

Plant Pathology Seminar Series

Seed gall nematodes, *Afrina sporoboliae* and *Anguina tritici*, a notable species in the U.S.

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Abstract

Plant-parasitic nematodes attack practically all crop plants and exhibit a wide variety of interactions with their hosts. Small grain cereals and forage grasses have been used in foods, beverages, and animal feed for thousands of years. Seed gall nematodes in the genus *Afrina* and *Anguina* are obligate specialized parasites with a global distribution; they are considered economically important agricultural and quarantine pests in some countries (Subbotin and Riley 2012). The impact of these nematodes on agricultural production is attributed to their ability to parasitize cereals and forage grasses like wheat and annual ryegrass (*Lolium* sp). *Anguina tritici*, is currently listed as a quarantine organism of the highest priority by USDA-APHIS in the prioritized Offshore Pest List. *Afrina sporoboliae*, a closely related seed gall nematode, was recently described in Idaho, inducing galls in seeds, stems, and leaves of *Sporobolus cryptandrus* (Barrantes-Infante *et al.*, 2018), a common roadside grass. *Anguinid* nematodes can act as vectors of bacterial plant pathogens in the genus *Rathayibacter* (Finnie, 2006; Murray *et al.*, 2017). *Rathayibacter toxicus* is a gram-positive bacterium that produces tunicamycin in seed galls of ryegrass, the consumption of which by grazing animals can result in fatal poisonings known as Annual Ryegrass Toxicity in Australia (Murray *et al.*, 2017). *R. toxicus* poses a threat to agriculture, animals, and humans and is listed as a Plant Pathogen Select Agent by APHIS. Little is known about the seed gall nematodes and their ability to vector *Rathayibacter* spp. in the U.S. We developed an innovative agglutination method to assess how seed gall nematodes *Af. Sporoboliae* collected from *Sp. cryptandrus* in Idaho, and *A. tritici* collected from wheat in Turkey, interact with *Rathayibacter* spp. that could affect nematodes and their ability to transmit the bacteria. We demonstrated specificity in the nematode-bacterium interaction involving seed gall nematode species and their respective *Rathayibacter* counterparts. Considering recent detections and damage caused by seed gall nematodes, and that *Rathayibacter* is obligately vectored by *Anguina* spp, these studies will provide a basis for exploring the interaction between seed gall nematodes and the bacteria they transmit that might lead to more effective disease control.

Biography

Aida Duarte received her M.S. in Biochemistry from University of Beira Interior, Portugal and then worked at the nematology lab at University of Coimbra, Portugal. Her interest in nematology began as a PhD student, and her PhD research was on the molecular analysis of secretions of the root-knot nematode *Meloidogyne hispanica*. In 2015, she came to U.S.A. to work with a quarantine nematode, the cyst nematode *Globodera* spp. at University of Idaho. She joined Dr. Murray's program where she is developing molecular tools for the detection and discrimination of seed gall forming nematodes in the family *Anguinidae* and determination of their potential to vector *Rathayibacter toxicus*.

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Meeting ID: 933 9533 3254

Passcode: 305936

Call in number: 1 253 215 8782



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References:

1. Barrantes-Infante, B. L., Schroeder, B. K., Sergei, A. S. and Murray, T. D. (2018). *Afrina sporoboliae* sp. n. (Nematoda: Anguinidae) Associated with *Sporobolus cryptandrus* from Idaho, United States: Phylogenetic Relationships and Population Structure. *Phytopathology* 108:768-779.
2. Finnie, J. W. (2006). Review of corynetoxins poisoning of livestock, a neurological disorder produced by a nematode-bacterium complex. *Australian Veterinary Journal* 84: 271-277.
3. Murray, T. D., Schroeder, B. K., Schneider, W. L., Luster, D. G., Sechler, A., Rogers, E. E. and Subbotin, S. A. (2017). *Rathayibacter toxicus*, other *Rathayibacter* species inducing bacterial head blight of grasses, and the potential for livestock poisoning. *Phytopathology* 107: 804-815.
4. Subbotin, S. A., and Riley, I. T. (2012). Stem and gall forming nematodes. Pages 521-577 in: *Practical Plant Nematology*. R. Manzanilla-Lopez and M. Marban-Mendoza, eds. Mundi Prensa, Mexico.