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

Todd F. Elliott¹, James M. Trappe², and Armin Weise³

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

²Department 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

³Department 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

Hysterangiaceae

Hysterangiaceae

hypogeous fungus

Eucalyptus

mycorrhizal fungus

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 H₂O, 5 % KOH, Cotton blue, and Melzer’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 H₂O mounts. Microscopic structures were described and measured to demonstrate their size range. Micrographs were taken of the H₂O 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 basidiomata 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.
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.
Hysterangium colossum sp. nov. from Australia

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, 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.


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.

ACKNOWLEDGEMENTS

We much appreciate the support of Paul Bartels, John Casey, and Mark Brenner of Warren Wilson College, Allein Stanley of the Schiele Museum, and Bob and Babs Strickland of Walnut Creek Preserve. Michael Castellano provided helpful suggestions and input. Ecologist Jacqui Stol of CSIRO Ecosystem Sciences facilitated travel to several of the paratype sites. Trappe’s travel expenses were initially covered in part by the then CSIRO Division of Wildlife and Ecology and later by the Australian Capital Territory National Parks. We thank the following collections for accessioning our material: BPI, BRI, CANB, FH, K, MEL, NY, and OSC.

REFERENCES


