

***Cordana terrestris* (Timonin) Hern.-Restr., Gené & Guarro – AEB1296 (= PDD 117258) Synonym = *Pseudobotrytis terrestris* (Timonin) Subram.**

This species wasn't observed initially while I was observing the nearby *Hydropisphaera suffulta* AEB 1294. I assume that it developed while in my closed moist collecting box sometime after the initial collection.

Collection site: Dry Creek entrance to Belmont Regional Park (Lower Hutt)

Collection date: 25 February 2017; **Collector & identifier:** Dan Mahoney

Substrate: moist, dead, soft decayed, partially buried wood

Voucher materials: dried herbarium specimen including a Shear's mounting fluid (SMF) microscope slide; Dan's in-situ dissecting scope photos – 35 mm Kodak color film, 24 exposure, 200 ASA (best ones digitally scanned) and a number of compound scope digital photos of microscopic detail; Dan's brief description and comments.

Other fungi also present on the same partially buried wood: *Hydropisphaeria suffulta* (AEB 1294) and an unidentified *Chaetosphaeria* (with 8, 3-septate, hyaline, smooth, fusoid 12.5–16 × 3–5 µm ascospores per ascus in smooth, non-descript, mostly superficial perithecia).

Brief description: **Conidiophores** numerous unbranched, each emerging from a dark swelling with dark rhizoidal outgrowths at the substrate surface, usually one conidiophore per swelling but sometimes a second shorter conidiophore also emerging from the same swelling. Conidiophores smooth, septate, gradually tapering base to apex, darker brown in the lower portion but becoming lighter brown in upper portions and nearly hyaline at the sporogenous apex – occasionally with what appeared to be points of percurrent regrowth. Variable in length – those measured were 80–210 × 5–7.5 µm near the basal swelling × 3–4 µm just below the whorl of sporogenous apical cells. **Sporogenous cells** sparingly & indistinctly septate, typically at the conidiophore apex in whorls of varying number – up to 9 or more were seen, hyaline or nearly so, tapering from base to just below their variously swollen (globular, irregular, elongate, etc.) denticulate apices. A whorl of sporogenous cells sometimes also arose from an intercalary position on the conidiophore where the brownish pigment seemed to spread from the conidiophore into the whorl – and occasionally a very short brown curled branch-like outgrowth was also seen at this intercalary position. Additional variations were also observed in the conidiophore apical whorl. Here, in place of one or more typical sporogenous cells, a regrowth sometimes occurred and, at its apex, another whorl of sporogenous cells was borne. These variations aren't mentioned or illustrated in earlier descriptions I have read.

Conidial origins on the variously swollen apices of the sporogenous cells, polyblastic, sympodial on short denticles. **Conidia** dry, non-catenulate, oblong with a rounded apex and basally tapered to the narrow denticle of origin, 2-celled with a median septum (sometimes slightly indented at the septum), smooth, hyaline or nearly so, 8–8.5 × 3.5–4 µm, detachment seemingly schizolytic.

Comments: See the next page for full reference citations to articles mentioned in the comments below.

Recent nomenclature changes -- based on the one fungus-one name code, chronological priority, sequencing and 'suggestions' for conserving fungal names -- have affected the accepted binomial *Cordana terrestris*. In 2004 Fernández and Huhndorf first described its teleomorph, *Porosphaerella borinquensis*, collected in Puerto Rico. In vitro, single & multiple ascospore inoculations yielded a conidial stage that matched the widely distributed *Pseudobotrytis terrestris*. To date, however, no in vivo observations of the conidial *P. terrestris* have revealed a teleomorph. Their comparisons of *Porosphaerella borinquensis* and its, then named, *Pseudobotrytis terrestris* anamorph with *Porosphaerella cordanophora* and its *Cordana pauciseptata* anamorph led them to suggest that the conidial ontogeny of the two anamorphs were modifications on the same theme. Since that time other publications have discussed *Pseudobotrytis* vs *Cordana* similarities – e.g. Réblová & Seifert. 2007 – but not until 2014 in Hernández-Restrepo et al. were the two genera formally described as congeneric under *Cordana*. More recently, *Cordana*, earlier placed in the *Cordanaceae* [*Cordanaceae* (Sacc.) Nann. 1934] has been placed in its own order (*Cordanales*, Hernández-Restrepo 2015). The use of *Cordana* rather than *Pseudobotrytis* and its placement in the *Cordanales* is also recommended by Réblová M. et al. 2016 (see page 134 below). Sequencing by Hernández-Restrepo 2015 and Réblová et al. 2018, both demonstrate a close relationship between the *Cordanales* and the *Coniochaetales*.

