Food is manufactured by a complex series of processes known as photosynthesis. Energy provided by sunlight causes carbon dioxide and water to combine and form the food source for the plant. The food is used by the plant to produce energy and build cells and tissue. Energy is required for plant growth and development. The release of energy is the result of a process known as respiration. In turf management, respiration results in growth. A balance between fuel production (photosynthesis) and fuel consumption (growth via respiration) must be maintained and is critical when developing mowing and other management strategies (see table 1).

**TABLE 1**

Factors that encourage excessive respiration
- Over-fertilizing with nitrogen
- Mowing
- Wear, insects and diseases
- Mid-summer conditions
- other versions shows Mowing, wear and disease together as the second bullet point

Factors that limit photosynthesis
- Close mowing
- Water and temperature stress
- Soil compaction

**Mowing**

The mowing schedule will be determined by many factors, including the geographic location of the field, the turfgrass species, the sports played on the field, the team schedule, staff availability, height of cut and weather conditions. At Notre Dame I would meet with coaches, study team schedules, assess the weather conditions, analyze

---

The fans never see the varied mowing techniques necessary to keep the turf healthy.
David Mellor has designed more than 1,000 striping patterns for sports fields, home and corporate lawns and golf courses. Shown is a picture of Frontier Field in Rochester, N.Y., taken in July 2000 at the Triple A All-Star game where Mellor worked with the crew to create this dazzling design.

existing turf conditions and efficiently schedule mowing into the mix. This could involve moving on weekends, early in the morning, late in the afternoon and even under the lights at night if necessary to produce the best results.

The selection of the most appropriate height of cut is influenced by each grass species' or cultivars' recommended mowing height range. This height is determined by the growth habit of the species (see table 2). The cardinal rule is to cut no more than 1/3 of the grass blade at one time, and remember, grass grows back after mowing because the growth tissue or crown is located beneath the path of the mower blade or reel. The tissue that is cut off is the oldest part of the leaf.

Anytime the grass is mowed it is injured. These injuries provide a place for disease-causing fungi and other pathogens to enter and infect the plant. Mowing with dull blades or reels will cause damage to leaf tissue, causing the wound to heal more slowly; therefore, repeated mowing with a dull blade seriously weakens the turf.

It is important to cut the grass in a different direction each time it is mowed. Turfgrass tends to grow or lean in the direction it is mowed. Repeatedly mowing in the same direction can cause it to grow horizontally creating a microclimate conducive to diseases, insects and excessive thatch accumulation. One exception, though, is grass that is intentionally mowed in one direction to prepare field striping patterns for a big game or major event.

continued on page 24
Greatest Hits

These bluegrass members of Jacklin's exclusive 5-Steps Above® program rocked in the latest NTEP trials. Each performed superbly in different climates, soil types and at 1/2" mowing heights. All excelled throughout the entire growing season. Every one exhibited exceptional texture, quality, darker green color, and uniform density. They also demonstrated an outstanding resistance to necrotic ring spot.

Regardless of which Jacklin bluegrass variety you choose (there are more than 20), know it'll be a chart-topper. Please call 800-688-SEED for the name of your nearest Jacklin distributor.
The following chart lists various grass types and the optimum height of cut for each species.

### Cool Season—

<table>
<thead>
<tr>
<th>Grass type</th>
<th>Optimum Height of Cut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky bluegrass</td>
<td>1 - 2 1/2&quot;</td>
</tr>
<tr>
<td>Annual bluegrass</td>
<td>1/4 - 1&quot;</td>
</tr>
<tr>
<td>Perennial ryegrass</td>
<td>1 - 2 1/2&quot;</td>
</tr>
<tr>
<td>Tall fescues</td>
<td>1-1/2 - 2-1/2&quot;</td>
</tr>
</tbody>
</table>

### Warm season—

<table>
<thead>
<tr>
<th>Grass type</th>
<th>Optimum Height of Cut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bermudagrass</td>
<td>down to 1/8&quot;</td>
</tr>
<tr>
<td>St. Augustine</td>
<td>down to 3/4&quot;</td>
</tr>
<tr>
<td>Zoysiagrass</td>
<td>down to 1/4&quot;</td>
</tr>
</tbody>
</table>

Cool season species grow quickly in spring and fall, but slowly in the summer. Warm season species grow best in hot weather.

