There are a several methods used to determine when to fertilize a green.

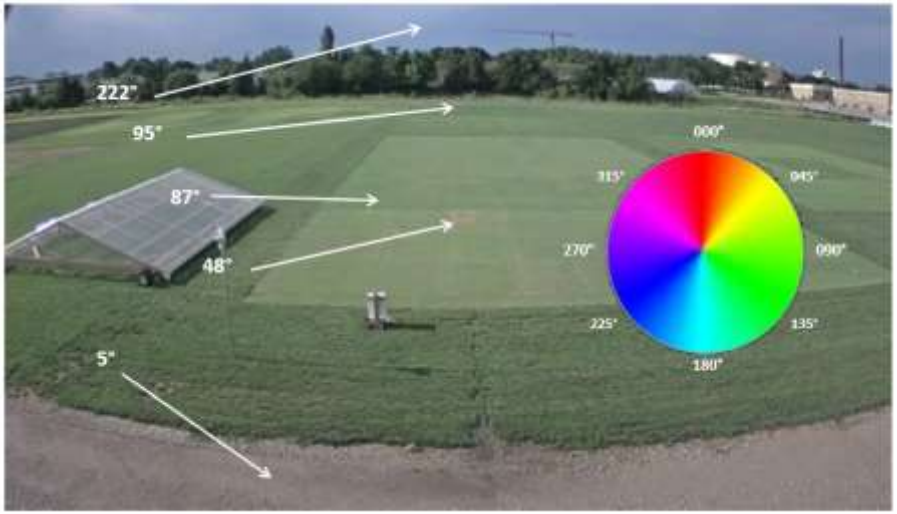
The best way to determine what the grass needs is to measure the grass.

- Clipping weight is a good indicator, but it's time consuming and clipping weight doesn't show the variability of need across the green. Some spots will always need more, others less.
- Petiole analysis is the best indicator, but it's even more time consuming and what leaves to sample to get at the variability of need across the green

A Hawk-Eye™ System measures the turfgrass' color and temperature.
From the color (processed to show Hue°) chlorophyll in the leaf can be estimated.
Green is good. Yellow is deficient.

