



## Comparison of Foliar Nitrogen Sources for Putting Greens

Putting green maintenance has evolved significantly in the last 15 years as turfgrass scientists and managers have developed a better understanding of the factors that create turfgrass stress. Successful management strategies include tree removal to increase light penetration, installing fans to improve air movement and evaporative cooling, and better water management to keep root zones at optimal moisture levels. Another improved technique has been light, frequent liquid applications of nitrogen and other plant nutrients. The purpose of this research project is to compare the performance of several commonly available plant nutrient packages against a program of weekly urea and iron sulfate ( $\text{FeSO}_4$ ) applications throughout the growing season.



*Researchers at the University of Illinois are conducting a bentgrass putting green field trial to compare foliar plant nutrient packages against urea plus iron sulfate.*

The study green was not fertilized for all of 2012 to reduce the fertility level of the green. The trial started in June of 2013 on a creeping bentgrass putting green mowed at 0.125 inch. A variety of weekly fertility programs were applied to test plots on the green throughout the 2013 growing season. The trial was restarted on May 7, 2014. Fertilizers were applied weekly at a rate of 0.1 pound of nitrogen per 1,000 square feet from May 7 through September 25, 2014. The total foliar fertilizer application of the study was 1.8 pound of nitrogen per 1,000 square feet. The products used included:

- Nutri-Rational® True Foliar® 19-1-6
- Floratine® Power 23-0-0
- Gary's Green® 18-3-4 + iron

- Simplot® Partners 18-3-6 with UMAXX®
- Urea + FeSO<sub>4</sub>
- Foliar Pak® 23-0-0
- Unfertilized control

Fungicides were preventatively applied in 2014 to control dollar spot, yellow tuft and other observed foliar diseases. A total of seven fungicide applications were made in 2014. Topdressing sand was applied weekly beginning on May 8 and continued until September 17. Topdressing was applied at a very light rate, estimated at 0.5 millimeters per application – i.e., approximately 0.06 cubic yards per 1,000 square feet.

Turf quality in May of 2014 was poor under all treatments. The low level of fertility applied in 2013 was insufficient to sustain turf quality. On May 29, 2014, a decision was made to apply urea to the entire trial area at 1 pound per 1,000 square feet. The green also was aerated in an effort to improve turf quality. Turf quality quickly improved following fertilization and aeration.

Interestingly, the Nutri-Rational® True Foliar® plots showed significantly better quality than all of the other treatments beginning on June 11 and continuing through June 29. Beginning in July and continuing through August, all fertility treatments gave similar quality and only the unfertilized control was significantly different.

Differences between foliar treatments began to emerge in September. The plots treated with Nutri-Rational® True Foliar®, which had performed best early in the season, began to lag the other treatments with significantly lower turf quality on four of six ratings. However, during the September and October evaluation period, only urea plus FeSO<sub>4</sub> exhibited lower quality at the September 25 evaluation than the other treatments.

Interestingly, in 2014 we observed what appeared to be differences in worm castings as a result of the different fertility treatments. Worm castings per plot were counted in May and October of 2014. On both dates, the plots treated with Nutri-Rational® True Foliar® had significantly more earthworm castings than plots treated with any other foliar fertilizer. On May 1, Nutri-Rational® True Foliar® had 26 castings per plot compared to 8.5 per plot for Floratine® Power and 3.8 per plot for urea plus FeSO<sub>4</sub>. On October 14, Nutri-Rational® True Foliar® had 43 castings per plot compared to 14.3 for Floratine® Power and 8.3 for Gary's

Green®. On both observation dates, the plots treated with Nutri-Rational® True Foliar® had 3 times more worm castings than the average amount of worm castings in the plots treated with the other five products.

Another interesting observation was the significant reduction in dandelion plants per plot. The plots treated with Nutri-Rational® True Foliar® on average had only one dandelion per plot while the other foliar fertilizer treatments averaged 14.5 dandelions per plot. Although further research is warranted, the reduction in dandelions could have significant implications in areas where herbicides are not allowed.

While the products used in this study were applied to achieve the same rate of nitrogen, it is clear that there are subtle and not-so-subtle differences in plant response. The plots treated with Nutri-Rational® True Foliar® looked good at the start of the year, but turf quality faded as the summer wore on. Other products such as Gary's Green®, Floratine® Power and Foliar Pak® provided excellent mid-summer quality. The final piece of this project is measuring nitrogen uptake from each source to determine whether any differences occur due to product formulation. Differences observed in clipping weights suggest that there are growth differences between the products. The question remains, are these growth differences due to nitrogen utilization or are other factors involved?

**Source:** Dr. Bruce Branham, University of Illinois

**Additional Information:**

[Comparison of Foliar N Sources for Putting Green Performance](#)

[How Efficient are Foliar Applied Nitrogen Applications?](#)