Coprotus albidus **(Boud.) Kimbr. PDD 126763 (= AEB 1417) – A good match.**

Collected: 3 April 2024

Substrate: red deer (*Cervus elaphus*) dung

Collection site & vegetation: NZTM = E2014005, N5801875; Raukumara Conservation Park – a slipface in mixed native forest (hard-beech, tawa, tanekaha, kamahi, rata etc.), altitude 450m

Collector: Ian Flux; **Identifier:** Dan Mahoney

Voucher materials: No dried herbarium specimen but 1 Shear's mounting fluid (SMF) semi-permanent microscope slide; photos of microscopic detail using an Olympus BX51 compound scope with a DP28 camera; references consulted.

References consulted:

1. Kimbrough J.W., Luck-Allen E.R. and Cain R.F. 1972. North American species of *Coprotus* (Thelebolaceae: Pezizales). Can. J. Bot. 50: 957–971. See their key to species and description of *Coprotus albidus* on the next two pages.

2. Kušan I, Matočec N, Jadan M, Tkalčec Z, Mešić A. 2017. An overview of the genus *Coprotus* (Pezizales, Ascomycota) with notes on the type species and description of *C. epithecioides* sp. nov. MycoKeys 29: 15–47. Includes a worldwide identification key to species, only 2 of which have 32-spored asci. That portion of their key is reproduced here:

14 Asci 32-spored..**15**
Asci 64 or ~256 spores...**16**
15 Asci broad clavate (Q ca. 3.5), 100–175 × 48–75 µm; ascospores narrowly ellipsoid (Q = 1.6–1.8), 13.5–17 × 7–8 µm; paraphyses filiform, apically bent and branched, up to 2 µm wide.................. ***C. rhyparobioides*** **(Heimerl) Kimbr.**
Asci clavate (Q = 4.8–6.0), 75–112 × 19–30 µm; ascospores elongated ellipsoid (Q = 1.9–2.2) 10–12.5 × 5–7.5 µm; paraphyses apically clavate and unbranched, 5–6 µm wide.................................***C. albidus*** **(Boud.) Kimbr.**

3. Link for *Coprotus albidus* photos by Enrique Rubio: https://www.centrodeestudiosmicologicosasturianos.org/?p=7851
The photos are reproduced, in this pdf, after those by Kimbrough et al. 1972.

Kimbrough J.W., Luck-Allen E.R. and Cain R.F. 1972. North American species of *Coprotus* (Thelebolaceae: Pezizales). Can. J. Bot. 50: 957–971. **See below p. 961 with synonyms, description & other details for *C. albidus*.**

Coprotus albidus (Boud.) Kimbr.
= ***Rhyparobius albidus*** Boudier, Bull. Soc. Mycol. Fr. 4: 49. 1887.
= ***Coprotus albidus*** (Boud.) Kimbrough, Am. J. Bot. 54: 22. 1967.
= ***Rhyparobius tenacellus*** Phillips, Grevillea, 19: 74. 1891.
= ***Rhyparobius mirabilis*** Vel., Discom. Bohem. 364. 1934.

Apothecia sessile, globose to lenticular, 0.2-0.4 mm in diam, white to almost translucent, smooth, hymenium roughened by protruding asci; ***excipulum*** pseudoparenchymatous in surface view; asci 32-spored, broadly clavate, attenuated at base, 75-100 X 20-30 p, with a broad operculum; ***ascospores*** irregularly disposed, 10.0-12.5 X 5.0-7.5 p, smooth, hyaline, each with a de Bary bubble which may be lacking at times; ***paraphyses*** cylindrical, septate, without apparent oil guttules, enlarged to 5.0-6.0 **p** at their apices.

<u>HABITAT:</u> On dung of rabbit and cow.
<u>TYPE:</u> On cow dung, in ForCt de Carnelle, France, March, 1884, ***Boudier*** (PC).
<u>SPECIMENS EXAMINED:</u> The type (cited above). On rabbit dung, the Wrekin, Shropshire, Britain, ***Phillips*** (NY).
<u>COMMENTS:</u> TWO 32-spored species of the old genus ***"Rhyparobius"*** belong to ***Coprotus.*** They are ***C. albidus*** and ***C. rhyparobioides.*** Both asci and ascospores are considerably smaller in ***C. albidus.*** Phillips (1891) felt that ***R. tenacellus*** differed from ***R. albidus*** in having larger asci and ascospores, but an examination of Boudier's type revealed that the asci and spores of ***R. albidus*** were larger than recorded in the original description.

