

# An Update From the CDFA Plant Pathology Lab Plant Pest Diagnostics Center



Suzanne Rooney Latham  
CDFA Plant Pest Diagnostics Lab  
Sacramento, CA

Annual Meeting of the California Forest Pest Council  
November 14, 2018



Nearly 6 years ago at Southern Region CA Forest Pest  
Council Meeting....

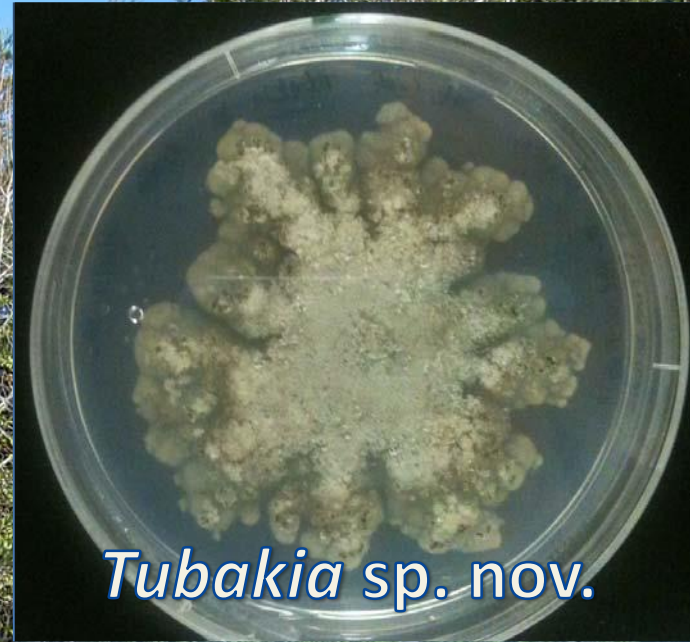
*A new **Tubakia** species affecting  
California oaks*



October 24, 2012  
Suzanne Rooney Latham  
CDFA Plant Pest Diagnostics Lab  
Sacramento, CA



*Quercus agrifolia*



*Tubakia* sp. nov.



