

**Impact of different nutrient formulations and liquid soil conditioners on sports turf quality, performance, vigor and playability (2017)**

**DATE:** June – October 2017

**PURPOSE:** BRANDT offers premium and advanced fertilizer technology, including GRIGG and Manni-Plex foliar nutrient formulations, and BRANDT iHAMMER – a fertilizer and photosynthetic activator. In this trial, we evaluated specific foliar or liquid fertilizers and liquid soil conditioner programs applied alone, or in combination, which were designed to increase turfgrass performance and improve soil physical properties on a moderate-high use athletic field. The programs, offering a mix of soluble nitrogen, minor nutrients, wetting agent, organic matter, seaplant extract and carbohydrate were designed as a sequential (applied every 14 days) routing approach to maintain high quality turfgrass during traffic and environmental stress.

**SUMMARY:** BRANDT's nutritional and soil-conditioning programs significantly improved turfgrass quality compared to nitrogen (N) control(s) and untreated plots. Additionally, the rotational programs that utilized a soil conditioner trended to improve soil physical properties, including reduced compaction and an increase in soil volumetric water content (%VWC). Considering the high use and traffic at the trial site and high heat, especially in the middle part of the trial, rotating BRANDT's nutrient and soil conditioning technology represents an effective way to maintain optimum vigor and soil surface characteristic under a typical sports field management program for warm season turfgrasses.

**GENERAL INFORMATION:**

Study Director: Gordon Kauffman III, Ph.D. – BRANDT  
Investigator: Gerald Henry, Ph.D. – University of Georgia.  
Brandt Rep: NA  
Location: '419' hybrid Bermudagrass sports field

**CROP DETAILS:**

Crop/Variety: '419' hybrid Bermudagrass (*Cynodon dactylon*)  
Crop/Variety:

**PLANTING TYPE, IRRIGATION & SOIL CONDITIONS:**

Irrigation Type: NA  
Planting Type: NA  
General Fertility: Maintenance  
Soil Type: Native sandy loam  
Plot Size: 10 X 20 ft.  
Replications: 4 - Random Complete Block

**PEST PRESSURE:**

Pest1: NA  
Pest2: NA

**WEATHER CONDITIONS:**

General Weather Cond.: Typical summer, Georgia  
During Application: Variable

**TREATMENT DETAILS:**

Crop Stage at App.: Mature hybrid Bermudagrass  
Crop Stage at App.:  
Site Type: Sports Field  
Plot Size: 10 X 20 ft.  
Application Date(s): Biweekly June 8 – October 2, 2017 - 8 total applications.  
Spray Volume/Carrier: 80 GAL H<sub>2</sub>O/A  
Application Method: CO<sub>2</sub> powered boom prayer  
Nozzle and Pressure: 4 Flat fan nozzles at 35 p.s.i.

**APPLICATIONS DETAILS: (M=1000ft<sup>2</sup>) (SEE BELOW)**

Application 1: \*  
Application 2: \*  
Application 3: \*  
Application 4: \*  
Application 5: \*

\* \*Weather at time of Appl\*

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### **APPLICATION DETAILS:**

#### **Products:**

##### Foliar

**Gary's Green Ultra** (13-2-3; 0.5Mg, 0.12Cu, 1.4Fe, 0.2Mn, 0.2Zn)

**Nutra Green** (5-10-5; 1Mg, 0.12B, 0.1Cu, 1Fe, 0.5Mn, 0.1Zn)

##### Liquid

**Brandt iHammer Upplause Plus** (10-0-0)

##### Liquid Soil Specialty (Conditioners)

**Rhizonify** (6-4-4; 0.2Fe, 0.05Mn, 0.05Zn)

**Bioblend** (10-0-0; 10Ca)

#### **Treatments: All RATES expressed per 1000ft<sup>2</sup> (M)**

<u>Application Timing</u>	<u>Products</u>
1. Every 14 days	Upplause Plus (6 fl. oz.)
2. Every 14 days	Gary's Green Ultra (12 fl. oz.) Nutra Green (6 fl. oz.)
3. Every 14 days	Rhizonify (12 fl. oz.) Bioblend (6 fl. oz.)
4. Every 14 days	Upplause Plus <i>rotated with</i> Rhizonify and Bioblend
5. Every 14 days	Gary's Green Ultra and NutraGreen <i>rotated with</i> Rhizonify and Bioblend
6. Every 14 days	Urea (5.23 fl. oz.)
7. Every 14 days	Urea (7.3 fl. oz.)
8. Untreated Control	

