Evaluation of the effectiveness of Systemix foliar fertilizers to improve turf quality on golf greens

By:
Guillaume Grégoire, Ph.D. agr. & Yves Desjardins, Ph.D. agr.

Horticultural Research Center
Laval University

January 2014

A. Objectives:

The objectives of this research were to evaluate the effects of Systemix fertilizer on turf colouration, quality and tissue nutrients content and compare the performance of Systemix fertilizers to competitive foliar fertilizers.

B. Experimental Design / Methods

Treatments

1. Positive control 1 (13-2-3) to 275 ml/100 m^2
2. Genesis (12-0-5) to 300 ml/100 m^2
3. Force (10-2-12) to 350 ml/100 m^2
4. Program 1 : Treatment 2 (Genesis) and 3 (Force) alternately applied
5. Program 2 : Treatment 2 (Genesis) with Tonik at 120 ml/100 m^2
6. Program 3 : Treatment 3 (Force) with Tonik at 120 ml/100 m^2
7. Positive control 2 (Combination of 19-1-6 at 180 ml/100 m^2 and 4-0-1 at 180 ml/100 m^2)
8. Untreated Control (water)

* Treatments were applied in a volume of 5 litres of water per 100 m^2.

C. Results and discussion

Visual turfgrass colour assessment and instrumental colour using canopy reflectance (NDVI)

In general, the same trends are observed for the NDVI (instrumental colour) and for the visual colour assessment. Fertilization significantly improved visual colour and NDVI of turf compared to unfertilized controls. Both treatments with Genesis fertilizer (treatments 2 and 5) had a positive and significant effect on turfgrass colour and NDVI compared to positive controls (Figure 1), whereas treatment with Force fertilizer alone resulted in a lighter colour than positive controls. The addition of Tonik to Genesis or Force foliar fertilizer (Figure 3) increased significantly colour response and NDVI. Alternating Force and Genesis (treatment 4) produced a darker turf colour than Force applied alone (Figure 2). Finally, turf treated with Genesis product had a darker colour and higher NDVI than turf treated with Force fertilizer.

Figure 1. Significant differences observed for turf colour vs. competitive products

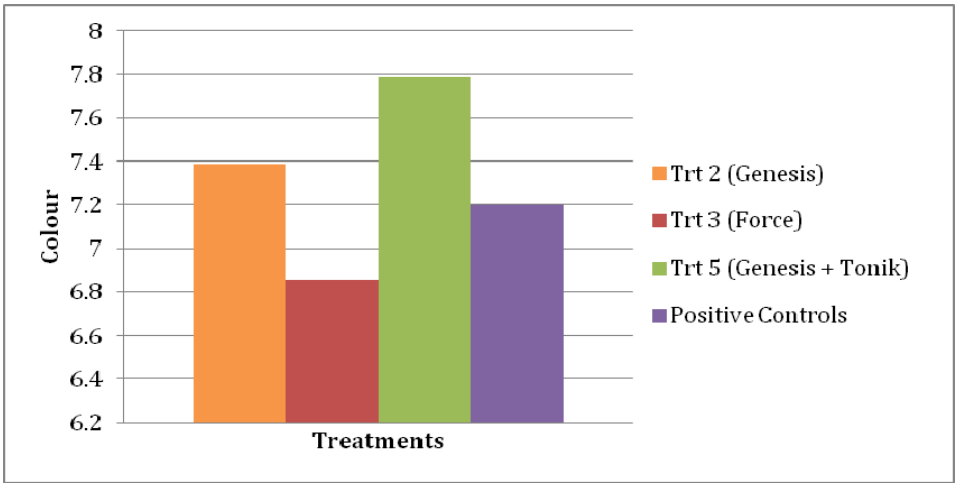


Figure 2. Significant differences observed for turf colour between treatment 3 and 4.