(page 134) “**Cordanales**

Use *Cordana* Preuss 1851 rather than *Pseudobotrytis* Krzemien. & Badura 1954 or *Porosphaerella* E. Müll. & Samuels 1982

The type species of *Cordana*, *C. pauciseptata*, was linked to a sexual morph described as *Porosphaerella cordanophora*, type of *Porosphaerella* (Müller & Samuels 1982), thus these generic names are synonyms. *Cordana* is a well-known asexual genus that includes 22 names while three species have been placed in *Porosphaerella*. Réblová and Seifert (2007) showed that *P. borinquensis* and *P. cordanophora* are closely related despite the fact that *P. borinquensis* has an asexual morph regarded as *Pseudobotrytis terrestris* which Hernández-Restrepo et al. (2014) recognized as *Cordana terrestris* including *Porosphaerella borinquensis* as a synonym. They also considered the type species of *Pseudobotrytis*, *P. fusca*, to be a synonym of *C. terrestris*, thus this generic name with four species is also a synonym of *Cordana*. Given its priority, fewer number of name changes required, and widespread use, we recommend the use of *Cordana* rather than *Pseudobotrytis* or *Porosphaerella*.”

References discussed on the previous page: listed in chronological order

- 1) Fernández, F.A. & Huhndorf, S.M. 2004. Neotropical pyrenomycetes: *Porosphaerella borinquensis* sp. nov. and its *Pseudobotrytis terrestris* anamorph. *Fungal Diversity* 17: 11–16. [See description and illustrations of *Pseudobotrytis terrestris*.](#)
- 2) Réblová M. & Seifert K.A. 2007. A new fungal genus, *Teracosphaeria*, with a *phialophora*-like anamorph (*Sordariomycetes*, *Ascomycota*). *Mycological Research* 111: 287–298. [The New Zealand ICMP 15117 culture mentioned here was reported in Genbank under *Porosphaerella borinquensis* 28S ribosomal RNA gene, partial sequence EF063573 \(*Cordana terrestris* was the name later applied to its *Pseudobotrytis terrestris* anamorph\).](#)
- 3) Hernández-Restrepo M., Gené J., Mena-Portales J., Cano J., Madrid H., Castañeda-Ruiz R.F. & Guarro J. 2014. New species of *Cordana* and epitypification of the genus. *Mycologia* 106: 723–734. [See their key to *Cordana* species on the next page.](#)
- 4) Hernández-Restrepo M., Groenewald J.Z. & Crous P.W. 2015. *Neocordana* gen. nov., the causal organism of *Cordana* leaf spot on banana. *Phytotaxa* 205(4): 229–238. [Several species, formerly placed in *Cordana* \(e.g. *C. musae*\), are here recognized in the new genus *Neocordana*. According to the authors, *Neocordana* belongs in the *Pyriculariaceae* \(*Magnaporthales*\) rather than in the *Cordanaceae* \(*Cordanales*\) where the type species of *Cordana*, *C. pauciseptata*, resides.](#)
- 5) Réblová M., Miller A.N., Rossman A.Y., Seifert K.A., Crous P.W., et al. 2016. Recommendations for competing sexual-asexually typified generic names in *Sordariomycetes* (except *Diaporthales*, *Hypocreales*, and *Magnaporthales*). *IMA Fungus* 7: 131–153.
- 6) Réblová M., Miller A.N., Réblová K. & Štěpánek V. 2018. Phylogenetic classification and generic delineation of *Calypotosphaeria* gen. nov., *Lentomitella*, *Spadicoides* and *Torrentispora* (*Sordariomycetes*). *Studies in Mycology* 89: 1–62.

Index Fungorum (as of 23 June 2021)

Current Name:

[Cordana terrestris \(Timonin\) Hern.-Restr., Gené & Guarro](#), in Hernández-Restrepo, Gené, Mena-Portales, Cano, Castañeda-Ruiz & Guarro, *Mycologia* 106(4): 729 (2014)

Synonymy:

[Spicularia terrestris Timonin](#), *Canadian Journal of Research*, Section C 18: 315 (1940)

[Umbellula terrestris \(Timonin\) E.F. Morris](#), *Mycologia* 47(4): 603 (1955)

[Pseudobotrytis terrestris \(Timonin\) Subram.](#), *Proc. Indian natn Sci. Acad.*, Part B. Biol. Sci. 43: 277 (1956)

[Porosphaerella borinquensis F.A. Fernández & Huhndorf](#), *Fungal Diversity* 17: 12 (2004)

KEY DIFFERENTIATING CORDANA SPECIES (FROM Hernández-Restrepo M., Gené J., Mena-Portales J., Cano J., Madrid H., Castañeda-Ruiz R.F. & Guarro J. 2014. New species of *Cordana* and epitypification of the genus. *Mycologia* 106: 723–734.)

