



Research Driven,
Proven Results®

TECHNICAL BULLETIN

USING GRIGG PROVEN FOLIAR® NUTRIENTS FOR SUMMER STRESS AND ANTHRACNOSE MANAGEMENT

GRIGG Proven Foliar nutrients have been synonymous with quality, compatibility and performance. GRIGG is committed to providing the highest quality turf nutrition products and agronomic solutions that are backed by research, plant science and innovation.

GRIGG has focused its research on maximizing plant health through the use of high efficiency foliar nutrients and elicitors like phosphite ($H_2PO_3^-$); understanding nutrient/pathogen interactions; and evaluating the synergy between foliar nutrients and fungicides applied at low label rates. To see a full list of GRIGG research, visit www.grigg.co.

Overview of Integrated Pest Management (IPM) on Turfgrass

Integrated Disease Management focuses on three important concepts:

- Utilizing all options (biological, cultural, chemical)
- Establishing maximum disease thresholds and designing strategies to manage at acceptable levels
- Protecting the environment

To effectively manage fungal pathogens on turfgrass systems, best fertilizer practices should be used. This begins with identifying the disease(s) present and/or have the greatest risk of occurring and choosing the best source, rate and application method of nitrogen (N). It is important to maintain balanced and adequate nutrition when environmental conditions become conducive to disease development.

**For a distributor near you contact:
800 300 6559 or www.grigg.co**

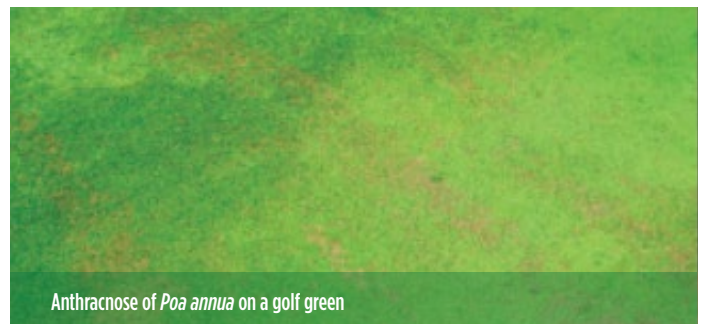
GRIGG is part of Brandt Consolidated, Inc.
2935 South Koke Mill Road
Springfield, IL 62711
www.brandt.co

Conditions That Lead to Summer Stress Syndrome

Adverse environmental conditions such as high heat, drought, and/or salinity combined with low mowing heights and disease pressure often lead to 'summer stress syndrome' in the transition zone and northern climates where cool season grasses are managed. This general malaise of creeping bentgrass (*Agrostis stolonifera*) includes a general decline in turf vigor, limited root function, poor recuperative capacity, and increased disease pressure.

Anthracnose Management

Anthracnose (*Colletotrichum cereale*) is a major disease problem on golf course putting greens. An integrated approach is the most effective management strategy for lessening the severity and incidence of this disease, including the utilization of appropriate cultural practices and a rotational fungicide program. Low mowing heights, low N or unbalanced fertility, and plant stress will increase the risk for disease development.



Anthracnose of *Poa annua* on a golf green

Field Trial: GRIGG Proven Foliar Nutrients and Fungicide Synergy for Summer Stress Management

Creeping Bentgrass, Virginia Tech University, 2008, Horvath, B.J. and McCall, D.S.

In 2008, research was conducted at Virginia Tech University to evaluate the effectiveness of low dose and frequent foliar nutrient applications, including those containing phosphate (PO_4^{3-}), phosphite (H_2PO_3^-) and a fungicide to alleviate creeping bentgrass summer stress.

In this trial, GRIGG P-K Plus[®] was applied with a fungicide (3.2 oz/M of Daconil Ultrex[®]) and compared to an untreated control, as well as turf treated with a rotational pesticide program utilizing five different fungicides (4 oz/M Signature[™] Ultra, 2 oz/M Tartan[®], 4 oz/M Chipco[®] 26 CT and 3.2 oz/M Daconil Ultrex).

GRIGG P-K Plus is a GRIGG Proven Foliar nutrient product that contains 3-7-17 + micronutrients + 14% potassium phosphite.

Observations

Turf treated with GRIGG P-K Plus and a fungicide had superior turf quality compared to the untreated control and similar turf quality of the turf treated with fungicides only, see Figure 1.

Season-Long Performance of Various Spray Programs on Golf Greens (2008) Horvath, B.J. and McCall D.S., VA Tech U.