#### **Materials and Methods (Cont.)**

- Hybrid Bermudagrass sports field maintained at 1.25 inches with a rotary mower.
- Plots were mowed once a week and irrigation was applied through an automated irrigation system at a rate of 1.5 inches per week.
- The sports field received moderate play from various intramural sports including soccer and lacrosse.
- Treatment applications were watered in with approximately 0.25 inches of water the night following application.

#### **Assessments:**

- Soil moisture (% volumetric water content), soil compaction (penetration resistance; PSI), and plant health (NDVI) were measured with the Toro Precision Sense 6000 every two (2) weeks.
- Approximately 8 soil moisture and soil compaction readings were recorded per plot and averaged to generate one (1) measurement per plot that was used for analysis.
- The PS6000 continuously takes NDVI readings as it moves; so more than 8 NDVI readings were used to create an average per plot.
- Shear strength and surface hardness were recorded at trial initiation (6/8/2017) and trial termination (10/17/2017) with a Turf-Tec Shear Strength Tester (Newton meters) and a Clegg Impact Meter (G max),

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respectively. Three readings of each measurement were recorded down the center of each plot and averaged to give one reading per plot.

**RESULTS**

- Traffic and wear had a negative impact on all plots regardless of treatment throughout the length of the trial; however, some treatments resulted in greater tolerance to this stress than others, particularly between 12 and 14 WAIT (Figure 1).
- Rotations of **Upplause** and **Rhizonify + Bioblend** along with rotations of **Gary's Green Ultra + Nutra Green** and **Rhizonify + Bioblend** resulted in NDVI of 0.63, while the untreated check was 0.57 14 WAIT (Figure 1).
- At 16 WAIT, the lowest soil compaction was observed in response to rotations of **Upplause Plus** and **Rhizonify + Bioblend** (404 PSI) and **Gary's Green Ultra + NutraGreen** (409 PSI) (Figure 2).
- The trend was for rotations of **Upplause Plus OR Gary's Green Ultra + NutraGreen** and **Rhizonify + Bioblend** to have higher soil volumetric water content (%VWC) compared to urea (N) control(s). These fertilizer and liquid soil amendment treatments did not perform different than the untreated control, however (Figure 3).
- Shear strength and surface compaction in untreated check plots 14 WAIT were 6.6 Nm and 123 G max, respectively. At the conclusion of the trial (18 WAIT), rotations of **Upplause and Rhizonify + Bioblend** still exhibited the lowest soil compaction (336 PSI) and highest NDVI (0.53) compared to all other treatments. Untreated check plots resulted in soil compaction of 414 PSI and NDVI of 0.46 18 WAIT (Figures 1, 2 and 4).