- 1a. Conidiogenous cells discrete, arranged in a whorl at the apex of the conidiophores . . . 2
 1b. Conidiogenous cells integrated in the conidiophores, intercalary or terminal . . . 3
- 2a. Conidia 1-septate, 6–11 × 3–4 µm; teleomorph, when present, with ascospores ellipsoidal, 1-septate, constricted at the septum, 7–9 × 3–4 µm **C. terrestris**
 2b. Conidia 0-septate, 5–7 × 2.5–4.5 µm; teleomorph absent **C. bisbyi**
- 3a. Conidia only 0-septate 4
 3b. Conidia only 1-septate 6
 3c. Conidia 0–1-septate **C. mercadiana**
- 4a. Conidia verruculose **C. verruculosa**
 4b. Conidia smooth-walled 5
- 5a. Conidia black, 21–27 × 9–15 µm **C. semaniae**
 5b. Conidia pale brown, 6.5–9.5 × 4.5–6.5 µm **C. solitaria**
- 6a. Conidial septum markedly thickened, brownish black 7
 6b. Conidia septum otherwise 9
- 7a. Conidia with an acute apex; teleomorph, when present, with ascospores ellipsoidal to elliptic-fusiform, one-septate, constricted at the septum, 9–12 × 3.5–5 µm **C. pauciseptata**
 7b. Conidia with a rounded apex; teleomorph absent 8
- 8a. Conidia broadly ellipsoidal or obovate, both cells concolorous, pale brown to brown. **C. ellipsoidea**
 8b. Conidia ellipsoidal or ovoid, the basal cell brown and larger than the distal cell. **C. inaequalis**
- 9a. Conidia obpyriform, distal cell consistently narrower than the basal cell 10
 9b. Conidia ovoid or pyriform, distal cell usually wider than the basal cell 11
 9c. Conidia ellipsoidal, oval or oblong, both cells of nearly equal width 12
- 10a. Basal cell dark brown, distal cell light brown with an acute apex, 18.5–27 × 9.5–15 µm. **C. crassa**
 10b. Both cells concolorous, brown, distal cell with rounded apex, 13–17.5 × 8–10 µm **C. lithuanica**
- 11a. Conidia 11–18 × 7–9 µm, ovoid or pyriform, light brown **C. musae**
 11b. Conidia 18–31 × 12.5–15.5 µm, ovoid, at first light brown, later dark brown, with a pigmented septal pore **C. abramovii**
- 12a. Conidia broadly ellipsoidal to obovoid, more than 8 µm wide . . . 13
 12b. Conidia ellipsoidal, oval or oblong, up to 8 µm wide 16

- 13a. Conidia concolorous, subhyaline to pale brown . . . 14
 13b. Conidia discolorous 15
- 14a. Conidia 20–30 × 12–18 µm, broadly ellipsoidal, **C. johnstonii**
 14b. Conidia 17–19 × 10–13 µm, obovoid **C. andinopatagonica**
- 15a. Basal cell brown, apical cell paler, 13.5–23 × 8.5–11.5 µm **C. uniseptata**
 15b. Basal cell subhyaline, apical cell pale brown, 15–25 × 10–15 µm **C. versicolor**
- 16a. Conidia ellipsoidal or oval, 11–20 × 4.5–7 µm **C. indica**
 16b. Conidia oblong, 6–10 × 3–5 µm **C. parasitica**

Illustrations from page 296 of “Réblová M, Seifert KA. 2007. A new fungal genus, *Teracosphaeria*, with a *phialophora*-like anamorph (Sordariomycetes, Ascomycota). *Mycological Research* 111: 287–298.”

