



Newsletter



United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Volume: 2 Issue: 1 (February 2021)

Specialty Crop Research Initiative Project #: 2020-51181-32135

Highlight

Featured Research	1
Featured Extension	2
Extension Highlight	3
Project Meeting Brief	4
New Team Member	4
Collaboration Corner	4
Recent Publications	4
Project Directors	5
Advisory Panel	5

FEATURED RESEARCH

Observations Regarding the Value of Boxwood Sales from 2014 to 2019 by Charles Hall

The value of boxwood sales in the US increased from \$123.7 million in 2014 to \$140.9 million in 2019. The top three states included Oregon, California, and Ohio, representing almost 40% of total US sales. Collectively, New Jersey, Illinois, Virginia, North Carolina, Maryland, Florida, and Louisiana finish out the top ten states, representing another 33% of total boxwood sales. Though spread throughout the country, the top ten states represent about 73% of boxwood sales, a fairly high concentration ratio for the industry.

Of the total number of states reporting boxwood sales in the Census of Horticultural Specialties in 2019, 26 states have experienced positive verification of boxwood blight (BB), while 5 are listed as BB negative. Even with the existence of

boxwood blight, however, the value of boxwood sales has increased as indicated above. These data seem to indicate that boxwood remain a popular choice among today's gardening and landscaping consumers.

Comparing 2014 sales to 2019, 14 states experienced an increase in sales, with 11 of them BB-positive and the remaining 3 states BB-negative to date. Of these 14 states, 5 of them experienced an increase in sales of over \$2 million including OR (+17.1%), CA (+34.8%), FL (+69.7%), LA (+91.7%), and NJ (+34.9%). Of these, Louisiana is the only BB-free state to date. Sales in Ohio and Virginia both increased between \$1 million and \$2 million in sales, while 7 other states experienced sales increases of less than \$1 million. Interestingly, the 14 states that experienced an increase in their boxwood sales in 2019 represented 70.5% of the total value of boxwood sales in the US.

While 17 states experienced decreases in boxwood sales in 2019 compared to 2014, only 3 decreased by more than \$2 million, including Maryland, Connecticut, North Carolina. Tennessee also decreased, but only by \$1.8 million, while the remaining 13 states underwent decreases of less than \$1 million each. All 17 states experiencing decreases only represented 21.9% of the total boxwood market with 15 of the states BB-positive and 2 of them BB-negative.

There are 17 states for which sales are not reported in 2014, 2019, or both. These states are designated with "(D)" in the Census table to specify that these data were "withheld to avoid disclosing data for individual farms." In other words, firms were too few in number to guarantee anonymity. Given this, it is not evident whether sales increased or decreased in these respective states even if data is provided for 5 of the firms in 2019 (but not for 2014) and 4 of the firms in 2014 (but not in 2019). We simply cannot make the determination with only part of the data, particularly for the 8 states where data was withheld for both years. That being said, since we know there are 5 states with too few firms to report in 2014 but had data in 2019, then we know for sure they experienced an increase in the number of growers to pass the disclosure threshold. If it is further assumed that boxwood sales increased in those states as well, then these states could also be added to the number of increasing states above. These, along with their respective increases (in \$1,000), included Minnesota (+\$885), Iowa (+\$252), Idaho (+\$111), Utah (+\$29), and South Dakota (+\$2). South Dakota was BB-negative when the 2019 survey was done, while all other four states remain negative today.

Comparing the production among the states that have either increased or decreased boxwood sales as described above, Boxwood blight appears to have promulgated some shifts in the market as to where boxwood production and sales occur, with some production shifting to states that remained free of blight or have

RECENT DELIVERABLES (Dec 2020-Feb 2021)

Research

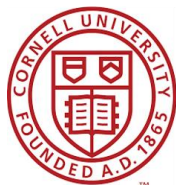
- 1 Research article
- 3 Conference proceedings articles
- 2 Seminars

Extension & Outreach

- 1 Recommendation/white paper
- 3 Webinars/virtual meetings
- 4 Extension presentations
- 23 Samples diagnosed
- 100 Email/phone inquiries answered
- 3612 People reached with research publications

Education

- 2 Postdoctoral associates
- 2 Graduate students



limited blight presence, particularly Texas, Louisiana, and Mississippi. The overriding conclusion from this analysis, however, is that boxwood remain a popular feature in US gardens and landscapes, thus it is imperative to have efficacious blight mitigation strategies at all levels of the green industry supply chain to ensure its landscape legacy in the future.

