Layering Reduction in Greens

Layering in golf greens reduces turf vigor and quality due to restricted root growth, poor internal drainage and aeration, immobilized nutrients, etc. Organic matter from surface thatch, thatch buried by improper topdressing, black layers from anaerobic microbial activity, or the interface with compacted soil at aeration tine depth can all cause these conditions in push-up or heavy soil greens. High sand-content greens can develop similar problems in the top few inches of the profile due to the accumulation of organic matter from dead roots and lack of microbial activity (decomposition) reducing water infiltration, drainage, and restricting root growth. The use of irrigation water high in silt can result in surface layering in both high-sand and heavy soil greens.

BioPro soil conditioners containing soluble carbohydrates and humates can stimulate microbial decomposition of organic layers, especially when applied in conjunction with aeration. Infiltration and internal drainage characteristics are improved, nutrients tied up in organic forms are recycled for plant uptake, and root growth is enhanced.

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

Application timing is specified. All product quantities are on a per 1000 sq. ft. basis. This program can be repeated at reduced rates if necessary, or at full rates the following spring or fall.

1st Application	
1) Bio CN (24-0-0)	6 oz.
2) Calcium Plus (8-0-0)	3 oz.

2nd Application (14 days after 1st)	
1) Multipurpose (6-0-0)	6 oz.
2) Calcium Plus (8-0-0)	3 oz.
3) Greens Plus (14-4-10)	12 oz.

*** Microbial activity should be high after the 2nd application. Reapplying Bio CN after 7 days sustains the activity at a high level.*

3rd Application (7 days after 2nd)**	
1) Bio CN (24-0-0)	6 oz.
2) Calcium Plus (8-0-0)	3 oz.

4th Application (14 days after 3rd)	
1) Multipurpose (6-0-0)	6 oz.
2) Magnesium Plus (7-0-0-6)	3 oz.
3) Greens Plus (14-4-10)	12 oz.

Resume seasonal BioPro nutrient program after last application.

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.*

Notice: Calcium and magnesium products should not be mixed with liquid fertilizers containing phosphorus.

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.

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.

Magnesium Plus (8-0-0-6) is an excellent source of plant available magnesium with an organic base. Magnesium is involved in increasing stress tolerance in turf plants.

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.

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