04.27.2012 09:26



*Quercus wislizeni* and *Notholithocarpus densiflorus*



Photo: Chris Lee CALFIRE





*Quercus kelloggii*



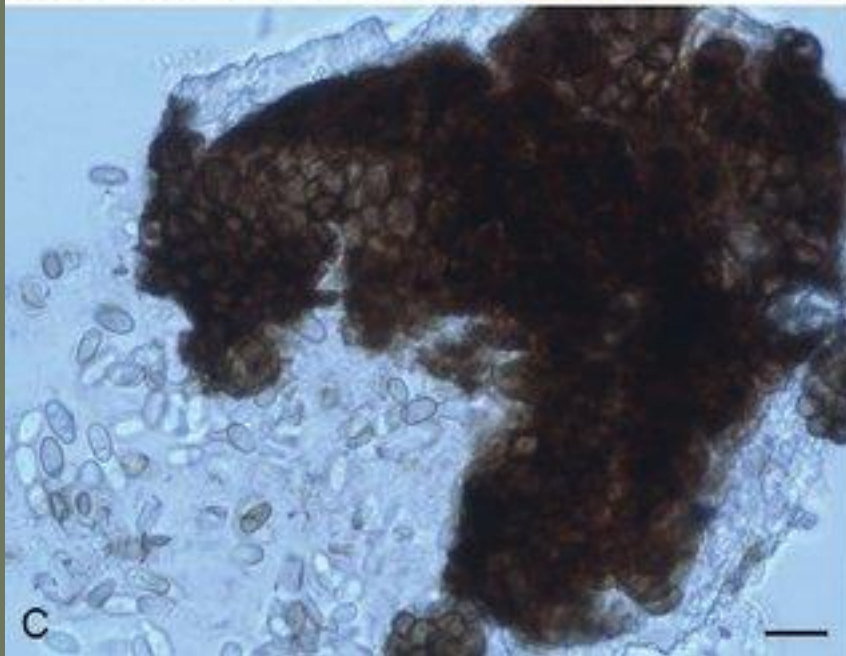
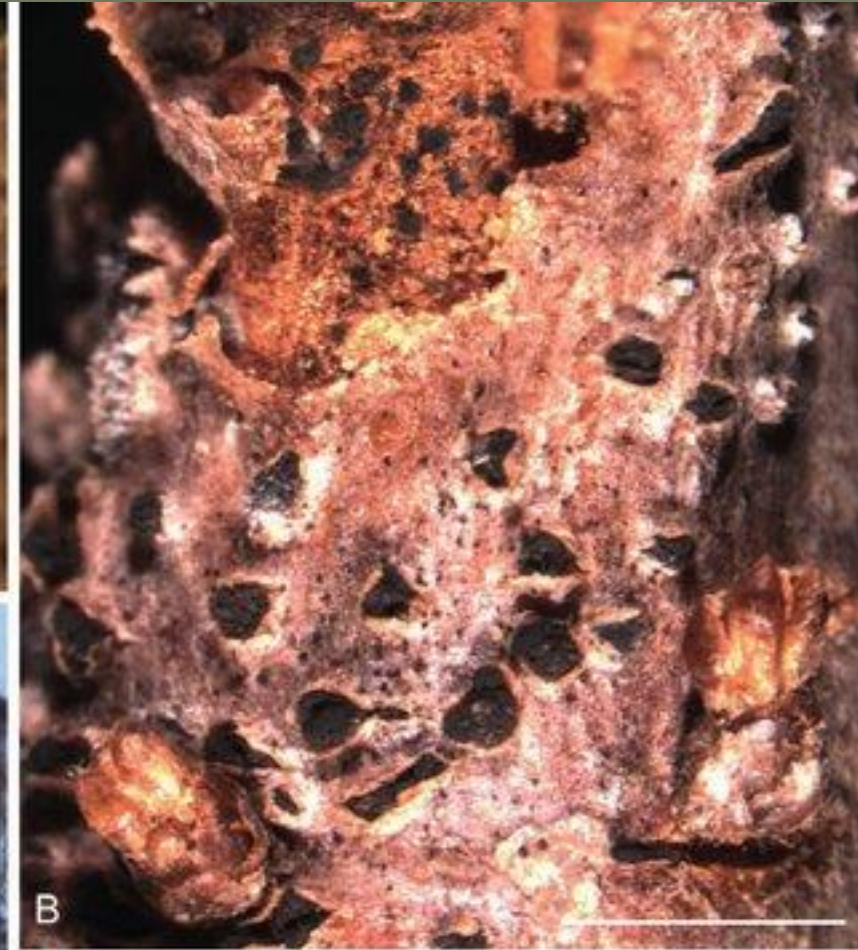




