

## Precision irrigation in nursery using wireless tensiometers

Water conservation is increasingly becoming a priority in nursery plant production in the face of growing concerns about availability, cost, and environmental impacts.

To let nursery plant growers reduce water consumption, Université Laval researcher Dr. Charles Goulet is leading a project that will help with making irrigation decisions and ensuring the right amount of water gets to plants at the right time for optimal growth.

He is evaluating the use of wireless tensiometers for precision irrigation in nursery settings, as well as establishing optimal irrigation levels for various species or groups of nursery plant species.

This includes creating clusters of species with similar water needs during a growing season so growers can

avoid overwatering species that would need less water without having to monitor tensiometers in every species.

A tensiometer precisely measures the amount of water in the soil that is available to plants. Resulting data can be sent to growers via mobile phone, creating real-time moisture monitoring and allowing growers to turn irrigation systems on and off in direct response to plant needs.

The project is evaluating four irrigation thresholds from -3 kPa to -12 kPa spanning a range from a lot to very little available water – but not enough to cause damage in most plant species.



Water meters measuring the volume of water used.



Experimental setup for one species.



Tensiometer probe monitoring soil moisture.



The experiment was performed in a tunnel to perfectly control irrigation.



Ten reference species were used in the first phase of the project.

In the first year, four thresholds were evaluated with five perennials and five shrubs that have different water needs and represent some of the most important nursery species: *Hosta*, *Astilbe arendsii*, *Echinacea purpurea*, *Sedum spectabile*, *Hemerocallis*, *Physocarpus opulifolius*, *Spiraea japonica*, *Hydrangea paniculata*, *Euonymus alatus*, and *Thuja occidentalis*.

Most plants showed no major damage at the end of the season. However, the optimal irrigation threshold was different for each species. For example, *Euonymus* showed most optimal growth at -9 kPa while the *Astilbe* grew the best at -6 kPa.

Because water use at each threshold varies greatly between species – at -3 kPa, *Astilbe* will receive about 80 litres during a season compared to *Euonymus*, which would receive approximately 17 litres during that same time – finding the best clustering is important.

In subsequent project years, Goulet and his team will look for the best clustering options for a wide range of species and compare four different irrigation strategies in a commercial nursery setting.

## Why is this project important to the ornamental horticulture industry?

This research will enable nursery growers to reduce their water consumption, which minimizes impacts on the environment and helps keep production costs in check, as well as ensuring plants grow with optimal moisture levels.



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