Kimbrough J.W., Luck-Allen E.R. and Cain R.F. 1972. pp. 960–961

A KEY TO NORTH AMERICAN SPECIES OF *Coprotus*

A. Apothecia yellow to orange, paraphyses with orange granules or guttules, excipulum weakly cyanophilous .... B
A. Apothecia translucent to white, drying faintly yellowish, paraphyses without pigmented guttules, excipulum sometimes strongly cyanophilous and dextrinoid........ F

B. Ascospores less than 10 μ long........ *C. luteus*
B. Ascospores more than 10 μ long........ C

C. Ascospores less than 15 μ long........ D
C. Ascospores more than 15 μ long........ E

D. Apothecia bright yellow or orange, asci 65–90 × 10–15 μ, ascospores 12–14 × 6.0–8.5 μ...... *C. aurora*
D. Apothecia yellow, asci 45–55 × 15–18 μ, ascospores 10–13 × 6.5–8.5 μ........ *C. breviascus*

E. Ascospores 15–18 × 9.0–10.5 μ, asci 110–150 × 12–18 μ, paraphyses slightly inflated........ *C. ochraceus*
E. Ascospores 17–25 × 11–14 μ, asci 65–100 × 20–28 μ, paraphyses slightly uncinate above........ *C. vicinus*

F. Asci eight-spored........ G
F. Asci with more than eight spores........ M

G. Asci broadly clavate, paraphyses strongly inflated at their apices........ *C. granuliformis*
G. Asci cylindric, paraphyses not strongly inflated........ H

H. Ascospores less than 10 μ long........ I
H. Ascospores more than 10 μ........ K

I. Asci less than 55 μ long, paraphyses filiform and strongly uncinate at their apices........ *C. glaucellus*
I. Asci longer, paraphyses slightly inflated above........ J

J. Asci 65–85 × 15–20 μ, marginal cells of excipulum not extremely elongate........ *C. lacteus*
J. Asci 80–100 × 8–12 μ, marginal cells of excipulum long, flexuous, and capitate........ *C. marginatus*

K. Spores mostly 14 μ or longer........ *C. leucopocillum*
K. Spores less than 14 μ long........ L

L. Spores narrowly ellipsoid, 12–13.5 × 5–8 μ, asci 75–90 × 10–15 μ, apothecia white........ *C. disculus*
L. Spores broader, 11–13 × 7.5–10 μ, asci 80–125 × 18–24 μ, apothecia with yellowish border .... *C. dextrinoideus*

