

FEATURED NEWS

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DELIVERABLES

(March to May 2023)

Research

- 2 Dissertations
- 3 Refereed journal articles
- 7 Conference proceedings

Extension & Outreach

- 3 Trade journal articles
- 6 Extension presentations
- 37 Samples diagnosed
- 51 Email/phone inquiries answered
- 6844 People reached with articles/news

Education

- 4 Postdoctoral associates
- 3 Graduate students
- 2 Interns

NewGen Boxwood® - Beautiful Plants, Backed by Research by Holly Scoggins Ph.D., Program Manager, and Bennett Saunders, General Manager, Saunders Genetics LLC, Piney River, VA

Saunders Brothers Inc., located in central Virginia, has been conducting in-house research since 2008 on boxwood cultivar susceptibility to boxwood leafminer (*Monarthropalpus flavus*) and since 2015 on boxwood blight (*Calonectria pseudonaviculata*). Saunders Genetics was formed in 2018 to expand those trials as part of our breeding and introduction program. Potential selections must also have that “WOW factor” – simply beautiful plants - both on the retail bench and in the landscape. Two excellent performers from these trials were introduced in 2020 under the NewGen® Boxwood brand, with additional selections on the way.

NewGen Independence® (*B. microphylla* ‘SB 108’^{PP28888}) serves up classic boxwood beauty with glossy, deep green foliage that holds excellent color throughout the winter. This medium-sized cultivar has a rounded habit and mature size similar to ‘Green Beauty’ but with better boxwood leafminer resistance. NewGen Independence® forms the backbone/structure of the White House Rose Garden and is already in high demand by landscape designers. The branching structure is strong and holds up under moderate snow load. NewGen Independence® should be pruned lightly in late winter to early spring to maintain a uniform shape. Cold hardy to USDA Zone 5b, it’s best for the milder “boxwood belt,” as an early or extreme drop in temperature can damage any relatively new foliage. These burned shoots can be removed in late fall after the first freeze, or in late winter/early spring



Formal, classic globes of NewGen Independence® compliment the summer blooms of Oakleaf hydrangea

depending on the gardener’s preference.

NewGen Freedom® (*B. sinica* ‘SB 300’^{PP32421}) is a vigorous boxwood featuring rounded, glossy green foliage. The habit of NewGen Freedom® is more uniform and tighter than ‘Wintergreen’ or ‘Winter Gem’ making it an excellent choice for formal or residential landscapes. Hardy to USDA Zone 5, it works well as a foundation plant, hedge, or specimen, reaching 4’ tall by 3.5’ wide in 15 years. For our licensed growers, it is easy to propagate and relatively quick to reach sale size. With all that vigor comes some specific production and landscape requirements, including pruning and soil fertility. Prune/shear at minimum once per year (late winter to early spring) to encourage branching. A second pruning in mid-summer can be helpful as well. If left



NewGen Freedom is a beautiful and versatile choice for the landscape

unpruned, branches may flop a bit under snow load or in heavy rain. NewGen Freedom® that are nitrogen-deficient and/or drought-stressed are more apt to take on bronze-to-orange cast in winter. The application of a good controlled-release fertilizer in late winter/early spring is very helpful. Do not use fertilizer products intended for acid-loving plants as the desired soil pH range for boxwood is 6.5-7.2. Some protection from wintertime full-sun exposure and high winds can help limit discoloration of any boxwood prone to bronzing. We encourage proper care as a critical tool in the fight against blight, including spacing plants to ensure good air movement and applying a light layer of mulch annually. Visit Newgenboxwood.com for more information on our exclusive varieties plus extensive planting and care information developed over decades of experience by the Saunders family.

FEATURED RESEARCH

Boxwood blight scouting in nurseries and pathogen detection using moist chambers and qPCR
by Jerry Weiland and Mana Ohkura, USDA ARS Horticultural Crops Disease and Pest Management Research Unit, Corvallis, OR

