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The taxonomic position of *Roesleria subterranea*

Martin KIRCHMAIR^{a,*}, Sigrid NEUHAUSER^a, Walter BUZINA^b, Lars HUBER^c

^aInstitute of Microbiology, Leopold Franzens-University of Innsbruck, Technikerstr. 25, 6020 Innsbruck, Austria

^bInstitute of Hygiene, Medical University of Graz, Universitaetsplatz 4, 8010 Graz, Austria

^cInstitute of Zoology, Johannes Gutenberg-University of Mainz, 55099 Mainz, Germany

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ABSTRACT

The genus *Roesleria* was introduced with the single species *Roesleria hypogaea* (current name: *R. subterranea*) by Thümen in 1877. The species was originally described from roots of grapevine and recognised as a facultative root-rotting parasite. The mazaediate ascoma with evanescent asci led to the assumption that *Roesleria* would be an ally of mazaediate lichens. In this study we calculate 28S, 18S as well ITS1–5.8S–ITS2 rDNA phylogenies. These data indicate that *Roesleria* is closely related to *Hymenoscyphus* (*Helotiales*). In contrast to other members of the *Helotiales*, the ascospores of *Roesleria* are passively released, and a distinct apical apparatus cannot be observed by LM. Electron optic investigations have also not elucidated whether the asci of *Roesleria* are equipped with a rudimentary apical apparatus or not. The passive release of the ascospores is discussed as an apomorphic character that evolved as adaptation to a hypogeous living.

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Introduction

The genus *Roesleria* with the single species *Roesleria hypogaea* (current name: *R. subterranea*) was introduced by Thümen in (1877). The species was originally described from roots of grapevine and recognised as a facultative root-rotting parasite. In subsequent studies *Roesleria* was reported to cause root damage and dieback of grapevines and of different fruit trees (Beckwith 1924; Véghelyi 1987). Moreover, *R. subterranea* has been discussed as implicated in replant problems (Deal et al. 1972; Gärtel 1988; Magarey 1999). Several studies on the pathogenicity of *R. subterranea* and the possible economic loss by an infestation of cultural plants were published (Höfer 1992; Véghelyi 1987; Huber et al. 2006). In a study aimed at the development of PCR-based diagnostic tools for grapevine root pathogens, we isolated several

strains of *R. subterranea*. Blasting the ITS1–5.8S–ITS2 sequences of our strains against the NCBI nucleotide database (megablast) resulted in high similarities with *Hymenoscyphus* and *Cudoniella* (*Helotiales*). These findings contradict the anatomical characters of the ascomata of *R. subterranea*, which indicate a relationship to mazaediate lichens, a fact that has been comprehensively discussed by Redhead (1984) and Yao & Spooner (1999).

Materials and methods

Specimens examined

Fungal strains studied are listed in Table 1. Voucher material was deposited at the University of Innsbruck, Austria (IB)

* Corresponding author. Tel.: +43 512 507 6013; fax: +43 512 507 2938.

E-mail address: martin.kirchmair@uibk.ac.at

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Table 1 – Collection data and GenBank accession numbers of the strains studied

Species	Collection, strain no.	GenBank accession no.			Host/substrate	Origin	Collector(s)	Date of isolation
		18S rDNA	ITS1–5.8S–ITS2 rDNA	28S rDNA				
<i>Roesleria subterranea</i>	IB2005/0506, MJG-040832	EF060310	EF060300	EF608075	Roots of <i>Vitis berlandieri</i> × <i>V. riparia</i>	Kiedrich, Germany	Huber, Michaelis, Hoffmann	8 Nov 2005
<i>R. subterranea</i>	IB2005/0504, MJG-040836	–	EF060305	–	On roots of <i>V. riparia</i> 183 G × <i>V. cinerea</i> Arnold	Hochheim, Germany	Huber, Michaelis, Hoffmann	8 Nov 2005
<i>R. subterranea</i>	IB2005/0509, MJG-040834.	–	–	–	On roots of <i>V. berlandieri</i> × <i>V. riparia</i> ;	Wiltingen, Germany	Huber, Michaelis	16 Oct 2005
<i>R. subterranea</i>	IB 2005/0508, MJG-040837	EF060312	EF060299	–	On roots of <i>V. rupestris</i> 193 G × <i>V. riparia</i> 1 G	Hochheim, Germany	Huber, Michaelis, Hoffmann	8 Nov 2005
<i>R. subterranea</i>	IB2005/0507, MJG-040833	–	EF060305	–	<i>V. berlandieri</i> × <i>V. riparia</i>	Kiedrich, Germany	Huber, Hoffmann, Michaelis	28 Oct 2005
<i>R. subterranea</i>	IB2005/0505, MJG-040835	–	EF060301	–	On roots of <i>V. berlandieri</i> × <i>V. riparia</i>	Hattenheim, Germany	Huber, Michaelis, Hoffmann	8 Nov 2005
<i>R. subterranea</i>	IB2005/0510	–	EF060303	–	On roots of <i>V. berlandieri</i> × <i>V. riparia</i>	Wehlen, Germany	Huber, Michaelis	29 Sep 2005
<i>R. subterranea</i>	IB2005/0511	–	EF060304	–	On roots of <i>V. berlandieri</i> × <i>V. riparia</i> 26 G	Wiltingen, Germany	Huber, Michaelis	29 Sep 2005
<i>R. subterranea</i>	IB1995/0966, CBS 339.96	–	EF060308	EF608074	Buried twig of deciduous shrub	Eberstein, Austria	Kirchmair	June 1995
<i>R. subterranea</i>	CBS 320.33	–	EF060307	–	On roots of <i>Malus sylvestris</i>	Nijmegen, Netherlands	Diddens	Dec 1933
<i>R. subterranea</i>	CBS 271.82	EF060311	EF060309	–	On roots of <i>Populus</i> sp.	Oostelijk, Netherlands	van der Aa	May 1982
<i>R. subterranea</i>	CBS 407.51	–	EF060298	EF608073	On roots of <i>V. vinifera</i>	Italy	Ciferr	May 1951
<i>R. subterranea</i>	CBS 201.25	–	EF060298	–	On roots of <i>V. vinifera</i>	USA	Beckwith	1925
<i>Moserella radiculicola</i>	IB1989/0600	–	–	–	On mycorrhized root tips of <i>Picea abies</i>	Montafon, Austria	Pöder, Pernfuß, Sigl	Sep 1989
<i>Hymenoscyphus fructigenus</i>	IB1990/1047	–	–	–	On acorns	Stams, Austria	Peintner	Aug 1990

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