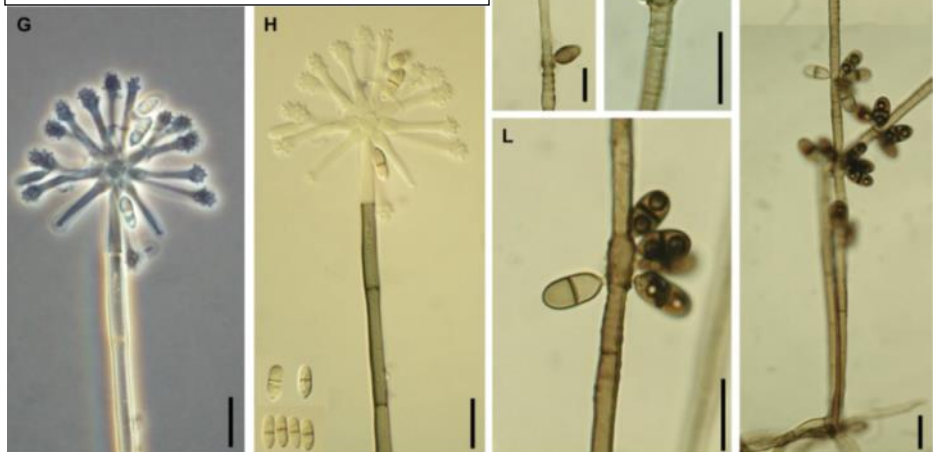
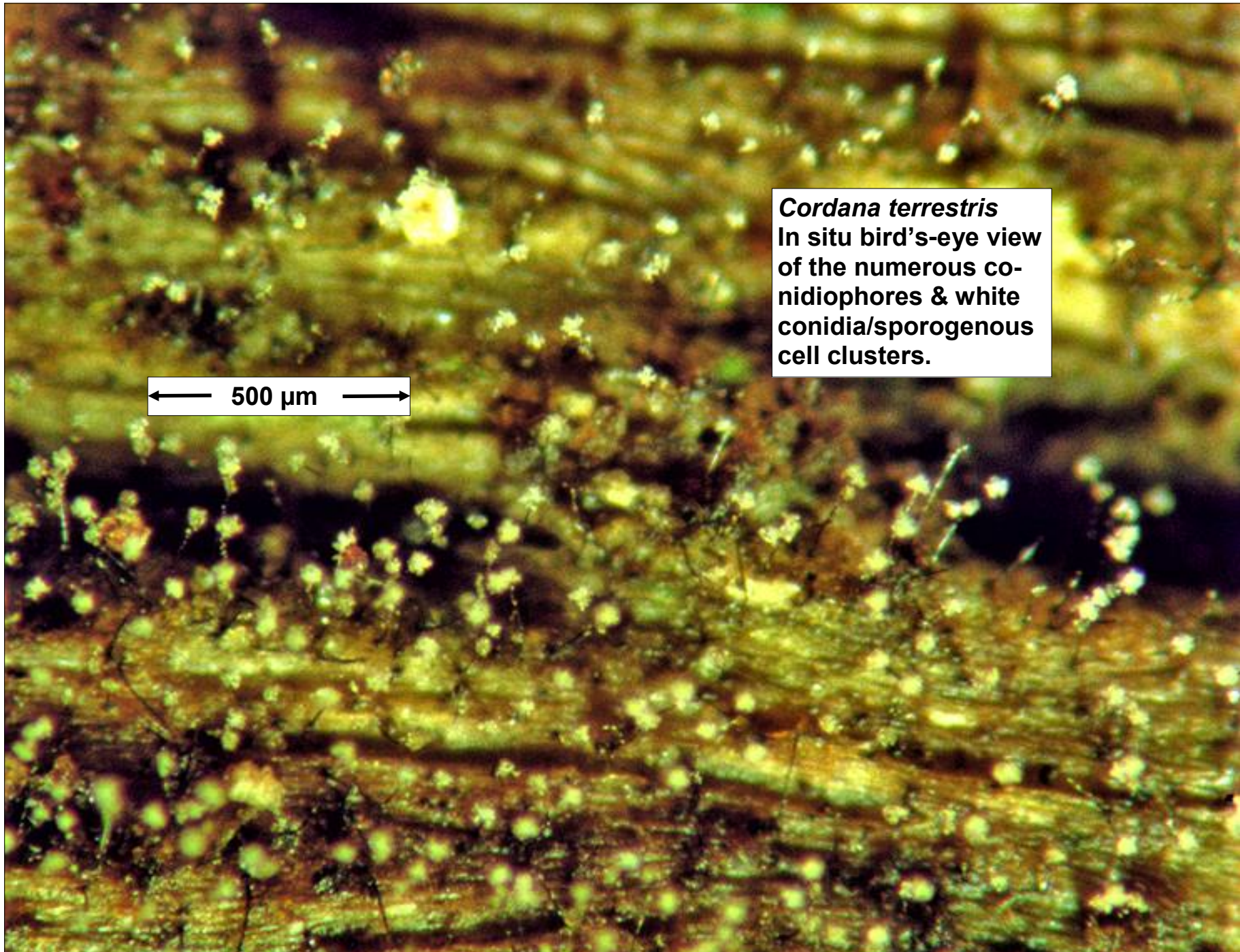
