

CURRICULUM VITAE

Anna O. Conrad

EDUCATION

Ph.D. 2015. Plant Pathology, The Ohio State University

M.S. 2013. Plant Pathology, The Ohio State University, non-thesis

B.S. 2010. Environmental Biology, SUNY College of Environmental Science and Forestry,
summa cum laude

PROFESSIONAL EXPERIENCE

2020 – present Research Plant Pathologist, USDA Forest Service, Northern Research Station,
Hardwood Tree Improvement and Regeneration Center

2017 – 2020 Postdoctoral Researcher, Department of Plant Pathology, The Ohio State
University

2015 – 2017 Postdoctoral Scholar, Forest Health Research and Education Center, University
of Kentucky

PUBLICATIONS

Refereed Journal Articles

Conrad, A.O., Wei, L., Lee, D-Y., Wang, G-L., Rodriguez-Saona, L., and Bonello, P. Machine learning-based presymptomatic detection of rice sheath blight using spectral profiles. *Plant Phenomics*. *In press*.

Conrad, A.O., Villari, C., Sherwood, P., and Bonello, P. 2020. Phenotyping Austrian pine for resistance to *Diplodia sapinea* using Fourier-transform infrared spectroscopy. *Arboriculture & Urban Forestry* 46(4): 276-286.

Yu, J., **Conrad, A.O.**, Decroocq, V., Zhebentyayeva, T., Williams, D.E., Bennett, D., Roch, G., Audergon, J-M., Dardick, C., Liu, Z., Abbott, A.G., and Staton, M.E. 2020. Distinctive gene expression patterns define endodormancy to ecodormancy transition in apricot and peach. *Frontiers in Plant Science* 11: 180. doi: 10.3389/fpls.2020.00180

Bonello, P., Campbell, F.T., Cipollini, D., **Conrad, A.O.**, Farinas, C., Gandhi, K.J.K., Hain, F.P., Parry, D., Showalter, D.N., Villari, C., and Wallin, K.F. 2020. Invasive tree pests devastate ecosystems—a proposed new response framework. *Frontiers in Forests and Global Change* 3:2. doi: 10.3389/ffgc.2020.00002

Conrad, A.O., Crocker, E.V., Li, X., Thomas, W.R., Ochuodho, T., Holmes, T.P., and Nelson, C.D. 2020. Threats to oaks in the eastern United States: perceptions and expectations of experts. *Journal of Forestry* 118(1): 14-27. doi: 10.1093/jofore/fvz056

†Mukrimin, M., **Conrad, A.O.**, Kovalchuk, A., Julkunen-Tiitto, R., Bonello, P., and Asiegbu, F.O. 2019. Fourier-transform infrared (FT-IR) spectroscopy analysis discriminates asymptomatic and symptomatic Norway spruce trees. *Plant Science* 289: 110247. doi: 10.1016/j.plantsci.2019.110247

Conrad, A.O., Yu, J., Staton, M.E., Audergon, J-M., Roch, G., Decroocq, V., Knagge, K., Chen, H., Zhebentyayeva, T., Liu, Z., Dardick, C., Nelson, C.D., and Abbott, A.G. 2019. Association of the phenylpropanoid pathway with dormancy and adaptive trait variation in apricot (*Prunus armeniaca*). *Tree Physiology* 39(7): 1136-1148. doi: 10.1093/treephys/tpz053

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- Conrad, A.O.**, McPherson, B.A., Lopez-Nicora, H.D., D’Amico, K.M., Wood, D.L., Bonello, P. 2019. Disease incidence and spatial distribution of host resistance in a coast live oak/sudden oak death pathosystem. *Forest Ecology and Management* 433: 618-624. doi: 10.1016/j.foreco.2018.11.035
- Conrad, A.O.**, McPherson, B.A., Wood, D.L., Madden, L.V., Bonello, P. 2017. Constitutive phenolic biomarkers identify naïve *Quercus agrifolia* resistant to *Phytophthora ramorum*, the causal agent of sudden oak death. *Tree Physiology* 37(12): 1686-1696. doi: 10.1093/treephys/tpx116
- ‡**Conrad, A.O.** and Bonello P. 2016. Application of infrared and Raman spectroscopy for the identification of disease resistant trees. *Frontiers in Plant Science* 6: 1152. doi: 10.3389/fpls.2015.01152
- Conrad, A.O.**, Rodriguez-Saona, L.E., McPherson, B.A., Wood, D.L., and Bonello, P. 2014. Identification of *Quercus agrifolia* (coast live oak) resistant to the invasive pathogen *Phytophthora ramorum* in native stands using Fourier-transform infrared (FT-IR) spectroscopy. *Frontiers in Plant Science* 5: 521. doi: 10.3389/fpls.2014.00521
- McPherson, B.A., Mori, S.R., Opiyo, S.O, **Conrad, A.O.**, Wood, D.L., and Bonello, P. 2014. Association between resistance to an introduced invasive pathogen and phenolic compounds that may serve as biomarkers in native oaks. *Forest Ecology and Management* 312: 154-160.
- Conrad, A.O.** and Segraves, K.A. 2013. Mycorrhizal colonization of *Palafoxia feayi* (Asteraceae) in a pyrogenic ecosystem. *Mycorrhiza* 23(3): 243-249.