M. Asci 16-spored........ N
M. Asci with more than 16 spores........ O

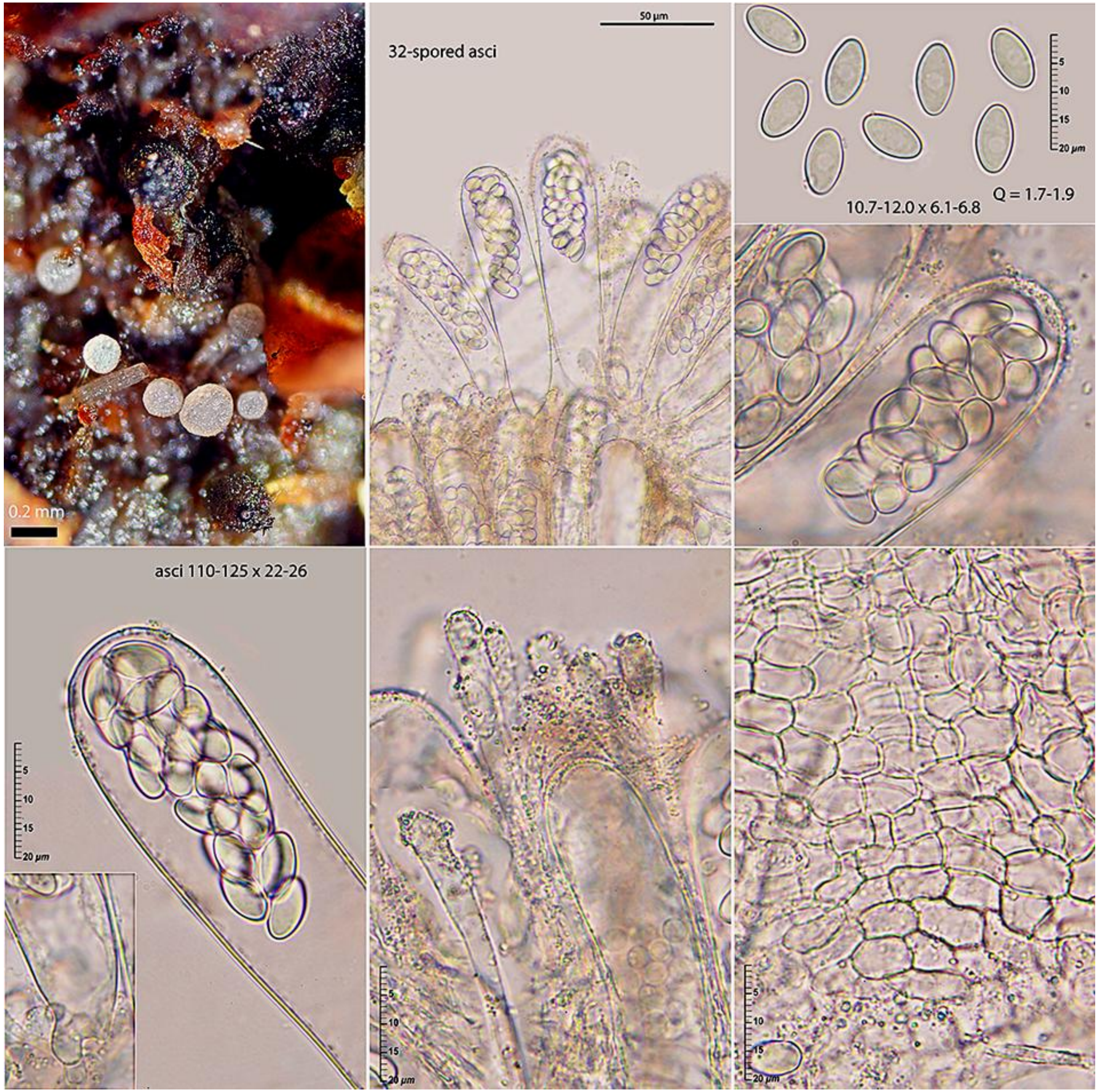
N. Ascospores 11–16 × 8–10 μ, asci 85–140 μ long........ *C. sexdecimsporus*
N. Ascospores 7.5–10 × 4.0–6.5 μ, asci 70–90 μ long........ *C. duplus*

O. Asci with 32 spores........ P
O. Asci with more than 32 spores........ Q

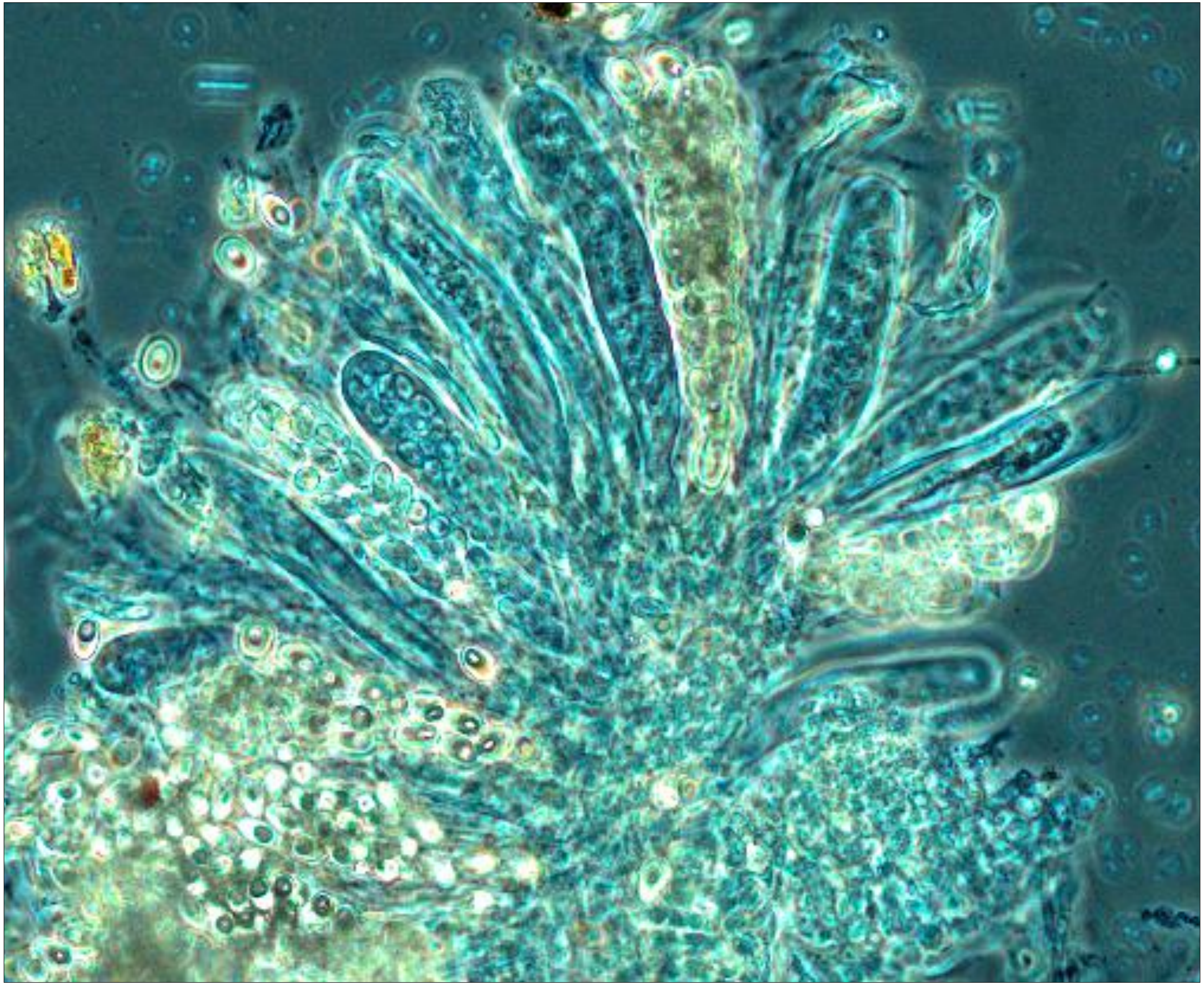
P. Spores less than 13 μ long, asci 50–110 μ long........ *C. albidus*
P. Spores more than 13 μ long, asci larger........ *C. rhyparobioides*