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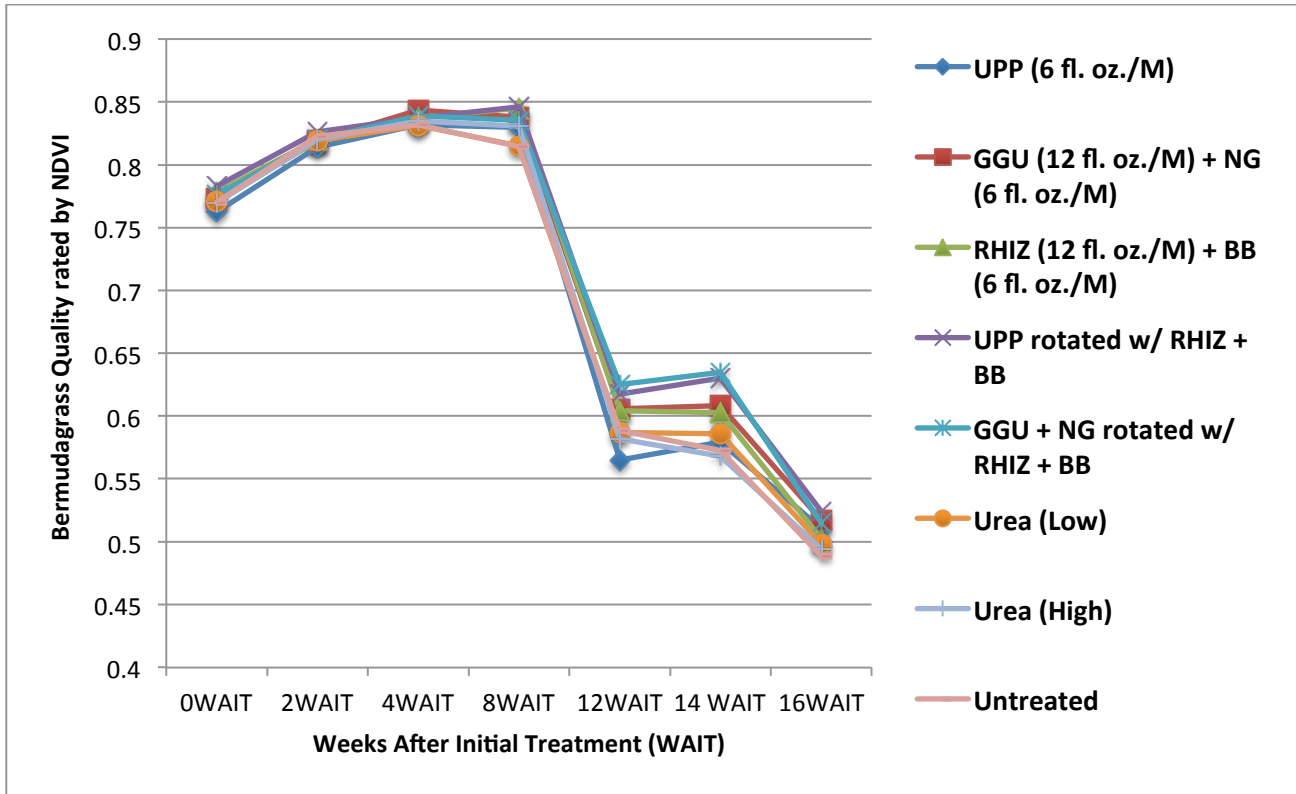


Figure 1. Impact of foliar nutrient and soil conditioners on Bermudagrass quality as measured by NDVI. Most treatment differences occurred 12-14 WAIT.

UPP=Upplause Plus; GGU=Gary’s Green Ultra; NG=Nutra Green; RHIZ=Rhizonify; BB=Bioblend

