

# GROWING KNOWLEDGE

Series content is coordinated by Dr. Jay Pscheidt, professor of botany and plant pathology at Oregon State University in Corvallis, Oregon.



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Figure 1: Layout of the spacing and irrigation experiment at North Willamette Research Extension Center (plants spaced 6 inches apart in the foreground and 0 inches apart in the center of the photograph). PHOTO COURTESY OF OREGON STATE UNIVERSITY

## Call it ‘herbal distancing’

Research shows that spacing out boxwood shrubs in production prevents the spread of infectious spores

BY MANA OHKURA, LLOYD NACKLEY, CAROLYN SCAGEL AND JERRY E. WEILAND

IT'S BEEN A YEAR and a half since the COVID-19 pandemic started. We have been hearing how social distancing prevents the spread of the virus and we see signs everywhere indicating we should stay at least 6 feet apart.

It turns out, social distancing may work to keep boxwood blight from spreading in your nursery too.

Wait a minute — boxwood plants can't move, and they don't reach out for hugs!

Well, they are often grown tightly packed together with branches overlapping each other, so let's say they're as close as holding hands.

In this study, we share results from a recent experiment where we grew boxwood plants either packed tightly together or spaced further apart under different irrigation frequencies to see how that impacted the spread of boxwood blight from infected plants to healthy plants.

### Boxwood blight

Boxwood blight has caused large losses to the nursery industry in Oregon since it was detected in the state in 2011. The disease is caused by a fungus, *Calonectria pseudonaviculata*. The pathogen causes leaf spots, stem lesions, and



**Figure 2:** Configuration of plants within each plot. **Left:** A 6-inch spacing plot. **Right:** A 0-inch spacing plot. Each plot contains 49 plants boxwood plants arranged in a 7 × 7 grid with the center plant inoculated with spores of the boxwood blight pathogen.

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significant defoliation (To learn more about boxwood blight symptoms, read “Scouting for boxwood blight” by Jerry Weiland at [www.diggermagazine.com/scouting-for-boxwood-blight](http://www.diggermagazine.com/scouting-for-boxwood-blight)).

It’s a stealthy disease that can be difficult to notice until an outbreak occurs. Symptoms start on lower parts of the canopy that are easily missed unless you are bending over to look for them. In addition, during dry or cold weather, symptoms can be mild with spots on just a few leaves that can be easily overlooked as mild defoliation that mimics general plant

stress. Symptoms can also be masked by soil or substrate that has splashed onto the leaves.

Difficulty in disease detection may result in infected plants unknowingly being shipped between nurseries and to customers throughout the country.

Boxwood blight occurs when the spores of the pathogen land and infect any above-ground portion of the plant. The pathogen also produces survival structures, known as microsclerotia. Microsclerotia overwinter in the soil or on plant debris and produce infectious spores when condi-

tions are favorable (warm and wet).

A recent study showed that spores of the pathogen, which are produced in sticky masses, are not windborne, but splash dispersed. A sporulating leaf does not release spores when air blows over it. Instead, spores are only dislodged when water droplets displace them.

On the one hand, this is good news, because it suggests that the pathogen is unlikely to be transported through the air to distant plants or nurseries. On the other hand, if rain occurs during warmer weather or if the plants are irrigated frequently, those conditions could accelerate the spread of the disease. It could also mean that if plants are grown tightly packed together, neighboring plants could easily be infected when water droplets containing spores splash from one plant to its neighbors. >>

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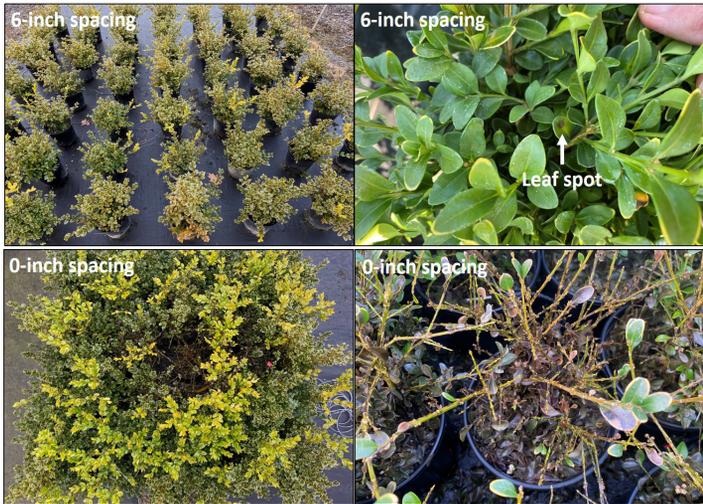
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## Call it 'herbal distancing'

**Figure 3:** Comparison of 6-inch spacing and 0-inch spacing plots in November 2020. **Top left:** A 6-inch spacing plot with infrequent, barely noticeable symptoms of boxwood blight. **Top right:** A close-up of the inoculated center plant in a 6-inch spacing plot with only one leaf spot. **Bottom left:** A 0-inch spacing plot with significant defoliation of the inoculated center plant and adjacent plants caused by boxwood blight. **Bottom right:** A close-up of the inoculated center plant in a 0-inch spacing plot with significant defoliation and dark leaf spots on the center plant and its adjacent plants. PHOTO COURTESY OF OREGON STATE UNIVERSITY



### The spacing and irrigation experiment

We used the susceptible boxwood cultivar 'Green Velvet', grown in 1-gallon pots that were spaced either 6 or 0 inches apart (Figure 2) and overhead irrigated once, twice, or three times a day while keeping the total volume of water applied the same for each of the three irrigation treatments.

Healthy plants for each treatment were arranged in a seven by seven grid with an inoculated plant placed in the center of the grid (49 plants per grid; Figure 2). Center plants were inoculated in mid-July and boxwood blight symptoms developed on these plants one week later. We assessed the development and spread of boxwood blight from inoculated plants to healthy plants over 8 months.

At the 6-inch spacing, initial symptoms on inoculated plants were mild regardless of irrigation frequency ( $\leq 5\%$  of canopy with very few leaf spots or stem

lesions) and the disease did not increase in severity or spread to healthy plants for the duration of the study (Figure 3). However, at the 0-inch spacing, initial symptoms were more severe ( $\geq 35\%$  of canopy with abundant leaf spots and stem lesions) and the disease spread to adjacent healthy plants over the 8 months, with generally greater disease severity and faster spread observed at higher irrigation frequencies. Thus, increasing plant spacing and reducing irrigation frequency could potentially mitigate further spread of boxwood blight if the disease is present in a nursery.

### Summary

Our experiment shows that growing boxwood plants under tight spacing accelerates disease spread when coupled with frequent overhead irrigation. On the flip side, it demonstrates how the spread of boxwood blight may be reduced if the plants are spaced further apart.

To maximize space use, most nurseries would prefer to grow plants tightly packed together. However, once boxwood blight is present in the nursery, keeping the plants 6

inches apart could limit disease spread.

If overhead irrigation is being used, reducing the frequency of irrigation also reduces the spread of boxwood blight. Although the boxwood blight spores are splash dispersed unlike the COVID-19 virus that is airborne, we found that social distancing works for boxwood blight, too. ☺

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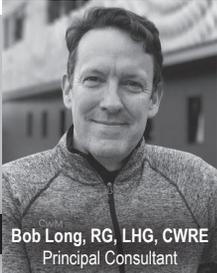
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