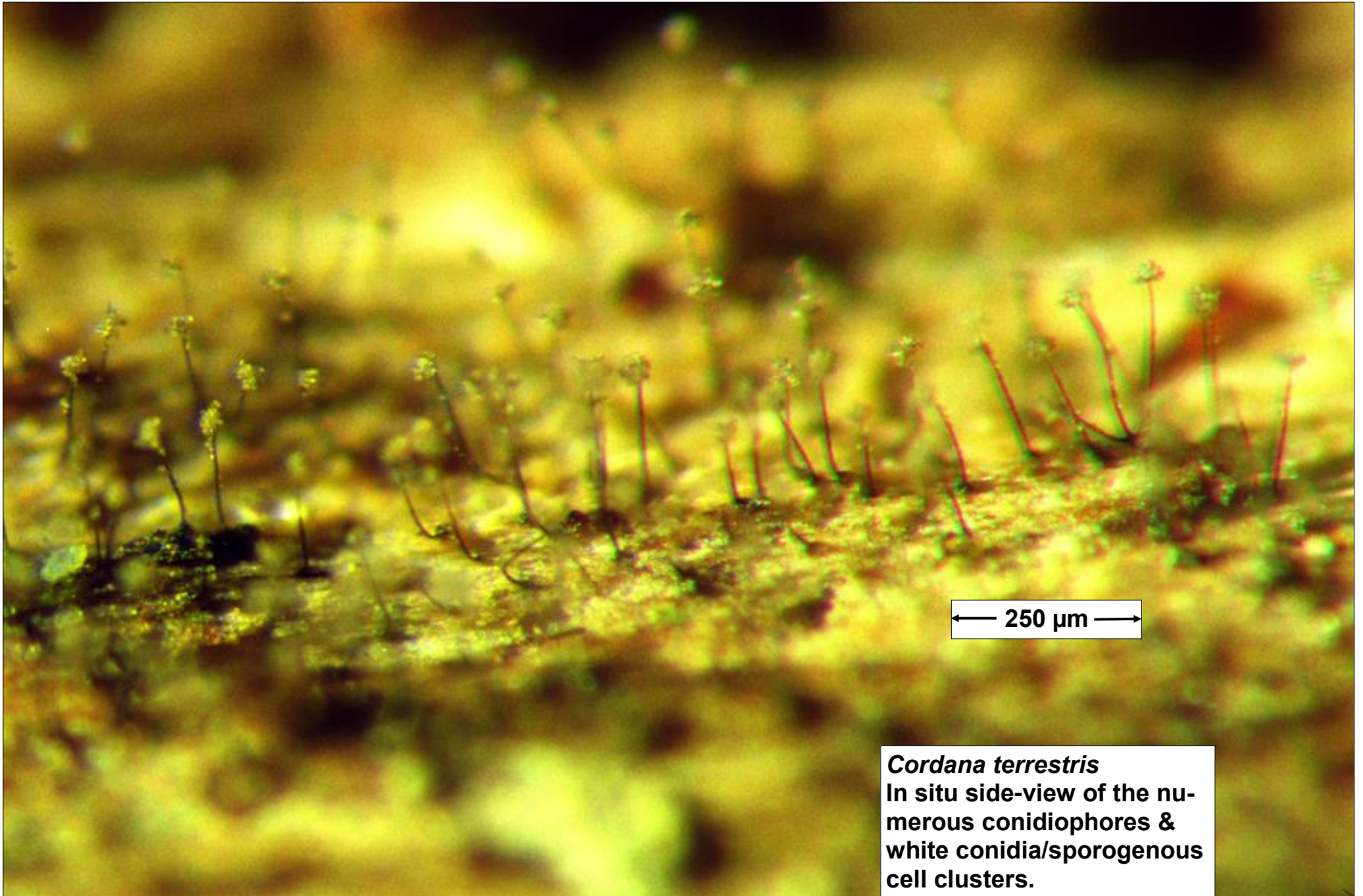


