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## Revision of the genus *Reddellomyces* (Tuberaceae): a combination of molecular and morphological analysis provides insights into species diversity

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### Abstract

The Australian genus *Reddellomyces* comprises several closely related symbiotic ascomycetes with chambered gleba (solid ptychothecium), ornamented ascospores and cylindrical paraphyses that are sometimes difficult to identify based on morphological aspects. Several *Reddellomyces* species are spread with their Australian host plants (*Eucalyptus* and *Acacia*) worldwide including Mediterranean areas. Specimens of an unusual truffle were collected from *Acacia saligna* stands in Tunisian semi-arid lands and eucalypt forest of Antalya (Turkey) dominated by *E. camaldulensis* Dehnh. and *E. grandis* W. Hill. Based on morphological features, these fungi are affiliated to *Reddellomyces* genus, differing from other species of the genus mainly based on ascospore size. Further analysis based on nuclear rDNA LSU and ITS and digital RFLP of the ITS sequenced amplicons with selected restriction endonucleases showed the unique identity of Tunisian specimens within the genus *Reddellomyces*. Our results showed also that at least six *Reddellomyces* species are present including two unnamed species restricted to Australia.

**Keywords:** *Reddellomyces*, Mediterranean-type climate, molecular phylogeny, taxonomy, Tuberaceae

### Introduction

Hypogeous ascomycetes of the genus *Reddellomyces* Trappe, Castellano and Malajczuk (1992: 606) have been documented in Australian eucalyptus stands (Boedijn 1939, Beaton & Weste 1977, 1988; Trappe *et al.* 1992). There are four recognized *Reddellomyces* species listed in the Index Fungorum (Index Fungorum 2020): *R. donkii* Malençon (1973: 265) Trappe, Castellano and Malajczuk (1992: 606), *R. magnisporus* Trappe, Castellano and Malajczuk (1992: 607), *R. parvulosporus* (Beaton & Malajczuk 1986: 504) Trappe, Castellano and Malajczuk (1992: 609) and *R. westraliensis* (Beaton & Malajczuk 1986: 504) Trappe, Castellano and Malajczuk (1992: 609); these are all characterized by white to pale brown and smooth peridia (Trappe *et al.* 1992). Several *Reddellomyces* species have been previously placed within the genus *Labyrinthomyces* Boedijn (1939: 236) on the basis of their morphological similarities, which include white to brown ascocarps with several forms of glebal trama and labyrinthine chambers (Boedijn 1939, Trappe 1979). Trappe *et al.* (1992) erected *Reddellomyces* and recombined *L. westraliensis* (G.W. Beaton & Malajczuk) and *L. donkii* (Malençon) with it based on morphology of asci and peridium. Molecular phylogenetic studies indicated a close relationship to *Labyrinthomyces*, *Dingleya* (Trappe 1979: 297) Trappe, Castellano and Malajczuk (1992: 600) and *Reddellomyces* (O'Donnell *et al.* 1997, Læssøe & Hansen 2007) and suggested their symbiotic associations with roots of perennial plants of *Eucalyptus* and *Acacia* species (Kope & Warcup 1986, Warcup 1988, Trappe *et al.* 2010).

Many Australian *Acacia* and *Eucalyptus* species have been widely planted around the world (Le Floch *et al.* 1990). *Acacia saligna* appears as most successful and occupies quantifiable distinct bioclimatic niches in its introduced