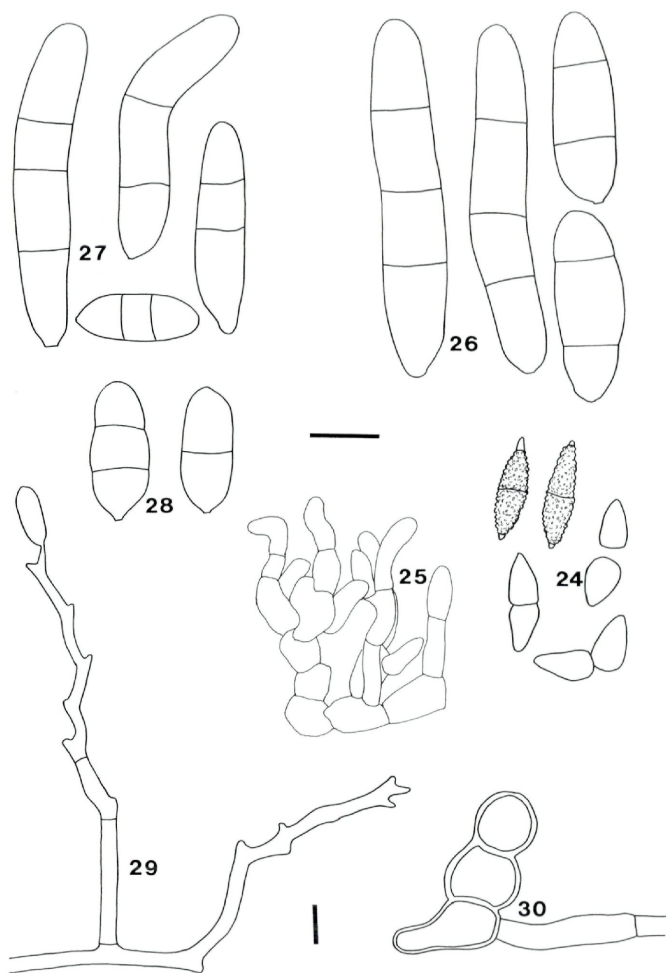
Figs. 18–23. – *Hypomyces viridigriseus*. – 18. Whole mount of a mature perithecium. – 19. Crushed perithecial apex showing hairs. – 20, 21. Asci. – 22. Ascospores disarticulating in an ascus. – 23. Conidiophore with denticulate conidiogenous cells. – All from TAA 169602. – Scale bars: Fig. 18 = 50  $\mu$ m; 19, 20, 23 = 25  $\mu$ m; 21 = 20  $\mu$ m; 22 = 10  $\mu$ m.

Holotypus. – Ad carposomata *Phellini laevigati* (Fr.) Bourdot et Galzin, K. Pöldmaa (TAA 169602).

Anamorph. – *Cladobotryum viridigriseum* (G. Arnold, Illman & G. P. White) K. Pöldmaa et Samuels, comb. nov. – Figs. 23, 26–30.

Basionym. – *Sympodiophora viridigrisea* G. Arnold, Illman & G. P. White, Mycotaxon 32: 371. 1988.

Subiculum effused over hymenophore of the host, at first white, turning green due to the production of conidia and afterwards



Figs. 24–30. *Hypomyces viridigriseus*. – 24. Ascospores, showing two that have disarticulated at the septum. – 25. Hairs found around the perithecial apex. – 26–28. Conidia. – 29. Conidiophore with geniculate-denticulate conidiogenous rachis. – 30. Chlamydospore. – Figs. 24–26, 28–30 from TAA 169602; 27 from Samuels 96-271; 26 from MEA; 27–30 from CMD. – Scale bars = 10 µm.