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**Recommended by Perfectionists Everywhere**

The Super GradeMaster
Automatic Laser Grading System

At LaserLeveling, we realize the importance of perfection, this is why we design box scrapers specifically for the sports turf industry. The Super GradeMaster allows you to push and pull material, giving you more flexibility and control than ever before. If you're looking to take your grading to a new level, look to Laser Leveling.

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**Field Demands**

The main goal of a turfgrass manager is to give coaches, players and fans what they want—safe, playable and aesthetically pleasing fields, especially if the game will be televised. The turfgrass manager is particularly challenged when maintaining a multiple use field. Many venues are used for football and soccer in the fall and lacrosse and/or field hockey in the spring. Picnics and barbecues are common and some are used for marching band practices. Then there is the ultimate field demand, although I personally have never had to endure one—a rock concert in the middle of summer when the turfgrass is already under stress and the playing season is a month away!

**Field Aesthetics with Rotaries and Reels**

Each sport has different objectives when it comes to mowing heights and aesthetics on the field. Baseball infields are sometimes mowed shorter than the outfields and field hockey and soccer generally prefer shorter heights of cut than football, rugby or lacrosse. Baseball and soccer have led the pack with interesting field striping patterns. Striping can be accomplished with rotary or reel mowers, although reel mowers are used more often for the task. Reel mowers are equipped with a full roller behind the cutting unit to lay the grass down and provide the grain necessary for the pattern.

Rotary mowers have blades that rotate horizontally at high speeds. They lay the grass down slightly but
do not provide as much grain as reel mowers unless they are equipped with a full roller. The sharpened edges at the ends of the blades cut off leaf tissue by impact. Rotaries will cut from 3/4 to 4 inches. Reel mowers, in contrast, have blades attached to a cylinder, which is the reel. As the reel rotates, leaves are pulled against a sharp bedknife and cut off. The blade and the bedknife create a scissors-type cutting action leaving a clean cut, which heals quickly. Reels can cut from 1/8 to 2-5/8 inches although quality of cut decreases above 2 inches. Rotary and reel mowers each have qualities for specific situations.

Reel mowers provide a consistent, higher quality of cut, particularly at lower heights. The scissors cutting action is better for the health of the plant, when the reels are kept sharp. The key aspects of reel mowers are the precision cut they deliver and the excellent pattern or striping on fields.

Rotary mowers are more versatile at higher levels of cut. Some new rotary mowers have a full roller behind the deck to provide field patterns. Rotary mowers are generally less maintenance intensive than reel mowers and are highlighted for their productivity.

Striping has become more than a way to mow grass. It has become a scientific art that can enhance the big event or ball game. David Mellor, director of grounds for the Boston Red Sox (and previously assistant director of grounds for the Milwaukee Brewers) is author of Picture Perfect, Mowing Pattern Techniques for Home Lawns, Landscapes, Athletic Fields and Golf Courses soon to be published by Sleeping Bear Press/Ann Arbor Press. In his book, one of the pictures he included is of a Toro Groundsmaster 3500-D as a new rotary mower that can be used for striping.

The great debate will continue. Some turfgrass managers will only use reel mowers, some swear by rotary mowers and others will use a combination of both. The goal is to determine the grass type, desired height of cut and the sport played on the field to make the grass optimum for the situation. With all these things considered, you will score points with the coaches, the players and the fans.
Table 3
Bottom line considerations—criteria for the selection of the mower

Quality of cut: Always use the equipment that will give the best quality of cut required for the sport. My general rule for sports turf maintenance is: Below 2 inches a reel mower provides a better quality of cut and above 2 inches a rotary mower is generally preferred.

Height of cut: The height of cut is determined by the turfgrass species, the sport, the environmental conditions and the coaching staff.

Maintenance: It is essential to the health of the grass and to achieve the best quality of cut to keep the blade or reel sharp. Reel sharpening is a more time intensive and costly procedure than rotary blade sharpening. Reel sharpening should be done at least once each year in the North with periodic backlapping performed. Reel sharpening should be done 2-3 times a year in the North with periodic backlapping performed.