Sampling for boxwood blight can be difficult, especially if symptoms are mild. Symptoms are easiest to find when conditions have been consistently humid, wet, and above 55-60F (13-15C). They are hardest to find after extensive periods of drought and heat. It is important to know what boxwood blight symptoms look like and how they differ from other common diseases, such as Phytophthora root rot or Volutella blight. For boxwood blight, look for fallen leaves, bare branches with black lesions, and for blighted leaves and leaf spots. Focus efforts on areas of the nursery where moisture and humidity remain high (near sprinkler heads, mist benches, shaded locations, next to taller plants) and on parts of the plant that stay wet for longer periods of time (low or interior branches). Symptoms are not always apparent from a few feet away, so it is important to get close to the plants. To confirm the presence of the boxwood blight pathogen, place symptomatic plant tissues in moist chambers. The characteristic, crystalline-appearing spores usually appear within 3-7 days. This method is simple, cost effective, and works well for the majority of the samples we collect. However, when the crop is sprayed with fungicides, sporulation can take 2 weeks or longer. Additionally, other fungi sporulate on dead tissues, which may obscure the presence of the boxwood blight pathogen. To overcome these challenges, we developed a DNA extraction protocol and qPCR assay to detect the boxwood blight pathogen more quickly. The DNA extraction protocol is able to accommodate relatively large volumes of plant tissue in comparison to DNA extraction kits, allowing us to screen many leaves at a time.



Newly planted 1-gallon containers of boxwood



Mild symptoms of boxwood blight discovered during scouting

EXTENSION HIGHLIGHTS

The BBIG community has been working together to enable first responders to scout for boxwood blight and detect the causal agent – *Calonectria pseudonaviculata* (*Cps*) with confidence. Specifically, **Stefanie Rhodes**, Lab Scientist of Michigan Department of Agriculture & Rural Development (MDARD), **Devin Bily**, Plant Pathologist of Virginia Department of Agriculture and Consumer Services, and **Xiao Yang**, Diagnostician and Manager of Plant Pest Diagnostic Clinic at Clemson University, joined the discussion led by two BBIG Scientists - **Jerry Weiland** and **Mana Ohkura** - during a quarterly project director/associate meeting on May 17, 2023. Other major contributors to this discussion included **Samantha Fieweger**, Director of Plant Industry Bureau Laboratory at Wisconsin Department of Agriculture, Trade, and Consumer Protection, and **Elizabeth Dorman**, Manager of the MDARD Plant Pathology Laboratory. One important outcome of this discussion was formation of a task force spearheaded by Jerry Weiland to continue the discussion and collectively develop it into a protocol for boxwood blight scouting and *Cps* detection from plant tissues.

PROJECT MEETING BRIEF

Two monthly **Project Leadership Team Meetings** were held on March 8 and April 28, 2023, respectively. At the March meeting, a range of topics were discussed and decisions made. Among the most important was a decision to feature cultivars that are most resistant to boxwood blight in this and upcoming issues of the BBIG Newsletter. The feature articles give details on how to grow and care for some of the most resistant cultivars in hope of promoting their adoption at production and landscape levels. Both March and April meetings discussed the potential topics and presenters for a new webinar series focusing on what we have learned and developed through this project.

The **Boxwood Microbiome Team** met on May 16, 2023 via Zoom, sharing the results of sampling four cultivars in two geographically and climatically distinct regions (Oregon and Virginia) and at three times (May, August and November) in 2021, and discussing the core taxa identified from these cultivars and their potential links to boxwood blight susceptibility.

ANNOUNCEMENTS

Congratulations to **Margery Daughtrey** and **Gabriel Sacher** on successfully defending their PhD theses at Cornell University on April 26, 2023 and Oregon State University on May 24, 2023, respectively.

Congratulations to **Jay Pscheidt** on the [2023 Excellence in Extension Award](#) from the American Phytopathological Society.

Gloria Chen, a junior at Perkiomen School in Pennsburg, PA, joined the Boxwood Microbiome Team at Virginia Tech as an intern in November of 2022. With her prior experience in plant microbiome research, Gloria delves into metagenomics data of the boxwood and associated soil samples collected from Oregon and Virginia in 2021. Specifically, her analyses examine and compare the bacterial and fungal diversity among four boxwood cultivars, two climatically distinct states/locations, and three sampling times, contributing to the identification of core taxa in the boxwood microbiome and the assessment of climatic and cultural impacts on bacterial and fungal communities.



RECENT PUBLICATIONS

Dissertations

- Daughtrey, M. L. 2023. Invasive exotic diseases on dogwood, boxwood and impatiens in the United States. Cornell University. May 2023.

- Sacher, G. O. 2023. Diseases of rhododendron and boxwood: survey and virulence of Phytophthora root rot and management of boxwood blight with systemic fungicides. Oregon State University. May 2023.

