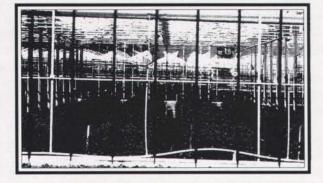


The STOCKOS RB 300 series superabsorbents are 100% Potassium polyacrylate/polyacrylamide copolymers formulated specifically for agricultural and horticultural applications.



Enhances turf Reduces growing time Reduces moisture stress

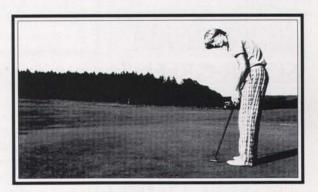


STOCKOS RB Superabsorbent Polymers-A contribution to modern agriculture and horticulture. AFFORDABLE AND EASY TO USE!

Reduces total water consumption Eliminates transplant shock Reduces leaching of nutrients



Improves plant yields Produces aeration in soil Retains moisture



STOCKHAUSEN, Inc. 2408 Doyle St. Greensboro, N.C. 27406 1-800-334-0242 Call for the nearest Stockhausen distributor Circle 113 on Postage Free Card

Organic Amendments

continued from page 30

biological reactions occurring in the rootzone require oxygen. When oxygen is depleted faster than it can enter and diffuse into the rootzone mix, these reactions change. When this occurs, obstructions to water and air movement can develop within the mix, and toxic gases are produced. Both can lead to a poor turf stand and higher maintenance costs.

Humus is a desirable component of any soil system. The more humus present, the better the nutrient retention and cation exchange capacity of the mix. Nutrients such as ammonium, calcium, sodium, and magnesium bind to humus instead of leaching through the rootzone. The carbon to nitrogen ratio of humus is also a favorable 15:1. The humus content of the organic component is an important indication of its value in the mix.

The moisture content of organic amendments is another consideration. Dry organic materials may not rewet to their original moisture content. In general, the moisture content of an amendment should not drop below 30 percent. This level should also be consistent within the material prior to mixing with the sand. Steps



Physical Data For The Amendments In a Mix

Organic Amendment Mix	Infiltration Rate in/hr	40 cm Water Holding %	Bulk Density g/cc	
Gillibrand Sand 100%	108.9	4.3	1.6	
90% Sand:10% Redge-Sedge	19.9	17.1	1.5	
80% Sand:20% Sphagnum	65.1	13.1	1.3	
80% Sand:20% Rice Hulls	101.0	14.9	1.4	
80% Sand:20% Fir Bark	71.9	12.2	1.4	

should be taken to maintain moisture content prior to mixing with sand.

For the purpose of comparing various organic amendments for sand-based turf systems, four commonly used products were evaluated for their suitability. They are a reed-sedge peat from North Dakota, a Canadian sphagnum peat, a rice-hull compost, and a fir bark product from California. All four are frequently submitted to soil labs for evaluation.

The two tests usually performed for this purpose are total carbon and pH. In this case, tests were also performed for C:N ratio and humic acid content.

The moisture content of all four amendments was adequate, ranging between 31 percent for Canadian sphagnum to 43 percent for the fir bark.

The nitrogen content of the reed-sedge peat was more than twice that of Canadian sphagnum and three times that of rice hull compost. The mineral content of the rice hull compost and the fir bark is high but only a small amount is nitrogen.

The two main components supplied by organic amendments are carbon and water. The nitrogen and mineral content are indicators of the organic material's nutrient value. The nitrogen content, when compared to the carbon content, also shows how well decomposed the organic fraction is.

Reed sedge peat had the only carbon-tonitrogen ratio (23:1, dry weight basis) that would not tie up nitrogen. It was the most decomposed, and also had the highest cation exchange capacity and humic acid content. Canadian sphagnum ranked second in these areas.

Based on the test data, the Dakota reed sedge peat has several attributes that make it appealing as an amendment for high-performance rootzones.

The most significant test is for the characteristics of sand mixes containing these amendments. The infiltration rate of the sand, supplied by P.W. Gillibrand Co., is very high without an amendment, while the water-holding capacity is very low.

The interaction of an organic amendment with the sand component will vary slightly from one sand to another. All amendments enhanced the mix physically to some degree. All the mixes met the USGA criteria for water holding and decreased bulk density. Based on the C:N ratio and total carbon content, the rice hull compost does not fit USGA criteria. The fir bark product contains a better total carbon content but has a high C:N ratio.