Expense: Reel mowers are typically more expensive than rotary mowers, but there are certain instances in which a rotary mower may be higher priced, however, the maintenance on a reel mower is more expensive.

Find Out How TifSport's Superior Sod Strength Provides Improved Playing Conditions & Reduced Divot Injuries On Athletic Fields

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THE NEW CERTIFIED BERMUDAGRASS STANDARD FOR ATHLETIC FIELDS, GOLF COURSES & HOME LAWNS

Circle 122 on Inquiry Card
Who took the worst pounding?
The Tigers? The Bears?
Your turf?

Playing fields that take a bruising can tolerate stress better and recover faster when they’re treated regularly with Launch® or Focus® biostimulants as part of their routine field care regimen.

The precise ratios of biostimulant components in our formulations are designed for quick germination, vigorous establishment and rapid recovery of healthy turf grasses.

Give your team the home field advantage. Contact your distributor or visit our website to devise your best game plan to boost turf performance with Launch and Focus biostimulants.

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Circle 123 on Inquiry Card
Find products to improve your field
Beacon Ballfields, based in Middleton, Wisc., has released their 2001 catalog to support those working to improve athletic playing fields. Products in the catalog help turf managers increase field performance and safety, lower maintenance needs and improve field appearance. The company supplies materials, equipment, education, design services and technical assistance to help make any project more successful.
Beacon Ballfields
For more information circle 150.

Mower gives operators a brake
Hustler Z Riding Mower features an integral park-brake system. When the steering levers are placed in the off position, the park brakes are engaged. This feature makes the starting and stopping sequence much more natural and instinctive. The operator does not have to remember to disengage the brake to drive nor engage the brake before starting. At 76 inches in length, it is the most compact z-rider on the market, with the lowest seat height in the industry (29 inches). The 60-inch-wide Side-Discharge Deck features high blade-tip speed, high-lift blades and six anti-scalp wheels to produce a quality finish.
Hustler Turf Equipment
For more information circle 152.

New Ditch Witch enhances productivity
Powered by a 185 horsepowerr turbocharged diesel engine, the Ditch Witch JT 4020 Mach 1 horizontal directional drilling system develops 40,000 lbs. Of pullback, 5,000 foot lbs. Spindle torque and spindle speeds to 250 rpm. It has the power and fluid capacity to accommodate a mud motor. New features include Mach 1 electronics, automated cruise control, four-point anchoring, improved pipe loading, heavy-duty vise wrenches and an improved automatic pipe lubrication system.
Ditch Witch
For more information circle 153.

Environmentally-friendly trimmer
RedMax BCZ2500S Clean Air Trimmer meets CARB II and EPA standards with a 25.4 cc, two-cycle Strato-Charged engine, the only engine to meet the 2,000 standards without a catalytic converter. The engine weighs 5 percent less, uses 34 percent less fuel and reduces emissions by 73 percent over previous engines. Clean air standards are met by introducing fresh air into the engine between the exhaust gases and the fresh charge of air/fuel mix. The ergonomically-engineered, commercial-grad bump-and-go trimmer car-
ries a two-year warranty.
RedMax
For more information circle 151.

A lasting legacy
With a 54-inch-wide Free Floating design, Legacy Garden Tractors deliver a smooth, manicured cut. Combined with full-width rollers, they leave a distinctive striping pattern to enhance the quality of the cut. The deck is built using rugged 10-gauge steel and heavy-duty components throughout. The 54-inch mower deck features a unique three-blade design, with the center blade smaller than the other two, that increases blade overlap which maximizes the quality of cut. The mower deck has been repositioned under the tractor to enhance its ability to trim and to better pick up and cut grass laid down by the front tires. The trim side of the mower has an integrated rubber bar welded to the deck and a protective bracket to prevent the roller bar from getting hung up on objects during tight turns.
Simplicity Mfg.
For more information circle 154.

Backhoe offers heavy-duty, efficient design
The heavy-duty tractor loader back-
hoe Allmand Contractor TLB-20 tackles many jobs typically reserved for larger TLBs, maneuvers easily in tight areas and can be towed on a trailer behind a pickup truck. The unit features a Robin EH65D air-cooled gasoline engine generating 20.5 horsepower at 3,600 rpm. An optional Kohler 20-horsepower air-cooled engine is available. The unit's gross overall weight is 3,100 lbs. The backhoe offers a 2-foot flat bottom digging depth of 7 feet, 6 inches. The backhoe's dual cylinder, 150-degree hydraulic cushioned swing allows precise work in tight areas. Easy joystick controls and hydrostatic drive provide a large backhoe feel.

