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Rhynchomeliola quercina, a new rostrate ascomycete from oak trees in western Canada

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Abstract — A new rostrate fungus with 2-celled, pale brown, verruculose ascospores was collected from dead buds of Oregon white oak in Canada. The fungus is identified and described as a new member of the genus *Rhynchomeliola*, *R. quercina*, and compared with other known species.

Key words — taxonomy, *Rhynchostoma*

Introduction

A nonstromatic perithecial fungus with a long neck has been collected from dead buds of Oregon white oak in Canada by M.E. Barr who identified it as a *Rhynchomeliola* Speg. species. Recently, a study of rhynchostomatoid fungi on *Proteaceae* was published by Lee et al. (2003). They introduced new species of *Rhynchostoma* P. Karst. and *Rhynchomeliola* and amended the description of *R. australiensis* (Petr.) E. Müll. (≡ *Rhynchostoma australiense* Petr.). Their paper discussed taxonomic affinity and history of both genera and the placement of *Rhynchostoma* based on nrDNA data. As the generic prefix of both genera "rhyncho (rostrate or beaked in Greek)" implies, they are characterized by ascomata with a distinctly long ostiolar neck together with brown, 2-celled, ornamented ascospores and filamentous paraphyses. Phylogenetic analyses showed that *Rhynchostoma* is closely related to chaetothyriaceous fungi that have completely different morphological characteristics (Lee et al. 2003). Winka & Eriksson (2000) proposed the family *Rhynchostomataceae* in *Chaetothyriomycetes* to encompass *Rhynchostoma*.

Since its introduction in 1884 (Spegazzini 1884), *Rhynchomeliola* has been placed in the *Sphaeriaceae* (*Sphaeriales*) (Müller & Arx 1962), in the *Trichosphaeriaceae* (*Trichosphaeriales*) (Hawksworth et al. 1995), in the *Rhynchostomataceae* with

uncertainty (Eriksson 2006, Winka & Eriksson 2000) or remained uncertain about the familial placement (Kirk et al. 2001). The genus comprises eight species on leaves, especially on trichomes, of various plants and lichens in the Southern Hemisphere (Batista & Maia 1964, Batista et al. 1960, Henssen & Kantvilas 1985, Lee et al. 2003, Müller & Arx 1962). The study of recently collected material based on morphological characteristics revealed the fungus is a good species of *Rhynchomeliola*. Its detailed description and illustrations are provided with comparison with other *Rhynchomeliola* species.

Materials and methods

Dead buds of Oregon white oak, *Quercus garryana* Dougl. ex Hook. (*Fagaceae*), were collected in Sidney, British Columbia, Canada. Dried specimens were directly used for the study. Morphological characteristics were observed using a Nikon Eclipse E600 light microscope with differential interference contrast (DIC) or a Nikon SMZ800 dissecting microscope. Photography was made on a Nikon Digital Camera DXM 1200 mounted on the microscopes. Fungal structures were mounted in clear lactophenol, or otherwise as specified. Ascospore dimensions were derived from 30 observations with 95% confidence intervals with the extremes given in parentheses. Dimensions of other fungal structures were described in the extremes with less than 30 observations. Sections of ascomata were prepared on a Leica CM1100 Cryostat microtome (Leica Instruments, Germany) from material mounted with Jung tissue freezing medium™. Herbarium specimens are deposited at PREM (Pretoria, South Africa) and at DAOM (Ontario, Canada).