Q. Asci approximately 64-spored........ *C. niveus*
Q. Asci approximately 256-spored........ *C. winteri*

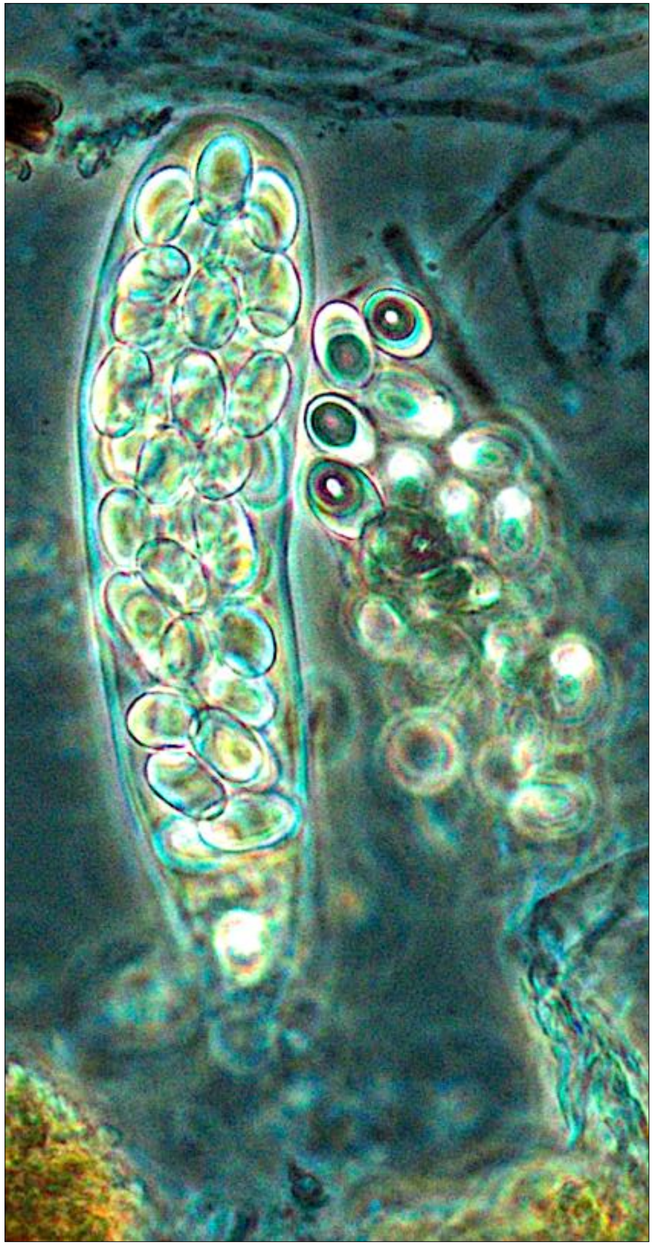
Coprotus albidus online photos by Enrique Rubio