**Allmand Bros.**
For more information circle 155.

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**Top-adjust rotor is easy to use**

Rain Bird has introduced the 3500 Series half-inch inlet rotor, the latest addition to its top-adjust rotor line for light-commercial applications. All settings for the 3500 Series are made from the top with a flat blade screwdriver, making this rotor easy to install. Reversing full- and 40-360 degree part-circle operation in one unit makes it easy to stock. And with a specially designed filter and nozzles that are easily removable with a flat blade screwdriver, it is easy to maintain. The series also includes an attachable "nozzle tree" of six Rain Curtain nozzles complete with a built-in pull-up tool.

**Rain Bird**
For more information circle 157.

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**Mix it up**

The Earth & Turf MultiSpread 200 and 200H are now approved for spreading infield mix for baseball fields. The 15-cubic-foot-capacity unit is available in a ground drive or hydraulic drive version and makes easy work out of a previously back-breaking task.

**Earth & Turf**
For more information circle 156.

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Worksite Gator made rugged for industrial applications

Rugged and durable, the 6-by-4 diesel Worksite Gator utility vehicle is made especially for off-road reliability in worksite, rental, landscape and industrial applications. The vehicle offers the same styling options and operational features as the traditional 6-by-4 diesel Gator utility vehicle, such as mig-welded unibody design and a fully independent, single A-Arm design that stands up to the bumps and jolts of off-road work. A standard front bumper, surrounded by a front and fender brush guard, provides extra reinforcement and durability. The unit is equipped with standard heavy-duty, all-purpose tires, allowing it to conquer the rugged landscape of a worksite while treading lightly on natural terrain. With a payload capacity of 1,400 lbs. And an additional towing capacity of 1,400 lbs. The vehicle hauls heavy loads with ease.

**John Deere**
For more information circle 158.

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Tiller attachment for skid steer loaders

Model SS725 Preseeder tiller attachment for skid steer loaders give contractors the ability to turn a rough grade into a finished seedbed. The 72-inch-wide rotor tills, levels and rakes in one operation. The rotor teeth are mounted in a helical pattern for smooth operation and a uniform seedbed depth, providing a superior seedbed. The attachment can be used while driving in forward or reverse. The finished seedbed virtually eliminates all the expensive handwork. Working depth and rotor angle can be adjusted from the seat, during operation. The rotor can be hydraulically angled left, right or straight. The hydraulic motor mounts directly on the rotor, eliminating the maintenance problems of sprockets, chain and an oil bath.

**ATI Corp.**
For more information circle 159.
Motivating and Retaining Quality Employees

by Steve Keating

Want to motivate your employees? I believe that one of the most effective ways to motivate people is to fire them! Not really fire them, just fire them up.

Almost every business manager agrees that their most valuable asset is their employees. No one in a leadership position, whether they are a leader in sports, politics, a profession or business can succeed without committed, quality employees. Yet, on any given day, in the heat of the battle, it is easy to overlook that most valuable asset and just manage “stuff” or to put out the inevitable fires. We leave that most valuable asset to fend for itself and often suffer serious consequences as a result.

Safe, effective goose control is here!

FlightControl® is the only product that effectively protects your properties seven days a week, 24 hours a day. FlightControl works like a “Biological Fence”, herding geese off the areas where you don’t want them. FlightControl is odorless, weather-proof, and does the job without harming humans, vegetation or wildlife.

Get rid of the geese, get FlightControl!

Reward correct actions

A recent survey conducted by Robert Half International shows that the primary reason people leave jobs today is limited recognition. Somewhat surprisingly, this is true for all categories of workers, from the career minded individual to those just working day to day. If we are going to look for what’s right then when we find it we need to share it.

The key to goose management

Get rid of the geese, get FlightControl!

Call us: 800-468-6324 or visit: www.flightcontrol.com

Circle 124 on Inquiry Card.

30 March 2001

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