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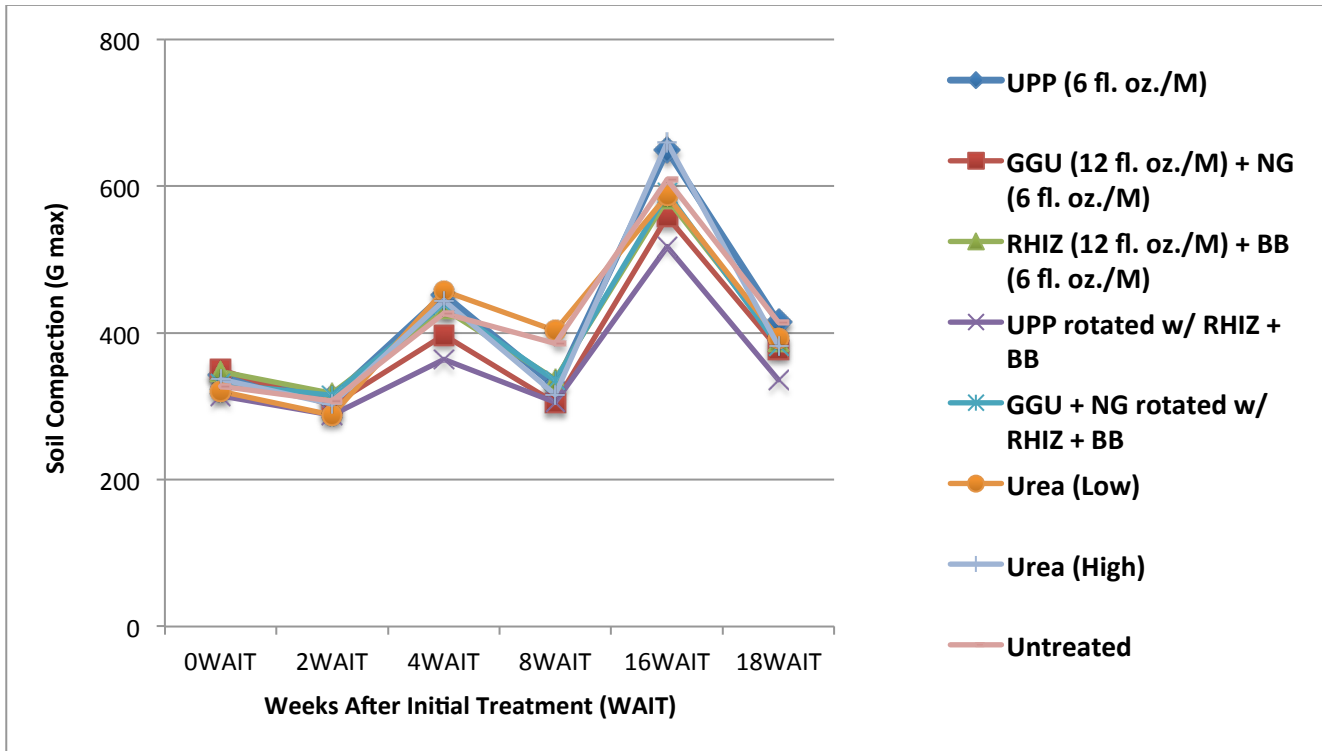


Figure 2. Impact of foliar nutrient and soil conditioners on soil compaction. Even as compaction increased 8 WAIT, UPP or GGU + NG rotated with RHIZ + BB treatments offered the lowest soil compaction readings towards the latter part of the trial.

UPP=Upplause Plus; GGU=Gary's Green Ultra; NG=Nutra Green; RHIZ=Rhizonify; BB=Bioblend

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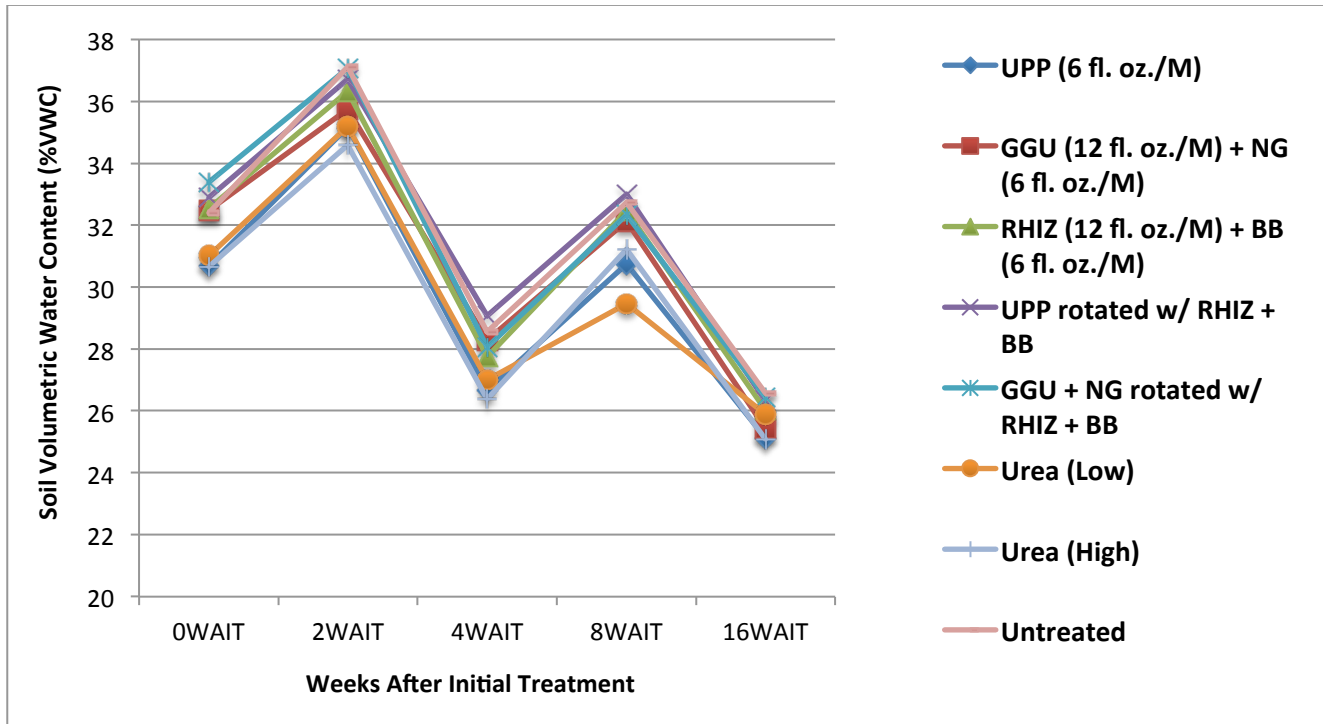