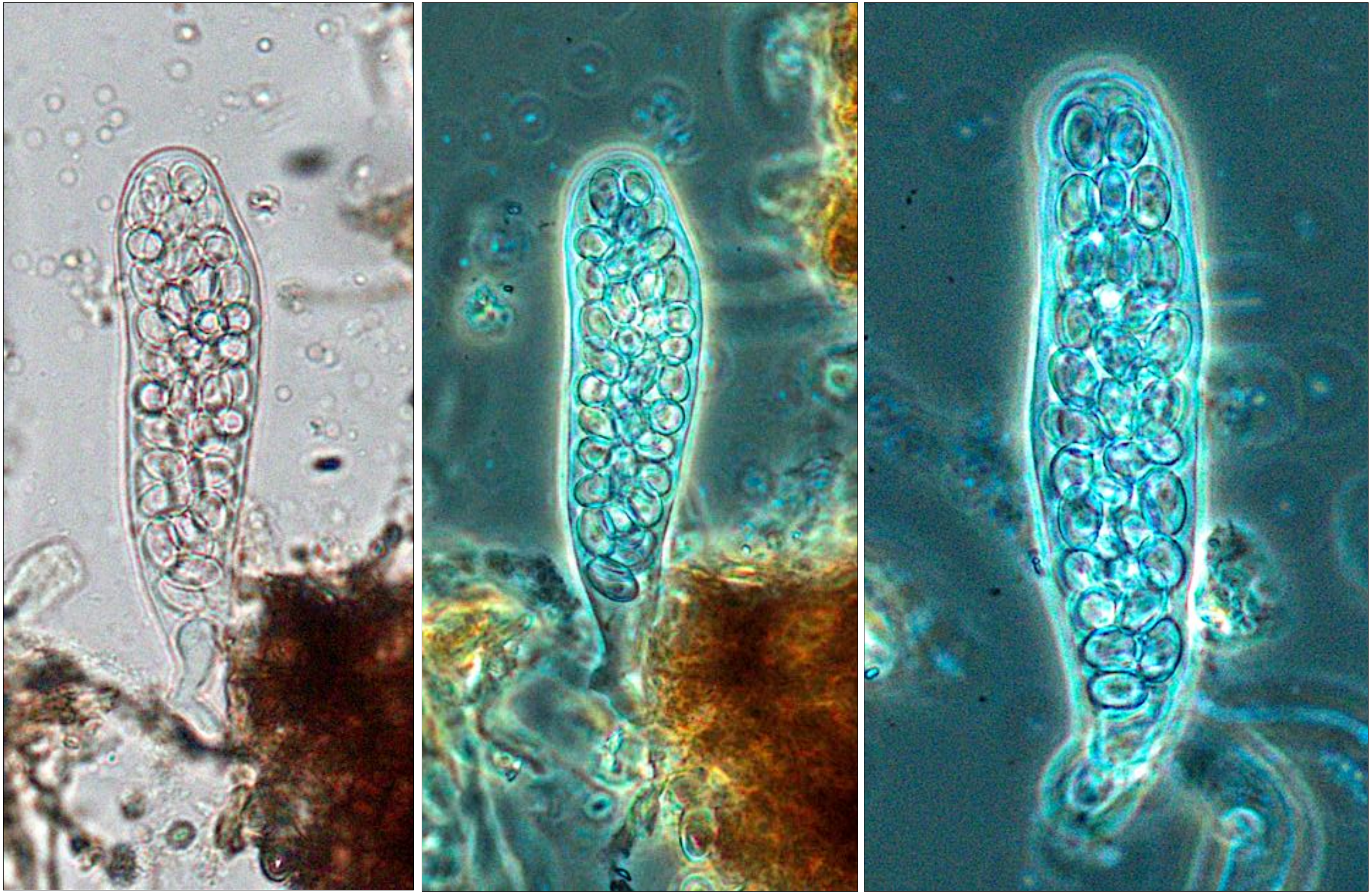
Coprotus albidus (Boud.) Kimbr. Micrografía. Puerto de Leitariegos (Cangas del Narcea-Asturias), 25-VII-2018, excrementos de pequeño roedor. Foto: Enrique Rubio.



