



Figure 1. Branch of Post Oak (*Quercus stellata*) with a variety of lichens and inconspicuous, black, boat-shaped ascocarps.

# The importance of looking: *Rhytidhysteron rufulum* in Texas

Denis R. Benjamin, Robert O’Kennon and Manuela Dal Forno

Botanical Research Institute of Texas, Fort Worth, Texas

It’s easy to see the things you are looking at without noticing what else is around. In other words, “you only find what you look for and you only look for what you know.” But if one is observant, “the shiny little pearl at the edge of your peripheral vision is often more important than what you are focusing on” (paraphrased from Tim Minchin, 2013).

Here we illustrate a case of a previously unseen fungus, the result of one investigator’s dedicated persistence — the same individual who discovered a new species of beetle living in the frustules of *Xylobolus frustulatus* (O’Kennon et al., 2018; Lopez-Andrade et al., 2020).

A lichen-covered Post Oak (*Quercus*

*stellata*) branch was collected in the field in January 2018 and brought back to the laboratory at the Botanical Research Institute of Texas for macro-photography and closer examination. It sat largely ignored on a table for nearly two years, other specimens competing for attention. In January 2020, it finally merited a close examination after at least 12 species of lichen were identified. Tiny black structures resembling mouths with “cracked lips” were scattered between the lichens (Figure 1) and our photos on iNaturalist suggested *Rhytidhysteron*. We then proceeded to rehydrate the sample with fresh rain water, hoping that the action would rehydrate the ascomata, encouraging them to open. Within hours the lips parted, disclosing a burnt orange

disc (Figures 2 and 3).

Morphologically, it appears to belong in the *Rhytidhysteron rufulum* complex (Murillo et al., 2009; Soto-Medina, 2017). Only three sightings of this little saprobic ascomycete are recorded in the USA: Ohio, Pennsylvania, and Staten Island, NY. It is far better known from subtropical areas, often on citrus, where it may cause stem canker, although it is described on a variety of other substrates. It is also described as a human skin pathogen, most cases from the Indian subcontinent. Human infection is extremely rare, with less than a dozen documented examples (Chander et al., 2017; Yadav et al., 2017; Mudhigeti et al., 2018).

Light microscopy demonstrated



Figure 2. *Rhytidhysteron rufulum* before rehydration.



Figure 3. *Rhytidhysteron rufulum* after rehydration showing the burnt orange disc.

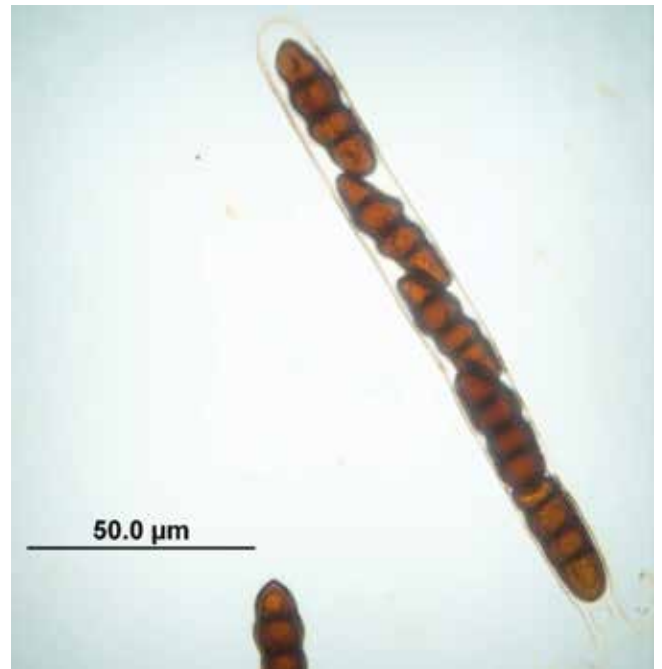


Figure 4. Ascus containing prominently 3-septate ascospores.

typical asci, containing ellipsoid, dark red-brown, 3-cross-septate, 35–49  $\mu\text{m} \times 10\text{--}14 \mu\text{m}$  ascospores (Figure 4). Fragments were mounted on stubs, sputtered with gold and examined with a Hitachi scanning electron microscope. Five ascomata were carefully removed, avoiding any bark or adjacent lichens,

and subjected to DNA extraction. A high-quality ITS sequence, which is the fungal barcoding marker (Schoch et al., 2012), was acquired and a BLAST search confirmed its identity as *R. rufulum*. Further studies are being performed with colleagues to clarify the nature of this taxon as the classification of this

group is still ongoing (Ohm et al., 2012).

The vouchered specimen was deposited at the Botanical Research Institute of Texas (BRIT572092) as *Rhytidhysteron rufulum* and has the following label information: R.J. OKennon, 34179, Elmer W. Oliver Nature Park, Mansfield, TX, on January

20, 2018.

Our research demonstrates that this fungal group could be more widespread than previously thought and calls attention to these tiny ascomycetes that are easily overlooked.

### References Cited

Chander, J., N. Singla, R. Kundu, U. Handa, and A. Chowdhary. 2017. Phaeohyphomycosis caused by *Rhytidhysterion rufulum* and review of literature. *Mycopathologia* 182: 403–407.

Lopez-Andrade, C., M.L. Ferro, and H. Keller. 2020. A new species of *Cis Latreille* (Coleoptera: Ciidae) from the USA, with comments on the use by Ciidae of Stereaceae fungi (Basidiomycota: Agaricomycetes: Russulales) as hosts. *The Coleopterists Bulletin* 74(1): 1–8.

Minchin, T. 2013. Commencement address at University of Western Australia <https://www.youtube.com/watch?v=yoEezZD71sc&t=729s>

Mudhigeti, N., R. Patnayak, U. Kalawat, and Y.S.C. Rekha. 2018. Subcutaneous *Rhytidhysterion* infection: a case report from south India with literature review. *Cureus* 109(4): e.2406. Published online doi:10.7759/cureus.2406

Murillo, E., and F. Alebertazzi. 2009. Data indicate that *Rhytidhysterion rufulum* (ascomycetes, Patellariales) in Costa Rica consists of four distinct lineages corroborated by morphological and chemical characters. *Mycological Research* 113: 405–416.

Ohm, R.A., N. Feau, B. Henrissat, C.L. Schoch, B.A. Horwitz, K.W. Barry, B.J. Condon, A.C. Copeland, B. Dhillon, F. Glaser, C.N. Hesse, I. Kosti, K. LaButti, E.A. Lindquist, S. Lucas, A.A. Salamov, R.E. Bradshaw, L. Ciuffetti, R.C. Hamelin, G.H. Kema, C. Lawrence, J.A. Scott, J.W. Spatafora, B.G. Turgeon, P.J. de Wit, S. Zhong, S.B. Goodwin, and I.V. Grigoriev. 2012. Diverse lifestyles and strategies of plant pathogenesis encoded in the genomes of eighteen Dothideomycetes fungi. *PLOS Pathogens* 9(3): 10.1371/annotation/fcca88ac-d684-46e0-a483-62af67e777bd. <https://doi.org/10.1371/annotation/fcca88ac-d684-46e0-a483-62af67e777bd>

O'Kennon, R., D.R. Benjamin, and H.W. Keller. 2018. *Xylobolus frustulatus* (Stereaceae): Developmental observation, morphology and ecology. *FUNGI* 10(4): 16–21.

Schoch, C.L., K.A. Seifert, S. Huhndorf, V. Robert, J.L. Spouge, C.A. Levesque, W. Chen, and Fungal Barcoding Consortium. 2012. Nuclear ribosomal internal transcribed spacer (ITS) region as a universal DNA barcode marker for Fungi. *Proceedings of the National Academy of Sciences* 109(16): 6241–6246.

Soto-Medina, E. and R. Lücking. 2017. A new species of *Rhytidhysterion* (Ascomycota: Patellariaceae) from Colombia, with a provisional working key to known species in the world. *Revista de la Academia Colombiana de Ciencias Exactas, Fisicas y Naturales* 41(158): 59–63.

Yadav, S., R. Agarwal, J. Chander, and A. Chowdhary. 2017. Subcutaneous mycoses by *Rhytidhysterion rufulum*. *International Journal of Medical Research & Health Sciences* 6: 12–15. †

**MycoCards**  
**Mushroom Flashcards**  
NOW TWO BOLETE EDITIONS  
• Northeastern North America  
• Western North America

**Suillus ampelorum**  
**Yellow Stinked Jack**  
• Yellow to greenish yellow, sometimes orange  
• Gills yellow to greenish yellow  
• Stipe yellow to greenish yellow  
• Cap yellow to greenish yellow  
• Smell: strong, unpleasant, stinky  
• Taste: bitter  
• Habitat: on decaying wood  
• Distribution: widespread  
• Season: late summer to fall

**Boletus sensibilis**  
**The White King**  
• Pink to red, sometimes orange  
• Gills yellow to orange  
• Stipe yellow to orange  
• Cap yellow to orange  
• Smell: none to slightly sweet  
• Taste: bitter  
• Habitat: on decaying wood  
• Distribution: widespread  
• Season: late summer to fall

**Boletus barrowsii**  
**The White King**  
• White to yellowish white  
• Gills white to yellowish white  
• Stipe white to yellowish white  
• Cap white to yellowish white  
• Smell: none to slightly sweet  
• Taste: bitter  
• Habitat: on decaying wood  
• Distribution: widespread  
• Season: late summer to fall

A DANIEL WINKLER, BILL NEILLS & GARY GILBERT PRODUCTION

- Large format 4" x 6" cards
- 55 species • Over 100 photos
- Use them in the field
- Drill yourself at home

**\$24.95**

For purchase & info go to  
**MycoCards.com**

**BIG BANG**

-for Art Goodtimes  
shroomer crooner

The universe  
is expanding.  
The expansion  
is accelerating as well.  
The theory is,  
at the start,  
there must have been  
one helluva BIG BANG!  
Did that new mushroom  
in the garden  
need a bang  
to expand?  
The astrophysicist,  
of course, explains it:  
"The mushroom expands  
because it is alive."  
So it is!

Doc Dachtler  
California