Figure 3. Impact of foliar nutrient and soil conditioners on volumetric water content (%VMC). Generally, any BRANDT/GRIGG treatment or combination treatment including UPP or GGU + NG rotated with RHIZ + BB treatments higher %VWC compared to urea, but not different from the untreated control.

UPP=Upplause Plus; GGU=Gary's Green Ultra; NG=Nutra Green; RHIZ=Rhizonify; BB=Bioblend

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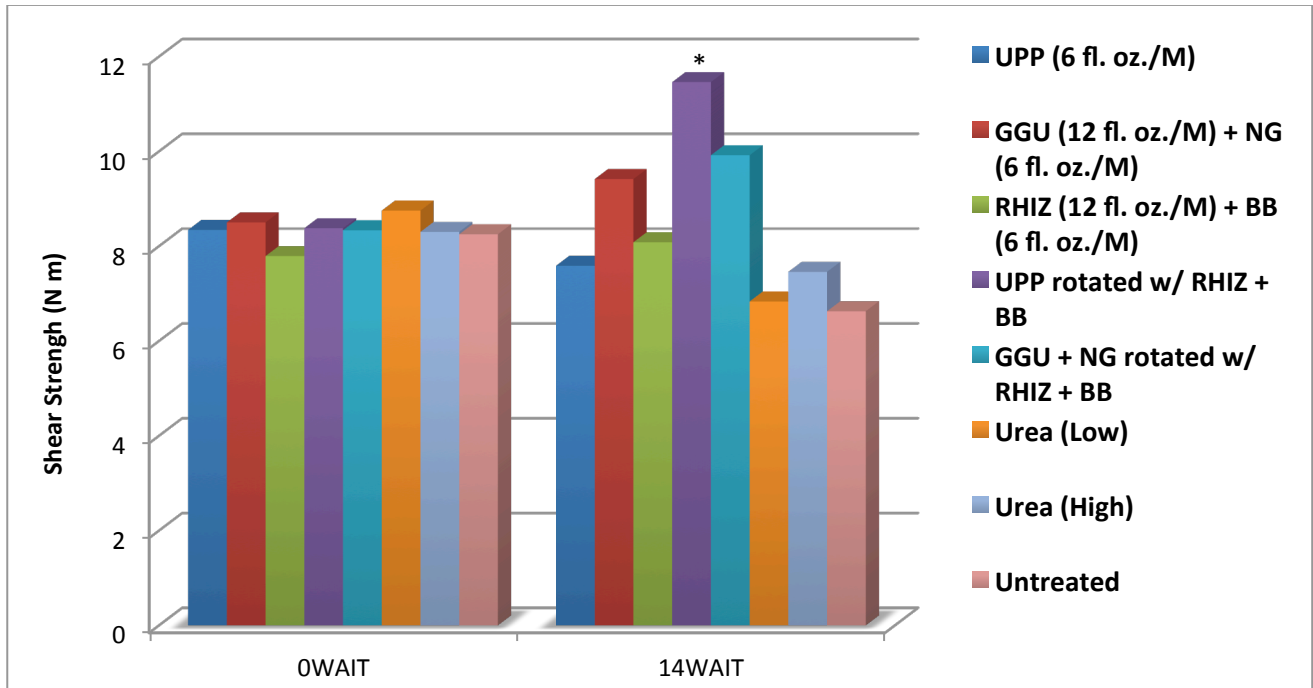