The lowest infiltration rate, still almost 20 inches per hour, was for ten percent reed sedge peat and 90 percent sand. It is interesting to note that this mix had a better infiltration rate and water holding capacity at a ten percent volume than the other amendments at a 20 percent volume.

There have been some problems associated with mixes that have high infiltration rates and are made of materials with wide C:N ratios. The combination of nitrogen/air competition, low nutrient retention, and high infiltration rates can make the turf grow-in period a prolonged and difficult process. Even though the grow-in may appear to be going well, the cost of nitrogen and fungicide inputs is usually high. Some of the rice hull mixes observed in the field never achieved full grow-in, even with high nitrogen rates.

Based on the data collected on the four organic amendments, the Dakota reed sedge peat meets all the technical criteria necessary for construction of a high-sand rootzone. The Canadian sphagnum would be the next best amendment.

There are significant differences among organic amendments mixed with sand in high-performance turf systems. By testing amendments prior to construction and following specifications such as the USGA's, a turf system will establish quickly and perform well for years under reasonable maintenance levels.

Editor's Note: Charles Dixon directs the Turf Services Division of K. W. Brown & Associates, Inc., College Station, TX.

CHALKBOARD

TIPS FROM THE PROS

KENTUCKY BLUEGRASSES DESERVE BETTER IMAGE

Rentucky bluegrasses, the backbone of the golf and sports turf market in the north, have been suffering from an identity crisis lately. The volume of proprietary perennial ryegrass, tall fescue, and creeping bentgrass has leaped during the '80s, partly at the expense of bluegrass. However, if you listen to turf breeders, the seed market relative to the golf and sports turf industry has not yet stabilized. The jury is still out.

Development of improved Kentucky bluegrasses simply takes longer than other cool-season turfgrasses. While an exceptional tall fescue or ryegrass can go from test plots to production in less than five years, a better bluegrass takes ten or more years to get to market. Quite a few of the big-name Kentucky bluegrasses on the market today have been around for more than 15 years.

The primary improvement of Kentucky bluegrasses during the past 20 years has been in the areas of disease resistance, shade tolerance, darker color, density, and heat and drought tolerance. Beginning in the '60s, seed companies could patent improved varieties to get a return on their research and marketing investment. The market began to swing away from common types toward proprietary varieties. Today, proprietaries dominate the golf and sports turf market.

Research continues for bluegrasses that require less frequent mowing, can be mixed with turf type tall fescues, and have greater resistance to regional disease problems. The goal has been to provide dense turf that requires less maintenance.

Meanwhile, the maintenance level of golf and athletic field turf has been increasing to meet the growing demand for safe, high-quality recreational turf areas. Use levels and higher standards are pushing turf to its limits. Golfers want fairways cut at 1/2-inch, superintendents stretch their water supply by cutting back irrigation in the roughs, coaches and players want low-cut fields like the pros, and groundskeepers have to make repairs in days instead of months.

"Breeders have begun to focus more

attention on the requirements of the sports turf industry for bluegrasses," explains Dr. Douglas Brede, director of research for Jacklin Seed Co., Post Falls, ID. "A growing number of seed companies and universities have machines for testing the wear tolerance of turfgrasses in their plots. Hopefully, wear testing will become part of NTEP's (National Turfgrass Evaluation Program) Kentucky bluegrass test going in this fall."

While U.S. breeders have been concentrating heavily on density, dark color, and fine texture, their European counterparts have been more concerned about wear tolerance. European cultivars tend to be lighter green, more wear tolerant, more aggressive, and green up earlier in the spring. "The Europeans have been torturing their grasses, while we have been holding a beauty contest," says Brede. "It's a matter of priorities, and maybe it's time for us to change ours."

Virtually every seed company recommends that mixtures of two or three Kentucky bluegrasses should be sown to provide the broadest protection against diseases, shade, and site conditions. Mixtures offer the widest range of adaptation and allow flexibility where conditions vary within the turf facility. The best-adapted variety will dominate the stand within a few years.

In residential and commercial turf, where traffic is not the primary concern, blends of moderately aggressive Kentucky bluegrasses have been fairly standard. This prevents one aggressive type from overtaking the stand. However, the aggressive component may not be best suited for disease or shade conditions and will be more prone to creating thatch.

For golf and sports turf, a certain amount of thatch is desired. The turf manager has the ability and equipment to manage it. His primary needs are traffic tolerance and rapid recovery. As far as diseases are concerned, the main problem is overwatering, says Dr. Virgil Meier, turf breeder for O.M. Scott & Sons in Marysville, OH. The use of a well designed, well managed irrigation system plus adequate drainage can go a long way in gaining control over many diseases.

