Figure 2: Prior to renovation with Sahara bermudagrass, Carlos Benavides' turf consisted of a hodgepodge of various cool- and warm-season grasses on a very rough surface. Courtesy: Seeds West.

hand-held spreaders at a rate of 2 lbs. per 1000 sq.ft. They raked the soil in two directions to ensure seed-to-soil contact.

Sahara seedlings emerged seven days after seeding. The grounds crew waited two more weeks to mow the young grass for the first time. Only 41 days after seeding, the new turf faced its first soccer tournament.

The Sahara variety held up quite well. The turf was rolled after the tournament, and as figure three demonstrates, Mr. Benavides was very happy with its performance.

New and improved varieties

The commercial acceptance of Sahara and similar varieties changed the turfgrass industry's view of seeded bermudagrass. Today, due to its density and durability, many turfgrass professionals promote bermudagrass as an ideal base for all kinds of sports turf. Worldwide usage of bermudagrass seed for turf has grown an estimated 40 percent since 1990.

Interest in establishing bermudagrass turf from seed and acceptance of varieties like NuMex Sahara fueled a demand for the development of more seeded varieties. Turf professionals wanted continued improvement of turf density and overall quality, starting at the level of the seed.

In 1994, a new group of improved turf-type seeded bermudagrasses met these demands. New varieties, such as Sultan and Yuma, featured significant improvements over Common bermudagrass, but also provided increased turf density and improved overall turf quality over NuMex Sahara.

Figure 3: Only 41 days after seeding, the new turf faced its first soccer tournament. Mr. Benavides was very happy with its performance. Courtesy: Seeds West.

Current trends

The use of bermudagrass for general purpose and sports turf applications continues to increase. The new denser seeded bermudagrasses are earning respect for improved characteristics on golf course fairways and sports fields around the world.

In less than 10 years, seeded turf-type bermudagrass has experienced tremendous advances. Over 15 varieties of seeded turf-type bermudagrass are currently commercially available. Turf professionals now have a range of options when choosing certified seeded bermudagrasses and certified seeded bermudagrass blends for their projects.

What does the future hold for seeded bermudagrass varieties? Turf professionals continue to seek varieties that possess greater turf density and improved overall turf quality, while retaining greater similarity to vegetative bermudagrasses. New varieties of the next century will also attempt to improve cold tolerance for transition zone and shaded area usage.

It may not be possible to predict exactly what the seeded bermudagrass of the future will look like, but one thing is certain: bermudagrass from seed isn't just common anymore. ❑

Brenda Dossey is an Agronomist and serves as Vice President of Sales for Seeds West, Inc., Yuma, Arizona.

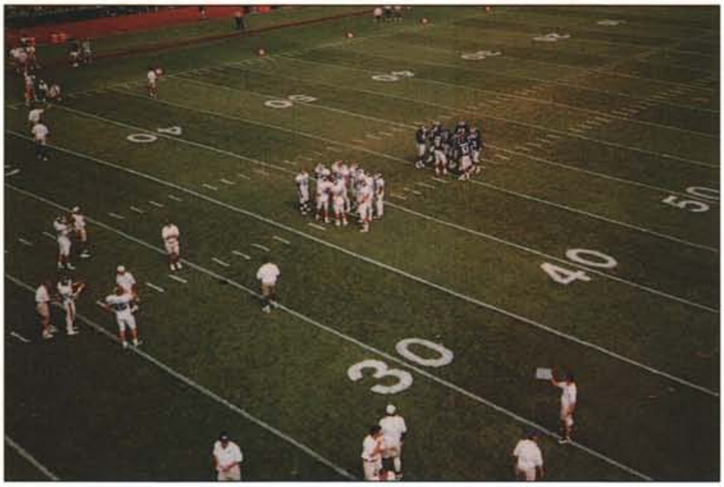
Drowned by Bertha, the University at Albany's Athletic Fields Rise to a Giant Challenge

by Dennis Smith

"The Giants are coming!" This was the official announcement at the March '96 news conference held by New York State Governor George Pataki, Albany Mayor Gerald Jennings, and University at Albany President Karen Hitchcock. After several months of reviewing potential sites, the New York Giants football team named the university as the summer home for their training camp for the following two years.

