

***Hydropisphaera suffulta* (Berk. & M.A. Curtis) Rossman & Samuels – AEB 1294 (= PDD 117254)**

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 AEB 1294 (= PDD 117254) – note portions where perithecia have fully developed triangular fasciculate hairs and those where they have not, accompanied by 4 Shear's mounting fluid (SMF)/aniline blue lactic acid microscope slides; Dan's in-situ dissecting scope photos 1) 35 mm Kodak color film, 24 exposure, 200 ASA, 2) Kodak Professional Portra 160 color neg. film, 36 exposure (best ones on both films digitally scanned); Dan's compound scope digital photos of microscopic detail; Dan's brief description and comments.

Other fungi also present on the same dead wood: *Cordana terrestris* AEB 1296 (= PDD 117258) – This species wasn't observed initially while I was observing the nearby *Hydropisphaera suffulta*. I assume that it developed while in my closed moist collecting box sometime after the initial collection.) Also present was 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. A single slide of the *Chaetosphaeria* was kept with the *C. terrestris* herbarium material.

Brief description of *Hydropisphaera suffulta* AEB 1294: **Perithecia** clustered to scattered, globose with the uppermost portion somewhat flattened, ostiole on short papillate apex; perithecia variable -- with younger perithecia lighter yellowish-tan, reasonably smooth and without fully developed fasciculate hairs, these becoming slightly roughened and somewhat darker; older perithecia a darker yellowish tan (more orangish in the dried herbarium material), moderately roughened (glistening in reflected light) and with distinctive triangular fasciculate hairs. Younger perithecia seemingly somewhat larger (300–340 µm in diam), mature perithecia mostly 220–280 µm. Upon drying a few of the younger perithecia collapse in a deep cupulate fashion, but most do not. Older perithecia collapse (or 'settle') only in the flattened upper region. **Triangular fasciculate hairs** mostly 50–100 µm long × 25 µm wide near the broader slightly domed base and tapering to a single hair or two at the apex (single hairs within the fascicle of varying shorter lengths), individual hairs simple, often tapering apically, smooth, septate and in mass concolorous with the overall perithecium. **Continued on the next page:**

When fresh and moist, the fasciculate hairs appear somewhat scattered but a closer observation of perithecia with fully intact fasciculate hairs reveals the location of many at the fringe of the slightly flattened uppermost portion of the perithecium (an observation strengthened by observations of older dry herbarium perithecia where the central papillate area and portions surrounding it have collapsed). **Periphyses** numerous, simple, short and hyaline. **Apical paraphyses (= pseudo-paraphyses)** common in the centrum in younger perithecia but not (or dissolving) in older fasciculate-haired perithecia, long, smooth, hyphoid, hyaline and septate. **Asci** cylindrical with 8 uniseriately to uniseriately overlapping ascospores in young non-fully-fasciculate-haired perithecia, but cylindrically clavate in mature fully-fasciculate-haired perithecia with lower ascospores uniseriately overlapping, upper middle ascospores biseriolate and apical ascospore(s) uniseriately overlapping. Measurements difficult with the basal portion indistinct when broken free or among other asci in the hymenium – ascospore portion roughly $80^{+/-} \times 7-8 \mu\text{m}$ in young uniseriate asci and roughly $50-60 \times 10 \mu\text{m}$ in mature biseriolate asci. **Ascospores** equally 2-celled without any indentation (or very slight in mature ascospores) at the median transverse septum --- in young uniseriate asci – hyaline, ellipsoidal, faintly longitudinally striate (clearly so in aniline blue lactic acid), 10 or less (-11) $\times 6 \mu\text{m}$; in mature biseriolate asci – elongate with slightly tapering rounded apices, longitudinally striate (also clearly so in aniline blue lactic acid), $(10-11-12(-13)) \times 4.5-5.5 \mu\text{m}$, appearing hyaline by transmitted light but faintly yellowish as exuded in mass from the perithecia.

Other AEB collections of *Hydropisphaera suffulta*: I have re-examined these dried/fumigated herbarium specimens in 2021 and compared them with the more extensive, larger and more variable AEB 1294 collection. None have been cultured or sequenced but my morphological descriptions and illustrations in pdfs are available for each on the PDD website under 'External links' in the Datastore. Their morphologies suggest close enough relationships to consider them 'variants' within the same species. Whether that species is the primarily tropical *H. suffulta* remains to be seen. For now that species seems most closely related.

1) *Hydropisphaera suffulta* AEB 874 (= PDD 82096) – previously identified as *H. boothii* before ascospore longitudinal striations were clearly seen. Collected 13 May 2004 on decorticated dead wood at Eve's Scenic Reserve near Brightwater by Ann Bell.

2) *Hydropisphaera suffulta* AEB 878 (= PDD 82091) – previously identified as *H. peziza* but its overall morphology better places it among the AEB collections that cluster around the AEB 1294 collection. Collected 10 May 2004 on dead Totara inner bark at Eve's Scenic Reserve near Brightwater by Ann Bell.

Continued on the next page:

3) *Hydropisphaera suffulta* AEB 1016 (= PDD 93153) – previously identified as *H. peziza* but its overall morphology better places it among the AEB collections that cluster around the AEB 1294 collection. Collected 24 April 2007 on dead wood at Grove Scenic Reserve, Takaka by Dan Mahoney.

4) *Hydropisphaera suffulta* AEB 1018 (= PDD 93155) - Collected 24 April 2007 on dead wood at Payne's Ford Scenic Reserve, Takaka by Ann Bell.

A selected chronological list of references consulted:

1999: ROSSMAN A.Y., SAMUELS G.J., ROGERSON C.T. & LOWEN R. 1999. Genera of *Bionectriaceae*, *Hypocreaceae* and *Nectriaceae* (*Hypocreales*, Ascomycetes). *Studies in Mycology*, 42: 1–248. **They treated *Hydropisphaera* as a distinct genus in the *Bionectriaceae* (*Hypocreales*) for species of *Nectria*-like fungi that had previously been placed in the *N. peziza* group.**

2010: LECHAT C., FARR D.F., HIROOKA Y., MINNIS A.M. & ROSSMAN A.Y. 2010. A new species of *Hydropisphaera*, *H. bambusicola*, is the sexual state of *Gliomastix fusigera*. *Mycotaxon*, 111: 95–102. **Further describes the genus *Hydropisphaera* and provides a key to species of *Hydropisphaera* with fasciculate hairs (Modified from Rossman et al. 1999).**

2016: LECHAT C. & FOURNIER J. 2016. *Hydropisphaera znieffensis*, a new species from Martinique. *Ascomycete.org*, 8 (2): 55–58.