Fig 4 – (G–I) *Pseudobotrytis terrestris*. (G–H) Conidiophores with conidia, in vitro (14 days, PCA). (I) Conidiophore, detail of a fertile region with denticles, in vitro (14 days, PCA). (J–M) *Cordana pauciseptata*. (J–M) Conidiophores with conidia, in vitro (14 days, PCA). (H, J–M) differential interference and (G) phase contrast microscopy. (G–I) ICMP 15117; (J–M) ICMP 15134. Bars 10 mm.



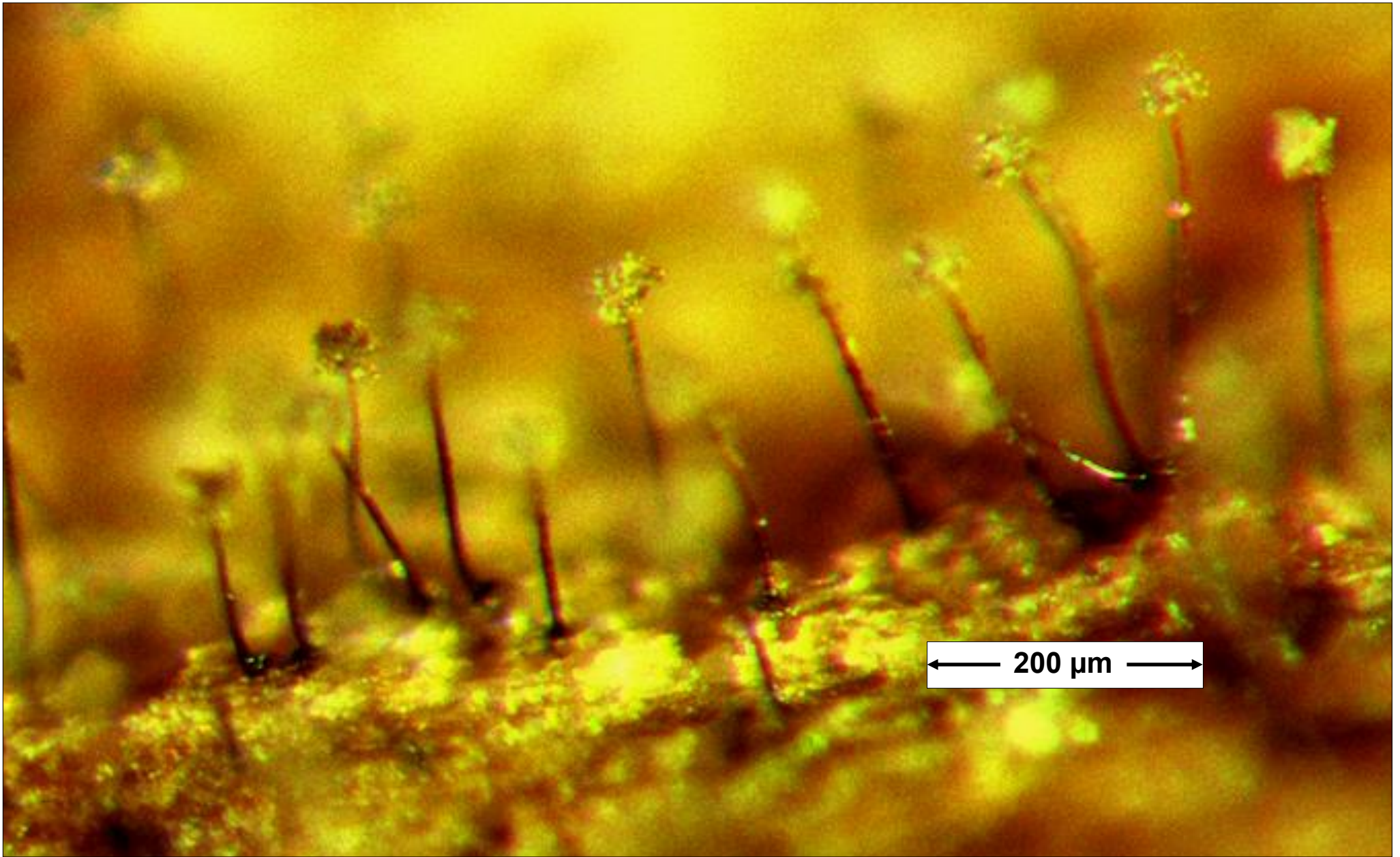
Cordana terrestris
In situ bird's-eye view
of the numerous co-
nidiophores & white
conidia/sporogenous
cell clusters.