The "easy" part was done. Now, as agreed by the university, state and city officials, and local business sponsors, the existing football, soccer and practice fields had to be upgraded to accommodate nearly 160 New York Giant players, coaches and support staff for their four week stay in July and August.

In the end, three months of constant effort would completely rehabilitate most of the fields. This mammoth task would include the re-sodding of more than a quarter-million square feet, and would require more than six thousand hours of manual labor. The improvements would be another step forward for the University at Albany, which had been upgraded to a Division II sports program in 1995.



The Giants scrimmage on their new practice field at the University at Albany during training camp, 1996. Courtesy: Toro.

At the start of May, just two months before training camp was set to begin, Giants Athletic Field Coordinator (and former University at Albany Assistant Director of Facilities) Karl Scharl started looking to update the University's equipment to prepare for the event. "We were facing some serious work ahead, and needed to make sure we had the proper equipment to get the job done right," explained Scharl.

The first task involved the main football and soccer fields. These were the only fields that did not require total rehabilitation. Time constraints prohibited the installation of a new irrigation system, so the maintenance team set out to upgrade the existing equipment. The team installed a versatile rotor that allowed insert nozzles of 5-24 gpm. They went on to aerate the field in three directions using a 42-in., three-point tractor-driven aerator with 3/4-in. slotted tines. The team proceeded to break up the dried plugs with a heavy-duty drag mat.

The crew overseeded the field with a triplex ryegrass mixture. They spread the mix in two directions with a slit seeder at a rate of 7 lbs. per 1,000 sq.ft. The team then fertilized with a slow-release starter fertilizer, using 1 lb. of Nitrogen per 1,000 sq.ft.

A topdressing mixture of 90 percent sand and 10 percent sedge peat completed the operation. The team applied the mix at a heavy rate, as the Giants were set to arrive in only eight weeks.

In mid-May, KSM Athletic Field Services was given the job of improving the fields. John Liburdi, head groundskeeper at Heritage Park Sports Facility in Albany, headed the team. Local athletic field expert, Brian Wimble, joined as head groundskeeper to fill out the very experienced group.

The grounds crew overseeded the fields with a triplex ryegrass mixture to prepare for the Giants. Courtesy: Toro.

"We knew we would need a total of five practice fields, including the main football field," said Liburdi. "So we decided to re-sod four fields, and use the main football and soccer fields for practices only if the new fields were not ready in time."

"The existing turf had to go," added Wimble. "It had 80-90 percent weed content, which we needed to destroy." A local company came in to roto-till the existing sod. They also supplied 270,000 sq.ft. of a new combination bluegrass blend mineral sod to complete the job.

Before sodding began, Liburdi and Wimble discovered a significant drainage problem in the fields. "The existing irrigation system was more than 20 years old and had leaking mains," explained Liburdi. "We began a drainage project around the perimeter of the four fields using 8,000 ft. of 6-in. drainage material." The lateral drainage lines were installed on 20-ft. centers, and trenches were back-filled with appropriate filter sand.