2017a: LECHAT C. & FOURNIER J. 2017. *Hydropisphaera foliicola*, a new species from Martinique. *Ascomycete.org*, 9 (1): 6–8.

2017b: LECHAT C. & FOURNIER J. 2017. *Hydropisphaera heliconiae*, a new species from Martinique (French West Indies). *Ascomycete.org*, 9 (3): 59–62.

2020a: LECHAT C. & FOURNIER J. 2020. Three new species of *Hydropisphaera* (*Bionectriaceae*) from Europe and French Guiana. *Ascomycete.org*, 12 (2): 39–46. **An updated dichotomous key to the worldwide known species of *Hydropisphaera* is proposed. See the next page of this pdf.**

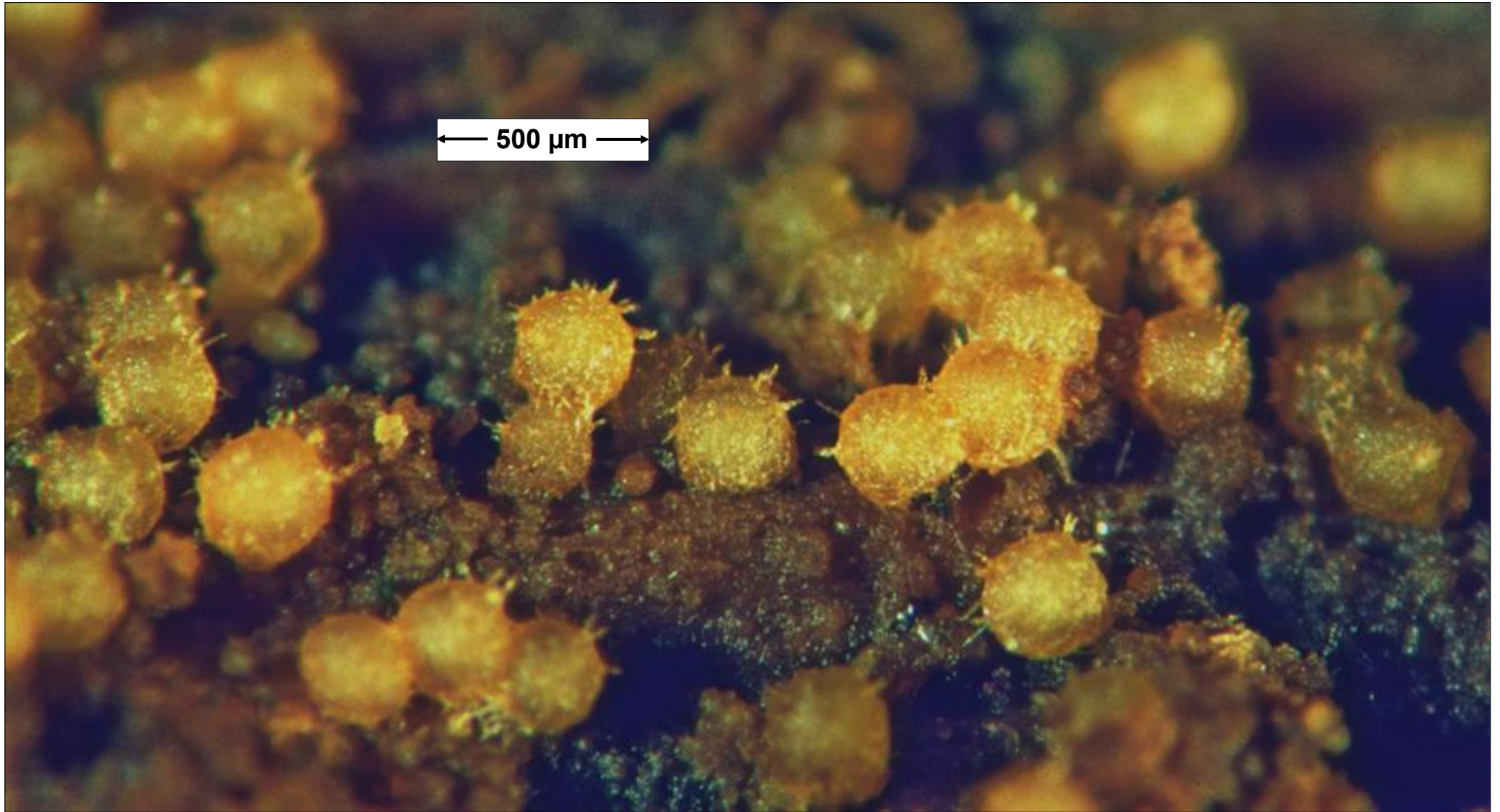
2020b: LECHAT C, FOURNIER J & RUBIO E. 2020. *Hydropisphaera angelicae* (*Bionectriaceae*), a new species from Spain. *Ascomycete.org*, 12 (4): 175–178. **“Morphologically, the most similar species is *H. suffulta* having ascomata of the same colour when fresh and a stellate fringe of fasciculate hairs around the upper part of the ascomata. However, *H. suffulta* primarily differs from *H. angelicae* in having ascomata that do not become blackish upon drying, significantly smaller ascospores 12–17 × 4–5 µm vs. (32–)34–38(–41) × 5.5–6.5(–7) µm, and a tropical to subtropical distribution.”**

LECHAT C. & FOURNIER J. 2020. Three new species of *Hydropisphaera* (*Bionectriaceae*) from Europe and French Guiana. *Ascomycete.org*, 12 (2): 39–46. doi: 10.25664/art-0296.