Taxonomic description

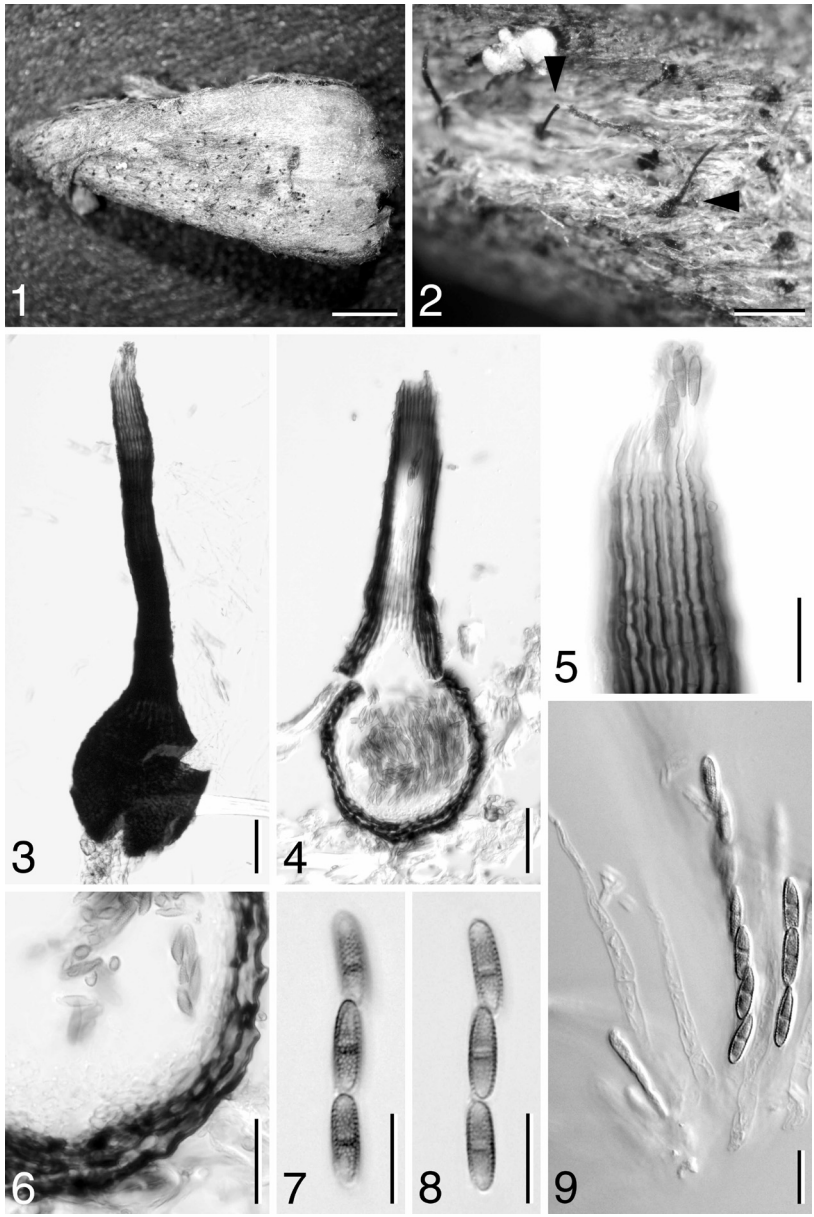
Rhynchomeliola quercina Marinc. & M.E. Barr **sp. nov.** **Figs. 1–9**

MycoBank MB510876

Ascomata nonstromatica rostrata; asci cylindrici, sine apparati apicali; paraphyses filamentosae; ascosporae pallide brunneae verruculosae uniseptatae ellipsoideae vel oblongae, (10–)11–12(–14) × (2.5–)3(–3.5) µm.

Etymology: from the Latin *quercus* = host genus, *Quercus*.

EXPANDED DESCRIPTION–Ascomata nonstromatic, perithecial, superficial among minute fiber-like trichomes, gregarious or separate, venter globose to subglobose, up to 187 µm high, up to 150 µm wide, with an ostiole in the neck, necks central, single, cylindrical, up to 400 µm high, up to 45 µm wide at the base, and up to 37.5 µm wide at the apex, consisting of longitudinally angular cells, individual neck cells 3–4 µm wide. **Peridium** up to 15 µm thick, composed of two layers, the outer layer consisting of a few rows of compressed, thick-walled, brown cells, the inner layer consisting of a few rows of compressed,



Figs. 1–9. *Rhynchomeliola quercina* (Holotype, PREM 58937) 1. Host substrate. 2. Ascomata with long necks among trichomes (arrowheads). 3. Squashed ascoma (in water). 4. Vertical section of ascoma. 5. Apex of ostiolar neck. 6. Peridium. 7, 8, Ascospores. 9. Paraphyses and asci.
Scale bars: Fig. 1 = 2 mm; 2 = 0.2 mm; 3, 4 = 50 µm; 5, 6 = 25 µm; 7–9 = 10 µm.

Table 1. Distribution, host substrates and ascospore characteristics of *Rhynchomeliola* species.