The team tested the drainage sys-

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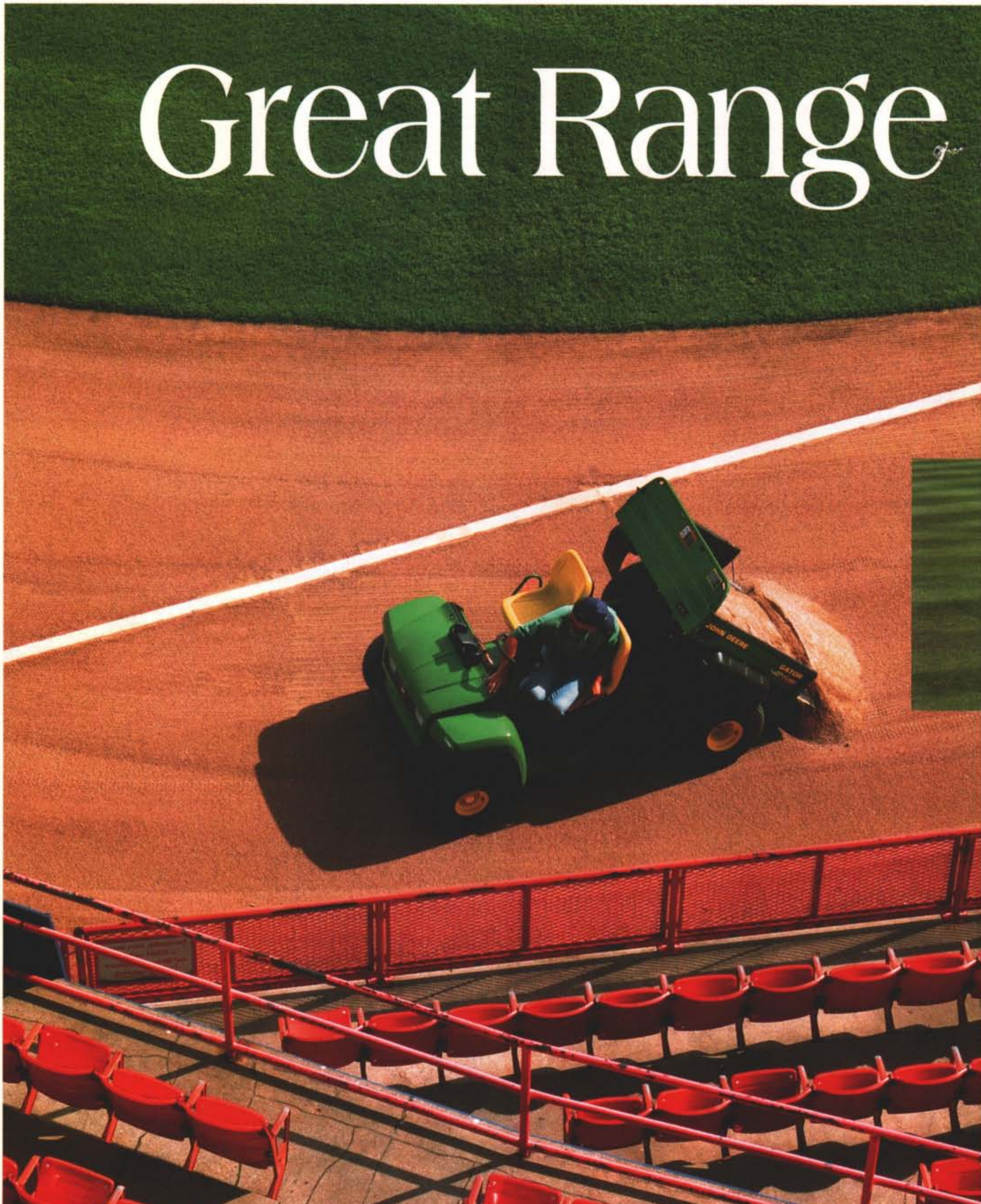
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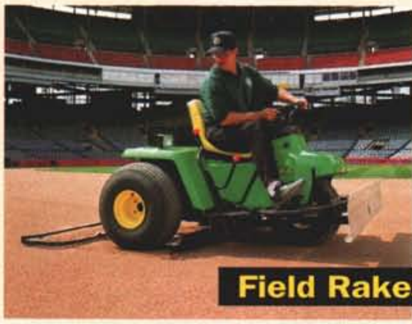

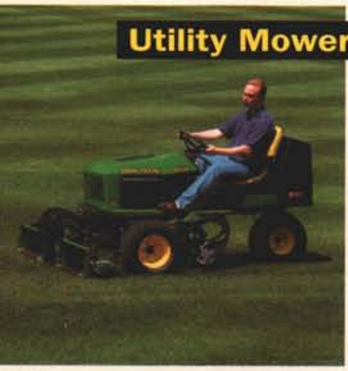

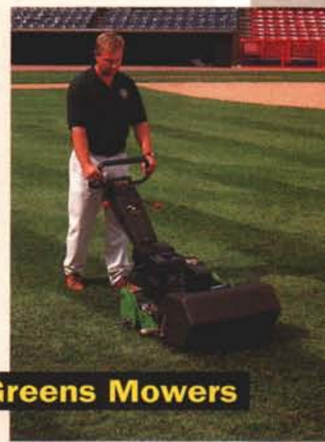

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tem early, and it worked very well. "Almost to the day we began laying the sod, mother nature really became uncooperative," recalled Liburdi. Nearly 50 inches of rain fell between May and mid-July that year.