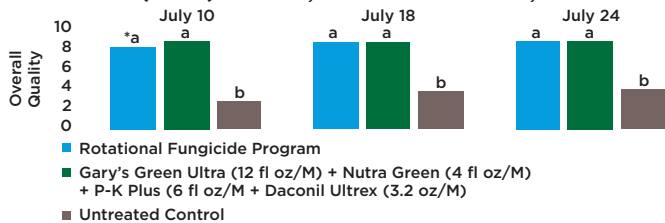


Figure 1. Overall quality of creeping bentgrass exposed to summer stress and treated with foliar Nutrition program plus Daconil Ultrex or rotational fungicide program. *Means followed by a different letter are statistically different (P=0.05)

The second observation was that turf treated with GRIGG P-K Plus had the best color as measured by the relative color index (RCI) ratings, see Figure 2.

Season-Long Performance of Various Spray Programs on Golf Greens (2008) Horvath, B.J. and McCall D.S., VA Tech U.

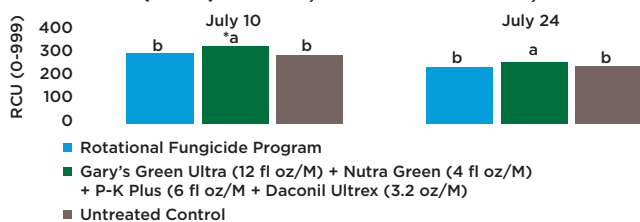


Figure 2. Relative Color Index (RCI) (0-999) of creeping bentgrass exposed to summer stress and treated with foliar Nutrition program plus Daconil Ultrex or rotational fungicide program. *Means followed by a different letter are statistically different (P=0.05)

Recommendations

To maintain excellent creeping bentgrass quality, GRIGG recommends the use of a foliar nutrition program on a 14 day spray interval that contains adequate nitrogen (0.13 lb N/M), phosphate (PO_4^{3-}), phosphite (H_2PO_3^-), micronutrients, and a broad spectrum contact fungicide. This will ensure adequate turfgrass nutrition during summer stress, including phosphite (H_2PO_3^-) for plant health, while limiting pesticide use as part of an integrated approach to disease management.

Field Trial: GRIGG Proven Foliar Nutrients and Fungicide Synergy on Anthracnose Management

2008, Rutgers University, Annual Bluegrass, BB Clarke.

In 2008, research was initiated at Rutgers University to determine the effect of highly efficient foliar nutrients, including those that contain potassium phosphite ($\text{K}_2\text{P}_2\text{O}_7$) applied alone or in combination with low label fungicide rates on anthracnose incidence and severity on an annual bluegrass (*Poa annua*) putting green.

In this trial, GRIGG P-K Plus was applied with a fungicide (1.8 oz/M of Daconil Ultrex) and compared to an untreated control, as well as turf treated with the fungicide alone.

Observations

Turf treated with GRIGG P-K Plus and a fungicide had excellent anthracnose suppression and was significantly better than the untreated check and consistently better, on average, than either Daconil Ultrex (1.8 oz./M) or GRIGG P-K Plus (6 fl oz/M) applied alone, and statically similar to Daconil Ultrex (3.2 oz/M) and Chipco Signature (4 oz/M) treatments, see Figure 3.

Impact of Chemical and Biological Fungicides for Preventative Control of Anthracnose on Annual Bluegrass Green (2008), B.B. Clarke, Rutgers University

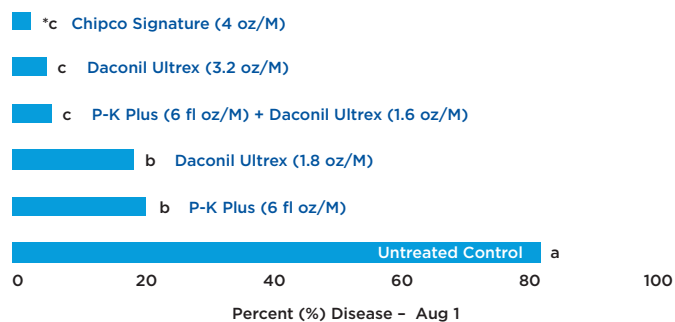


Figure 3. Turf area infested by anthracnose (%) as affected by fungicides, foliar fertilizer containing potassium phosphite, and combination foliar fertilizer and low label fungicide rate. *Means followed by a different letter are statistically different (P=0.05)

Recommendations

To maintain turfgrass quality and effectively manage anthracnose, GRIGG recommends the use of P-K Plus of used regularly (14 days) with a low label rate fungicide (Daconil Ultrex (1.8 oz/M), which should start before environmental conditions become conducive to disease development. P-K Plus provides adequate mineral nutrient and potassium phosphite ($\text{K}_2\text{P}_2\text{O}_7$) to turf during environmental stress periods and improves overall plant health, by upregulating plant metabolism and defense mechanisms, including antioxidant and phytoalexin production.

Signature Ultra, Tartan, and Chipco 26 GT are all registered trademarks of Bayer Crop Sciences Daconil Ultrex is a registered trademark of Syngenta Crop Protection