†Contributed equally as first author.

‡Invited review paper.

Other Publications

- Conrad, A.O.**, Taylor, N.J., and Bonello, P. 2013. Fact sheet: Thousand Cankers Disease. HYG-3313-13.
- Conrad, A.O.**, Bonello, P., and Bienemann, D.S. 2011. An introduction to sudden oak death and upcoming research. *City Trees* September/October.

GRANTS

- 2017 – 2018 **The American Chestnut Foundation**, \$4,511. PI: **Conrad**, co-PIs: Abbott, Nelson, Bonello, Rodriguez-Saona. Renewal of “Evaluating chemical fingerprinting as a tool to rapidly screen hybrid chestnut for disease resistance”
- 2015 – 2016 **The American Chestnut Foundation**, \$3,000. PIs: **Conrad**, Abbott, Nelson. “Evaluating chemical fingerprinting as a tool to rapidly screen hybrid chestnut for disease resistance.”
- 2015 – 2018 **AFRI NIFA**, \$425,220. PI: Abbott, co-PI’s: Liu, Dardick, Zhebentyayeva, Staton, Nelson, **Conrad**. “Abiotic stress response and adaptive phenology in fruit trees.”
- 2013 **SEEDS: The Ohio Agricultural Research and Development Center Research Competitive Grants Program, Graduate Research Competition**, \$5,000. “Transcript and metabolite profiling to understand mechanisms of oak resistance against the introduced pathogen, *Phytophthora ramorum*.”

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Finalist

- 2019 **The ‘Ōhi‘a Challenge. Conrad and Bonello.** “Field-based detection of rapid ‘Ōhi‘a death using spectroscopy.”

AWARDS AND HONORS

- 2018 Pathogens Travel Award Winner, 800 Swiss Francs
2014 14th I.E. Melhus Graduate Student Symposium invited speaker and travel award, American Phytopathological Society, \$1,200
2014 C.C. Allison Award, Department of Plant Pathology, The Ohio State University, \$800
2013 H.A.J. Hoitink Graduate Education Scholarship, Department of Plant Pathology, The Ohio State University, \$700
2013 Honorable Mention, Grant-in-Aid of Research Competition, The Ohio State University Chapter of Sigma Xi
2012 3rd Place Poster Presentation, North Central Division Meeting, American Phytopathological Society
2012 North Central Division travel award, American Phytopathological Society, \$250

PRESENTATIONS

Oral Presentations

- ***Conrad, A.O.** and Bonello, P. New approaches for identifying disease resistant forest trees. North American Invasive Species Management Association Annual Conference. Saratoga Springs, NY, September 30 – October 3, 2019.
- Conrad, A.O.**, Lee, D-Y., Li, W., Wang, G-L., and Bonello, P. Machine learning-based early rice disease detection using spectral profiles. Plant Health 2019. Cleveland, OH, August 3 – 7, 2019.
- Conrad, A.O.**, D'Amico, K.M., Bonello, P., McPherson, B.A., Wood, D.L., and Lopez-Nicora, H.D. 2019. Incidence and distribution of resistance in a coast live oak/sudden oak death pathosystem. The Seventh Sudden Oak Death Science and Management Symposium. San Francisco, CA, June 25 – 27, 2019.
- ***Conrad, A.O.** Chemical fingerprinting: a tool for identifying disease resistant trees. The American Chestnut Foundation Annual Meeting. Huntsville, AL, October 26 – 27, 2018.
- Conrad, A.**, Villari, C., Sniezko, R., Rodriguez-Saona, L., and Bonello, P. Development of a tool for rapid identification of resistant trees in species affected by alien invasive pathogens. The 6th International Workshop on the Genetics of Tree-Parasite Interactions: Tree Resistance to Insects and Diseases: Putting Promise into Practice. Mt. Sterling, OH, August 5 – 10, 2018.
- Conrad, A.**, Sniezko, R., Rodriguez-Saona, L., and Bonello, P. Developing a phenotyping tool for disease resistance using Fourier transform infrared (FT-IR) and Raman spectroscopy. International Congress of Plant Pathology, Boston, MA, July 29 – August 3, 2018.
- Conrad, A.**, Yu, J., Staton, M., Audergon, J.M., Decroocq, V., Knagge, K., Chen, H., Zhebentyayeva, T., Liu, Zongrang, L., Dardick, C., Nelson, C.D., and Abbott, A.G. Genomic analysis of the endodormancy-ecodormancy transition (EET) in trees. Forest Tree Workshop, Plant & Animal Genome XXVI. San Diego, CA, January 13 – 17, 2018.
- Conrad, A.**, Westbrook, J, Zhebentyayeva, T., Rodriguez-Saona, L., Bonello, P., James, J., Jeffers, S., Sisco, P., Hebard, F., Georgi, L., Staton, M, Audergon, J-M, Decroocq, V., Liu, Z.,