"To make matters worse, what remained of Hurricane Bertha came along on July 6. It dumped 5-1/4 inches on us in about four hours, but the fields were playable about five days later," said Liburdi.

In most soil conditions, laying sod would have been nearly impossible with so much rainfall. Fortunately, the campus was built on the former Albany Country Club, and it was blessed with a sandy soil and a thick layer of organic matter.

Supervised by Wimble and Liburdi, a crew of 17 laid sod from 5:00 a.m. to 10:00 p.m. for 21 consecutive days. After treating the fields with a biostimulant, they cut the 4-ft. wide, 60-ft. long sod rolls at a depth of 1/2-3/4 inches.

The team rolled out 270,000 feet of sod, four feet at a time. Courtesy: Toro.

Because conditions were so wet, Liburdi employed a helicopter for a half-day in an attempt to dry the soil. For four hours, the helicopter created a downdraft over extremely wet spots to dry them enough to be sodded.

As the crew rolled out the sod, they significantly reduced rutting in the saturated ground by renting a tractor with large balloon tires. Once it was laid, they smoothed the turf by tractoring one-ton rollers in five directions.

A deep-tine aeration helped the new turf drain, and aided the new roots in penetrating the soil profile. Additionally, since aeration was practically non-existent in the university's program, the deep-tine aeration assisted the existing core aeration in opening the fields.

Again, the team applied a light topdressing with 90 percent sand and 10

After two months of intense preparation, the fields were ready to host the Giants. Courtesy: Toro.

percent sedge peat. They followed by broadcast overseeding the fields with a triplex ryegrass mixture. As the sod began to establish, a slow release fertilizer enriched the soil at the rate of 1 lb. of Nitrogen per 1,000 sq.ft. Finally, the crew sprayed the fields with liquid iron, with an omni-directional wetting agent, and with a microbial biostimulant to enhance color and improve rooting.

As stipulated by the Giants, all of the fields were mowed with a two-wheel drive, 72-in. wide-cut triplex reel mower with eight-blade hydraulically-driven floating cutting units. The crew maintained a grass height of 1-1/4 inches, and for the first time, they mowed the football field in a striping pattern.

When New York Giants management arrived in July, they were extremely pleased with the results, particularly in light of the adverse weather conditions the crew was forced to overcome. However, early in training, during an afternoon practice following a previous night's rain, Giants Head Coach Reeves felt the field was too soft.

"I was concerned about the safety of my players, as well as the possibility of tearing up a quality field unnecessarily," recalls Reeves. Head Groundskeeper Wimble applauded the coach's decision to move to another practice field, observing, "It was nice to see that Coach Reeves was a 'turf guy'." At a press conference on July 18, Reeves remarked that the University, state, city and local businesses "had completed a wonderful job in a relatively short period of time."

Perhaps the greatest testament to the achievement came from a person with "hands-on experience." Giants Quarterback Dave Brown remarked, "The turf provided great footing, and allowed our team to get through camp with fresh legs because it was so soft. The condition of the fields can be attributed to the people who worked on them and to their equipment."

In an effort to protect the university's investment, Scharl and Wimble developed a maintenance plan to keep the new athletic fields in quality shape. With these efforts, and with future plans to upgrade its other fields, the University at Albany continues to build a higher athletic profile. This commitment to quality paid off when the Giants agreed to use the university's fields during training camp for six more years. ❑

Dennis Smith represents CME Public Relations for the Toro Company, Minneapolis, MN.

Springtime Fertilization: Getting An Edge

by: Tony Koski, Ph.D.