Antidesiccants as a Physical Barrier for Blight Mitigation by Chuan Hong

Antidesiccants or antitranspirants are widely used in the horticulture industry, public and private gardens to prevent transplant shock, water and drought stress, heat and sunburn, as well as damage caused by drying winds, rapid temperature variations, frost and freezing. These products form a thin, flexible film on the leaf surface that reduces moisture loss in plants during hostile climate conditions. These films could potentially be a physical barrier to protect boxwood from infection by the blight pathogen and prevent the pathogen spores produced on diseased tissues from dislodging and becoming inoculum for new infections.

To test the above hypothesis, two products registered for boxwood use and four registered for ornamental crop application were selected and evaluated for their potential to help manage boxwood blight under controlled environment conditions at a containment facility in Virginia Beach, VA. Three antidesiccants (TransFilm, Vapor Gard, and Wilt-Pruf) consistently provided excellent blight control on Justin Brouwers, a highly susceptible cultivar, if plants were treated before inoculation.

These products will be further evaluated under field conditions. If they provide the same level of boxwood protection without any negative impacts, these products could have much longer efficacy than most fungicides (3 to 4 months vs. 2 to 3 weeks). They are low-toxicity, thus will have smaller environmental footprint.



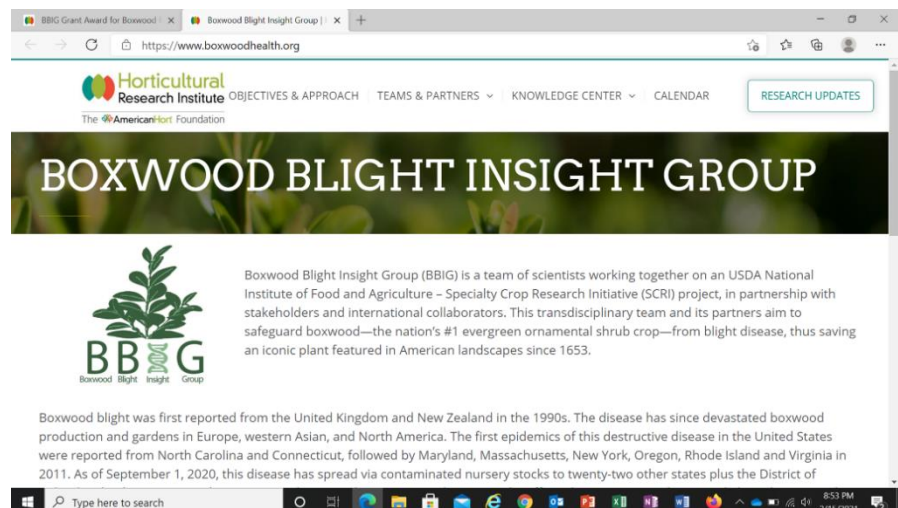
FEATURED EXTENSION AND OUTREACH

Beating Boxwood Blight Through Stakeholder Partnership and International Collaboration

The BBIG outreach website (<https://www.boxwoodhealth.org>) was released to the public on February 5, 2021. This website includes five major tabs – **Project Objectives & Approach**, **Teams & Partners**, **Knowledge Center**, **Calendar**, and **Research Updates**. In addition to sharing our vision and mission, who we are and who are our major stakeholder partners and international collaborators, educational materials are posted under the **Knowledge Center** tab. Current postings include: images showing diagnostic symptoms of this disease on boxwood, sweet box and pachysandras, and short videos illustrating how to scout for boxwood blight, and a next generation technology – manipulating boxwood microbiome to improve plant health and production. The image gallery should aid horticulturists and gardeners to recognize the blight disease while the Scouting video should increase the chance of early detection of this destructive disease. Educational events on boxwood blight mitigation will be marked on the **Calendar**, while this newsletter and research publications as well as press releases about this project will be posted under **Research Updates** tab.

