

Impact of turfgrass fertilization on nutrient losses through runoff and leaching

An increase in blue-green algae in Quebec lakes has led some jurisdictions in the province to adopt bylaws limiting or even banning the use of fertilizer on turfgrass.

Because many municipalities don't have available agronomic and turfgrass expertise, scientists from Université Laval, led by Dr. Yves Desjardins and Dr. Guillaume Grégoire, are working to evaluate the use of different types of turfgrass fertilizers and their impacts on nutrient runoff and leaching.

The project is comparing nutrient losses from turfgrass fertilized with natural, synthetic and compost fertilizer sources to unfertilized turfgrass, as well as measuring the impact of cultural practices like aeration, clipping recycling, and overseeding.

Fifteen plots have been established at Université Laval's campus in Quebec City using soil representative of what

would commonly be found in an urban environment to trial five different treatments with three repetitions of each.

The treatments include two fertilization regimes based on lawn care industry practices (one using a synthetic fertilizer, the other using a natural one), one approach based on municipal by-law requirements (compost applied once in the spring every year) and two unfertilized treatments (one receiving cultural practices, the other one unmaintained).

Leaching and runoff water volumes are measured at each plot with water samples analyzed for phosphorus and nitrogen levels. Soil moisture at various depths and soil temperature is recorded, turf visual quality and weed encroachment data are collected monthly, and a soil analysis is conducted twice yearly.



Excavated plot with plastic lining placed on the bottom and a drain to collect leachate.



Tipping bucket used to measure leachate and runoff water volumes.



Fertilized plot after establishment.



Mixed-species unfertilized plot after establishment.

To date, results from 2012 and 2013 show a reduction in phosphorus losses through runoff in fertilized plots compared to the unfertilized ones, driven in part by a reduction in runoff volume. The fertilizer source (synthetic, natural or compost) did not significantly impact phosphorus losses.

Although there has been an increase in nitrogen leaching from the fertilized plots, it is estimated to be less than two

percent of the nitrogen applied, meaning the losses are still fairly low. As well, 40 per cent of the losses are attributed to three specific events as opposed to across the entire season so these could be addressed through management changes such as differing application times or using a slower release fertilizer, for example.

Why is this project important to the ornamental horticulture industry?

The research outcomes will provide scientific data to support responsible fertilizer use on turfgrass, including modification of industry practices regarding how and when fertilizer is applied to minimize environmental impacts, and educating consumers and regulators on best practices.



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