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ARTICLE

Australasian Sequestrate Fungi 19: *Hysterangium colossum* sp. nov.

Todd F. Elliott[1], James M. Trappe[2], and Armin Weise[3]

[1]Department of Integrative Studies, Warren Wilson College, P.O. Box 9000, Asheville, North Carolina 28815-9000, USA; corresponding author e-mail: toddfelliott@gmail.com

[2]Department of Forest Science, Oregon State University, Corvallis, Oregon 97331-5752, USA and U.S. Forest Service, Pacific Northwest Research Station, Forestry Sciences Laboratory, 3200 Jefferson Way, Corvallis, Oregon 97331-8550, USA

[3]Department of Environmental Studies, Warren Wilson College, P.O. Box 9000, Asheville, North Carolina 28815-9000, USA

Abstract: *Hysterangium colossum* sp. nov., with extraordinarily large basidiomata for the genus, is described from dry *Eucalyptus* woodlands in the Australian Capital Territory and southeastern New South Wales. It typically grows in confluent clusters and has a thick peridium often invaginated into the gleba.

Key words:
Basidiomycota
Hysterangiales
Hysterangiaceae
hypogeous fungus
Eucalyptus
mycorrhizal fungus

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INTRODUCTION

Species in the cosmopolitan genus *Hysterangium* are characteristically hypogeous and range from 5–25 mm diam (Beaton *et al.* 1985, Castellano 1988, Castellano & Beever 1994, Montecchi & Sarasini 2000). In recent years, we and our many collaborators have made more than 1 500 collections of *Hysterangium* species in habitats from sea level to timberline and semiarid to wet tropics in all Australian states and territories. We here describe a novel and relatively rare species with basidiomata to 55 mm broad, a giant in comparison to other species in the genus. To our knowledge, it only occurs in dry *Eucalyptus* woodlands of southeastern Australia.

MATERIALS AND METHODS

We collected basidiomata by raking away leaf litter under *Eucalyptus* spp. and carefully examining the exposed soil for the white to brown *Hysterangium* basidiomata. Once basidiomata were collected, we recorded fresh macroscopic characteristics, photographed representative specimens, and sliced and placed all collected specimens on the trays of a portable electrical circulating-air dehydrator set on low. In the laboratory, we prepared razor blade sections for microscope mounts in H_2O, 5 % KOH, Cotton blue, and Meltzer's reagent, respectively. Slides were briefly flamed to enhance specimen rehydration and expel air bubbles. Microscopic measurements were taken in 5 % KOH mounts after we determined that KOH did not differ from fully hydrated H_2O mounts. Microscopic structures were described and measured to demonstrate their size range. Micrographs were taken of the H_2O slide mounts for the plate illustrations.

TAXONOMY

Hysterangium colossum T.F. Elliott & Trappe, **sp. nov.**
MycoBank MB810777
(Fig. 1)

Etymology: Latin *colossum* (colossal), in reference to its unusually large basidiomata (to 55 mm broad) compared to other species in the genus (basidiomata typically < 25 mm broad).

Diagnosis: Differs from all other known species of *Hysterangium* by the exceptionally large size of the basidomata in combination with a tendency to occur in confluent clusters of 2–6 and the peridial invaginations into its gleba.

Type: **Australia**: *Australian Capital Territory*: Gungahlin, Yerrabi Pond, near pond shore at end of James Kirk St., 35º 10´ 37" S, 149º 7´ 54" E, elev. 615 m, under *Eucalyptus* spp., 30 Aug. 2010, *Todd F. Elliott*, *Trappe 35048* (CANB – holotype; BPI, BRI, FH, K, MEL, NY, OSC 148802 – isotypes).