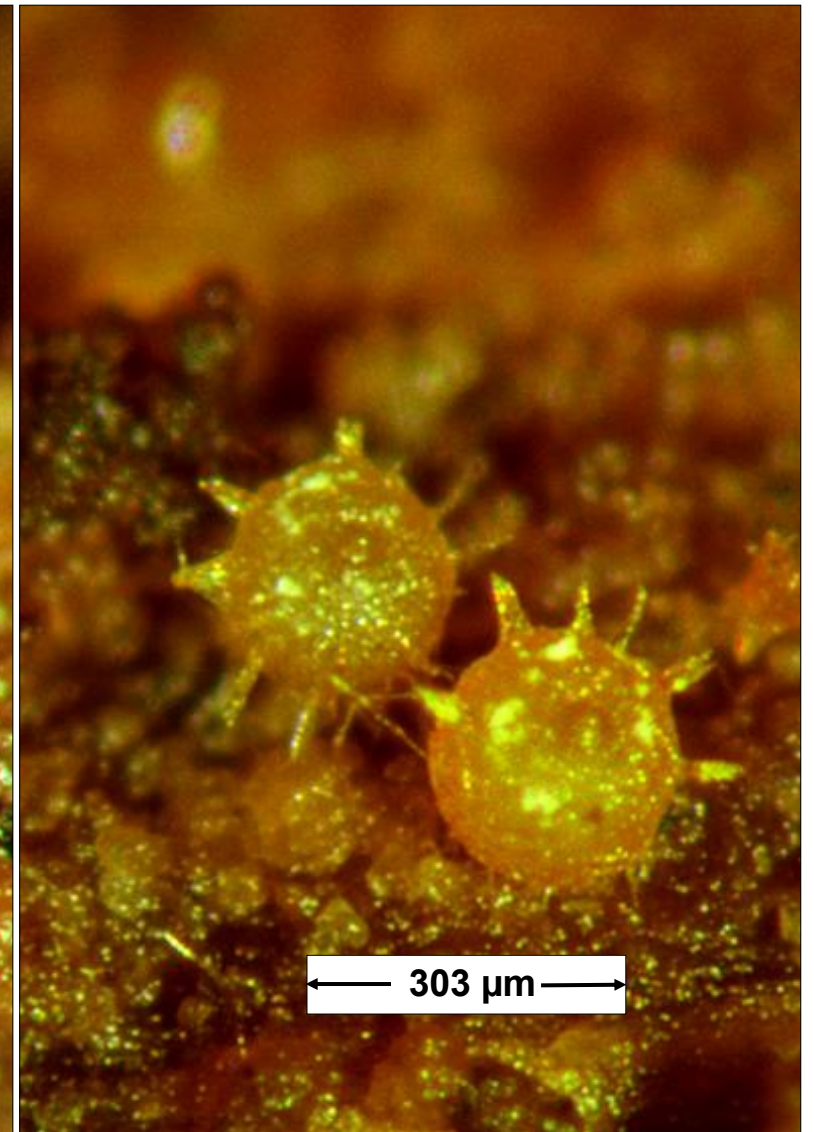
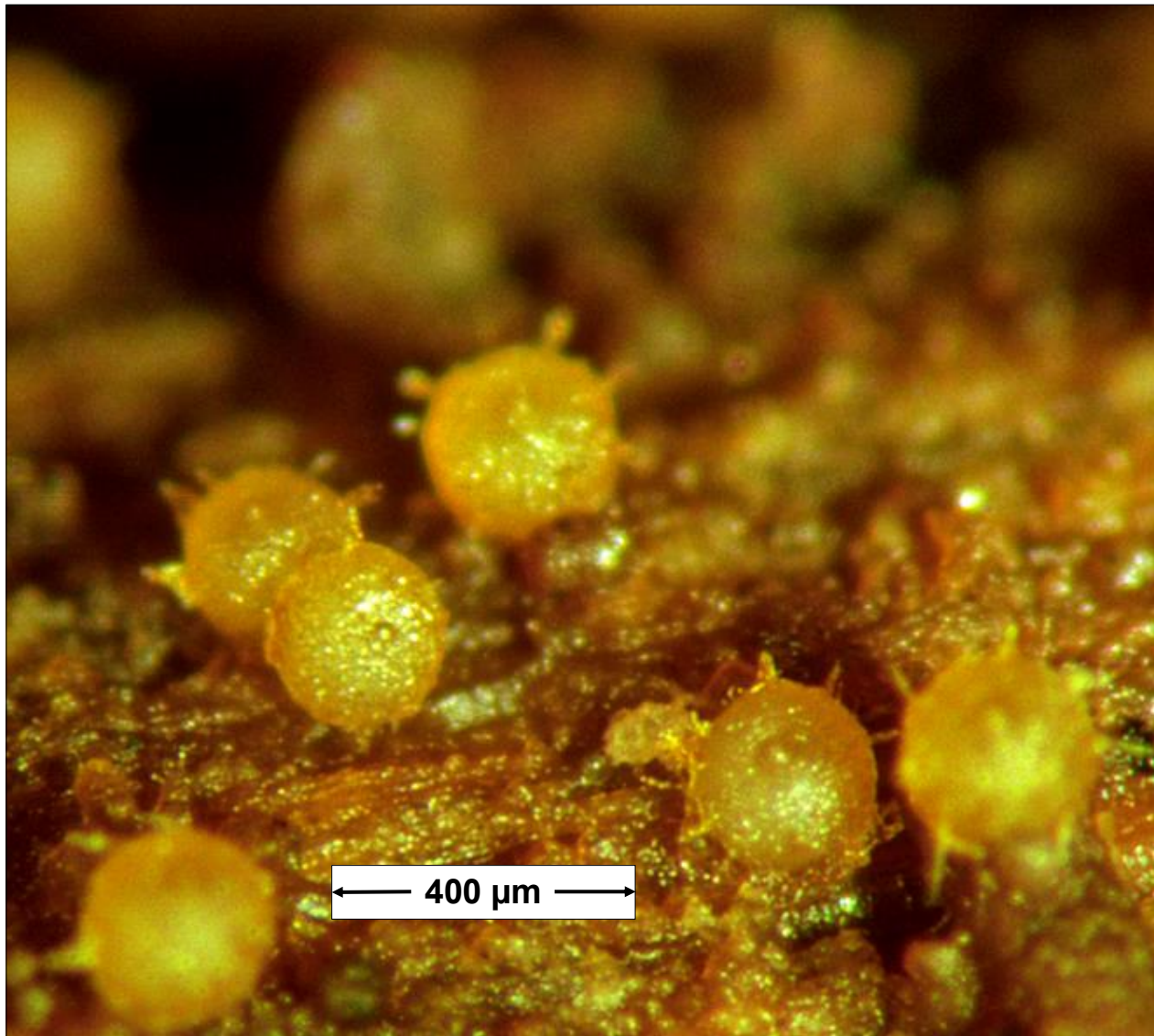
See their updated dichotomous key to the worldwide species of *Hydropisphaera* – reproduced on the right side of this page.