"Our results over the past two years have been that the denser, more aggressive varieties of each species have shown the best traffic tolerance under our traffic simulator," reveals Dr. William Meyer, director of research for Turf Seed, Inc., in Hubbard, OR. "Comparing species, the perennial ryegrasses are usually the most traffic tolerant, followed by the better Kentucky bluegrasses and tall fescues."

It is also important to remember that Kentucky bluegrass is the only one of these three species that creeps. "Kentucky bluegrasses will cover two to three times the area covered by ryegrasses or tall fescues during establishment," adds Meier. "It should be the base of any fairway of sports field north of the transition zone."

In the long run, bluegrass can take a lower cut than perennial ryegrass," Meier adds. "Those turf managers who tried to manage perennial ryegrass [without bluegrass] are switching back. They still use ryegrass for repairs and spot seeding, because it germinates so quickly.

"Kentucky bluegrass should be mixed with perennial ryegrass (50:50) during overseeding, once before the fall season and [then again] immediately after the season ends. By the spring, you will have restored the bluegrass base."

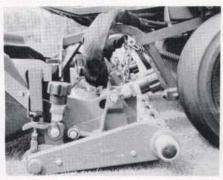
The slow rate of germination for Kentucky bluegrass is partially solved by mixing it with perennial ryegrass. In the future, seed priming and pregermination may speed up establishment by weeks. However, Kentucky bluegrass still needs time to spread and must be maintained throughout the growing season.

Superintendents and sports turf managers can take advantage of modest price reductions in many varieties of Kentucky bluegrass this fall. Most companies report good supplies and lower prices. However, some varieties are already sold out.

More specific comparisons of varieties are available from the National Turfgrass Evaluation Program, c/o Kevin Morris, U.S. Department of Agriculture, Agricultural Research Center, Beltsville, MD 20705.

ROOKIES PRODUCT UPDATE

GREENS CONDITIONING ATTACHMENT



Designed for use on Ransomes Greens 3000 mower, the Verti-groom unit conditions and improves greens' surfaces by cutting lateral growth and removing thatch. The result is a more consistent finish to each green and a smoother putting surface.

The unit is mounted in front of a

grooved roller to shorten the distance between the rollers, which reduces the incidence of scalping. It consists of 34 steel blades, each with five cutting teeth. The blades rotate at high speed and are spaced for optimum performance and minimum damage from obstructions.

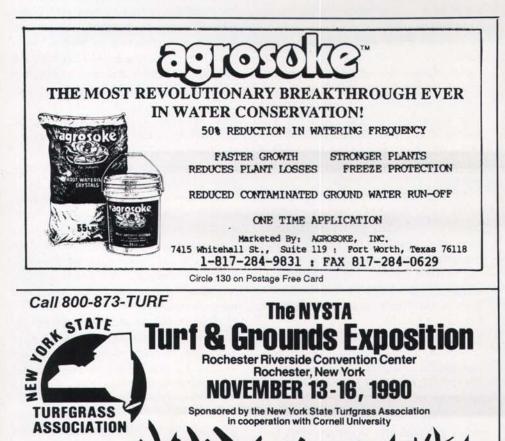
The attachment floats with undulations in the turf and can be raised easily to provide 1/2-inch ground clearance for normal greens mowing. It driven by a toothed belt and utilizes a simple hand-operated clutch to disengage the drive for normal greens mowing.

RANSOMES, INC. Circle 179 on Postage Free Card

MOISTURE SENSOR

The Aquamiser microelectronic moisture sensor automatically measures the relative change in soil moisture at the plant root zone, compares it to the desired moisture levels set by the user, and prevents the sprinkler system from operating once the required moisture levels are met. The unit eliminates the guess work of reprogramming to meet changing climatic conditions.

A valuable tool for irrigation management, the moisture sensor saves water and can lower operation costs. One unit can be set to control a single valve, a group of valves, or an entire system on a single program. Separate units can be installed to control independent programs on the same controller. The moisture sensors adjust to most types of soil and can be installed with either new or existing irrigation systems. **RAIN BIRD SALES, INC./TURF DIV.** Circle 183 on Postage Free Card



SOLID TINE AERATOR SYSTEMS



Cushman has introduced tine holder attachments and 1/4-inch solid tines for the Ryan GA 30 and GA 24 aerators. The tines are designed for mid-summer and off-season aeration to supplement regular spring and fall core aeration treatments. They increase oxygen, nutrient, and water intake to the turf rootzone but do not pull cores to the surface.