In recent years, the concept of late-season fertilization has become a mainstay of most cool-season turfgrass fertilization programs. It has even become a common practice on the warm-season species in the transition zone and South. This is an agronomically sound, research-proven fertilization technique. However, we all know that good quality turf can not be sustained without some kind of early-season fertilization.

It seems some turf managers are now reluctant to fertilize in the spring because they have been preached to about the terrible havoc that springtime nitrogen applications wreak on turfgrass roots, stress tolerance, and disease resistance. Certainly, excessive springtime N use results in a disease-prone, less stress-tolerant turf that requires frequent mowing. Also, concerns about the potential for water contamination via runoff and leaching require us to more closely consider N sources, application rates, and in which situations we should (or should not) be using that fertilizer. But judicious, well-timed spring fertilization can enhance turf quality, aid in recovery from winter problems, reduce the incidence or severity of some diseases, and help to prevent weed problems via the production of a vigorous, dense turf.

Stimulate color, not growth

This is a good rule-of-thumb for the average turf that is not subjected to intensive wear. However, on a heavy use soccer field, N must be applied more frequently to stimulate the growth that promotes better wear tolerance and speeds recovery from intense foot traffic.

Common sense must be used in determining frequency and amount of fertilizer to apply. The proper amount will vary with species, desired quality level, and designated application for which the turf is used. Annual N requirements for cool- and warm-season lawns are shown in Table 1.

Most turf managers do not generally make monthly N applications. Instead, they rely on residual activity of fertilizer sources to carry them from one fertilizer application to the next. The residual activities of a number of commonly used fertilizers appear in Table 2, along with a number of other characteristics important in fertilizer source selection.

Note that those fertilizers which promote rapid greening possess short residual activity, and that the potential for fertilizer burn is higher with these quickly-available sources. On the other hand, the quickly-available N sources are less affected by temperature (more of an advantage later in the season), and are less expensive on a per-pound-of-N basis.

The slowly-available N fertilizers provide more even feeding and longer residual activity than do fertilizers like urea or ammonium sulfate. However, some of the slowly-available fertilizers may provide a slow (yes, even disappointing) initial greening effect, especially under cool, dry spring conditions. This tendency for slow initial response can be offset by applying high rates (1.5 to 2 lbs. of actual N per 1000 sq.ft.) of the slowly-available source, as is often done with straight ureaform and the natural organics.

This is one of those rare instances when more than 1 lb. of N per 1000 sq.ft. can be safely applied. Unless you wish to adhere to a strictly natural organic program, it is wisest and easiest (and usually least expensive) to apply a blend of quickly- and slowly-available N sources in the early season.

Use N to fight diseases

We have long known that over- or underfertilization, especially in the spring, can result in turfgrass disease problems (Table 3). For example, red thread can be a problem during moist, cool springs on fine fescues and perennial ryes if they are underfertilized and not growing at a satisfactory rate. On the other hand, diseases like striped smut can become severe if susceptible Kentucky bluegrass cultivars are fertilized excessively during the spring.

Research at Cornell University and other universities is now showing that nitrogen sources may play an important role in the suppression of certain diseases. Although much work must still be done, it appears that natural organic fertilizers and composts, when used as turf fertilizers, can sometimes reduce the incidence or severity of diseases like brown patch, necrotic ring spot, red thread, dollar spot, and pythium root rot. Still, the use of these materials should not be considered a cure-all. The relative success of their use can vary with fertilizer and location.

It appears that base material, production/composting process, disease pressure, and the environment into which these fertilizers and composts are introduced all influence the degree of disease suppression. It is also well-known that the acidifying effect of ammonium-based fertilizers can help reduce the severity of take-all patch on bentgrass and spring dead spot on bermudagrass over time. It should be emphasized that the simple use of a fertilizer will not in-itself counteract the negative effects of poor soil preparation and improper cultural practices which may predispose turf to disease problems.

Table 1: Seasonal N requirements (lbs. N/1000 sq.ft.)