This website is the first result of our partnership with AmericanHort and its affiliate – Horticultural Research Institute (HRI). HRI is hosting this website and will maintain and update as new materials become available to best serve the horticulture industry and the public throughout the project period and beyond. The AmericanHort and HRI also are hosting our **International**

Boxwood Seminar series. This series is coordinated by the BBIG Extension/Outreach Leader, Margery Daughtrey of Cornell University, in liaison with Jennifer Gray of HRI, Programs Administrator. The seminar series is set to launch on March 18, 2021 with the first presentation by Dr. Thomas Brand, Department Head of Ornamental Plant Cultivation, Tree Nurseries, Public Greenery @ Chamber of Agriculture of Lower Saxony, Germany. Dr. Brand will share his 15-year love-hate relationship with boxwood blight.



This seminar series will be held virtually via Zoom. This educational series is free of charge although pre-registration at <http://bit.ly/3rrnWxu> is required. If you have not registered yet, it's time to do so. You do not want to miss hard-to-find unique educational events like this series.

EXTENSION HIGHLIGHT by Margery Daughtrey

The new BBIG web site hosted by the Horticultural Research Institute of AmericanHort (launched Feb 2021) provides a very visible and accessible place for our BBIG Newsletters to be found. Bookmark www.hriresearch.org or www.boxwoodhealth.org for easy access. The home page gives the vision and mission statement for our research and extension efforts for the horticulture industry, and a click onto RESEARCH UPDATES will feature the latest in boxwood research. Volume 1, No. 1 of the newsletter is already posted at the site, and also a special scouting video developed by Jay Pscheidt and Jerry Weiland (Oregon State University and USDA in collaboration). The current video is in English; watch for a Spanish version to come in the near future.

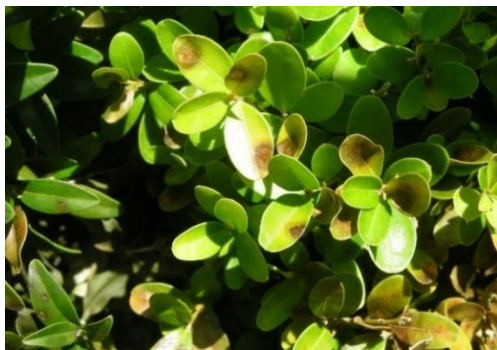
Even in a pandemic year, the winter season is a time for landscapers, arborists and growers to come together for continuing education. Boxwood blight was featured in many virtual presentations by BBIG members in December, January and February. A virtual short course in Middle Tennessee reached 120 nursery and landscape professionals (Fulya Baysal-Gurel). A day-long boxwood health workshop was held in Oregon (Jay Pscheidt, Luisa Santamaria, Jerry Weiland). An interactive webinar presenting boxwood blight diagnostics in Spanish is planned for March 2 in Oregon and a poster on bilingual education on best management practices for boxwood blight was presented at the Oregon State University Annual Extension Conference (Luisa Santamaria). Digital Diagnosis (including boxwood blight education) was the topic for a Zoom presentation to 140 Washington County, Washington Master Gardeners that was recorded for future viewing (Jay Pscheidt).

Boxwood blight ID and management were presented at Chesapeake Green in Maryland and to the Connecticut Department of Environmental Protection in February (Jim LaMondia), reaching over 100 nurserymen, landscapers and regulatory personnel. Boxwood blight was also the topic for 120 attendees at a New York State Nursery and Landscape Association webinar, 40 at the Nursery/Landscape session of the Long Island Agricultural Forum, and 25 at a meeting of the Horticultural Alliance of the Hamptons (Margery Daughtrey). A presentation was also delivered in the newly established Ornamentals/Nursery track at the 66th New Jersey Annual Vegetable Meeting hosted by Rutgers University (Chuan Hong).