The system for the GA 30 aerator includes "quint" tine holders with five 1/4inch solid steel tines and adjustable spacing. The GA 24 unit can be equipped with quad tine holders with four 1/4-inch tines and one-by-one-inch spacing. **CUSHMAN. INC.**

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Fine Lawn Research proves ... not all perennial ryegrasses are created equal.

As a professional turf manager, you know there <u>are</u> measurable differences between turfgrasses. And, as

research has proven, Stallion is the new breed in turf type perennial ryegrass. No longer is your choice limited to look-alike perennial ryegrasses. Stallion establishes quickly, performs well under moderate to low fertility and, with its heavy tillering ability, produces the dense turf you require. Stallion's rich color and fine leaves blend extremely well with other perennial ryegrasses, bluegrass, fine or tall fescues. So, whether you're establishing new turf, reseeding or overseeding, remember, strength of breeding always shows — Stallion — a breed apart!



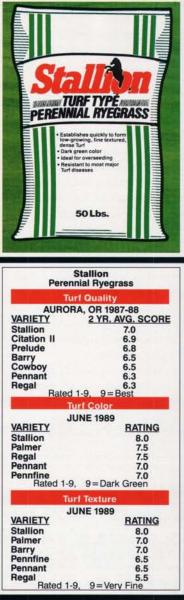


For additional information, see your distributor or dealer, or write to Fine Lawn Research, Inc. 4900 Blazer Pkwy. Dublin, Ohio 43017



Since not all fairways, athletic fields, or office parks are created equal, Fine Lawn Research developed Triple Play. This is a unique blend of perennial ryegrasses that can be carefully tailored to the specific needs dictated by the use and climate conditions in your area. Triple Play includes Stallion plus two other elite turf type perennial ryegrasses. You no longer have to settle for a perennial ryegrass blend that is only satisfactory. You can have Triple Play blended to your requirements. Ask your local distributor how you can get Stallion blended specifically for you!









ROOKIES PRODUCT UPDATE

FERTILIZERS

Humax fertilizers are a viable alternative to chemical-based products. Using a colloidal process, the company has developed a line of 3-2-0 fertilizers that makes efficient use of nitrogen, phosphate, and potassium. By combining these essential plant nutrients with the advantages of organic material in the soil, the fertilizer creates an ideal growing environment.

The Humax Base reactor process breaks down organic waste materials into humic acid. Fertilizer nutrients are then attached to these humic acid molecules to form a large organic colloid, with nutrients readily available for plant uptake.

These newly bonded nutrients are then held stable in the plants' root systems, which increases, draws out, and strengthens their feeding capacity. By creating a well balanced, ecologically sound, and biologically active soil structure, fewer applications are required and less water is needed to maintain growth.

HUMAX CORP. Circle 191 on Postage Free Card

ADJUSTABLE ARC SPRINKLERS

Designed for sports fields, golf courses, and other large turf areas, Hunter I-40-ADS sprinklers can be set simply at any arc between 40 and 360 degrees with the water on or off. For installations requiring full-circle coverage, this sprinkler is also available as Model I-40-36S, a fixed, 360-degree fullcircle unit.

Both models come with five interchangeable nozzles to vary the radius and discharge rate. The radius can be varied



from 45 to 67 feet and the discharge rate can be adjusted from seven to 25.3 gpm.

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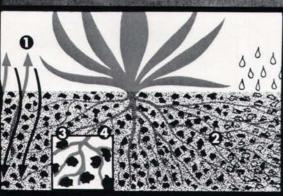
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Terra-Green® Soil-Conditioner





Photomicrograph (enlarged 2,100 times) of Terra-Green Soil Conditioner granule. Note unusual porosity for unequalled water absorption and retention.



4 ways Terra-Green promotes better turf growth

- Loose, porous soil structure created by Terra-Green increases air intake and circulation – speeds up release of plant gases.
- Non-compacting, nondecomposing granules keep soil loose, speed up water intake and

drainage, balance water retention. 3. Roots spread more easily to reach water and nutrient and to strengthen plant support.

 Terra-Green's unique internal structure helps nature's plant-soil chemistry.