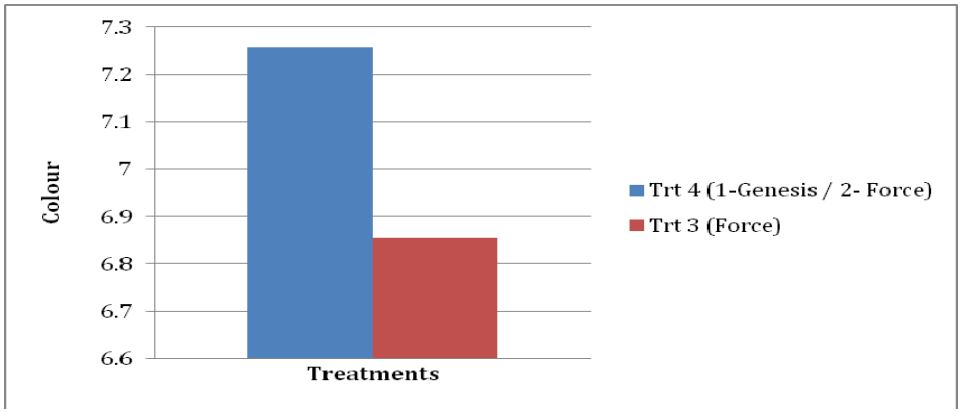
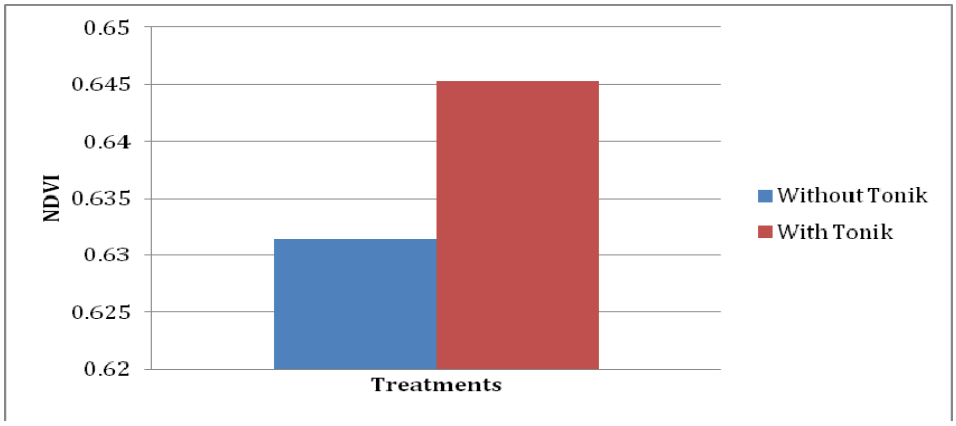


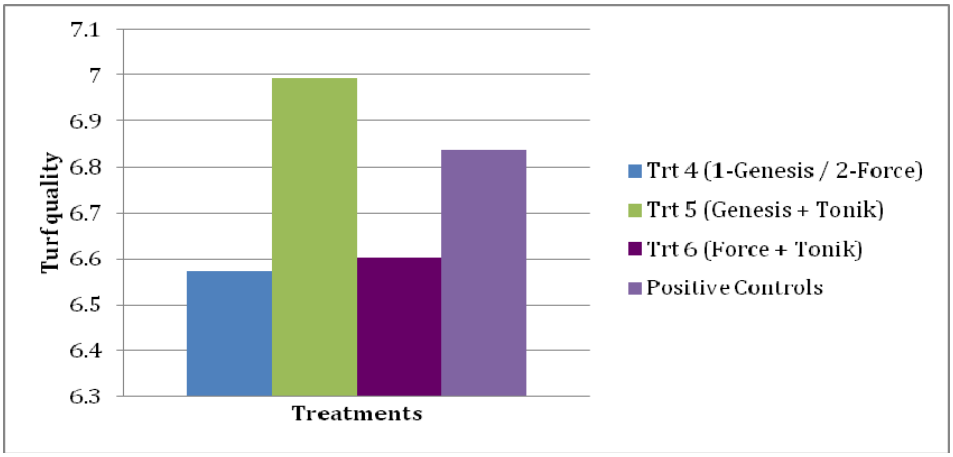
Figure 3. Significant differences observed for instrumental colour (NDVI) on turf with the addition of *Tonik*.