A report on evaluation of fungicides for boxwood blight in Tennessee was submitted to *Plant Disease Management Reports* (PDMR) by Fulya Baysal-Gurel, and this information is also published in the *Tennessee State Woody Ornamental Disease Management Research Reports*. Nina Shishkoff, Jo Anne Crouch and collaborators at NC State also have a report that will be in the next edition of PDMR, "Evaluation of boxwood cultivars for resistance to boxwood blight, 2020," which separately categorizes performance in terms of leaf spots, stem cankers and defoliation. An article entitled 'Scouting for boxwood blight appeared in *Digger* 64(3):25-28, as part of the OSU Growing Knowledge Series (Jay Pscheidt and Jerry Weiland).

A special session on boxwood blight is planned for Cultivate'21 in Columbus, Ohio in July. Chuan Hong, Fred Gouker, Jim LaMondia and Len Coop are working with Jennifer Gray of HRI to plan this live event, which will showcase knowledge from BBIG.

The International Seminar Series will produce its first webinar on March 18, from 1-2 pm, when Dr. Thomas Brand will be presenting on boxwood blight experience from the point of view of gardeners and researchers in Germany, where the disease has been known for 15 years. HRI has kindly agreed to assist us in hosting and advertising this webinar series. Many thanks to HRI/AmericanHort for putting out a press release to announce the Boxwood SCRI project, launch the new website, and publicize the International Seminar Series! You can read the press release here:



<https://www.greenhousegrower.com/production/boxwood-blight-gets-new-research-focus-in-2021/>. In December, American Farm Publications also did a great announcement about our Boxwood Blight project funded by NIFA through the SCRI program, which you can read here: <https://americanfarmpublications.com/universities-unite-to-knock-out-boxwood-blight/>.

Diagnostic Character of Boxwood Blight by Margery Daughtrey

Leaf spots on *Buxus* sp. caused by *Calonectria pseudonaviculata*. Note that the spots have a diffuse rather than sharp outline. Circular spots with

a tan center surrounded by a diffuse black border are one of the many ways boxwood blight can present itself.

PROJECT MEETING BRIEF

In addition to the Extension/Outreach meetings reported above, the Leadership team: Doug Luster, Margery Daughtrey, and Chuan Hong met on the second Tuesday of each month – December 15, 2020, January 19 and February 16, 2021, discussing project progress, planning project-wide activities, reviewing individual teams' quarterly progress reports, and preparing this issue of the BBIG Newsletter.

The two most important meetings of the quarter were: 1) All Project Directors and their associates met with the Advisory Panel members on December 4, 2020, reporting the project progress for the first 3 months and soliciting their feedback, and 2) Xiaoping Li, Postdoctoral Microbiome Scientist, presented a seminar entitled: Plant microbiome and how to study it using high throughput DNA sequencing, to the team including Project Directors, their associates and some Advisory Panel members, plus several invited colleagues across the country from New Hampshire to Georgia. The recording of this seminar is posted at <https://www.boxwoodhealth.org/knowledge-center> to share with like-minded. This seminar was a great success and has become an inaugural presentation of a new seminar series focusing on the Project Team's capacity-building.

NEW TEAM MEMBER



Dr. Srikanth Kodati joined Dr. LaMondia's research group at Valley Laboratory of Connecticut Agricultural Experiment Station in Windsor as a Postdoctoral Scientist in March 2020. His research focuses on understanding the factors influencing the development, spread, and management of boxwood blight. He received his doctoral degree from University of Nebraska-Lincoln studying the diversity and pathogenicity of *Rhizoctonia* spp. from different plant hosts in Nebraska.

