ATRF 2008 – 2 (E)

factsheet

Water Quality Monitoring for Turfgrass Systems

Water quality monitoring is an integral component of environmental stewardship. Proper sampling techniques and understanding results can minimize waste and maximize quality of the overall turfgrass system.

Monitoring the water quality of the irrigation source is important for many reasons. Using lower quality water can:

- Allow the accumulation of detrimental compounds in the soil
- Cause injury to plant foliage and roots
- Potentially deteriorate irrigation infrastructure and require costly repairs

Fig. 1. Natural vegetation helps protect water quality.

Water Sampling Techniques

Fig. 2. Sampling water from a pond.

Proper water sampling techniques can save time and money, and ensure accurate water test results. When sampling, remember to:

- Take a sample of both incoming and outgoing water sources
- Use the sample bottle and follow directions, provided by the laboratory
- Fill sample bottle as outlined in the instructions
- Return sample to laboratory as soon as possible
- Keep sample cool

To ensure understanding of the results, before dropping off any sample for analysis, be sure to record the:

- Date
- Sampling location
- Identification number of the sample

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For more information, please check our website at www.turfgrass.ca

Some Water Quality Parameters

Water quality test results contain many levels and parameters. Here are some of the more important results for the turfgrass manager and producer. Upon request, the laboratory will provide both a written report and an email version of the analysis.

a) Total Dissolved Solids (TDS) is a measure of the amount of soluble salts in the water. TDS can be measured in ppm or mg/L, which are equal. The higher the value of TDS, the more detrimental. These soluble salts can build up in the soil and inhibit the uptake of water by the plant. Keep in mind if additional irrigation is required to prevent salt accumulation, using the same irrigation source will accelerate the process.

Total Salinity Hazard Classification Guidelines for TDS		
Class	***TDS (ppm)***	***Management Requirement***
Low	<500	no detrimental effects expected
Medium	500-1000	additional irrigation needed periodically to prevent salt accumulation
High	1000-2000	species/cultivar selection, drainage, additional irrigation
Very high	>2000	most salt-tolerant cultivars; excellent drainage; frequent irrigation; intensive management

b) Sodium (Na) is absorbed by roots and accumulates in the leaves where it can cause damage over time. Excessive Na can lead to soil degradation as it can eventually displace both Calcium (Ca) and Magnesium (Mg) ions from clay particles. Sodium Adsorption Ratio (SAR) measures the amount of Na to Ca and Mg in the water. SAR values < 3 indicate no restriction on use. Values > 9 indicate severe restrictions on use. If Na buildup in plant leaves exists, mowing will remove the damaged leaves.

c) pH is a measurement of the hydrogen ions in water. The pH scale ranges from 1 (most acidic) to 14 (most alkaline). Irrigation water should measure between 6.5 and 8.5. It is important to note any fluctuations in this measurement from year to year as it could be an indicator of more serious problems with the irrigation water source.

d) Nutrient levels are important to know for management programs to be adjusted accordingly. All sources of irrigation water contain some level of nutrients. Although the quantities can be very low, they can have a significant impact over the season. There can also be a significant amount of micronutrients in the water so that no supplemental micronutrients need to be applied.

Nutrient Guidelines for Irrigation Water (ppm)				
Nutrient	***Low***	***Normal***	***High***	***Very High***
Phosphorus (P)	<0.1	0.1-0.4	0.4-0.8	>0.8
Phosphate (PO_4^-)	<0.3	0.3-1.21	1.21-2.42	>2.42
Phosphorus oxide (P_2O_5)	<0.23	0.23-0.92	0.92-1.83	>1.83
Potassium (K)	<5	5.20	20-30	>30
Potassium oxide (K_2O)	<6	6-24	24-36	>36
Calcium (Ca)	<20	20-60	60-80	>80
Magnesium (Mg)	<10	10-25	25-35	>35
Nitrogen (N)	<1.1	1.1-11.3	11.3-22.6	>22.6
Nitrate (NO_3^-)	<5	5-50	50-100	>100
Sulphur (S)	<10	10-30	30-60	>60
Sulphate (SO_4)	<30	30-90	90-180	>180

Testing and monitoring irrigation water limits costly and detrimental effects on the turfgrass plant. Water bodies that are contained within or pass through the overall turfgrass system should be assessed regularly and should be considered as an alternative water source, should the quality of the main source degrade over time. It is the responsibility of the turfgrass manager to irrigate with these sustainable practices in mind.