



Ohio State University Finds Better Turf Health with Use of Alive Elite (ACF-SR) and Reduced N Fertilization

Overall Summary

A summer of 2024 research project at The Ohio State University Agricultural Technical Institute led by Dr. Dominic Petrella has identified a beneficial synergy between Alive Elite (ACF-SR) and modest rates of nitrogen (N) fertilizer in perennial ryegrass turf. While standard approaches often rely on higher N inputs, these findings show that combining Alive Elite (ACF-SR) with more moderate fertilizer rates can enhance turf color, density, and overall quality, potentially reducing environmental impact and overall fertilizer usage.



Dr. Dominic Petrella

Biography of Dr. Dominic Petrella

Dr. Dominic Petrella is an Assistant Professor and Program Coordinator for the Turfgrass Management Program at The Ohio State University Agricultural Technical Institute. He earned his Ph.D. in Horticulture and Crop Science from The Ohio State University, specializing in the photoregulation of flavonoid synthesis in turfgrass species. With a strong focus on turfgrass physiology and stress tolerance, Dr. Petrella leads cutting-edge research projects aimed at improving sustainable turf management practices.

Procedures

1. Plot Establishment

- Perennial ryegrass mowed weekly at 3.5 inches
- Plots measured 3 ft x 5 ft
- Uniform irrigation to prevent drought stress

2. Fertilizer & Alive Elite (ACF-SR)

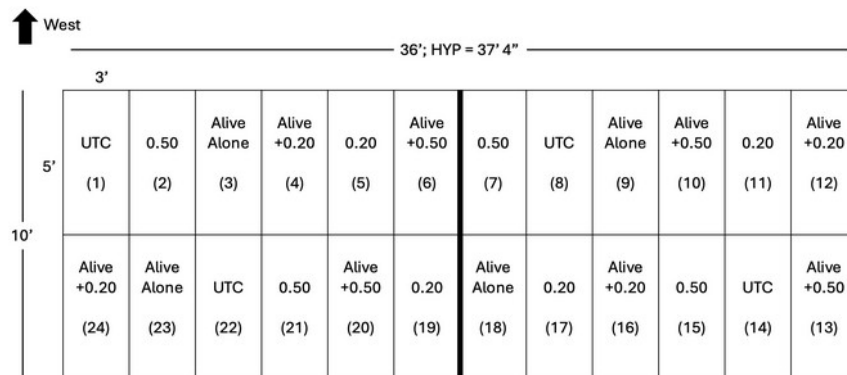
- Nitrogen (N) applied at carefully controlled rates (0.20 lb. and 0.50 lb. N per 1,000 ft²)
- Alive Elite (ACF-SR) applied at ~7.5 gallons per acre; subsequent re-applications at regular intervals

3. Data Collection

- Visual evaluations of turf quality (1–9 scale)
- Image-based turf metrics (e.g., NDVI, % green cover, Dark Green Color Index)
- Drone photographs for additional visual confirmation

These data were integrated using area-under-the-curve (AUC) metrics and analyzed with a robust statistical approach.

Figure 1: Plot plan/design for this experiment



Positive Results

1. Synergy with Reduced N

- Plots receiving Alive Elite (ACF-SR) plus 0.20 lb. N per 1,000 ft² consistently showcased improved turf quality, greenness, and percent cover compared to the same rate of N alone.
- These enhancements were especially apparent around one month after the initial application.

2. Enhanced Turf Quality & Color

- Turf under the combined Alive Elite (ACF-SR) and reduced N program exhibited deeper green color, as reflected by higher Dark Green Color Index (DGCI) scores.
- Image-based and visual quality ratings indicated more uniform turf density and vitality.

3. Sustainable Management Potential

- Leveraging microbial activity in Alive Elite (ACF-SR) with moderate N rates highlights a promising approach for those seeking to reduce fertilizer inputs while maintaining or even improving turf performance.

DATA PLOTS:

In the following plots, blue lines represent plots NOT treated with Alive Elite (ACF-SR) and Red lines represent plots treated with Alive Elite (ACF-SR). Shaded areas represent the standard error. In all charts, the left-most chart shows product dose and control with zero nitrogen. The center chart shows product dose and control with low N input (0.2). The right-most chart shows data for high N (0.5).

You will see that for all types of charts, the red shaded areas (Alive Elite / ACF-SR) rise above the blue line (without product dosing) as time proceeds.

Also, in general, the largest differences are with a combination of product (Alive Elite / ACF-SR) and low-rate N application (0.2). In future studies, TLC Products and Dr. Petrella will more closely evaluate optimal dosing and N levels. Optimal considerations will allow for the best cost-savings, best turf quality, and minimal run-off of fertilizer in lakes and streams.

VISUAL TURFGRASS QUALITY. Evaluators visually inspect and rate turf based on color, density, uniformity, and overall appearance. It is rapid, widely recognized, and valuable for broad comparisons.