← 500 μm →

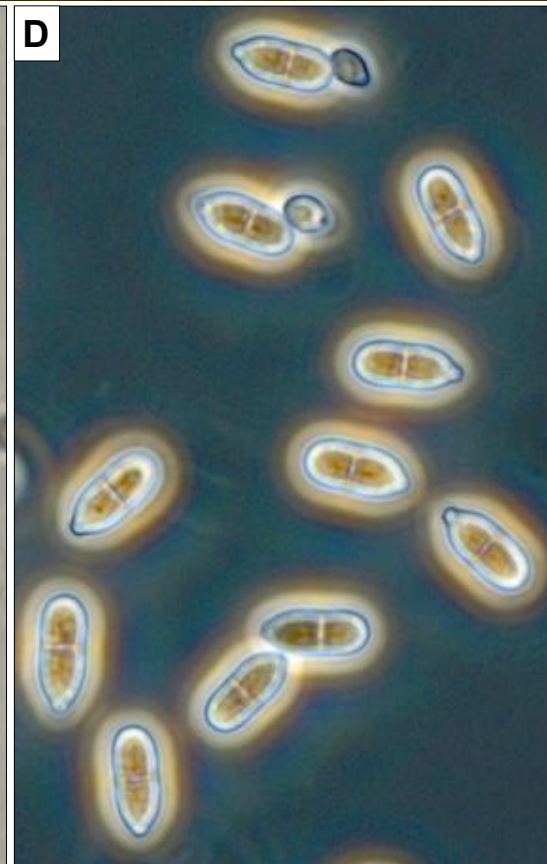
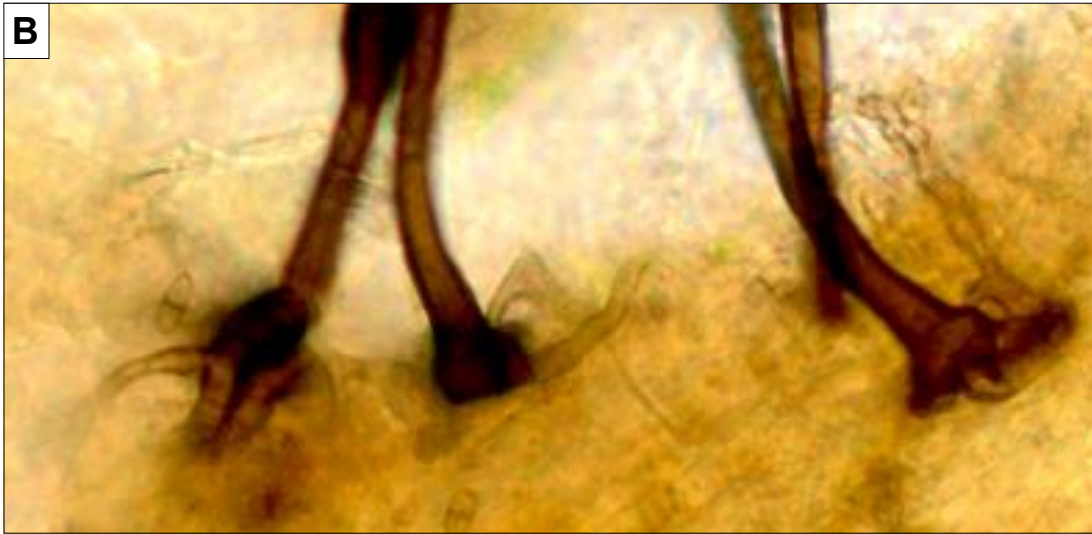
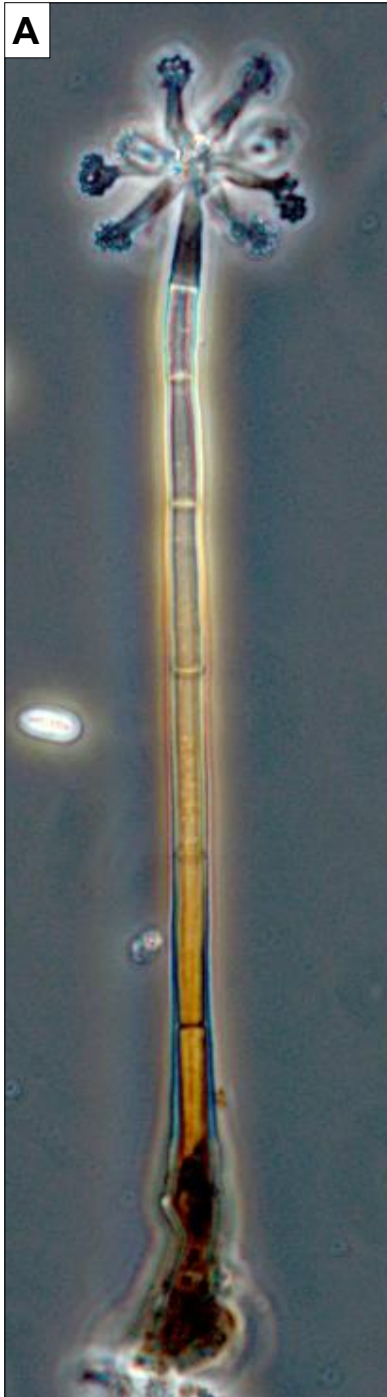


← 250 μ m →

Cordana terrestris
In situ side-view of the numerous conidiophores & white conidia/sporogenous cell clusters.



Cordana terrestris. In situ side-view of the conidiophores & white conidia/sporogenous cell clusters.