Turfgrass visual quality assessment

Significant differences were observed for the comparisons made in these analysis. Visual turf quality in fertilized plots was significantly higher than in non-fertilized plots. Treatment 5 with Genesis in combination with Tonik (Figure 4) obtains a visual turf quality rating significantly higher than the positive control. The alternation of Force fertilizer with Genesis (treatment 4) increased turf quality compared to Force treatment only.

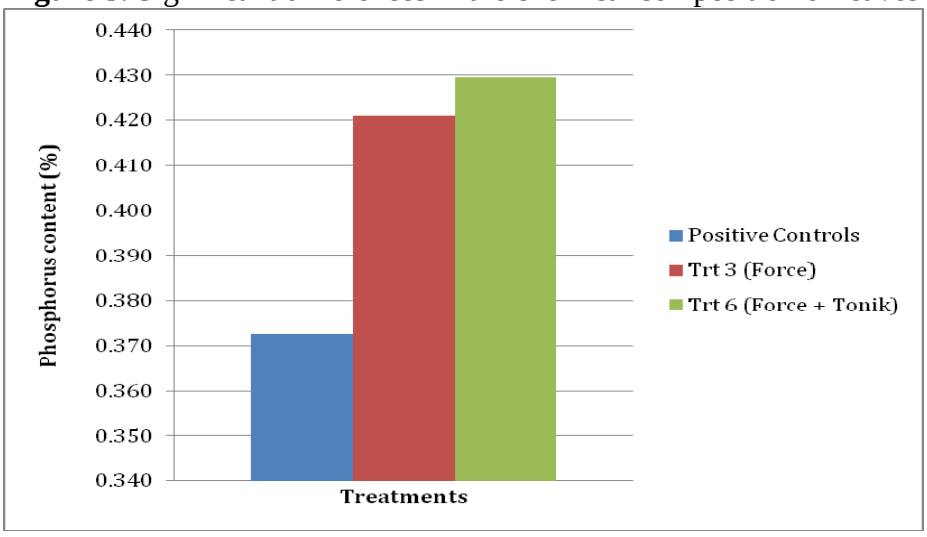
Figure 4. Significant differences observed in the overall turf quality



Tissues nutrients content

Fertilized plots had significantly higher leaf nitrogen content, but lower potassium content as compared to unfertilized plots. Regarding phosphorous content in leaves, differences were observed for two treatments using Force fertilizer (treatments 3 and 6) and have significantly increased the concentration of phosphorus in leaves compared to untreated controls (Figure 5).

Figure 5. Significant differences in the chemical composition of leaves



D. Conclusion

The objective of this experiment was to evaluate the effects of four fertilization treatments using Systemix fertilizers to improve turf quality on golf greens. **Based on the results, the performance of Systemix fertilizers seems to compare favourably with competitive products (Grigg Bros. and Emerald Isle). Indeed, no significant differences were observed between these products. In addition, when differences were observed, at least one of two Systemix fertilizers offered better performance than positive controls. In general, Genesis fertilizer (treatment 5) used in combination with the Tonik fertilizer is more efficient of all those measured in this research to improve colour and turf quality. The addition of Tonik to Force or Genesis significantly improves the digital colour (NDVI) and visual colouration.** In the case of Force fertilizer, its performance when used alone is generally less than positive controls. However, its use in combination with Tonik fertilizers results in similar performance to competitive products. **These results clearly demonstrate that Systemix foliar fertilizer enable a turf quality at least similar, if not superior to that obtained with high foliar fertilizer competitors range.**