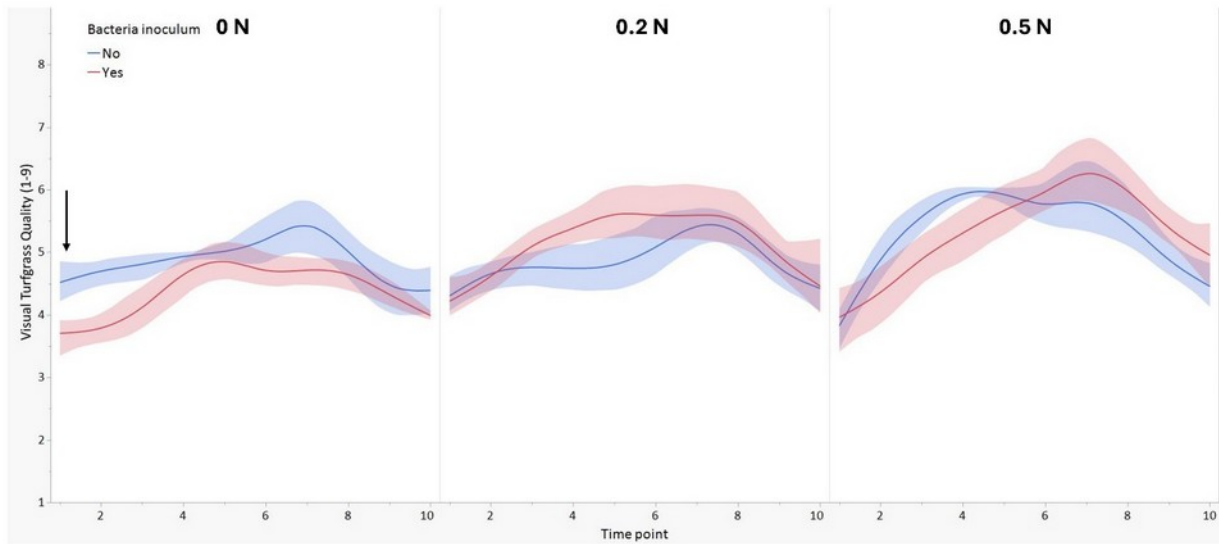
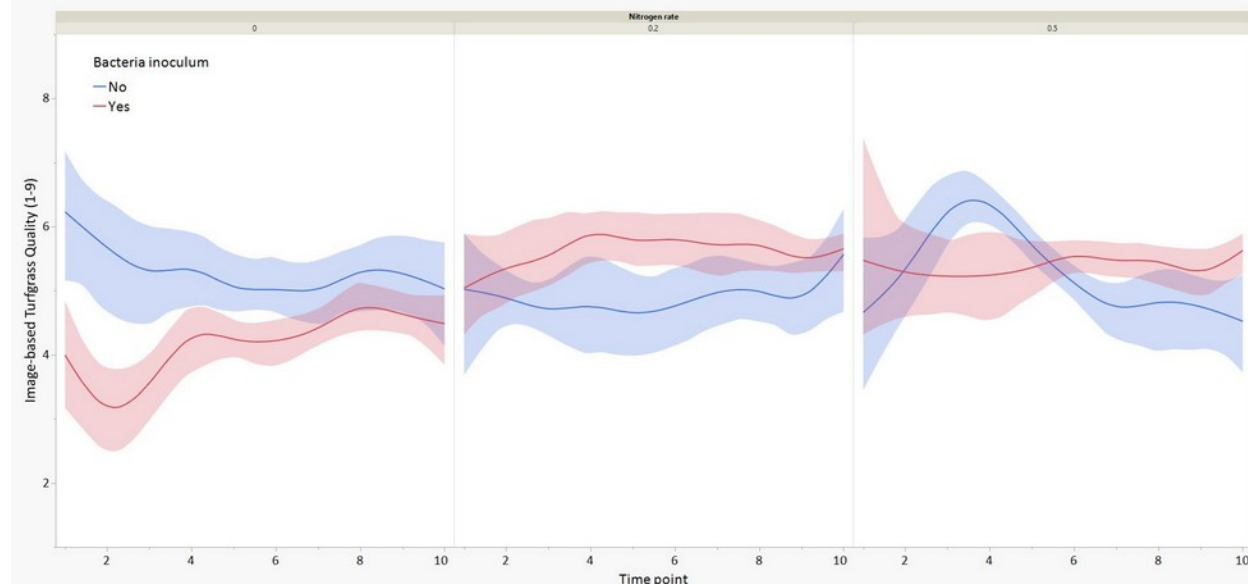
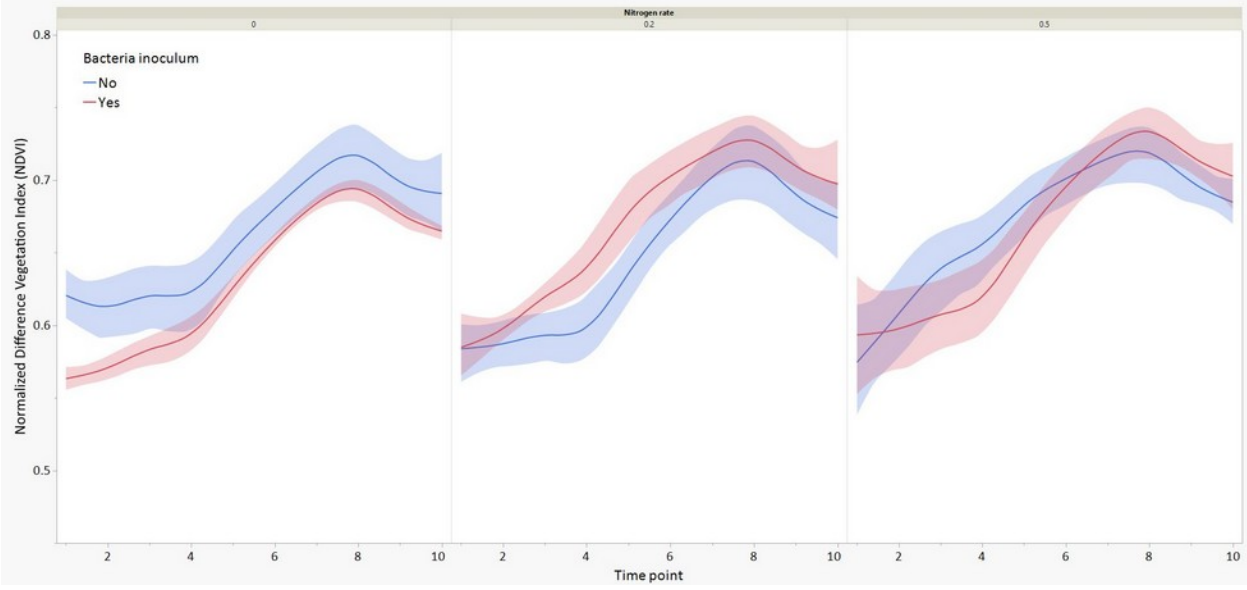