green, 60° - 150°

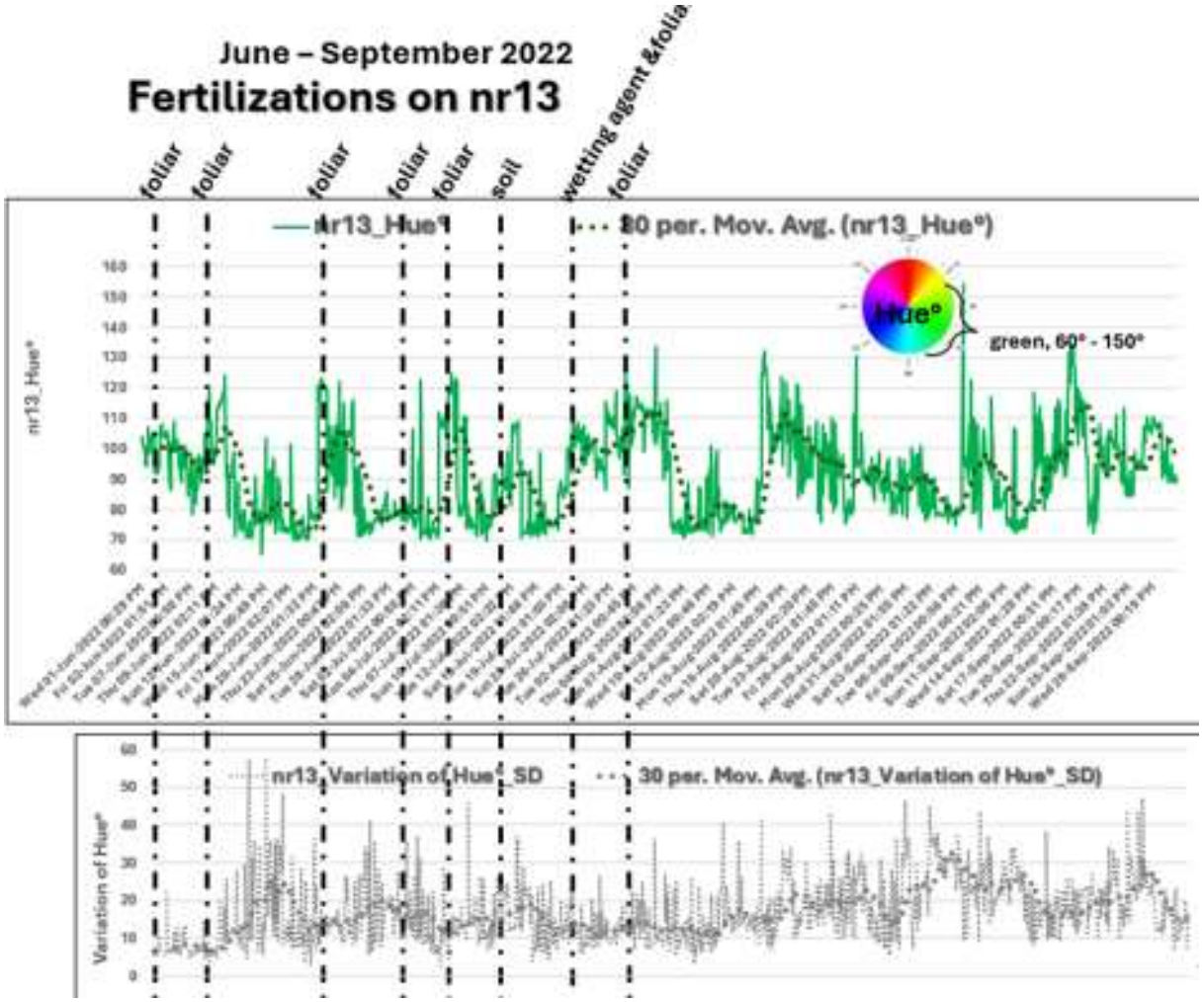
This is what you see when you do your scouting routine.



The Hawk-Eye™ System processes the visual image to expose the Hue° so that the color can be represented by a numerical value on the color wheel.
Using the Hue° we can measure, track, and establish indices that can assess uniformity and estimate the chlorophyl content of the leaves.

This is how the Hawk-Eye™ sees and measure it for you.

This is a summer of autonomous measurements of a bentgrass green's Hue° and standard deviation of the Hue°.



This variety is at its best when the Hue° is between 90°-100°.
Low standard deviations, less than 15, shows good uniformity.

= 7-8 on Quality Scale

Using Hue° to Precisely Apply Fertilizer

Broadcast vs Precision Methods

Broadcast

In Spring, broadcast Nitrogen & K, P, Ca, Mg, and S.

As year progresses apply Nitrogen when the Hue° drops below* 80°

* Variety Specific

In early Fall, broadcast Nitrogen & K, P, Ca, Mg, and S.

Examining Hawk-Eye's look at the green, a pattern emerges showing that between fertilizations the center of the green becomes nitrogen deficient relatively quickly.

Precision

In Spring, broadcast Nitrogen & K, P, Ca, Mg, and S.

Use imagery to select locations to take petiole samples to see if trace nutrients are needed with the Nitrogen in each defined area.

