

AUSTRALASIAN SEQUESTRATE FUNGI 17: THE GENUS *HYDNOPLICATA* (ASCOMYCOTA, PEZIZACEAE) RESURRECTED

James M. Trappe¹ and Andrew W. Claridge

¹Department of Forest Science, Oregon State University, Corvallis, Oregon 97331-5752, USA

²Department of Environment and Conservation, Parks and Wildlife Division, Reserve Conservation Unit, Southern Branch, PO Box 2115, Queanbeyan, NSW 2620, Australia.

ABSTRACT

The genus *Hydnoplicata* and its type species, *H. whitei*, were described by Gilkey in 1954. Having discovered that it has amyloid asci and other characters that relate it to the genus *Peziza*, Trappe later proposed the new combination, *Peziza whiten*, even though the species is consistently hypogaeous. Recent molecular phylogenetic studies of *Peziza*, however, indicate that *Peziza sensu lato* is strongly non-monophyletic. *Hydnoplicata* is in a Glade distinctly separate from the type Glade of *Peziza*, so the name *Hydnoplicata* can be restored to represent that Glade. Because *H. whitei* proved to be a later, taxonomic synonym of *Hydnocystis convoluta*, -however, the correct name for the species is *Hydnoplicata convoluta* (Gilkey) Trappe and Claridge, *comb. nov.*

J.M. Trappe & A.W. Claridge (2006). Australasian sequestrate fungi 17: the genus *Hydnoplicata* (Ascomycota, Pezizaceae) resurrected. *Australasian Mycologist* 25 (1): 33-36.

Introduction

In 1950, Dr. N.H. White collected a truffle- in Sydney that he sent to Prof. Helen Gilkey of Oregon State University for identification. Gilkey (1954) regarded the specimen as a new genus and species, which she described as *Hydnoplicata whitei* Gilkey. Subsequent studies by others, however, revealed that the story of this fungus was not that simple, as so often happens in mycological taxonomy. The rather convoluted taxonomic and nomenclatural history of the species is most easily related in chronological order.

In 1896, D. McAlpine described a new truffle species from Hobart as *Hydnocystis convoluta* McAlpine (McAlpine and Rodway 1896). McAlpine's description conforms rather well to Gilkey's *Hydnoplicata whitei*, so Gilkey was evidently unaware of McAlpine's fungus when she published *Hydnoplicata* in 1954. Subsequently, McLennan (1961) collected the species in Victoria and recombined McAlpine's *Hydnocystis convoluta* as *Hydnotrya convoluta* (McAlpine) McLennan, apparently being unaware of Gilkey's *Hydnoplicata*. Transfer of the species to *Hydnotrya*

was considered appropriate by McLennan, because the spores of her specimens were ornamented, as is true of species of *Hydnotrya* but not *Hydnocystis*. None of these authors investigated the iodine reaction of the asci of their specimens. In examining an isotype of *Hydnocystis convoluta*, however, Burdsall and Korf (Burdsall 1968) discovered that the asci turn a rather strong blue in Melzer's reagent. In other respects, the specimen generally conformed to the genus *Peziza sensu lato*, so they transferred the species to that genus. Because the epithet *convoluta* was already occupied in *Peziza*, they renamed the species *Peziza jactata* Burdsall & Korf. The epithet *jactata*, meaning 'bounced about', seemed appropriate, given the nomenclatural history of the fungus. However, the bouncing about was not over. Trappe (1975) compared the holotypes of *Hydnocystis convoluta* and *Hydnoplicata whitei* and found them to be conspecific. Accepting the conclusion of Burdsall and Korf (1968), that the species should be in *Peziza*, he proposed the new combination *Peziza whitei* (Gilkey) Trappe, because in the genus *Peziza* the epithet *whitei* had priority over Burdsall and Korf's *jactata*.



Figure 1. Ascoma of *Hydnopticata convoluta*.

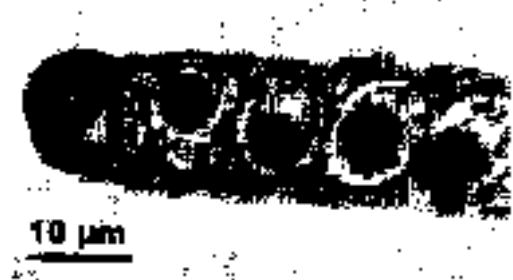


Figure 2. Spores in ascus of *Hydnopticata convoluta* in Melzer's reagent; note deBary bubbles and ornamentation of minute warts and lines.



Figure 3. Ascus of *Hydnopticata convoluta* in Melzer's reagent.

The subsequent molecular phylogenetic studies of *Peziza sensu lato* by Hansen *et al.* (2001) demonstrate that genus to be non-monophyletic. Their study included the species we have discussed here as *Peziza whitei*, represented by a collection from East Gippsland, Victoria (Trappe No. 17049).