Pounds of TERRA GREEN required per 1000 sq. ft.			TERRA-GREEN required to cover 1000 square feet to a given depth		Conversion Table			
Depth of Mix	TER	RA-GF Part 25%	35%	Depth TERRA- GREEN	Pounds of TERRA GREEN	Pounds	50 lb. Bag	Cubic Feet
2"	850	1400	2000	1/8"	350	50	1	1.5
3"	1250	2100	3000	1/4"	700	100	2	3
4"	1650	2800	4000	1/2"	1400	500	10	15
5"	2100	3500	5000	3/4"	2100	1000	20	30
6"	2500	4200	6000	4.4	2800	2000	40	60
8**	3300	5600	8000	2"	5600	5000	100	150

WHAT IS TERRA-GREEN?

It's a montmorillonite mineral. It's sterile, has a neutral pH and is completely inert. Its remarkable porosity soaks up water, creates maximum drainage in any soils. With Terra-Green, soils won't pack down, so turfs stay porous – remain moist even in hot weather. It retards fungus and algae. It encourages nutrient transfer and delivers more oxygen to the root zone to promote deep, healthy root growth.

HOW TERRA-GREEN WORKS

The small granules of pure, inorganic mineral rapidly absorb and store water in thousands of little pores and capillaries and hold it in suspension in surface crevices for gradual release to thirsty roots. Kiln processing super hardens the granules for permanent stability and long-term effectiveness in the soil. Because the granules are chemically neutral and inert, they are completely safe to handle and apply.

HOW TO APPLY TERRA-GREEN

After Aerifying: Rake or drag one 50-lb bag per 200 sq. ft. into aerified holes.

Without Aerifying: Spread one 50 lb. bag per 500 sq. ft. to level depressions, dilute thatch, increase drainage. May also be used with sand and soil mixes.

New Construction: Use as 15 to 35 per cent component of top-soil layer. See table at left.

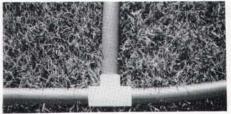


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ROOKIES PRODUCT UPDATE

COLORED POLYETHYLENE PIPE



Distinguished by its blue color, True Blue polyethylene pipe combines schedule 40 PVC fittings with polyethylene pipe through a simple solvent weld process. It is designed to improve poly pipe flow characteristics, expedite installation, and reduce labor and material costs.

The pipe is available in 100- to 400-foot lengths, in 1/2-, 3/4-, one-, 1-1/4-, 1-1/2-, and two-inch sizes.

GreenGraphics®

P.E. SALES Circle 195 on Postage Free Card

RETRACTING **IRRIGATION REELS**



Available in one-, 1-1/4-, 1-1/2, and twoinch hose diameters, Orma leader reels use high-efficiency turbines to operate with no water loss and minimal pressure loss.

A low working pressure of four psi and automatic water shutoff enables the reels to be used on almost any job site. The products' heavy construction makes them ideal for commercial applications.

AR ASSOCIATES, INC. Circle 186 on Postage Free Card

SELF-PROPELLED STRIPER



The TMS-4 self-propelled striping machine has a simple friction drive system. Powered by an eight-hp air-cooled engine and a 13.2 cfm twin-cylinder cast iron compressor, the unit can spray a single one- or two-inch wide line or two six-inch parallel lines simultaneously.

An hand gun can be added for spraying curbs, stencils, poles, etc. A reflective bead dispenser and gun purge system are also available.

NEWSTRIPE, INC. Circle 199 on Postage Free Card

BLOWER

The Salsco 300-Series line of walk-behind blowers have balanced impellers and provide both side and forward air streams. Certain models are also equipped with a debris intake for removing remaining debris.

Constructed of heavy-duty steel, the units are durable and finely balanced for smooth operation.

SALSCO, INC.

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GREEN Permanent Turf Colorant

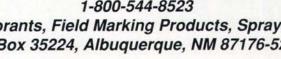
This unique water-based, concentrated color satin coating is intended to provide realistic green coloration in the event of drought, distress or winter dormancy. For golf greens, tees and fairways; sod farms; public yards; sports fields; courtyards and patios in public buildings; and residential lawns.

GreenGraphics® Green is a permanent turf colorant that will last all season, providing exceptional color retention, even in high traffic areas.

Jim Wellborn-GreenGraphics Company 1-800-544-8523 Colorants, Field Marking Products, Sprayers PO Box 35224, Albuquerque, NM 87176-5224

GreenGraphics Company and our network of distributors will show you how to get the most from your turf managment program when you make GreenGraphics® Green part of your game plan. We also can provide you with a variety of products that can be used to apply

GreenGraphics® Green which will make the job easier and more satisfying. By the way, we hope you can take a compliment because you're sure to get plenty. You might even be tempted to share your little GREEN secret! Naaaa.



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