Fungi	Ascospore characteristics	Host substrates	Known areas
R. australiensis	Striate 10–14 × 3.5–4.5 µm	*Grevillea* sp. (*Proteaceae*)	Australia
*R. licaniae**	Smooth 4–6.5 × 2–2.5 µm	*Licania* sp. (*Chrysobalanaceae*)	Brazil
*R. lichenicola**	Verruculose 8–10.5 × 3.5–8 µm	Lichen	Australia
R. lomatiae	Verruculose 8–11 × 2–4 µm	*Lomatia polymorpha* R. Br. (*Proteaceae*)	Australia
*R. pulchella**	Striate 7–8 × 2.5–3 µm	*Feijoa sellowiana* (O. Berg) O. Berg (*Myrtaceae*)	Brazil
*R. pusilla**	Not mentioned 7.5–10 × 3–4 µm	*Rondeletia affinis* Hemsl. (*Rubiaceae*)	Costa Rica
*R. rosacearum**	Smooth 2.5–4 × 1–2.5 µm	A species of *Rosaceae*	Brazil
*R. usteriana**	Verruculose 13–18 × 3.5–5.5 µm	A species of *Myrtaceae*	Brazil, Papua New Guinea
R. quercina	Verruculose, forming parallel longitudinal rows 10–14 × 2.5–3.5 µm	*Quercus garryana* (*Fagaceae*)	Canada

*information obtained from the literature

thin-walled, hyaline cells. **Paraphyses** hyaline, scanty, 3–4 µm wide at the base, tapering into 1.5–2 µm at the apex, unbranched, filamentous, flexuose, septate. **Asci** unitunicate, cylindrical, lining the perithecial wall, persistent but becoming indistinguishable when ascospores are fully developed, 76–110 × 3.5–4 µm, no apical apparatus observed. **Ascospores** hyaline, becoming pale brown at maturity, oblong or ellipsoidal, (10–)11–12(–14) × (2.5–)3(–3.5) µm, 1-septate, verruculae forming parallel longitudinal rows, germ pore inconspicuous.

SPECIMENS EXAMINED–CANADA. British Columbia: Sidney–On bud scales of *Quercus garryana*, 22 March 1998, M.E. Barr 9649 (**HOLOTYPE**–PREM 58937); 16 June 1993, M.E. Barr 8536, PREM 58936; 25 May 2004, M.E. Barr 10963, PREM 58938; 21 November 2005, M.E. Barr 12000, PREM 59666; 23 October 2006, M.E. Barr 12026, PREM 59665.

COMMENTS–Among known species, *Rhynchomeliola quercina* is similar to *R. australiensis* in spore dimensions. However, ascospores of *R. quercina* are mostly oblong-shaped without constriction at septum and have minute warts on the surface that form parallel longitudinal rows. Besides long beaked ascomata, *Rhynchomeliola* species have ascospores with ornamentations such

as striations or minute warts (verruculose). *Rhynchomeliola pulchella* Speg., the type species, and *R. australiensis*, have striated ascospores. *Rhynchomeliola lichenicola* Henssen & Kantvilas, *R. lomatiae* S.J. Lee & Joanne E. Taylor, *R. pusilla* (Syd.) E. Müll. and *R. usteriana* (Speg.) Arx & E. Müll. have verruculose ascospores. The original descriptions of *Rhynchomeliola licaniae* Bat. & J.L. Bezerra and *R. rosacearum* Bat. & Cavalc. illustrate ascospores as "liso (smooth in Portuguese)". It is, however, possible that ascospore ornamentation may have been overlooked due to their minute size. For example, *Rhynchomeliola australiensis* was described as having smooth ascospores (Müller & Arx 1962), but later striations were observed on the type specimen of the species (Lee et al. 2003). All the species are foliicolous except for *R. lichenicola* that occurs on lichens and *R. quercina* on bud scales. *Rhynchomeliola quercina* is the first species of the genus that is reported from temperate regions of the Northern Hemisphere (Table 1). Various attempts have been made to grow it on artificial media. A couple of ascospores produced a germ tube of less than 1 cm length but ceased to grow further.

Key to the species of *Rhynchomeliola*

1a. Occurring on lichen ..... ***R. lichenicola***
1b. Occurring not on lichen 2

2a. Ascospores less than 4 µm in length ..... ***R. rosacearum***
2b. Ascospores more than 4 µm in length 3

3a. Ascospores 4–11 µm in length 4
3b. Ascospores more than 10 µm in length 7

4a. Ascospores 4–6.5 µm in length ..... ***R. licaniae***
4b. Ascospores more than 7 µm in length 5

5a. Ascospores with striations ..... ***R. pulchella***
5b. Ascospores without striations 6

6a. Ascospores fusiform ..... ***R. lomatiae***
6b. Ascospores oblong ellipsoid or oblong fusoid ..... ***R. pusilla***

7a. Ascospores with striations ..... ***R. australiensis***
7b. Ascospores verruculose 8

8a. Ascospores oblong ..... ***R. quercina***
8b. Ascospores fusiform ..... ***R. usteriana***

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