In their phylogenetic trees, this collection is on a branch by itself in a Glade considerably removed from that containing *Peziza vesiculosa*, the type species of *Peziza*. Much molecular study remains to be done to sort out the genera contained in *Peziza sensu lato* from *Peziza sensu stricto*, but the data of Hansen *et al.* clearly show that *Peziza whitei* belongs in a different genus to *Peziza sensu stricto*. Accordingly, we here restore the genus *Hydnopticata*, which would have priority over other generic names in its Glade. The bouncing about thus has yet one more bounce, because the original epithet of the species, *convoluta*, has not been used in *Hydnopticata* and therefore has priority over the epithet *whitei*.

Materials and Methods

Macroscopic characters were described from fresh specimens. Microscopic characters were from hand-sectioned mounts in water for spore measurements, KOH (5%) for describing tissues, and Melzer's reagent for testing reaction of asci to iodine. When measurements include length or height plus width, length (height) is given first. Herbaria in which collections are deposited are abbreviated according to Index Herbariorum (<http://1207.156.243.8/emu/ih/index.php>).

Taxonomy

Hydnopticata convolute (McAlpine) Trappe & Claridge, comb. nov. (Figs 1-3).

E Hydnocystis convoluta McAlpine, in McAlpine & Rodway, *Agric. Gaz. NSW* 7: 86 (1896).

Hydnotriza convoluta (McAlpine) McLennan, *Proc. Roy. Soc. Victoria n.s.* 74: 115 (1961).

S Peziza jactata Burdsall & Korf, in Burdsall, *Mycologia* 60: 520 (1968).

= *Hydnopticata whitei* Gilkey, *Mycologia* 46: 784 (1954).

® *Peziza whitei* (Gilkey) Trappe, *Mycotaxon* 2: 112 (1975).

ASCOMATA 10-17 - 8-25 mm, in youth urnulate to sphaerical with a single opening, becoming convoluted and infolded to form inner chambers and canals, initially white, becoming greyish white but by maturity sometimes becoming pale yellowish grey, pale brownish grey, or pink-tinged, the surface smooth to minutely scabrous; base with a white, variably sized basal protuberance that usually breaks off when the specimen is removed from the soil. TRAMAL WALLS 1.5-3 mm thick,

fragile, white to grayish white in cross section. TASE mild. ODOUR initially mild, by maturity or senescence sometimes becoming fishy or musty.

SPORES 10-12 (-14) - (6.5-) 8-8.5 (-11) gm including the ornamentation, ellipsoid, hyaline, the surface with hyaline warts and lines 0.5 µm tall and broad, aguttulate but often containing deBary bubbles; spore walls <1 gm thick. ASCI in a hymenial palisade, 230-260 _ 12-15 gm, at maturity in Melzer's reagent diffuse blue but more intensely blue at the apex, lacking an operculum and not discharging the spores, with 8 uniseriate spores, tapered to a forked base; ascus walls 0.5-1 gm thick at maturity. PARAPHYSES 2-3 gm broad, cylindric, exceeding the asci, the terminal cells slightly enlarged and crowded to enclose the ascus tips. TRAMA of ±isodiametric cells 5-20 gm broad.

Etymology: Latin, *convoluta* ('convoluted') in reference to the configuration of the mature ascomata.

Distribution, habitat, hosts and season:

Tasmania, Victoria, New South Wales, Australian Capital Territory and southern South Australia across a wide array of habitats with no apparent environmental correlates (Claridge *et al.* 2000); associated with a wide diversity of *Eucalyptus* spp. and demonstrated by Kope and Warcup (1986) by pure culture synthesis to form ectomycorrhizae with *Poranthera microphylla* (Euphorbiaceae), and a Hartig net but no mantle with *Angianthus tomentosus* and *Waitzia citrea* (Asteraceae), and *Pultenaea obovata* (Fabaceae); March through October.

Collections examined: Representatives of the 240 collections examined are listed below, with the total number of collections for each state indicated in parentheses.

AUSTRALIAN CAPITAL TERRITORY

(10)-Canberra Nature Park, Black Mountain Reserve, *J.M. Trappe* 25423, 6 July 2000 (CANE). Namadgi National Park, Jct of Brindabella and Blundells Creek Rds, *A.W. Claridge & F. Camacho*, *Trappe* 15637, 1 June 1995 (CANE). Uriarra State Forest, Warks Rd, 6.7 km S of Brindabella Rd, *A.W. Claridge*, *Trappe* 16817, 10 June 1995 (CANE). **NEW SOUTH WALES** (78)-South East Forests National Park, Bemboka River Rd, 1 km W of Xi Rd, *A. W. Claridge*, *Trappe* 26676, 19 April 1996 (DAR). Monga National Park, jct of Milo & Saddleback Rds, *J.M. Trappe* 15783, 3 June 1995 (DAR). Nadgee State Forest,

