

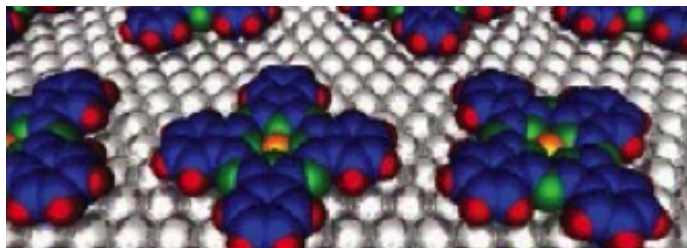


Research Driven,  
Proven Results™

## TECHNICAL BULLETIN

# USING GRIGG GREENPIG™ COLORANT FOR SUMMER STRESS MANAGEMENT

GRIGG GreenPIG is a premium pigment additive specifically formulated for golf course and sports turf to enhance and extend the aesthetic appearance. The use of pigmented products on fine turfgrass has increased in the past five years. The most noticeable benefits are better color and quality of both actively growing and dormant turfgrass, and possible physiological benefits resulting in better overall plant health (to be determined by future turf research).



*Figure 1. Computer generated illustration of phthalocyanine structures. The central Cu atom (yellow) surrounded by four (4) inward projecting nitrogen.*

## GRIGG GreenPIG Active Ingredient

GRIGG GreenPIG contains a green colored (reflected light) aromatic macrocyclic pigment called phthalocyanine. The phthalocyanine found in GRIGG GreenPIG contains a central copper (Cu) atom. Phthalocyanine is very similar in chemical structure to porphyrins—or naturally occurring compounds such as chlorophyll and heme B. As a result, it absorbs light strongly in the visible spectrum. The word porphyrins is derived from the greek word, “porphyra” or “purple pigment.” GRIGG GreenPIG also contains trace levels of zinc (Zn).

## Key Advantages of GRIGG GreenPIG Formulations

GRIGG GreenPIG contains a highly concentrated amount of pigment that is 10-20% higher than many competitors. This results in a formulation that offers low use rates and promotes fast, intense, and long lasting turf color, as well as improved overall turf quality. GRIGG GreenPIG is available in 4 X 1 gallon and 12 X 1 quart cases to allow flexibility in spray preparation.

## Key Advantages of Using GRIGG GreenPIG on Turfgrass

GRIGG GreenPIG may be used on all turfgrass species in a wide range of climates and with different turfgrass management intensity levels. The primary uses of GRIGG GreenPIG include:

1. Optimizing turf color and quality
2. Enhancing aesthetics for dormant turf
3. Speeding spring green up and possible establishment
4. Increasing stress tolerance (see research—reverse)

## Application Rates

**Maintenance Rate:** Apply with 50-100 gallons of water [190-380 L of water].

**Golf Course Putting Greens:** 12-24 fl oz per acre [660 mL-1 .5L per hectare].

**Golf Course Fairways:** 18-32 fl oz per acre [1.25-2.25 L per hectare].

**Sports Fields:** 24-34 fl oz per acre [1.5-2.5 per hectare].

GRIGG GreenPIG applications target the turf canopy and are NOT a substitute for a sound fertilizer program. GRIGG GreenPIG may be compatible with foliar fertilizers, plant growth regulators, and crop protectants\*.

*\*Jar tests are always recommended before use.*



*Figure 2. Whirlwind GC, Chandler, AZ 8008 twin flat fan nozzles; 30 psi; 65 gal/A applied to Tifeagle Bermudagrass. Photo taken the day of application.*

Photo Courtesy: B. Whitlark, USGA.

# FIELD TRIAL: USING GRIGG GREENPIG TO MANAGE TURFGRASS QUALITY DURING SUMMER STRESS

2012, Kimberton Golf Club, Phoenixville, PA. McDonald, S.

## Objectives

During high intensity light and heat, near infrared light that is not reflected off turfgrass can cause oxidative stress and plant injury.

GRIGG set out to determine if the use of GRIGG GreenPIG on turfgrass would increase NIR reflectance compared to untreated turf and turf treated with foliar nutrition during summer stress (high heat/drought), and lead to an overall increase in plant health. To view the full trial, visit [www.grigg.co](http://www.grigg.co).

## Application

The trial was conducted on a G-6 creeping bentgrass (*Agrostis stolonifera*) sward mown at 0.125 inches. Treatments included GRIGG applied alone and GRIGG GreenPIG tank mixed with GRIGG Ultraplex® foliar nutrition and Chipco® Signature Fungicide.

## Results

All GRIGG GreenPIG treatments, either alone or tank mixed with foliar fertilizers, impacted NIR reflectance. This effect corresponded well with visual ratings. The GRIGG GreenPIG treatment produced the best CB color, see Figure 3.