ochraceous at places where perithecia are formed, thin and easily removed from the substratum; subicular hyphae hyaline, smooth-walled, 3.5–5  $\mu\text{m}$  wide, sometimes becoming swollen, then up to 25  $\mu\text{m}$  diam, KOH<sup>+</sup>. – Perithecia obpyriform, 250–400(–500)  $\mu\text{m}$  high, 165–300(–400)  $\mu\text{m}$  wide, semi-immersed, becoming almost superficial in the subiculum, solitary or formed in scattered small groups, orange-brown, KOH<sup>+</sup>; papilla well developed, 70–135  $\mu\text{m}$  high, usually covered with hyphal hairs, 30–70  $\times$  4–5  $\mu\text{m}$ , hyaline, septate, smooth-walled, with obtuse tips, some cells becoming swollen (up to 15  $\mu\text{m}$  diam.). – Perithecial wall ca. 20  $\mu\text{m}$  thick, pseudoparenchymatous in surface view, with cells 6–15  $\mu\text{m}$  diam. – Papilla formed of outwardly diverging files of cells; the terminal cells clavate, ca. 10  $\mu\text{m}$  diam. – Asci cylindrical, 100–140  $\times$  7–8  $\mu\text{m}$ , apex slightly thickened; ascospores uniseriate with ends overlapping. – Ascospores fusiform, (14–)17–19(–30)  $\times$  (4–)4.5–6(–7.5)  $\mu\text{m}$ , equally two-celled, some disarticulating at the septum while still in the asci, smooth to finely verrucose; nonapiculate or with blunt to acute apiculi up to 2(–4)  $\mu\text{m}$  high.

**Characteristics of the associated anamorph.** – Anamorph abundant on natural substratum. – Conidiophores hyaline, indefinite in length, to 7  $\mu\text{m}$  wide, irregularly branched, terminal branches by 1–3, septate, 30–260  $\times$  3.5–5  $\mu\text{m}$ , producing up to 24 geniculate-denticulate conidiogenous loci over the terminal 1/3 or the whole branch; denticles 2–12  $\times$  1.5–2.5  $\mu\text{m}$ . – Conidia mostly ellipsoidal, some cylindrical or clavate, (15–)17.5–28.5(32.5)  $\times$  7–10(–11)  $\mu\text{m}$ ; 1–3-septate, pale green, with a distinct, protuberant hilum at the base. – Chlamydospores dark green, formed in irregular clusters, cells 12–18  $\mu\text{m}$  diam.

**Characteristics in culture.** – Colonies on CMD growing very slowly, attaining 12  $\mu\text{m}$  diam in 7 d, velvety, turning from white to yellow and finally green while conidia are being produced, reverse turning from deep green through yellowish brown to dark brown, sometimes brown pigment diffusing into the agar. – Conidiation abundant, odour absent. – Most of the mycelium submerged, orange-brown, cells often becoming moniliform, up to 18  $\mu\text{m}$  diam. – Conidiophores arising mostly from submerged hyphae, ascending to suberect, simple or irregularly branched, indefinite in length, 5–7  $\mu\text{m}$  wide, frequently septate, the upper third or the entire length a geniculate-denticulate rachis, with up to 20 conidiogenous loci, forming one to six conidia from each. – Conidia ellipsoidal to cylindrical, straight or sometimes bent at the tip, (10–)18–34(–47)  $\times$  (5–)7–9(–11)  $\mu\text{m}$ , (0–)13(4)-septate, green, with a protuberant basal hilum; held singly or in short imbricate chains, which appear as ra-



diating heads. – Chlamydospores forming terminally or laterally on short hyphal branches, composed of 2 to 6 subglobose cells, 14–18 µm diam, orange-brown.

**Holotype.** – UNITED STATES. ILLINOIS: Ogle Co., White Pines Forest State Park, Sleepy Hollow, on *Phellinus laevigatus*, 28 Sept. 1996, K. Põldmaa (TAA 169602, Isotype BPI; cultures: CBS 497.97, Samuels 96-234, TAA 96-86).