Of particular interest in the key, as regards those AEB collections clustering around *Hydropisphaera suffulta*, are those among the first 12 dichotomies that feature ascomata with fasciculate hairs and ascospores of a common size range [11–14(–17) × 4–6(–7)] that are longitudinally striate. *Hydropisphaera peziza* (dichotomy 23) lacks fasciculate hairs on its ascomata but has similar-sized striate ascospores. Some of the AEB New Zealand collections originally identified as *H. peziza* (AEB 878 and AEB 1016) have hairy ascomata on which fasciculate hairs were not always clearly seen. However, like *H. suffulta* AEB 1294 where ascomata were hairy but not always fasciculate, their fasciculate nature is expected. Also the fasciculate AEB 874, originally designated *H. boothii*, was collected in a similar environment not far from AEB 878. A similar condition exists between AEB 1016 and the fasciculate AEB 1018. After more attention is given to the similarities between *H. suffulta* and *H. peziza* in New Zealand, this author feels that some *H. peziza* AEB collections not re-examined, as well as many other PDD *H. peziza* collections from other collectors may fall in the *H. suffulta* cluster. It is also possible that the NZ *H. suffulta* cluster will be considered different enough from its tropical cousin to be a new species.

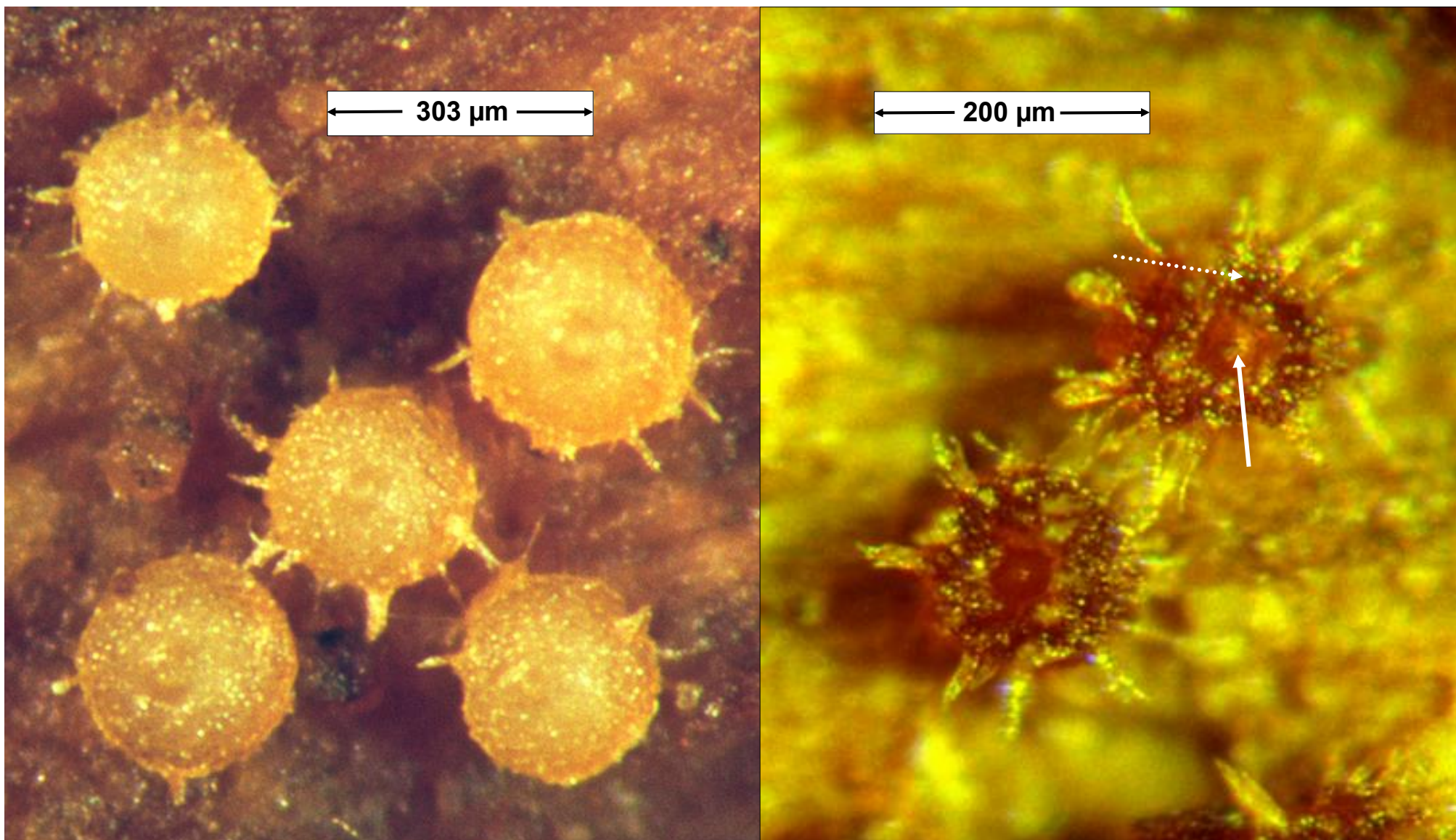
Key to species of <i>Hydropisphaera</i>	
(The numbers in brackets after species names refer to the bibliography)	
Ascomata with fasciculate or solitary hairs on the ascomatal wall; ascospores smooth, striate or spinulose.....	1
Ascomata glabrous; ascospores striate, spinulose or verrucose.....	13
1. Ascospores more than 25 µm long on average.....	2
2. Ascospores less than 25 µm long on average.....	6
3. Ascospores 16–18 × 4.5–5 µm, spinulose (Germany).....	<i>H. cirsi</i> (this paper)
3. Ascospores 16–18 × 4.5–5 µm, spinulose (Germany).....	2
4. Ascospores 25–38 × 5–7 µm (Colombia, Indonesia).....	<i>H. dolichospora</i> (12; 14)
4. Ascospores 25–38 × 5–7 µm (Colombia, Indonesia).....	3
5. Ascospores 48–55 × 6–7 µm (Argentina).....	<i>H. gigantea</i> (12)
5. Ascospores 48–55 × 6–7 µm (Argentina).....	4
6. Ascospores 38–50 × 5–6.4 µm (China).....	<i>H. sinensis</i> (17)
6. Ascospores 38–50 × 5–6.4 µm (China).....	5
7. Ascospores 12.5–17.5 × 3.5–4 µm; ascospores pale brownish orange.....	<i>H. rufosca</i> (14)
7. Ascospores 12.5–17.5 × 3.5–4 µm; ascospores pale brownish orange.....	7
8. Ascospores 14.5–17.8 × 4.5–5 µm (French West Indies).....	<i>H. heliconiae</i> (5)
8. Ascospores 14.5–17.8 × 4.5–5 µm (French West Indies).....	8
9. Ascospores 12–17 × 4–5 µm, smooth to striate (tropical regions).....	<i>H. suffulta</i> (11; 12)
9. Ascospores 12–17 × 4–5 µm, smooth to striate (tropical regions).....	9
10. Ascospores 15–22 × 2.4–3.6(–4) µm (China).....	<i>H. yunnanensis</i> (6)
10. Ascospores 15–22 × 2.4–3.6(–4) µm (China).....	10
11. Ascospores 17–23 × 5–7 µm, striate (New Zealand).....	<i>H. cyathaeae</i> (11)
11. Ascospores 17–23 × 5–7 µm, striate (New Zealand).....	11
12. Ascospores 12–16(–22) × 4–5(–6) µm (Indonesia).....	<i>H. leucotricha</i> (14)
12. Ascospores 12–16(–22) × 4–5(–6) µm (Indonesia).....	12
13. Ascospores 16–18 × 7–8 µm (French West Indies).....	<i>H. znieffensis</i> (3)
13. Ascospores 16–18 × 7–8 µm (French West Indies).....	13
14. Ascospores 1–3-septate.....	19
14. Ascospores 1–3-septate.....	14
15. Ascospores 10–11(–12) × 3.5–4 µm; ascospores dark brownish orange to blackish brown (French Guiana).....	<i>H. saulensis</i> (this paper)
15. Ascospores 10–11(–12) × 3.5–4 µm; ascospores dark brownish orange to blackish brown (French Guiana).....	15
16. Ascospores 15–17 × 4–4.7 µm; ascospores pale yellow (French West Indies).....	<i>H. follicola</i> (4)
16. Ascospores 15–17 × 4–4.7 µm; ascospores pale yellow (French West Indies).....	16
17. Ascospores 9.4–13.7 × 2.5–3.5 µm (China).....	<i>H. jigongshanica</i> (7)
17. Ascospores 9.4–13.7 × 2.5–3.5 µm (China).....	17
18. Ascospores 10–12–15 × (3–)3.2–5 µm; ascospores orange yellow to reddish brown (China).....	<i>H. spinulosa</i> (16)
18. Ascospores 10–12–15 × (3–)3.2–5 µm; ascospores orange yellow to reddish brown (China).....	18
19. Ascospores 8–11 × 5–6 µm; ascospores orange to reddish brown (France).....	<i>H. castaneicola</i> (2)
19. Ascospores 8–11 × 5–6 µm; ascospores orange to reddish brown (France).....	19
20. Ascospores 8.9–10.6 × 4.3–5.9 µm; ascospores yellow to dark brown (U.S.A.).....	<i>H. fungicola</i> (9)
20. Ascospores 8.9–10.6 × 4.3–5.9 µm; ascospores yellow to dark brown (U.S.A.).....	20
21. Ascospores 14–16 × 3.5–4 µm; ascospores orange to brownish orange (cosmopolitan).....	<i>H. arenula</i> (13)
21. Ascospores 14–16 × 3.5–4 µm; ascospores orange to brownish orange (cosmopolitan).....	21
22. Ascospores 11–14 × 5–6 µm; ascospores orange to reddish orange, with the base immersed in the substrate (Indonesia, Mexico).....	<i>H. hypoxantha</i> (14)
22. Ascospores 11–14 × 5–6 µm; ascospores orange to reddish orange, with the base immersed in the substrate (Indonesia, Mexico).....	22
23. Ascospores 11–14 × 5–7 µm; ascospores yellow to orange, easily removed from the substrate (cosmopolitan).....	<i>H. peziza</i> (10; 12)
23. Ascospores 11–14 × 5–7 µm; ascospores yellow to orange, easily removed from the substrate (cosmopolitan).....	23
24. Ascospores 19–22 × 4–4.5 µm; ascospores orange (New Zealand).....	<i>H. arenuloides</i> (11)
24. Ascospores 19–22 × 4–4.5 µm; ascospores orange (New Zealand).....	24
25. Ascospores 23.5–30 × 5.6–7.3 µm; ascospores orange, on a minute basal stroma (New Zealand, Indonesia).....	<i>H. macrarenula</i> (14)
25. Ascospores 23.5–30 × 5.6–7.3 µm; ascospores orange, on a minute basal stroma (New Zealand, Indonesia).....	25
26. Ascospores 23–27 × 5–6 µm; ascospores reddish orange, lacking a basal stroma (Indonesia).....	<i>H. nymaniana</i> (12; 14)
26. Ascospores 23–27 × 5–6 µm; ascospores reddish orange, lacking a basal stroma (Indonesia).....	26
27. Ascospores 18–26 × 4–5 µm; ascospores pale orange (temperate regions).....	<i>H. erubescens</i> (8; 13)
27. Ascospores 18–26 × 4–5 µm; ascospores pale orange (temperate regions).....	27
28. Ascospores 65–92 × 6–8 µm; ascospores orange to brown-vinaceous (Colombia).....	<i>H. pachyderma</i> (8)
28. Ascospores 65–92 × 6–8 µm; ascospores orange to brown-vinaceous (Colombia).....	28
29. Ascospores 28–38 × 4–6 µm (New Zealand).....	<i>H. multisepitata</i> (8; 13)
29. Ascospores 28–38 × 4–6 µm (New Zealand).....	29
29. Ascospores 50–70(–80) × 6–7(–8–11) µm (Ecuador, New Zealand, Peru).....	<i>H. multiloculata</i> (8; 13)
29. Ascospores 50–70(–80) × 6–7(–8–11) µm (Ecuador, New Zealand, Peru).....	29



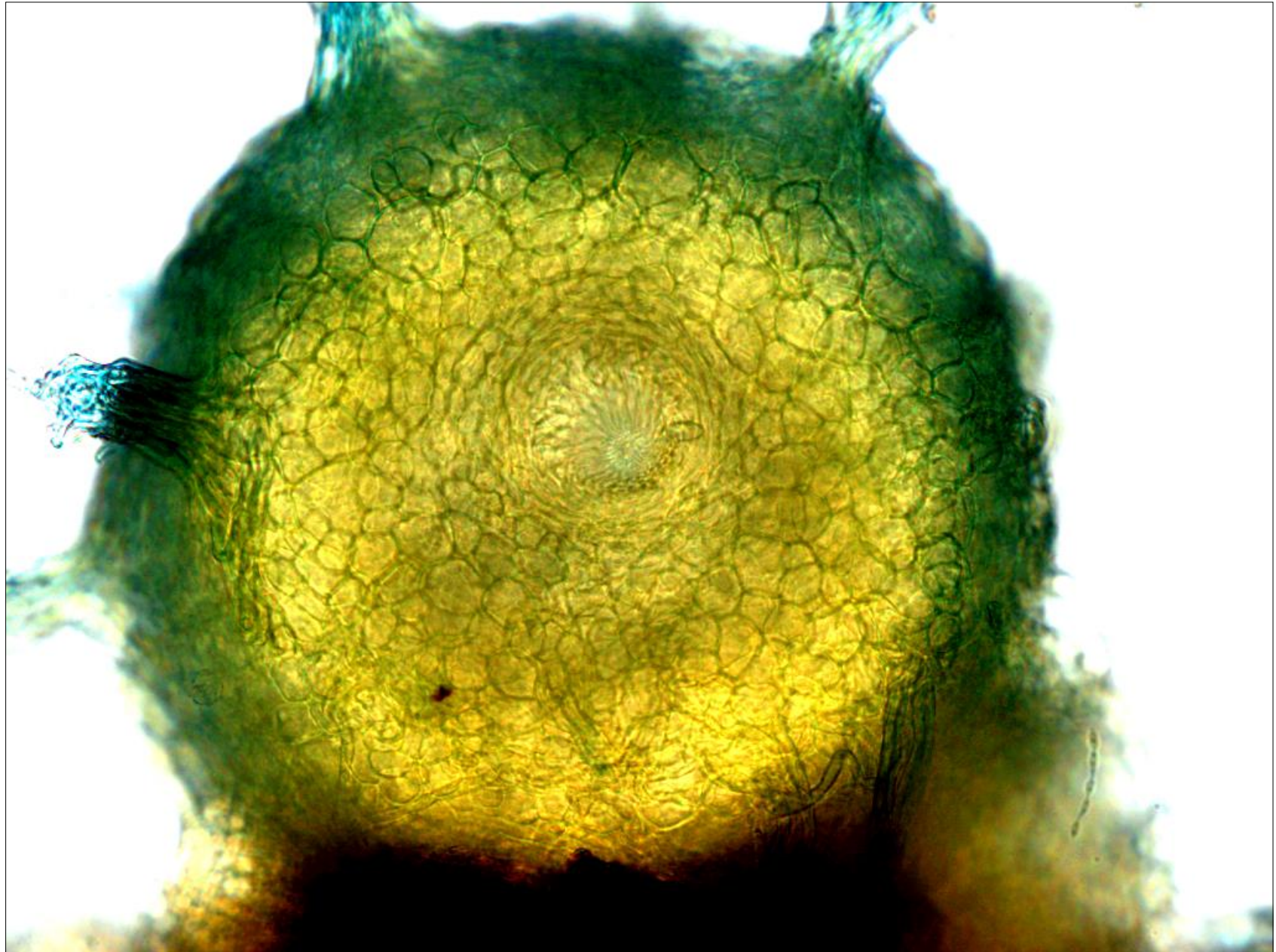
28 February 2017. *Hydropisphaera suffulta* fresh perithecia in-situ on moist dead wood.



28 February 2017. *Hydropisphaera suffulta* fresh perithecia in-situ on moist dead wood.



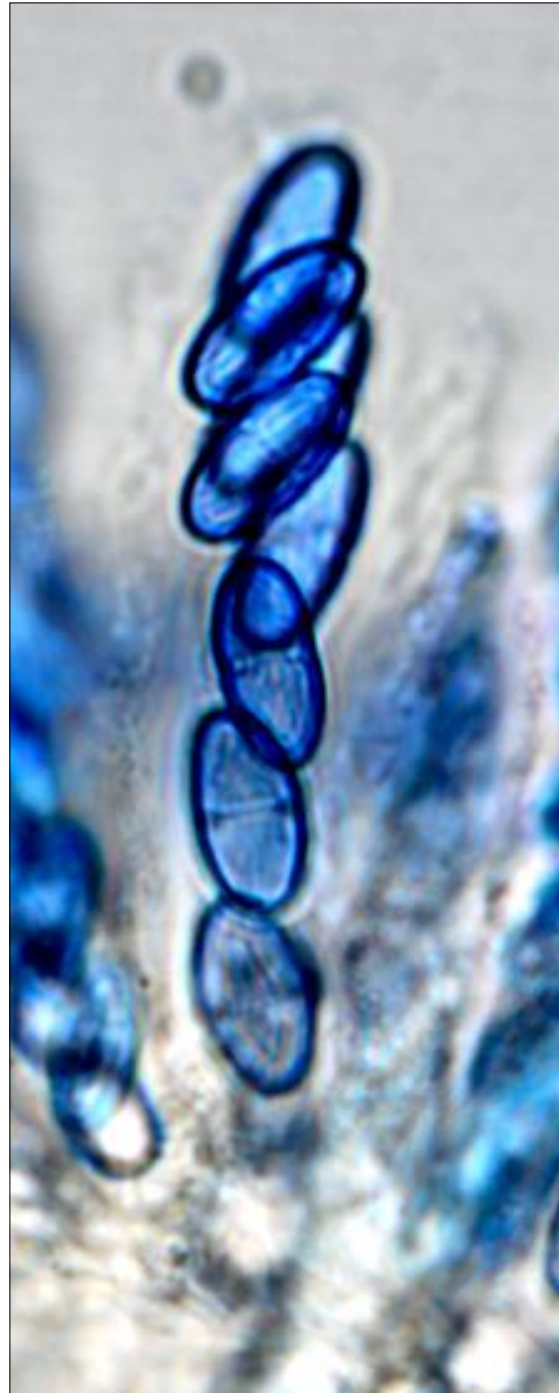
***Hydropisphaera suffulta*. Left photo. 28 February 2017. Fresh perithecia in-situ on moist dead wood. Right photo. 1 May 2017. Dried herbarium specimen. Darkened and somewhat collapsed (but not cupulate) perithecia. Note the triangular fasciculate hairs that fringe the edge of the slightly flattened apical dome, the central ostiolate papilla now sunken (solid arrow) and the nearly black cells (dotted arrow).**



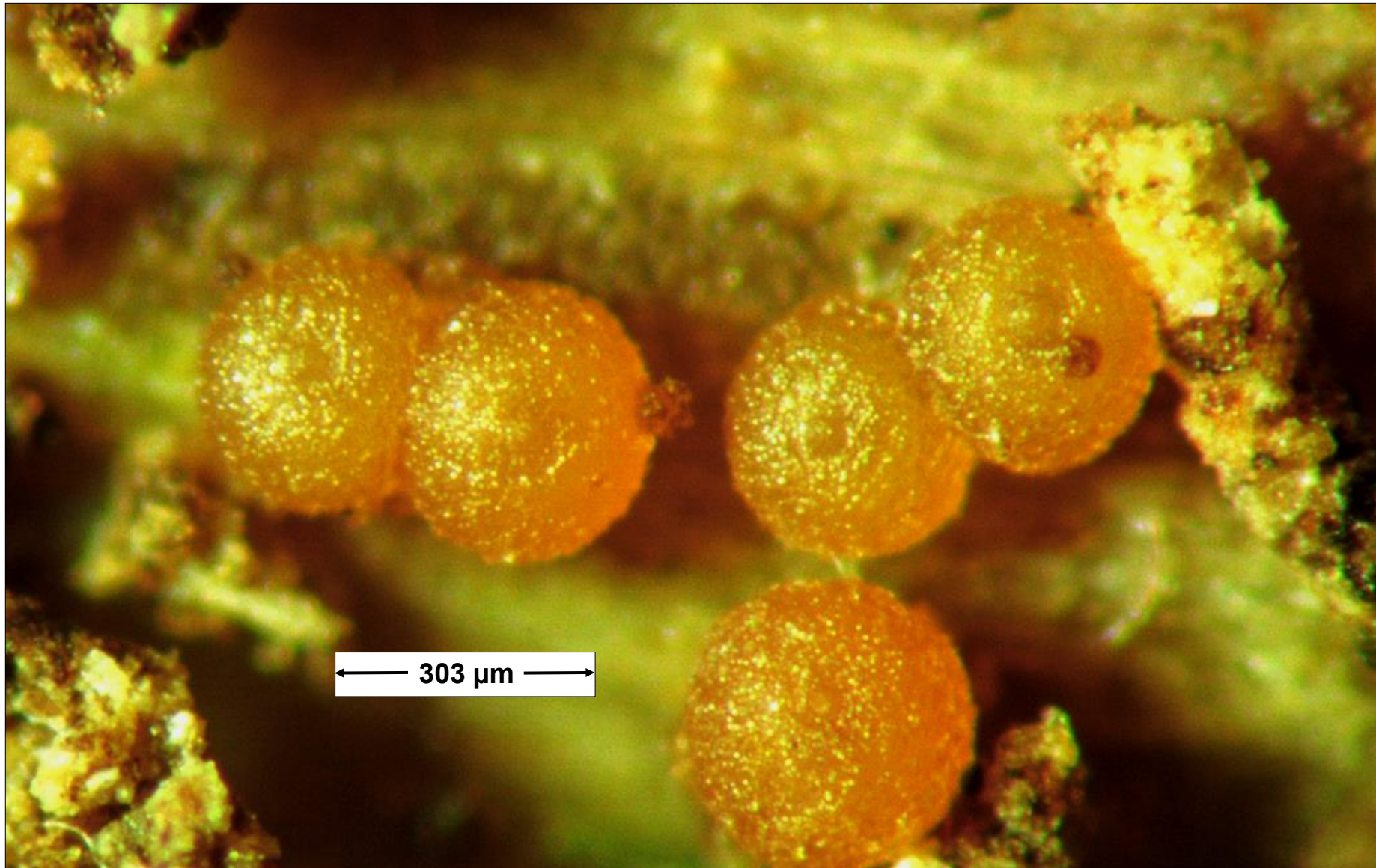
27 February 2017. *Hydropisphaera suffulta* fresh perithecium. Peridium and ostiolar area detail – SMF/aniline blue lactic acid mount, X40 objective, brightfield microscopy. Note peripheral fasciculate appendages.



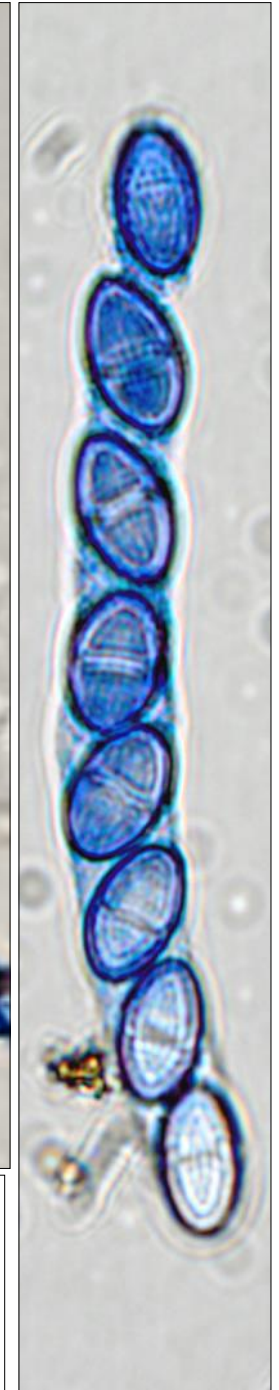
27 February 2017. Fresh *Hydropisphaera suffulta* triangular fasciculate hairs on the perithecium peridium. Left photo, triangular hair $92.5 \times 25 \mu\text{m}$ near the spreading base – water mount, X40 objective, brightfield microscopy. Right photo, triangular appendages $67.5 \times 25 \mu\text{m}$ near the base – SMF/aniline blue lactic acid, X40 objective, brightfield.