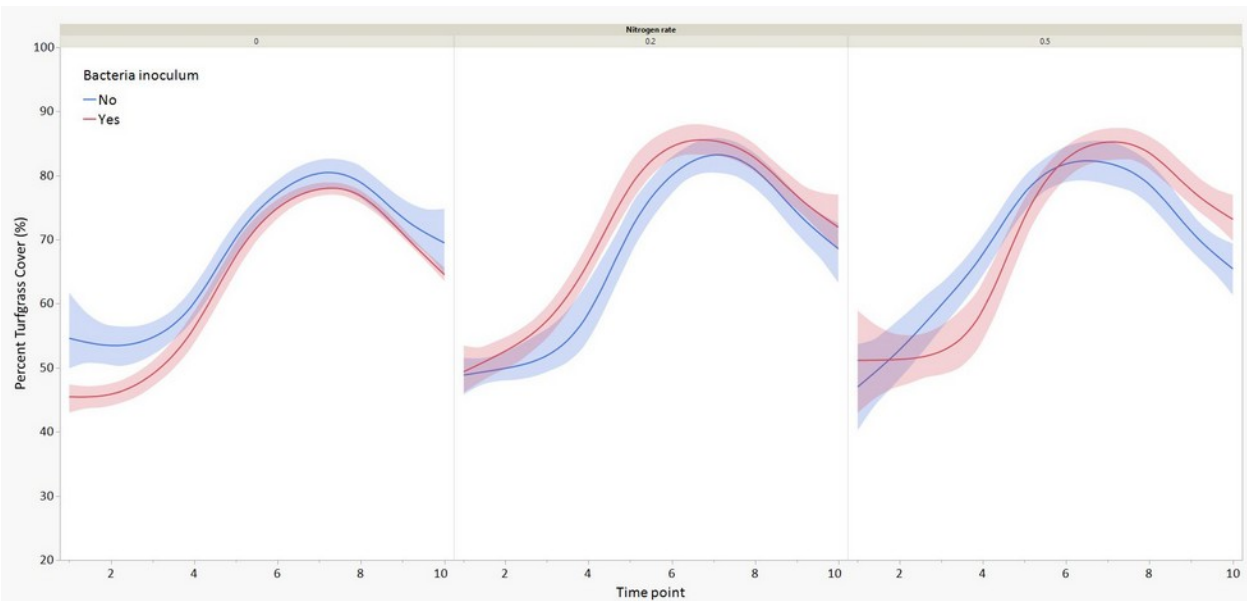
IMAGE BASED TURF GRASS QUALITY. Researchers capture digital images under standardized lighting, then software algorithms classify and quantify color/quality before converting results to a 1-9 scale.