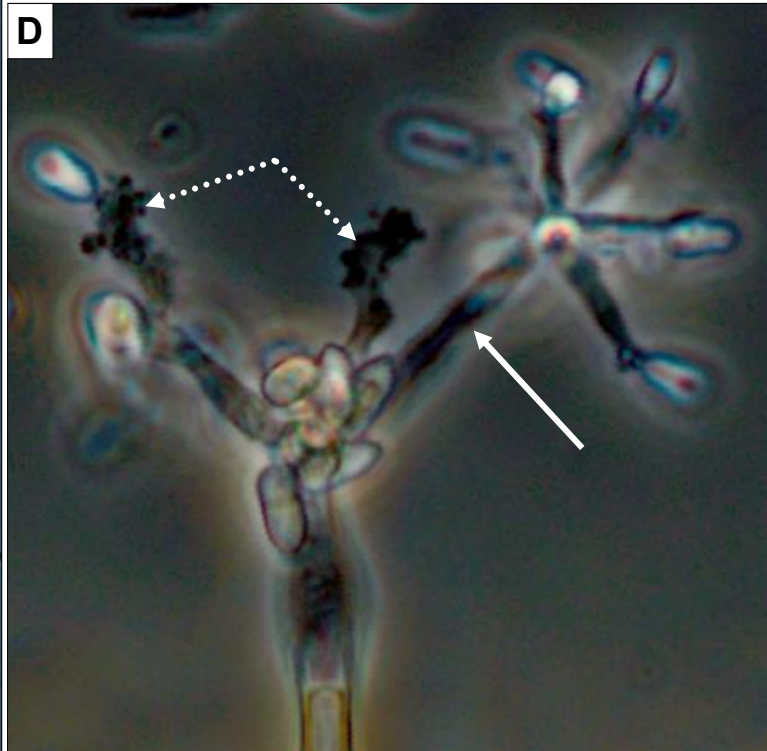
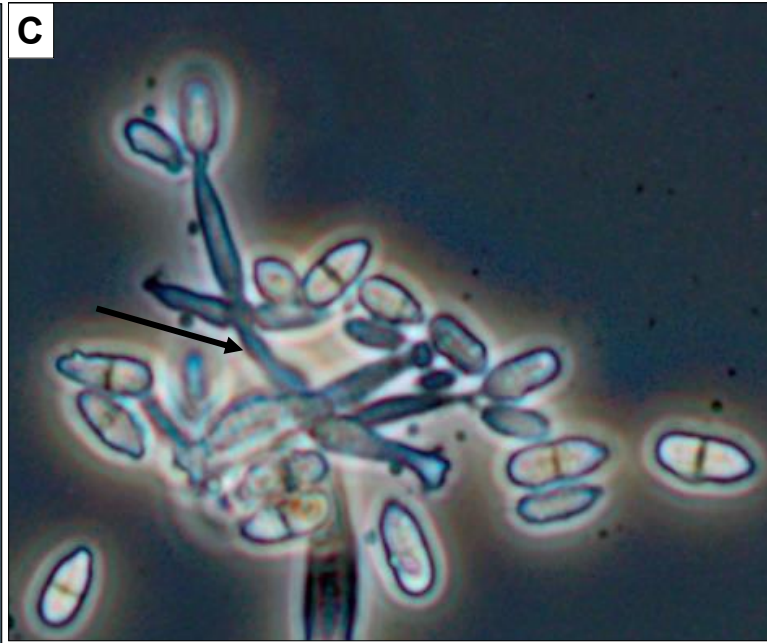


Cordana terrestris

A. Conidiophore with its terminal whorl of sporogenous cells. Sporogenous cells with denticulate terminal swellings from which the conidia have detached. SMF, X40 objective, phase.

B. Conidiophores emerging from a dark swelling with rhizoidal outgrowths at the substrate surface. Water, X40 obj., phase.

C,D. Conidia. Water, X100 obj.; C brightfield, D phase. Dry, non-catenulate, oblong with a rounded apex and basally tapered to the narrow denticle of origin, 2-celled with a median septum (sometimes slightly indented at the septum), smooth, hyaline or nearly so, $8-8.5 \times 3.5-4 \mu\text{m}$, detachment seemingly schizolytic.



Cordana terrestris
 A–C. Same fruiting structure. Water, X40 objective. A. Bright-field; B,C phase. Note that one of the terminal sporogenous cells (black solid arrows) has regrown to produce its own small whorl of sporogenous cells. Note also a small group of sporogenous cells in an intercalary position on the A,B conidiophores (arrows with small dashes). D. Another situation similar to A–C. SMF, X40 obj., phase. Here a white solid arrow points to a small branch-like regrowth at the conidiophore apex. Also two of the irregularly swollen denticulate apices on the sporogenous cells are particularly obvious (see dotted white arrows).



More variations in the *Cordana terrestris* specimen. A,B. Same field (water, X40 objective). A. Brightfield. B. Phase. C,D. Same field but different conidiophores than A,B (water, X40 obj.). C. Brightfield. D. Phase. In A,B note that conidia are detached from both terminal sporogenous cells on the longer and shorter conidiophores while the opposite is true in C,D. Note also that both long and short conidiophores shown here arise from a common basal swelling and that all the longer conidiophores shown here have intercalary areas with sporogenous cells. In A,B one intercalary position (solid arrow) seems to bear only short curling aborted branches. In C,D the intercalary position (dotted arrow) seems to have both curled aborted branches and indistinct sporogenous cells.