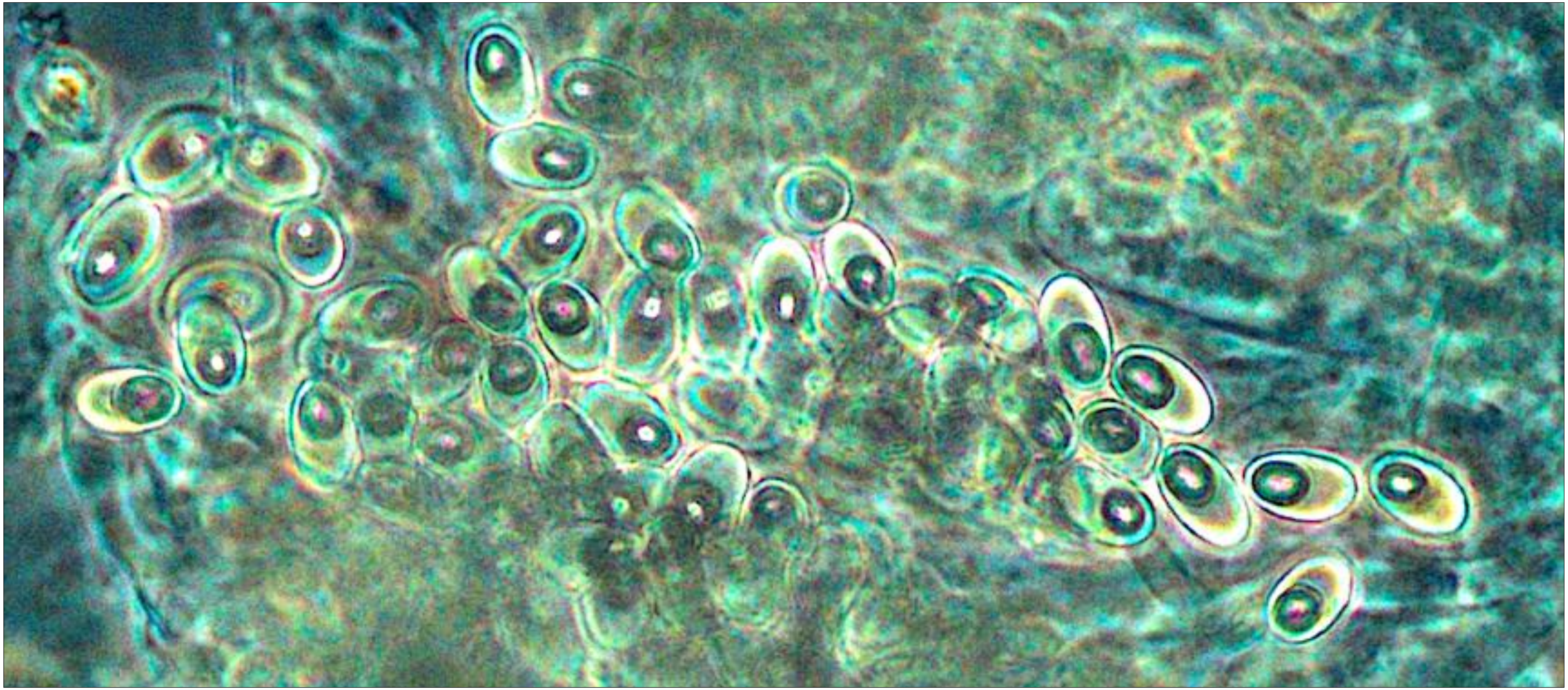
AEB 1417. Cluster of 32-spored asci seen enlarged in a SMF slide mount, using the X40 objective and phase microscopy.



AEB 1417. Both photos from the same SMF slide mount, using the X40 objective. Left photo: 32-spored intact ascus & broken ascus using brightfield microscopy & confocal stacking. Note the debary bubbles in the ascospores from the broken ascus. Right photo: the same field of view but using phase microscopy & non-confocal stacking.



AEB 1417. All photos from the same SMF slide mount, using the X40 objective. Left 2 photos: the same 32-spored intact ascus using brightfield & phase resp. Right photo: a different ascus. Asci shown here were 110 × 22.5 µm.



AEB 1417. Broken open asci from a SMF slide using phase microscopy and seen (enlarged) under the X40 objective. Note the ascospores, each exhibiting a single large debary bubble. Most ascospores were ≈ 10 × 6 µm.