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.  
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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 subglobe, 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,
Rhyncomeliola quercina sp. nov. (Canada)...


Scale bars: Fig. 1 = 2 mm; 2 = 0.2 mm; 3, 4 = 50 μm; 5, 6 = 25 μm; 7–9 = 10 μm.
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, verrucae forming parallel longitudinal rows, germ pore inconspicuous.


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

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

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

*information obtained from the literature
as striations or minute warts (verruculose). *Rhyncomeliola pulchella* Speg., the type species, and *R. australiensis*, have striated ascospores. *Rhyncomeliola 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 *Rhyncomeliola 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, *Rhyncomeliola 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. *Rhyncomeliola 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 Rhyncomeliola**

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*
Acknowledgements

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Literature cited