**Etymology.** – Refers to the previously described anamorph and to the colour of the conidia.

**Additional anamorphic specimens examined in culture.** – CANADA. ONTARIO: Temiskaming District, Tarzwell, on *Phellinus punctatus* (Fr.) Pilát, 30 Aug. 1979, G. P. White (DAOM 113666, CBS 630.88, ex type isolate of *Sympodiophora viridigrisea*). UNITED STATES. NEW YORK: Adirondack region, Raquette Lake, Long Point, on *Polyporus varius* Fr., 10 Sept. 1994, collector unknown, comm et det. K. T. Hodge (culture CBS 435.97, Samuels 96-271). ILLINOIS: Ogle Co., White Pines Forest State Park, Squirrel Trail, on *Hymenochaete rubiginosa* (Fr.) Lév., 28 Sept. 1996, K. Põldmaa (TAA 169614, cultures: CBS 436.97, Samuels 96-270, TAA 96-87).

*Hypomyces viridigriseus* is characterized by the formation of perithecia that are nearly superficial on the subiculum, and by the formation of hyphal hairs around the perithecial apex (Fig. 19). The contents of most of the perithecia in the type material were not ripe when collected and ascospores were found only in few asci. Most of the ascospores were not typical of *Hypomyces*, being smooth-walled, nonapiculate and tending to disarticulate while still in the asci (Figs 22, 24). Ascospore formation was not induced by incubating the material in a moist chamber for a week.

The most conspicuous and characteristic feature of the species is the formation of green conidia, which, although found in *Cladobotryum virescens* G. Arnold (Arnold, 1987), has not previously been reported for the proved anamorphs of *Hypomyces*. Most of the characteristics of the anamorph coincide with those given in the original description of *Sympodiophora viridigrisea* (Arnold & al., 1988). However, single ascospore, as well as conidial isolates grown on CMD and MEA produced also 5-celled conidia that were much longer than was given in the original description and that were sometimes bent at the top (Figs 26, 27).

The anamorph of *H. viridigriseus*, *C. viridigriseum*, was originally proposed in the genus *Sympodiophora* G. Arnold. *Sympodiophora* is characterized mainly by the sympodial proliferation of the conidiogenous cells. We follow Rogerson & Samuels (1993) in re-

garding *Sympodiophora* to be synonymous with *Cladobotryum* and have, accordingly, proposed the new combination.

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### References

- Arnold, G. R. W. (1987). Beitrag zur Kenntnis der Pilzflora Kubas. III. – Feddes Rept. 98: 351–355.
- , W. I. Illman & G. P. White (1988). A greenish grey species of *Sympodiophora* Arnold (Hyphomycetes). – Mycotaxon 32: 369–374.
- Bastos, C. N., H. C. Evans & R. A. Samson (1981). A new hyperparasitic fungus, *Cladobotryum amazonense*, with potential for control of fungal pathogens of cocoa. – Trans. Br. mycol. Soc. 77: 273–278.
- Helfer, W. (1991). Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. – Libri Botanici 1: 1–157.
- Pöldmaa, K. (1996). A new species of *Hypomyces* and three of *Cladobotryum* from Estonia. – Mycotaxon 59: 389–405.
- Rogerson, C. T. & G. J. Samuels (1985). Species of *Hypomyces* and *Nectria* occurring on Discomycetes. – Mycologia 77: 763–783.
- & — (1989). The boleticolous species of *Hypomyces*. – Mycologia 81: 413–432.
- & — (1993). Polyporicolous species of *Hypomyces*. – Mycologia 85: 231–272.
- & — (1994). Agaricolous species of *Hypomyces*. – Mycologia 86: 839–866.
- Samuels, G. J. & K. A. Seifert (1987). Kinds of Pleoanamorphy in the Hypocreales. – In: Sugiyama, J. (ed.) Pleomorphic fungi: the diversity and its taxonomic implications. Kodansha Ltd, Tokyo and Elsevier, Amsterdam 29–56.

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