Figure 4. Impact of foliar nutrient and soil conditioners on Bermudagrass shear strength. 14 WAIT, UPP or GGU + NG rotated with RHIZ and BB provided the best shear strength, a good indication of improved turfgrass vigor and playability. UPP=Upplause Plus; GGU=Gary's Green Ultra; NG=Nutra Green; RHIZ=Rhizonify; BB=Bioblend  
\* (P=0.05)

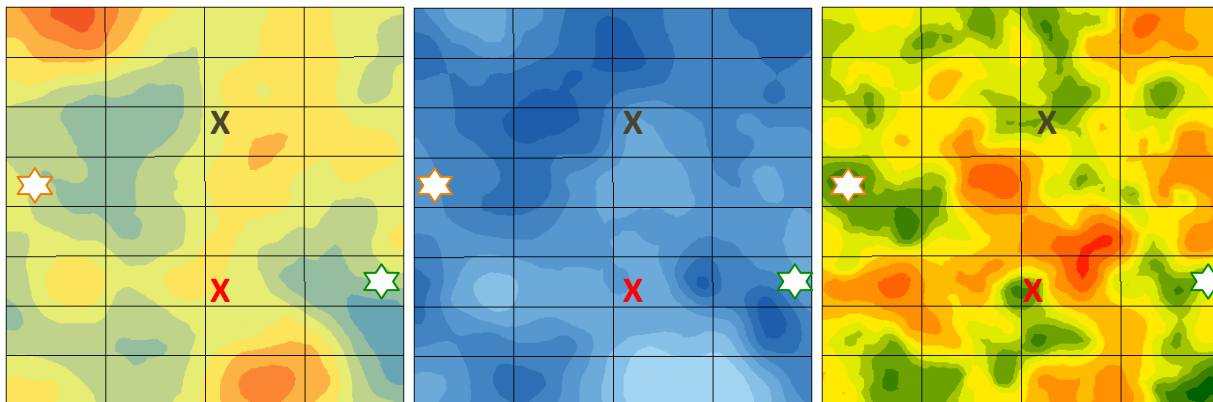


Figure 5. Maps from left → right showing plot data for a.) soil compaction b.) %VMC and c.) NDVI. Data collected with Toro Precision Sense 6000.

☆=GGU and NG rotated with Rhizonify and Bioblend; ☆=UPP with Rhizonify and Bioblend  
X =urea control; X=untreated control

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**RECOMMENDATIONS**

- Maximize turfgrass performance and sports turf playability by rotating foliar (**GGU + NG**) or liquid fertilizer (UPP) applications with select liquid soil conditioners (**RHIZ + BB**).
- Utilize **GRIGG** organic chelation technology (**GGU and NG**) OR **BRANDT iHammer** advanced fertilizer technology (**UPP**) and **GRIGG** liquid soil conditioners (**RHIZ and BB**) to optimize turfgrass performance and soil physical parameters on high traffic sports fields.
- Rotate nutrition (**Brandt iHAMMER or GRIGG**) AND liquid soil conditioners (**GRIGG**) to decreased compaction, increase %VMC, improve turf quality (NDVI) and increase turf shear strength.