Dr. Mana Ohkura joined the BBIG project as a postdoctoral scholar in the Weiland lab at Oregon State University. Mana completed her MS at Cornell University and PhD at the University of Arizona where she gained training in plant pathology, bioinformatics, and genetics. Prior to Oregon State University, she worked as a postdoctoral researcher at the University of Arizona on a vaccine development project for Valley Fever where she studied the biology of the live-attenuated vaccine candidate using transcriptomics and comparative genomics.

Mana's focus on the boxwood blight project is to develop a sampling strategy that allows identification of diseased plants in large nursery settings where scouting can be very labor intensive. Developing an effective sampling strategy for boxwood blight would facilitate early detection of the disease and prevent large outbreaks from occurring. She is also investigating how different variables in the nursery environment can facilitate the spread of the boxwood blight pathogen from plant to plant.



COLLABORATION CORNER

North Carolina Department of Agriculture and Consumer Services (NCDA&CS) has joined the project recently to help identify fields suitable for evaluating selected antidesiccants and biological control agents – a critical step to move research and innovations from lab to field. Key collaborators included Dr. Hsien Tzer Tseng, State Plant Pathologist, Chad Taylor, Western Region Field Supervisor and Ginger Hemmings, Plant Pest Specialist. They, along with Amanda Taylor, a Nursery Specialist with NC Cooperative Extension – Western Region, met with Chuan Hong at Virginia Tech in the region on February 10, 2021, visiting several fields currently under box blight quarantine and identifying one with good-sized boxwood plants and a reasonable level of blight in a relatively isolated area for both trials.

RECENT PUBLICATION

Baysal-Gurel, F., Jennings, C., Simmons, T. Evaluation of fungicides for the control of boxwood blight, 2020. Plant Disease Management Report No. 15:OT002. Online publication. The American Phytopathological Society, St. Paul, MN.

PROJECT DIRECTORS

Chuan Hong (Project Director), Virginia Tech, Virginia Beach, VA
Margery Daughtrey (Extension Leader), Cornell University, Riverhead, NY
Douglas Luster (Research Leader), USDA ARS Foreign Disease & Weed Science Research, Ft Detrick, MD
Charles Hall, Texas A&M University, College Station, TX
Jerry Weiland, USDA ARS Horticultural Crop Research Lab, Corvallis, OR
Fulya Baysal-Gurel, Tennessee State University, McMinnville, TN
Fred Gouker, USDA ARS Floral & Nursery Plants Research, Beltsville, MD
Ping Kong, Virginia Tech, Virginia Beach, VA
Jo Anne Crouch, USDA ARS Mycology & Nematology Genetic Diversity and Biology Lab, Beltsville, MD
James LaMondia, Connecticut Agricultural Experiment Station, Windsor, CT
Jay Pscheidt, Oregon State University, Corvallis, OR
Luisa Santamaria, Oregon State University, Aurora, OR
Nina Shishkoff, USDA ARS Foreign Disease & Weed Science Research, Ft Detrick, MD
Karen Snover-Clift, Cornell University, Ithaca, NY

ADVISORY PANEL AND LIAISON TO AMERICANHORT

Jill Calabro (Chair), Sr Product Development Manager, Valent USA Corporation, Walnut Creek, CA
Lynn Batdorf, Boxwood Cultivar Registration Authority, International Society for Horticultural Science
Frank Collier, Owner, Pleasant Cove Nursery, Rock Island, TN
Michael Gaines, President, CW Arborists, Ltd., Sagaponack, NY
John Keller, Planning & Research Vice President, Monrovia – Grow Beautifully in CA, CT, GA, OR
Bennett Saunders, General Manager, Saunders Genetics, LLC., Piney River, VA
Richard Schnall, Vice President, Rosedale Nurseries, Inc., Hawthorne, NY
Casey Sclar, Executive Director, American Public Gardens Association, Kennett Square, PA
Mark Sellew, Owner, Prides Corner Farms, Lebanon, CT
Martha Sleeper, Plant Health Manager, Hines Growers, Forest Grove, OR
Jennifer Gray (Liaison to AmericanHort), Administrator, Horticultural Research Institute, Washington, DC

DISCLAIMER

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture.