

PROJECT TITLE: Evaluation of innovative water treatment technologies for reuse of nutrient solutions in the horticulture industry

PROJECT DESCRIPTION

Ontario's greenhouse and container nursery industry includes over 2500 operations, over 1200 ha of greenhouse and 11000 ha of nursery/sod production. The industry contributes significantly to the economy of Ontario in terms of farm gate sales, jobs and the presence of supporting and complimentary industries.

A 2009 economic and environmental impact assessment of Canada's ornamental horticulture sector indicated that, on average, nurseries use 8361 m³/ha/yr and greenhouse floriculture 657 m³/ha/yr(http://www.fihog.qc.ca/The_impact_of_ornamental_horticulture_on_Canada_economy.pdf); vegetable greenhouse production is likely similar. Nutrient concentrations in irrigation water runoff range from near detection levels to in excess of 200ppm NO₃-N and 50 ppm total P depending on the type of operation (SRG, 2010). Without accessible technologies to treat and recycle, significant quantities of water and nutrients can be lost.

Growers recognize the importance of water conservation and recycling, and environmental protection and significant research dollars have been invested to develop integrated pest-management systems to reduce pesticide use, to optimize water and nutrient use within the operation, and encourage recirculation. Growers are concerned about the future availability and cost of the water they require, and the environmental impacts of disposal to surface or groundwater resources. However, because of the costs of many available treatment systems and plant pathogen concerns, many small and medium sized operations continue to discharge nutrient-laden wastewater

The current project seeks to evaluate emerging innovative technologies to collect, treat and re-use irrigation water runoff, leachate, and other nutrient rich wastewaters. These technologies have the potential to cost-effectively reduce water and nutrient use on the farm and eliminate or greatly reduce environmental impacts. They will be evaluated for effectiveness, cost/benefit, advantages, disadvantages, and suitability for different production systems.

While this project is directed towards small and medium greenhouse operations and container nurseries, other groups producing high nutrient wastewater will benefit from the information derived.

The technologies to be evaluated include:

1. Floating Treatment Wetland Technology (PhytoLinks™)
2. Woodchip Biofilter
3. Geotextile & Membrane Filtration
4. An under production filtering irrigation system (SRI Envirogrow system (EGS))

Project Objectives:

1. Evaluate the suitability of 4 innovative technologies for treatment and reuse of wastewaters from typical Ontario greenhouse and container nursery operations

2. Determine loading rates for optimal removal of pollutants (nitrogen, phosphorus, pesticides, pathogens)
3. Evaluate treatment technology effects on pH, ionic balances, and other greenhouse solution parameters required for good plant growth
4. Evaluate cost/benefit of each technology per litre of water treated
5. Evaluate the performance of a recently installed full scale constructed wetland at a nursery operation for removal of nutrients, pesticides, plant pathogens
6. Develop recommendations for treatment systems based on the criteria of the incoming water stream (volume, concentrations, consistency) the level of treatment required for a range of production systems and the capacity for reuse.
7. Develop a set of factsheets for growers to aid making effective decisions regarding wastewater treatment and reuse
8. Provide science-based recommendations to the industry through grower meetings and workshops and in grower publications

Project Start Date:

Spring 2012

Additional Project Information:

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