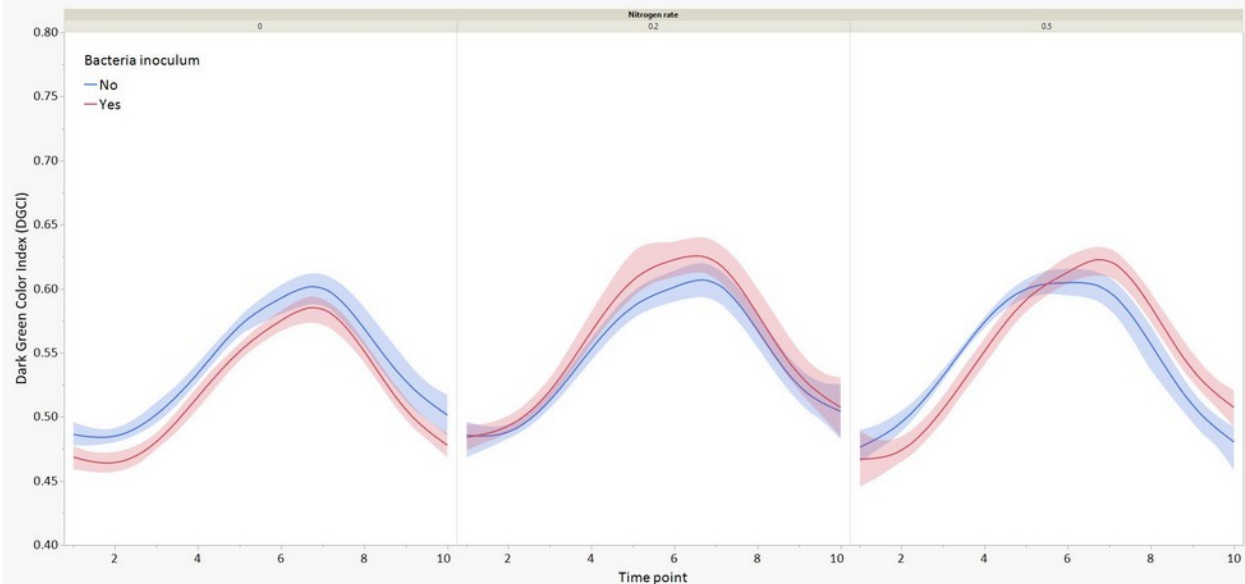
NDVI. Normalized Difference Vegetation Index. Instruments emit light and measure reflectance to quantify plant density and vigor. Higher NDVI typically correlates with better photosynthetic activity and plant health.



% TURF GRASS COVER. The percentage of the plot surface area covered by green, living turf. Captured via digital images analyzed by software (e.g., TurfAnalyzer) that distinguishes green turf from other elements (soil, weeds, etc.). Provides an objective measure of turf uniformity and density and helps compare treatments by quantifying how much “usable” turf is present over time (e.g., following stress, fertilizer application, or inoculant use).



DGCI. Dark Green Color Index. Software calculates color indices (e.g., hue, saturation) directly from JPEG images. A higher DGCI often aligns with higher turf nitrogen levels and visually appealing turf color.



Conclusion as Stated in Dr. Petrella's Report:

Figures over time point to the fact that plots treated with low rates nitrogen (0.20) exhibit improvements when also treated with Alive Elite (ACF-SR). This is consistent across all metrics. This is most noticeable around week 5, 1-month after initial treatments, and points to a synergy between Alive Elite and low rates of nitrogen fertilizer.

Future Testing

- Refining Dosing Frequency**
 Ongoing evaluations will determine how often Alive Elite (ACF-SR) should be applied to sustain these benefits, particularly at moderate N rates.
- Optimizing Nitrogen Rate**
 Although synergy was clear at 0.20 lb. N per 1,000 ft², Dr. Petrella will explore if similar or better benefits might be achieved with small adjustments in N rates.
- Longer-Term Trials**
 Repeated multi-season or multi-year studies will help confirm how the product performs through seasonal transitions, traffic stress, and varying climate conditions. Dr. Petrella and TLC plan studies in both Ohio and Minnesota to see results in different climates and soils.

In Conclusion

These results demonstrate that Alive Elite (ACF-SR) can deliver measurable benefits to perennial ryegrass turf when combined with a moderate nitrogen fertilization program. Based on these successes, investigations will continue to identify optimal application rates and timing for both N and Alive Elite (ACF-SR). By balancing microbial inoculant benefits with carefully managed fertilization, turf managers have a powerful new tool to achieve healthier, greener turf in a more sustainable and cost-effective manner.