Mines Forest Rd, 1.22 km W of Buckland Rd, *A.W. Claridge*, *Trappe* 18692, 2 June 1996 (DAR). Sydney, *N.H. White*, *Gilkey* 540, 1950 (holotype of *Hydnoplicata whitei*, OSC). Weddin Mountains National Park, Weddin Gap Track at park boundary, *J.M. Trappe* 24294, 17 July 1999 (DAR). **SOUTH AUSTRALIA** (5)-Adelaide Hills, *J. Warcup* EM-421, 1984 (MEL). Deep Creek Conservation Park, Trig Campground, *J.M. Trappe* H6952, 20 June 1994 (PERTH). **TASMANIA** (9)-Hobart, Waterworks, *L. Rodway* 21, July (Holotype of *Hydnocystis convoluta*, K). Mt Hartz Rd at Tahune Forest Reserve Rd, *J. Trappe*, *M. Castellano & T. Lebel*, *Trappe* 14551, 16 July 1993 (HO). Tasman Peninsula, Kellevie Rd, *W. Colgan III*, *Trappe* 14605, 17 July 1993 (HO). **VICTORIA** (138)-Fraser National Park, jct of Skyline and Maintongoon Rds, *M. Castellano & T. Lebel*, *Trappe* 14147, 10 July 1993 (MEL). Nunniong Forest Management Block, Nunniong Rd 1.7 km S of Low Saddle Track, *A. Jumpponen*, *Trappe* 18307, 26 May 1996 (MEL). Omeo Highway, *A.W. Claridge* AWC 4955, 25 June 2003 (CANE). Alpine National Park, Rams Horn Track 1.3 km N of Black Mt Rd, *M.J. Trappe*, 17 May 1999 (CANB).

Discussion

Hydnoplicata convoluta is among the more common and widely distributed sequestrate fungi endemic to Australia. It is likely to be encountered in any foray focused on hypogaeous fungi within its range in autumn, winter and spring. McAlpine's (1896) original description (as *Hydnocystis convoluta*) and illustrations are quite good. His placement of the species in the wrong genus is understandable, given the tendency of those times to force Australian species into European genera. In addition, the use of iodine to detect ascus amyloidity had yet to be discovered. Gilkey (1954) and McLennon (1961) were unaware of the issue of ascus amyloidity as well, but Gilkey recognised that this fungus did not belong in any described, Northern Hemisphere genus. Gilkey, a very careful worker, rather surprisingly described the spores as smooth, but our examination of her type collection of *Hydnoplicata whitei* revealed the typical (albeit inconspicuous), minute warts and lines on the spore surfaces. Trappe (1975) asserted that the species has operculate asci, but he perhaps saw an artifact such as poorly rehydrated ascus tips. We have not seen an operculum in any of the nearly 240 collections examined since, and we have carefully broken open dozens and dozens of well matured

specimens to see if they would puff spores: none did.

Acknowledgements

This study was supported in part by funding from the Australian Biological Resources Study, CSIRO Sustainable Ecosystems and the U.S. Forest Service, Pacific Northwest Research Station, Forestry Sciences Laboratory, Corvallis, Oregon. We thank these herbaria for accessioning our collections and providing other collections on loan: The Australian National Herbarium, Canberra (CANB), the National Herbarium of Victoria, Melbourne (MEL); the Plant Pathology Museum, Orange Agricultural Institute (DAR); the Oregon State University Mycological Herbarium (OSC); the Tasmanian Museum and Art Gallery (HO); and the Western Australian Herbarium (PERTH).

References

- Burdsall, Jr, H.H. (1968). A revision of the genus *Hydnocystis* (Tuberales) and of the hypogeous species of *Geopora* (Pezizales). *Mycologia* **60**, 496-525.
- Claridge, A.W., Barry, S.C., Cork, S.J. & Trappe, J.M. (2000). Diversity and habitat relationships of hypogeous fungi. II. Factors influencing the occurrence and **number of taxa**. *Biodiversity and Conservation* **9**, 175-199.
- Gilkey, H.M. (1954). Taxonomic notes on Tubercles. *Mycologia* **56**, 783-793.
- Hansen, K., Ltesr e, T. & Pfister, D.H. (2001). Phylogenetics of the Pezizaceae, with an emphasis on *Peziza*. *Mycologia* **93**, **958-990**.
- Kope, H.H. & Warcup, J.H. (1986). Synthesized ectomycorrhizal associations of some Australian herbs and shrubs. *New Phytologist* **104**, 591-599.
- McAlpine, D. & Rodway, L. (1896). Australian fungi. *Agricultural Gazette of New South Wales* **7**, 84-87.
- McLennan, E.I. (1961). Australian Tuberales. *Proceedings of the Royal Society of Victoria* **74**, 111-117.
- Trappe, J.M. (1975). Generic synonyms in the Tuberales. *Mycotaxon* **2**, 109-122.