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- Dardick, C., Nelson, C.D., and Abbot, A. Metabolomics approaches for tracking biotic and abiotic stress performance in tree improvement programs. 34th Southern Forest Tree Improvement Conference, Melbourne, FL, June 19 – 22, 2017.
- Conrad, A.O.**, Abbott, A., Nelson, C.D., Westbrook, J., Zhebentyayeva, T., Jeffers, S., Bonello, P., Rodriguez-Saona, L., Sisco, P., and James, J. Chemical fingerprinting: An alternative approach for screening hybrid chestnut for disease resistance. NE-1333 Annual Meeting, Syracuse, NY, September 30 – October 1, 2016.
- Conrad, A.O.**, Rodriguez-Saona, L., McPherson, B., Wood, D., and Bonello, P. Alternative approaches for phenotyping trees for disease resistance. Northern Forest Genetics Association Meeting, Martinsville, IN, July 14 – 16, 2015.
- ***Conrad, A.O.**, Rodriguez-Saona, L., McPherson, B., Wood, D., and Bonello, P. New approaches to assess coast live oak resistance before infection by the invasive pathogen *Phytophthora ramorum*. American Phytopathological Society and Canadian Phytopathological Society Joint Meeting, Minneapolis, MN, August 9 – 13, 2014.
- Conrad, A.**, McPherson, B., Wood, D., Opiyo, S., Mori, S., and Bonello, P. Potential Biomarkers of resistance to *Phytophthora ramorum* in coast live oak. 18th Ornamental Workshop on Diseases and Pests, Hendersonville, NC, September 24 – 28, 2012.
- Conrad, A.**, McPherson, B., Wood, D., Opiyo, S., Mori, S., and Bonello, P. Metabolite profiling to predict resistance to *Phytophthora ramorum* in natural populations of coast live oak. Sudden Oak Death Fifth Science Symposium, Petaluma, CA, June 19 – 22, 2012.

*Invited presentation.

Poster Presentations

- Conrad, A.O.**, Jones, M., Willie, K., Massawe, D., Stewart, L., and Bonello, P. Early detection of maize dwarf mosaic using near-infrared spectroscopy. Poster presentation at Plant Health 2020. August 10th – 14th, 2020.
- Conrad, A.**, Sniezko, R., Rodriguez-Saona, L., and Bonello, P. Application of chemical fingerprinting as a tool to screen trees for resistance against invasive and non-native pathogens. Poster presentation at the USDA Interagency Forum on Invasive Species. Annapolis, MD, January 9 – 12, 2018.
- Conrad, A.**, Crocker, E., Thomas, W., Li, X., Ochuodo, T., Holmes, T., and Nelson, C.D. Delphi expert opinion survey to assess threats to oaks in the eastern United States. Poster presentation at Oak Symposium, Knoxville TN, October 24, 2017, 100 people.
- Conrad, A.O.**, Zhebentyayeva, T., Staton, M., Audergon, J.M., Decroocq, V., Liu, Z., Dardick, C.D., Nelson, C.D., and Abbott, A. Variation in phenylpropanoid intermediates associated with adaptation to abiotic stress in the perennial tree species *Prunus persica* and *P. armeniaca*. American Phytopathological Society Annual Meeting, San Antonio, TX, August 5 – 9, 2017.
- Conrad, A.O.**, Westbrook, J. Zhebentyayeva, T., Rodriguez-Saona, L., Bonello, P., Nelson, C.D., and Abbott, A. Evaluating chemical fingerprinting as a tool to rapidly screen hybrid chestnut for resistance to pathogens. American Phytopathological Society Annual Meeting, Tampa, FL, July 30 – August 3, 2016.
- Conrad, A.O.**, Nelson, C.D., Abbott, A., and Bonello, P. Chemical fingerprinting: An alternative approach for identifying disease resistant trees. Society of Postdoctoral Scholars Research Symposium, University of Kentucky, Lexington, KY, June 3, 2016.

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- Crocker, E.V., **Conrad, A.O.**, Li, X., Abbott, A.G., Stainback, G.A., Stringer, J.W., Nelson, C.D., and Baker, T.T. An interdisciplinary approach to address current and emerging threats to forest health. Society of American Foresters Meeting, Baton Rouge, LA, November 3 – 5, 2015.
- Villari, C., Snieszko, R.A., **Conrad, A.O.**, Rodriguez-Saona, L.E., and Bonello, P. New technology to fast-track finding genetic resistance to destructive pathogens: FT-IR spectroscopy. Society of American Foresters Meeting, Baton Rouge, LA, November 3 – 5, 2015.
- Conrad, A.O.**, Rodriguez-Saona, L., McPherson, B., Wood, D., and Bonello, P. FT-IR spectroscopy identifies coast live oak resistant to *Phytophthora ramorum* before infection. International Union of Forest Researcher Organizations XXIV World Congress, Salt Lake City, UT, October 5 – 11, 2014.
- Conrad, A.O.**, McPherson, B., Wood, D., and Bonello, P. Can constitutive phenolic biomarkers be used to predict coast live oak resistance to *Phytophthora ramorum*? American Phytopathological Society Annual Meeting, Austin, TX, August 10 – 14, 2013.
- Conrad, A.O.**, McPherson, B.A., Wood, D.L., Opiyo, S.O., and Bonello, P. Metabolite profiling to predict resistance to *Phytophthora ramorum* in natural populations of coast live oak. Fourth International Ecosummit, Columbus, OH, September 30 – October 5, 2012.
- Conrad, A.O.**, McPherson, B.A., Wood, D.L., Mori, S.R., Opiyo, S.O., and Bonello, P. Metabolite profiling to predict coast live oak resistance to *Phytophthora ramorum*. American Phytopathological Society North Central Division Annual Conference, Wooster, OH, June 13 – 15, 2012.
- Conrad, A.O.** and Horton, T.R. An initial survey of fungi in the cloud forests of Honduras with a focus on edibles. Mycological Society of America and Botanical Society of America Joint Annual Meeting, Snowbird, UT, July 25 – 29, 2009.

TEACHING EXPERIENCE

University of Georgia

Guest Lecturer, Forest Health Seminar Series, Spring 2019

University of Kentucky

Co-instructor, Introduction to Forest Health and Protection, Spring Field Semester, 2016, 2017

The Ohio State University

Guest Lecturer, Functional Biochemistry of Plant Defense, Autumn 2019

Guest Lecturer, Molds, Mushrooms, and Mankind, Spring 2019, Spring 2020

Guest Lecturer, Societal Impacts of Plant Disease, Spring 2013

Graduate Teaching Assistant, Diseases of Forest and Shade Trees, Winter 2012

Graduate Teaching assistant, General Plant Pathology, Fall 2011

Operation Wallacea, Cusuco National Park, Honduras

Co-instructor, DNA lab, June – July 2010

PROFESSIONAL SERVICE

Organizer, Forest Pathology Field Trip, Plant Health 2019

Chair, Forest Pathology Committee, American Phytopathological Society, 2018 – 2019

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Vice Chair, Forest Pathology Committee, American Phytopathological Society, 2017 – 2018

Ad Hoc Reviewer: Forest Pathology (2016 – present); Plant, Cell and Environment (2017 – present); Wood Science and Technology (2017); Plant Ecology (2018 – present); Forests (2018 – present); Canadian Journal of Forest Research (2018 – present); Tree Physiology (2019 – present); Plant Direct (2019 – present); Scientific Reports (2019 – present); Plant Disease (2019 – present)

Review Editor: Pests, Pathogens and Invasions, Frontiers in Forests and Global Change (2019 – present)

DEPARTMENTAL AND UNIVERSITY SERVICE

Organizing Committee, 10th Tripartite Workshop, The Ohio State University, 2018

Kowlett Seminar Series Organizer, The Ohio State University, 2018

Symposium Organizing Committee Member, Society of Postdoctoral Scholars, University of Kentucky, 2016 – 2017

Committee on Academic Misconduct, The Ohio State University, 2013 – 2015

Council of Graduate Students, The Ohio State University, 2013 – 2014

PROFESSIONAL AFFILIATIONS

American Phytopathological Society

OUTREACH PRESENTATIONS

Conrad, A.O. Early screening of chestnut hybrid seedlings for resistance to chestnut blight and Phytophthora root rot. Invited talk at a meeting of the Virginia Chapter of the American Chestnut Foundation, Genomics and American Chestnut Restoration: New Tools to Identify and Increase Disease Resistance. Blacksburg, VA, October 28, 2016.