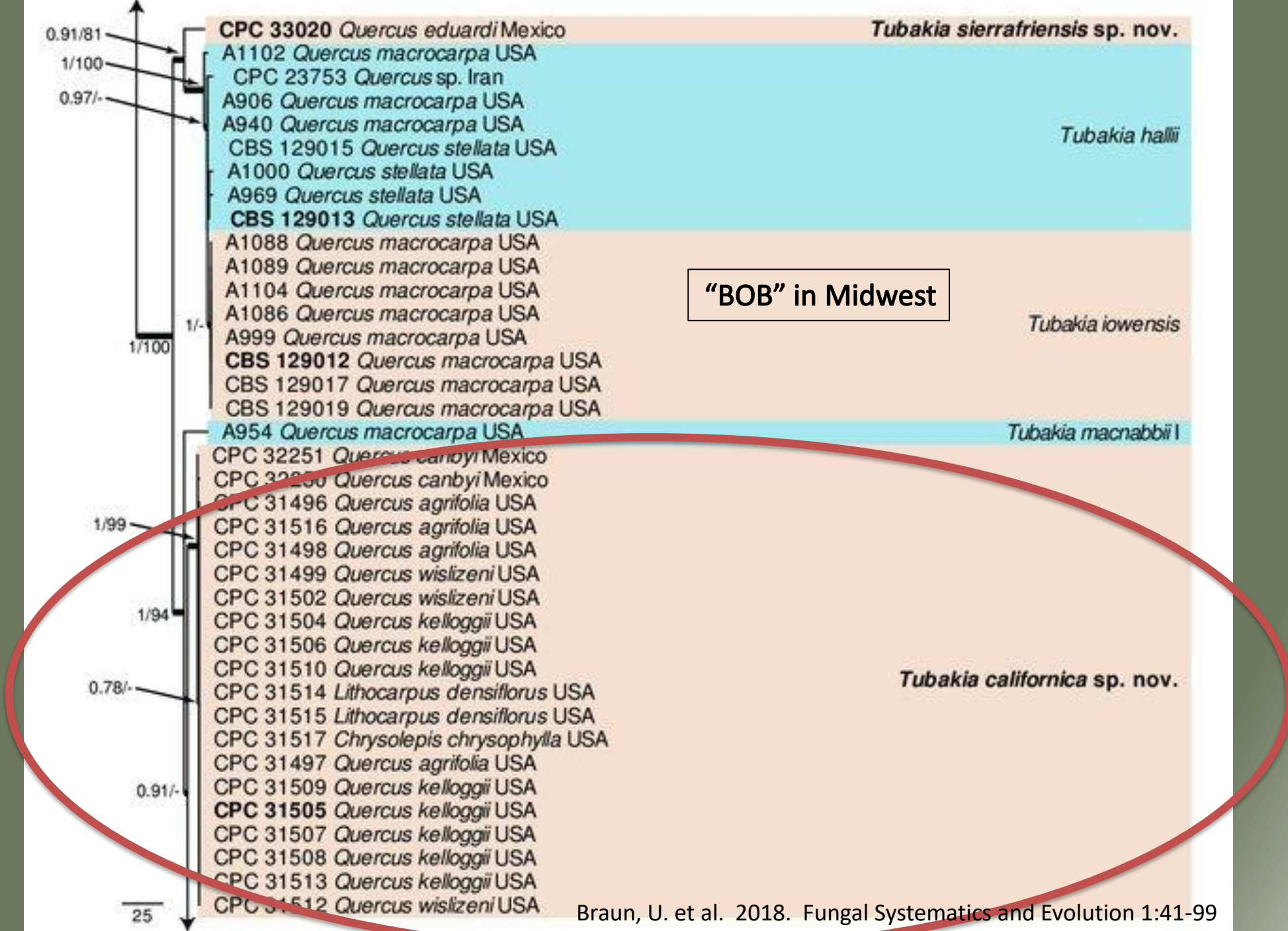




Fungal fruiting structures of the new *Tubakia* species









Botryosphaeriaceae  
Associated with Dieback  
of Landscape California  
Coast Redwood



