

GROWERTALKS

Features

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A Guide To Container Nursery Crop Fertilization

Dr. Youbin Zheng

Irrigation water and nutrient runoff from nursery operations, especially in environmentally sensitive areas, is under stringent scrutiny from governmental agencies, like the Ontario Ministry of the Environment. This may lead to restrictions of irrigation water access or use, or fertilization practices for nursery crop production. To minimize nutrient runoff, it's essential to understand the response of plants to fertilizer applications and the fate of applied nutrients (i.e. N, P, K, etc.) within the production system and the environment. The anticipation of restrictions for nursery crop production practices has motivated Vineland researchers to help nursery growers identify management strategies to prevent negative environmental impacts, while maintaining productivity during nursery crop production.

In collaboration with nursery growers in the Niagara Region and throughout Ontario, Dr. Youbin Zheng, Vineland's Environmental Horticulture Chair and University of Guelph Associate Professor; Mary Jane Clark, Vineland's Senior Research Technician, Environmental Horticulture; and Erin Agro, Vineland's Graduate Student, Horticultural Production Systems, are discovering the best fertilization practices for container nursery crop production.

The trials

Currently, applying one fertilizer rate to all nursery crops on the farm is a common practice for most nurseries. However, over-application of fertilizer can add to production expenses, cause crop injury and environmental damage through nutrient runoff. Insufficient fertilizer application can also reduce crop productivity, cause plant nutrient deficiencies and, eventually, reduce the efficiency of resources (i.e., land and water) and labor during nursery crop production. When the right type of fertilizer is applied at optimal rates, nursery crops perform at their best and growers can increase profit margins through savings in labor, land, water, etc. while minimizing negative environmental impacts.

During the 2012 and 2013 growing seasons, research trials were conducted at four commercial nurseries in different regions of Ontario and at the Vineland Research and Innovation Centre campus. Six controlled-release fertilizer types, two application methods—incorporation and topdressing—and more than 20 nursery crop species were tested during production in both 1- and 2-gal pots. Controlled-release fertilizer was used as it's commonly applied in the nursery industry to regulate the timing of nutrient release into the plant root

zone.

The Vineland research team has found that each nursery crop has its own preference for controlled-release fertilizer rate. When the rate is increased, some shrubs—such as Rose of Sharon and PeeGee Hydrangea—show a significant increase in growth. Others, including spirea, show a moderate increase in growth, while some—like Dwarf Winged Euonymus—don't respond to fertilizer rate. These results show that tailoring fertilizer application rates for individual species or groups of species with similar fertilizer needs may have a significant impact on nursery growers and the environment.

Species-specific

Using these results, growers can apply the appropriate fertilizer amount according to the crop species, rather than using one fertilizer rate for the entire farm. Applying fertilizer based on plant demands can reduce production costs, as well as produce high-quality crops without nutrient deficiencies and reduce negative environmental impacts by reducing nutrient runoff. The outcome of this research not only helps nursery growers increase the quality and efficiency of their production, but provides consumers with access to nursery-grown plants of the highest quality.

“I'm very happy to have been involved in this research these past two years,” says Chris Pieper, owner of Pieper Nurseries in Dorchester, Ontario. “A robust fertilization program means cost savings by using only minimal amount of fertilizers while getting maximum results. It also helps promote a better environment.”

An additional challenge for Ontario nursery growers is that irrigation water at most nurseries has a high level of alkalinity. Over time, this high alkalinity water can cause the growing substrate pH to increase and induce micronutrient deficiencies (e.g. Fe and Mn) in nursery crops. Research at Vineland showed that certain fertilizer types and rates have an acidifying effect and can mitigate irrigation water alkalinity while maintaining growing substrates within the optimal pH range. The team has conducted an additional trial by applying acidifying fertilizer to container-grown nursery crops. Results showed that topdressing with an acidifying fertilizer can help maintain the growing substrate pH within the optimal range and prevent crops from developing nutrient deficiency symptoms. This data will help growers produce high-quality nursery crops.

“From this project, we learned that additional research—including more fertilizer types, plant species, growing substrate and different climate regions—is needed to help growers optimize their fertilization strategies and minimize environmental impacts from nutrient runoff,” says Dr. Zheng.

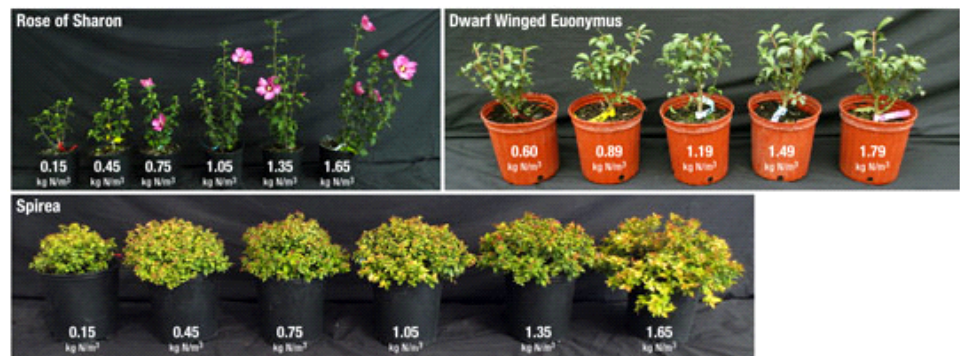
This applied research shows that it's beneficial to conduct studies at commercial nursery sites and subject research plants to typical nursery growing conditions, allowing the results to be immediately used by the growers within the nursery operations.

“The results help us to refine our fertilizer applications, thus reducing the environmental impact and costs,” says Bart Brusse, Container Manager for Sheridan Nurseries in Georgetown, Ontario.

Results from this research indicate that fertilizer can be used as a management tool in container nursery crop production. For example, fertilizer can be used to regulate production timing, either to slow growth and reduce pruning or to accelerate growth to shorten the production time. By understanding crop-specific optimal

fertilizer rates, nursery growers can increase production efficiency, reduce production costs and protect the environment. Additional results can be found in a new comprehensive guide located on Vineland's website at <http://tinyurl.com/o6r4tg2>. GT

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For more information on this research program, please contact Dr. Youbin Zheng at (905) 562-0320 ext. 765 or youbin.zheng@vinelandresearch.com. Funding for this project has been provided by Growing Forward 2, a federal-provincial-territorial initiative, Agriculture and Agri-Food Canada through the Canadian Agricultural Adaptation Program (CAAP), Landscape Ontario and Agrium Advanced Technologies.