Refereed Journal Articles

- Ghimire, B., Parajuli, M., Liyanapathirana, P., Simmons, T., and Baysal-Gurel, F. 2023. Evaluation of fungicides and antitranspirant for the control of boxwood blight, 2022. Plant Disease Management Report No. 17:OT018.
<https://www.plantmanagementnetwork.org/pub/trial/pdmr/reports/2023/OT018.pdf>.
- Hong, C. X. 2023. Building health into new boxwood crops and plantings by making informed cultivar selection. Plant Health Progress, Abstract at <https://apsjournals.apsnet.org/doi/10.1094/PHP-01-23-0002-RV>.
- Li, X. P., Tseng, H. T., Omolehin, O., Hemmings, G., Taylor, C., Taylor, A., Kong, P., Daughtrey, M. L., Gouker, F., and Hong, C. X. 2023. Characterization of boxwood shoot bacterial communities and potential impact from fungicide treatments. Microbiology Spectrum ([open access](#)).

Newsletter and Trade Journal Articles

- Hong, C. X. 2023. Boxwood blight – an emerging disease that keeps landscapers and gardeners awake at night. [Virginia Turfgrass Journal \(March/April\):24-26](#).
- Hong, C. X. 2023. BBIG Team met in the boxwood country – Oregon. Phytopathology News 57(5):11-12.
- Pscheidt, J. W. 2023. Boxwood (*Buxus* spp.) – Boxwood Blight. [Pacific Northwest Plant Disease Management Handbook](#).

RECENT PRESENTATIONS

At Professional Conferences, Seminars or Webinars

- Daughtrey, M. L. 2023. Invasive exotic diseases on dogwood, boxwood, and impatiens in the United States. Cornell University, by Zoom, April 26.
- Ghimire, B., Liyanage, K., Hall, C., Pendyala, B., Patras, A., and Baysal-Gurel, F. 2023. An investigation on nursery growers' perception of boxwood blight disease and assessment of efficacy of its management using chemical and innovative alternative approaches. 45th Tennessee State University (TSU)-wide Annual Research Symposium. March 27-31.
- Hong, C. X. 2023. Antidesiccants for boxwood blight management in gardens and public spaces. The 79th Annual Meeting of American Phytopathological Society (APS) – Potomac Division. Fairfax, VA, March 22 to 24.
- Liyanage, K., Ghimire, B., Hall, C., Baysal-Gurel, F. 2023. Economic impact and management of boxwood blight disease in the U.S. Nursery Industry. 45th TSU University-wide Annual Research Symposium. March 27-31.
- Ohkura, M., Scagel, C. F., and Weiland, J.E. 2023. The effect of host volatiles on spore germination of *Calonectria pseudonaviculata*, the causal agent of boxwood blight. 2023 Annual Meeting of the APS Pacific Division. Tucson, AZ, March 13 to 16.
- Olsson, A., Shishkoff, N., and Smallwood, E. 2023. Effect of relative humidity on disease severity and sporulation of fungal pathogens *Calonectria pseudonaviculata* and *C. henricotiae*. The 79th Annual Meeting of APS Potomac Division. Fairfax, VA, March 22 to 24.
- Sacher, G. O. 2023. Diseases of rhododendron and boxwood: survey and virulence of Phytophthora root rot and management of boxwood blight with systemic fungicides. Oregon State University, In a hybrid format, May 23.

At Extension and Outreach Programs

- Baysal-Gurel, F. 2023. Boxwood blight disease management. Nashville Lawn & Garden Show. in Nashville, TN, March 2.

- Baysal-Gurel, F. 2023. Dealing with boxwood diseases in the landscape. Warren County Master Gardener's Class. McMinnville, TN. April 6.
- Baysal-Gurel, F. 2023. Dealing with diseases in the landscape. TEMG Intern Training. Virtual presentation. March 28.
- Daughtrey, M. 2023. Diseases update. New York State Nursery and Landscape Association. Virtual. March 9.
- Daughtrey, M. 2023. Diseases after drought and diseases after rain. Long Island Horticulture Conference. Brookhaven National Laboratory, Upton, NY. March 9.
- Daughtrey, M. 2023. Tree and shrub diseases coming in 2023. Urban Forestry Today. University of Massachusetts. Virtual. March 16.

PROJECT DIRECTORS

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 Karen Snover-Clift, Cornell University, Ithaca, NY

ADVISORY PANEL & 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
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 Laura Gladwin, Plant Health Manager, Everde Growers, Forest Grove, OR
 John Keller, Planning & Research Vice President, Monrovia – Grow Beautifully in CA, CT, GA, OR
 Bennett Saunders, General Manager, Saunders Genetics, LLC., Piney River, VA
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