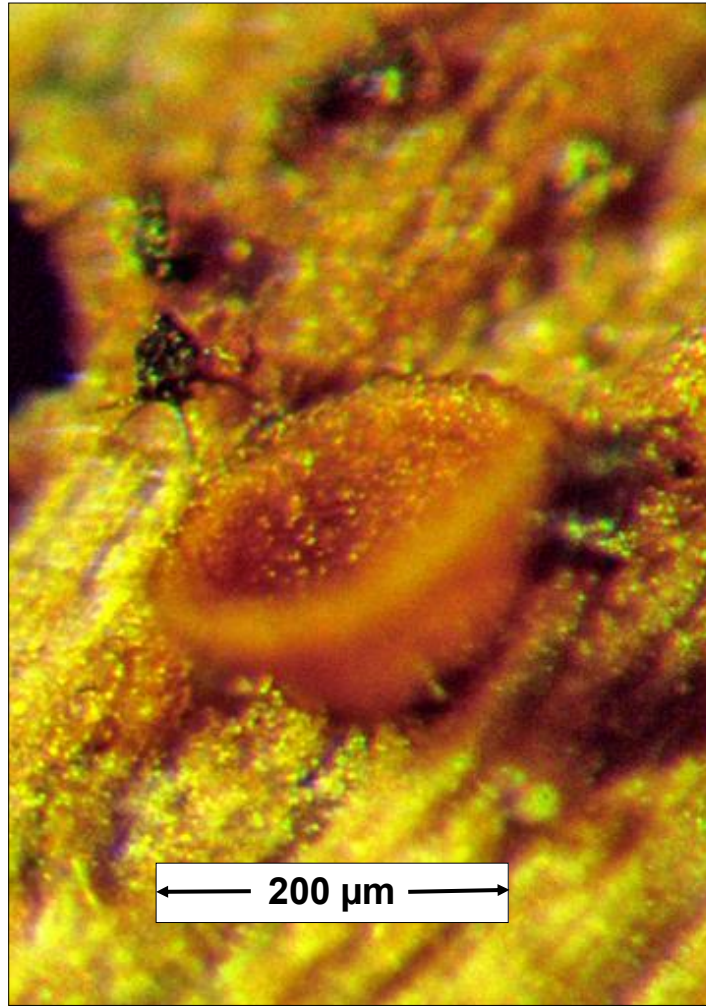
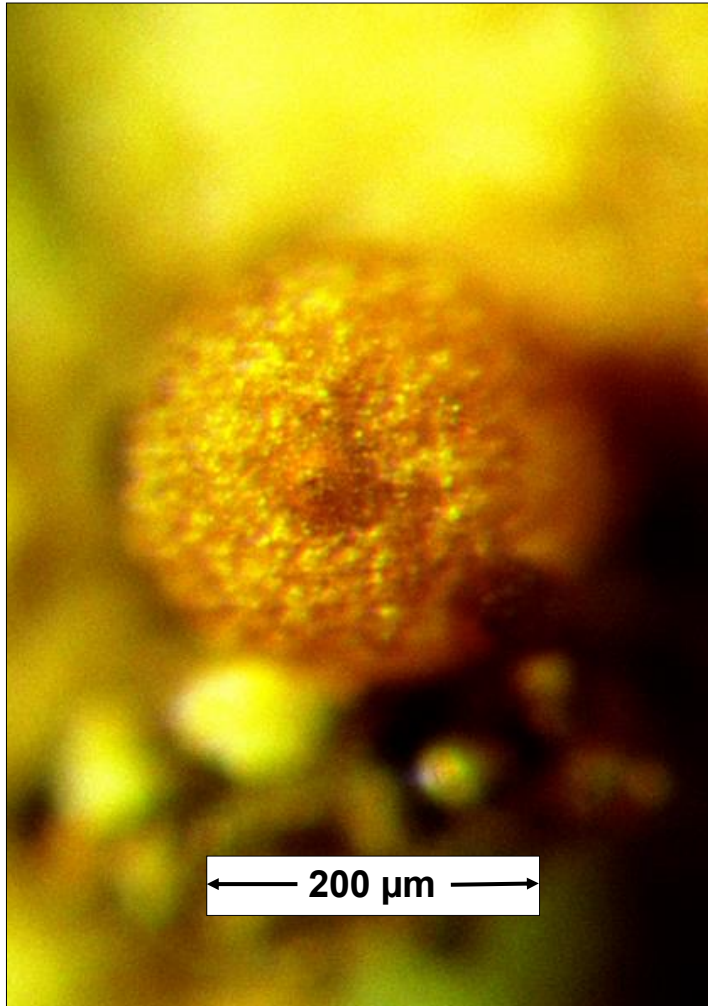
25 Feb. 2017.
Hydropisphaera suffulta asci from fresh perithecia with fully developed triangular fasciculate hairs. Asci cylindrically clavate with ascospores uniseriately arranged near the base and apex but biseriate below the uniseriate apex. All photos X100 objective and brightfield. Left photo water mount (note single large guttule in each cell). Right 2 photos water/aniline blue lactic acid. Note longitudinal striations in all ascospores.



15 March 2017. Reasonably fresh *Hydropisphaera suffulta* perithecia in-situ on moist dead wood. Note the absence of fully developed fasciculate hairs on the perithecia.



Hydropisphaera suffulta asci from younger (but full-sized) fresh perithecia (27 Feb. 2017) without fully developed triangular fasciculate hairs (see previous page). Asci cylindrical with ascospores arranged uniseriately. Note the ascus apical ring (solid arrows). Apical paraphyses (= pseudoparaphyses) long, hyphoid, septate, smooth (dotted arrows). Water/aniline blue lactic acid mount, X40 objective, brightfield microscopy. Ascus at right - also from perithecium without fascicular hairs (note the striate ascospores). SMF/aniline blue lactic acid mount, X100 objective, brightfield microscopy.



Hydropisphaera suffulta perithecia in-situ on dead wood. All 3 photos are from the thoroughly dried herbarium specimen – taken in a portion of the specimen that featured young perithecia lacking well-developed triangular fasciculate hairs. Most perithecia there were like the perithecium in the left photo that looks very similar to young perithecia when freshly collected although often slightly darker and more roughened. Perithecia in the right two photos have collapsed in a cupulate fashion. Such a collapse was rarely seen in young or older perithecia.