Description: *Macrocharacters*: *Basidiomata* 12–40 × 14–55 mm, subglobose to turbinate or irregular and lobed, often confluent in clusters of 2–6, hypogeous or sometimes emergent. *Peridium* 0.35–1.5 mm thick, not readily separable

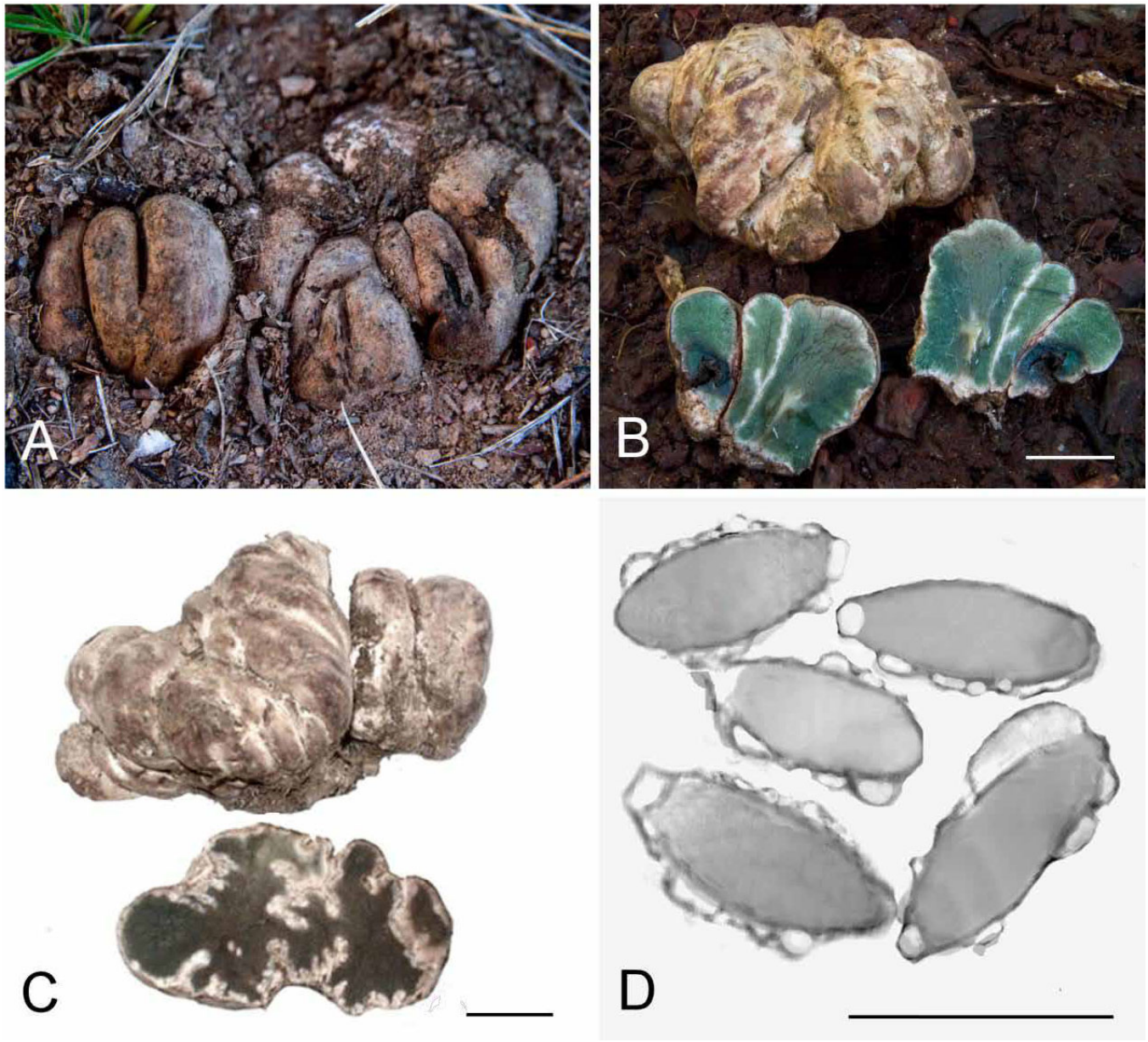

Fig. 1. *Hysterangium colossum* (Trappe 35048 – holotype). **A.** Emergent specimens *in situ* at the type locality. **B.** Confluent basidiomata, surface view above, cross section below. **C.** Basidiome surface above, cross-section with invaginated peridium below. **D.** Basidiospores showing irregular inflation of the utricle. Bars: B–C = 10 mm, D = 5 µm.

from gleba, felty-glabrous, dirty white to pale brown, peridial surface of fresh specimens turns brown where bruised or exposed and reddens slightly in cross-section, larger specimens sometimes invaginated 2–10 mm into the gleba in a meandering pattern. *Gleba* firm, slightly rubbery to cartilaginous, whitish translucent in youth, becoming green and finally dark olive by maturity, locules ± 0.5 mm broad, sterile base inconspicuous to prominent. *Columella* obscure to well-developed, dendroid, greyish translucent, sometimes with reddish areas. *Basal attachment* with clusters of white mycelia and fine rhizomorphs that mostly detach when specimens are separated from the soil.

