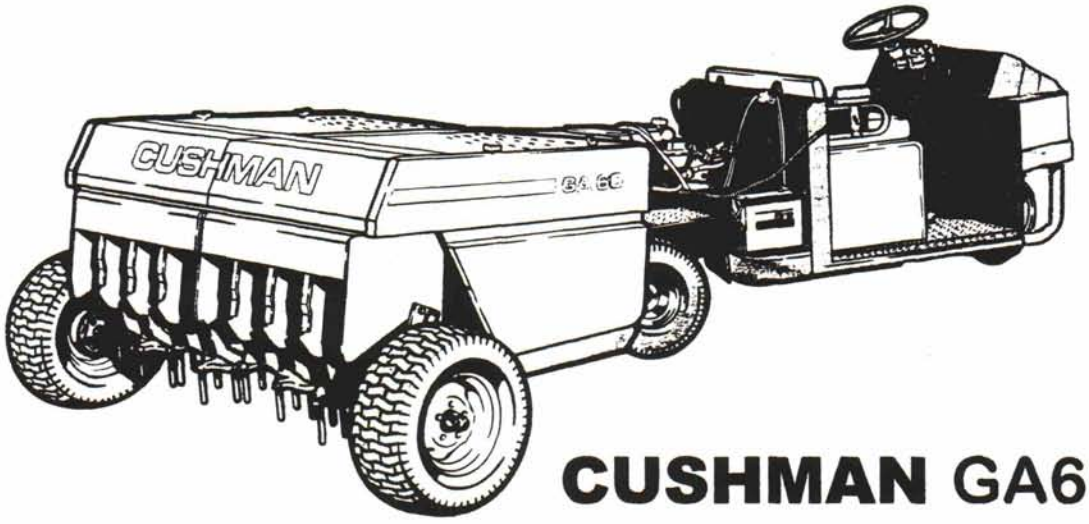
The whole course aerator ...



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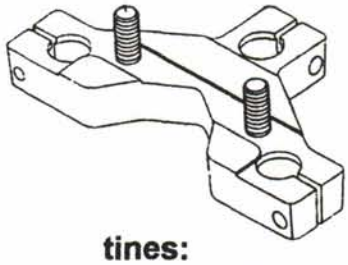
Full 60-inch aerator with eight timed and balanced aerating heads for greens-caliber aeration, governed rotation speed for maximum productivity with minimum plant/soil disturbance. Truckster or tractor drawbar. 2-Year Warranty.

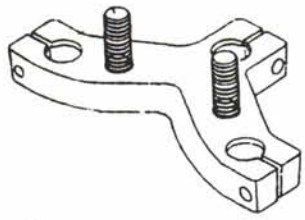
The GA60 now comes standard with three sets of holders

FAIRWAY



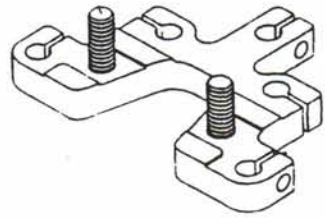
tines:
3/4" open*
5/8" solid

GREENS AND TEES



tines:
5/8" coring tine*
1/2" core
3/8" core
1/2" solid

QUAD TINES



tines:
1/4" solid*
1/4" hollow

*denotes standard tine set

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Greg Johnson –N– Eagle Brook Country Club

John Meyer
Cannon Turf Supply

Last time I wrote a Super -N- Site Profile, it was for the College Golf Championship at Bryn Mawr last October. It is hard to believe yet another year has slipped us by. This year's tournament is slated for Monday, October 6, at the beautiful Eagle Brook Country Club.

Greg Johnson, graduate of the University of Wisconsin-River Falls, is our host. As in the past, the event will be a two-man scramble with a minimum two-team entry. Hopefully, the "home-field" advantage will benefit our host's team, of which I am a part of. I know a certain team out of Wisconsin fared pretty well this past January with a "home-field" advantage. Maybe Greg's team will do as well as his favorite football team.

Following his father's lead, Greg grew up a die-hard Packer fan in Richmond, Illinois. After graduating from River Falls in Scientific Land Management, Johnson moved to San Diego, California, to become a superintendent. Johnson spent eight years in Southern California before moving back to his roots and the green and gold. That was 1987, the year Golf Club of Illinois (GCI) was built.

Greg started at the Dick Nugent–designed course shortly after it opened and stayed there through numerous ownership changes. The most recent change at GCI was when Southwest Golf purchased the property. Greg's responsibility changed as Southwest purchased additional properties in the Chicagoland area. In the summer of '95, Greg was named regional superintendent for Southwest Golf in the Midwest. Greg oversaw GCI, Blackhawk Golf Course and Eagle Brook Country Club.

EAGLE BROOK COUNTRY CLUB

Greg, Cathy and Alex.