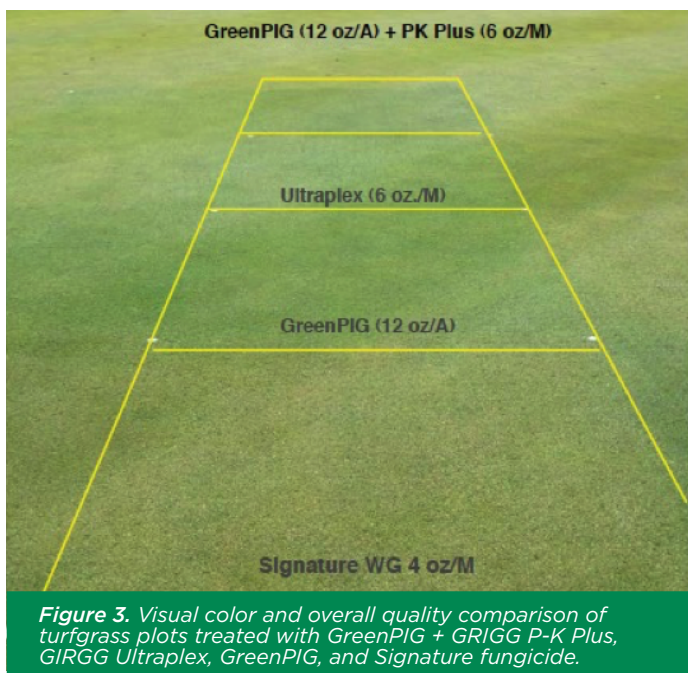


Figure 3. Visual color and overall quality comparison of turfgrass plots treated with GreenPIG + GRIGG P-K Plus, GRIGG Ultraplex, GreenPIG, and Signature fungicide.



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[www.brandt.co](http://www.brandt.co)

The GRIGG GreenPIG and fungicide application also affected near infrared reflectance (NIR) (780 nm). NIR was significantly higher than the control and turf treated with foliar fertilizer, see Figure 4.

Effect of pigments and foliar fertilizers on near infrared (NIR) (780 nm) light reflectance from creeping bentgrass turf.  
McDonald, S., TDS (2012)

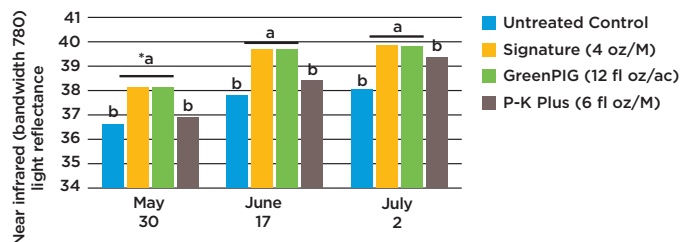


Figure 4. Effect of GRIGG GreenPIG, GRIGG P-K Plus, and Signature fungicide on NIR light reflectance using remote sensing technology. A Holland Scientific Crop Circle is a ground mounted unit with an active light source and multi-spectral data capabilities. The Crop Circle was mounted to a Turf Scout designed cart using a sub-meter GPS. \*Means followed by a different letter are statistically different (P=0.05)

On four rating dates, creeping bentgrass treated with GRIGG GreenPIG was significantly better overall quality compared to the untreated control, see Figure 5. On 23-Jun, GRIGG GreenPIG alone and GRIGG GreenPIG + GRIGG Ultraplex produced significantly better creeping bentgrass quality than the fungicide treatment and untreated control, see Figure 5.

Effect of pigments and foliar fertilizers on creeping bentgrass quality.  
McDonald, S. (2012)

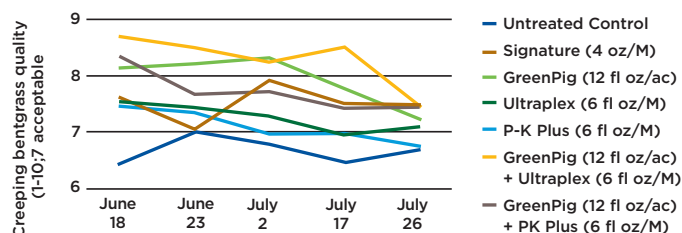


Figure 5. Effects of treatments on overall turf quality. \*GP treatments (3) significantly different from untreated control \*\*GP and GP+UP treatments significantly different from Signature and untreated control \$GP and GP+UP treatments significantly different from untreated control #GP+UP treatment significantly different from untreated control

## Recommendations

1. Maximize turf vigor using the correct cultural practices.
2. On cool season turfgrass, apply GRIGG GreenPIG sequentially with GRIGG P-K Plus® or GRIGG Ultraplex foliar nutrients in summer to maximize turf quality.
3. Use GRIGG GreenPIG at the recommended rates to improve turfgrass color.
4. For better overall turfgrass quality, apply GRIGG GreenPIG to increase the reflectance of harmful NIR light.