Microcharacters: Peridium thickness variable, typically 500–600 µm, consisting of a layered gradient of hyphae: pellis 180–250 µm thick, of loosely interwoven, thin-walled, light yellowish hyphae 2–12 µm broad at the septa, most cells inflated to 4–15 µm, with oxalate crystals adhered to surfaces of outer hyphae; subpellis 240–400 µm thick, of interwoven, hyaline, thin-walled hyphae 2–20 µm broad at the septa, most cells inflated to 5–20 µm broad near the pellis but many sphaerocyst-like and inflated to 30 µm broad, grading to 2–5 µm broad and not inflated toward the gleba; invaginated peridial veins lined with tissue similar to the peridial pellis but the channel filled with tangled hyphae with apical cells inflated to 40 × 35 µm. *Glebal trama* 100–250 µm thick, of hyaline, interwoven hyphae 2–5 µm broad with gelatinized walls. *Columella* of hyaline hyphae 1.5–2.5(–4) µm broad with thickened gelatinous walls. *Spores* 9–11 × 4–5 µm, Q = 2.4, ellipsoid to subovoid with a slightly tapered truncate-cupped base no longer than 1 µm, enclosed in a utricle, apex obtuse, wall surfaces under the utricle punctate

roughened; utricle irregularly inflated up to 2.5 µm from the spore wall, not inflated in Cotton blue mounts; spores nonreactive in Meltzer's reagent. *Basidia* 33–40 × 5–10 µm, cylindric to clavate, 4–8-spored, sterigmata ± 1.5 × 1.5 µm.

Distribution, habitat, *habit, hosts, and season*: Australian Capital Territory and southeastern New South Wales west of the Great Dividing Range at 90-630 m altitude under various mixtures of *Eucalyptus albens, E. blakelyi, E. macrorhyncha, E. microcarpa,* and *E. sideroxylon,* often with understory *Acacia deanei, A. doratoxylon,* and *A. paradoxa*; hypogeous or emergent in compacted soils; June – August.

Additional material: **Australia**: *Australian Capital Territory*: as per holotype, 8 Aug. 2010, *Todd F. Elliott, Trappe 34585* (CANB, OSC 149381, MEL). *New South Wales*: 10 km north of Deniloquin on Conargo Road, Wandook Traveling Stock Route, 35° 27' 47" S, 145° 0' 40" E, elev. 90 m, under *Eucalyptus microcarpa,* 16 Jul. 2003, *Trappe 28655* (CANB, OSC 148803, MEL, K, NY); *ibid*. *Trappe 28671* (CANB, OSC 148804, MEL, K, NY); *ibid*. 18 Jul. 2003, *Trappe 28672* (CANB, OSC 144805, MEL, K, NY) 17 km west of Finley, Greens Travelling Stock Route, 35º 36´ S, 154º 24´ 4" E, elev. 103 m, 15 Jul. 2003, *Trappe 28655* (CANB, MEL, NY, OSC 148803); Goobang National Park, Currumbenya Nature Reserve, alongside Wellington Highway, AMG 632830 E, 6352300 S, elev. 505 m, in mixed *Eucalyptus* stand with *Acacia* understory, 20 Jun. 2001, *Trappe 26461* (CANB, isoparatype OSC 148806).

DISCUSSION

Hysterangium is a widely distributed genus in Australia (Beaton *et al.* 1985, Castellano 1988), but few of its species are described. The combination of the three macrocharacters noted in the diagnosis is unknown in other species of the genus. *Hysterangium inflatum* sometimes produces compound basidiomata but never reaches the maximum size of *H. colossum*. It also lacks peridial invaginations, its peridium easily separates from the gleba, its spore surface is smooth, and its spore utricle tends to inflate evenly around its spores in contrast to the irregular inflation of *H. colossum*.

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