In the past two months, American Golf Country Club purchased Eagle Brook from Southwest Golf. Greg has been named superintendent with Tod Hopphan as his assistant. With the recent acquisition, plans are in motion to make a couple of changes around the course, enlarging the driving range tee complex and improving the chipping and practice green areas, to name a few. Additional irrigation and other instrumental changes are being looked at to improve the course.

For the championship, the 18th hole will prove to be the most difficult. The par 4, 448-

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Are You Walking on Water?
(continued from page 10)

and it can take a few months or more for chemical residues to become inert. Ken doesn't utilize any form of aeration either, which may also be an advantage in this case because the bacteria utilized are facultative anaerobic bacteria, which again, according to the manufacturer, perform better in the absence of oxygen.

Continuing along the lines of the absence of oxygen, what would an expert column be without helpful advice of Dr. Randy Kane and, coincidentally, Paul Vermeulen during a recent USGA visit. Each mentioned simply floating hay bales in a pond as a method of algae control. According to both of these respected experts, the slow decomposition of the hay may be depleting the oxygen content of the pond and, since algae is an oxygen consumer, reduces algae growth. No superintendent that I contacted had tried this technique.

We own 14 floating fountains from 4 different manufacturers, all of which provide excellent revenue to the electric company and are very pleasing to the eyes of golfers and homeowners alike.

One superintendent who does utilize aeration is Pete Leiponis at Old Oak C.C. Pete has a simple plan of attack. He dredged his irrigation pond to at least twenty-four feet deep, stocked a few grass carp, installed a 1-1/2 h.p. vacuum pump, and attached poly tubing and a domed diaphragm aerator stone like those utilized in the wastewater industry. He operates the pump all year long, 24 hours a day. According to Pete, he has no algae problems except a little bit of duck weed when it gets very hot.

As for what we have done and are currently are doing at Crystal Tree to save stationery and photographic paper and lower telephone bills, I'll offer the following marginally expert information. We own 14 floating fountains from 4 different manufacturers, all of which provide excellent revenue to the electric company and are very pleasing to the eyes of golfers and homeowners alike. The aerators are operated twelve to fourteen

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Toughening Up Turf Through Fall Feeding

Joseph Slater
Plant Marvel Laboratories, Inc.

Fall is the time of year when we want to toughen up our turf before it goes dormant. Properly prepared turf will stay greener longer in the fall, withstand the stresses of cold temperatures and drying winds better through winter dormancy, and green up earlier in the spring. The object of fall fertility is to build up and strengthen the turf while keeping any tender new growth to a minimum. The ratio of N to P and K can almost be reversed from the turf's needs in spring and summer.

High potash fertilizers are a good practice and provide many rewards in strengthening the plant. Potash thickens cell walls building up the plant's resistance, consequently reducing the effectiveness of cold season pathogens. It is also responsible for a metabolic change within the cellular cytoplast allowing the plant to better withstand severe cold temperatures. Once potash has entered the plant, it aids in the production of a powerful carbohydrate reserve. This reserve will help in the healing and repair of damaged tissue as well as help the plant get an earlier start next spring.

Unfortunately, there are many obstacles that stand in our way preventing us from providing these benefits to our turfgrass. Decreasing soil temperatures become a major roadblock for the plant's potassium utilization. Microbial activity is slowed causing decreased conversion of organics and coated inorganics into usable forms. This loss in soil temperature also decreases the percentage of diffusion movement in and around the soil particles. So even if the potassium were in a usable form, its ability to get to the plant is restricted.

Nitrogen also plays a role in potassium uptake. Although we want to avoid nitrogen fertilization, we need some nitrate nitrogen to increase potassium uptake by the plant. Ammonium base N or ammoniacal N tends to depress potash accumulation, whereas nitrate N will increase the plant's ability to uptake potash. When soil temperatures are low, nitrosoma and nitrobacter bacteria are slowed in the nitrification process, and the plant receives the nitrogen in the ammonium form, thus reducing potash uptake. These forms of nitrogen will be listed under total nitrogen in a fertilizer's guaranteed analysis statement. Slow release and water insoluble (WIN) forms of N will also be listed but will play little part in a fall fertilization because they generally become less available as soil temperatures decrease.

Potash thickens cell walls building up the plant's resistance, consequently reducing the effectiveness of cold season pathogens.

Phosphorus and micronutrients also play an essential role in a fall fertilization program. Phosphorus aids the plant in the movement of the starches formed by potassium into the primary energy-storing capillary, the root. At the same time, the micro nutrients assure that we avoid any deficiencies and have an overall healthy plant. The aid of these nutrients becomes more crucial in the late fall when the plant's metabolism has slowed down.