As year progresses apply Nitrogen when the Hue° drops below* 80°

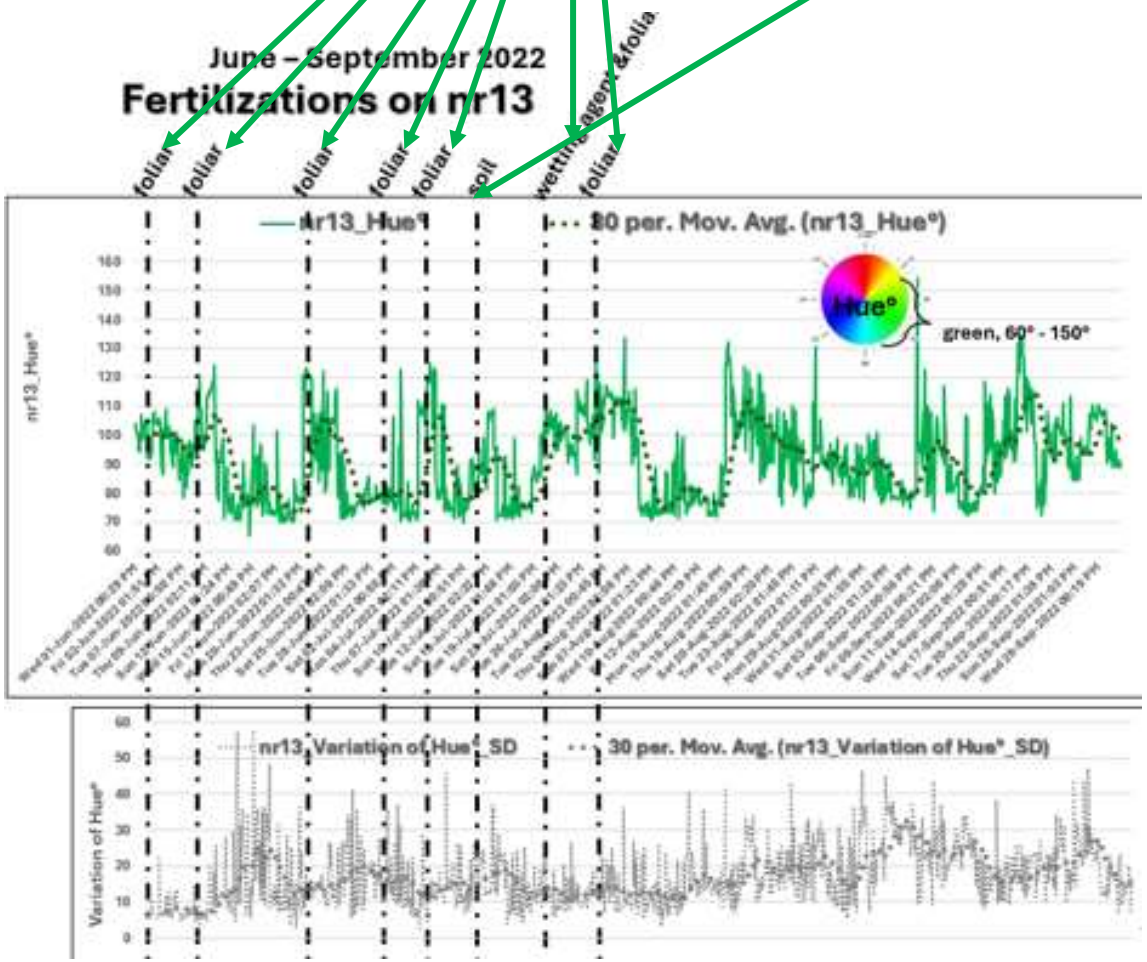
* Variety Specific

If Std Deviation remains high take another set of petiole samples and fertilize.

In early Fall, broadcast Nitrogen & K, P, Ca, Mg, and S.

Foliar Application

Soil Application



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Is a ground application of fertilizer or a foliar application more efficient and effective and does one method have a longer lasting effect?

Does a wetting agent improve the longevity of an application?

What impact does a Hydrogation Device* in the irrigation line have and is it less expensive than using a wetting agent?

* **A Hydrogation Device, put in an irrigation line, runs a small electric current through the water.**

- **It conditions the water by converting the crystalline structure of calcium carbonate to aragonite.**
- **And agitates the water as it passes through so that much of the CO_2 comes out of solution.**

In clay soils the water percolates quickly.