Spring Fertilization: Cool and Warm Season Grasses
Transition Zone and Southern Climates

Spring green-up is an important period in golf turf management. For bentgrass greens, or for transitioning from cool to warm season species, spring growth can set the stage for the season to come. Bentgrass emerges from slow growth during the winter in a vegetative growth phase but soon shifts to a reproductive phase as day length increases. Once this shift occurs, the plant is geared to produce flowers and seed even when both are prevented by close mowing. From that time until weather conditions break in mid to late summer, the bentgrass plant is using more energy than it is producing. Root systems decline as carbohydrates are consumed. Bentgrass vigor on Southern greens decreases as temperatures rise into the summer. Therefore, promoting excessive growth through improper fertilization in the spring depletes energy reserves that will be needed during the summer stress period ahead.

Bermuda and zoysia emerge from winter dormancy and slowly gear up as temperatures rise and day length increases through the spring. The most active growth in warm season species occurs in the heat of the summer. As a result, they need light feedings in the spring to establish good color and turf quality but to conserve energy for summer growth.

The first objective of a spring nutrition program is to optimize color and playing surface consistency without excessive top growth. The second objective is to prepare bentgrass for the summer stress period to come, or to prepare bermuda and zoysia for the active mid-summer growth period. BioPro nutrient products are ideal for spring fertilization. They produce deep consistent color, dense upright tillering without excessive top growth and increase the uptake of important nutrients such as calcium, potassium, magnesium, and iron for maximum summer stress tolerance in bentgrass.

Nutrient Monitoring Program

The following program should be used as a guide. Monitoring nutrient levels in leaf tissue and soils is critical for designing the most efficient nutrient program. BioPro recommends the use of a diagnostic service that provides soil, water, and NIRS (Near Infrared Reflectance Spectroscopy) tissue analysis. With diagnostic results, BioPro nutrient programs may be modified to correct imbalances and prevent future problems.

Application Recommendations

March 15

1) Multi-Purpose (6-0-0) ***or***	6 oz.
2) Enviro K (0-0-30)	3 oz.
3) Iron Plus (15-0-0)	3 oz.
4) Organic Granular (0.75 lb. N/1000sf)	6.25-13 lb.
5) CytoGro	0.8 oz.
6) H3O	6.25 oz.

April 1

1) Multi-Purpose (6-0-0) **or**	3 oz.
Bio CN (24-0-0)	3 oz.
2) Turf Starter (8-16-5)	15 oz
3) Magnesium Plus (7-0-0-6)	3 oz
4) Tuff Greens (0-0-13)	2 oz.
5) Iron Plus (15-0-0-6)	3 oz.

April 15

1) Multi-Purpose (6-0-0)	3 oz.
2) Iron Plus (15-0-0-6)	3 oz.
3) Enviro K (0-0-30)	3 oz.
4) Calcium Plus (8-0-0-10)	6 oz.
5) Greens Plus (14-4-10)** (0.25 lb. N/1000sf)	20 oz.
6) CytoGro	0.4 oz.
7) H3O	2 oz.

May 1

1) Multi-Purpose (6-0-0)	3 oz.
2) Iron Plus (15-0-0-6)	3 oz.
3) Tuff Greens (0-0-13)	2 oz.
4) Greens Plus (14-4-10) (0.25 lb. N/1000sf)	20 oz.

May 15	
1) Multi-Purpose (6-0-0)	3 oz.
2) Iron Plus (15-0-0-6)	3 oz.
3) Enviro K (0-0-30)	3 oz.
4) Calcium Plus (8-0-0)	6 oz
5) Greens Plus (14-4-10)** (0.25 lb. N/1000sf)	20 oz.
6) CytoGro	0.4 oz.
7) H3O	2 oz.

June 1	
1) Multi-Purpose (6-0-0)	3 oz.
2) Iron Plus (15-0-0-6)	3 oz.
3) Tuff Greens (0-0-13)	2 oz.
4) Greens Plus (14-4-10)** (0.25 lb. N/1000sf)	20 oz.

June 15 begin BioPro Mid-Summer Heat Program

** May substitute Greens Plus (12-0-12) when phosphorus is not desired.

***Mixing*:** Fill spray tank with ½ the necessary water; add *Multi-Purpose* or *Bio CN* first, then additional products one at a time; if *Calcium Plus* is in the mix add it last; add remaining water last.

BioPro Products

Bio CN (24-0-0) is a higher nitrogen, compost-derived soil conditioner containing humic acids and other microbially produced organic compounds. The additional nitrogen in *Bio CN* stimulates faster decomposition of organic material by improving the Carbon to Nitrogen ratio.

Calcium Plus (8-0-0) is a chloride free, readily available calcium source. Calcium is critical for vigorous new growth and for establishing stress tolerance for the next season.

CytoGro (Liquid Root Biostimulant) is an EPA registered hormone biostimulant that improves turf tolerance to stress resulting from disease, insect damage, drought, and soil temperature extremes by augmenting cytokinins and auxins, the turf's natural growth hormones.

Enviro K (0-0-30) provides potassium from potassium carbonate, a high quality, less caustic, chlorine-free source that is retained in the root zone longer for more uniform and consistent uptake by plants. It also contains organic acids from leonardite, which enhances turf performance and improves soil quality. Potassium's role in stress tolerance and recovery is well known.

Greens Plus 14-4-10 & 12-0-12 (Liquid NPK Nutrient Blend) are balanced nutrient blend with nitrogen, phosphorous, and potassium in the same ratio as they are generally found in plant tissue. Nitrogen is supplied as a polymethylene urea blend to provide uniform turf growth and color. This product contains 8.85% controlled release nitrogen, and organic acids from leonardite, which may enhance nutrient uptake.

H3O (Liquid Soil Moisture Management Product) employs a revolutionary new chemistry formulated to manage root zone moisture, making efficient use of water and protecting the turf from the harmful effects of drought stress, thus reducing disease pressure and root shrinkage. It attracts and holds free water molecules from the air within the soil, and efficiently transfers them to the plant root.

Iron Plus *(15-0-0)* is a particularly effective Fe source. Humic acid is known to be an excellent organic chelator of Fe increasing its availability for plant uptake and mobility within plant tissue.

Multi-Purpose 6-0-0 (Liquid Organic Soil Conditioner) is a unique mixture of organic acids and biostimulants derived from a biological composting and extraction process. It is designed to increase nutrient availability to the plant, stimulate soil microbial activity, increase root mass, and improve overall turf quality.