With all of this in mind, a good fall fertility program will begin while soil temperatures are still warm enough to allow soil bacteria to do their job. As cooler temperatures arrive, it becomes increasingly more important to select a fertilizer that has a 1:2:3 ratio of NPK with a high percentage of the nitrogen in the nitrate form. In addition, if the fertilizer nutrients are in liquid form when applied, they will be assimilated by the plant immediately without dependence on soil microbial activity. There are not a lot of products that have the ability to overcome all of the obstacles and still provide us with all these great results, but using a water soluble fertilizer in this proper ratio has proven to be a good way to avoid nutrient tie-ups and increase potassium utilization. Water solubles are also compatible with most fungicides

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Late Season Nitrogen Fertilization

John Street, Ph.D.
Ohio State University

It has been pointed out that heavy nitrogen fertilization during the spring and summer is undesirable for cool-season turfgrasses. Nitrogen fertilization has proven beneficial during the late fall (late season) on cool-season turfgrasses (Powell, Blazer and Schmidt). Decreased disease, improved stress tolerance, and increased rhizome and root growth are among several of the claimed advantages to the "late-season" nitrogen fertilization program. The late-season program is based on differences in optimum temperatures that exist between (1) root-rhizome growth versus shoot growth and (2) photosynthesis versus respiration.

Shoot and root growth of cool-season turfgrasses occur most readily in the temperature ranges of 60°-75°F and 50°-65°F, respectively. Root growth of cool-season grasses will continue at soil temperatures close to freezing (Koski, 1983). Shoot growth will cease at higher temperatures than those for root growth. Late-season nitrogen fertilization capitalizes on this differential. Under late-season fertilization, nitrogen applications should be made when vertical shoot growth has stopped, but the turf leaves are still green to produce carbohydrates via photosynthesis. Air temperatures of 45°-50°F are usually necessary for vertical shoot growth stoppage. *It is important to understand that since temperatures will be at a point causing stoppage of topgrowth, roots, rhizomes and stolons will captialize on any applied nitrogen.* The carbohydrate produced will be more efficiently used of root, rhizome and stolon growth during the late fall and winter periods. It is critical that the nitrogen be applied prior to dormancy for maximum efficiency of applied nitrogen. Once the tissue has turned brown, photosynthesis will no longer occur. "Late-season" fertilization is not dormant fertilization.

It is important to understand that since temperatures will be at a point causing stoppage of topgrowth, roots, rhizomes and stolons will captialize on any applied nitrogen.

During late fall, photosynthesis is higher than respiration for cool-season grasses. With green tissue, photosynthesis will occur readily at low temperatures. This high net photosynthesis during late season leads to maximum carbohydrate production and carbohydrate storage for reserves. The positive carbohydrate balance favors root and rhizome growth over topgrowth since air temperatures are well

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The View From M.S.U.: Late Fall Fertilization Philosophies

P.E. Rieke
Crop and Soil Sciences
Michigan State University

In the late fall, there are still many projects which require the time and attention of turf managers. Many of the turf management practices done during late fall have a major impact on turf quality the following spring. Fertilization is one of the most important.

Phosphate and Potash

In the opinion of a few agronomists, the key nutrients in fall fertilization are phosphorus and potassium, but most agronomist acknowledge that nitrogen management is the most important. Of course, if P is recommended (based on soil tests), this should be applied as needed. Because K is so important in stress tolerance, application of some K in both fall and late fall programs should be considered. On sandy soils, some late fall K should be a regular part of the program. Potassium is easily leached from sands, so regular applications are needed and should be made in the fall and late fall, as well as throughout the year.

To be confident there is adequate potash in the soil, use a soil test for medium- and fine-textured soils. If tests suggest potash is needed, appropriate rates should be applied based on recommendations and common sense. Remember that recommendations for P_2O_5 and K_2O given in soil test reports are for the amount needed for an entire year. In fall and late fall, apply reasonable amounts to achieve the total needed over the year.

When late fall N fertilization is practiced, some potash should normally also be applied along with the nitrogen. Without benefit of soil test recommendations on finer-textured soils, apply potash at about half the rate of nitrogen. On sands without soil tests, use nearly as much potash as nitrogen in late fall applications.

Timing of Late Fall Nitrogen Applications

For cool-season grasses, both fall and late fall fertilization should be considered. Fall fertilization is best done during September, preferably early in the month. With the weather changes in late summer and early fall (shorter days, cooler nights and more regular rainfall), the turf plant tends to grow less rapidly vertically than in the spring. More lateral growth results in improvement in turf density after the rigors of summer. Fertilization in the fall deserves top priority. More of the carbohydrates manufactured by photosynthesis at this time of year will be stored, building up the plant for next year.

Normally it is best to withhold nitrogen applications during October to permit the turf to "harden off." If not applied earlier, low rates of N (1/2 lb. N/1000 sq. ft. or less) can be applied as needed to hold reasonable color and density. This can help improve turf density and permits the turf to accumulate carbohydrates. Heavier rates of N in early October should normally not be used as this could cause the grass to become very succulent. Should a high rate of N be applied in late September or early October under excellent growing conditions (warm and rainy) followed by a hard freeze, the grass leaf tips

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