	Desired Quality Management	
Cool-Season Species	**Lower**	**Higher**
Bentgrass	1 to 3*	3 to 8
Fine Fescues	0.5 to 2	2 to 4
Common Kentucky bluegrass	1 to 2	2 to 4
Improved Kentucky bluegrass	1.5 to 3	3 to 6
Perennial ryegrass	2 to 4	4 to 6
Tall fescue	1 to 2	3 to 5
Wheatgrass	0 to 2	2 to 4
Warm-Season Species		
Bahiagrass	0 to 1	2 to 4
Bermudagrass	1 to 4	3 to 8
Buffalograss/Blue grama	0 to 1	2 to 3
Carpetgrass	1.5 to 3	4 to 6
Centipedegrass	0 to 1	2 to 4
St. Augustinegrass	2 to 4	5 to 7
Zoysiagrass	2 to 4	5 to 7

*Lower rates are for shorter growing seasons and/or on heavy soils. Higher rates are used when growing season is longer, soils are sandy, precipitation rates are high, and clippings are routinely removed.

Fertilize with grass clippings

Grass clippings continue to be shown as legitimate and important nutrient sources when returned to turf areas. Research here at Colorado State University and elsewhere has shown that the quality, color, and density of cool-season turf species are noticeably greater when clippings are regularly returned to the lawn. In addition, the severity of rust and red thread may be dramatically reduced on ryegrass and bluegrass lawns where clippings are returned.

Local and state laws increasingly encourage recycling of clippings. It is generally conceded that the return of grass clippings does not contribute significantly to thatch accumulation, but that the organic matter returned is rapidly converted to a form which is beneficial to turfgrass systems.

Be a responsible fertilizer user

While most available research indicates that careful fertilizer use presents negligible risk to most ground and surface water sources, any fertilizer application has the potential to cause contamination via the processes of surface runoff or leaching. Use of water-soluble fertilizers on sandy soils where precipitation (or irrigation rates) are

Table 2: Characteristics of N fertilizers

Fertilizer Name	Analysis	Source of Nitrogen	Moisture Dependence	Low Temp. Response	Residual N Activity	Salt Index (per N)	Leaching Potential
Quickly-Available N Ferilizers							
Ammonium nitrate	33-00-0	ammonium nitrate	minimal	rapid	04-06 weeks	3.2	high
Ammonium sulfate	21-00-0	ammonium sulfate	minimal	rapid	04-06 weeks	3.3	high
Ammonium phospate	18-46-0	diammonium phosphate	minimal	rapid	04-06 weeks	1.6	high
Urea	46-00-0	urea	minimal	rapid	04-06 weeks	1.6	moderate
Slowly-Available Fertilizers							
Slow-Release Sources							
Sulfur-coated urea	22-38%	urea	moderate	mod.	10-15 weeks	NA	low
ONCE	24-35%	urea, nitrate, ammon.N	moderate	mod.	15-36 weeks	NA	low
Scots Poly-S	16-40%	urea, methylene urea	high	mod.	12-24 weeks	NA	low
Slowly-Soluble Sources							
IBDU	31-0-0	isobutylidine diurea	high	mod.	10-16 weeks	0.2	mod.low
Ureaform Reaciton Fertilizers							
Nitroform	38-0-0	ureaformaldehyde	high	slow	10-30 weeks+	0.3	very low
FLUF	18-0-0	urea, ureaformaldehyde	moderate	mod.	06-10 weeks	NA	low
Nutralene	40-0-0	methylene ureas	moderate	mod.	07-16 weeks	NA	low
Methylene urea	39-0-0	methylene ureas	moderate	mod.	07-09 weeks	0.7	low
Coron	28-0-0	urea, methylene ureas	minimal	mod.	07-09 weeks	NA	moderate
N-Sure	28-0-0	triazone, urea sol.	minimal	mod.	06-09 weeks	NA	moderate
Natural Organic Fertilizers							
Ringers	5-9% N	blood, bone, seed, meals	high	mod.	10-12 weeks	0.7	low
Sustane	5-2-4	composted turkey waste	high	mod.	10-12 weeks	0.7	low
Milorganite	5-6% N	activated sludge	high	slow	10-12 weeks	0.7	low

*Inclusion of products does not imply endorsement, nor does exclusion imply criticism.