<https://treeassociates.files.wordpress.com/2011/10/redwood-fig-5.jpg>







# Natural Range of Coast Redwood (*Sequoia sempervirens*) in CA





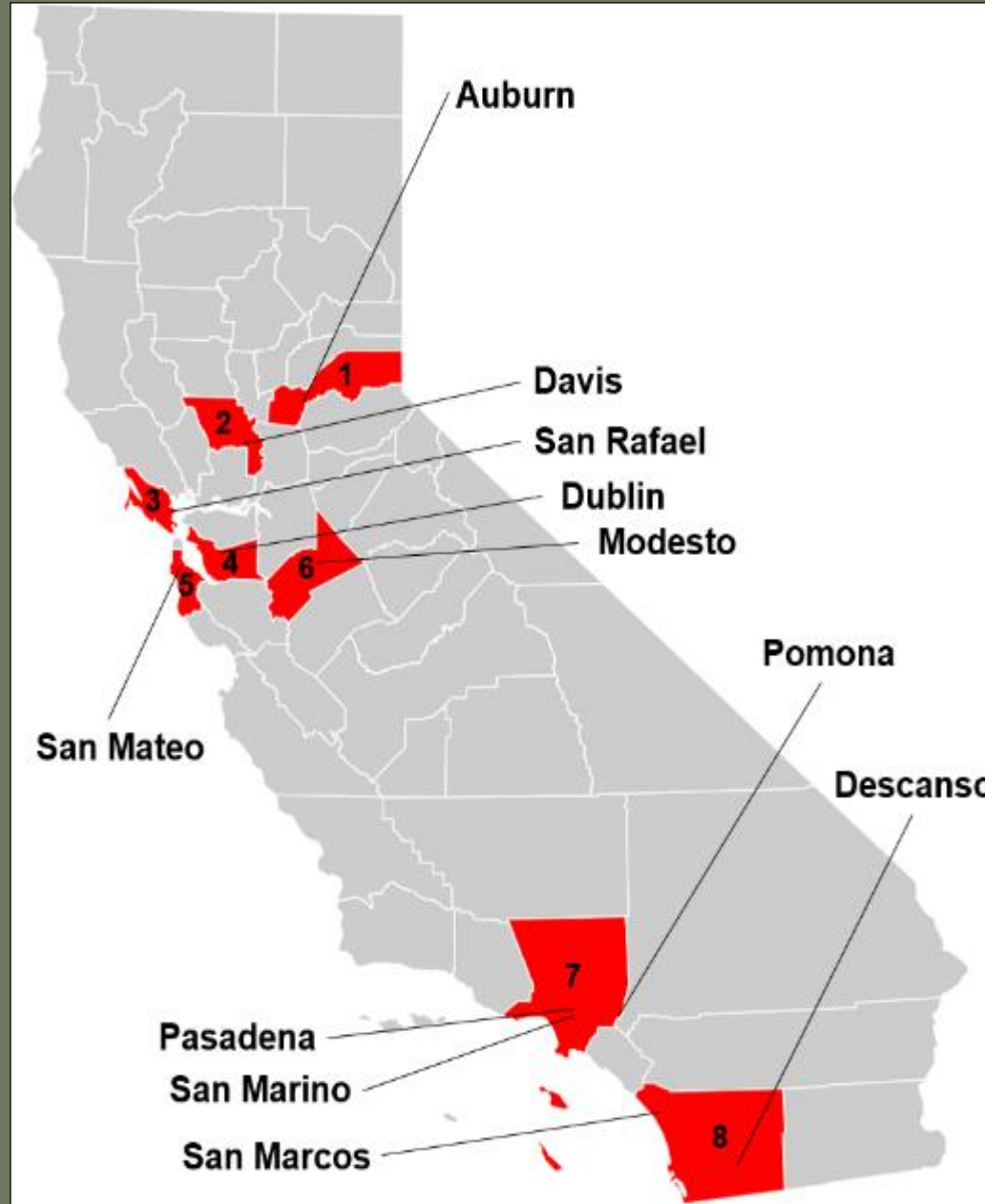


Photo: Tim Tidwell, CDFA



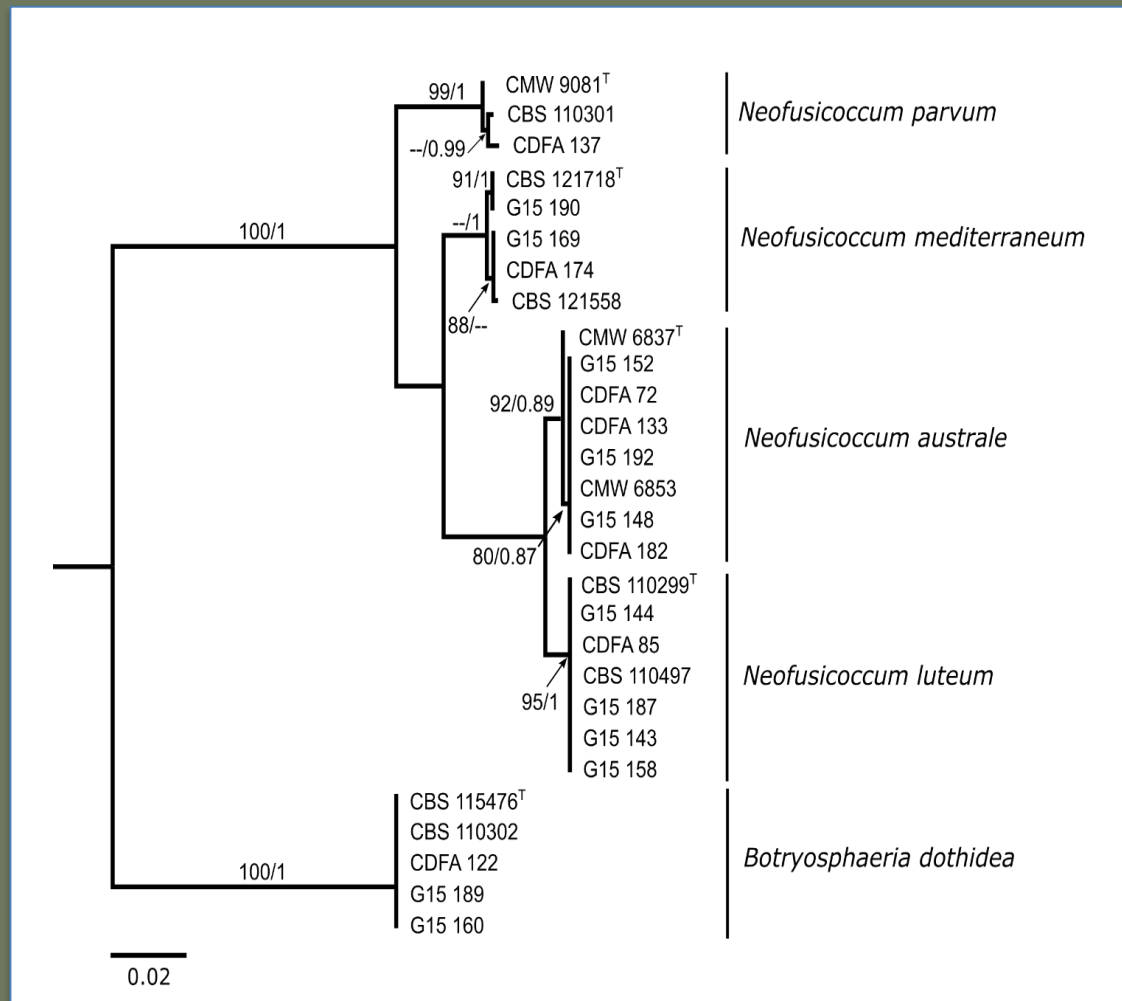


# Distribution of Botryosphaeriaceae isolates used in this study





# Five Botryosphaeriaceae species on Coast Redwood were characterized in this study



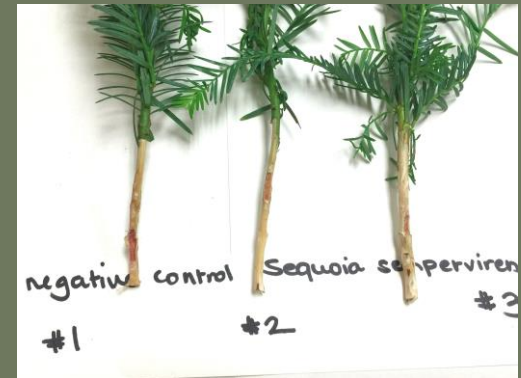
<https://www2.ipm.ucanr.edu/agriculture/pistachio/Botryosphaeria-Panicle-and-Shoot-Blight/>



[https://crec.ifas.ufl.edu/extension/pomegranates/pdfs/Michailides\\_2014.pdf](https://crec.ifas.ufl.edu/extension/pomegranates/pdfs/Michailides_2014.pdf)

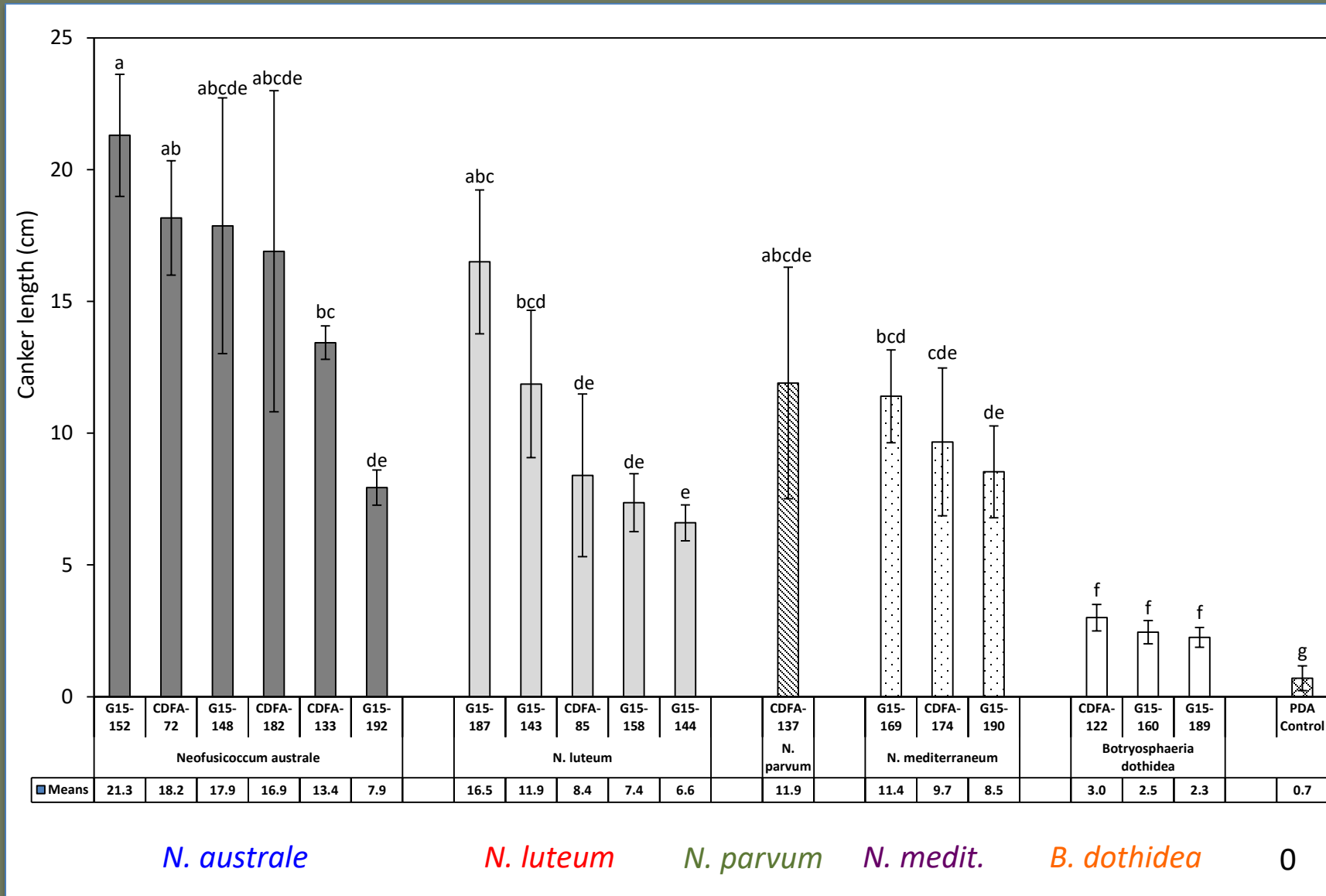
Aćimović, S. et al. 2018. Plant Disease 102: 1950-1957







# Pathogenicity of Five Botryosphaeriaceae isolates from Coast Redwood







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Phylogeny and taxonomy of the genus *Tubakia* s. lat.

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Key words:

Ascomycota

DNA phylogeny

epitypification

key

systematics

*Tubakiaceae*

24 new taxa

**Abstract:** The genus *Tubakia* is revised on the basis of morphological and phylogenetic data. The phylogenetic affinity of *Tubakia* to the family *Melanconiellaceae* (*Diaporthales*) was recently postulated, but new analyses based on sequences retrieved from material of the type species of *Tubakia*, *T. dryina*, support a family of its own, viz. *Tubakiaceae* fam. nov. Our phylogenetic analyses revealed the heterogeneity of *Tubakia* s. lat. which is divided into several genera, viz., *Tubak* str., *Apiognomonioides* gen. nov. (type species: *Apiognomonioides supraseptata*), *Involutiscutellula* gen. nov. (type species: *Involutiscutellula rubra*), *Oblongisporothyrium* gen. nov. (type species: *Oblongisporothyrium castanopsidis*), *Paratubakia* gen. nov. (type species: *Paratubakia subglobosa*), *Racheliella* gen. nov. (type species: *Racheliella wingfieldiana* sp. nov.), *Saprothyr* gen. nov. (type species: *Saprothyr thailandense*) and *Sphaerosporithyrium* gen. nov. (type species: *Sphaerosporithyrium mexicanum* sp. nov.). *Greeneria saprophytica* is phylogenetically closely allied to *Racheliella wingfieldiana* and is there reallocated to *Racheliella*. Particular emphasis is laid on a revision and phylogenetic analyses of *Tubakia* species described from Japan and North America. Almost all North American collections of this genus were previously referred to as *T. dryina* s. which is, however, a heterogeneous complex. Several new North American species have recently been described. The new species *Sphaerosporithyrium mexicanum*, *Tubakia melnikiana* and *T. sierrafriensis*, causing leaf spots on several oak species found in the North-Central Mexican state Aguascalientes and the North-Eastern Mexican state Nuevo León, are described, illustrated, and compared with similar species. Several additional new species are introduced, including *Tubakia californica* based on Californian collections on various species of the genera *Chrysopsis*, *Notholithocarpus* and *Quercus*, and *T. dryinoides*, *T. oblongispora*, *T. paradyrinoides*, and *Paratubakia subglobosoides* described on the basis of Japanese collections. *Tubakia suttoniana* nom. nov., based on *Dicarpella dryina*, is a species closely allied to *T. californica* and currently only known from Europe. *Tubakia dryina*, type species of *Tubakia*, is epitypified, and the phylogenetic position and circumscription of *Tubakia* are clarified. A revised, supplemented key to the species of *Tubakia* and allied genera on the basis of conidiomata is provided.

Thanks!

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## Characterization and Pathogenicity of Botryosphaeriaceae Fungi Associated with Declining Urban Stands of Coast Redwood in California

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### Abstract

Coast redwood (*Sequoia sempervirens*) is among the most widely planted landscape trees in California (CA) but is in decline outside its natural range due to factors including prolonged drought and plant pathogens. We investigated associations of Botryosphaeriaceae fungi with declining coast redwood trees throughout CA. More than 100 samples were collected from 11 coastal and inland locations in CA. Fifty-nine *Botryosphaeria*-like fungal strains were isolated and 18 were selected for further study. Phylogenetic analysis of ITS and EF-1 $\alpha$  sequence data confirmed the presence of *Botryosphaeria dothidea*, *Neofusicoccum australe*, *N. luteum*, *N. mediterraneum*, and *N. parvum*. Pathogenicity testing

showed that although the *Neofusicoccum* species vary in virulence, all are more virulent than *B. dothidea*. *N. australe* caused the largest lesions, followed by *N. luteum*, *N. parvum*, and *N. mediterraneum*. Of the species recovered, only *B. dothidea* has been previously confirmed as a pathogen of coast redwood in CA. These results confirm that multiple Botryosphaeriaceae species are associated with branch decline and dieback on coast redwood in CA, which agrees with similar studies on woody agricultural crops. Accurate diagnosis of fungal pathogens of coast redwood is important for the development of disease management strategies and may help improve horticultural practices in maintenance of urban stands.

*Sequoia sempervirens* (Lamb. ex. D. Don) Endl., also known as coast or coastal redwood or California redwood, is the sole living species in the genus *Sequoia*. This evergreen tree in the Cupressaceae family is native to North America and its natural range extends along the coast of southern Oregon into central California. In their native stands and under optimal conditions (i.e., moderate temperatures, high rainfall, and seasonal fog), coast redwood trees have very high growth rates and are regarded as among the world's tallest trees. Mixed coast redwood forests play a crucial ecological role with high rates of carbon sequestration related to large tree sizes and maximum biomass production (Sillett et al. 2010; Stephenson et al. 2014; Van

growth. In the last decade, there has been a noticeable decline among redwoods, especially in urban landscapes outside of their native range (Downer 2004). Although a number of different twig, branch, and needle pathogens have been documented on coast redwood, their role in the recent widespread decline has not been confirmed. *Phytophthora ramorum*, the cause of Ramorum blight on forest coast redwood trees and many other tree species, has been confirmed on coast redwood, but only within *P. ramorum* infested counties, and not in valley locations (Davidson et al. 2008; Fichtner et al. 2007; Maloney et al. 2002, 2005). Other primary and opportunistic pathogens that can infect healthy or stressed coast redwood trees include: